



EIR Videos Filming Schedule

Wednesday, April 19, 2023 – Canal Farms, Funks Reservoir

2 p.m. Zach Dennis
Canal Farms (Meet at SPA office first) - 122 Old Hwy 99W, Maxwell, CA 95955

20 minute travel time

4 p.m. Heather Dyer
Funks Reservoir (Meet at SPA office first) - 122 Old Hwy 99W, Maxwell, CA 95955

5 p.m. Jeff Sutton
Funks Reservoir

Thursday, April 20, 2023 – GCID

9 a.m. Ali Forsythe
GCID Canal at McDermott Road

10 a.m. Jerry Brown— Plus additional Executive Director Update (:45)
GCID Canal at McDermott Road

11:45 a.m. Thad Bettner
GCID Canal at McDermott Road

32 minute travel time

Thursday, April 20, 2023 – Mary Wells Home

1:15 p.m. JP Robinette
Mary Wells' Home

2 p.m. Anastacia Allen
Mary Wells' Home

2:30 p.m. Fritz Durst
Mary Wells' Home

Friday, April 21, 2023 – Sites Project Authority Office

9 a.m. Sites Project Authority Board Meeting
122 Old Hwy 99W, Maxwell, CA 95955
Group shots, b-roll, possible Board/RC member interviews

10 a.m. Rob Cooke
Maxwell sign across the street

1 p.m. Valerie Pryor
Maxwell sign across the street or nearby location



Name: Jerry Brown

Filming Date: Thursday, April 20, 2023

Scheduled Time: 10 a.m.

Location: GCID Canal

Filming Day-of Logistics

Please meet at the GCID Canal at McDermott Road no later than **9:45 a.m. on Thursday, April 20**. Sara Katz (619-813-9551) and Quin La Capra (201-452-7460) will serve as your on-site point of contacts.

The video team will be set up there and ready to record your portion of the video during your scheduled window. The weather forecast is expected to be between 65 and 70 degrees with possible rain showers, so please plan appropriately.

Thad Bettner will also be on site filming a separate video.

Other Video Participants – Filmed Separately

- **Fritz Durst**, Sites Project Authority Board Chair
- **Ali Forsythe**, Sites Project Authority Environmental Planning and Permitting Manager
- **Heather Dyer**, San Bernardino Valley Municipal Water District (SBVMWD) General Manager
- **Anastacia Allen**, Colusa County Agricultural Commissioner
- **Valerie Pryor**, Zone 7 Water Agency General Manager
- **Zach Dennis**, Tehama Colusa Canal Authority Chair

Sent: 4/3/2023 3:28:09 PM
To: Spranza, John [john.spranza@hdrinc.com]
Subject: FW: Sites Project - Admin Final EIR/EIS, NMFS Comment

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Stephen Maurano - NOAA Federal <stephen.maurano@noaa.gov>
Sent: Wednesday, March 22, 2023 4:49 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Amanda Cranford <amanda.cranford@noaa.gov>; Garwin Yip <garwin.yip@noaa.gov>
Subject: Re: Sites Project - Admin Final EIR/EIS, NMFS Comment

Hi Ali,

Thanks for reaching out. I did review both the master response and the table of responses to NMFS comments. Those responses do address issues made by other commentators regarding the Trinity: water rights, diverting CVP water into Sites (and resulting Trinity temperature impacts) and Reclamation's investment. I don't feel like it addressed the NMFS comment, which I'd summarize in two parts:

1. Sites exchanges with Shasta will impact Shasta Operations
2. Shasta operations affect Trinity Operations

I'd be happy to discuss more with you or your team, and really focus on which of those two points you see differently. I copied both Amanda, as the management lead for this project, and Garwin due to his familiarity with CVP operations.

Best,

- Stephen

On Wed, Mar 15, 2023 at 2:57 PM Alicia Forsythe <aforsythe@sitesproject.org> wrote:

Hi Stephen – I wanted to check with you on a comment on the Admin Final EIR/EIS received from NMFS. The comment below came in on Chapter 2. We explained this quite a bit in Master Response 8. Do you know if the commentor had been able to review Master Response 8 and if this comment still stands in light of the Master Response? If so, we'd be happy to discuss this comment in more depth. But considering this was on Chapter 2, we weren't sure if the reader was also able to review Master Response 8 and if this addressed the comment or not.

Comment:

"The project description asserts that, "The Project would not affect or result in changes in the operation of the CVP, Trinity River Division facilities (including Clear Creek)" (Page 2-79). However, Trinity River and Clear Creek operations are closely tied to Shasta operations, and the CVP/SWP in general. The EIS explicitly states that, "The proposed operation of the Project includes exchanges of water with the CVP and SWP" (Page 2-89). More specifically, in the description of surface water resources, page 5-11 it specifies that, "Sites Reservoir would operate in conjunction with the operations of Shasta Lake, and flows in the Sacramento River downstream of Shasta Lake would be affected by Sites Reservoir diversions and releases." If Sites Reservoir will effect Shasta operations, then it has the potential to improve, or exacerbate, conditions on the Trinity." - NMFS

Any insight you have would be great. We're happy to discuss this in more detail if the comment still stands.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

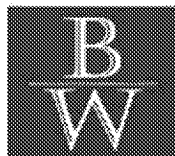
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Stephen Maurano (he/him/his)
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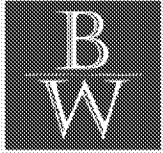


Evaluation of Proposed Water Wheeling Charges

December 30, 2019



BARTLE WELLS ASSOCIATES
INDEPENDENT PUBLIC FINANCE ADVISORS



BARTLE WELLS ASSOCIATES
INDEPENDENT PUBLIC FINANCE ADVISORS

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Berkeley, CA 94703
Tel: 510 653 3399
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Date: December 30, 2019

To: Local Agency Partners
Los Vaqueros Reservoir Expansion Project

Re: Evaluation of Proposed Water Wheeling Charges

Bartle Wells Associates is pleased to submit the attached *Evaluation of Proposed Water Wheeling Charges*. The report provides an independent review of water wheeling charges proposed to be levied on the Local Agency Partners by Contra Costa Water District (CCWD) and East Bay Municipal Utility District (EBMUD). The wheeling charges recover costs for the intake and conveyance of water through each agency's facilities and also include a charge component for water storage in the Los Vaqueros Reservoir benefiting from the existing reservoir and dam.

The water wheeling charges proposed by CCWD and EBMUD include a number of fee components designed to recover both operating and capital costs. This report provides commentary on the calculation and application of each of the various fee components and identifies some alternative approaches for consideration.

Ultimately, all the agencies involved benefit from the Los Vaqueros Reservoir Expansion Project. Ideally, the final wheeling charges should be perceived as "fair" by all parties and facilitate participation by all agencies in the expansion project

We greatly appreciate the input and assistance provided by the Local Agency Partners, CCWD and EBMUD during development of our evaluation. Please contact us anytime if you have questions about the findings presented in this report or any related issues.

Sincerely,

BARTLE WELLS ASSOCIATES

Alex Handlers
Principal/Vice-President

Erik Helgeson
Senior Consultant/Assistant Vice-President

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Appendix A - Alternative Fee Calculations for CCWD Capital Cost Recovery

Appendix B - Alternative Fee Calculations for EBMUD Capital Cost Recovery

Appendix C – The Wheeling Statute: California Water Code Sections 1810 - 1814

Appendix D - CCWD Proposed Wheeling Charges

Appendix E - EBMUD Proposed Wheeling Charges

1. Background

Introduction

Bartle Wells Associates (BWA) was retained by the Local Agency Partners (LAPs) participating in the Los Vaqueros Reservoir Expansion Project to provide an independent review of water wheeling charges proposed by Contra Costa Water District (CCWD) and East Bay Municipal Utility District (EBMUD). The proposed wheeling charges of each agency include a number of fee components that are designed to recover the capital and operating costs benefiting water wheeling.

This report provides commentary on the calculation and application of the various fee components proposed by CCWD and EBMUD. Based on our review, BWA believes that both CCWD and EMBUD made efforts to develop wheeling charges that were fair to both the LAPs and to their own ratepayers via charges that a) recognize the LAPs lower priority of use for capacity in facilities required to wheel water, when such capacity is available, and b) recover “fair compensation” on behalf of their regular ratepayers who funded and continue to pay for the operating and capital costs of infrastructure used to wheel water.

Based on our analysis, BWA believes a number of the proposed wheeling charge components are reasonable and appropriate as designed but there are some components BWA feels could be more reasonable or fair if they were derived using a different approach. Our goal was not to nit-pick the basis for the proposed charges; rather we felt it appropriate to detail our findings for each proposed rate component as a matter of providing due diligence. We recognize that in some cases, although we have identified issues and concerns regarding specific fee calculations, that the fee components themselves may be less than the potential maximum charges that could have been applied.

Ultimately, all the agencies involved -- including CCWD, EBMUD and the LAPs -- benefit from the Los Vaqueros Reservoir Expansion Project. Ideally, the final wheeling charges should be perceived as “fair” by all parties and facilitate participation by all agencies in the expansion project.

Legal Environment

California Water Code Sections 1810 – 1814

Enacted in 1996, California Water Code Sections 1810 – 1814 (aka the “Wheeling Statute”) prohibit public agencies from denying access to unused capacity in their water conveyance facilities for the transfer of water if fair compensation is paid for that use. The law aims to facilitate the conveyance of water by a) requiring public agencies to wheel water for other parties when unused capacity is available in their water facilities, but also b) entitles the owner to fair compensation for the use and operation of their facilities.



The Code does not detail any specific formula or methodology for determining “fair compensation”. As such, the public agency that owns the conveyance facilities has the ability to establish charges for water wheeling subject to the definitions provided in the Code, which include:

“Fair compensation” means the reasonable charges incurred by the owner of the conveyance system including capital, operation, maintenance, replacement costs, increased costs from any necessitated purchase of supplemental power, and including reasonable credit for any offsetting benefits for user of the conveyance system.

“Replacement costs” means the reasonable portion of costs associated with material acquisition for the correction of irreparable wear or other deterioration of conveyance facility parts that have an anticipated life that is less than the conveyance facility repayment period and which costs are attributable to the proposed use.

The Wheeling Statute also requires public agencies to “act in a reasonable manner consistent with the requirements of law to facilitate the voluntary sale, lease, or exchange of water” and denotes that the code applies to “only 70 percent of the unused capacity”.

Several key court cases have further defined the interpretation of the Wheeling Statute, particularly as it applies to water wheeling charges. These court decisions provide some additional legal guidance regarding what does, or does not, meet the definition of “fair compensation”. Of note, while the court cases do not provide clear-cut guidelines regarding the limits of “fair compensation”, the courts have recognized the monopolistic pricing power of the owner of conveyance facilities and have stepped in to help ensure the charges are reasonable.

- Metropolitan Water District (MWD) v. Imperial Irrigation District (IID), 2000
 - The court ruled that MWD could charge a fixed per acre-foot rate for wheeling water “based on the amount transported without regard to the source of the water, facilities used, or the distance the water travels” to its member agencies, which have representation on MWD’s Board.
- Central San Joaquin Water Conservation District v. Stockton East Water District, 2016
 - Central is a third party (not a member agency with Board representation) that contracted to use Stockton East’s conveyance system for water wheeling.
 - Stockton East established a charge based on Central’s proportionate share of water flow through the conveyance system, which would have recovered 38% of capital and operating costs of the conveyance system.

- The court found that it was not reasonable or permissible for a conveyance owner to simply charge a pro-rata application of costs based on the share of flow to a nonmember agency.
- The court also found that the setting of wheeling rates requires consideration of the owner's marginal or incremental costs resulting from the use, in addition to other factors detailed in the Code
- Additionally, the court found that a conveyance owner may not exploit a monopoly-type position on a nonmember but is required to set rates that both consider a) the incremental costs incurred for wheeling, and b) the cost of competitive alternatives.
- The Court also rejected Central's assertion that wheeling charges are limited to only recovering marginal or incremental costs

Proposition 26

Proposition 26 was approved by California voters in November 2010 and places limitations on fees and charges "imposed" by governmental agencies. Under Prop 26, all charges imposed by local governments are defined as a "tax" (which requires voter approval) unless the charge meets one of seven exemptions. Among those exemptions, a charge imposed for a "specific benefit" or a "specific governmental service" is not considered to be a tax provided the charge "does not exceed the reasonable costs to the local government" of conferring the benefit or providing the service.

The applicability of Proposition 26 to the proposed wheeling charges hinges on whether these charges are "imposed" and not voluntarily paid by the users. If the charges are levied for a service for which the local agency is the exclusive provider or otherwise exercises monopoly pricing power they are "imposed." If Proposition 26 does apply, then it would require that the wheeling charges levied by CCWD and EBMUD not exceed the reasonable cost of providing the service.

Regarding legal compliance, each of the LAP agencies should review the proposed charges and/or any alternatives with its own legal counsel.

Regular Customers vs. Water Wheeling Entities

It is important to recognize differences between an agency's regular ongoing ratepayers within the agency's service area and outside entities that may periodically request to wheel water through an agency's conveyance system, particularly regarding capital cost recovery.

- Regular customers pay a) a one-time capacity charge up front to "buy in" for capacity in facilities and assets that benefit the new development, and subsequently pay b) ongoing water rates that recover costs for fixed and volumetric operating expenses, debt-service when applicable, and ongoing capital improvements including repairs & replacements. Hence, an agency's ratepayers pay upfront for infrastructure capacity and subsequently contribute toward rehabilitation and

placement of those same facilities as assets reach the end of their useful lives. Regular ratepayers typically have representation on the agency's governing body and are considered to be "members" of the agency, which in turn has legal responsibility to provide water service to the customer. It is important to note that the agency designs its facilities to ensure it can provide water service to its regular customers by sizing its facilities to meet their peak demands and building redundancy into its system to ensure it can provide reliable service to its regular customers.

- Wheeling customers are users who typically have no ownership or usage rights in the conveyance system nor representation on the agency's governing body. These entities are only entitled to wheel water through another agency's system when spare capacity is available. The agency that owns the conveyance system is entitled to "fair compensation" for facilitating water wheeling, pursuant to the provisions of the Wheeling Statute. Typically, wheeling customers have a lower priority of use in the conveyance system and were not considered in the design of the conveyance systems used to wheel water.
- BWA understands that the LAPs will be executing service agreements with CCWD and EBMUD, which will provide some level of representation through a proposed Joint Powers Authority. As such, the relationship of the LAPs may ultimately be more than that of a traditional wheeling entity. Once that relationship is better defined, to the extent there are guarantees or limitations on levels of service, these service rights or limits should be accounted for in the wheeling charge calculations.

Wheeling Rate Approaches

There are three general approaches to setting wheeling rates. The general approaches are point-to-point, postage stamp and zonal pricing. The specific circumstances of a wheeling arrangement should be considered when deciding which approach to use, and in some cases, multiple approaches may be appropriate for use of different conveyance facilities.

Point-to-Point Approach

The wheeling rate is based on the specific facilities used to wheel water from the source point to the delivery point. Hence, different charges would apply depending on which facilities are used each time water is conveyed.

Postage Stamp or Average Cost Approach

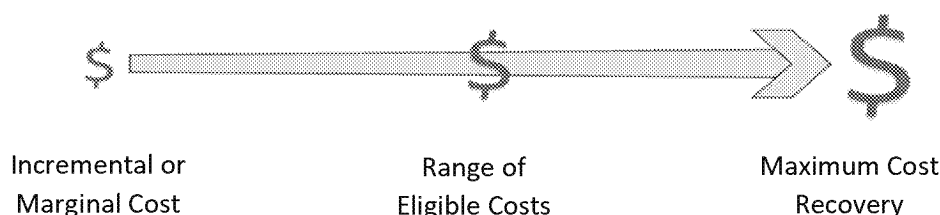
Under this approach, a uniform rate would apply for use of the conveyance system, regardless of the specific points of intake and pathways used to convey water.

Zonal Pricing Approach

With zonal pricing, wheeling charges vary by operational zone, with a uniform charge (similar to the postage stamp approach) levied within each zone regardless of the specific facilities used in the zone.

Range of Charges

BWA believes it can be helpful to view the proposed wheeling charges on a continuum from the lowest potential charges (incremental cost recovery) to the maximum allowable level of cost recovery that does not exceed the legal limitations established by the Wheeling Statute and subsequent court decisions.



Incremental/Marginal Cost Recovery

Incremental or marginal cost recovery only includes the additional costs an agency incurs wheeling water that are in excess of the agency's expenses without the wheeling. These costs would generally include a) any increase in costs for operations (e.g. electricity/pumping and additional staffing needs) needed to wheel water, as well as b) a minimal level of capital cost recovery to account for wear and tear on facilities due to wheeling. Any cost recovery in excess of incremental costs results in a financial benefit to the owner of the conveyance facilities.

Maximum Cost Recovery

Maximum cost recovery represents the highest level of charges that can reasonably be assigned for recovery from water wheeling, including an appropriate share of the agency's fixed and variable costs for operating and maintenance expenses and administration, additional incremental costs incurred due to wheeling such as increased operating costs, cost recovery for wear and tear on equipment/assets caused by wheeling, and cost recovery for use of capacity in conveyance infrastructure. A maximum cost recovery rate allocates the maximum amount of costs to wheeling and apportions those costs over the fewest units possible (i.e. the rate calculation will have the highest reasonable numerator and the smallest reasonable denominator).

While it can be difficult to pinpoint the maximum level of cost recovery legally allowable, the Wheeling Statute, court opinions, and general rate-making industry standards provide some basis for assessing if a fee or charge is "reasonable" or exceeds the notion of "fair compensation".

Wheeling Rate Methodology

Wheeling rates generally include components for both a) capital cost recovery and b) operating cost recovery. Each fee component is based on a "revenue requirement" – costs identified to be reasonably recovered by the wheeling rate – divided by "units of service" over which the costs will be apportioned. In this context the "revenue requirement" is the numerator and the "units of service" are the denominator for the fee calculation.

Capital Cost Recovery

The following are standard methodologies for determining the Annual Revenue Requirement (valuation of capital facility costs apportioned over the life of the asset, and the Units of Service (units for cost apportionment) for cost recovery of capital facilities.

Annual Revenue Requirement

- **Original Cost** – Actual cost of facility at time of acquisition divided by the useful life of the asset, otherwise known as depreciation.
- **Replacement Cost** – Replacement cost is determined by either inflating the original cost of the relevant assets into current dollars or identifying the market cost of replacement assets e.g. the current price per linear foot of pipe then divided by the useful life of the asset. Costs may be escalated by some measure of inflation such as the Engineering News-Record Construction Cost Index or the Consumer Price Index (CPI). This approach is sometimes referred to as depreciation based on a current cost basis.
- **Debt Financing Costs** – Total debt service associated with funding the facility divided by the useful life of the asset.
- **Present Value of Debt Financing Costs** – Present value of the stream of debt service payments escalated or discounted into current dollars divided by the useful life of the asset.
- **Cash Basis** – Annual or normalized annual cash expenditures on capital improvements and/or debt service. BWA believes this approach may not be reasonable for water wheeling as the capital costs incurred in a given year or period may not reflect the cost of the asset allocated over the life of the asset, and as such results in potential for wide variability and over- or under-recovering costs in a given year.
- **Utility Basis** – Under a Utility Basis, the revenue requirement typically consists of two components including a) annual depreciation based on the original cost of the asset and b) a reasonable rate of return on the “rate base”, which is often defined as net book value (original cost less accumulated depreciation) of the asset. The Utility Basis is more commonly used by private, investor-owned utilities which are entitled to a rate of return on their investment in facilities. Additionally, the Utility Basis can result in a potential “double counting” or overcollection of revenues as it recovers costs for annual depreciation plus a rate of return, which can result in charges that recover costs in excess of double the current replacement cost apportioned over life of the asset (such as when an asset is new). With a Utility Basis, the amount of cost recovery starts high and decreases every year towards zero at the end of the asset’s life.

Units of Service

- **Firm Operational Capacity** – This capacity generally represents the “reliable” operating capacity of a facility accounting for redundancy, such as when a pump is out of service.
- **Average Day or Base Design Capacity** – Average Day Design Capacity represents the underlying base capacity a facility is designed to serve on an ongoing average basis and excludes additional

capacity provided for peaking, fire flow, or other purposes. If using Average Day Capacity, it may also be appropriate to exclude cost recovery for facilities related to peaking, fire flow, and other purposes.

- **Total Capacity** – Using Total Capacity to allocate capital costs results the lowest unit charge as it is the largest possible denominator. BWA recognizes that this measure of capacity includes capacity which is not designed for regular conveyance and could result in a potential under-collection of capital costs. At the same time, it may be reasonable to use Total Capacity for capital cost allocation to the extent the wheeling customer has no control over conveyance and is only entitled to wheeling when adequate capacity is available.
- **Annual Flow** – Dividing capital costs by a measure of annual flow can result in a disproportionately high unit charge as flows are often significantly lower than facility capacity. BWA does not believe it is reasonable to use flow as a basis for capital cost recovery for wheeling charges as this denominator can result in cost recovery for capacity that is not used or needed for the actual conveyance of wheeled water.
- **Peak Flow** – BWA does not believe it is reasonable to use a measure of peak flows as a basis for allocating capital costs for wheeling rates for the following reasons:
 - Wheeled water is typically conveyed through available capacity and cannot be conveyed during periods in which an agency is using its peak capacity.
 - Wheeling is typically done at the discretion of the agency who owns the capacity. This means that the wheeling customer has no control over the magnitude of its peak use.
 - Wheeling customers are not responsible for the sizing of peak facilities. Water systems are designed to meet an agency's own projected operational needs; capacity for water wheeling is only available when an agency is operating below peak capacity.

Operating and Maintenance ("O&M") Cost Recovery

Revenue Requirement & Units of Service

- **Fixed O&M Costs** – Fixed operating and maintenance costs include annual expenses an agency incurs regardless of the volume of water conveyed such as costs for staffing and administration. At the low end of the continuum, there would be no cost recovery for fixed operating expenses as agency's typically incur minimal to no additional fixed operating costs for water wheeling since these fixed costs would be incurred without wheeling. At the high end of the continuum, fixed operating costs can be recovered in proportion to total annual flow, thus allocating a pro-rata share of fixed operating costs to water wheeling based on the volume of usage.
- **Variable O&M Costs** – These costs vary with the volume of water conveyed such as costs for electricity and pumping. As such, these costs are recovered on a per unit basis, such as by dividing the total variable operating costs by total annual flow, or by recovering costs based on actual costs incurred for each instance of water wheeling.

2. CCWD Proposed Wheeling Charges

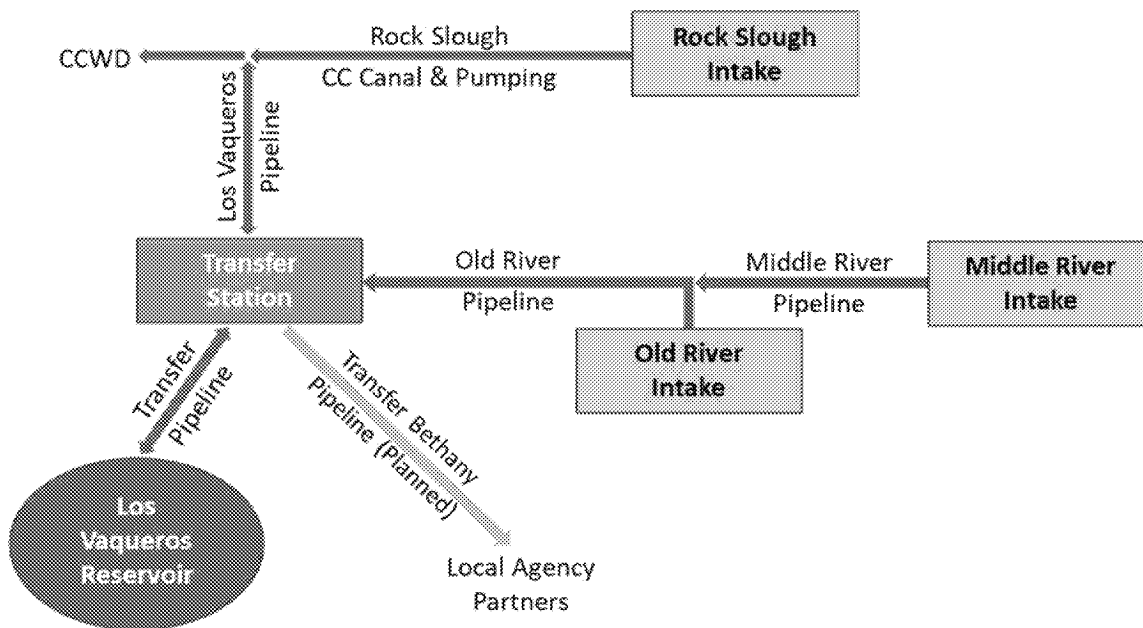
Overview

CCWD developed wheeling charges to recover the costs for the intake and conveyance of water from its three Sacramento-San Joaquin Delta intakes to the transfer station and subsequently to the Los Vaqueros Reservoir for storage and future delivery. From the transfer station the water could flow to either the Los Vaqueros Reservoir or to the LAPs via the planned Transfer Bethany pipeline, which has not yet been constructed.

While separate charges are proposed for a number of individual facilities, it is important to note that these facilities are components of three separate pathways that convey water from three intakes to the transfer station. Subsequently, water would be pumped from the transfer station to the Los Vaqueros Reservoir for use when needed.

Three Intakes/Pathways to Transfer Station

- **Rock Slough:** Facilities on this pathway include a) Rock Slough Intake & Facilities and b) Los Vaqueros Pipeline
- **Old River:** Facilities on this pathway include a) Old River Intake and b) Old River Pipeline
- **Middle River:** Facilities on this pathway include a) Middle River Intake, b) Middle River Pipeline, which then connects to the c) Old River Pipeline



Reservoir Transfer & Storage

Facilities used for the conveyance of water from Transfer Station to the Reservoir include: a) Transfer Pipeline, and b) Los Vaqueros Reservoir Storage. The Storage Capacity charge is levied annually on the volume of water stored in the Los Vaqueros Reservoir. CCWD's proposed wheeling charges include the Storage Capacity Fee to recover costs for CCWD's prior investment made in the existing Los Vaqueros Reservoir that includes land and "foundational facilities" that provide benefit to the expanded reservoir.

Proposed Wheeling Charges by Pathway

The following table summarizes water wheeling charges by CCWD conveyance pathway. Charges are shown per Acre-Foot (AF) as proposed, and are also shown per hundred cubic feet (hcf) for informational purposes.

	Wheeling Charge Component (\$/AF)					Total (\$/hcf)
	Capacity Usage	Renewal/ Replacement	Fixed O&M	Variable O&M	Total (\$/AF)	
<u>Three Intakes/Pathways to Transfer Station</u>						
Rock Slough Pathway	53.06	61.99	13.69	22.70	151.44	0.35
Old River Pathway	28.11	31.97	13.69	38.20	111.97	0.26
Middle River Pathway	44.49	42.96	13.69	46.70	147.84	0.34
<u>Reservoir Transfer & Storage</u>						
Transfer Pump & Pipeline	24.01	29.78		70.00	123.79	0.28
Storage Capacity (per year)	37.80				37.80	0.09

Since CCWD anticipates choosing the source of water supply and associated intake/pathway based on operational preferences and needs, both CCWD and the LAPs may want to consider establishing a single "weighted average" charge for the three intakes and pathways, in line with the "postage stamp" approach.

Analysis of CCWD Charge Components

The following sections summarize each of CCWD's proposed wheeling charges and provide commentary and analysis on each component. The proposed charges would only apply when water is wheeled or stored in the reservoir. As proposed, the LAPs would only be charged based on actual usage and would not be billed on an ongoing basis based on projected demand or some measure of allocated capacity.

Overall, BWA believes the charges for Fixed O&M and Variable O&M are within a reasonable range. However, we have a number of concerns regarding the reasonableness of the two capital cost recovery components including the Capacity Usage and Renewal/Replacement charges. These capital charge components were intended to recover a share of costs for both original facilities as well as renewal/replacement of those same facilities, which is similar to how regular customers of CCWD might

be charged but may not be appropriate for wheeling customers who do not own any capacity rights in the conveyance system and can only wheel water when spare capacity is available.

Our biggest concern is that these two separate charges seems to recover the costs for conveyance system capacity via two different methods. The proposed charges for Capacity Usage and Replacement are very similar in cost per AF resulting in total capital cost recovery that is close to double the replacement cost (escalated into current dollars) of each facility over the life of each facility.

BWA believes it would be reasonable to recover costs for conveyance system capacity based on either a) the replacement cost of facilities (escalated into current dollars), b) the present value of debt service payments (or conservative estimate debt service payments), or similar approach, but not via two separate approaches to recover costs for the same infrastructure capacity.

Additionally, we believe it would be more reasonable to recover costs for infrastructure capacity over the life of each facility, not over the term of an actual or hypothetical financing, which can be substantially shorter than the life of the asset.

We also question the reasonableness of use of the “utilization factor” as it is currently calculated and applied and believes additional discussion between CCWD and the LAPs would be helpful in determining a reasonable basis for allocating capital costs. In general, we question whether using a percentage of “flow” is a reasonable basis for apportioning capital costs, especially for a system built with substantial redundancy and designed to meet peak demands. BWA believes it would be more reasonable to apportion capital-related costs based on some measure of facility capacity, which need not be “total capacity” (which would result in the lowest fee) but instead can be “firm operational capacity” or “average day capacity” excluding additional capacity built to meet peak demands.

Finally, BWA suggests consideration of an alternative method for recovering costs for CCWD’s investment in the existing reservoir’s “foundational assets” that benefit the expansion project.

Conveyance Capacity Usage Fees

Purpose

Compensate CCWD for the cost of capital to finance the construction of the conveyance facilities used to wheel water. CCWD’s memo notes that this charge recognizes the depreciated value and lower priority of use.

Basis of Fee Calculation

This fee component is based on the interest-only portion of debt service in the 15th year of a hypothetical 30-year 4% loan issued in an amount equal to the original uninflated cost of each facility less grant funding. The capacity usage fees are calculated assuming a conveyance system “utilization factor” of 32%. This results in the debt service interest for each facility (described above) being divided by only 32% of the capacity of each facility to calculate a unit cost per AF. This charge component would not be adjusted for inflation in future years and would be eliminated when the facility is replaced.

Analysis

- The charge on the interest-only portion of debt service in the 15th year of a hypothetical 30-year loan was used to reflect a discounted cost for a lower priority of use and lack of ownership rights. It is reasonable to reflect the lower priority of wheeled water but this approach seems like it may be a bit arbitrary and does not seem to reflect the actual cost of the facilities. Note that the amount of interest in year 15 equates to approximately 2.7% of the original cost of the facility and also equates to about 47% (roughly half) of total annual debt service. At the same time, BWA recognizes that the charge is based on recouping a little less than half of hypothetical debt service, not the full amount, and that the charge is only paid when the conveyance system is used to wheel water.
- The charges are based on the repayment period of a hypothetical 30-year loan, not the life of the asset. BWA believes it would be more reasonable to recover costs for infrastructure capacity over the life of each facility, not over the term of an actual or hypothetical financing, which can be substantially shorter than the life of the asset.
- The text references “depreciated value” but the cost recovery used in the charge calculation is based on the non-depreciated original cost of facilities less grants. Additionally, CCWD’s charges include a separate Renewal/Replacement Fee that recover the replacement cost (in current dollars) of each facility over the life of each facility. As noted, BWA is concerned that the inclusion of both the Capacity Usage Charge and the Replacement Charge result in two methods for cost recovery for the same facilities.
- BWA questions whether the use of the 32% utilization factor is “reasonable” as it is currently calculated and applied and believes additional discussion between CCWD and the LAPs would be helpful in determining a reasonable basis for allocating capital costs. The proposed charges are calculated using an “average systemwide utilization factor” of 32% that is then applied to the specific charges for each facility.

Alternatives

- BWA recommends moving away from use of a flow-based “utilization factor” in the fee. As previously noted, BWA believes it is more reasonable to apportion capital-related costs by some reasonable measure of facility capacity, which need not be full design capacity but instead can be “firm operational capacity” or “average day design capacity” excluding additional capacity built in to meet peak demands. BWA also believes that the LAPs – who have a lower priority of use and can only wheel water when spare capacity is available – should only have to pay for capacity in facilities involved in the wheeling of water.
- BWA suggests that a single charge could replace the combined Capacity Usage and Renewal/Replacement fees. This charge can recover costs for both the replacement cost of facilities (in current dollars) as well as estimated or actual costs of financing, apportioned over the life of the asset. BWA recognizes that this would result in a lower charge than the two proposed charges combined, but also believes it would compensate CCWD in current dollars for facilities as well as financing costs associated with each facility.

Storage Capacity Usage Fees

Purpose

Recover a share of costs for the existing reservoir which serves as a foundation to the expanded reservoir capacity (e.g. property & foundational dam facilities)

Basis of Fee Calculation

This fee component is based on the interest-only portion of debt service in the 15th year of a hypothetical 30-year 4% loan issued in an amount equal to the original uninflated cost of the existing Los Vaqueros Dam Facilities (including the original 100 TAF reservoir and expansion to 160 TAF in 2012). This interest cost is divided by 160 TAF capacity of the existing reservoir. The usage fees are subsequently prorated to account for 58% of the full usage fee for the existing reservoir based on CCWD's share of total capacity in the expanded reservoir (160 TAF / 275 TAF). This results in a charge that is equivalent to simply dividing the interest cost by the full 275 TAF of expansion capacity. The storage capacity charge is a volumetric charge applied per AF that is charged in perpetuity each year water is stored in the expanded reservoir.

Analysis

- Although CCWD's investment in the existing reservoir is a prior "sunk" cost, BWA believes it is reasonable for CCWD to recover costs for property and foundational facilities that benefit the reservoir expansion project. These costs can be viewed as a component of the expansion project costs that were previously funded by CCWD. However, as these costs are not related to conveyance, the recovery of these costs likely does not fall under the purview of the wheeling statute.
- This fee component as proposed appears to be designed to recover a portion of all costs of the original facility with no adjustment for costs that may exclusively benefit CCWD's 160 TAF of capacity. If the existing and expansion facilities were built together, we assume some of the costs for CCWD's 160 TAF would be exclusively assigned to CCWD just as all the costs for the additional 115 TAF would be assigned exclusively to the LAPs, resulting in only a portion of the base reservoir facilities being treated as shared costs. With the proposed charge, the LAPs fund 100% of the costs of the expansion and also pay charges associated with 115/275 TAF, or roughly 42%, of the capacity of the existing 160 TAF reservoir which results in the LAPs contributing toward more than 42% of the capacity of the total expanded reservoir.
- BWA also believes that cost recovery for existing foundational reservoir facilities should only continue until the full amount of allocated costs are recovered. As proposed, the charge continues in perpetuity. Our understanding is that future rehabilitation and replacement costs for shared facilities would be negotiated between CCWD and the LAPs.
- A volumetric charge levied each year on water stored in the reservoir can provide some disincentive for water storage for the LAPs and could also result insufficient cost recovery to CCWD in years of minimal water storage.

- BWA recognizes that the proposed charge is based on the original cost of the facilities and could have been significantly higher if based on current/replacement value of facilities and/or current market value of land.
- On a related note, BWA believes there are multiple ways for the LAPs to fund both the reservoir expansion project as well as the “buy-in” for shared foundational facilities of the existing reservoir that benefit the expansion. In general, BWA recommends agencies be given flexibility for funding their share of allocated costs. For example, some agencies may want to participate in a multi-agency debt issuance while others may prefer to pay cash up front or issue their own debt for their share of project costs. It is also important to keep in mind that use of debt financing may result in cost recovery over a shorter time period than the life of the asset. As such, the LAPs should consider how future reservoir users would provide reimbursement for costs incurred by the LAPs in the nearer term.

Alternatives

- BWA suggests an alternative approach for cost recovery based a fixed amount of payments to reimburse CCWD for the LAPs share of costs for land and shared foundational facilities. This fixed amount could be allocated to the LAPs by the same approach ultimately used to allocate costs for the reservoir expansion project. The costs could be paid up front or could be recovered over time via annual payments (similar to debt service payments).
- This approach would entail first identifying land and shared foundational assets that benefit the expansion project but exclude assets that only benefit CCWD’s 160 TAF of reservoir capacity that are not shared assets. Cost recovery for these “shared facilities” could be allocated based on a pro-rata share of total capacity of the expanded reservoir with the LAPs allocated 115/275, or roughly 42%, of the costs identified for recovery, similar to the allocation incorporated in CCWD’s proposed charge
- There are many reasonable approaches for valuing the shared foundational assets which benefit the expansion. CCWD and the LAPs would need to establish a valuation methodology which they agree is fair. It is important to keep in mind that any costs CCWD receives will be reimbursement for prior expenditures that would otherwise not have been recovered. The fee should fairly compensate CCWD without creating an impediment to enhancing the regional water supply. use of the expanded reservoir by the LAPs.

Renewal/Replacement (Wear & Tear) Usage Fee

Purpose

Recover the cost of replacing facilities and equipment that experience wear and tear due to the conveyance of wheeled water.

Basis of Fee Calculation

This fee is calculated based on annual depreciation for each facility based on *current replacement costs* divided by the capacity of each facility discounted to account for a 32% utilization factor.

Analysis

- The Wheeling Statue defines “replacement costs” as the reasonable portion of costs associated with correction of irreparable wear or other deterioration of conveyance facility parts that have an anticipated life that is less than the conveyance facility repayment period and which costs are attributable to the proposed use. This would seem to imply that the Renewal/Replacement Usage Fee is only supposed to recover costs for assets that are parts of each conveyance facility (not the whole facility) and require replacement on a more frequent basis than the life of the overall conveyance facility (e.g. pump station equipment). Since the proposed wheeling charges include a) capital cost recovery for existing conveyance facilities via the Capacity Usage Fees, and b) cost recovery for the full replacement cost (in current dollars) of those same facilities, we are concerned that these charges may overlap. As previously discussed, BWA is concerned that the proposed wheeling charges include two methods of capital cost recovery for the same facility capacity via both the Capacity Usage Fees, and the Renewal/Replacement Usage Fees.
- The proposed charges for Renewal/Replacement are very similar in dollar amount to the Capacity Usage Fees resulting in total capital cost recovery that is close to double the replacement cost (escalated into current dollars) of each facility apportioned over the life of each facility.
- Again, BWA questions whether the use of the 32% utilization factor is “reasonable” as it is currently calculated and applied and believes additional discussion between CCWD and the LAPs would be helpful in determining a reasonable basis for allocating capital costs. BWA believes that the LAPs – who have a lower priority of use and can only wheel water when spare capacity is available – should only have to pay for capacity in facilities involved in the wheeling of water.
- We are unclear on how exactly the original costs were escalated to the replacement costs shown for each facility. BWA was able to verify the calculation of the replacement costs used for most, but not all, of the facilities.

Alternatives

- Again, BWA suggests that a single charge could replace the combined Capacity Usage and Renewal/Replacement fees. This charge can recover costs for both the replacement cost of facilities (in current dollars) as well as estimated or actual costs of financing, apportioned over the life of the asset. BWA recognizes that this would result in a lower charge than the two proposed charges combined, but also believes it would compensate CCWD in current dollars for facilities as well as financing costs associated with each facility.
- BWA recommends moving away from use of a flow-based “utilization factor” in the fee calculation. As previously noted, BWA believes it is more reasonable to apportion capital-related costs by some reasonable measure of facility capacity, which need not be full design capacity but instead can be “firm operational capacity” or “average day design capacity” excluding additional capacity built in to meet peak demands.

Fixed O&M Charge

Purpose

Recover a share CCWD's fixed costs related to operation and maintenance of conveyance facilities.

Basis of Fee Calculation

CCWD's proposed charge is based on a) the fixed operating costs for CCWD's "Eastern Division" that operates and maintains CCWD's water intake and conveyance facilities, which currently total roughly \$3.2 million per year, multiplied by b) the LAPs projected share of total water flow delivered through CCWD's conveyance facilities. The charge assumes that the LAPs account for 33% of the total amount of water conveyed through CCWD's three intakes, resulting in an allocation to the LAPs of slightly more than \$1 million per year. The Fixed O&M charge is levied on a per acre-foot basis and applies to all wheeled water.

Analysis

- BWA believes that this charge is reasonable and falls in the middle range of the continuum for "fair compensation" cost recovery. Based on our understanding, BWA believes this charge only recovers fixed operating costs for CCWD's Eastern Division and does not include additional cost recovery for other CCWD operations or administration.
- BWA believes allocating fixed O&M costs to the LAPs based on pro-rata share of flow is on the high side of the continuum but within a reasonable range.

Alternatives

- While there are a number of potential fee alternatives for recovering fixed O&M costs, BWA does not have any major concerns with the fee calculation. However, we do have some suggestions for the application of how the fee would be applied.
- Annual True Up: This charge component is based on a number of variables such as a) volume of LAPs' wheeled water, b) volume of CCWD water conveyance, c) amount of applicable CCWD fixed operating costs incurred each year. As such, BWA recommends that these charges be established each year based on reasonable estimates with a subsequent true up to reflect the actual flows and costs that had been incurred. The true up could be applied toward the LAPs charges in the subsequent year or potentially refunded at year end.
- Multi-Year Averaging: Since the volume of water conveyed by CCWD and the LAPs can vary from year to year, BWA recommends consideration of multi-year averaging in the fee calculation. For example, the share of flow allocated to the LAPs could be based on a trailing 3-year average.

Variable O&M Charge

Purpose

Recovers the additional power costs incurred by CCWD for pumping water on behalf of the LAPs.

Basis of Fee Calculation

Charges for each intake and the transfer station are based on CCWD estimates of the cost of power to operate each facility expressed in terms of \$ per AF.

Analysis

- For variable operating cost recovery, BWA believes it is reasonable and appropriate to allocate costs to the LAPs based on their actual flow or pro-rata share of total flow.
- The proposed charges are based on estimated costs for power and electricity. Our understanding is that CCWD incurs a range of costs for power depending on factors such as time of use. As such, BWA would recommend CCWD consider charging based on actual power costs incurred for wheeling water, or based on average costs for power incurred for water conveyance.
- BWA believes that this charge is reasonable as proposed based on our understanding that the actual charges would be based on the pass-through of actual power costs. However, we are a little unclear how exactly the charges would be determined and applied.

Alternatives

- Annual True Up: Due to the variability of electricity charges, CCWD's Variable O&M Charge can be levied based on reasonable estimates and subject to a subsequent true up to reflect the actual power costs incurred.

Overall CCWD Fee Analysis

- CCWD anticipates retaining authority to determine the source of supply/intake of wheeled water and associated conveyance pathway. As such, BWA recommends that the LAPs evaluate if an average cost "postage stamp" approach would be more appropriate than a point-to-point pathway approach. Under an average cost "postage stamp" approach, the LAPs would pay a uniform charge per AF for all water conveyance regardless of the specific source. BWA believes a "postage stamp" approach would provide benefits of simplicity and consistency without resulting in charges that vary dependent on CCWD's operational decisions to convey water through different facilities.
- Based on our analysis of CCWD's proposed charges, BWA believes a) the Fixed and Variable O&M Charges are within a reasonable range, but we are concerned that b) the Capacity Usage Fee combined with the Renewal/Replacement Usage Fees as currently proposed recover the costs for conveyance system capacity via two different methods and result in total capital cost recovery that is roughly double the current replacement cost of each facility divided by the life of each asset. As such,

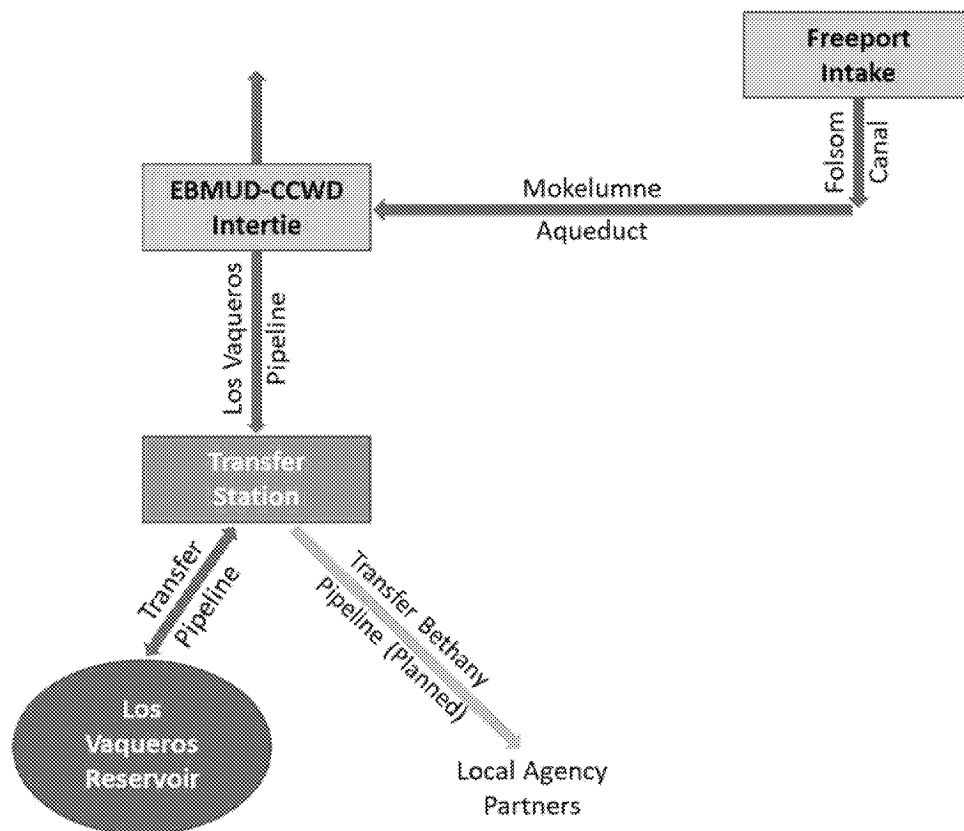
BWA recommends transition to single charge that could replace the combined Capacity Usage and Renewal/Replacement fees. This charge can recover costs for both the replacement cost of facilities (in current dollars) as well as estimated or actual costs of financing, apportioned over the life of the asset.

- BWA calculated a range of fee alternatives for capital cost recovery, which are included in Appendix A. These fee alternatives are based on information provided in CCWD’s description of proposed charges, but also incorporate some additional assumptions where needed for fee calculation (e.g. calculating fees based on alternatives to CCWD’s “utilization factor”). These fee alternatives are not fully developed recommendations. The purpose of these calculations was to provide some comparative fee estimates under alternative approaches, including approaches that BWA believes would be more appropriate and would avoid potential for “double counting”. The conceptual alternatives include approaches that recover costs for conveyance facilities based on original costs and replacement costs (excluding financing costs), as well as other approaches. One alternative accounts for the present value of debt service payments assuming facilities were debt-financed via a hypothetical 30-year financing with an estimated 4% interest rate. If such an approach were used, the charge could be based on actual financing terms or interest rates associated with CCWD’s or EBMUD’s actual credit ratings.
- As previously discussed, CCWD and the LAPs could potentially evaluate an alternative approach to the Storage Capacity Charge such as determination of a fixed amount to reimburse CCWD for the LAPs share of costs for land and shared foundational facilities provided by the existing reservoir. These costs can be allocated by the same approach used to allocate costs for the reservoir expansion project. In general, BWA believes agencies should be given flexibility for funding their allocated share of costs for a multi-agency project such as the reservoir expansion.
- Wheeling charges must account for any benefits provided to the owner of the facilities related to the wheeled water. To the extent there are benefits derived from wheeling water – such as water quality benefits – these benefits should be more clearly identified and accounted for in the wheeling charge calculation when appropriate.
- BWA recommends establishment of a separate wheeling charge for water conveyed through a portion of CCWD’s Los Vaqueros Pipeline from the EBMUD-CCWD intertie to the Transfer Station as we do not believe these costs are recovered under the current fee proposals.
- BWA recommends CCWD and the LAPs establish a method for periodically reviewing and updating or modifying the water wheeling charges to ensure future charges are reasonable and “fairly compensate” CCWD for costs incurred wheeling water. For example, a review/advisory committee could be established to periodically review the charges.

3. EBMUD Proposed Wheeling Charges

Overview

EBMUD developed wheeling charges to recover the cost for the intake and conveyance of water from EBMUD's Freeport Intake on the Sacramento River through the Mokelumne Aqueduct to the EBMUD-CCWD Intertie. From the intertie, water would subsequently be conveyed through a portion of CCWD's Los Vaqueros Pipeline to the Transfer Station from where water could flow to either the Los Vaqueros Reservoir or to the LAPs via the planned Transfer Bethany pipeline, which has not yet been constructed.



EBMUD Water Wheeling Charges

Wheeling Charge Components						
	Facility Charge	Conveyance Charge	Freeport Start-Up & Shut Down	Mokelumne Aqueduct Relining	Walnut Creek Pumping Plant VFD Project	Total
Charge per AF	\$120	\$306	\$12 - \$52	\$44	\$14	\$496 - \$536
Charge per hcf	\$0.28	\$0.70	\$0.03 - \$0.12	\$0.10	\$0.03	\$1.14 - \$1.23

Charges shown are estimates and are subject to change; EBMUD anticipates charging based on actual costs & use.

Due to the infrequent availability of capacity in the Mokelumne Aqueduct and substantially higher cost of water wheeling through EBMUD facilities, it would seem that the LAPs would only wheel water through EBMUD when there is no viable alternative for water wheeling or supply through CCWD.

Analysis of EBMUD Charge Components

The following sections summarize each of EBMUD's proposed wheeling charges and provide commentary and analysis on each component. Overall, BWA believes a number of the charges are within a reasonable range. However, we have some concerns regarding the reasonableness of the cost recovery approaches used for the Mokelumne Aqueduct Relining and Walnut Creek Pumping Plant VFD Project. At the same time, we recognize that the charge for the Mokelumne Aqueduct Relining excludes cost recovery for the aqueduct itself, which could have resulted in a substantially higher charge.

EBMUD has indicated that its proposed wheeling charges are for comparative purposes only, and that EBMUD may change the methodology to more comprehensively capture EBMUD's impacts and costs.

Facility Usage Charge

Purpose

Recover costs for use of EBMUD intake and conveyance facilities used to wheel water from the Freeport Intake to the EBMUD-CCWD Intertie including costs for Freeport facilities, the Folsom South Canal facilities, and a portion of EBMUD's conveyance system, but excluding cost recovery for the portion of the Mokelumne Aqueduct being relined to avoid double-counting with other fee components.

Basis of Fee Calculation

The charge recovers costs for capital renewal and replacement. The charge is calculated by dividing the annual depreciation based on original cost of each facility divided by the firm capacity of each facility, resulting in a unit charge for facility usage that is applied to proportionate share of capacity used to convey water for the LAPs. Firm capacity excludes the capacity of one pump which EBMUD holds in reserve for emergency situations.

Analysis

- BWA believes the renewal and replacement charge component is reasonable considering it recovers depreciated costs divided by the firm operational capacity of each facility, and only assigns costs to the LAPs based on their proportionate share of capacity used in EBMUD facilities. As such the LAPs only contribute towards facility capacity used to wheel water on their behalf.

Alternatives

- BWA believes this is a reasonable charge; no alternatives are recommended for consideration.

Conveyance Charge

Purpose

Recover the direct costs associated with a) physically conveying water from the Freeport Intake through the Folsom South Canal and the Mokelumne Aqueduct to the EBMUD-CCWD Intertie as well as b) operational costs incurred by EMBUD to facilitate wheeling by freeing up capacity in the Mokelumne Aqueduct via temporarily drawing down water supply from the Briones Reservoir, which requires operation of the Walnut Creek Pumping Plant and costs for refilling the Briones Reservoir.

Basis of Fee Calculation

Charges for each facility are calculated to recover costs for a) EBMUD's variable operating costs based on actual time, materials, and other costs related to water conveyance (including costs for operation of the Walnut Creek Pumping Plant and refilling of the Briones Reservoir), divided by b) the volume of water conveyed resulting in a charge per AF that reflects the average cost actually incurred by EBMUD for conveying water.

Analysis

- EBMUD relies on water conveyance through the Mokelumne Aqueduct for its own water supply. To facilitate water wheeling, EBMUD would need to temporarily draw down water from the Briones Reservoir to free up capacity in the Mokelumne Aqueduct for wheeling. As such, BWA believes it is appropriate for EBMUD to include cost recovery for the incremental pumping cost required to refill the reservoir as part of the Conveyance Charge.
- This charge appears to be calculated on a reasonable basis. However, the estimated charge seems high at \$306 per AF considering it only reflects incremental costs for water intake and conveyance.
- EBMUD's proposed charges are based on cost estimates. In most cases, EBMUD states that LAPs would be billed for conveyance costs on an actual time and materials basis

Alternatives

- BWA believes the incremental O&M basis for the charge is reasonable but recommends review of the detailed components of the fee. It is important to note that EBMUD does not have excess capacity to wheel water during normal operations, but instead would need to alter its normal operations to make room for wheeled water in its water supply conveyance facilities.

Freeport Start-Up & Shutdown

Purpose

Recover a share of costs incurred for the start-up and shut down of Freeport facilities.

Basis of Fee Calculation

This charge is calculated by dividing the start-up and shut down costs for EBMUD's Freeport facilities by the total flow passing through the facilities for each occurrence of a start-up and shut down. EBMUD's draft fee calculation is based on a) estimated costs of \$750,000 for combined start-up and shut down during of Freeport facilities based on actual costs from fiscal year 2014/15, divided by b) the estimated volume of flow during years of assumed Freeport facility use based on analysis of historical hydrologic conditions. EBMUD provides a range of fee estimates based on whether the fee is based on the median or average volume of water during years of assumed facility use.

Analysis

- The Freeport facilities are only periodically used to supplement EBMUD's source of water supply, such as during periods of drought. EBMUD incurs substantial costs every time the Freeport facilities are started up and shut down. Due to the high cost of start up and shut down, we assume EBMUD would only wheel water for the LAPs when the facilities are already in operation. As such, EBMUD incurs no incremental startup or shut-down costs for water wheeling. However, BWA believes it is reasonable for EBMUD to recover costs for a share of its start up and shut down costs, and basing cost recovery on the LAPs pro-rata share of the total volume of flow during each operational period is consistent with standard rate-setting practices.

Alternatives

- If the facilities will be operated for multiple years before shutdown, the methodology for calculating this fee component may need to be reviewed.

Mokelumne Aqueduct Relining

Purpose

Recover costs for financing a portion of the Mokelumne Aqueduct relining project that conveys water from EBMUD's Pardee Reservoir to the interie with CCWD, and reimburse EBMUD for wear and tear on the Mokelumne Aqueduct via a charge component based on annual depreciation.

Basis of Fee Calculation

This fee component includes into two components, a) a capital cost recovery charge for capacity in the portion of the Mokelumne relining project applicable to the the LAPs, and b) a renewal and replacement charge to recover costs for wear and tear on these facilities.

The capital cost-recovery component is based on the interest-only portion of debt service in the 15th year of a hypothetical 30-year 4% loan issued in an amount of \$130 million, representing the estimated cost of

the applicable portion of the Mokelumne Aqueduct relining project involved in conveying water to the intertie with CCWD which subsequently would be conveyed to the Los Vaqueros Reservoir or the LAPs. This portion of cost is divided by the total capacity of the aqueduct.

The repair and replacement component is calculated by dividing annual depreciation of the aqueduct (based on the \$130 million estimated cost of the applicable portion of the relining project) by the capacity of the aqueduct.

Analysis

- BWA is concerned that the proposed charge recovers costs for the same facilities via two methods.
- While BWA has some concern with the specific charge calculation, we also recognize that this charge only recovers costs related to the relining project, which results in a substantially lower charge than if the charge recovered costs for the full Mokelumne Aqueduct itself.
- Basing a portion of the charge on the interest-only portion of debt service in the 15th year or a 30-year loan results in cost recovery over 30 years, which may not reflect the life of the facility. In addition, BWA believes that EBMUD would be able to obtain financing at interest rates below 4% based on current market conditions. As previously noted, that the amount of interest in year 15 equates to approximately 2.7% of the original cost of the facility and that interest in the 15th year equals about 47% of annual debt service. EBMUD has acknowledged that the loan assumptions were simply for comparison, and that EBMUD is open to alternative fee calculation methods.
- BWA believes that EBMUD's use of aqueduct capacity is a reasonable denominator for apportioning costs and results LAPs contributing costs for actual capacity used in the aqueduct.

Alternative

- BWA suggests that a single charge component could replace the two separate fee components. This charge can recover costs for both the replacement cost of facilities (in current dollars) as well as estimated or actual costs of financing, apportioned over the life of the asset.

Walnut Creek Pumping Plant VFD Project

Purpose

Compensate EBMUD for the cost of the Walnut Creek Pumping Plant Variable Frequency Drive (VFD) Project, which is proposed to be built by EBMUD in order to facilitate EBMUD's participation in the Los Vaqueros Reservoir Expansion Project.

Basis of Fee Calculation

The fee is based on a) the interest portion plus 50% of the principal portion of the actual debt service incurred to finance the project, divided by b) aqueduct capacity of 100 MGD. EBMUD notes that the fee

recovers 50% of the principle, as opposed to 100% of the principal, because EBMUD will derive additional benefit from the project outside of participation in the Los Vaqueros expansion.

Analysis

- BWA understands that EBMUD plans to construct this project in conjunction with their participation in the Los Vaqueros Reservoir Expansion and that the project will provide benefit to EBMUD operations during periods of water wheeling. As such, BWA believes that cost recovery for a portion of the project is reasonable.
- EBMUD's proposed fees are based on the 15th year of debt service on a hypothetical 4% 30-year financing. Basing a portion of the charge on 30-year debt service results in cost recovery over 30 years, which may not reflect the life of the facility. In addition, BWA believes that EBMUD would be able to obtain financing at interest rates below 4% based on current market conditions.
- EBMUD's approach for this fee component accounts for 100% of interest costs plus 50% of principal, which equates to roughly 73% of total annual debt service. BWA is unclear if this is the appropriate percentage of costs that provides shared benefit to both EBMUD and the LAPs.
- Again, BWA believes that EBMUD's use of aqueduct capacity is a reasonable denominator for apportioning costs and results LAPs contributing costs for actual capacity used in the aqueduct.

Alternatives

- BWA recommends that EBMUD more clearly identify a) the share of project costs benefiting EBMUD exclusively vs. b) the portion that provides shared benefits to the LAPs. The percentage of the project providing shared benefits with the LAPs could be used in the fee calculation, rather than recovering costs for 100% of interest plus 50% of principal.
- In general, BWA recommends that capital cost recovery be apportioned over the life of the asset, not the term of financing. However, in this case, both periods may be similar. In this case, if EBMUD requires the LAPs to contribute toward annual debt service, BWA believes the share of debt service used in the fee calculation should be based on actual debt service or anticipated market interest rates.

Overall EBMUD Fee Analysis

- BWA believes the Facility Usage Charge, Conveyance Charge, and the Freeport Start-Up & Shutdown charge components are within a reasonable range. However, we have some concerns with the way the Mokelumne Aqueduct Relining and Walnut Creek Pumping Plant VFD Project fee components are calculated, while recognizing that cost recovery the Mokelumne Aqueduct Relining results in charges that are substantially lower than if they included cost recovery for the aqueduct itself.
- BWA calculated a range of fee alternatives for capital cost recovery for the Mokelumne Aqueduct Relining and Walnut Creek Pumping Plant VFD Project, which are included in Appendix B. These fee alternatives are based on information provided in EBMUD's description of proposed charges, but also

incorporate some additional assumptions where needed for fee calculation (e.g. calculating fees based on alternatives to CCWD's "utilization factor"). The purpose of these calculations was to provide some comparative fee estimates under alternative approaches, including approaches that BWA believes would be more appropriate and would avoid potential for "double counting".

- Wheeling charges must account for any benefits provided to the owner of the facilities related to the wheeled water. To the extent there are benefits derived from wheeling water, these benefits should be more clearly identified and accounted for in the wheeling charge calculation.
- BWA recommends EBMUD and the LAPs establish a method for periodically reviewing and updating or modifying the water wheeling charges to ensure future charges are reasonable and "fairly compensate" EBMUD for costs incurred wheeling water. For example, a review/advisory committee could be established to periodically review the charges.

Appendix A

Alternative Fee Calculations for CCWD Capital Cost Recovery

Table 1
LVE Wheeling Rate Review
Capital Cost Recovery: Alternative Approaches

CCWD Fee Alternatives

	Original Cost Less Grants	Acquisition Year	Est. Life	Annual Depreciation	Est. Age	Accumulated Depreciation	Net Book Value	ENR-Escalated Cost ¹		CPI-Escalated Cost ²		PV Debt Svc (30-Yr 4% Loan)
								Acquisition	Net Book	Acquisition	Net Book	
Rock Slough Pathway												
Rock Slough Facilities	\$117,170,377	Est. 1987	75	\$1,562,272	32	\$49,992,694	\$67,177,683	\$299,666,829	\$171,808,982	\$264,193,414	\$151,470,891	\$316,485,439
Los Vaq Pipeline	48,519,455	1996	75	646,926	23	14,879,300	33,640,155	97,247,296	67,424,792	79,209,170	54,918,358	100,523,125
Total	165,689,832			2,209,198		64,871,994	100,817,838	396,914,126	239,233,774	343,402,584	206,389,249	417,008,564
Old River Pathway												
Old River Intake	30,497,364	1996	50	609,947	23	14,028,787	16,468,577	61,125,711	33,007,884	49,787,676	26,885,345	63,184,764
Old River Pipeline	38,293,849	1996	75	510,585	23	11,743,447	26,550,402	76,752,166	53,214,835	62,515,624	43,344,166	79,337,605
Total	68,791,213			1,120,532		25,772,234	43,018,979	137,877,878	86,222,719	112,303,299	70,229,511	142,522,369
Middle River Pathway												
Middle River Intake	24,736,150	2011	50	494,723	8	3,957,784	20,778,366	30,732,517	25,815,315	28,167,600	23,660,784	37,382,560
Middle River Pipeline	40,963,850	2011	75	546,185	8	4,369,477	36,594,373	50,894,025	45,465,329	46,646,439	41,670,819	61,906,707
Old River Pipeline	38,293,849	1996	75	510,585	23	11,743,447	26,550,402	76,752,166	53,214,835	62,515,624	43,344,166	79,337,605
Total	103,993,849			1,551,492		20,070,708	83,923,141	158,378,709	124,495,479	137,329,663	108,675,769	178,626,872
Transfer to Reservoir												
Transfer Pipeline	23,998,870	1996	75	319,985	23	7,359,653	16,639,217	48,100,813	33,349,897	39,178,729	27,163,919	49,721,115
Transfer Pump & Tank	17,281,844	1996	40	432,046	23	9,937,060	7,344,784	34,637,912	14,721,113	28,213,023	11,990,535	35,804,709
Total	41,280,714			752,031		17,296,714	23,984,000	82,738,725	48,071,009	67,391,752	39,154,454	85,525,824
Storage Capacity												
Original 100 TAF	290,035,618	1996	Est. 75	3,867,142	23	88,944,256	201,091,362	581,316,911	403,046,392	473,490,078	328,286,454	600,898,889
Expansion to 60 TAF	95,600,000	2012	Est. 75	1,274,667	7	8,922,667	86,677,333	115,733,498	104,931,705	106,654,663	96,700,228	141,712,855
Total	385,635,618			5,141,808		97,866,923	287,768,695	697,050,409	507,978,097	580,144,742	424,986,683	742,611,744

1 Based on change in ENR Construction Cost Index from Acquisition Year average to June 2019.

2 Based on change in CPI index from Acquisition Year average to June 2019.

Table 2
LVE Wheeling Rate Review
Capital Cost Recovery: Annual Cost (Based on Life of Asset)

CCWD Fee Alternatives

	Est. Life	Original Cost Less Grants	Annual Cost	Net Book Value	Annual Cost	ENR-Esc Original Cost	Annual Cost	ENR-Esc Net Book	Annual Cost	CPI-Esc Original Cost	Annual Cost	CPI-Esc Net Book	Annual Cost	PV Debt Svc (30-Yr 4% Loan)	Annual Cost	Annual Deprec	+ Return on Net Book	Utility Basis
																	3.0%	
Rock Slough Pathway																		
Rock Slough Facilities	75	\$117,170,377	\$1,562,272	\$67,177,683	\$895,702	\$299,666,829	\$3,995,558	\$171,808,982	\$2,290,786	\$264,193,414	\$3,522,579	\$151,470,891	\$2,019,612	\$316,485,439	\$4,219,806	\$1,562,272	\$2,015,330	\$3,577,602
Los Vaq Pipeline	75	48,519,455	646,926	33,640,155	448,535	97,247,296	1,296,631	67,424,792	898,997	79,209,170	1,056,122	54,918,358	732,245	100,523,125	1,340,308	646,926	1,009,205	1,656,131
Total		165,689,832	2,209,198	100,817,838	1,344,238	396,914,126	5,292,188	239,233,774	3,189,784	343,402,584	4,578,701	206,389,249	2,751,857	417,008,564	5,560,114	5,233,733		
Old River Pathway																		
Old River Intake	50	30,497,364	609,947	16,468,577	329,372	61,125,711	1,222,514	33,007,884	660,158	49,787,676	995,754	26,885,345	537,707	63,184,764	1,263,695	609,947	494,057	1,104,005
Old River Pipeline	75	38,293,849	510,585	26,550,402	354,005	76,752,166	1,023,362	53,214,835	709,531	62,515,624	833,542	43,344,166	577,922	79,337,605	1,057,835	510,585	796,512	1,307,097
Total		68,791,213	1,120,532	43,018,979	683,377	137,877,878	2,245,876	86,222,719	1,369,689	112,303,299	1,829,295	70,229,511	1,115,629	142,522,369	2,321,530	2,411,101		
Middle River Pathway																		
Middle River Intake	50	24,736,150	494,723	20,778,366	415,567	30,732,517	614,650	25,815,315	516,306	28,167,600	563,352	23,660,784	473,216	37,382,560	747,651	494,723	623,351	1,118,074
Middle River Pipeline	75	40,963,850	546,185	36,594,373	487,925	50,894,025	678,587	45,465,329	606,204	46,646,439	621,953	41,670,819	555,611	61,906,707	825,423	546,185	1,097,831	1,644,016
Old River Pipeline	75	38,293,849	510,585	26,550,402	354,005	76,752,166	1,023,362	53,214,835	709,531	62,515,624	833,542	43,344,166	577,922	79,337,605	1,057,835	510,585	796,512	1,307,097
Total		103,993,849	1,551,492	83,923,141	1,257,498	158,378,709	2,316,600	124,495,479	1,832,042	137,329,663	2,018,846	108,675,769	1,606,749	178,626,872	2,630,909	4,069,187		
Transfer to Reservoir																		
Transfer Pipeline	75	23,998,870	319,985	16,639,217	221,856	48,100,813	641,344	33,349,897	444,665	39,178,729	522,383	27,163,919	362,186	49,721,115	662,948	319,985	499,176	819,161
Transfer Pump & Tank	40	17,281,844	432,046	7,344,784	183,620	34,637,912	865,948	14,721,113	368,028	28,213,023	705,326	11,990,535	299,763	35,804,709	895,118	432,046	220,344	652,390
Total		41,280,714	752,031	23,984,000	405,476	82,738,725	1,507,292	48,071,009	812,693	67,391,752	1,227,709	39,154,454	661,949	85,525,824	1,558,066	1,471,551		
Reservoir Storage																		
Original 100 TAF	Est. 75	290,035,618	3,867,142	201,091,362	2,681,218	581,316,911	7,750,892	403,046,392	5,373,952	473,490,078	6,313,201	328,286,454	4,377,153	600,898,889	8,011,985	3,867,142	6,032,741	9,899,882
Expansion to 60 TAF	Est. 75	95,600,000	1,274,667	86,677,333	1,155,698	115,733,498	1,543,113	104,931,705	1,399,089	106,654,663	1,422,062	96,700,228	1,289,336	141,712,855	1,889,505	1,274,667	2,600,320	3,874,987
Subtotal		385,635,618	5,141,808	287,768,695	3,836,916	697,050,409	9,294,005	507,978,097	6,773,041	580,144,742	7,735,263	424,986,683	5,666,489	742,611,744	9,901,490	5,141,808	8,633,061	13,774,869
Prorated at 160/275 TAF		58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%	58.2%			58.2%
Total		224,369,814	2,991,598	167,429,059	2,232,387	405,556,602	5,407,421	295,550,893	3,940,679	337,538,759	4,500,517	247,264,979	3,296,866	432,065,015	5,760,867	8,014,469		

Table 3

CCWD Fee Alternatives

LVE Wheeling Rate Review

Capital Cost Recovery: Annual Cost per AF

Estimated Base Capacity as % of Peak Capacity 100%

	Peak Capacity CFS	Est. Base Capacity CFS*	Est. Base Capacity AFY*	Original Cost		Net Book Value		ENR-Esc Orig Cost		ENR-Esc Net Book		CPI-Esc Orig Cost		CPI-Esc Net Book		PV Debt Svc (30-Yr 4%)		Utility Basis	
				Annual Cost	Cost per AF	Annual Cost	Cost per AF	Annual Cost	Cost per AF	Annual Cost	Cost per AF	Annual Cost	Cost per AF	Annual Cost	Cost per AF	Annual Cost	Cost per AF	Annual Cost	Cost per AF
Est. Base Capacity as % of Peak		100%																	
Rock Slough Pathway																			
Rock Slough Facilities	350	350	253,388	\$1,562,272	\$6.17	\$895,702	\$3.53	\$3,995,558	\$15.77	\$2,290,786	\$9.04	\$3,522,579	\$13.90	\$2,019,612	\$7.97	\$4,219,806	\$16.65	\$3,577,602	\$14.12
Los Vaq Pipeline	400	400	289,587	646,926	2.23	448,535	1.55	1,296,631	4.48	898,997	3.10	1,056,122	3.65	732,245	2.53	1,340,308	4.63	1,656,131	5.72
Total				2,209,198	8.40	1,344,238	5.08	5,292,188	20.25	3,189,784	12.15	4,578,701	17.55	2,751,857	10.50	5,560,114	21.28	5,233,733	19.84
Old River Pathway																			
Old River Intake	250	250	180,992	609,947	3.37	329,372	1.82	1,222,514	6.75	660,158	3.65	995,754	5.50	537,707	2.97	1,263,695	6.98	1,104,005	6.10
Old River Pipeline	320	320	231,669	510,585	2.20	354,005	1.53	1,023,362	4.42	709,531	3.06	833,542	3.60	577,922	2.49	1,057,835	4.57	1,307,097	5.64
Total				1,120,532	5.57	683,377	3.35	2,245,876	11.17	1,369,689	6.71	1,829,295	9.10	1,115,629	5.47	2,321,530	11.55	2,411,101	11.74
Middle River Pathway																			
Middle River Intake	250	250	180,992	494,723	2.73	415,567	2.30	614,650	3.40	516,306	2.85	563,352	3.11	473,216	2.61	747,651	4.13	1,118,074	6.18
Middle River Pipeline	250	250	180,992	546,185	3.02	487,925	2.70	678,587	3.75	606,204	3.35	621,953	3.44	555,611	3.07	825,423	4.56	1,644,016	9.08
Old River Pipeline	320	320	231,669	510,585	2.20	354,005	1.53	1,023,362	4.42	709,531	3.06	833,542	3.60	577,922	2.49	1,057,835	4.57	1,307,097	5.64
Total				1,551,492	7.96	1,257,498	6.52	2,316,600	11.56	1,832,042	9.26	2,018,846	10.15	1,606,749	8.18	2,630,909	13.26	4,069,187	20.90
Transfer to Reservoir																			
Transfer Pipeline	200	200	144,793	319,985	2.21	221,856	1.53	641,344	4.43	444,665	3.07	522,383	3.61	362,186	2.50	662,948	4.58	819,161	5.66
Transfer Pump & Tank	200	200	144,793	432,046	2.98	183,620	1.27	865,948	5.98	368,028	2.54	705,326	4.87	299,763	2.07	895,118	6.18	652,390	4.51
Total				752,031	5.19	405,476	2.80	1,507,292	10.41	812,693	5.61	1,227,709	8.48	661,949	4.57	1,558,066	10.76	1,471,551	10.16
Reservoir Storage																			
Existing Reservoir			160,000	2,991,598	18.70	3,836,916	23.98	9,294,005	58.09	6,773,041	42.33	7,735,263	48.35	5,666,489	35.42	9,901,490	61.88	8,014,469	50.09
Total				2,991,598	18.70	3,836,916	23.98	9,294,005	58.09	6,773,041	42.33	7,735,263	48.35	5,666,489	35.42	9,901,490	61.88	8,014,469	50.09

* Base Capacity roughly estimated as 50% of Peak Capacity as placeholder estimate for calculation of hypothetical fee alternatives; actual Base Capacity may vary.

Table 4
LVE Wheeling Rate Review

CCWD Fee Alternatives

Capital Cost Recovery: Annual Cost per AF

Estimated Base Capacity as % of Peak Capacity 100%

	CCWD Proposed			Original Cost		Net Book Value		ENR-Esc Orig Cost		ENR-Esc Net Book		CPI-Esc Orig Cost		CPI-Esc Net Book		PV Debt Svc (30-Yr 4%)		Utility Basis	
	Capacity Usage Fee	Renewal/ Repl Fee	Subtotal	Cost per AF 100%	50%	Cost per AF 100%	50%	Cost per AF 100%	50%	Cost per AF 100%	50%	Cost per AF 100%	50%	Cost per AF 100%	50%	Cost per AF 100%	50%	Cost per AF 100%	50%
Rock Slough Pathway																			
Rock Slough Facilities	\$38.95	\$49.18	\$88.13	\$6.17	\$3.08	\$3.53	\$1.77	\$15.77	\$7.88	\$9.04	\$4.52	\$13.90	\$6.95	\$7.97	\$3.99	\$16.65	\$8.33	\$14.12	\$7.06
Los Vaq Pipeline	14.11	12.81	26.92	2.23	1.12	1.55	0.77	4.48	2.24	3.10	1.55	3.65	1.82	2.53	1.26	4.63	2.31	5.72	2.86
Total	53.06	61.99	115.05	8.40	4.20	5.08	2.54	20.25	10.12	12.15	6.07	17.55	8.77	10.50	5.25	21.28	10.64	19.84	9.92
Old River Pathway																			
Old River Intake	14.19	19.33	33.52	3.37	1.69	1.82	0.91	6.75	3.38	3.65	1.82	5.50	2.75	2.97	1.49	6.98	3.49	6.10	3.05
Old River Pipeline	13.92	12.64	26.56	2.20	1.10	1.53	0.76	4.42	2.21	3.06	1.53	3.60	1.80	2.49	1.25	4.57	2.28	5.64	2.82
Total	28.11	31.97	60.08	5.57	2.79	3.35	1.67	11.17	5.59	6.71	3.36	9.10	4.55	5.47	2.73	11.55	5.77	11.74	5.87
Middle River Pathway																			
Middle River Intake	11.51	14.33	25.84	2.73	1.37	2.30	1.15	3.40	1.70	2.85	1.43	3.11	1.56	2.61	1.31	4.13	2.07	6.18	3.09
Middle River Pipeline	19.06	15.99	35.05	3.02	1.51	2.70	1.35	3.75	1.87	3.35	1.67	3.44	1.72	3.07	1.53	4.56	2.28	9.08	4.54
Old River Pipeline	13.92	12.64	26.56	2.20	1.10	1.53	0.76	4.42	2.21	3.06	1.53	3.60	1.80	2.49	1.25	4.57	2.28	5.64	2.82
Total	44.49	42.96	87.45	7.96	3.98	6.52	3.26	11.56	5.78	9.26	4.63	10.15	5.07	8.18	4.09	13.26	6.63	20.90	10.45
Transfer to Reservoir																			
Transfer Pipeline	10.05	17.11	27.16	2.21	1.10	1.53	0.77	4.43	2.21	3.07	1.54	3.61	1.80	2.50	1.25	4.58	2.29	5.66	2.83
Transfer Pump & Tank	13.96	12.67	26.63	2.98	1.49	1.27	0.63	5.98	2.99	2.54	1.27	4.87	2.44	2.07	1.04	6.18	3.09	4.51	2.25
Total	24.01	29.78	53.79	5.19	2.60	2.80	1.40	10.41	5.20	5.61	2.81	8.48	4.24	4.57	2.29	10.76	5.38	10.16	5.08
Reservoir Storage																			
Existing Reservoir	37.80	-	37.80	18.70	9.35	23.98	11.99	58.09	29.04	42.33	21.17	48.35	24.17	35.42	17.71	61.88	30.94	50.09	25.05
Total	37.80	-	37.80	18.70	9.35	23.98	11.99	58.09	29.04	42.33	21.17	48.35	24.17	35.42	17.71	61.88	30.94	50.09	25.05

* Base Capacity roughly estimated as 50% of Peak Capacity as placeholder estimate for calculation of hypothetical fee alternatives; actual Base Capacity may vary.

Table 5A

CCWD Fee Alternatives

LVE Wheeling Rate Review

Capital Cost Recovery: Range of Costs per AF

Estimated Base Capacity as % of Peak Capacity

100%



	Allocable Capacity	Marginal Cost (tbd)	Original Cost Asset Life	Repl Cost (CCI) Asset Life	Repl Cost (ENRI) Asset Life	Utility Basis (with 3% R of R)	PV Debt Svc Asset Life	CCWD Proposed
Rock Slough Pathway	TAF							
Rock Slough Facilities	350	\$0.00	\$6.17	\$13.90	\$15.77	\$14.12	\$16.65	\$88.13
Los Vaq Pipeline	400	0.00	2.23	3.65	4.48	5.72	4.63	26.92
Total		0.00	8.40	17.55	20.25	19.84	21.28	115.05
Old River Pathway								
Old River Intake	250	0.00	3.37	5.50	6.75	6.10	6.98	33.52
Old River Pipeline	320	0.00	2.20	3.60	4.42	5.64	4.57	26.56
Total		0.00	5.57	9.10	11.17	11.74	11.55	60.08
Middle River Pathway								
Middle River Intake	250	0.00	2.73	3.11	3.40	6.18	4.13	25.84
Middle River Pipeline	250	0.00	3.02	3.44	3.75	9.08	4.56	35.05
Old River Pipeline	320	0.00	2.20	3.60	4.42	5.64	4.57	26.56
Total		0.00	7.96	10.15	11.56	20.90	13.26	87.45
Transfer to Reservoir								
Transfer Pipeline	200	0.00	2.21	3.61	4.43	5.66	4.58	27.16
Transfer Pump & Tank	200	0.00	2.98	4.87	5.98	4.51	6.18	26.63
Total		0.00	5.19	8.48	10.41	10.16	10.76	53.79
Reservoir Storage								
100% Cost Recovery		0.00	18.70	48.35	58.09	50.09	61.88	37.80
50% Cost Recovery		0.00	9.35	24.17	29.04	25.05	30.94	

Table 5B

CCWD Fee Alternatives

LVE Wheeling Rate Review

Capital Cost Recovery: Range of Costs per AF

Estimated Base Capacity as % of Peak Capacity

90%



	Allocable Capacity	Marginal Cost (tbd)	Original Cost Asset Life	Repl Cost (CCI) Asset Life	Repl Cost (ENRI) Asset Life	Utility Basis (with 3% R of R)	PV Debt Svc Asset Life	CCWD Proposed
Rock Slough Pathway	TAF							
Rock Slough Facilities	315	\$0.00	\$6.85	\$15.45	\$17.52	\$15.69	\$18.50	\$88.13
Los Vaq Pipeline	360	0.00	2.48	4.05	4.98	6.35	5.14	26.92
Total		0.00	9.33	19.50	22.50	22.04	23.65	115.05
Old River Pathway								
Old River Intake	225	0.00	3.74	6.11	7.51	6.78	7.76	33.52
Old River Pipeline	288	0.00	2.45	4.00	4.91	6.27	5.07	26.56
Total		0.00	6.19	10.11	12.41	13.05	12.83	60.08
Middle River Pathway								
Middle River Intake	225	0.00	3.04	3.46	3.77	6.86	4.59	25.84
Middle River Pipeline	225	0.00	3.35	3.82	4.17	10.09	5.07	35.05
Old River Pipeline	288	0.00	2.45	4.00	4.91	6.27	5.07	26.56
Total		0.00	8.84	11.27	12.85	23.23	14.73	87.45
Transfer to Reservoir								
Transfer Pipeline	180	0.00	2.46	4.01	4.92	6.29	5.09	27.16
Transfer Pump & Tank	180	0.00	3.32	5.41	6.65	5.01	6.87	26.63
Total		0.00	5.77	9.42	11.57	11.29	11.96	53.79
Reservoir Storage								
100% Cost Recovery		0.00	18.70	48.35	58.09	50.09	61.88	37.80
50% Cost Recovery		0.00	9.35	24.17	29.04	25.05	30.94	

Table 5C

CCWD Fee Alternatives

LVE Wheeling Rate Review

Capital Cost Recovery: Range of Costs per AF

Estimated Base Capacity as % of Peak Capacity

60%



	Allocable Capacity	Marginal Cost (tbd)	Original Cost Asset Life	Repl Cost (CCI) Asset Life	Repl Cost (ENRI) Asset Life	Utility Basis (with 3% R of R)	PV Debt Svc Asset Life	CCWD Proposed
Rock Slough Pathway	TAF							
Rock Slough Facilities	210	\$0.00	\$10.28	\$23.17	\$26.28	\$23.53	\$27.76	\$88.13
Los Vaq Pipeline	240	0.00	3.72	6.08	7.46	9.53	7.71	26.92
Total		0.00	14.00	29.25	33.74	33.06	35.47	115.05
Old River Pathway								
Old River Intake	150	0.00	5.62	9.17	11.26	10.17	11.64	33.52
Old River Pipeline	192	0.00	3.67	6.00	7.36	9.40	7.61	26.56
Total		0.00	9.29	15.17	18.62	19.57	19.25	60.08
Middle River Pathway								
Middle River Intake	150	0.00	4.56	5.19	5.66	10.30	6.88	25.84
Middle River Pipeline	150	0.00	5.03	5.73	6.25	15.14	7.60	35.05
Old River Pipeline	192	0.00	3.67	6.00	7.36	9.40	7.61	26.56
Total		0.00	13.26	16.91	19.27	34.84	22.10	87.45
Transfer to Reservoir								
Transfer Pipeline	120	0.00	3.68	6.01	7.38	9.43	7.63	27.16
Transfer Pump & Tank	120	0.00	4.97	8.12	9.97	7.51	10.30	26.63
Total		0.00	8.66	14.13	17.35	16.94	17.93	53.79
Reservoir Storage								
100% Cost Recovery		0.00	18.70	48.35	58.09	50.09	61.88	37.80
50% Cost Recovery		0.00	9.35	24.17	29.04	25.05	30.94	

Table 5D

CCWD Fee Alternatives

LVE Wheeling Rate Review

Capital Cost Recovery: Range of Costs per AF

Estimated Base Capacity as % of Peak Capacity

32%



	Allocable Capacity	Marginal Cost (tbd)	Original Cost Asset Life	Repl Cost (CCI) Asset Life	Repl Cost (ENRI) Asset Life	Utility Basis (with 3% R of R)	PV Debt Svc Asset Life	CCWD Proposed
Rock Slough Pathway	TAF							
Rock Slough Facilities	112	\$0.00	\$19.27	\$43.44	\$49.28	\$44.12	\$52.04	\$88.13
Los Vaq Pipeline	128	0.00	6.98	11.40	13.99	17.87	14.46	26.92
Total		0.00	26.25	54.84	63.27	61.99	66.51	115.05
Old River Pathway								
Old River Intake	80	0.00	10.53	17.19	21.11	19.06	21.82	33.52
Old River Pipeline	102.4	0.00	6.89	11.24	13.80	17.63	14.27	26.56
Total		0.00	17.42	28.44	34.91	36.69	36.09	60.08
Middle River Pathway								
Middle River Intake	80	0.00	8.54	9.73	10.61	19.30	12.91	25.84
Middle River Pipeline	80	0.00	9.43	10.74	11.72	28.39	14.25	35.05
Old River Pipeline	102.4	0.00	6.89	11.24	13.80	17.63	14.27	26.56
Total		0.00	24.86	31.71	36.13	65.32	41.43	87.45
Transfer to Reservoir								
Transfer Pipeline	64	0.00	6.91	11.27	13.84	17.68	14.31	27.16
Transfer Pump & Tank	64	0.00	9.32	15.22	18.69	14.08	19.32	26.63
Total		0.00	16.23	26.50	32.53	31.76	33.63	53.79
Reservoir Storage								
100% Cost Recovery		0.00	18.70	48.35	58.09	50.09	61.88	37.80
50% Cost Recovery		0.00	9.35	24.17	29.04	25.05	30.94	

Table 6
LVE Wheeling Rate Review
Hypothetical 30-Year Debt Issue

Loan Amount	\$100,000,000
Interest Rate	4.00%
Repayment Term (Years)	30

Pymt No.	Principal Payment	Interest Payment	Total Debt Service
1	\$1,783,010	\$4,000,000	\$5,783,010
2	1,854,330	3,928,680	5,783,010
3	1,928,504	3,854,506	5,783,010
4	2,005,644	3,777,366	5,783,010
5	2,085,869	3,697,141	5,783,010
6	2,169,304	3,613,706	5,783,010
7	2,256,076	3,526,934	5,783,010
8	2,346,319	3,436,691	5,783,010
9	2,440,172	3,342,838	5,783,010
10	2,537,779	3,245,231	5,783,010
11	2,639,290	3,143,720	5,783,010
12	2,744,862	3,038,148	5,783,010
13	2,854,656	2,928,354	5,783,010
14	2,968,843	2,814,167	5,783,010
15	3,087,596	2,695,414	5,783,010
16	3,211,100	2,571,910	5,783,010
17	3,339,544	2,443,466	5,783,010
18	3,473,126	2,309,884	5,783,010
19	3,612,051	2,170,959	5,783,010
20	3,756,533	2,026,477	5,783,010
21	3,906,794	1,876,216	5,783,010
22	4,063,066	1,719,944	5,783,010
23	4,225,589	1,557,421	5,783,010
24	4,394,612	1,388,398	5,783,010
25	4,570,397	1,212,613	5,783,010
26	4,753,213	1,029,797	5,783,010
27	4,943,341	839,669	5,783,010
28	5,141,075	641,935	5,783,010
29	5,346,718	436,292	5,783,010
30	5,560,586	222,423	5,783,010
Total	100,000,000	73,490,297	173,490,297

Table 7

LVE Wheeling Rate Review

Present Value of Hypothetical Loan

Loan Amount	\$100,000,000
Interest Rate	4.00%
Repayment Term (Years)	30
Year of Issuance	1987

Pymt No.	Year	Principal Payment	Interest Payment	Total Debt Service	Annual Adjustment Factor	Debt Adjustment	Present Value
1	1988	\$1,783,010	\$4,000,000	\$5,783,010	2.57%	219.6%	\$12,699,451
2	1989	1,854,330	3,928,680	5,783,010	2.57%	214.1%	12,381,253
3	1990	1,928,504	3,854,506	5,783,010	2.57%	208.7%	12,071,028
4	1991	2,005,644	3,777,366	5,783,010	2.57%	203.5%	11,768,575
5	1992	2,085,869	3,697,141	5,783,010	2.57%	198.4%	11,473,701
6	1993	2,169,304	3,613,706	5,783,010	2.57%	193.4%	11,186,215
7	1994	2,256,076	3,526,934	5,783,010	2.57%	188.6%	10,905,933
8	1995	2,346,319	3,436,691	5,783,010	2.57%	183.9%	10,632,673
9	1996	2,440,172	3,342,838	5,783,010	2.57%	179.3%	10,366,260
10	1997	2,537,779	3,245,231	5,783,010	2.57%	174.8%	10,106,523
11	1998	2,639,290	3,143,720	5,783,010	2.57%	170.4%	9,853,293
12	1999	2,744,862	3,038,148	5,783,010	2.57%	166.1%	9,606,408
13	2000	2,854,656	2,928,354	5,783,010	2.57%	162.0%	9,365,710
14	2001	2,968,843	2,814,167	5,783,010	2.57%	157.9%	9,131,042
15	2002	3,087,596	2,695,414	5,783,010	2.57%	153.9%	8,902,254
16	2003	3,211,100	2,571,910	5,783,010	2.57%	150.1%	8,679,199
17	2004	3,339,544	2,443,466	5,783,010	2.57%	146.3%	8,461,732
18	2005	3,473,126	2,309,884	5,783,010	2.57%	142.7%	8,249,714
19	2006	3,612,051	2,170,959	5,783,010	2.57%	139.1%	8,043,009
20	2007	3,756,533	2,026,477	5,783,010	2.57%	135.6%	7,841,483
21	2008	3,906,794	1,876,216	5,783,010	2.57%	132.2%	7,645,006
22	2009	4,063,066	1,719,944	5,783,010	2.57%	128.9%	7,453,453
23	2010	4,225,589	1,557,421	5,783,010	2.57%	125.7%	7,266,698
24	2011	4,394,612	1,388,398	5,783,010	2.57%	122.5%	7,084,624
25	2012	4,570,397	1,212,613	5,783,010	2.57%	119.4%	6,907,111
26	2013	4,753,213	1,029,797	5,783,010	2.57%	116.4%	6,734,046
27	2014	4,943,341	839,669	5,783,010	2.57%	113.5%	6,565,317
28	2015	5,141,075	641,935	5,783,010	2.57%	110.7%	6,400,816
29	2016	5,346,718	436,292	5,783,010	2.57%	107.9%	6,240,437
30	2017	5,560,586	222,423	5,783,010	2.57%	105.2%	6,084,076
Total		100,000,000	73,490,297	173,490,297			270,107,042

Historical annual adjustment factor based on average annual change in CIP since 1987.

Table 8
LVE Wheeling Rate Review
Present Value of Hypothetical Loan

Loan Amount	\$100,000,000
Interest Rate	4.00%
Repayment Term (Years)	30
Year of Issuance	1996

Pymt No.	Year	Principal Payment	Interest Payment	Total Debt Service	Annual Adjustment Factor	Debt Adjustment	Present Value
1	1997	\$1,783,010	\$4,000,000	\$5,783,010	2.15%	159.7%	\$9,234,175
2	1998	1,854,330	3,928,680	5,783,010	2.15%	156.3%	9,039,819
3	1999	1,928,504	3,854,506	5,783,010	2.15%	153.0%	8,849,553
4	2000	2,005,644	3,777,366	5,783,010	2.15%	149.8%	8,663,293
5	2001	2,085,869	3,697,141	5,783,010	2.15%	146.7%	8,480,952
6	2002	2,169,304	3,613,706	5,783,010	2.15%	143.6%	8,302,450
7	2003	2,256,076	3,526,934	5,783,010	2.15%	140.5%	8,127,704
8	2004	2,346,319	3,436,691	5,783,010	2.15%	137.6%	7,956,636
9	2005	2,440,172	3,342,838	5,783,010	2.15%	134.7%	7,789,169
10	2006	2,537,779	3,245,231	5,783,010	2.15%	131.9%	7,625,227
11	2007	2,639,290	3,143,720	5,783,010	2.15%	129.1%	7,464,735
12	2008	2,744,862	3,038,148	5,783,010	2.15%	126.4%	7,307,621
13	2009	2,854,656	2,928,354	5,783,010	2.15%	123.7%	7,153,814
14	2010	2,968,843	2,814,167	5,783,010	2.15%	121.1%	7,003,244
15	2011	3,087,596	2,695,414	5,783,010	2.15%	118.6%	6,855,844
16	2012	3,211,100	2,571,910	5,783,010	2.15%	116.1%	6,711,545
17	2013	3,339,544	2,443,466	5,783,010	2.15%	113.6%	6,570,284
18	2014	3,473,126	2,309,884	5,783,010	2.15%	111.2%	6,431,996
19	2015	3,612,051	2,170,959	5,783,010	2.15%	108.9%	6,296,619
20	2016	3,756,533	2,026,477	5,783,010	2.15%	106.6%	6,164,091
21	2017	3,906,794	1,876,216	5,783,010	2.15%	104.3%	6,034,353
22	2018	4,063,066	1,719,944	5,783,010	2.15%	102.2%	5,907,345
23	2019	4,225,589	1,557,421	5,783,010	--	100.0%	5,783,010
24	2020	4,394,612	1,388,398	5,783,010	2.00%	98.0%	5,669,618
25	2021	4,570,397	1,212,613	5,783,010	2.00%	96.1%	5,558,449
26	2022	4,753,213	1,029,797	5,783,010	2.00%	94.2%	5,449,459
27	2023	4,943,341	839,669	5,783,010	2.00%	92.4%	5,342,607
28	2024	5,141,075	641,935	5,783,010	2.00%	90.6%	5,237,850
29	2025	5,346,718	436,292	5,783,010	2.00%	88.8%	5,135,147
30	2026	5,560,586	222,423	5,783,010	2.00%	87.1%	5,034,458
Total		100,000,000	73,490,297	173,490,297			207,181,067

Historical annual adjustment factor based on average annual change in CIP since 1996.
Future annual adjustment factor estimated at 2.00%.

Table 9
LVE Wheeling Rate Review
Present Value of Hypothetical Loan

Loan Amount	\$100,000,000
Interest Rate	4.00%
Repayment Term (Years)	30
Year of Issuance	2011

Pymt No.	Year	Principal Payment	Interest Payment	Total Debt Service	Annual Adjustment Factor	Debt Adjustment	Present Value
1	2012	\$1,783,010	\$4,000,000	\$5,783,010	1.64%	112.1%	\$6,480,470
2	2013	1,854,330	3,928,680	5,783,010	1.64%	110.3%	6,375,906
3	2014	1,928,504	3,854,506	5,783,010	1.64%	108.5%	6,273,028
4	2015	2,005,644	3,777,366	5,783,010	1.64%	106.7%	6,171,810
5	2016	2,085,869	3,697,141	5,783,010	1.64%	105.0%	6,072,226
6	2017	2,169,304	3,613,706	5,783,010	1.64%	103.3%	5,974,248
7	2018	2,256,076	3,526,934	5,783,010	1.64%	101.6%	5,877,851
8	2019	2,346,319	3,436,691	5,783,010	--	100.0%	5,783,010
9	2020	2,440,172	3,342,838	5,783,010	2.00%	98.0%	5,669,618
10	2021	2,537,779	3,245,231	5,783,010	2.00%	96.1%	5,558,449
11	2022	2,639,290	3,143,720	5,783,010	2.00%	94.2%	5,449,459
12	2023	2,744,862	3,038,148	5,783,010	2.00%	92.4%	5,342,607
13	2024	2,854,656	2,928,354	5,783,010	2.00%	90.6%	5,237,850
14	2025	2,968,843	2,814,167	5,783,010	2.00%	88.8%	5,135,147
15	2026	3,087,596	2,695,414	5,783,010	2.00%	87.1%	5,034,458
16	2027	3,211,100	2,571,910	5,783,010	2.00%	85.3%	4,935,743
17	2028	3,339,544	2,443,466	5,783,010	2.00%	83.7%	4,838,964
18	2029	3,473,126	2,309,884	5,783,010	2.00%	82.0%	4,744,082
19	2030	3,612,051	2,170,959	5,783,010	2.00%	80.4%	4,651,061
20	2031	3,756,533	2,026,477	5,783,010	2.00%	78.8%	4,559,864
21	2032	3,906,794	1,876,216	5,783,010	2.00%	77.3%	4,470,455
22	2033	4,063,066	1,719,944	5,783,010	2.00%	75.8%	4,382,799
23	2034	4,225,589	1,557,421	5,783,010	2.00%	74.3%	4,296,862
24	2035	4,394,612	1,388,398	5,783,010	2.00%	72.8%	4,212,609
25	2036	4,570,397	1,212,613	5,783,010	2.00%	71.4%	4,130,009
26	2037	4,753,213	1,029,797	5,783,010	2.00%	70.0%	4,049,029
27	2038	4,943,341	839,669	5,783,010	2.00%	68.6%	3,969,636
28	2039	5,141,075	641,935	5,783,010	2.00%	67.3%	3,891,800
29	2040	5,346,718	436,292	5,783,010	2.00%	66.0%	3,815,490
30	2041	5,560,586	222,423	5,783,010	2.00%	64.7%	3,740,677
Total		100,000,000	73,490,297	173,490,297			151,125,217

Historical annual adjustment factor based on average annual change in CIP since 2011.
Future annual adjustment factor estimated at 2.00%.

Table 10
LVE Wheeling Rate Review
Present Value of Hypothetical Loan

Loan Amount	\$100,000,000
Interest Rate	4.00%
Repayment Term (Years)	30
Year of Issuance	2012

Pymt No.	Year	Principal Payment	Interest Payment	Total Debt Service	Annual Adjustment Factor	Debt Adjustment	Present Value
1	2013	\$1,783,010	\$4,000,000	\$5,783,010	1.58%	109.9%	\$6,353,356
2	2014	1,854,330	3,928,680	5,783,010	1.58%	108.2%	6,254,534
3	2015	1,928,504	3,854,506	5,783,010	1.58%	106.5%	6,157,250
4	2016	2,005,644	3,777,366	5,783,010	1.58%	104.8%	6,061,478
5	2017	2,085,869	3,697,141	5,783,010	1.58%	103.2%	5,967,197
6	2018	2,169,304	3,613,706	5,783,010	1.58%	101.6%	5,874,381
7	2019	2,256,076	3,526,934	5,783,010	--	100.0%	5,783,010
8	2020	2,346,319	3,436,691	5,783,010	2.00%	98.0%	5,669,618
9	2021	2,440,172	3,342,838	5,783,010	2.00%	96.1%	5,558,449
10	2022	2,537,779	3,245,231	5,783,010	2.00%	94.2%	5,449,459
11	2023	2,639,290	3,143,720	5,783,010	2.00%	92.4%	5,342,607
12	2024	2,744,862	3,038,148	5,783,010	2.00%	90.6%	5,237,850
13	2025	2,854,656	2,928,354	5,783,010	2.00%	88.8%	5,135,147
14	2026	2,968,843	2,814,167	5,783,010	2.00%	87.1%	5,034,458
15	2027	3,087,596	2,695,414	5,783,010	2.00%	85.3%	4,935,743
16	2028	3,211,100	2,571,910	5,783,010	2.00%	83.7%	4,838,964
17	2029	3,339,544	2,443,466	5,783,010	2.00%	82.0%	4,744,082
18	2030	3,473,126	2,309,884	5,783,010	2.00%	80.4%	4,651,061
19	2031	3,612,051	2,170,959	5,783,010	2.00%	78.8%	4,559,864
20	2032	3,756,533	2,026,477	5,783,010	2.00%	77.3%	4,470,455
21	2033	3,906,794	1,876,216	5,783,010	2.00%	75.8%	4,382,799
22	2034	4,063,066	1,719,944	5,783,010	2.00%	74.3%	4,296,862
23	2035	4,225,589	1,557,421	5,783,010	2.00%	72.8%	4,212,609
24	2036	4,394,612	1,388,398	5,783,010	2.00%	71.4%	4,130,009
25	2037	4,570,397	1,212,613	5,783,010	2.00%	70.0%	4,049,029
26	2038	4,753,213	1,029,797	5,783,010	2.00%	68.6%	3,969,636
27	2039	4,943,341	839,669	5,783,010	2.00%	67.3%	3,891,800
28	2040	5,141,075	641,935	5,783,010	2.00%	66.0%	3,815,490
29	2041	5,346,718	436,292	5,783,010	2.00%	64.7%	3,740,677
30	2042	5,560,586	222,423	5,783,010	2.00%	63.4%	3,667,330
Total		100,000,000	73,490,297	173,490,297			148,235,204

Historical annual adjustment factor based on average annual change in CIP since 2011.
Future annual adjustment factor estimated at 2.00%.

Appendix B

Alternative Fee Calculations for EBMUD Capital Cost Recovery

Table 1

EBMUD Fee Alternatives

LVE Wheeling Rate Review

EBMUD Capital Cost Recovery: Alternative Approaches

	Cost Estimate (Current \$)	Est. Life	Annual Depreciation	PV Debt Svc (30-Yr 4% Loan)	<u>PV Debt Service</u> Est. Asset Life	Annual Deprec	+ Rate of Return	Utility Basis	EBMUD Proposed
							3.0%		
Mokelumne Aqueduct Relining									
Project Cost Estimate	\$130,000,000	100	\$1,300,000	\$168,374,602	\$1,683,746	\$1,300,000	\$3,900,000	\$5,200,000	
Est. Capacity (MGD)			100		100			100	
Est. Capacity (AF)			112,015		112,015			112,015	
Annual Cost per AF			\$11.61		\$15.03			\$46.42	\$44
Walnut Creek VFD Project									
Project Cost Estimate	\$40,000,000	50	\$800,000	\$51,807,570	\$1,036,151	\$800,000	\$1,200,000	\$2,000,000	
Est. Capacity (AF)			112,015		112,015			112,015	
Annual Cost per AF			\$7.14		\$9.25			\$17.85	\$14

Table 2
LVE Wheeling Rate Review
Present Value of Hypothetical Loan

Loan Amount	\$100,000,000
Interest Rate	4.00%
Repayment Term (Years)	30
Year of Issuance	2020

Pymt No.	Year	Principal Payment	Interest Payment	Total Debt Service	Discount Factor	Debt Adjustment	Present Value
1	2021	\$1,783,010	\$4,000,000	\$5,783,010	2.00%	98.0%	\$5,669,618
2	2022	1,854,330	3,928,680	5,783,010	2.00%	96.1%	5,558,449
3	2023	1,928,504	3,854,506	5,783,010	2.00%	94.2%	5,449,459
4	2024	2,005,644	3,777,366	5,783,010	2.00%	92.4%	5,342,607
5	2025	2,085,869	3,697,141	5,783,010	2.00%	90.6%	5,237,850
6	2026	2,169,304	3,613,706	5,783,010	2.00%	88.8%	5,135,147
7	2027	2,256,076	3,526,934	5,783,010	2.00%	87.1%	5,034,458
8	2028	2,346,319	3,436,691	5,783,010	2.00%	85.3%	4,935,743
9	2029	2,440,172	3,342,838	5,783,010	2.00%	83.7%	4,838,964
10	2030	2,537,779	3,245,231	5,783,010	2.00%	82.0%	4,744,082
11	2031	2,639,290	3,143,720	5,783,010	2.00%	80.4%	4,651,061
12	2032	2,744,862	3,038,148	5,783,010	2.00%	78.8%	4,559,864
13	2033	2,854,656	2,928,354	5,783,010	2.00%	77.3%	4,470,455
14	2034	2,968,843	2,814,167	5,783,010	2.00%	75.8%	4,382,799
15	2035	3,087,596	2,695,414	5,783,010	2.00%	74.3%	4,296,862
16	2036	3,211,100	2,571,910	5,783,010	2.00%	72.8%	4,212,609
17	2037	3,339,544	2,443,466	5,783,010	2.00%	71.4%	4,130,009
18	2038	3,473,126	2,309,884	5,783,010	2.00%	70.0%	4,049,029
19	2039	3,612,051	2,170,959	5,783,010	2.00%	68.6%	3,969,636
20	2040	3,756,533	2,026,477	5,783,010	2.00%	67.3%	3,891,800
21	2041	3,906,794	1,876,216	5,783,010	2.00%	66.0%	3,815,490
22	2042	4,063,066	1,719,944	5,783,010	2.00%	64.7%	3,740,677
23	2043	4,225,589	1,557,421	5,783,010	2.00%	63.4%	3,667,330
24	2044	4,394,612	1,388,398	5,783,010	2.00%	62.2%	3,595,422
25	2045	4,570,397	1,212,613	5,783,010	2.00%	61.0%	3,524,923
26	2046	4,753,213	1,029,797	5,783,010	2.00%	59.8%	3,455,807
27	2047	4,943,341	839,669	5,783,010	2.00%	58.6%	3,388,046
28	2048	5,141,075	641,935	5,783,010	2.00%	57.4%	3,321,614
29	2049	5,346,718	436,292	5,783,010	2.00%	56.3%	3,256,484
30	2050	5,560,586	222,423	5,783,010	2.00%	55.2%	3,192,631
Total		100,000,000	73,490,297	173,490,297			129,518,924

Discount factor estimated at 2.00%.

Appendix C

The “Wheeling Statute”

California Water Code Sections 1810 - 1814

Code: Section: [Up^](#) [Add To My Favorites](#)**WATER CODE - WAT****DIVISION 2. WATER [1000 - 5976]** (*Division 2 enacted by Stats. 1943, Ch. 368.*)**PART 2. APPROPRIATION OF WATER [1200 - 1851]** (*Part 2 enacted by Stats. 1943, Ch. 368.*)**CHAPTER 11. Joint Use and Development [1750 - 1814]** (*Chapter 11 enacted by Stats. 1943, Ch. 368.*)**ARTICLE 4. Joint Use of Capacity in Water Conveyance Facilities [1810 - 1814]** (*Article 4 added by Stats. 1986, Ch. 918, Sec. 2.*)

1810. Notwithstanding any other provision of law, neither the state, nor any regional or local public agency may deny a bona fide transferor of water the use of a water conveyance facility which has unused capacity, for the period of time for which that capacity is available, if fair compensation is paid for that use, subject to the following:

(a) Any person or public agency that has a long-term water service contract with or the right to receive water from the owner of the conveyance facility shall have the right to use any unused capacity prior to any bona fide transferor.

(b) The commingling of transferred water does not result in a diminution of the beneficial uses or quality of the water in the facility, except that the transferor may, at the transferor's own expense, provide for treatment to prevent the diminution, and the transferred water is of substantially the same quality as the water in the facility.

(c) Any person or public agency that has a water service contract with or the right to receive water from the owner of the conveyance facility who has an emergency need may utilize the unused capacity that was made available pursuant to this section for the duration of the emergency.

(d) This use of a water conveyance facility is to be made without injuring any legal user of water and without unreasonably affecting fish, wildlife, or other instream beneficial uses and without unreasonably affecting the overall economy or the environment of the county from which the water is being transferred.

(*Added by Stats. 1986, Ch. 918, Sec. 2.*)

1811. As used in this article, the following terms shall have the following meanings:

(a) "Bona fide transferor" means a person or public agency as defined in Section 20009 of the Government Code with a contract for sale of water that may be conditioned upon the acquisition of conveyance facility capacity to convey the water that is the subject of the contract.

(b) "Emergency" means a sudden occurrence such as a storm, flood, fire, or an unexpected equipment outage impairing the ability of a person or public agency to make water deliveries.

(c) "Fair compensation" means the reasonable charges incurred by the owner of the conveyance system, including capital, operation, maintenance, and replacement costs, increased costs from any necessitated purchase of supplemental power, and including reasonable credit for any offsetting benefits for the use of the conveyance system.

(d) "Replacement costs" mean the reasonable portion of costs associated with material acquisition for the correction of irreparable wear or other deterioration of conveyance facility parts that have an anticipated life that is less than the conveyance facility repayment period and which costs are attributable to the proposed use.

(e) "Unused capacity" means space that is available within the operational limits of the conveyance system and that the owner is not using during the period for which the transfer is proposed and which space is sufficient to convey the quantity of water proposed to be transferred.

(*Amended by Stats. 1998, Ch. 485, Sec. 161. Effective January 1, 1999.*)

1812. The state, regional, or local public agency owning the water conveyance facility shall in a timely manner determine the following:

(a) The amount and availability of unused capacity.

(b) The terms and conditions, including operation and maintenance requirements and scheduling, quality requirements, term or use, priorities, and fair compensation.

(Added by Stats. 1986, Ch. 918, Sec. 2.)

1813. In making the determinations required by this article, the respective public agency shall act in a reasonable manner consistent with the requirements of law to facilitate the voluntary sale, lease, or exchange of water and shall support its determinations by written findings. In any judicial action challenging any determination made under this article the court shall consider all relevant evidence, and the court shall give due consideration to the purposes and policies of this article. In any such case the court shall sustain the determination of the public agency if it finds that the determination is supported by substantial evidence.

(Added by Stats. 1986, Ch. 918, Sec. 2.)

1814. This article shall apply to only 70 percent of the unused capacity.

(Added by Stats. 1986, Ch. 918, Sec. 2.)

Appendix D

CCWD Proposed Wheeling Charges

Contra Costa Water District Proposed Usage Fees

Draft: October 5, 2018

Updated: June 2019

A usage fee will be included in the reimbursements to the Contra Costa Water District (CCWD) for the use of CCWD's existing facilities as part of the Phase 2 Los Vaqueros Reservoir Expansion Project (Project). The usage fee to be collected by CCWD is intended to recover three components of CCWD's costs: capacity usage, renewal/replacement, and operations/maintenance.

Capacity Usage Fee

Excess or unused capacity in CCWD's existing facilities will be utilized to convey water to the Local Agency Partners according to the Project's operational rules and priorities. CCWD has developed a "rental" model in past agreements where the capacity usage fee is determined by dividing the interest on the debt service by annual deliveries to develop a cost per acre-foot. The principal amount of the debt service is not included in the calculation of the capacity usage fee as the renter is not receiving the same priority and benefits that the owner of the facility enjoys. The capacity usage fee in this instance is not conveying ownership. The interest only portion of the debt service is based on the original project costs in the year the facilities were constructed. The costs have not been inflated to current dollars. The intent of the Capacity Usage Fee is to recover a proportional and fair share of the value of the past investment of CCWD customers in the facilities, recognizing the depreciated value and lower priority of use. The Capacity Usage Fee would not be adjusted for inflation in future years, and would be eliminated when the facility is replaced. The draft capacity usage fees for conveyance facilities are provided in Table 1.

Table 1 – Conveyance Capacity Usage Fees

Conveyance Facility	Original Cost, less Grants	Cost Year	Capacity (cfs)	Debt Service Interest ² (\$/yr)	Capacity Usage Fee ³ (\$/AF)
Los Vaqueros Pipeline	\$48,519,455	1996	400	\$1,307,800	\$14.11
Middle River Pipeline	\$40,963,850	2011	250	\$1,104,145	\$19.06
Middle River Intake	\$24,736,150	2011	250	\$666,742	\$11.51
Old River Pipeline	\$38,293,849	1996	320	\$1,032,178	\$13.92
Old River Intake	\$30,497,364	1996	250	\$822,030	\$14.19
Rock Slough Facilities ¹	\$117,170,377	Various	350	\$3,158,226	\$38.95
Transfer Pipeline	\$23,998,870	1996	200	\$646,869	\$13.96
Transfer Pump Station/Tank	\$17,281,844	1996	200	\$465,817	\$10.05

1. Rock Slough Facilities include the Rock Slough Fish Screen, Canal Replacement Project (4 miles), Contra Costa Canal (3 miles), and Pumping Plants 1 – 4.
2. Facilities are at various stages of debt service. The interest payment is assumed to be equal to the interest only portion of the debt service at year 15 of a 30-year loan at 4%.
3. The capacity usage fee was determined per acre-feet of water delivered by applying an overall facility utilization factor of 32%, based on operations modeling results (see Utilization Factor section).

The Project includes the expansion of the Los Vaqueros Reservoir from its current capacity of 160 thousand acre-feet (TAF) to 275 TAF. The costs to expand the dam would be fully paid by the Project beneficiaries. The existing reservoir will serve as the foundation to the expanded reservoir and previous CCWD investment and existing dam facilities will provide benefits to the Project.

The determination of the capacity usage fee for the existing Los Vaqueros Dam follows the same methodology as the conveyance facilities (debt service interest); however, an adjustment factor is proposed to recognize that CCWD's storage capacity is not directly used or impacted by the new storage. The usage fee would be applied each year water is stored in the expanded reservoir. An alternative to a volumetric usage fee for storage would be an annual fixed payment to CCWD, CCWD Usage Fees

which could be considered in future negotiations. The draft capacity usage fees for the existing Los Vaqueros Dam facilities are provided in Table 2.

Table 2 – Storage Capacity Usage Fees

Facility	Original Cost (\$)	Debt Service Interest ² (\$/yr)	Full Usage Fee (\$/AF/yr)	Pro-Rated Usage Fee ³ (\$/AF/yr)
Los Vaqueros Dam Facilities ¹	\$385,635,618	10,394,475	\$64.97	\$37.80

1. Includes the original 100 TAF dam (1996: \$290,035,618) and expansion to 160 TAF (2012: \$95,600,000).
2. Facilities are at various stages of debt service. The interest payment is assumed to be equal to the interest only portion of the debt service at year 15 of a 30-year loan at 4%.
3. Pro-rated usage fee was assumed to be 58% of the Full Usage fee based on the proportion of CCWD's capacity (160 TAF) to the expanded reservoir capacity (275 TAF).

Renewal/Replacement (Wear & Tear) Usage Fee

The additional use of CCWD's facilities will incrementally increase the renewal and replacement costs, as pumps, motors, and other facilities will require more frequent rehabilitation than would have been required absent the Project. The costs for the increased rehabilitation needs and replacement for conveyance facilities (intakes, pump stations, pipelines) is proposed to be recovered through a wear and tear usage fee, with the intent being to recover a proportional and fair share of future capital renewal and replacement costs. The wear and tear usage fee is determined by dividing the annual depreciation of the facility by the annual deliveries to determine a per acre-foot charge. Annual depreciation is based on the current replacement cost. CCWD will also seek the ability to review the wear and tear charge periodically with Local Agency Partners, or upon significant facility rehabilitation, to ensure that the charge is appropriately recovering the cost of incremental wear and tear. Local Agency Partners would not be responsible for any additional renewal/replacement costs (including facility replacement) beyond the renewal/replacement usage fee. The draft renewal/replacement usage fees are provided in Table 3.

Table 3 – Renewal/Replacement Usage Fee

Conveyance	Replacement Cost	Assumed Useful Life	Capacity	R/R Usage Fee, \$/AF
Los Vaqueros Pipeline	\$89,043,961	75	400	\$12.81
Middle River Pipeline	\$69,462,174	75	250	\$15.99
Middle River Intake	\$41,499,765	50	250	\$14.33
Old River Pipeline	\$70,277,707	75	320	\$12.64
Old River Intake	\$55,969,428	50	250	\$19.33
Rock Slough Facilities ¹	\$299,055,398	75	350	\$49.18
Transfer Pipeline	\$44,043,250	75	200	\$12.67
Transfer Pump Station and Tank	\$31,716,017	40	200	\$17.11

1. Rock Slough Facilities exclude Pumping Plant 1, as this is a modified facility and R/R for PP1 is included elsewhere in the financial model.
2. The usage fee was determined per acre-feet of water delivered by applying an overall facility utilization factor of ~~33-~~32%, based on operations modeling results.

Operations and Maintenance

The District incurs both fixed and variable costs in operating and maintaining the existing facilities. Some examples of fixed O&M costs include valve exercising, preventative maintenance, labor, agency fees, and biological monitoring. These fixed costs do not change significantly in response to varying water deliveries. Fixed O&M costs for the existing facilities are proposed to be allocated to the Local Agency Partners based on the average historical modeled deliveries, as established in the Proforma financial model. On average, the LAPs proportional share of deliveries (excluding refuges) through CCWD conveyance facilities has ranged from approximately 30 to 35%, depending on the particular CALSIM run utilized. For example, The Local Agency Partners receive approximately 33% of the water delivered through the facilities and would be allocated 33% of the fixed O&M costs associated with those facilities. The fixed O&M is currently estimated to be \$3.2 million per year. The proportion allocated for reimbursement is 33% of this amount, or \$1.05 million.

Power is the primary variable O&M cost, and the additional power costs associated with pumping of water for Project beneficiaries would be passed on directly to the Local Agency Partners. Current estimates of power costs for the existing facilities are shown in Table 4.

Table 4 – Variable Power Costs

Facility	Estimated Power Cost (\$/AF)
Middle River Intake	\$46.70
Old River Intake	\$38.20
Rock Slough Facilities	\$22.70
Transfer Pump Station	\$70.00

Utilization Factor

An overall facility utilization factor is used to determine the per acre-foot charge for water delivered through the facilities. The utilization factor considers all uses (CCWD, refuges, LAPs) and represents the average utilization of CCWD facilities relative to capacity. Facility usage data is provided in Table 5. The calculation of the utilization factor is provided in Table 6.

Table 5 – Facility Usage in TAF

Facility	Alt 1B CCWD, TAF	Alt 1B Refuge, TAF	Alt 1B LAP, TAF	Alt 1B Total, TAF
Los Vaqueros Pipeline	57.8	10	23.3	91.1
Middle River Intake/Pipeline	33.2	5.7	13.4	52.4
Old River Intake	14.0	2.4	5.6	22.0
Old River Pipeline	35.9	6.2	14.5	56.6
Rock Slough Intake	96.5	16.7	38.9	152.1
Transfer Facility & Pipeline	7.3	0.2	28.6	36.1

Table 6 – Facility Utilization

	Alt 1B CCWD, CFS	Alt 1B Refuge, CFS	Alt 1B LAP, CFS	Alt 1B Total , CFS	Capacity, CFS	Total, Capacity Utilization
Los Vaqueros Pipeline	79.8	13.8	32.2	125.8	400	31.5%
Middle River Intake	45.9	7.9	18.5	72.4	250	29.0%
Old River Intake	19.3	3.3	7.7	30.4	250	12.2%
Old River Pipeline	49.6	8.6	20.0	78.2	320	24.4%
Rock Slough Intake	133.3	23.1	53.7	210.1	350	60.0%
Transfer Facility & Pipeline	10.1	0.3	39.5	49.9	200	24.9%
Totals				566.8	1770.0	32.0%

Latest version of Draft Pro Forma results in utilization factor calculation of 35%

Appendix E

EBMUD Proposed Wheeling Charges

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: October 18, 2018

MEMO TO: Maureen Martin, Contra Costa Water District

FROM: Alice Towey, East Bay Municipal Utility District

SUBJECT: EBMUD Usage Fee Calculation for Los Vaqueros Reservoir Expansion Project

INTRODUCTION

EBMUD is evaluating participation in the Los Vaqueros Reservoir Expansion Project. One option for EBMUD participation would be to use available capacity in its facilities, including the Freeport Facilities and the Mokelumne Aqueducts, to wheel water to the Los Vaqueros Reservoir on behalf of other Project Partners. To help with discussions related to cost, EBMUD has prepared this first draft, preliminary usage fee to reflect the costs associated with wheeling water through its facilities. This usage fee has been incorporated into the proforma financial model developed by Clean Energy Capital. It should be noted that this usage fee is approximate, preliminary, and is subject to further refinement by EBMUD.

The purpose of this memorandum is to document the assumptions underlying the preliminary usage fee and to present some of the potential restrictions on use of EBMUD facilities by other Project Partners.

EBMUD FACILITIES

Figure 1 shows the EBMUD facilities that could be used to wheel water to the Los Vaqueros Reservoir. EBMUD facilities include the Freeport Regional Water Project (FRWP), the Folsom South Canal Connection (FSCC), the Mokelumne Aqueducts, and the EBMUD-CCWD raw water intertie. CCWD or other Project Partners could use these facilities to wheel water supplies including CVP supplies or transfer water.

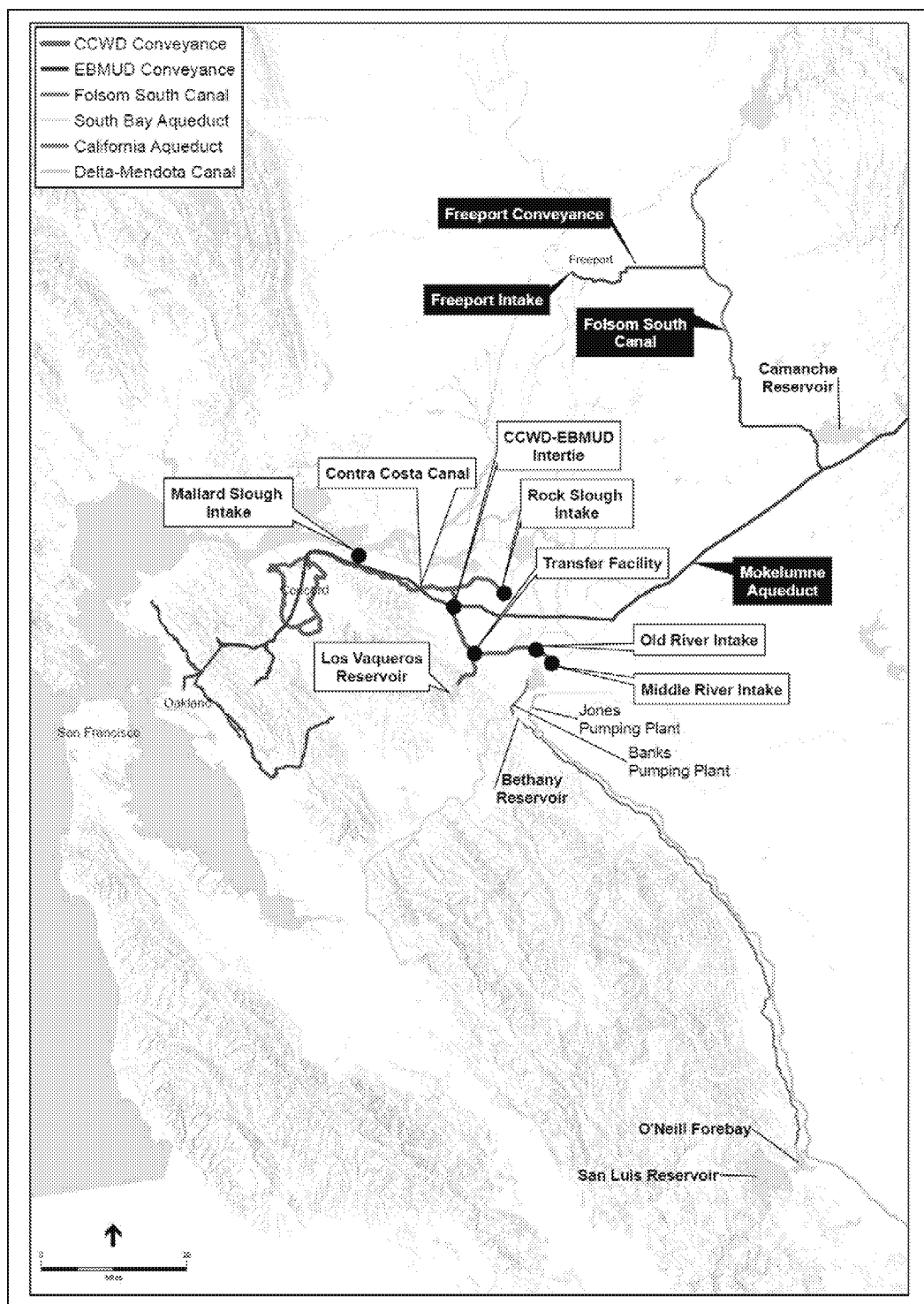


Figure 1. EBMUD and CCWD Facilities

EBMUD USAGE FEE CALCULATION

Table 1 summarizes the components of the preliminary EBMUD Usage Fee. These components include a facility use charge, costs for conveyance, and Freeport start-up and shutdown. Cost per

acre-foot (AF) for the Mokelumne Aqueduct Relining project and Walnut Creek Pumping Plant (WCPP) Variable Frequency Drive (VFD) project are also included. Following are more details on each component.

Facility Use Charge

The facility use charge is based on proportionate use of facility capacity and annual depreciation. The costs in the usage fee are based on a tech memo prepared in 2013 as part of the Bay Area Regional Desalination Project, “Annual Fixed Cost Estimate for Wheeling Desalination Water Using EBMUD’s System.”

Conveyance

The conveyance costs included in the table are provided as an estimate; normally EBMUD would bill the recipient of the water based on actual time, materials, and other costs. This component includes costs associated with physically moving the water from FRWP to the Los Vaqueros Reservoir. Costs for operations of FRWA and the FSCC are based on actual 2014-2015 operating costs. Raw water pumping costs at the Walnut Creek Pumping Plant are estimates. The cost to refill EBMUD’s Briones Reservoir following completion of the transfer is also included; typically Briones storage is depleted to meet EBMUD demands while Mokelumne Aqueduct No. 2 is dedicated to the wheeling operation.

Freeport Start-up and Shutdown

There are considerable costs associated with start-up and shutdown of the Freeport Facilities; for the purposes of this Usage Fee calculation, EBMUD assumed a \$750,000 cost for each use of these facilities, based on real costs in 2014-2015. The start-up and shutdown costs are incurred each time the facilities are placed into service, regardless of the duration of use of the facilities. Costs include draining, chlorinating, and refilling the pipeline and startup and testing of pump stations.

The \$750,000 cost was converted to a \$/AF value by examining the CalSIM modeling results from CCWD. Over the 82-year hydrologic record, the CalSIM results show fifteen periods of time when EBMUD’s Freeport facilities would be used for one or more contiguous years. For each period, it was assumed that the Freeport facilities would be started up and shutdown once, and that the cost of startup and shutdown would be shared evenly by each agency moving water that period. For each contiguous period, the \$750,000 startup cost was divided by the volume conveyed during that period to determine a cost per AF for that period. Then, the results of all fifteen periods were averaged, and the median and mean were used to provide the range of costs per AF that are included in Table 1.

Mokelumne Aqueduct Relining

EBMUD would use its Mokelumne Aqueduct No. 2 to convey Mokelumne River water to the Los Vaqueros Reservoir. However, studies conducted by EBMUD have shown that this Aqueduct is in need of extensive maintenance. EBMUD has determined that a planned maintenance project – the Mokelumne Aqueduct Relining Project – would contribute to the overall reliability of the Project by ensuring that there is hydraulic capacity to convey the water to the reservoir and by reducing the risk of aqueduct failure. This maintenance project will preserve the integrity of the pipe and restore its hydraulic capacity.

EBMUD has developed a planning level cost estimate for the Relining Project. For the purposes of the LVE project, only the length of pipe from EBMUD's Pardee Reservoir to the CCWD intertie is considered here, although EBMUD plans to reline the pipe all the way to the WCPP, as well as portions of Mokelumne Aqueduct No. 3. The approximate cost to reline this 40 mile length of pipeline is estimated to be \$130 million. CCWD's application for grant funding through the Water Storage Improvement Program (WSIP) included \$18.06 million for this project, but for the purposes of this preliminary usage fee calculation the WSIP funding is not considered.

EBMUD followed a "rental" model similar to that used by CCWD to develop a per-AF unit cost for this project. The capacity usage fee for this project was calculated by dividing the interest on debt service (based on year fifteen of a 30-year loan at 4% interest) by the aqueduct capacity, assumed here to be 100 MGD.

Additional use of EBMUD's facilities will also incrementally increase the renewal and replacement costs. EBMUD accounted for increased wear and tear on the Mokelumne Aqueduct No. 2 by dividing the annual depreciation of the facility (based on the \$130 million cost of the relining project) by the aqueduct capacity.

Walnut Creek Pumping Plant VFD Project

Wheeling water for the Project Partners as currently envisioned would require EBMUD to make upgrades at its WCPP, particularly the installation of VFDs to balance flows coming in with system demands. EBMUD has developed a conceptual cost estimate of \$40 million for this project. The WSIP funding application included \$5.6 million for this project, but for the purposes of this preliminary usage fee the grant funding is not considered.

Unlike the Mokelumne Aqueduct Relining Project, EBMUD is only implementing this capital project if it participates in the Los Vaqueros Reservoir Expansion Project. Therefore, EBMUD used a different methodology for calculating costs.

The cost per AF was developed by dividing the annual interest on debt service, plus half of the principal, by the aqueduct capacity of 100 MGD. Only 50% of the principal is charged, to reflect the fact that EBMUD would derive benefits from the project outside of participation in Los Vaqueros.

AVAILABILITY OF EBMUD FACILITIES TO WHEEL WATER

There are operational limitations on when EBMUD could wheel water for the Project, as EBMUD would need to ensure availability of the Mokelumne Aqueducts to meet its own ongoing operational needs. During the summer, EBMUD generally requires the full use of the Mokelumne Aqueducts to meet customer demands. EBMUD's Mokelumne Aqueduct No. 2 may be available during wet years in the months of October through February for use to move water for the project partners. Availability of the Mokelumne Aqueduct to wheel water for other agencies may be affected by future changes in hydrology, customer needs, and regulatory requirements. In addition, for the next twenty years, there are planned maintenance activities

during this four-month window that may periodically make the Mokelumne Aqueducts unavailable. Therefore, Mokelumne Aqueduct No. 2 is only available on a case-by-case, or year-by-year, basis.

In addition, the use of EBMUD facilities to wheel water for other agencies would be guided by the “Principles for Use by Other Parties of Unassigned EBMUD Capacity in Freeport Regional Water Project Facilities,” adopted by EBMUD’s Board of Directors on January 10, 2017 (see Attachment 1). These Principles set out EBMUD’s objectives for the facilities and conditions for use. Use of the facilities must not interfere with EBMUD or Sacramento County Water Agency’s use of the facilities. The Principles also emphasize the need for project proponents to demonstrate good conservation practices.

Table 1. EBMUD USAGE FEES

Includes Freeport Facilities, Mokelumne Aqueducts, Intertie
October 18, 2018

Component	Cost/AF ⁽¹⁾	Notes
Facility Use Charge	\$120	Use charge is based on proportionate use of the facility capacity and annual depreciation of facility. Rehab or financing costs for Freeport Facilities are not included since the facilities are fairly new.
Conveyance ⁽²⁾	\$306	Includes FRWA operations, FSCC, SMUD mitigation, chemicals, full cost of labor, Briones refill, Walnut Creek pumping, ODCs. Aqueducts or intertie costs are not included.
Freeport Start-up and Shutdown ⁽²⁾⁽³⁾	\$12-\$52	Based on 2014 actual costs for Freeport startup and shutdown and CCWD CalSIM modeling results.
Mokelumne Aqueduct Relining ⁽⁴⁾	\$44	
Walnut Creek Pumping Plant VFD Project ⁽⁵⁾	\$14	
Total	\$496-\$536	

Notes:

1 Costs are estimates and subject to change.

2 This is a cost estimate. In most cases, EBMUD would bill the party for costs based on actual time, materials, and other costs.

3 Based on 2014 Freeport project operation cost, 2016 depreciation rates, and Regional Desalination wheeling cost estimates.

4 Cost includes payment of interest on debt service and depreciation divided by aqueduct capacity.

5 Cost includes payment of interest on debt service and half of principal divided by aqueduct capacity.

Attachment 1
“Principles for Use by Other Parties of Unassigned EBMUD
Capacity in Freeport Regional Water Project Facilities”

Revised
Principles for Use by Other Parties of Unassigned EBMUD Capacity in
Freeport Regional Water Project Facilities
January 10, 2017

Definition:

Unassigned East Bay Municipal Utility District (EBMUD) capacity means any capacity dedicated to EBMUD remaining in the Freeport Regional Water Project (Freeport Project) facilities after meeting all EBMUD needs.

Purpose:

EBMUD anticipates interest on the part of third parties regarding EBMUD's unassigned capacity of the Freeport Project facilities. These principles are intended to guide decisions related to the use of the unassigned capacity.

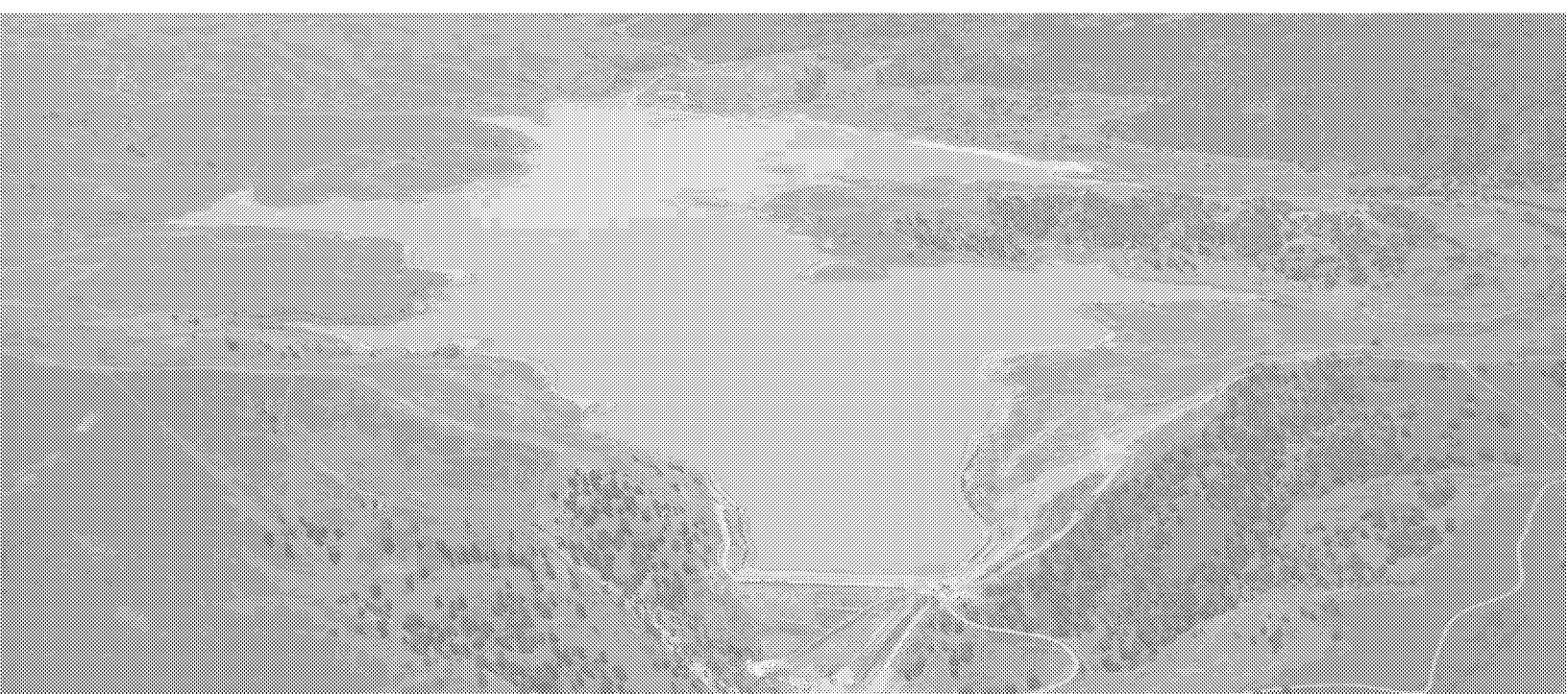
EBMUD Objectives:

1. Deliver water to improve reliability for EBMUD customers.
2. Deliver water as an alternate supply to facilitate maintenance of Mokelumne facilities.
3. Protect and restore or enhance the environment of the Delta and its tributaries, and meet water conservation and recycling objectives as detailed in the Delta Plan.
4. Minimize EBMUD capital and operation cost for Freeport Project.

Conditions for Use:

1. Any proposed use of the Freeport Project unassigned EBMUD capacity must be consistent with the Freeport Regional Water Authority (FRWA) Joint Powers Agreement between EBMUD and the Sacramento County Water Agency, and the settlement agreements between FRWA and the state and federal water contractors. The Joint Powers Authority agreement between EBMUD and Sacramento County Water Agency prohibits EBMUD from contracting for the use of its Dedicated Capacity for the delivery of water for use within the County of Sacramento without the prior approval of Sacramento County Water Agency.
2. Any proposed use of the unassigned EBMUD capacity will include a complete project description and shall be subject to applicable environmental regulations and laws including the California Environmental Quality Act (CEQA), the National Environmental Protection Act (NEPA), the Endangered Species Act (ESA), the Clean Water Act (CWA), the state and federal Wild and Scenic Rivers Acts, and all others that may also be applicable. This shall include providing a project description with full environmental review and permitting.
3. Any proposed use of the EBMUD unassigned capacity shall not negatively impact project performance for FRWA member agencies, including water quantity and water quality.

4. The proposed use shall not negatively impact EBMUD or Sacramento County Water Agency water rights, contract rights, water quality, or customer rates. The proposed use shall not interfere with current or future needs of EBMUD customers.
5. Any proposed use of the EBMUD unassigned capacity that requires conveyance through the Folsom South Canal must have the approval of the U.S. Bureau of Reclamation. It is the FRWA agencies' expectation and preference that any uses of the unassigned capacity shall have a diversion point only on the Sacramento River.
6. Proposed uses shall:
 - ◆ Not diminish water quality, environmental, reliability, or recreational benefits unless mitigated.
 - ◆ Not redirect impacts from one sensitive fishery of concern to another, and preferably provide net benefits to fish and wildlife.
 - ◆ Utilize the best available scientific analysis within an open and inclusive stakeholder process.
7. Water agencies proposing to use EBMUD's unassigned capacity shall demonstrate:
 - ◆ Water conservation programs achieving high levels of savings including compliance with state-mandated drought demand reductions compliant with SBx7-7, agency demand limits under Executive Order B-37-16 for urban and agricultural users, or the most current state or local use restrictions applicable for the area of intended use;
 - ◆ That the capacity will not be used to serve unsustainable new development or agricultural uses (consistent with the definition of sustainable in Policy 7.05);
 - ◆ That end use billing will include a volumetric component;
 - ◆ That water losses are being reduced in accordance with the most current state or local requirements.
8. In the event of competing applications for use of the unassigned capacity, the project that is deemed to best meet EBMUD objectives and result in the greatest environmental benefit will be favored. Environmental benefits may include, but are not limited to increased releases for fisheries, wetland creation, surface and groundwater quality improvements, groundwater basin recovery, or increased surface water flows in dry years.
9. Proponents for use of EBMUD's unassigned capacity should work with relevant agencies to ensure any use of unassigned EBMUD capacity is consistent with the Delta Plan and all other applicable state requirements. Such use of EBMUD's unassigned capacity is further conditioned on continued compliance with all applicable State Board standards and decisions.
10. Proponents for use of EBMUD's unassigned capacity shall pay all costs of operation related to their use of the unassigned capacity and a negotiated share of capital and financing costs of



Sites Reservoir Project - 3 Month Look Ahead

Primary	Assigned To	Governing Body
April 2023		
Consent Items		Joint Authority Board & Reservoir Committee
Minutes	Sandra Yarbrough	Joint Authority Board & Reservoir Committee
Treasurer's Report	Joe Trapasso	Joint Authority Board & Reservoir Committee
Payment of Claims	Joe Trapasso	Joint Authority Board & Reservoir Committee
Action Items		
Procurement Strategy Adoption	Cheyenne Harris, Joe Trapasso, JP Robinette, Pat Tangora	Joint Authority Board & Reservoir Committee
Reclamation Preconstruction MOA - Authorization to Sign	Ali Forsythe	Joint Authority Board & Reservoir Committee
Discussion and Informational Items		
Final EIR/EIS Status Briefing - Part 3 of 3 in Preparation for Approval of Project	Ali Forsythe, Laurie Warner Herson	Joint Authority Board & Reservoir Committee
Placeholder - Review and concur with allocations of Storage space and proportionate shares of diverted water for Participants based on conditional State and Federal participation.	Angela Bezzone	Joint Authority Board & Reservoir Committee
Review of Conveyance and Storage Loss Assumptions, confirm the Deadpool assumption of 60taf, and evaluate considerations to be included in the B&O contract related to the risks associated with actual conditions limiting the ability to deliver Sites water when storage is approaching Deadpool but no actually reaching the assumed level.	JP Robinette	Joint Authority Board & Reservoir Committee
Monthly Reporting (Monthly Status Report, Work Plan, Action Items)	All	Joint Authority Board & Reservoir Committee
Closed Session		
Update on Water Rights Resubmittal	Ali Forsythe	Joint Authority Board & Reservoir Committee
Negotiations of Terms with USFWS/NMFS	Ali Forsythe	Joint Authority Board & Reservoir Committee
Committees/Workgroups		
Governance Adhoc	Jerry Brown	Joint Authority Board & Reservoir Committee
Payment of Claims	Joe Trapasso	Budget & Finance Committee
Placeholder - Proforma 2.0 Update to Support mid-2023 Participant 'Soft Call'	Brian Thomas, JP Robinette	Budget & Finance Committee
Review of Conveyance and Storage Loss Assumptions	Angela Bezzone, JP Robinette	Reservoir Operations & Engineering Workgroup
Soft Call Prep, Cost Estimate - Market Conditions Update	Henry Luu, JP Robinette	Reservoir Operations & Engineering Workgroup
Informational report out from Ad Hoc Contract Strategy O&E Subworkgroup	JP Robinette	Reservoir Operations & Engineering Workgroup
Final EIR/EIS Status Briefing - Part 3 of 3 in Preparation for Approval of Project	Ali Forsythe, Laurie Warner Herson	Environmental Planning & Permitting Workgroup
May 2023		
Consent Items		Joint Authority Board & Reservoir Committee
Minutes	Sandra Yarbrough	Authority Board & Reservoir Committee
Treasurer's Report	Joe Trapasso	Authority Board & Reservoir Committee
Payment of Claims	Joe Trapasso	Authority Board & Reservoir Committee
First Quarter 2023 Quarterly Report	Joe Trapasso	Joint Authority Board & Reservoir Committee
Investment Policy	Brian Thomas, Joe Trapasso	Joint Authority Board & Reservoir Committee
Placeholder Asset Policy	Brian Thomas, Joe Trapasso	Joint Authority Board & Reservoir Committee
Action Items		
NMFS Reimbursable Agreement - Approve ED entering into reimbursable agreement with NMFS	Ali Forsythe, John Spranza	Joint Authority Board & Reservoir Committee
Discussion and Informational Items		
Plan of Finance / Big 3 Questions Update to Support mid-2023 Participant 'Soft Call'	Brian Thomas, JP Robinette	Joint Authority Board & Reservoir Committee
Final EIR/EIS Status Briefing - Additional Briefing in Preparation for Approval of Project	Ali Forsythe, Laurie Warner Herson	Joint Authority Board & Reservoir Committee
Monthly Reporting (Monthly Status Report, Work Plan, Action Items)	All	Joint Authority Board & Reservoir Committee
Closed Session		

Primary	Assigned To	Governing Body
Placeholder- Property Acquisition Update	Kevin Spesert	
Placeholder - Tribal MOA - Principles and Parameters	Ali Forsythe	Joint Authority Board & Reservoir Committee
Placeholder - Water Rights - Protests Status Update Briefing (Want to have this after the protest period closes)	Ali Forsythe	Joint Authority Board & Reservoir Committee
Placeholder - B & O Contract Principles	Cheyenne Harris, Elizabeth Cousins, JP Robinette	Authority Board & Reservoir Committee
Committees/Workgroups		
No O&E Workgroup This Month		
ROW Manual Discussion	Kevin Spesert	Land Management Committee
Project Roadway Discussion	Kevin Spesert	Land Management Committee
Placeholder - TROE/Acquisition Update	Kevin Spesert	Land Management Committee
Federal/State Legislative Update	Kevin Spesert	Legislative & Outreach Committee
Comms Program Update	Kevin Spesert	Legislative & Outreach Committee
Payment of Claims	Joe Trapasso	Budget & Finance Committee
First Quarter 2023 Quarterly Report	Joe Trapasso	Budget & Finance Committee
Investment Policy	Joe Trapasso	Budget & Finance Committee
Asset Policy	Joe Trapasso	Budget & Finance Committee
Final EIR/EIS Status Briefing - Additional Briefing in Preparation for Approval of Project	Ali Forsythe, Laurie Warner Herson	Environmental Planning & Permitting Workgroup
NMFS Reimbursable Agreement - Approve ED entering into reimbursable agreement with NMFS	Ali Forsythe, John Spranza	Environmental Planning & Permitting Workgroup
June 2023		
Consent Items		
Minutes		Joint Authority Board & Reservoir Committee
Treasurer's Report	Sandra Yarbrough	Authority Board & Reservoir Committee
Payment of Claims	Joe Trapasso	Authority Board & Reservoir Committee
	Joe Trapasso	Authority Board & Reservoir Committee
Action Items		
Final EIR/EIS - Approval of Project	Ali Forsythe, Laurie Warner Herson	Joint Authority Board & Reservoir Committee
Placeholder - Authority Board Approval to proceed with negotiation of Benefits and Obligations Contract with Participants and distribute first draft of Contract for Participant review/comment	Cheyenne Harris, Elizabeth Cousins, JP Robinette	Joint Authority Board & Reservoir Committee
Discussion and Informational Items		
Clean Water Act 404 and 401 Permit Applications - Overview in Prep to Approve Submittal next Month - pls make sure Section 2.5 is met prior to board presentation	Ali Forsythe, Jelica Arsenijevic	Joint Authority Board & Reservoir Committee
Section 106 - Cultural Resources Status Update	Ali Forsythe	Joint Authority Board & Reservoir Committee
Participant Soft Call	Brian Thomas, Cheyanne Harris, JP Robinette	Authority Board & Reservoir Committee
Placeholder Consider an action related to Sell/Lease Transactions Framework	Jerry Brown	Joint Authority Board & Reservoir Committee
Governance Committee Update-preliminary term sheet	Jerry Brown	Joint Authority Board & Reservoir Committee
Monthly Reporting (Monthly Status Report, Work Plan, Action Items)	All	
Closed Session		
Placeholder Clean Water Act 404 and 401 Permit Applications	Ali Forsythe, Jelica Arsenijevic	Authority Board & Reservoir Committee
Placeholder Section 106 - Cultural Resources Negotiations	Ali Forsythe	Authority Board & Reservoir Committee
Water Right Terms - Protest Negotiations	Ali Forsythe	Joint Authority Board & Reservoir Committee
Committees/Workgroups		
Governance Adhoc	Jerry Brown	Joint Authority Board & Reservoir Committee
Update on TRR sizing and considerations	Henry Luu, JP Robinette	Reservoir Operations & Engineering Workgroup
Section 106 - Cultural Resources Status Update	Ali Forsythe	Environmental Planning & Permitting Workgroup
Local Community Working Group (Bi-Monthly)	Kevin Spesert	

From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 4/4/2023 3:01:04 PM
To: Jerry Brown [jbrown@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Project - Delta Outflow Changes by Water Year Type by Month
Attachments: Changes in Delta Outflow.pptx

See attached. Let me know if you would like any changes or need anything else to prepare for tomorrow's meeting.

Angela

From: Angela Bezzone
Sent: Tuesday, April 4, 2023 1:12 PM
To: 'Jerry Brown' <jbrown@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Project - Delta Outflow Changes by Water Year Type by Month

Hi Jerry – I'm working on this. I need Steve's help to put in percentages for the annual values. I will get the ppt slide over to you soon.

Angela

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Tuesday, April 4, 2023 7:30 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: Re: Sites Project - Delta Outflow Changes by Water Year Type by Month

CAUTION - EXTERNAL SENDER: This email originated from outside of the organization. Only open links from **TRUSTED** sources.

Yes, as expected 'deminimus' effect on delta outflow.

Angela - Can you sum the rows to come to an annual total effect for water year type? This would help us to show there are pluses that offset the minuses. Also throw the table on a ppt slide. thanks

From: Alicia Forsythe <aforsythe@sitesproject.org>
Date: Monday, April 3, 2023 at 6:48 PM
To: Jerry Brown <jbrown@sitesproject.org>
Cc: Angela Bezzone <bezzone@mbkengineers.com>
Subject: FW: Sites Project - Delta Outflow Changes by Water Year Type by Month

Jerry – See below for changes in Delta outflow. This is from Alt 3 from the Final EIR/EIS modeling. So a full 25% Reclamation investment based on historical hydrology.

This is consistent with how I was expecting this to come out. Pretty minor changes in outflow in all years because of the project.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Monday, April 3, 2023 1:00 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>
Cc: Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: RE: Sites Project - Delta Outflow Changes by Water Year Type by Month

Hi Ali and Angela,

See table of Delta outflow statistics below.

Note that, under Alternative 3, there are increases to Delta outflow (due to Prop 1 Yolo Bypass releases, Fall Flow stability releases, Spring Pulse flow releases, etc.)

Per CalSim II limitations, I narrowed the max and min values to 95th and 5th percentile of differences, respectively.

Let me know if you have any questions.

Thanks,
Steve

Change to Delta Outflow (TAF), Alternative 3 051722 minus No Action Alternative 051422

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
Wet Water Years (32%)	2 (0%)	-19 (-3%)	-27 (-2%)	-79 (-2%)	-102 (-2%)	-43 (-1%)	-44 (-1%)	-6 (0%)	-1 (0%)	-1 (0%)	21 (5%)	23 (3%)
Above Normal Water Years (15%)	26 (6%)	23 (4%)	-44 (-4%)	-110 (-4%)	-72 (-2%)	-106 (-3%)	-10 (-1%)	18 (1%)	-9 (-1%)	5 (1%)	22 (6%)	28 (4%)
Below Normal Water Years (17%)	56 (15%)	24 (4%)	-70 (-4%)	-48 (-4%)	-40 (-2%)	-50 (-3%)	-16 (-1%)	2 (0%)	-4 (-1%)	5 (1%)	9 (4%)	11 (5%)
Dry Water Years (22%)	9 (4%)	-11 (-3%)	38 (3%)	-17 (-2%)	-40 (-3%)	-39 (-3%)	1 (0%)	0 (0%)	0 (0%)	7 (2%)	15 (7%)	12 (7%)
Critical Water Years (15%)	-7 (-3%)	5 (2%)	-3 (-1%)	-12 (-2%)	-5 (-1%)	-19 (-3%)	0 (0%)	3 (1%)	1 (0%)	6 (2%)	7 (3%)	5 (3%)
Long-term Average	15 (4%)	0 (0%)	-19 (-1%)	-55 (-2%)	-59 (-2%)	-49 (-2%)	-18 (-1%)	2 (0%)	-2 (0%)	4 (1%)	16 (5%)	17 (4%)
Max (95th Percentile) Difference	68	57	38	5	9	3	32	50	1	17	33	36
Min (5th Percentile) Difference	-69	-106	-146	-204	-192	-213	-211	-12	-16	-2	-1	-6

From: Micko, Steve
Sent: Saturday, April 1, 2023 8:14 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites Project - Delta Outflow Changes by Water Year Type by Month

On it! I'll have it by Monday!

Steve

From: Alicia Forsythe <aforsythe@sitesproject.org>

Sent: Saturday, April 1, 2023 2:45 AM

To: Micko, Steve <Steve.Micko@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>

Subject: [EXTERNAL] Re: Sites Project - Delta Outflow Changes by Water Year Type by Month

Now that I think more about this, we should likely do this with the final EIR/EIS modeling with Alt 3. This is the modeling that the State Board is ultimately going to approve the Project based on so let's focus there.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

From: Alicia Forsythe

Sent: Friday, March 31, 2023 3:36:50 PM

To: steve.micko@jacobs.com <steve.micko@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>

Subject: Sites Project - Delta Outflow Changes by Water Year Type by Month

Steve – We are meeting with the State on Wednesday morning and will be talking about VAs and changes in Delta outflow. Can you help us with some statistics?

I am thinking of the following data –

By water year type, then by month, the following:

Average monthly reduction in Delta outflow as an AF amount and percent

Minimum monthly reduction in Delta outflow in AF (assume this is 0 AF, but I might be surprised)

Maximum monthly reduction in Delta outflow in AF

These could be all in one table, or multiple tables. We're just trying to get a sense of our changes to outflow. So for each water year type, we'd have a value for each month of the diversion season.

Lets also use our BA/ITP modeling for this – 2035 CT with Alt 3B. I think this presents the most realistic look at the project.

Would it be possible to have this ready late Monday? Sorry for the short notice. But we're just thinking that we're talking about a little change here and I'd like to have it prior to the Wednesday meeting with a little time to chat with Jerry on it.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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Biological and Cultural Survey Work Plan for Sites Reservoir Project

Banyan Properties APN 011-150-021 & 011-150-022

The Sites Reservoir Project (Project) is proposing field surveys to document existing conditions within the proposed Project study area, which includes APNs 011-150-021 and 011-150-021. Mandated by state and federal environmental laws, Project applicants must consider and verify the effects of their Projects on existing resources in the Project area, including biological and cultural resources.

Field surveys for biological and cultural resources are proposed to begin within APNs 011-150-021 and 011-150-021 on April 10, 2023, or thereafter, for the Project (Figure 1). The survey area is defined by the Project footprint plus a 250-foot¹ buffer. Lands within the survey area would be visited to gather an inventory of the existing flora, fauna, and habitats as well as to conduct presence/absence surveys for cultural resources. All reports prepared summarizing this data collection would be available for review by the landowner prior to any further distribution.

Five types of surveys would be conducted including: (1) reconnaissance-level surveys for biological resources; (2) wetland and waters mapping; (3) botanical surveys; (4) aquatic studies; and (5) cultural resource surveys. Below are details for each of the proposed surveys. Table 1 summarizes the survey type, number of staff, survey timing, and equipment required.

Table 1. Survey Summary

Survey Type	Number of Staff	Survey Timing	Equipment
Reconnaissance Survey for Biological Resources	4	3 days - April 2023 to December 2023	GPS units, camera, binoculars, and trowel
Wetlands and Waters Mapping	2	3 days - April 2023 to December 2023	GPS units, camera, binoculars, trowel or shovel
Botanical Surveys	2	4 days - April 2023 to December 2023	GPS units, camera, binoculars, and trowel
Aquatic Surveys			
Hydrology	3	20 days - April 2023 to December 2024 ²	HOBO pressure transducer located inside of a small stilling well

¹ If additional areas beyond the 250-foot survey area are needed due to survey requirements, (i.e., a resource is encountered at the survey boundary and extends beyond it), a request would be coordinated with the landowner on a case-by-case basis. If landowner approves, additional survey areas may be visited at a later time during the survey period but not after December 31, 2024.

² Project commitments require surveys through 2028. This work plan is applicable through 2024. A separate work plan would be prepared for work beyond 2024.

Survey Type	Number of Staff	Survey Timing	Equipment
Geomorphology	2	2 days - April 2023 to May 2024	10 Survey monuments (i.e., tree stakes), transect tape,
Bioassessment	3	4 days - April 2023 to December 2024	YSI Pro DSS unit, buckets
Water Quality	3	4 days - April 2023 to December 2024	YSI Pro DSS unit, buckets
Fish	3	4 days - April 2023 to December 2024	Block nets, buckets, electrofisher, floating net pens, or large aerated containers
Cultural Resources Survey	3	3 days - April 2023 to December 2023	GPS units, iPads, or cameras

Biological Surveys

Reconnaissance-Level Surveys

Reconnaissance-level surveys are needed to document existing biological resources in the survey area to consider the effects of the proposed Project. Two botanists and two wildlife biologists would visit the survey area to map terrestrial and aquatic habitats in the field with handheld Global Positioning System (GPS) units and/or directly onto field maps. The botanists and wildlife biologists would cover the survey area on foot (where accessible), traversing the entire survey area in meandering transects to ensure full coverage. This includes the Project footprint work areas and the survey buffer. During the survey, a general inventory of plant and general wildlife species detected by sight, calls, tracks, scat, or other signs would be compiled. Observable “sensitive³” resources including plants and certain wildlife (i.e., birds and some reptiles) would be recorded using a GPS unit, and later digitized into a Geographic Information System (GIS) format onto a Biological Resources Map for the Project if encountered.

Survey trucks would need to use existing access roads to bring crews and equipment into each work area. All vehicles would be checked before use to confirm they are in good working order with no observable oil or fuel leakage as per the safety measures detailed in the Safety and Fire Prevention section below. Equipment may include handheld GPS units, camera, binoculars, and trowel.

³ Some biological resources are referred to as “sensitive or special-status” and/or listed as threatened or endangered by state and federal wildlife agencies (California Department of Fish and Wildlife [CDFW] and U.S. Fish and Wildlife Service [USFWS]) because they are rare in California and/or throughout the nation. While these surveys are not directly looking for these species, any readily observable ones would be noted.



Insert Figure 1.



Reconnaissance-level biological surveys would commence on or after April 10, 2023, and conclude by December 31, 2023. It is anticipated that the work described above would be completed over the course of three days, which may, or may not, be consecutive.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. If required, resource records may be filed with the California Natural Diversity Database (CNDDDB), a public database managed by California Department of Fish and Wildlife (CDFW). The reports and resource records may then be available to state and federal wildlife agencies as required by the Project's permits and environmental documentation.

Wetlands and Waters Mapping

Wetlands and waters mapping is needed to document existing wetlands and water resources in the survey area to consider the effects of the proposed Project. Two botanists would visit the survey area to identify and map all rivers, streams, ponds, wetlands and adjacent vegetation features including wetland vegetation in the field with handheld GPS units and/or directly onto field maps. The botanists would cover the survey area on foot, traversing the entire survey area in meandering transects to ensure full coverage. This includes the Project footprint work areas and the survey buffer. During the wetland and waters mapping survey, data points at several locations at each wetland or water feature would be taken to delineate the feature boundaries. Data noting hydrology, vegetation, and soils would also be collected. Additionally, representative photographs of each feature would be documented.

Survey trucks would need to use existing access roads to bring crews and equipment into each work area. All vehicles would be checked before use to confirm they are in good working order with no observable oil or fuel leakage as per the safety measures detailed in the Safety and Fire Prevention section below. Equipment may include handheld GPS units, camera, binoculars, small handheld tools such as a trowel or shovel.

Wetland and waters mapping surveys would commence on or after April 10, 2023, and conclude by December 31, 2023. It is anticipated that the work described above would be completed over the course of three days, which may, or may not, be consecutive.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. The reports may then be available to state and federal agencies as required by the Project's permits and environmental documentation. After agency review, state and/or federal agency staff may request visitation to verify the wetlands and waters mapping. The request would be coordinated with the landowner. If landowner approves, the schedule for this field verification would occur over the course of one day and would commence after April 30, 2023, and conclude by December 31, 2024.

Botanical Surveys

Botanical surveys are needed to document existing botanical resources in the survey area to consider the effects of the proposed Project. Two botanists would visit the survey area to identify and record all



plant species present in the field with handheld GPS units and/or directly onto field maps. The botanists would cover the survey area on foot, traversing the entire survey area in meandering transects to ensure full coverage. This includes the Project footprint work areas and the survey buffer. Observable “sensitive¹” plants would be recorded and later digitized into a GIS format onto a Biological Resources Map for the Project. If necessary for plant species identification, individual plants may be collected during the survey by permitted botanists.

Survey trucks would need to use existing access roads to bring crews and equipment into each work area. No overland travel will occur with vehicles, crews would park on existing roads, and walk to areas beyond the existing roads. All vehicles would be checked before use to confirm they are in good working order with no observable oil or fuel leakage as per the safety measures detailed in the Safety and Fire Prevention section below. Equipment may include handheld GPS units, camera, binoculars, small handheld tools such as a trowel.

Botanical surveys would commence on or after April 10, 2023, and conclude by December 31, 2023. Surveys would be dispersed throughout the year to coincide with spring and summer blooming periods. It is anticipated that the work described above would be completed over the course of two days for each blooming period (spring, summer), which may, or may not, be consecutive, for a total of four days.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. Resource records may be filed with the CNDDB, if required. The reports and resource records may then be available to state and federal wildlife agencies as required by the Project’s permits and environmental documentation.

Aquatic Studies

Aquatic studies are needed to document the existing hydrology (i.e., flow levels), bioassessment conditions, existing water quality, and fluvial (i.e., streambed) geomorphic processes within Stone Corral Creek. This data would be used to update the information on aquatic species presence and habitat use in the reaches of interest to establish system-wide aquatic model conditions that would be used to manage environmental release into the creeks from the Project. The following aquatic studies would be conducted at a suitable location along Stone Corral Creek downstream of the Maxwell Sites Road bridge crossing (Figure 2).

Hydrology Survey

A hydrology survey measures the water surface levels and discharge rates of existing creeks, streams, or rivers prior to, during, and after rain events. The survey would provide existing flow and hydrology data for Stone Corral Creek in the survey area. A geomorphologist and a biologist, each with expertise in



Insert Figure 2

these types of hydrology studies, would install measuring equipment both inside (on the channel bed in a deeper pool location) and adjacent to the creek (on the streambanks) at the location depicted in Figure 2. Equipment would consist of a HOBO pressure transducer located inside of a small stilling well sighted within the creek along with a similar transducer located somewhere safely on the nearby bank/terrace at one suitable location (Photo 1). The HOBO data logger measures water depth, water temperature, and air pressure.



Photo 1. Example of a HOBO pressure transducer located inside of a small stilling well (black rod with white cap) sighted within the middle of a creek during a hydrogeomorphic field survey.

The initial hydrology survey would require one full day of field work with three staff members for set up. Follow-up surveys would be required to re-survey the site after each rain event to re-measure larger flows and would only involve two staff members. In addition, a monthly visit would be required to download the HOBO data. On average, between 4 and 6 rain events total over the course of the next five years would be ideal for the data required for the aquatic survey plan. Once the creek runs dry, the equipment can be removed and reinstalled prior to the beginning of the next rainy season. Hydrology surveys would commence on or after April 10, 2023, and conclude by September 30, 2024⁴. It is anticipated that the work described above would be completed over the course of 20 days, which may, or may not, be consecutive.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. The reports may then be available to state and federal wildlife agencies as required by the Project's permits and environmental documentation.

Geomorphology Survey

Geomorphic surveys consist of topographic surveys (cross section and longitudinal profile measurements), as well as other field observations to capture various geomorphic attributes such as habitat conditions, substrate composition, and flow levels of existing creeks, streams, or rivers. The survey results would provide geomorphic data for the existing conditions of Stone Corral Creek in the survey area.

⁴ Project commitments require surveys through 2028. This work plan is applicable to Amendment 3, which goes through 2024. A separate work plan would be prepared for work beyond 2024.

The geomorphic survey would require two days of field work with two geomorphologists for set up and data collection. The geomorphologists would find a suitable location in the field to install permanent survey monuments adjacent to Stone Corral Creek along the banks (Figure 2). Survey monuments consist of tree stakes that are flush to the ground (Photo 2). To the casual observer, they look like a

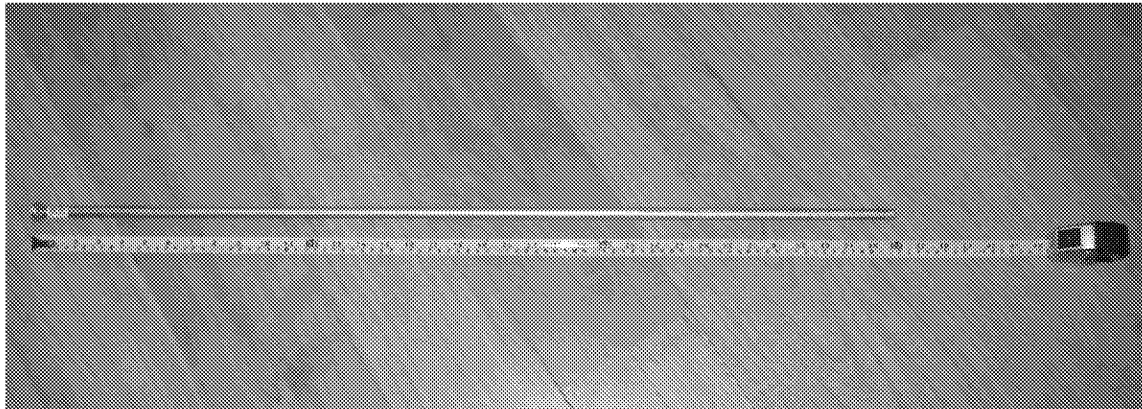


Photo 2. Example of a survey monument or tree stake, which would be installed into the creek bank flush with the ground surface. To the casual observer, they look like a nickel or dime on the surface of the ground.

nickel or dime on the surface of the ground. They are safe to use in grazed lands with livestock or open areas with wild game. Approximately 5 cross sections would be needed at each site resulting in the installation of 10 survey monuments (one on each bank for repeat surveys). Geomorphology surveys would be initiated the spring of 2023. Geomorphology surveys would commence on or after April 1, 2023, and conclude by May 31, 2024. It is anticipated that the work described above would be completed over the course of two days, which may, or may not, be consecutive.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. The reports may then be available to state and federal wildlife agencies as required by the Project's permits and environmental documentation.

Bioassessment Survey

A bioassessment survey identifies the benthic macroinvertebrates (BMIs), algal communities, and (limited) instantaneous water quality parameters within existing creeks, streams, or rivers. The survey would provide benthic and algal data for Stone Corral Creek in the survey area.

The bioassessment survey would require two days of field work with one geomorphologist and two aquatic biologists. Staff members would collect BMI and algae within Stone Corral Creek for laboratory processing, as well as measure instantaneous water quality parameters such as temperature, specific conductivity, salinity, dissolved oxygen, turbidity, and pH using a YSI Pro DSS unit (or similar collection device). No permanent equipment would be left in the creek as a result of the bioassessment survey.

Bioassessment surveys would occur over two years (2023-2024⁵) generally during the springtime period, but perhaps earlier depending on streamflow conditions. Bioassessment surveys would commence on or after April 10, 2023, and conclude by June 30, 2024⁵. It is anticipated that the work described above would be completed over the course of two days, which may, or may not, be consecutive, each year for a total of four days.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. The reports may then be available to state and federal wildlife agencies as required by the Project's permits and environmental documentation.

Water Quality Survey

In addition to the instantaneous water quality parameters described above for the Bioassessment Survey, additional water quality samples would be collected for laboratory measurements. The objectives for taking these additional measurements would be to compare pre-Project and Project values, determine any effect of operational adjustments on sampled water quality constituents, and compare measurement values to key stressor thresholds. These additional measurements include:

- A suite of total and dissolved metals and metalloids. The suite includes aluminum, arsenic, cadmium, chromium (total), chromium, copper, iron, lead, manganese, mercury, methylmercury, nickel, selenium, silver, and zinc.
- Cyanobacteria and cyanotoxins. The cyanobacteria water samples would be collected for the purpose of laboratory analysis for cyanobacteria presence and density and the presence of cyanotoxins (specifically microcystins, anatoxin-a, and cylindrospermopsin).
- Dissolved organic carbon and hardness. These parameters influence water quality standards for aquatic life protection for some metals.

Water quality sampling would occur during the same time as the rest of the bioassessment studies proposed from 2023 to 2024⁵. These additional water quality measurements would be taken twice a year, once during a high flow period and once during a low flow period, at the same location as the bioassessment sampling reach. Additional water quality measurements would be taken on or after April 10, 2023, and conclude by June 30, 2024⁵. It is anticipated that the work described above would be completed over the course of two days, which would not be consecutive, each year for a total of four days.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. The reports may then be available to state and federal wildlife agencies as required by the Project's permits and environmental documentation.

⁵ Project commitments require surveys through 2028. This work plan is applicable to Amendment 3, which goes through 2024. A separate work plan would be prepared for work beyond 2024.

Fish Survey

Fish surveys are needed to document existing fish community in the survey area to consider the effects of the proposed Project. A fish survey identifies existing fish species in the aquatic ecosystem within existing creeks, streams, or rivers. The survey would provide data for the fish community in Stone Corral Creek within the survey area.

The fish survey would require two days of field work with three fisheries biologists. Fisheries biologists would sample the fish community within the banks of Stone Corral Creek to identify fish species via beach seining or electrofishing. Beach seining would include the use of block nets to prevent fish from moving out of the area prior to being sampled. Captured specimens would be held in floating net pens or large aerated containers, based on site conditions, prior to being processed. Specimens would be identified to species, and the first 20 of each species would be measured for fork length to the nearest millimeter before being released at the capture site. Additional specimens would be tallied and released. Representative specimens would be photographed for positive identification. Electrofishing with block nets would be done with a Smith-Root type backpack electrofisher. Sections of creeks would be isolated using blocking nets before biologist's wade into them, starting from the upstream net and moving downstream. Captured specimens would be held in buckets, floating net pens, or large aerated containers prior to being identified and measured as described above for beach seine sampling. No permanent equipment would be left in the creek as a result of the fish survey. Water quality data would be measured at every fish sampling location using a hand-held YSI Pro DSS unit. Water quality data obtained would include temperature, specific conductivity, salinity, dissolved oxygen, turbidity, and pH.

Fish surveys would commence on or after April 10, 2023, and conclude by December 31, 2024⁵. It is anticipated that the work described above would be completed over the course of two days each year for a total of four days.

Results of the survey would be documented in Project reports and shared with the landowner prior to any further distribution. The reports may then be available to state and federal wildlife agencies as required by the Project's permits and environmental documentation.

Cultural Resources Surveys

The purpose of the cultural resources surveys is to help meet state and federal compliance requirements for considering and addressing potential effects from Project activities to significant cultural resources. These compliance requirements include considering and addressing such effects in consultation with tribes, agencies, and other interested parties. Three cultural resources specialists would conduct pedestrian cultural resources surveys. These surveys entail cultural resources specialists walking in systematic transects that are typically spaced 15-meters apart but no wider than 30-meters apart. Portions of the survey area that are considered unsafe (e.g., steep slopes) or otherwise would not be appropriate for pedestrian survey (e.g., areas inundated with water) would not be subjected to cultural survey and would be noted on field maps. Field crews would document archaeological resources and built environment resources (buildings and structures) that are 40 years old or older (recording a



written description of the resources, mapping the location using a GPS unit, and taking photographs). Results of the survey would be documented in Project reports and resource records which would be filed with the appropriate California Historical Resources Information System repository (the state repository for cultural resources data). Through this repository, the reports and resource records will be available to tribes, other cultural resource specialists, and governmental agencies on an as needed basis. Results of the survey would also be shared with the landowner if resources are found. No collection of artifacts or other cultural materials or ground disturbing activities would occur as part of the cultural resources surveys.

Survey trucks would need to use existing access roads to bring crews and equipment into each work area. All vehicles would be checked before use to confirm they are in good working order with no observable oil or fuel leakage as per the safety measures detailed in the Safety and Fire Prevention section below. Equipment may include handheld GPS units, iPads, or cameras.

Cultural resources surveys would commence on or after April 10, 2023, and conclude by July 31, 2023. It is anticipated that the work described above would be completed over the course of three days, which may, or may not, be consecutive. Cultural resources specialists would usually be in one place for only a few hours but could be in one place up to a day should a complex resource be encountered that requires more time to document.

Safety and Fire Prevention

Safety and fire prevention is one of the top priorities during the proposed field surveys. All staff would follow approved safety plans and come prepared for field conditions. As previously stated, all vehicles would be checked before use to confirm they are in good working order with no observable oil or fuel leakage. All vehicles would be high occupancy vehicles with four-wheel-drive capability (or equivalent) and equipped with 20 lbs. fire extinguishers and shovels. Access would be via existing roads with minimal vegetation present. Overland travel would not be permitted for biological and cultural resource surveys. Field surveys would not be conducted during rain events or during excessively hot weather. All staff are aware of the field site dangers (i.e., trips, slips, and falls) and have a planned route to the nearest emergency room, if necessary. Safety plans are available for review upon request.

From: Micko, Steve [Steve.Micko@jacobs.com]
Sent: 4/5/2023 4:00:31 PM
To: Angela Bezzone [bezzone@mbkengineers.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Project Re: Undark

Nvm – I see Jerry took care of it!

PS CalSim II results are still based on amendment 2.

Steve

From: Micko, Steve
Sent: Wednesday, April 5, 2023 3:58 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Project Re: Undark

Hi Angela,

See table below.

I broke down Sites Storage Partner releases (NOD and SOD) by Ag and M&I.

I assumed all Prop 1 releases are for the environment.

Per the Sites Metrics, I see that CVP SOD Ag deliveries increase by 22 TAF. For Alt 3 and historical climate, CalSim assumes a 23% salinity cost for transferring water SOD. So, I divided the deliveries (22 TAF) by 77% to get the CVP storage account releases associated with the 22 TAF increase in CVP SOD Ag deliveries.

I assumed the remainder of CVP releases, 60 TAF, are dedicated to the environment (Shasta CWP, Fall Flow Stability and Spring Pulse).

Note that the Sites metrics shows a 1 TAF increase to CVP NOD M&I. Since this is so small, I ignored..

Could you check my logic on breaking down the CVP releases? I'm good with Sites Storage partners and Prop 1.

Thanks,
Steve

Releases by Beneficiary Operation (TAF)

	Ag	M&I	Env
Sites Storage Partners	24	88	-
Prop 1	-	-	56
CVP	29	-	60
Total	53	88	116

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 5, 2023 2:17 PM
To: Kevin Spesert <kspesert@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Micko, Steve <Steve.Micko@jacobs.com>
Cc: Ann Newton <anewton@katzandassociates.com>
Subject: [EXTERNAL] Sites Project Re: Undark

Angela and Steve - sorry to ask this as I think I can pull this out of a trend report. But being on vacation, I am wondering if you could help me. Can you pull the long-term average annual releases for M&I, ag and the environment? Just assume that our predominantly m&i customers are serving all m&i and predominant ag are serving all ag. Not totally sure what to do with Reclamation. Any thoughts on this?

Let's use Alt 3 from the Final Eir/EIS modeling. Historic baseline.

Thank you!!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

From: Kevin Spesert <kspesert@sitesproject.org>
Sent: Wednesday, April 5, 2023 8:04:15 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>
Subject: Re: Undark

I agree with your approach in using CalSim...

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 5, 2023 11:01 AM
To: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>
Subject: FW: Undark

Jerry and Kevin – Ann and I completed a fact check with Undark this morning. This was an interview that Ann and I completed some time ago and they are getting ready to publish.

In the fact check, they have me down as saying: : If all goes well, Forsythe said each years Sites will release enough water to serve between 250,000 and 500,000 households.

I think they pulled this from our previous press release on the amount diverted into the reservoir this year. But they are talking about releases, and really long term releases.

Have we every used/calculated the number of households Sites would serve in long-term releases?

If not, I am thinking that we look at the CALSIM modeling and calculate the long-term releases for our M&I customers. They apply the factors to these. We would then say something like –

If all goes well, Forsythe said each years Sites will release enough water to serve between X and Y households in addition to X to Y acre-feet of water for agricultural and environmental uses.

Let me know what you think. We need to close this out quickly.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Ann Newton <anewton@katzandassociates.com>
Sent: Wednesday, April 5, 2023 10:52 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Undark

Here's the sentence as is: If all goes well, Forsythe said each years Sites will release enough water to serve between 250,000 and 500,000 households.



Ann Newton
Director, Los Angeles
d: 310.774.7639
San Diego · Los Angeles · San Francisco

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From: Jerry Brown [jbrown@sitesproject.org]
Sent: 4/5/2023 6:09:20 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; Ann Newton [anewton@katzandassociates.com]; steve.micko@jacobs.com
Subject: Re: Sites Project Re: Undark

No, there seems to be a bust because our participants think they are signed up for 166taf vs the 112 taf shown in the table.

From: Alicia Forsythe <aforsythe@sitesproject.org>
Date: Wednesday, April 5, 2023 at 5:43 PM
To: Angela Bezzone <bezzone@mbkengineers.com>, Jerry Brown <jbrown@sitesproject.org>, Ann Newton <anewton@katzandassociates.com>, "steve.micko@jacobs.com" <steve.micko@jacobs.com>
Subject: Re: Sites Project Re: Undark

Jerry - I think I would rather use Steve's numbers below as it separates water out by ag and m&i. With your numbers, I'd have to calculate all members as m&i. Are you good with using Steve's numbers below?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Wednesday, April 5, 2023 12:57 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Project Re: Undark

Hi Angela,

See table below.

I broke down Sites Storage Partner releases (NOD and SOD) by Ag and M&I.

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To: Kevin Spesert <kspesert@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Micko, Steve <Steve.Micko@jacobs.com>

Cc: Ann Newton <anewton@katzandassociates.com>

Subject: [EXTERNAL] Sites Project Re: Undark

Angela and Steve - sorry to ask this as I think I can pull this out of a trend report. But being on vacation, I am wondering if you could help me. Can you pull the long-term average annual releases for M&I, ag and the environment? Just assume that our predominantly m&i customers are serving all m&i and predominant ag are serving all ag. Not totally sure what to do with Reclamation. Any thoughts on this?

Let's use Alt 3 from the Final Eir/EIS modeling. Historic baseline.

Thank you!!

Ali

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From: Kevin Spesert <kspesert@sitesproject.org>

Sent: Wednesday, April 5, 2023 8:04:15 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>

Cc: Ann Newton <anewton@katzandassociates.com>

Subject: Re: Undark

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Sent: Wednesday, April 5, 2023 11:01 AM

To: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>

Cc: Ann Newton <anewton@katzandassociates.com>

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In the fact check, they have me down as saying: : If all goes well, Forsythe said each years Sites will release enough water to serve between 250,000 and 500,000 households.

I think they pulled this from our previous press release on the amount diverted into the reservoir this year. But they are talking about releases, and really long term releases.

Have we every used/calculated the number of households Sites would serve in long-term releases?

If not, I am thinking that we look at the CALSIM modeling and calculate the long-term releases for our M&I customers. They apply the factors to these. We would then say something like –

If all goes well, Forsythe said each years Sites will release enough water to serve between X and Y households in addition to X to Y acre-feet of water for agricultural and environmental uses.

Let me know what you think. We need to close this out quickly.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Ann Newton <anewton@katzandassociates.com>

Sent: Wednesday, April 5, 2023 10:52 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>

Subject: Undark

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Ann Newton

Director, Los Angeles

d: 310.774.7639

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From: Alicia Forsythe [aforsythe@sitesproject.org]
Sent: 4/5/2023 6:29:38 PM
To: Jerry Brown [jbrown@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Ann Newton [anewton@katzandassociates.com]; Angela Bezzone [bezzone@mbkengineers.com]; steve.micko@jacobs.com
Subject: Re: Sites Project Re: Undark

Okay. This looks good. When I looked at this on my phone, I didn't see the break down between Ag and M&I. Lets go ahead and use this.

Ann, can you help me apply the same factor that we used for the press release to calculate # of people to the 128,000 AF? Was it 3 – I just don't remember but I think we should be consistent. Then I think we give back a sentence like this:

If all goes well, Forsythe said each year Sites will release enough water to serve between X and Y households in addition to 38,000 acre-feet of water for agricultural uses and 64,000 AF for the environment.

I applied all of the Reclamation water to the environment in this scenario as I think they will first use it for the environment and second use it for CVP obligations and supplies. This is also consistent with how they want to do non-reimbursability for the Project.

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Sent: Wednesday, April 5, 2023 12:53 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; steve.micko@jacobs.com <steve.micko@jacobs.com>
Cc: Ann Newton <anewton@katzandassociates.com>
Subject: Re: Sites Project Re: Undark

Hang on – I just went through all of this in developing the voting analysis we discussed as a leader team. Based on 166TAF total annual avg supply used for amendment 3 cost allocation:

Urban = 128 taf (I think we landed on a factor of 3 being reasonable to use for # of household served by each af per year, 384,000 houses served)
Ag = 38 taf

Using 230 taf total annual avg supplies:
Local agencies = 166 taf
P1 ecosystem = 51 taf
Reclamation = 13 taf (7%, alt 1a)

From: Alicia Forsythe <aforsythe@sitesproject.org>
Date: Wednesday, April 5, 2023 at 2:16 PM
To: Kevin Spesert <kspesert@sitesproject.org>, Jerry Brown <jbrown@sitesproject.org>, Angela Bezzone <bezzone@mbkengineers.com>, "steve.micko@jacobs.com" <steve.micko@jacobs.com>
Cc: Ann Newton <anewton@katzandassociates.com>
Subject: Sites Project Re: Undark

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From: Kevin Spesert <kspesert@sitesproject.org>
Sent: Wednesday, April 5, 2023 8:04:15 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>
Subject: Re: Undark

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From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 5, 2023 11:01 AM
To: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>
Subject: FW: Undark

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If all goes well, Forsythe said each years Sites will release enough water to serve between X and Y households in addition to X to Y acre-feet of water for agricultural and environmental uses.

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From: Ann Newton <anewton@katzandassociates.com>

Sent: Wednesday, April 5, 2023 10:52 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>

Subject: Undark

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Ann Newton

Director, Los Angeles

d: 310.774.7639

[San Diego](#) · [Los Angeles](#) · [San Francisco](#)

From: Jerry Brown [jbrown@sitesproject.org]
Sent: 4/6/2023 6:18:07 AM
To: Mitchell, Stephanie [Stephanie.Mitchell@asm.ca.gov]
Subject: Re: Sites Commissioning timeline

Stephanie – Sedimentation buildup is a bigger problem for on river dams. Sites has 2 features that help it minimize this issue 1) Sites is off stream, 2) Sites relies on tens of miles of canal to convey the water from the river to the reservoir and the canals generally flow at low enough velocity that will allow a lot of the sediment to drop out before it gets into the reservoir. Its not zero sediment going into the reservoir, but its much less than on river conditions. The 100 year accumulation of sediment in Sites is not expected to materially effect the storage capacity of the reservoir.

Thank you for mentioning the bill you are looking at. We will take a look. The Sites Authority generally does not take positions on bills expect when they directly affect the success of the project.

Keep up your good work and don't hesitate to reach out if I can be of any further assistance!

Jerry

From: "Mitchell, Stephanie" <Stephanie.Mitchell@asm.ca.gov>
Date: Wednesday, April 5, 2023 at 8:46 PM
To: Jerry Brown <jbrown@sitesproject.org>
Subject: RE: Sites Commissioning timeline

Thanks Jerry!

Also thank you for passing on a new word/concept for me: shakedown. This will really help me feel like I know something the next time I have the opportunity to chat with an engineer! If you'll entertain one more question: I've been doing some reading about the issue of reservoir sedimentation and the challenge of recovering that space. Since its been over 40 years since the last reservoir was constructed, have there been any advancements that would help reduce this issue for Sites? Or is this an unavoidable problem?

The bill I'm looking at is AB-62, which seeks to codify storage goals in the Water Supply Strategy report from Aug 2022. The language is interesting as it suggests the state should be responsible for "designing and implementing" the storage measures—words I think better describe the role of all the individual projects. Base on the title of the bill, I believe this comes from frustration of perceived delays in storage project progress. From my understanding, the Prop 1 projects have faced some hiccups, but are largely on schedule, especially considering the magnitude of the work and novelty of agreements.

Steph

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Wednesday, April 5, 2023 5:23 PM
To: Mitchell, Stephanie <Stephanie.Mitchell@asm.ca.gov>
Subject: Re: Sites Commissioning timeline

Hi Stephanie – I remember. Thanks for reaching out. You are the first person to ask about that so you must be someone that pays attention to details which I think is an excellent character trait.

We use "commissioning" on the schedule to generally mean the back end of the construction period where equipment and systems are in shake down which leads to certification of final completion. Its shown as 2 years because of the phased nature of the work. The initial fill period is not assumed to be initiated until after all construction and

commissioning is completed. Our general talking point on filling is that it would take ~5 years under average conditions to fill completely. Could be 1-2 yrs or 7-9 yrs, it just depends on hydrology which we can't control. We would expect to have enough stored water to initiate releases after ~2 yrs of filling.

Can you share what the bill intends to do that you are working for Prop 1 storage?

Jerry

From: "Mitchell, Stephanie" <Stephanie.Mitchell@asm.ca.gov>

Date: Wednesday, April 5, 2023 at 4:57 PM

To: Jerry Brown <jbrown@sitesproject.org>

Subject: Sites Commissioning timeline

Hi Jerry,

We met briefly a few weeks ago when you came to chat with the WPW Committee. I'm working on a bill related to Prop 1 storage so I've been looking at your 2022 Annual Report. I noticed there is a two year "commissioning" phase before the reservoir becomes operational. Can you explain to me what is happening during this stage? Is this the accumulation of water?

Thank you,

Stephanie Mitchell

Pronouns: she/her/hers

CCST Science Fellow

Assembly Water, Parks, and Wildlife Committee

California State Legislature

Office: (916) 319-2096

From: Kevin Spesert [kspesert@sitesproject.org]
Sent: 4/6/2023 10:46:20 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Ann Newton [anewton@katzandassociates.com]; Jerry Brown [jbrown@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; steve.micko@jacobs.com
Subject: Re: Sites Project Re: Undark

Looks good to me as well

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, April 6, 2023 10:44 AM
To: Ann Newton <anewton@katzandassociates.com>; Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; steve.micko@jacobs.com <steve.micko@jacobs.com>
Subject: Re: Sites Project Re: Undark

This looks good to me. Thank you!

Jerry, Kevin - any concerns before we get back to uNdark?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

From: Ann Newton <anewton@katzandassociates.com>
Sent: Thursday, April 6, 2023 7:11:16 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; steve.micko@jacobs.com <steve.micko@jacobs.com>
Subject: RE: Sites Project Re: Undark

Back in January we agreed on 1 acre foot = 2 households with 2.5 people. So, 1 acre foot serves 5 people for a year. For the statement in question:

"If all goes well, Forsythe said each year Sites will release enough water to serve roughly 640,000 people for one year between X and Y households in addition to 38,000 acre-feet of water for agricultural uses and 64,000 acre-feet for the environment."



Ann Newton
Director, Los Angeles
d: 310.774.7639
San Diego · Los Angeles · San Francisco

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 5, 2023 6:30 PM
To: Jerry Brown <jbrown@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Ann Newton

<anewton@katzandassociates.com>; Angela Bezzone <bezzone@mbkengineers.com>; steve.micko@jacobs.com

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From: Jerry Brown <jbrown@sitesproject.org>

Sent: Wednesday, April 5, 2023 12:53 PM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; steve.micko@jacobs.com <steve.micko@jacobs.com>

Cc: Ann Newton <anewton@katzandassociates.com>

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aforsythe@sitesproject.org | www.SitesProject.org

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Ann Newton
Director, Los Angeles
d: 310.774.7639
[San Diego](#) · [Los Angeles](#) · [San Francisco](#)

From: Ann Newton [anewton@katzandassociates.com]
Sent: 4/6/2023 12:26:41 PM
To: Kevin Spesert [kspesert@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]; Jerry Brown [jbrown@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; steve.micko@jacobs.com
Subject: RE: Sites Project Re: Undark

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d: 310.774.7639
San Diego · Los Angeles · San Francisco

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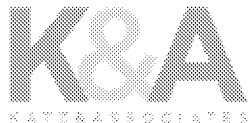
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Subject: Re: Sites Project Re: Undark

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Sent from my iPhone

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<image002.png>

From: David Hubbard [Dhubbard@BrwnCald.com]
Sent: 4/7/2023 7:41:24 AM
To: Jerry Brown [jbrown@sitesproject.org]
CC: Marcus Maltby [mmaltby@brwncald.com]; Marcia Kivett [MKivett@sitesproject.org]
Subject: RE: Sites Reservoir Project - Schedule Update to April 2, 2023

Jerry – each month is a comparison to the previous month. Let's call this one April and it is being compared to March. March was compared to February.

Do you want me to compare April to February (and not to March)?

Dave Hubbard

Project Controls
Brown and Caldwell
Cell: 832.840.1789
dhubbard@brwncald.com



From: Jerry Brown <jbrown@sitesproject.org>
Sent: Friday, April 7, 2023 9:29 AM
To: David Hubbard <Dhubbard@BrwnCald.com>
Cc: Marcus Maltby <mmaltby@brwncald.com>; Marcia Kivett <MKivett@sitesproject.org>
Subject: Re: Sites Reservoir Project - Schedule Update to April 2, 2023

Thanks. I believe the report you provided last month was relative to another baseline. If that was the case can you provide this report relative to the same baseline as last month?

From: David Hubbard <Dhubbard@BrwnCald.com>
Date: Friday, April 7, 2023 at 7:26 AM
To: Jerry Brown <jbrown@sitesproject.org>
Cc: Marcus Maltby <mmaltby@brwncald.com>, Marcia Kivett <MKivett@sitesproject.org>
Subject: RE: Sites Reservoir Project - Schedule Update to April 2, 2023

Yes, the Variance is relative to last month's completion date for the Activity. It is workdays, so 5 days is a week. A 21 days variance (WRP) is 4 weeks plus one day.

Dave Hubbard

Project Controls
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Cell: 832.840.1789
dhubbard@brwncald.com



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Cc: Marcus Maltby <mmaltby@BrwnCald.com>; Marcia Kivett <MKivett@sitesproject.org>

Subject: Re: Sites Reservoir Project - Schedule Update to April 2, 2023

Thanks. Is the finish variance relative to last months update? And is that work days or calendar days?

From: David Hubbard <Dhubbard@BrwnCald.com>

Date: Thursday, April 6, 2023 at 6:21 AM

To: Jerry Brown <jbrown@sitesproject.org>

Cc: Marcus Maltby <mmaltby@brwncald.com>, Marcia Kivett <MKivett@sitesproject.org>

Subject: RE: Sites Reservoir Project - Schedule Update to April 2, 2023

Jerry – attached the “clean” version along with the comparison to last month with variances shown so you’ll have that if needed for reference.

Dave Hubbard

Project Controls

Brown and Caldwell

Cell: 832.840.1789

dhubbard@brwncald.com



From: David Hubbard

Sent: Thursday, April 6, 2023 8:12 AM

To: Jerry Brown <jbrown@sitesproject.org>

Cc: Marcus Maltby <mmaltby@BrwnCald.com>

Subject: RE: Sites Reservoir Project - Schedule Update to April 2, 2023

Yes, let me prepare the version without the comparison to prior. There was no feedback to change anything with the Water Right Permit and the activities downstream and tied to it. Will send to you shortly.

Dave Hubbard

Project Controls

Brown and Caldwell

Cell: 832.840.1789

dhubbard@brwncald.com



From: Jerry Brown <jbrown@sitesproject.org>

Sent: Thursday, April 6, 2023 8:09 AM

To: David Hubbard <Dhubbard@BrwnCald.com>

Cc: Marcus Maltby <mmaltby@BrwnCald.com>

Subject: Re: Sites Reservoir Project - Schedule Update to April 2, 2023

Thanks Dave. Looks good. Is the State/Federal report ready to go too?

From: David Hubbard <Dhubbard@BrwnCald.com>

Date: Thursday, April 6, 2023 at 5:58 AM

To: Marcus Maltby <mmaltby@brwncaid.com>, JP Robinette <jrobinette@sitesproject.org>, Alicia Forsythe <aforsythe@sitesproject.org>, conner <conner@cmdwest.com>, "Risse, Danielle" <danielle.risse@hdrinc.com>, "Edwards, Dawn" <Dawn.Edwards@hdrinc.com>, "Luu, Henry" <henry.luu@hdrinc.com>, "jelica.arsenijevic" <jelica.arsenijevic@hdrinc.com>, "Spranza, John" <john.spranza@hdrinc.com>, Kevin Spesert <kspesert@sitesproject.org>, "laurie.warner.herson" <laurie.warner.herson@phenixenv.com>, Marcia Kivett <MKivett@sitesproject.org>, Marcus Maltby <mmaltby@brwncaid.com>, Cheyanne Harris <CHarris@BrwnCald.com>, Justin Davies <JDavies@BrwnCald.com>, "bezzzone@mbkengineers.com" <bezzzone@mbkengineers.com>, Lee Lambert <LLambert@BrwnCald.com>, "Westcot, Cathy" <cathy.westcot@hdrinc.com>, Joe Trapasso <jtrapasso@sitesproject.org>

Cc: Jerry Brown <jbrown@sitesproject.org>, Benjamin Orsak <BOrsak@BrwnCald.com>

Subject: RE: Sites Reservoir Project - Schedule Update to April 2, 2023

Sites Project Team – below link to Sites Schedule with remaining activities for the Amendment 3 period and with comparison to last month's completion dates.

Also included below screenshots of our two one-page summary level schedules with their comparisons to last month's completion dates.

Asking for team to review, make comments, changes, ask questions and anything else prior to finalizing for the month.

Again, the biggest change this month is slipping the Water Right Permit month-on-month again.

Submittal of the ITP Applications has also slipped as more time continues with reviewing prior to submittal.

2023.04 April '23

Schedules Library > Schedules - Amendment 3 > 2023.04 April '23

 Name ▾

 ²¹ Sites WPPR_Comp to Last Month_2023.04.05.pdf

 ²¹ Sites Strike Team_Comp to Last Month_2023.04.05.pdf

 ²¹ Sites Remaining Schedule_Comp to Last Month_2023.04.05.pdf



Sites Reservoir Project

Coordination Activities with State and Federal Agencies

Activity Name	Start	Finish	Last Month's Finish	Finish Variance	2023	2024	2025
Water Right Permit							
SWRCS determines Application is Complete	12-May-22	17-Apr-23	15-Apr-23	-21			
SWRCS issues Notice of Application & Petitions for Assignment & Releases from Priority	16-May-22	16-May-23	17-Apr-23	-21			
Deadline to Submit Process	16-Jun-22	16-Jun-23	16-Jun-23	-21			
State Authority & Petitioners Resolve Process	16-Jun-22	15-Jun-23	15-Jun-23	-21			
Pre-hearing Conference	15-Feb-24	15-Feb-24	17-Jun-24	-21			
SWRCS issues Hearing Notice	15-Mar-24	15-Mar-24	15-Feb-24	-21			
Case in Chief Testimony Due	17-May-24	17-May-24	16-Apr-24	-21			
Hearings (Presentation of Case-in-Chief)	24-Jun-24	21-Jul-24	21-May-24	-21			
Rebuttal Testimony Due	17-Jul-24	17-Jul-24	17-Jun-24	-21			
Rebuttal Hearing	21-Aug-24	14-Aug-24	16-Jul-24	-21			
Enr's Due	11-Oct-24	11-Oct-24	10-Sep-24	-21			
SWRCS issues Water Right Permit		15-Dec-24	07-Nov-24	-21			
Clear Water 404 / 401 Permits (SWRCS & USACE)							
Prepare Draft CWA 401 Permit Application	06-Jun-21 A	30-May-22	30-May-22	0			
Submit CWA 401 Application	31-May-22	31-May-22	31-May-22	0			
Receive CWA Section 401 Permit							
Prepare Draft 404 Application	06-Jun-21 A	30-May-22	30-May-22	0			
Submit 404 Application	31-May-22	31-May-22	31-May-22	0			
Receive 404 Permit							
National Wetlands Preservation Act (NWPA)							
Prepare Final PA	14-Jun-23 A	10-Jun-23	11-May-23	-22			
Circulate Final PA to SHPO & Consulting Parties	23-Jul-23	25-Aug-23	27-Jul-23	-22			
Circulate Final PA to Parties for Signatures	28-Sep-23	17-Oct-23	16-Sep-23	-22			
Exclude Final PA	16-Oct-23	31-Oct-23	26-Sep-23	-22			
Incidental Take Permits (ITP)							
Submit CESA ITP Application - Operations (needs revision to)	17-Apr-23	17-Apr-23	22-Apr-23	-18			
Re-submit CESA ITP Application - Construction	17-Apr-23	17-Apr-23	22-Apr-23	-18			
Receive CESA ITP - Construction	16-Nov-23	16-Nov-23	23-Oct-23	-19			
Receive CESA ITP - Operations	19-Nov-23	19-Nov-23	23-Oct-23	-19			
Endangered Species Act Section 7							
Prepare Draft EA	11-Jun-21 A	04-Jun-23 A	10-Jun-23	0			
Reclamation submits EA to USFWS & NMFS	02-Apr-23	02-Apr-23	17-Apr-23	-11			
Reclamation initiates Consultation with FWS & NMFS	24-May-23	08-Jun-23	24-May-23	-11			
Receive USFWS/NMFS Biological Opinions (Precedent Take Authorizations)		31-Dec-23	16-Oct-23	-11			
Other Agreements & Benefits							
Initiate Application for Permit to Construct from DOD	01-Feb-22 A	30-Dec-24	30-Dec-24	0			
Develop & Execute Agreement for Administration of Public Benefits with DWR	01-Jun-22 A	31-Jul-23	31-Jul-23	0			
Develop & Execute Agreement for Administration of Public Benefits with CDFG	13-Apr-22 A	30-Jun-23	31-Jul-23	0			
Final Operating Agreement - Sites/DWR/Reclamation	10-Jun-22 A	30-Jun-23	30-Jun-23	0			
Negotiate Reclamation Benefits & Obligations Contract	16-Dec-22	17-Oct-23	17-Oct-23	0			
Rebate Delivery Agreement with Reclamation	10-Dec-22	21-Dec-23	20-Dec-23	-11			
Prepare & Submit Power Interconnection Application	26-Mar-23 A	10-May-23	14-Apr-23	-19			
Develop Benefits & Obligations Contract with Participants	22-Mar-23 A	16-Dec-23	12-Feb-24	36			
Final EIR / EIS (ROD) - Complete	02-Jun-23	28-Jun-23	28-Jun-23	0			
Authority Carries EIR & Approves Project	18-Jun-23	18-Jun-23	18-Jun-23	0			
ROD Signed	21-Dec-23	20-Dec-23	20-Dec-23	-11			
Rebate Commitment	09-Jan-24	09-Jan-24	09-Jan-24	-11			
Receive WSP Final Approval from CWD	11-Feb-24	13-Jan-24	13-Jan-24	-11			
Reclamation Agreement - Home Base Emission & Final Reclamation	24-Feb-24	02-May-24	02-Apr-24	-21			
Financing							
Submission of Final WIFA Application	30-Mar-23 A	30-Apr-23	30-Apr-23	0			
WIFA Loan Negotiation	04-Apr-23	25-May-24	25-May-24	0			
Close WIFA Loan		26-Jul-24	26-Jul-24	0			
Construction, Construction & Oversight							
NAFC/OWA Review AS B Construction	01-Oct-20 A	07-Jun-23	07-Jun-23	0			
Construction & Oversight: DWR, WAPA, CH&D, UPRR, Caltrans	03-Jan-21 A	30-Dec-24	30-Dec-24	0			



Sites Reservoir Project

Work Plan Progress Reporting - Comparison to Prior Month

#	Activity Name	Start	Finish	Last Month's Finish	Months Left	2023	2024	2025
1	What do we get?	18-Apr-22 A	10-Dec-24	07-Nov-24	-21			
2	Final Operating Agreement - Sites/DWR/Reclamation	19-Apr-22 A	30-Jun-23	30-Jun-23	0			
3	Submit Water Right Permit Application	11-May-22 A	15-May-22	15-May-22	0			
4	Develop Participant Specific Model	10-Apr-23	21-Feb-24	21-Feb-24	0			
5	CWA 404 / 401 - Submit Final Permit Applications	31-May-22	31-May-23	31-May-23	0			
6	Final EIR / EIS (ROD) - Complete	02-Jun-23	02-Jun-23	02-Jun-23	0			
7	Receive CESA ITP - Operations	16-Nov-23	23-Oct-23	23-Oct-23	-18			
8	Receive CESA ITP - Construction	15-Nov-23	23-Oct-23	23-Oct-23	-18			
9	Operations Plan, Version 2	17-Nov-23	24-Jul-24	27-Jun-24	-18			
10	Federal ESA - Receive Biological Opinions	21-Dec-23	05-Dec-23	05-Dec-23	-11			
11	Water Right Permit Issued	10-Dec-24	07-Nov-24	07-Nov-24	-21			
12	What does it cost?	03-Jan-22 A	30-Jul-24	30-Jul-24	0			
13	Geotech EA/IS	03-Jan-22 A	28-Jul-24	29-Jun-24	0			
14	Landowners Access Agreements for Geotech	23-Mar-22 A	30-May-24	30-May-24	0			
15	Geotech Work Package #1	06-Sep-22 A	30-Dec-22 A	30-Dec-22	0			
16	Geotech Work Package #2	02-Jan-23	30-Jun-23	30-Jun-23	0			
17	Mitigation Cost Estimate Update (circle back to John)	01-Apr-23	25-May-23	25-Apr-23	-23			
18	Geotech Work Package #3	01-Jul-23	29-Dec-23	29-Dec-23	0			
19	Geotech Work Package #4	03-Jan-24	28-Jun-24	28-Jun-24	0			
20	Land Cost Established	27-Jun-24	27-Jun-24	27-Jun-24	0			
21	Project Unit Cost Update Complete	30-Jul-24	30-Jul-24	30-Jul-24	0			
22	How do we pay?	01-Jul-22 A	25-Mar-24	25-Mar-24	0			
23	Financing Check-in Q3-2022	01-Jul-22 A	01-Jul-22	01-Jul-22	0			
24	WIFA Loan Application	05-Jul-22 A	30-Mar-23 A	21-Mar-23	2			
25	Financing Check-in Q3-2022	07-Oct-22 A	07-Oct-22	07-Oct-22	0			
26	Submission of Final WIFA Application	30-Mar-23 A	03-Apr-23	03-Apr-23	0			
27	Financing Check-in Q1-2023	02-Apr-23	03-Apr-23	03-Apr-23	0			
28	WIFA Loan Negotiation	04-Apr-23	25-Mar-24	25-Mar-24	0			
29	Participants Ready for Finance	03-Jul-23	03-Jul-23	03-Jul-23	0			
30	Investor Commitment	10-Jan-25	10-Jan-25	09-Dec-24	-21			
31	Investor Commitment	10-Jan-25	09-Dec-24	09-Dec-24	-21			
32	Construction	22-Apr-25	22-Apr-25	24-Mar-25	-21			
33	Construction Groundbreaking	22-Apr-25			-21			

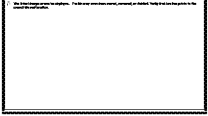
Dave Hubbard

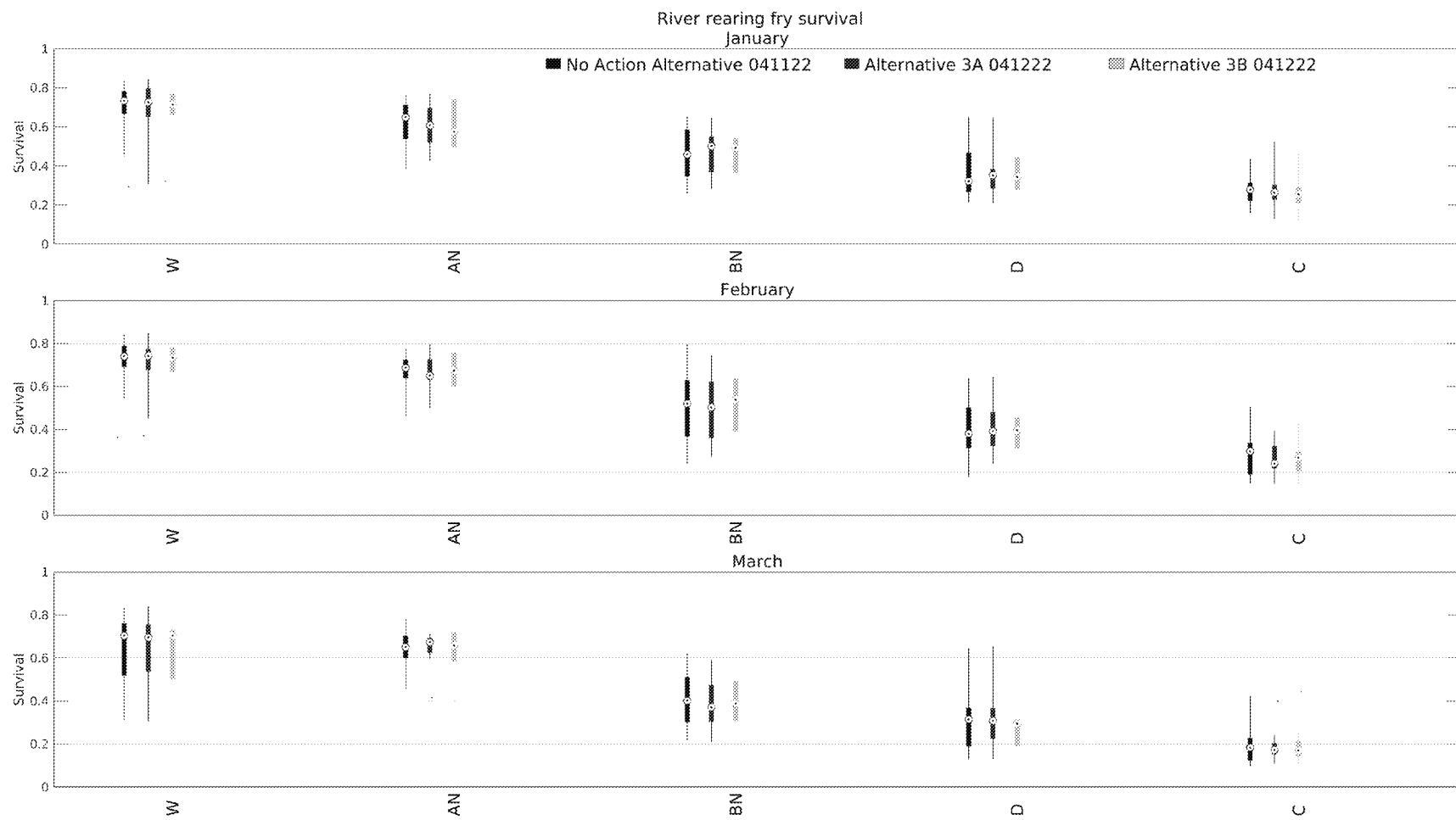
Project Controls

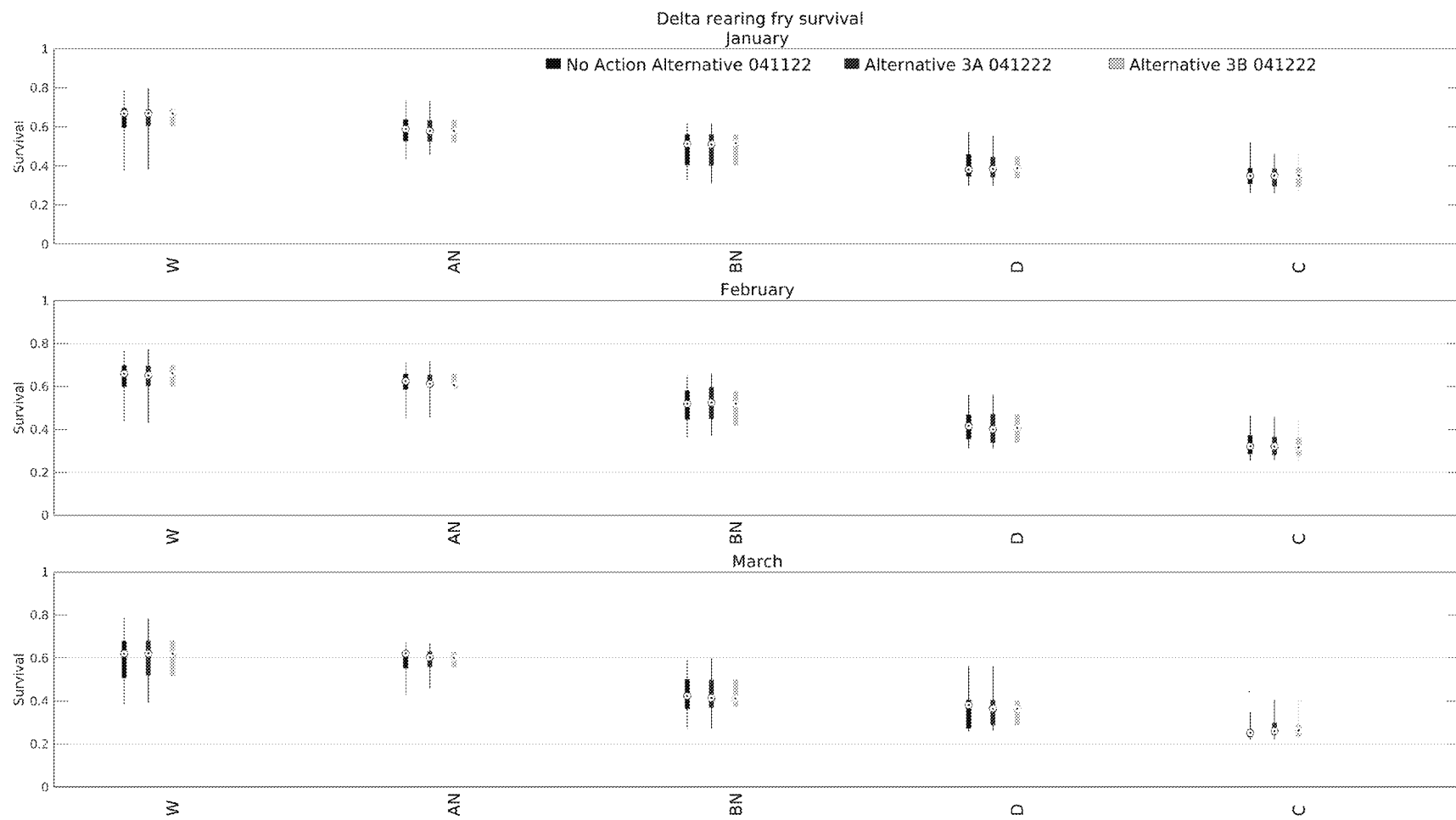
Brown and Caldwell

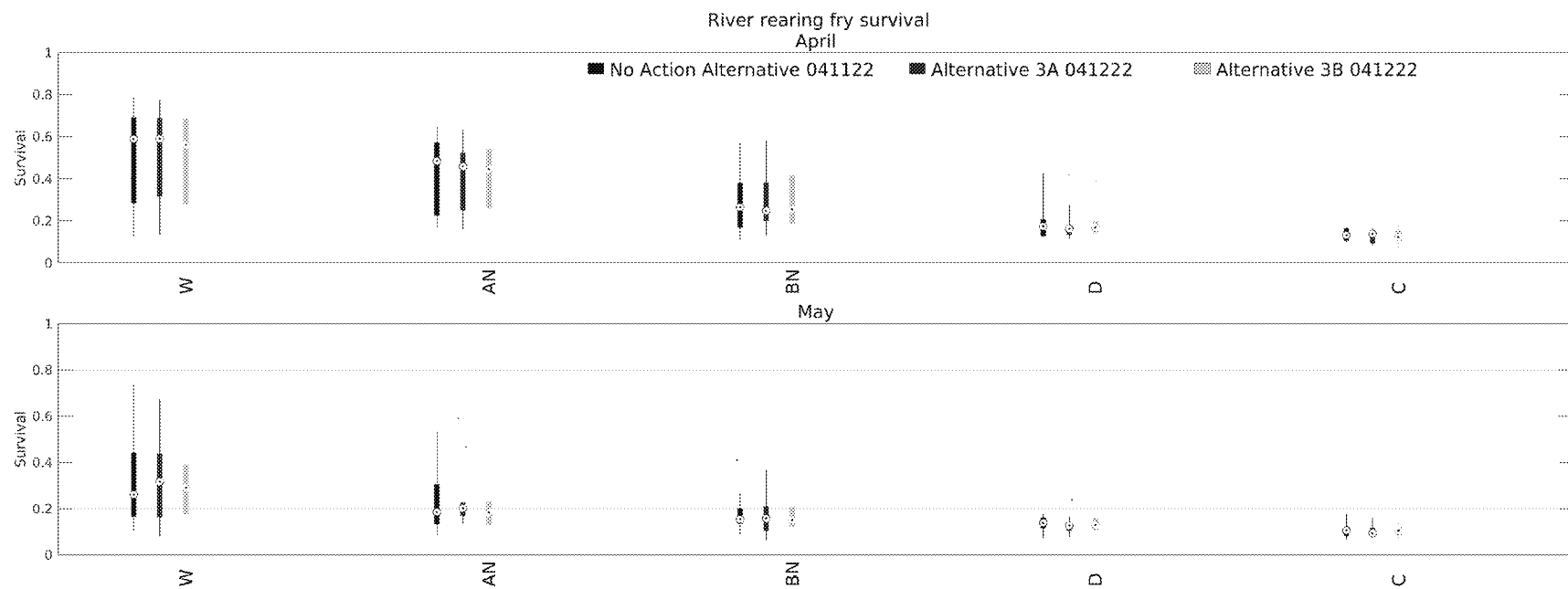
Cell: 832.840.1789

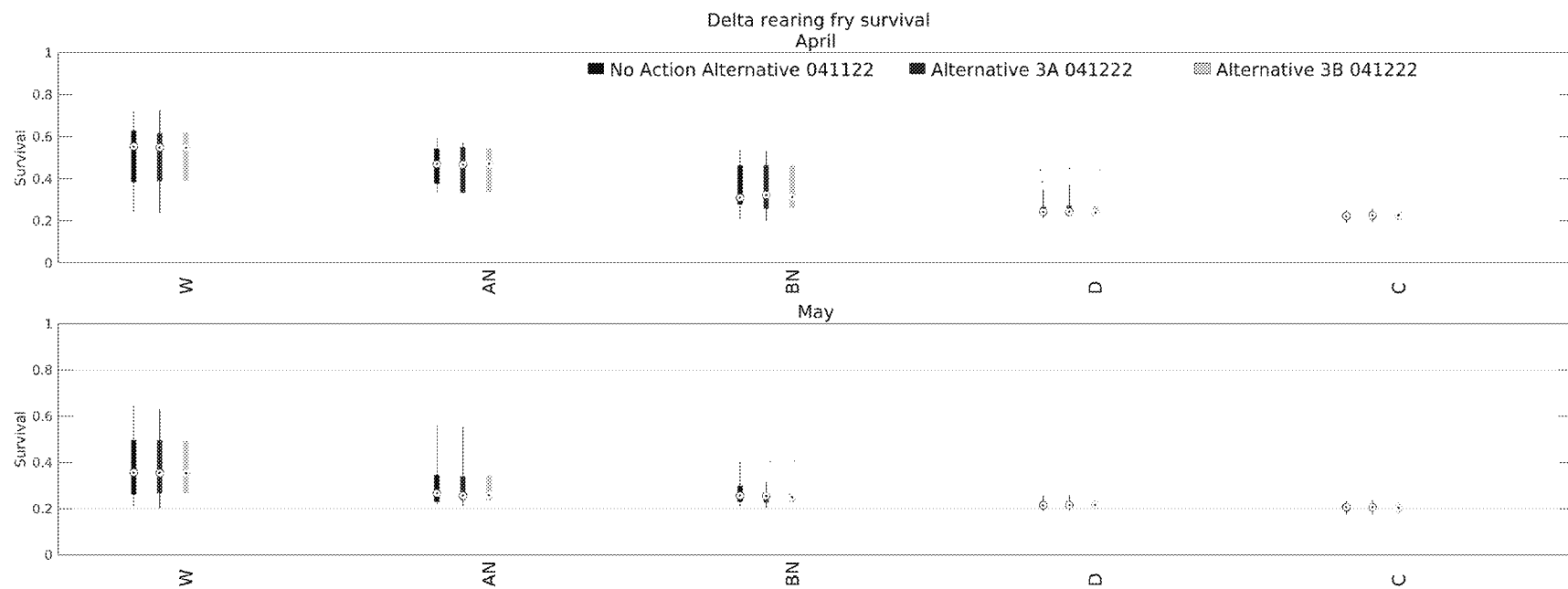
dhubbard@brwnclld.com

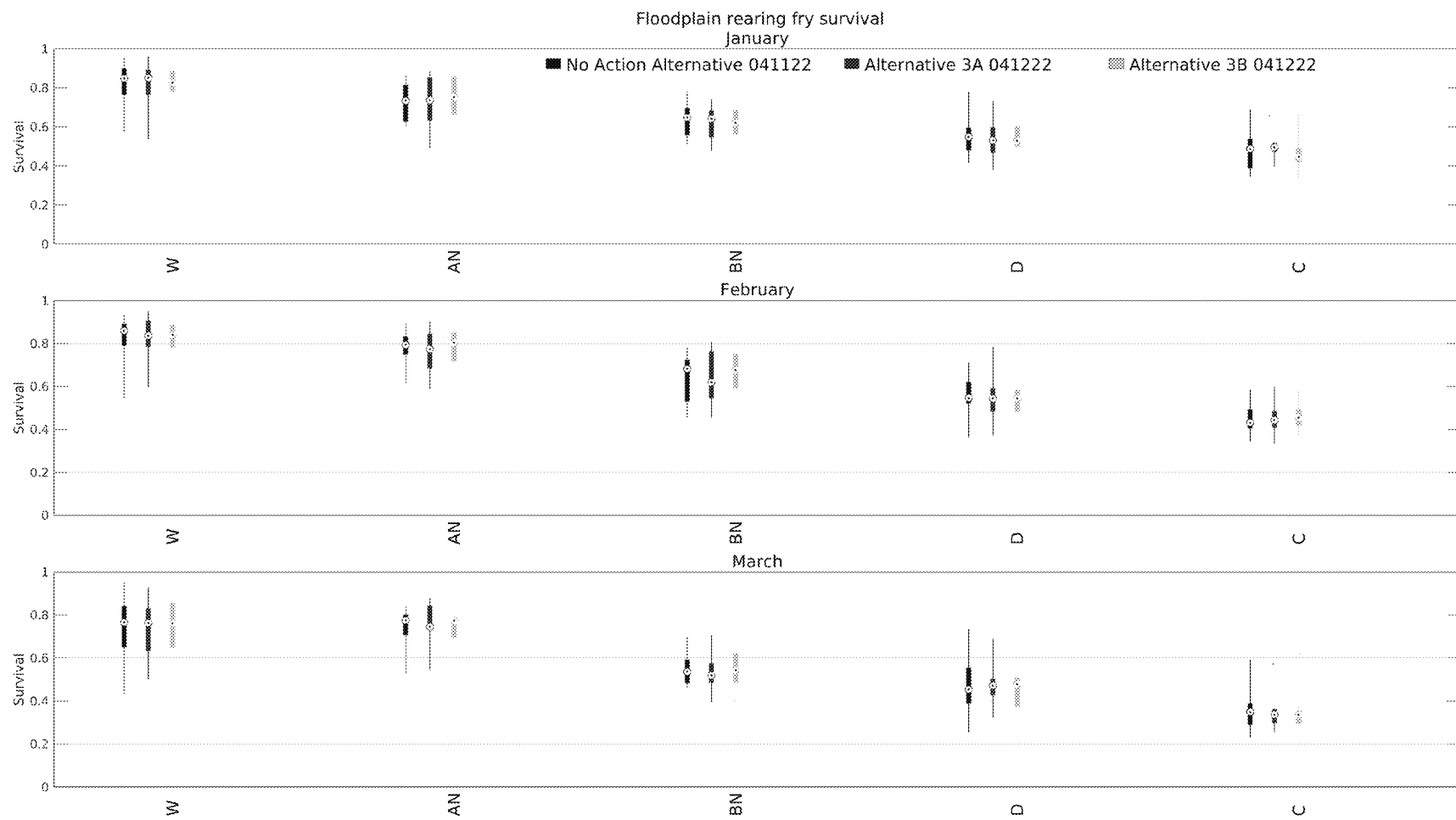


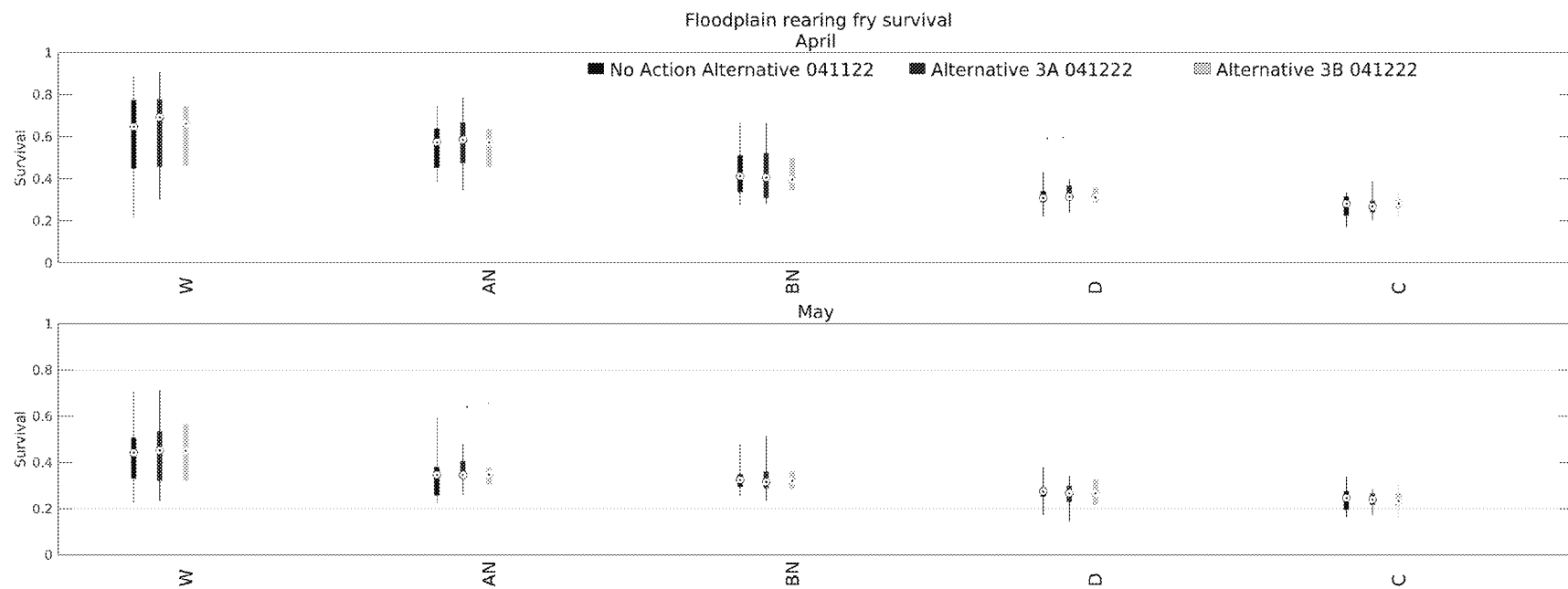












Real Estate Team

Weekly Check-In – Agenda



Our Core Values – Safety, Trust and Integrity, Respect for Local Communities, Environmental Stewardship, Shared Responsibility and Shared Benefits, Accountability and Transparency, Proactive Innovation, Diversity and Inclusivity
Our Commitment – To live up to these values in everything we do

Meeting Information:

Date: April 10, 2023 **Location:** Virtual – Microsoft Teams
Start Time: 2:00 p.m. **Finish Time:** 3:00 p.m.
Purpose: Real Estate Team – Weekly Check-In

Meeting Participants:

Kevin Spesert Jeff Mathews Trishna Patel
 Conner McDonald Caitlin Nielsen

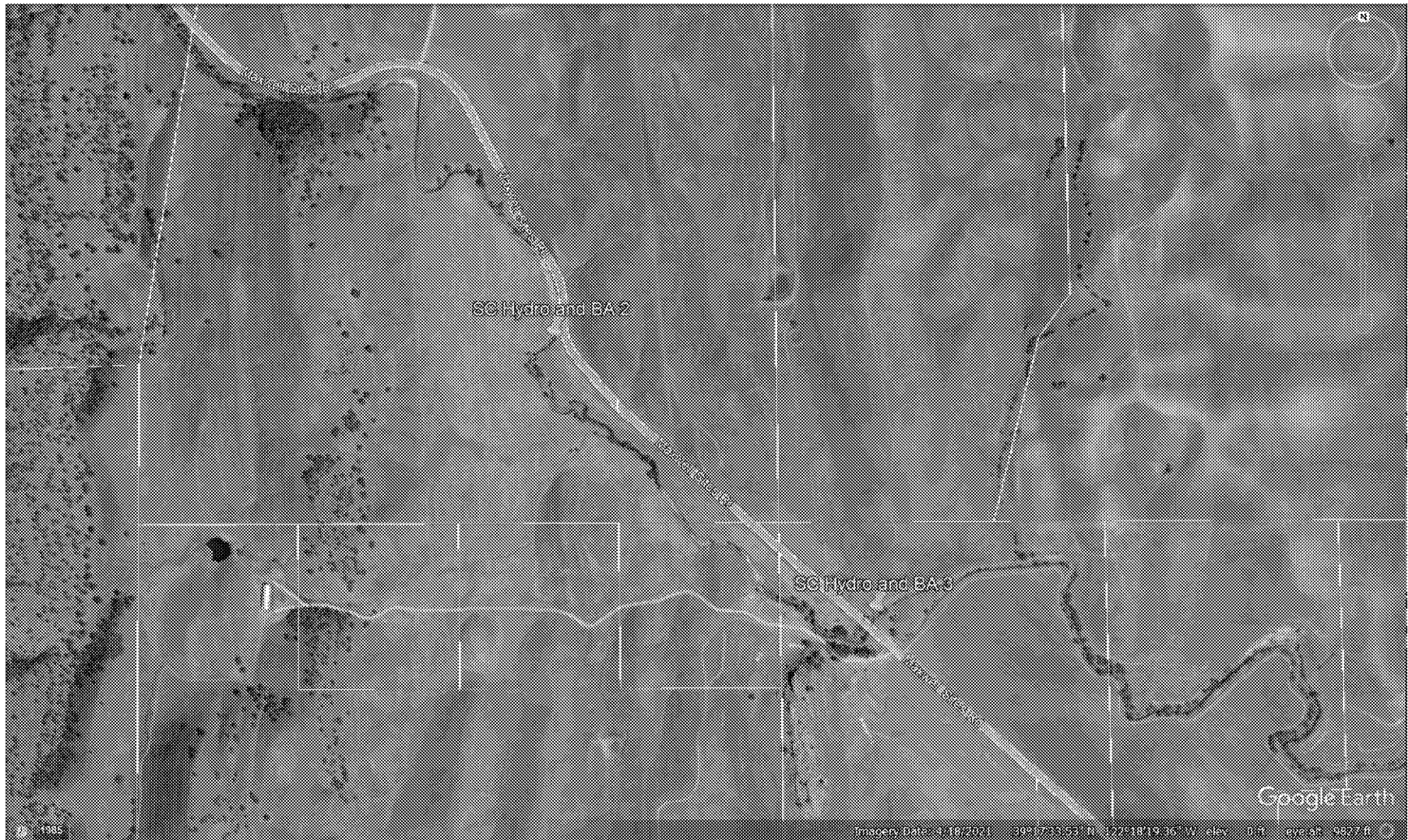
Agenda:

Discussion Topic	Topic Leader
1. Overview and Opening Comments	Kevin
2. Field Work – Previous Week’s Recap	Conner / All
a. Planning and Coordination	
b. No Field Work Performed	
3. Field Work – Current and Upcoming	Conner / All
a. Planned - Tentative - Pre-Siting - GCID / Funks - April 19	
b. In Planning - Tentative - Geotech - GCID / Funks - Week of April 24	
c. Contemplated - Geotech - Banyan - Early May	
d. Contemplated - Environmental Field Work - Banyan	
a) Land Work - Contemplated Start - Week Of May 1	
b) Aquatics	
e. Contemplated - Red Stick - Geotech and Environmental - May	
4. Landowner Engagement – Recap, Current Engagement, Look-Ahead	Conner / Jeff / All
a. Banyan - Gravel of Road; Star Thistle and Landscape Work; On-Site Merchantable Rock; Rental as Laydown Area	
b. Red Stick - Preliminary Visit - In Scheduling	
c. Wells Ranch - Cemetery - Draft Fact Sheets Available	
d. LaGrande - Discussions With Representative - Varying Ownerships?	
e. Owens - Electric Power Line	
f. Jensen - Follow-Up for Appraisal Site Visit	
g. Kellogg	
h. Cody Arnold - Cattle; Bee Boxes	

i. Holthouse - Appraisal Site Visit; Confirming Geotech Locations For Work Package 3 and 4; reached out for a chitchat	
5. Local Coordination – Recap, Current Engagement, Look-Ahead	Conner / Jeff / All
a. USBR / TCCA – Funks Coordination With Don Babb	
b. GCID Coordination – Geotech Work Package 2 - Permit on the way - Additional Locations Requested	
6. Right-of-Way Manual	Conner / Jeff / Caitlin / Trishna
a. Draft For Review	
7. Project Team – Interdisciplinary Coordination	Conner / All
a. Cultural Team - Danielle Risse; Danielle T - Cemetery - Draft Fact Sheets Ready - Next Steps?	
b. Cultural Team - Observation from Public Right-of-Way - Eagle Survey Approach - Meeting In Planning	
c. Environmental Team - Aquatic Studies - Information from John	
d. Borrow Areas - Meeting 4/13	
e. Roadways - Glenn County Meeting	
f. Roadways - Colusa County Meeting	
g. Environmental Mitigation Open House - Planning Meeting - Contemplated - May 16	
h. Environmental Mitigation Coordination - Regular Meetings	
i. GIS Tool - Color Coding	
a) Red - "No Access"	
b) Yellow - "Potential For Access - Consult With Real Estate"	
8. Administrative	Conner
a. Appraisals In Process - Preliminary Reports	
b. Next Land Management Committee Meeting - May	
a) Environmental Mitigation Presentation - Jeff	
b) Land Acquisition Considerations - Brad	
c. California Rangeland Trust - May 20	
9. Open Discussion	All
10. Action-Item Recap	Caitlin
11. Next Steps	Kevin / Conner / All
12. Closing Thoughts	Kevin

















EIR Videos Filming Schedule

Wednesday, April 19, 2023 – Canal Farms, Funks Reservoir

2 p.m. Zach Dennis
Canal Farms (Meet at SPA office first) - 122 Old Hwy 99W, Maxwell, CA 95955
20 minute travel time

4 p.m. Heather Dyer
Funks Reservoir (Meet at SPA office first) - 122 Old Hwy 99W, Maxwell, CA 95955

5 p.m. Jeff Sutton
Funks Reservoir

Thursday, April 20, 2023 – GCID

9 a.m. Ali Forsythe
GCID Canal at McDermott Road

10 a.m. Jerry Brown— Plus additional Executive Director Update (:45)
GCID Canal at McDermott Road

11:45 a.m. Thad Bettner
GCID Canal at McDermott Road
32 minute travel time

Thursday, April 20, 2023 – Mary Wells Home

1:15 p.m. JP Robinette
Mary Wells' Home

2 p.m. Anastacia Allen
Mary Wells' Home

2:30 p.m. Fritz Durst
Mary Wells' Home

Friday, April 21, 2023 – Sites Project Authority Office

9 a.m. Sites Project Authority Board Meeting
122 Old Hwy 99W, Maxwell, CA 95955
Group shots, b-roll, possible Board/RC member interviews

10 a.m. Rob Cooke
Maxwell sign across the street

1 p.m. Valerie Pryor
Maxwell sign across the street or nearby location



Name: Jerry Brown

Filming Date: Thursday, April 20, 2023

Scheduled Time: 10 a.m.

Location: GCID Canal

Filming Day-of Logistics

Please meet at the GCID Canal at McDermott Road no later than **9:45 a.m. on Thursday, April 20**. Sara Katz (619-813-9551) and Quin La Capra (201-452-7460) will serve as your on-site point of contacts.

The video team will be set up there and ready to record your portion of the video during your scheduled window. The weather forecast is expected to be between 65 and 70 degrees with possible rain showers, so please plan appropriately.

Thad Bettner will also be on site filming a separate video.

Other Video Participants – Filmed Separately

- **Fritz Durst**, Sites Project Authority Board Chair
- **Ali Forsythe**, Sites Project Authority Environmental Planning and Permitting Manager
- **Heather Dyer**, San Bernardino Valley Municipal Water District (SBVMWD) General Manager
- **Anastacia Allen**, Colusa County Agricultural Commissioner
- **Valerie Pryor**, Zone 7 Water Agency General Manager
- **Zach Dennis**, Tehama Colusa Canal Authority Chair

Sites Reservoir Project Overview

Congressional Project Tour
Sites Reservoir

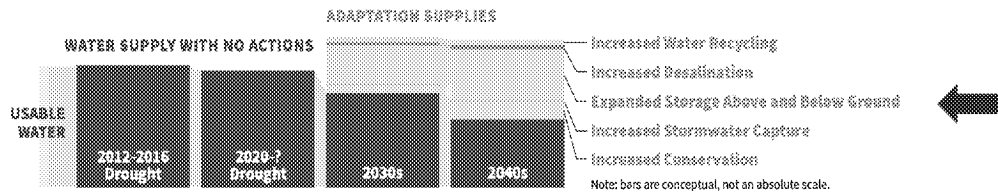
April 12, 2023



What Problem Does the Sites Project Help Solve?

Over the next 20 years, California could lose 10 percent¹ of its water supplies.

Our climate has changed, and the West continues to get hotter and drier. As it does, we will see on average less snowfall, more evaporation, and greater consumption of water by vegetation, soil, and the atmosphere itself.



In previous droughts the ratio of precipitation to evaporation to runoff has been similar. However, as temperatures rise, evaporation increases, with the consequence of a fall in runoff. As average temperatures continue to increase, the increase in evaporation will continue, with a concurrent drop in runoff.

Excerpted from Aug 2022 "California's Water Supply Strategy, Adapting to a Hotter Drier Future"

‘What if we had Sites?’ – most recent storms update

- Revised estimate for January 2023 storms - ~250,000af
- Current March-April 2023 forecasted filling is ~250,000af
- If spilling occurs from Lake Shasta, filling opportunities could continue
- Sites team will continue to monitor conditions and adjust forecasts as needed
- Real time monitoring continues to show Project capabilities are in line with modeling projections



Sites Project Authority

'the Sites Project is a local led project'

- Joint Powers Authority established under California law
- Authority member agencies located in the Sacramento Valley
- Reservoir Committee made up statewide agencies investing in the Sites Project
- The Sites Project Authority will own and operate Sites Reservoir

Board of Directors:

Colusa County
Colusa County Water District
Glenn County
Glenn-Colusa Irrigation District
Placer County Water Agency/City of Roseville
Reclamation District 108
Sacramento/Sac County Water Agency
Tehama-Colusa Canal

**Our Strength is in Our
Broad Statewide Participation
'the Sites Project is Beneficiary
Days!'**

**Sacramento
Valley**

City of American Canyon
Colusa County
Colusa County Water Agency
Cortina Water District
Davis Water District
Dunnigan Water District
Glenn County
Glenn-Colusa Irrigation District
LaGrande Water District
Placer County Water Agency
Reclamation District 108
City of Roseville
Sacramento County Water Agency
City of Sacramento
Tehama-Colusa Canal Authority
Westside Water District
Western Canal Water District

Bay Area

Santa Clara Valley Water District
Zone 7 Water Agency

San Joaquin Valley

Wheeler Ridge-Maricopa Water Storage
District
Rosedale-Rio Bravo Water Storage
District

Southern California

Antelope Valley - East Kern Water
Agency
Coachella Valley Water District
Desert Water Agency
Irvine Ranch Water District
Metropolitan Water District
San Bernardino Valley Municipal Water
District

Waiting List

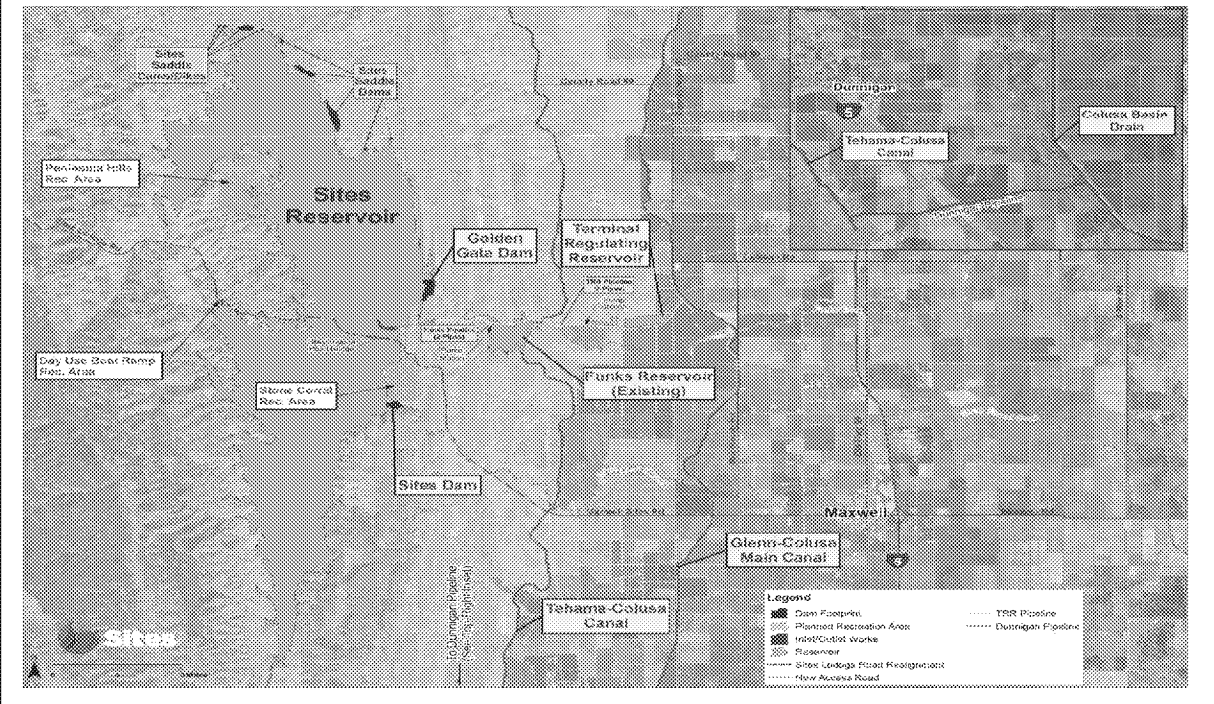
Cal-Am Sacramento
City of Napa
Delta View WDA
Glenn County
La Cumbre MWC
Madera County
Pacific Resources MWC
Palmdale WD
Santa Clara Valley WD
Western Municipal WD
Westlands WD
Wheeler Ridge Maricopa WSD
Woodland Davis CWA



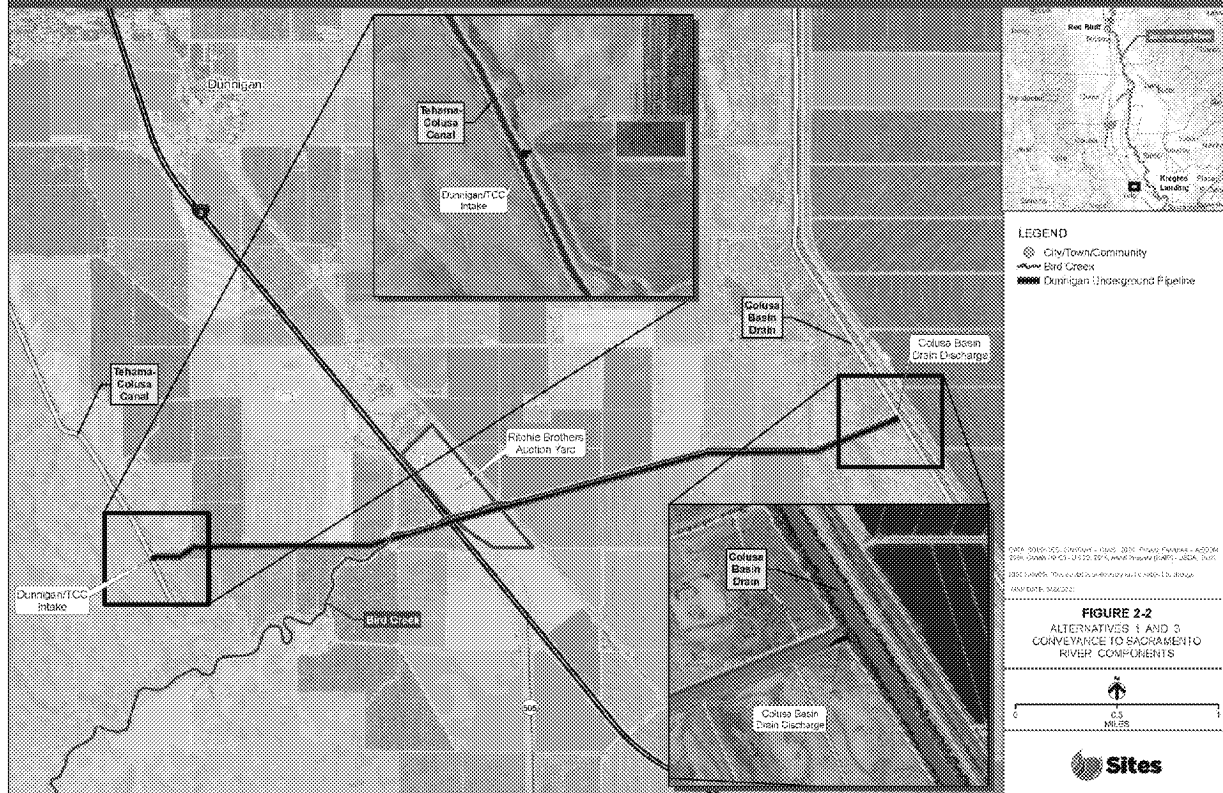
Overview of Sites Reservoir Project

- The Project is a multi-benefit, beneficiary pays off-stream surface storage project that will help provide needed flexibility, reliability and resiliency to California's water supply
- **The Project will capture and store stormwater flows from the Sacramento River (after all other water rights and regulatory requirements are met) for release primarily in dry and critical years for California communities, farms, and ecosystems.**
- The Project will use existing intakes with state-of-the-art fish screens. Diversions would only occur when permitted river flows exist that are protective of river and Delta aquatic species
- The Sites Authority has applied for a new water right to divert water from the Sacramento River at Red Bluff and Hamilton City.
- The Project includes about 180 miles of conveyance. Only about 20 miles is new facilities. The remainder is shared existing infrastructure.
- **Sites water is to be conveyed "through Delta" to southern California participants - not reliant upon the proposed Delta Conveyance Project.**
- The Project is climate resilient; it does not rely on snowmelt but will capture winter river runoff from uncontrolled streams below existing reservoirs in the Sacramento Valley
 - As such, it will inherently adapt to future climate conditions and will be operated to improve water supply resilience to predicted changes in weather

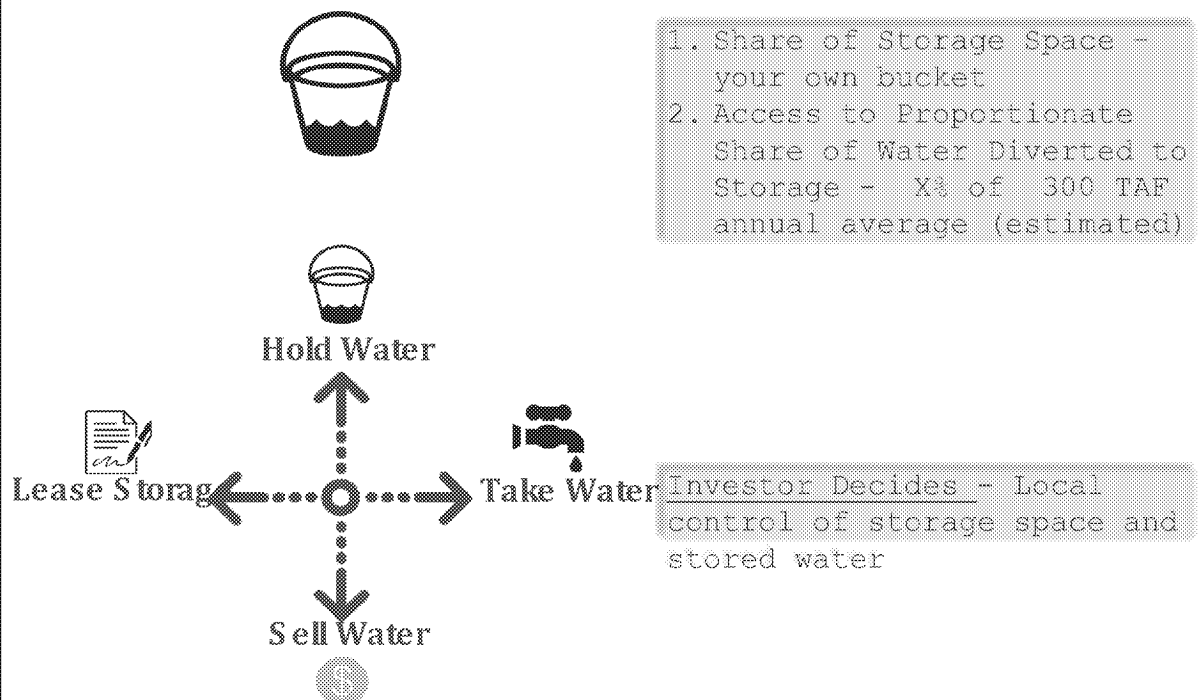
Project Facilities



Project Facilities



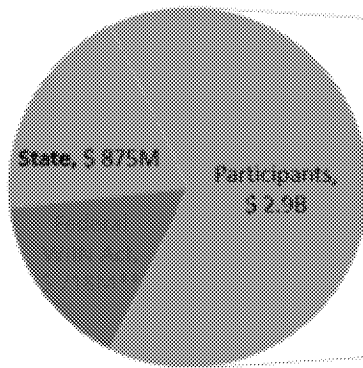
What Do You Get With Your Investment in Sites Reservoir?



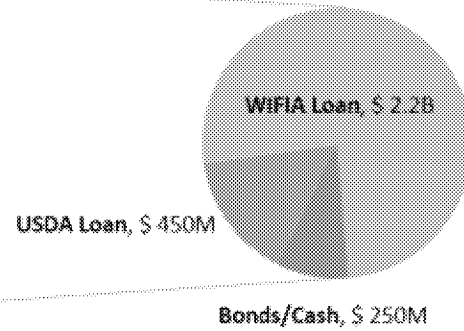
Project Funding Sources

'State/Federal Interest in the Sites Project'

Project Investors



Participant Funding Sources



**WIFIA Act funding is based on 16% Reclamation investment under Alternative 3 (Preferred Project) and is reported in future dollars.

Environmental Planning & Permitting Update

- Environmental Impact Report
 - 2017 Draft Document
 - 2021 Revised Draft document
 - Released for public review in November 2021
 - Comment period closed in January 2022
 - 2023 Final document
 - Expected in June 2023
 - All concerns evaluated
 - Revisions to 2021 draft included
 - Response to comments
- Water Right Permit
 - Submitted application to State Board in May 2022
 - Expect Board to complete review and notice for public review/protests in April 2023

Engineering Update

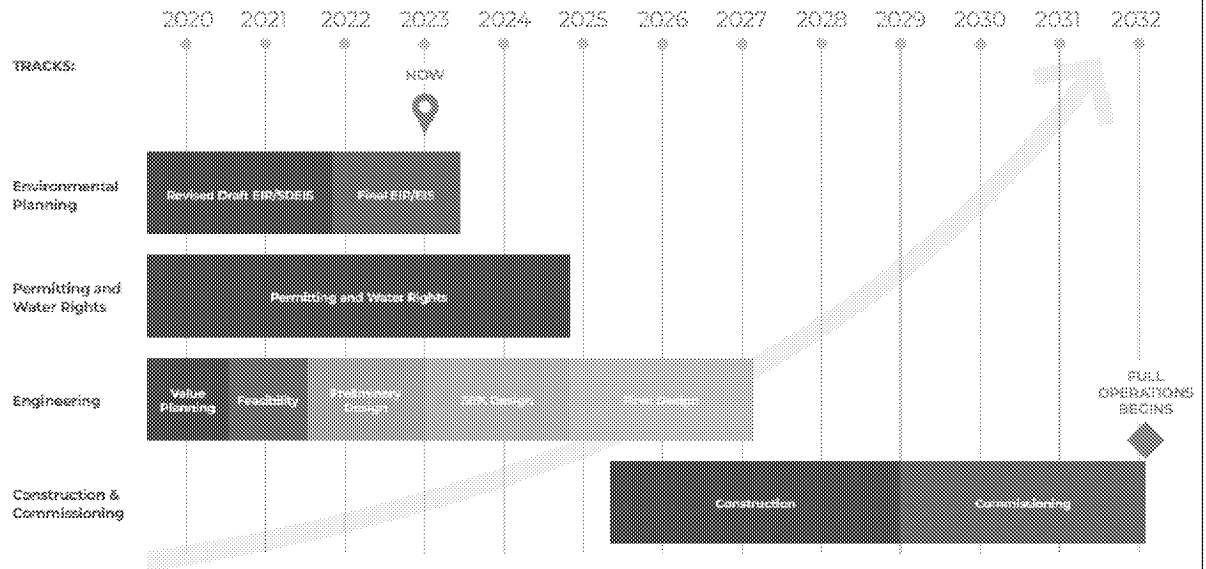
- **2021** - Completed the Feasibility Analysis
 - The California Water Commission Determined the Project is Feasible
- **2022-2024** - Conducting Field Studies
 - Survey Mapping & Geotechnical Investigations to Inform Preliminary Engineering Analysis and Design
- **2024** - Complete 30% Design
 - Update Project Cost Estimate
- **2024** and Beyond - Key Agency Reviews and Approvals
- **2025** - Begin Construction

Real Estate Update

- Coordinating with Landowners on the project design. Two most frequently asked questions:
 - anticipated land needs and
 - timing for acquisition
- Securing Temporary Rights of Entry (TROE) and other agreements to conduct necessary technical field activities
- Having acquisition discussions on key project parcels or parcels associated with major project infrastructure
- Acquisition transactions not likely to occur sooner than 2024.

Project Schedule

Sites Reservoir Project Schedule



Draft - Predecisional Working Document - For Discussion Purposes Only

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Speaker: Laurie

Draft - Predecisional Working Document - For Discussion Purposes Only

Questions



Other Items of Potential Interest



Overview of Amendment 3 Participants

- Participants generally include large urban water wholesalers downstream ("South of Delta") and small agricultural districts primarily located in the Sacramento Valley ("North of Delta")

- South of Delta participants comprise 59% of Participants and 76% of total Project subscriptions

- North of Delta participants comprise 41% of Participants and 24% of total Project subscriptions

- 65% of total Project subscriptions are rated A or higher by S&P

- Four Participants (Metropolitan Water District of Southern California, San Bernardino Valley Municipal Water District, Zone 7 Water Agency, and Coachella Valley Water District) are rated AAA/AA+ by S&P and account for 55% of total Project subscriptions

- The single largest user of water from Sites is the ecosystem portion of the State's Prop 1 investment.

Sites Amendment 3 Participants	Acre Foot Participation
Antelope Valley-East Kern WA	500
City of American Canyon	4,000
Coachella Valley WD	10,000
Colusa County*	10,000
Colusa County WD*	9,256
Cortina WD*	450
Davis WD*	2000
Desert WA	6,500
Dunnigan WD*	2972
Glenn-Colusa ID*	5000
Irvine Ranch WD	1,000
La Grande WD*	1000
Metropolitan Water District of SC	50,000
Reclamation District 108*	4000
Rosedale-Rio Bravo WD	500
San Bernardino Valley Municipal WD	21,400
San Geronio Pass WA	14,000
Santa Clara Valley WD	500
Santa Clarita Valley WA	5,000
Westside WD*	5375
Wheeler Ridge - Maricopa WSD	3050
Zone 7 WA	10,000
Total	166,503

*Denotes North of Delta participant

Denotes agricultural participant

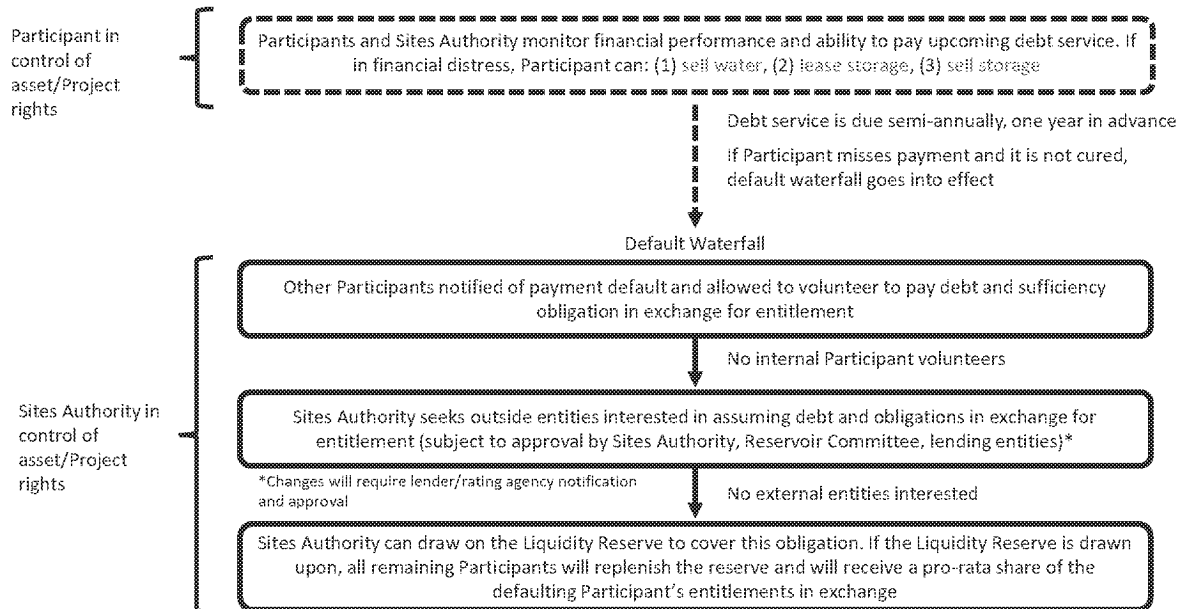
Securing Revenue to Meet WIFIA Loan Debt Service

- Prior to execution of the WIFIA loan, Sites Authority will enter into a Sites Reservoir Benefits and Obligations Contract (Contract) with Participants that will require Participants to collect revenue sufficient to fund their share of pooled debt service
- Participants have several potential sources of funds that can be used to meet Project financial obligations: (1) include costs on Participant's DWR State Water Project Annual Statement of Charges; (2) levy benefit assessments or other land-based charges; (3) incorporate costs into water rates and charges; or (4) pay-go their share of costs

Rates and Charges or Benefit Assessment (with or without Prop 218)	Land-Based Charges	State Water Project Statement of Charges (through property taxes)
City of American Canyon	Colusa County ¹	Antelope Valley-East Kern
Glenn Colusa Irrigation District	Colusa County WD	Coachella Valley WD
Irvine Ranch Water District ³	Cortina WD	Desert WA
MWD of Southern California	Davis WD	San Bernardino Valley MWD
Santa Clara Valley WD	Dunnigan WD	San Geronio Pass WA
Santa Clarita Valley WA	La Grande WD	
Reclamation District 108 ¹	Reclamation District 108 ¹	
Rosedale-Rio Bravo WSD	Westside WD	
Zone 7 WA	Wheeler Ridge Maricopa WSD ²	
Notes:		
1. Still to be determined whether using Rates and Charges or District-wide land-based charges		
2. Land-based charges imposed via recorded Benefits and Obligations Contracts on Certain Lands		
3. Irvine Ranch Water District is exploring funding its share of capital costs separately from the group participating in the pooled Loan borrowing, but is currently included in the group financing for purposes of the pro forma		
4. Colusa County is exploring funding its share of capital costs as a General Fund obligation		

Summary of Key Security Covenants/Terms

- Contract will also include a default “waterfall” process that will be utilized if a Participant fails to pay by the due date. If Participant efforts outlined below are not successful, the Authority will have the right to suspend or terminate the Contract, including selling water and storage



Discuss JPA rights in case of default

Summary of WRLCM Results

- The Project has a slightly positive effect on winter-run with the potential to increase the overall population
- Benefits to winter-run are associated with periodic reductions in late summer water temperatures that decreases salmon egg mortality
 - Likely driven mostly by Reclamation's investment and exchanges with Reclamation
- Model runs included Alternative 3 with Reclamation investment at both a 25% (Alt 3A) and 16% (Alt 3B)
 - Alt 3A has slightly greater benefits than Alt 3B

Draft - Predecisional Working Document - For Discussion Purposes Only

20

Speaker: Ali

Draft - Predecisional Working Document - For Discussion Purposes Only

Summary of Water Availability Results

Approach	Result Take-away	Annual Average Available (AFY)	Max Water Available (AF)
Historical	Water available in all year types* and 18 of 22 years	748,000	3,879,000
CalSim II			
Historical hydrology	Water available in all year types and 74 of 82 years	1,448,000	5,249,000
Climate change -- 2035 Central Tendency	Water available in all year types and 73 of 82 years	1,518,000	5,330,000
Climate change -- 2070 Central Tendency	Water available in all year types and 70 of 82 years	1,455,000	5,176,000
Unimpaired Flow -- Based on Reclamation's Alternative 4 in their 2019 Reconsultation EIS	Water available in all year types and 73 of 82 years	1,518,000	5,330,000
Face Value	Water available mainly in wet and above normal years and 55 of 93 years	1,118,000	8,681,000

*Based on the Sacramento Valley Water Year Index (40-30-30 Index)

Project Next Steps/Goals: 2022 - 2024

- ✓ Secure Final Prop 1 Funding award with CWC
- ✓ Execute Final Operations Agreement
- ✓ Secure WIIN and BIL Federal Funding
- ✓ Complete WIFIA/USDA Loan Agreements
- ✓ Execute Benefits and Obligations Contracts
- ✓ Complete Final EIR/EIS
- ✓ Obtain Critical Environmental Permits (BO, ITP, 404)
- ✓ Receive Water Right Order and Permit
- ✓ Obtain Local Agency Agreements and Permits
- ✓ Execute Benefits Contracts with DWR and 

Project Next Steps/Goals: 2022 - 2024

- ✓ Develop Mitigation Acquisition Master Plan
- ✓ Initiate Application for DSOD Permit to Construct
- ✓ Advance Engineering Design to achieve Level 3 cost estimate
- ✓ Determine Procurement and Delivery Strategy
- ✓ Determine Overall Project Schedule
- ✓ Develop and Implement Land Acquisition Master Plan
- ✓ Conduct Geotech Investigations and Evaluations
- ✓ Perform Geotech Evaluation of all "Willing Seller" Properties
- ✓ Determine Organization Structure and Governance



From: Cooke, Robert@DWR [Robert.Cooke@water.ca.gov]
Sent: 4/11/2023 12:39:05 PM
To: Jerry Brown [jbrown@sitesproject.org]
Subject: Follow-up
Attachments: How to avoid a challenge to Goodman.docx; Sites Reservoir - DWR Comments of 4-21-2023 on Video for EIR-EIS - June 2023 Launch.docx; PLOT_ESI.pdf

Issues:

1. Goodman – See the attached “How to avoid a challenge to Goodman”. The Judge did us all a big favor. At least we all know how now.
2. My comments for the video – See the attached “comments”
3. The Water Board and Permitting Agency lack of vision for Humans living in CA.

In regard to the Water Board and Permitting Agencies...

The larger question here is:

Do we have a vision for the future of California and does it account for population growth? We can't conserve our way out of water shortages. Not even close.

Sites represents the best known opportunities for Surface Storage left in California, outside the Eel River (Good luck with a Wild and Scenic River).

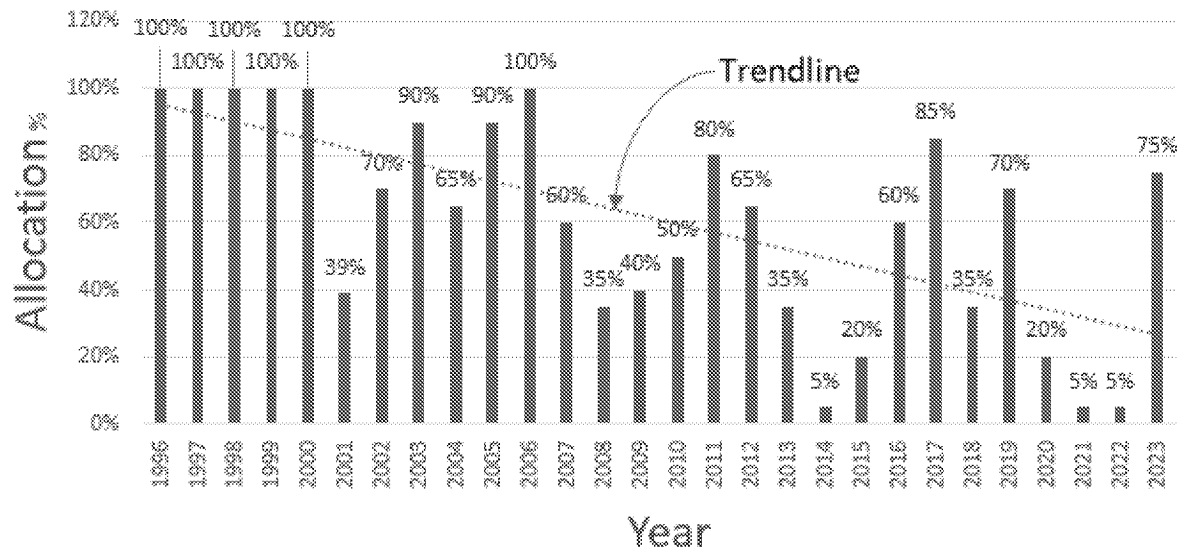
And these Projects aren't getting any cheaper. Sites estimates the cost of delay is \$100M/YR on a \$4B Project.

I wonder if they have seen this Trendline? **This is clearly a regulatory induced Trendline.** The SWP regularly had 100% allocations prior to 2001. Not always, 1990 and 1991 were tough years. But generally speaking the average year brought 100% allocation. What we are witnessing now is the slow death of California Water. We just experienced the best statewide snow pack on record, plus currently 133% of average 8-station index, and the SWP is only at a 75% allocation??? What is wrong with this picture? Very Sad!

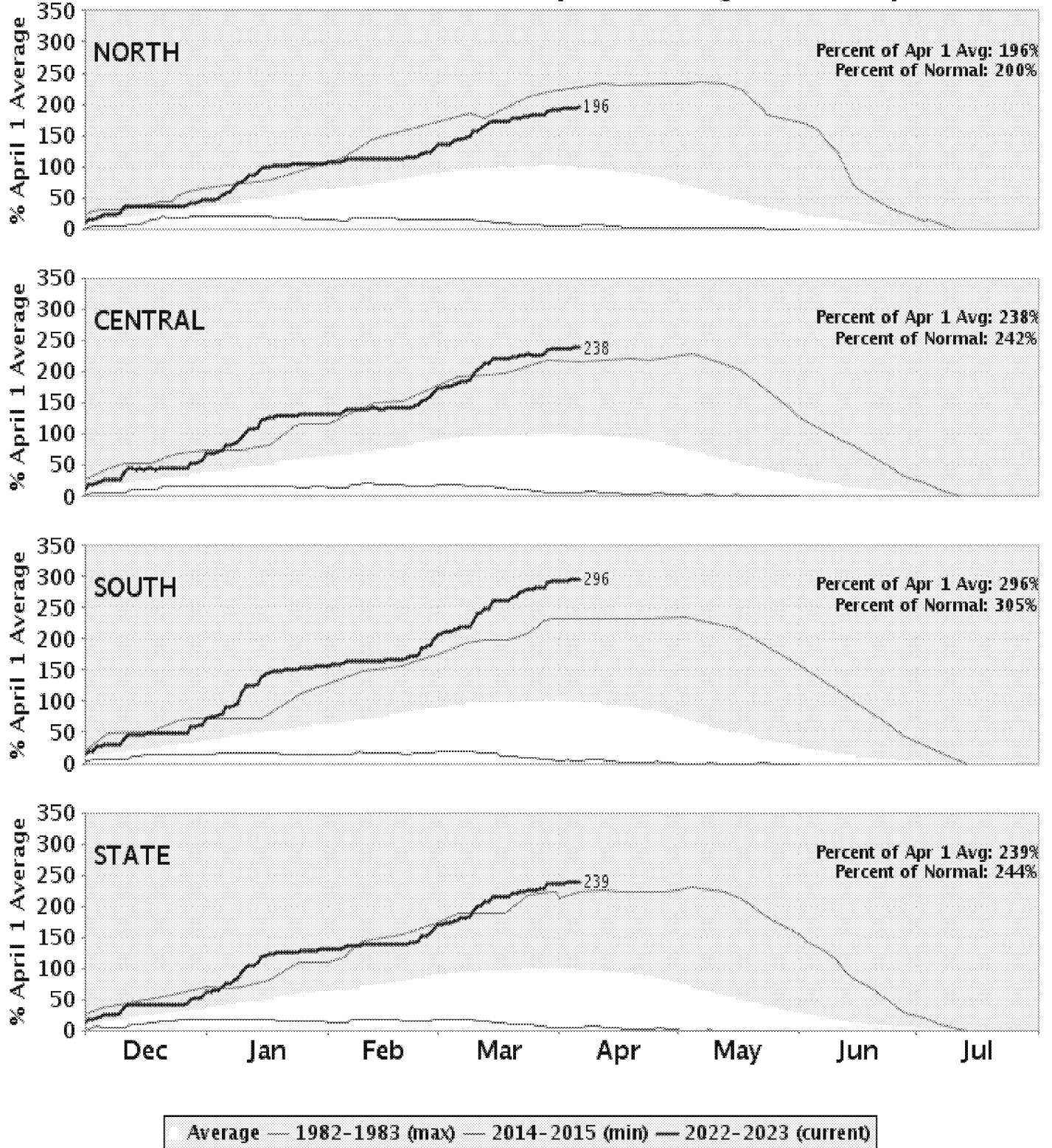
The same may happen to Sites but we have to build it while it is still affordable and try to address the regulatory assault later.

Don't get me wrong, I want the environment to flourish. But you do it with building the bottom of the food chain and providing good habitat to spawn and hide. Not by sending water out the golden gate. Sell some of this water and use the money to build the bottom of the food chain and provide good habitat to spawn and hide. But we have one trick ponies.

SWP Allocation 1996 -2023



CA Snow Water Content - Percent of April 1 Average For: 06-Apr-2023



Rob Cooke
Principal Engineer, PE, RA
Department of Water Resources
(916) 365-7915
(916) 820-7792

From: Cooke, Robert@DWR
Sent: Tuesday, March 14, 2023 11:45 AM
To: Jerry Brown <jbrown@sitesproject.org>
Subject: RE: Draft Amendment Language

Jerry,
FYI – Here is the Tentative Ruling as I mentioned. My analysis is in the email below Jeff's response.
Rob-

Rob Cooke
Principal Engineer, PE, RA
Department of Water Resources
(916) 365-7915
(916) 820-7792

From: Jeff Davis <JDavis@ppeng.com>
Sent: Tuesday, March 14, 2023 10:42 AM
To: Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Rob Kunde <rkunde@wrmwsd.com>
Subject: RE: Draft Amendment Language

Rob, I have spent the last hour or so reading this and I agree—it is very illuminating. And, I concur with you that I think this is good for our Sites amendment. Especially when you look at it from the perspective of, like you say, DWR is replacing the project with water from other sources since 44% of the SWP water has been lost.

Our next call with the Amigos should include a summary of this decision from one of the attorneys—I'm guessing it should be Steve Abbott—but yes, I think we should discuss it first to assure ourselves that we agree on what it says and what we think it means.

Rob Kunde, do you have some time available this week?

From: Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>
Sent: Tuesday, March 14, 2023 5:33 AM
To: Jeff Davis <JDavis@ppeng.com>; Rob Kunde <rkunde@wrmwsd.com>
Subject: Re: Draft Amendment Language

Hi Jeff,
Yes, I'm fine with your question below:

"Are you both ok with me sending out a poll for a final meeting of the Amigos before taking this to the Contractors?"

But first, I want to address your comment on **Goodman risks**. I have been reviewing the Tentative Ruling on the Coachella Case.

Perhaps the three of us should talk about this Case. It is very illuminating.

I have attached the Ruling for your use. I think you both should read and understand it.

In summary this is what the ruling tells me:

1. The pre-Prop 13 taxing authority (indebtedness exemption) can only be used when it's necessary to provide for payments to the state under the state water supply contracts.
2. The risk to Goodman comes when contractors **don't** go through the SOC, **not when they do**, as is the case with the 4 Amigos or Gang of 4.
3. Contractors must keep separate accounting of their funding sources and what sources they used to pay each bill.

So any SWP contractor that is planning to participate in Sites, and use pre-Proposition 13 taxing authority (indebtedness exemption), without making the Sites charges “SWP payment obligations under SWP Contracts” (the Sites Participating Contractors not going through the SOC), would appear to be in violation of both Proposition 13 and Goodman.

It’s important to note that in the Coachella case, the plaintiff didn’t dispute that the District is entitled to levy ad valorem taxes to pay for its SWP payment obligations under SWP Contracts. The dispute is, and the only point of 3 points that Coachella lost on is, that Coachella didn’t go through the SOC, not that they used SWP tax funds.

This is my analysis:

We now know Judge Reimer’s 12/14/22 tentative ruling in the Coachella Valley Property Tax case. (Howard Jarvis Tax Assn v. Coachella Valley Water District)

The Judge determined:

“The District failed to meet its burden showing the SWP taxes collected for FY 2020-2022 were allocated and used solely for SWP expenditures. SWP taxes levied by the District for purposes other than SWP expenses violate Proposition 13’s one percent cap on property taxes, and Propositions 218 and 26’s requirement for voter approval for tax increases.

Accordingly, that portion of the petition that seeks relief based on the District’s levy and diversion of SWP taxes for purposes other than SWP expenses in FY 2020, FY 2021 and FY 2022 is granted. The actual amounts of those improper expenditures (i.e., expenditures labeled “SWP Related Payments to Others” and “Other”) shall be determined during the remedies phase of trial.”

Judge Reimer’s 12/14/22 tentative ruling used the following as a basis for his decision. Proposition 13 and Goodman Decision exemptions are based on SWP payment obligations under SWP Contracts:

Proposition 13

“Section 1(b) of Proposition 13 provides: “The [1%] limitation provided for in subdivision (a) shall not apply to ad valorem taxes or special assessments to pay the interest and redemption charges on any indebtedness approved by the voters prior to the time this section becomes effective.” The DWR asked the AG whether SWP taxes fall within that prior- indebtedness exception. The Attorney General concluded that the SWP taxes fell within the exception: “Property taxes levied by local water districts necessary to provide for payments to the state under the state water supply contracts fall within section 1(b) of article XIII A of the California Constitution.” (RJN, Ex. 1, p. 1.)”

The Goodman Decision reaffirmed Proposition 13

“In Goodman, property owners filed an action against the county to recover real property taxes levied by a local water agency to fund the agency’s SWP payment obligations, alleging that the levy and collection of such taxes violated the 1% ad valorem real property taxation restriction embodied in Proposition 13 and Article XIII A, § 1(a). The court held that such taxes came within the prior indebtedness exception to the property tax restriction under Article XIII A, § 1(b)(1), explaining as follows: “we conclude, when the state’s voters approved the Burns-Porter Act, they approved an indebtedness in the amount necessary for building, operating, maintaining, and replacing the Project, and that they intended that the costs were to be met by payments from local agencies with water contracts. Further, we conclude that the voters necessarily approved the use of local property taxes whenever the board of directors of the agencies determined such use to be necessary to fund their water contract obligations, and that the ad valorem taxes levied by [the local agency] fall within the exception of section 1, subdivision (b).” (Goodman, supra, 140 Cal.App.3d at 910.) Thus, under Goodman, taxes levied by local agencies to fund payment obligations under SWP contracts are exempt from Proposition 13’s restriction on property taxes.”

End of Ruling analysis.

DWR's approach and Rational for Sites

For Sites Reservoir Water Purchases, DWR is saying that: due to its Delivery Capability Report, now showing a 56% SWP delivery capability, and requests from its SWP Contractors to purchase water to help relieve this situation, ***"replacing the Project"*** in the form of purchasing the most cost effective and available water is a reasonable and necessary part of meeting the intension of the Burns Porter Act. DWR tried to build Sites Reservoir, but determined it was not implementable for DWR to do so. Purchasing Sites Water from the Sites Project Authority is the next best way to help SWP Delivery Capability. Water Code Section 11454(b)(1) gives DWR broad authority, among other statutes and contract articles.

I'm interested to know your take on this. This is my 2 cents as an Engineer, not an Attorney.

Thanks,
Rob-

Rob Cooke
Principal Engineer, PE, RA
Department of Water Resources
(916) 365-7915
(916) 820-7792

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From: Jeff Davis <JDavis@ppeng.com>

Sent: Monday, March 13, 2023 2:28:50 PM

To: Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Rob Kunde <rkunde@wrmwsd.com>

Subject: Draft Amendment Language

Rob and Rob,

I did not get as much feedback from my last email as I was hoping for (only Steve Abbott responded, in addition to Rob C and Jagruti). I am hoping that this means that everyone is ok with the current language. Are you both ok with me sending out a poll for a final meeting of the Amigos before taking this to the Contractors? The meeting with the Amigos would be per Robert Cheng's request and would review the final draft language that we have right now (still have some placeholders that need to be filled in eventually). It would also provide the Amigos (now that there are four of them, I would consider changing the name to the Gang of Four, but I don't know how many people would get the reference) one final opportunity to discuss the risks associated with this amendment, including Goodman risks. That seemed to be a sobering subject in our last call, with some of the Amigos not remembering that we have known about these risks from the beginning (2018), and yet have continued on with this work.

For your information, I have attached the most recent version, dated March 6.

Jeff Davis, P.E.

Provost & Pritchard Consulting Group

Mobile: (909) 782-5455

email: jdavis@ppeng.com

website: <https://provostandpritchard.com>

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Sites Imported Aggregate Briefing

March 31, 2023

Agenda

- Project Description
- Dam Filter, Drain and Transition Zones
- Road Base
- Concrete Aggregate
- Summary of Quantities
- Questions

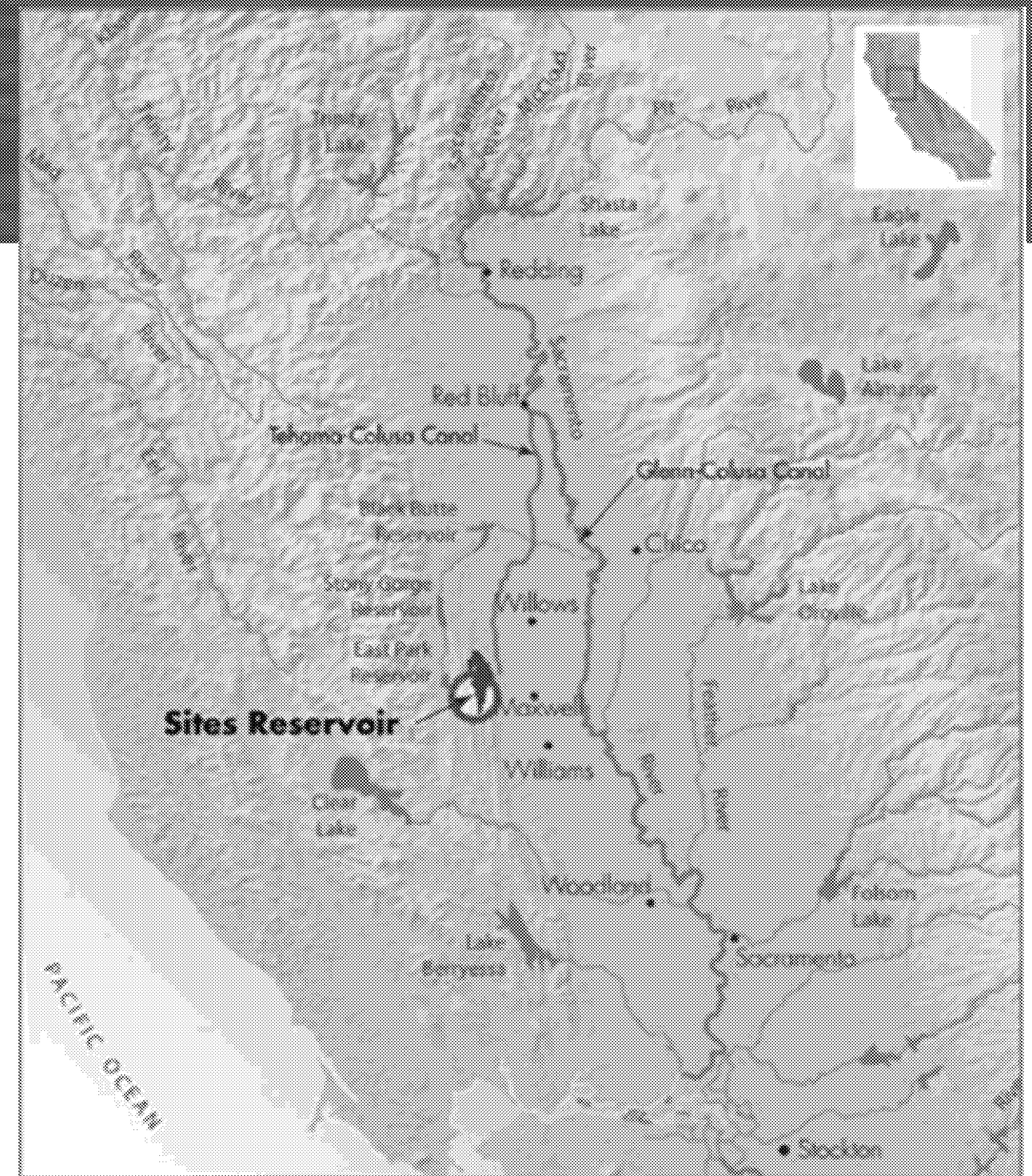
Project Description

Project Location

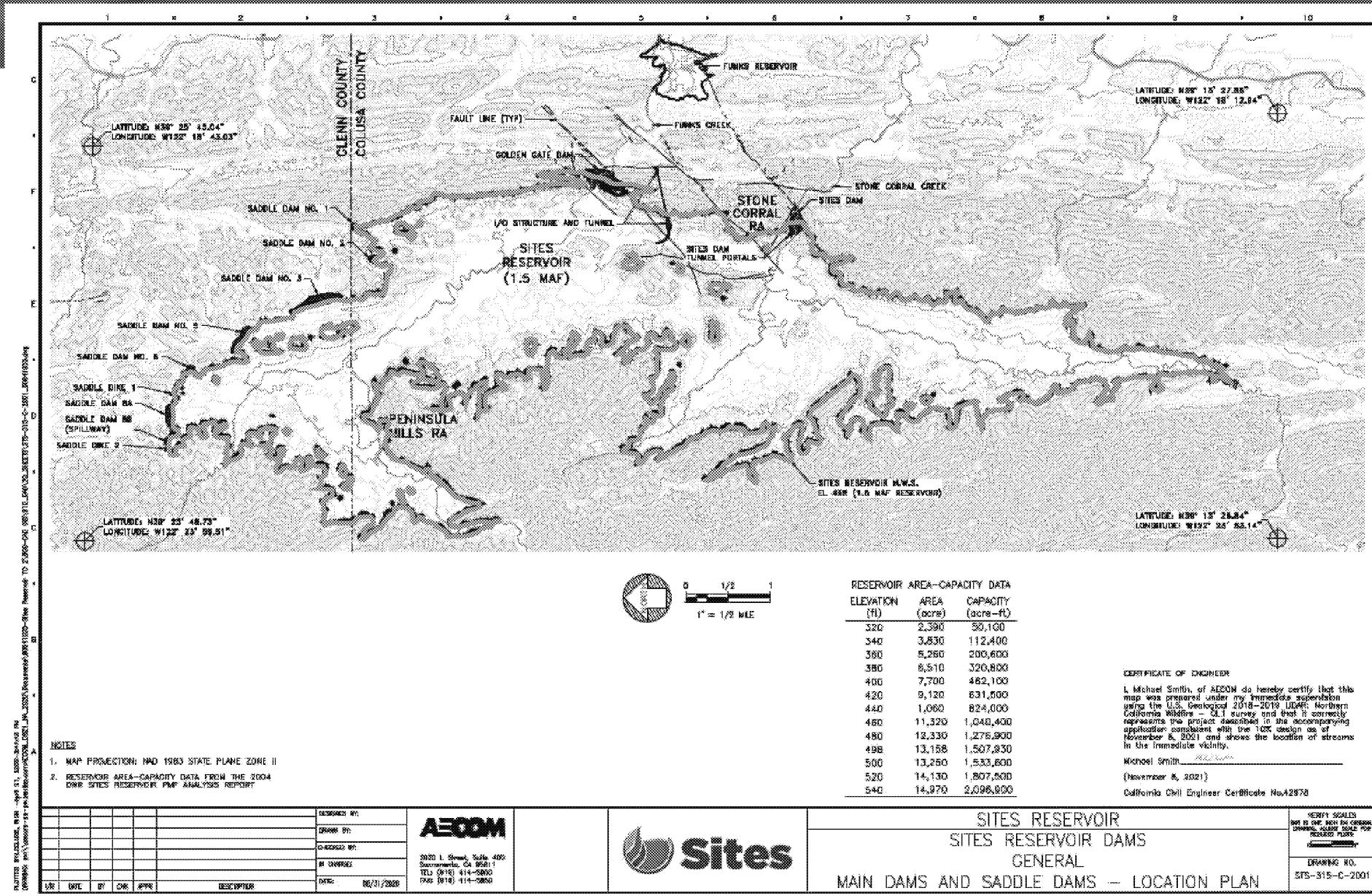
80 miles north of Sacramento

10 miles west of Maxwell

45 miles south of Orland



Sites Reservoir Features

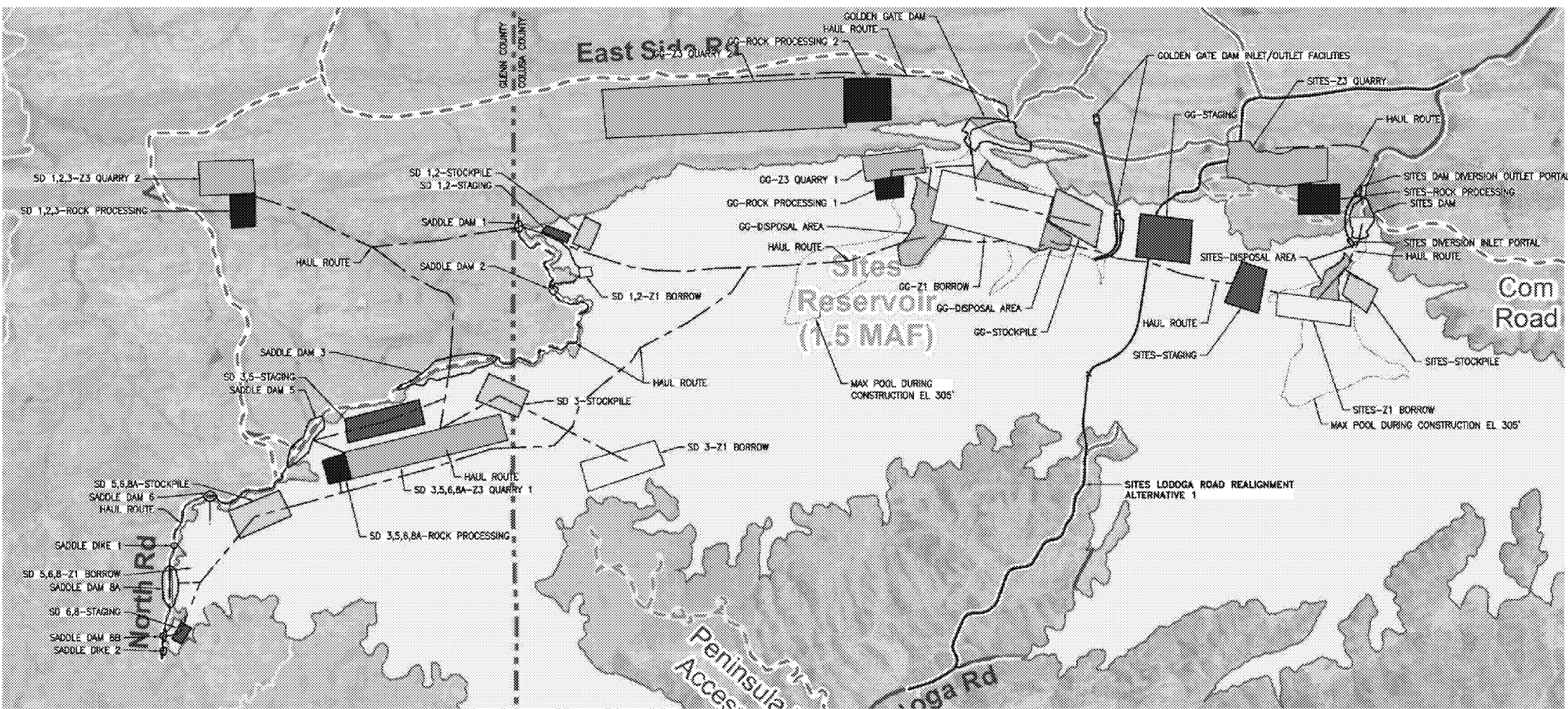


Sites Reservoir Features

Total Storage Capacity	1.5 MAF
Active Storage Capacity	1.4 MAF
Approximate Inundation Area	13,200 acres
Approximate Watershed Area	54,150 acres (84.6 mi ²)
Dam/Saddle Dam/Dike Crest Elevation (Without Camber)	517 feet
Dam Heights (approx. - max. ht. above streambed):	
Golden Gate Dam	287 feet
Sites Dam	267 feet
7 Saddle Dams*/2 Saddle Dikes (for freeboard)	12 – 107 feet
Maximum Operating Water Elevation	498 feet
Minimum Operating Water Elevation	340 feet
Top of Dead Pool	300 feet
Inlet/Outlet Facilities:	
I/O Tunnel (single), with sloping intake (south of GG Dam)	32 feet ID
Sites Diversion Tunnel (north abutment of Sites Dam)	12 feet ID

* Saddle Dam 8B is the spillway location.

Sites Reservoir Features – Construction



LEGEND

- BORROW AREA
- DISPOSAL AREA
- STAGING AREA
- STOCKPILE AREA
- ROCK PROCESSING AREA
- QUARRY AREA
- HAUL ROUTE

NOTES

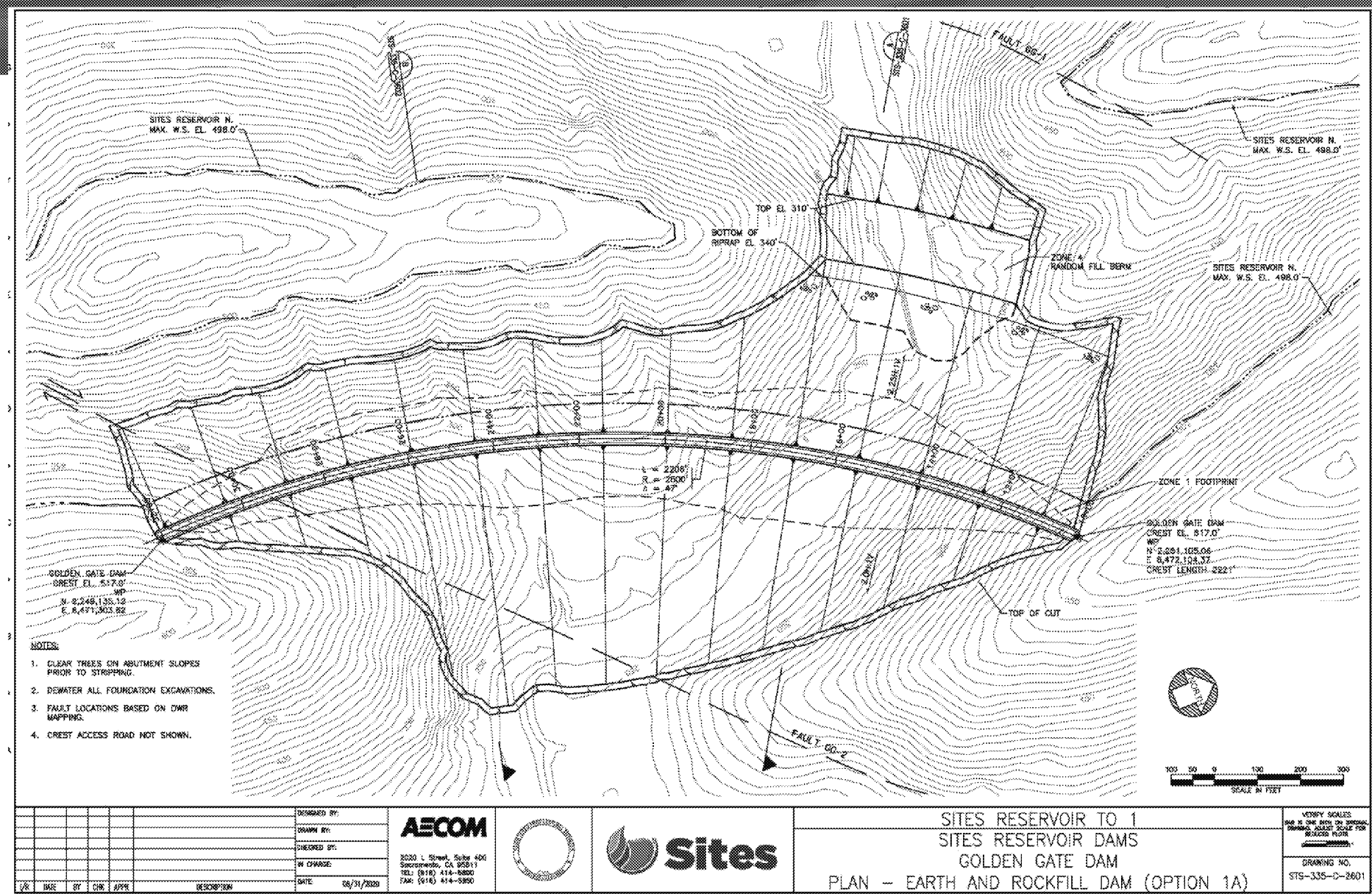
1. FOR OFFSITE BORROW AREA SEE DRAWING STS-315-C-2002
2. FOR LARGER VIEW SEE DRAWING STS-315-C-2003
3. POTENTIAL BORROW SITES ARE FROM DWR, 2002

HAUL ROUTES, BORROW, DISPOSAL, STOCKPILE, STAGING, AND ROCK PROCESSING AREAS (EXPANDED VIEW)
SCALE: 1" = NTS

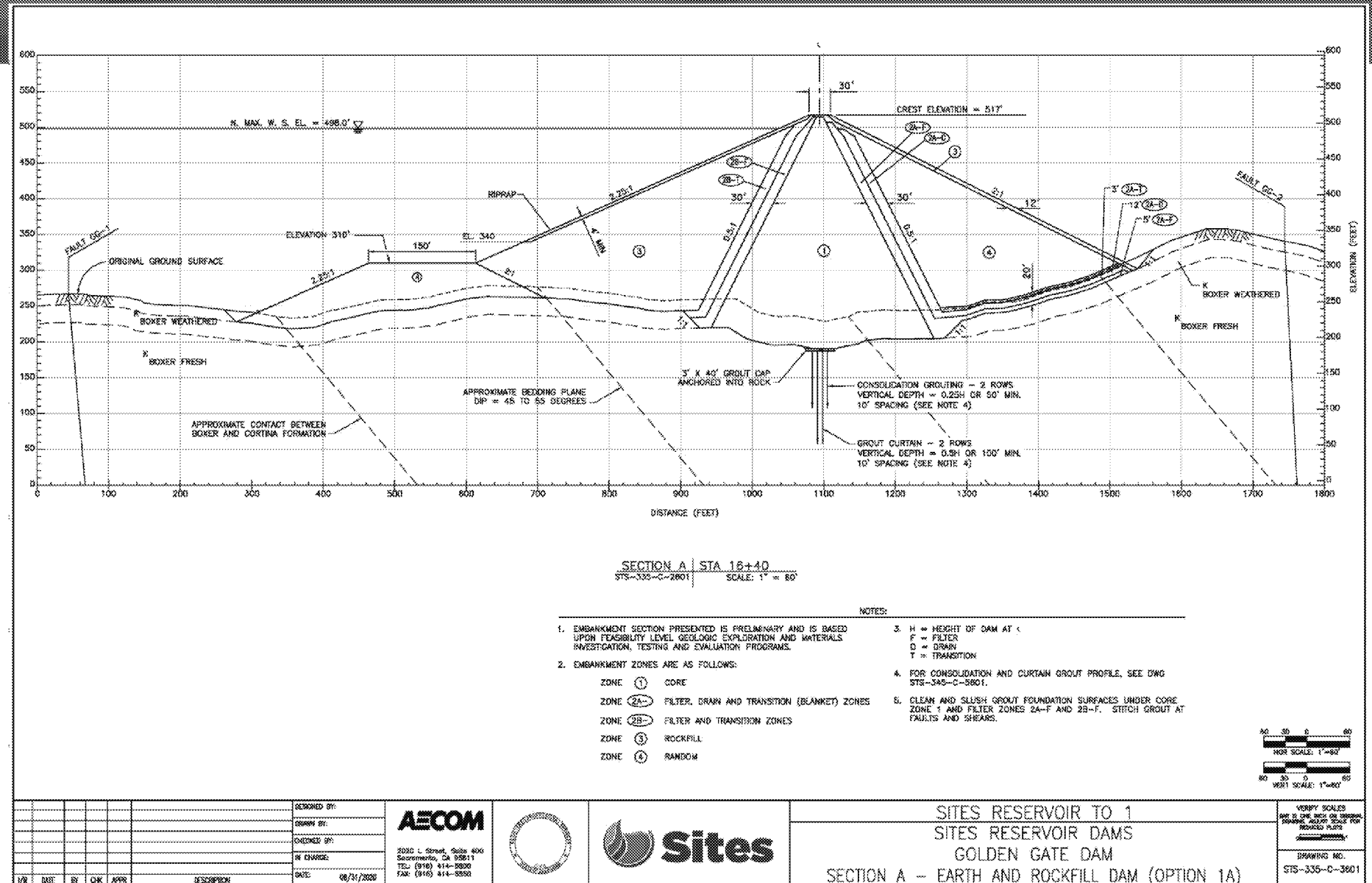


Dam Filter, Drain and Transition Zones

Golden Gate Dam

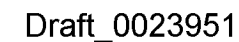


Typical Golden Gate and Sites Dam Section



MATERIALS BALANCE
GOLDEN GATE DAM - 1.5 MAF RESERVOIR

Completed by: 876
 Reviewed by: 876
 Date: January 2023



Examples of Dam Construction



Examples of Dam Construction



Examples of Dam Construction



Examples of Dam Construction

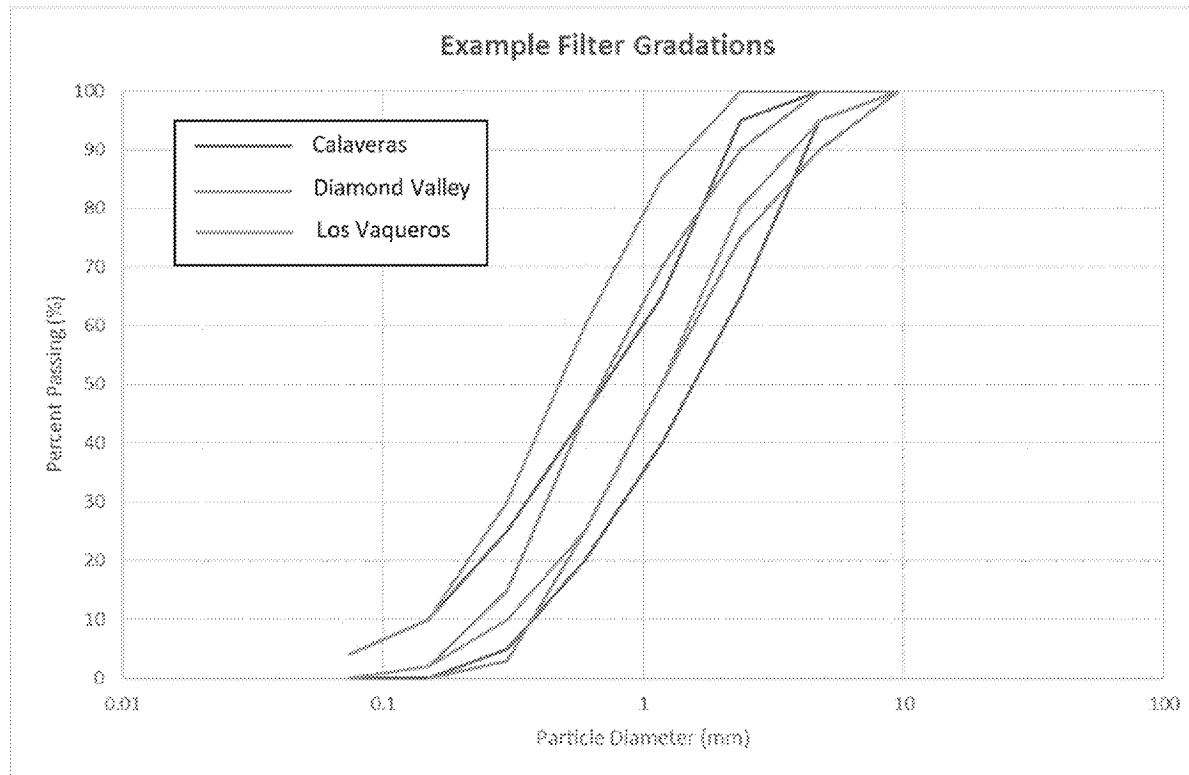


Examples of Filter Gradations and Requirements

Generally meet the soundness requirements of ASTM C33 for fine aggregate plus requirements below

Test Type	Acceptability Standard	Criteria
Specific Gravity	ASTM C127	Greater than 2.6
Abrasion Resistance	ASTM C131	10 percent maximum loss by weight at 100 revolutions, and 40 percent loss of weight at 500 revolutions
	ASTM C535	40 percent maximum loss of weight at 1000 revolutions
Sodium Sulfate Soundness	ASTM C88	10 percent maximum weighted average loss by weight, after five cycles
Shape		Particles shall be generally equidimensional
Elongated Particles	CRD-C-119 and CRD-C-120	Not greater than 15 percent by weight
Other		Material shall be free of clay balls, organics, soft particles, and other impurities

Examples of Filter Gradations and Requirements



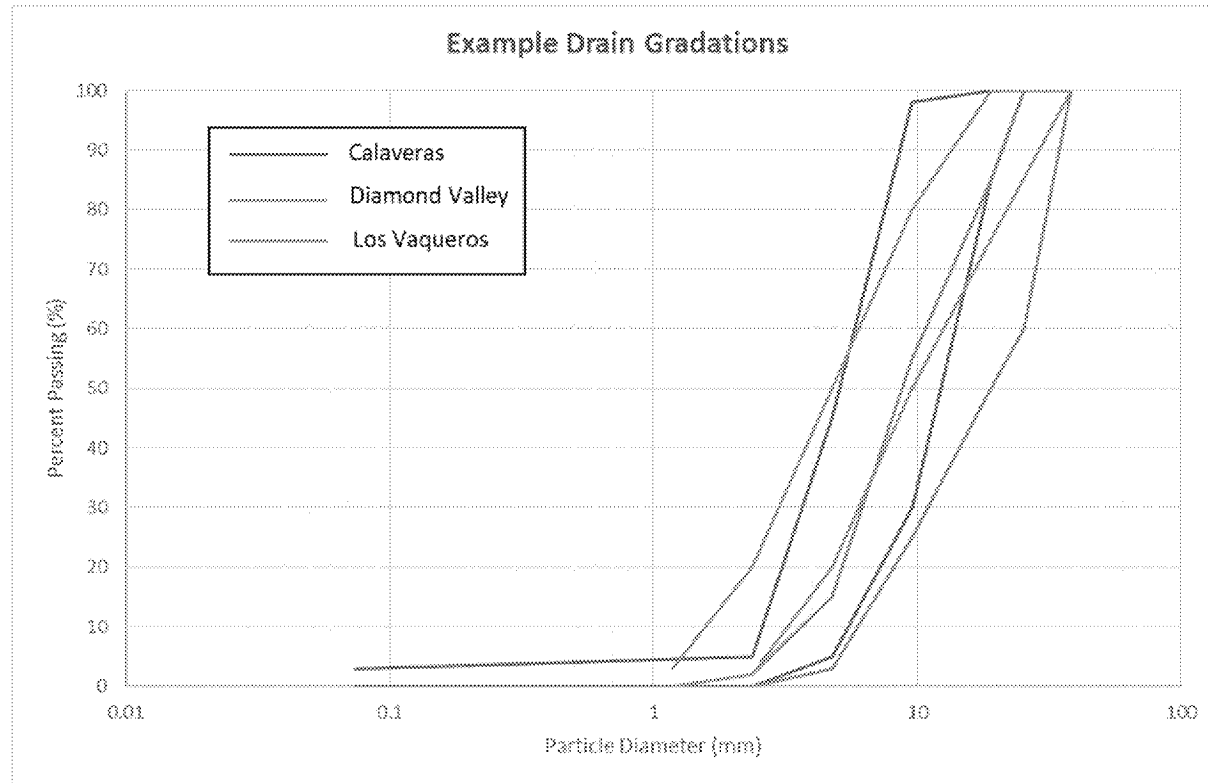
Note: No gap or skip grading between any two consecutive sieves

Sieve Size	Calaveras	Diamond Valley	Los Vaqueros
3/8-inch	100	100	100
No. 4	95 – 100	90 – 100	95 – 100
No. 8	65 – 95	75 – 90	80 – 100
No. 16	40 – 65	50 – 70	50 – 85
No. 30	20 – 45	25 – 45	25 – 60
No. 50	5 – 25	3 – 15	10 – 30
No. 100	0 – 10	0 – 2	2 – 10
No. 200	0 – 4	-	0 – 4

Examples of Drain Gradations and Requirements

Test Type	Acceptability Standard	Criteria
Adsorption	ASTM C127	Greater than 2.6
Specific Gravity	ASTM C127 and C128	Greater than 2.6
Abrasion Resistance	ASTM C131	10 percent maximum loss by weight at 100 revolutions, and 40 percent loss of weight at 500 revolutions
Sodium Sulfate Soundness	ASTM C88	10 percent maximum weighted average loss by weight, after five cycles
Shape		Particles shall be generally equidimensional
Elongated Particles	CRD-C-119 and CRD-C-120	Not greater than 15 percent by weight
Other		Material shall be free of clay balls, organics, soft particles, and other impurities

Examples of Drain Gradations and Requirements



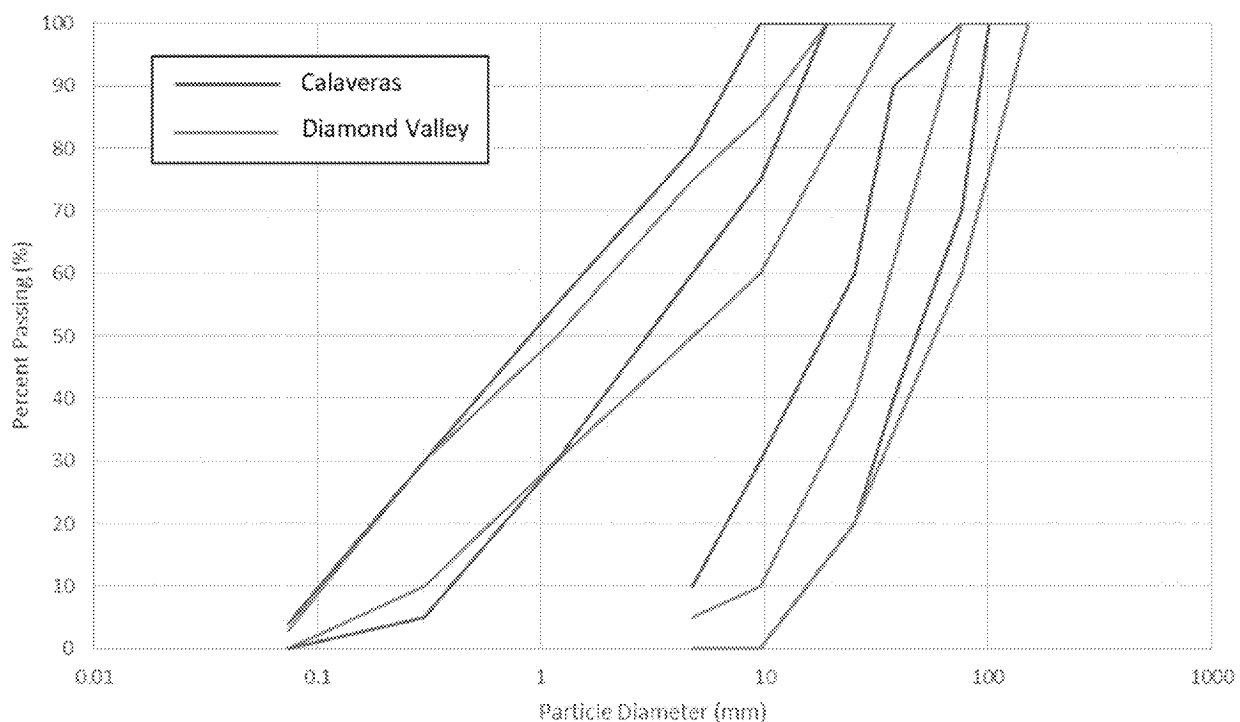
Note: No gap or skip grading between any two consecutive sieves

Sieve Size	Calaveras	Diamond Valley	Los Vaqueros
1.5-inch	-	100	100
1-inch	100	60 – 100	-
3/4-inch	85 – 100	50 – 85	75 – 100
3/8-inch	30 – 98	25 – 55	50 – 80
No. 4	5 – 45	3 – 15	20 – 50
No. 8	0 – 5	0 – 2	2 – 20
No. 16	-	-	0 – 3
No. 200	0 – 3	-	-

Examples of Transition Gradations and Requirements

- Similar soundness requirements to filter and drain

Example Transition Gradations



Sieve Size	Calaveras (Upstream)	Calaveras (Downstream)	Diamond Valley (Upstream)	Diamond Valley (Downstream)
6-inch	-	-	-	100
4-inch	-	100	-	-
3-inch	-	70 – 100	-	60 – 100
1.5-inch	-	40 – 90	100	-
1-inch	-	20 – 60	-	20 – 40
¾-inch	100	-	80 – 100	-
3/8-inch	75 – 100	0 – 30	60 – 85	0 – 10
No. 4	60 – 80	0 – 10	50 – 75	0 – 5
No. 16	30 – 55	-	30 – 50	-
No. 50	5 – 30	-	10 – 30	-
No. 200	0 – 4	-	0 – 3	-

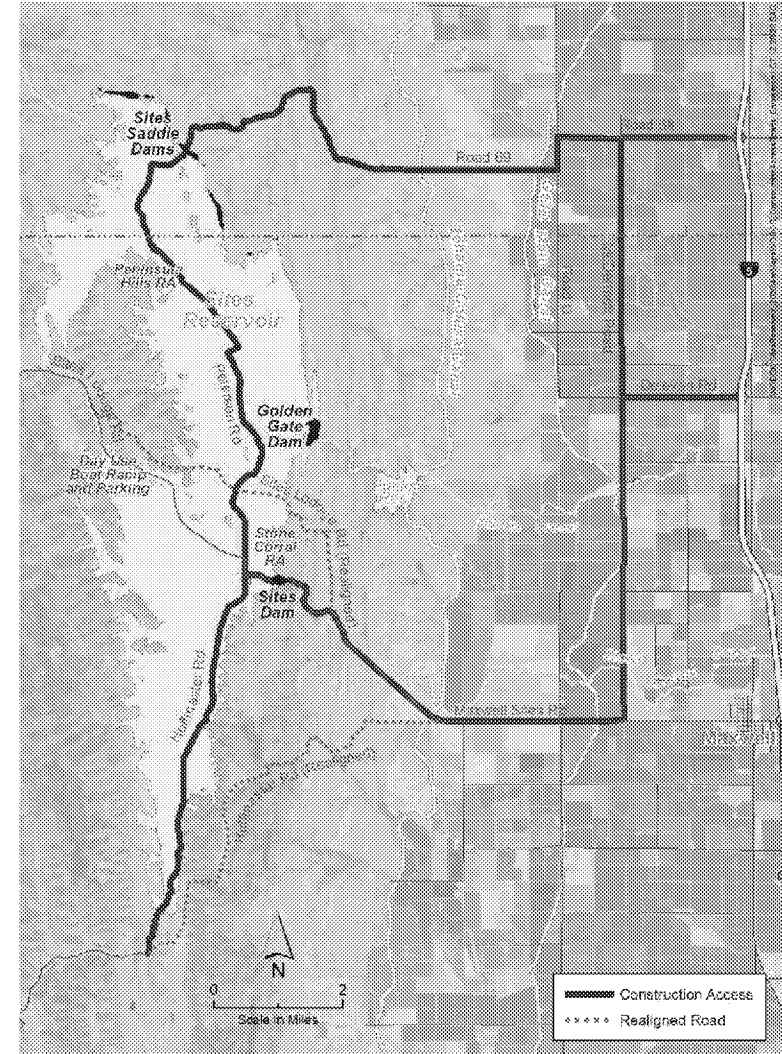
Road Base

Road Base

- Caltrans Class 2 Aggregate Base (standard specifications 26-1.02)
 - Consists of clean broken stone, crushed gravel, natural rough-surfaces gravel, sand, and/or processed reclaimed AC, PCC, LCB, or CTB

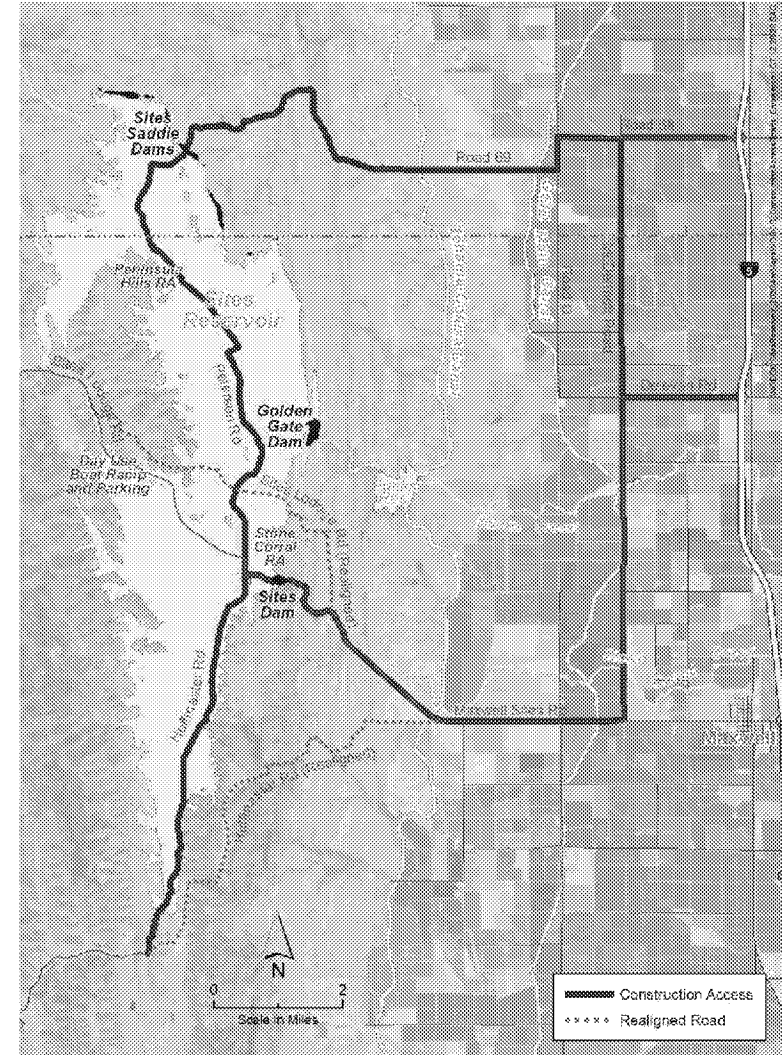
Sieve size	Percentage passing			
	1-1/2 inch maximum		3/4 inch maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	--	--
1-1/2"	90-100	87-100	--	--
1"	--	--	100	100
3/4"	50-85	45-90	90-100	87-100
No. 4	25-45	20-50	35-60	30-65
No. 30	10-25	6-29	10-30	5-35
No. 200	2-9	0-12	2-9	0-12

Quality characteristic	Requirement	
	Operating range	Contract compliance
Resistance (R-value, min)	--	78
Sand equivalent (min)	25	22
Durability index (min)	--	35



Road Base

- Caltrans Class 4 Aggregate Subbase (standard specifications 25-1.02)
 - Consists of clean broken stone, crushed gravel, natural rough-surfaces gravel, sand, and/or processed reclaimed AC, PCC, LCB, or CTB
 - Gradation and quality requirements to be decided based on project needs, but likely to have a minimum sand equivalent of about 20 and R-value of about 40



Concrete Aggregate

Concrete Aggregate

- Need to meet quality requirements of ASTM C33, Concrete Aggregates

Location	Approximate Quantities (tons)
Spillway (Saddle Dam 8B)	19,500
Inlet/Outlet Structure	115,900
Sites Diversion Tunnel	10,400
Golden Gate Dam Bypass	35,000
Sites Lodoga Bridge	45,585

Summary of Quantities

Summary of Quantities

Location	Approximate Quantities (Million Tons)
Zone 2A – Downstream Filter	1.5
Zone 2A – Downstream Drain	1.6
Zone 2A – Downstream Transition	0.3
Zone 2B – Upstream Filter	0.6
Zone 2B – Upstream Transition	0.6
Class 4 Aggregate Subbase	0.3
Class 2 Aggregate Base	0.5
Concrete Aggregate	0.6
Total	6.0 million tons

Crude Average Delivery Schedule

- **Overall Project Schedule = 800 to 1200 days**
- **Overall Quantity of Material = 6 million tons**
- **Average Delivery = 6,000 to 7,500 tons per day**

Questions

Questions

- Do you have the quality of materials needed and their location(s)?
- Do you have the plants to create the materials in spec and their location(s)?
- Do you have the capacity to deliver the quality and quantities of materials in the time needed?

Questions – cont'd.

- Do you have technical specifications/lab certifications such as durability, gradation, petrographic analysis, LA rattler, R-value, available?
- What is the location of quarry and type of material; alluvium, hard rock, soft rock?
- What are the available material remaining/duration of permitted operations?

Questions – cont'd.

- What are the productivity rates for different materials?
- What is the maximum amount of material you can deliver per day?
- What are the approximate at plant costs for different materials?
- Will you be using prevailing labor rates for trucking?

Sites Reservoir Project Overview

Westside Water District
Board of Directors Meeting

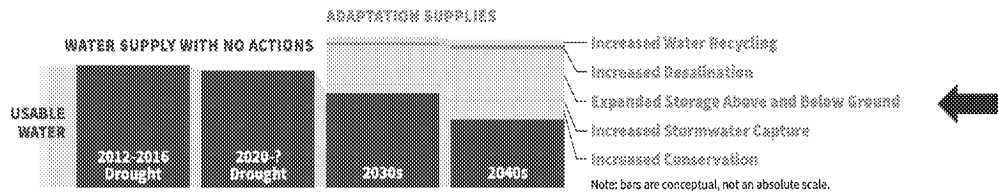
April 13, 2023



What Problem Does the Sites Project Help Solve?

Over the next 20 years, California could lose 10 percent¹ of its water supplies.

Our climate has changed, and the West continues to get hotter and drier. As it does, we will see on average less snowfall, more evaporation, and greater consumption of water by vegetation, soil, and the atmosphere itself.



In previous droughts the ratio of precipitation to evaporation to runoff has been similar. However, as temperatures rise, evaporation increases, with the consequence of a fall in runoff. As average temperatures continue to increase, the increase in evaporation will continue, with a concurrent drop in runoff.

Excerpted from Aug 2022 "California's Water Supply Strategy, Adapting to a Hotter Drier Future"

‘What if we had Sites?’ – most recent storms update

- Revised estimate for January 2023 storms - ~250,000af
- Current March-April 2023 forecasted filling is ~250,000af
- If spilling occurs from Lake Shasta, filling opportunities could continue
- Sites team will continue to monitor conditions and adjust forecasts as needed
- Real time monitoring continues to show Project capabilities are in line with modeling projections

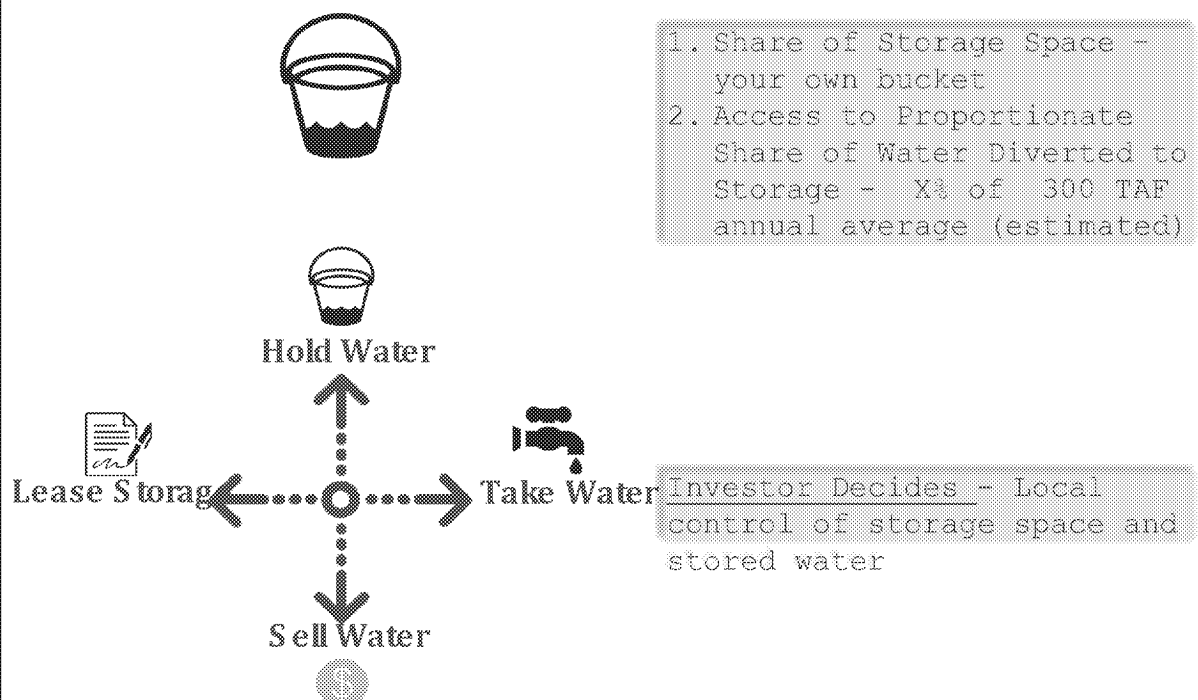


How big would Sites be when built relative to other reservoirs in the state?

CALIFORNIA'S LARGEST RESERVOIRS					
Rank	Name	County	Acre-Feet	Outflow	Dam
1	Lake Shasta	Shasta	4,552,000	Sacramento River	Shasta Dam
2	Lake Oroville	Butte	3,537,577	Feather River	Oroville Dam
3	Trinity Lake	Trinity	2,448,000	Trinity River	Trinity Dam
4	New Melones Lake	Tuolumne, Calaveras	2,400,000	Stanislaus River	New Melones Dam
5	San Luis Reservoir #	Merced	2,041,000	San Luis Creek	San Luis Dam
6	Don Pedro Reservoir	Tuolumne	2,030,000	Tuolumne River	New Don Pedro Dam
7	Lake Berryessa	Napa	1,602,000	Putah Creek	Monticello Dam
8	Sites Reservoir #	Colusa, Glenn	1,500,000	Stone Corral & Funks Creeks	Sites & Golden Gate Dams
9	Lake Almanor	Plumas	1,308,000	North Feather River	Canyon Dam
10	Folsom Lake	Sacramento, El Dorado, Placer	1,120,200	American River	Folsom Dam
		# - off stream reservoir			



What Do You Get With Your Investment in Sites?



Allocation of Active Storage

Reservoir Size: 1,470,000 AF

Dead Pool: 60,000 AF

Active Storage: 1,410,000 AF

Participant Name	Amendment 3 Participation Level	Amendment 3 Storage Allocation	% Active Storage
Antelope Valley-East Kern WA	500	3,117	0.2%
City of American Canyon	4,000	24,936	1.8%
Coachella Valley WD	10,000	62,340	4.4%
Colusa County	10,000	62,340	4.4%
Colusa County WD	9,256	57,702	4.1%
Cortina WD	450	2,805	0.2%
Davis WD	2,000	12,468	0.9%
Desert WA	6,500	40,521	2.9%
Dunnigan WD	2,972	18,527	1.3%
Glenn-Colusa ID	5,000	31,170	2.2%
Irvine Ranch WD	1,000	6,234	0.4%
LaGrande WD	1,000	6,234	0.4%

Allocation of Active Storage

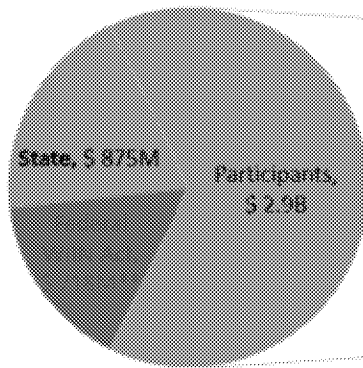
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Wheeler Ridge - Maricopa WSD	3,050	19,014	1.3%
Zone 7 WA	10,000	62,340	4.4%
State of California - Total	--	244,000	17.3%
Reclamation**	--	128,020	9.1%
Active Storage Total	166,503	1,410,000	100.0%

- Water diverted will be allocated to each Storage Partner's storage space proportional to its Storage Allocation (i.e., percent of Active Storage)

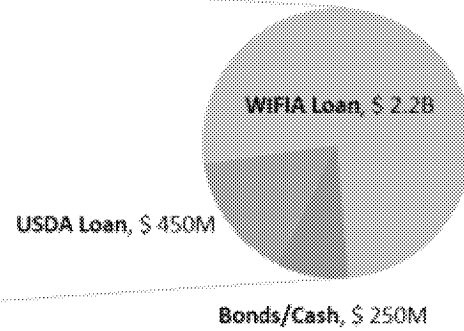
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'State/Federal Interest in the Sites Project'

Project Investors



Participant Funding Sources



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Engineering Update

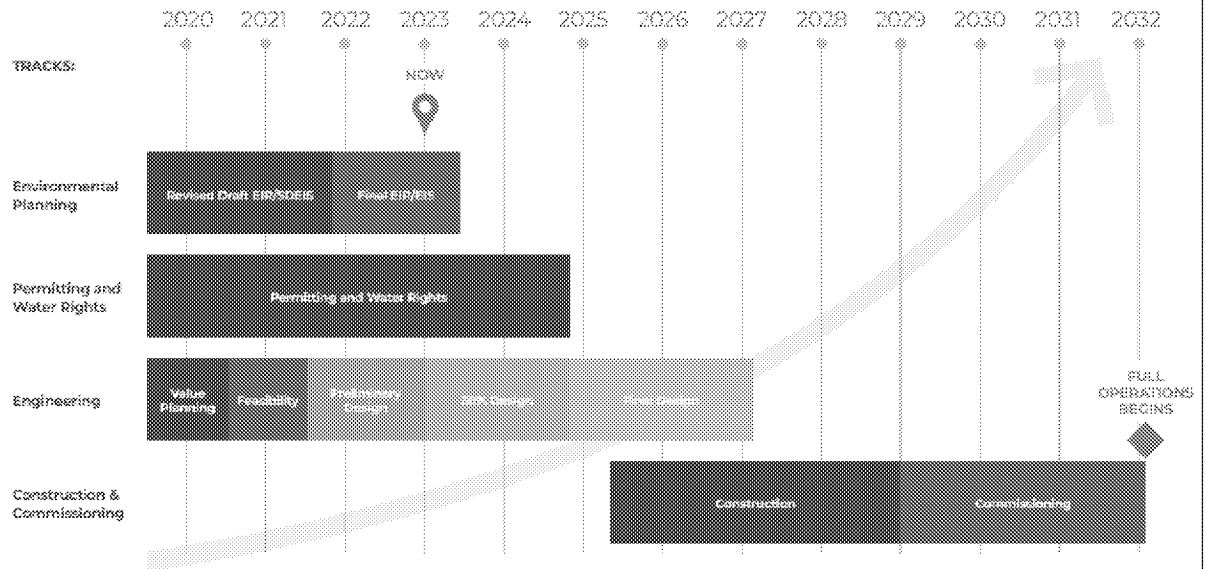
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- Acquisition transactions not likely to occur sooner than 2024.

Project Schedule

Sites Reservoir Project Schedule



Draft - Predecisional Working Document - For Discussion Purposes Only

12

Speaker: Laurie

Draft - Predecisional Working Document - For Discussion Purposes Only

Other Considerations Specific to Westside Water District



We are in a very dynamic interest rate environment (Slide updated 9/26/2022, post workshop)

Parameter	Oct-21 Plan of Finance (POF) "Historical" Rates (Case 1)	\$2.2B WIFIA with POF "Current" Rates (Case 6)	\$2.2B WIFIA with POF "Historical" Rates (Case 7)	\$2.2B WIFIA with POF "Historical" Rates Deferred Interest (Case 8)
Revenue Bond Interest Rate	5%	3.5%	5%	5%
WIFIA Interest Rate	n/a	2.38%	3.5%	3.5%
Bond funding	\$2.8 B	\$0.7 B	\$0.7 B	\$1.3 B
WIFIA funding	\$0	\$2.2 B	\$2.2 B	\$2.2 B = \$1.6 B for Const + \$0.6 B for interest
Annual Debt Service (\$2021)	\$137 M	\$107 M	\$121 M	\$155 M
\$/AF of Participant Storage (\$2021) Debt Service, Full Storage of 1,045 TAF	\$131	\$102	\$116	\$148
Debt Service \$/AF of Participant Yield (\$2021) Average Nominal Yield of 168 TAF/Yr	\$818	\$636	\$722	\$923
Total \$/AF of Participant Yield (\$2021) (Average Fixed and Variable Cost = \$120/AF)	\$938	\$756	\$842	\$1,043

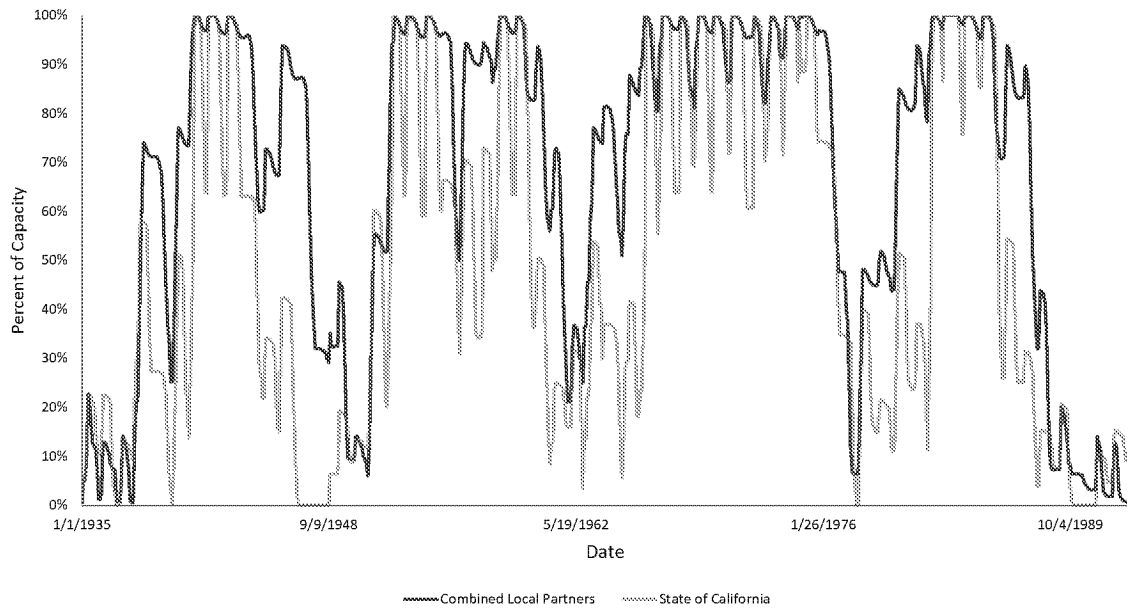
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B=billions, M=millions

2022 - Environmental Working Group - Part 1: Water & Wastewater

2

Doug M

Considerations – Supply vs. Storage



Summary of WRLCM Key Results

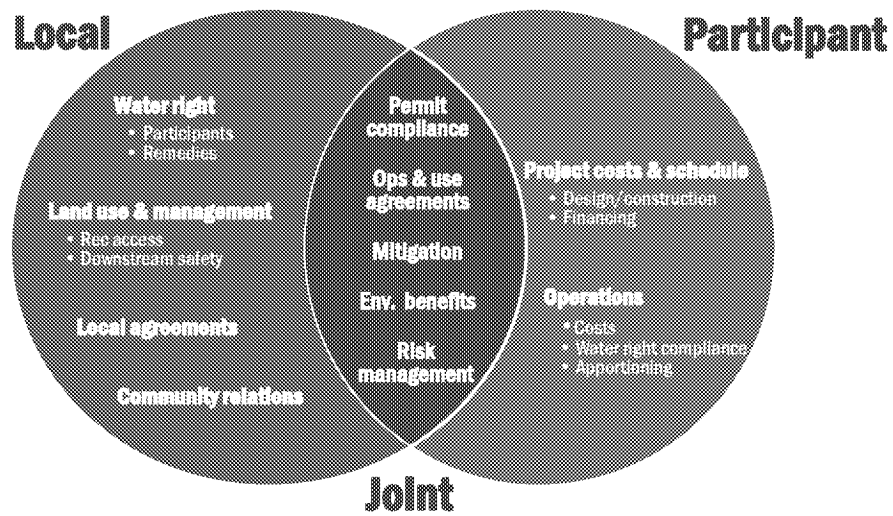
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- The Project has a slightly positive effect on winter-run with the potential to increase the overall population
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 - May be able to create same benefits with more exchanges

Speaker: Ali

Draft - Predecisional Working Document - For Discussion Purposes Only

Project Construction and Operations Oversight Considerations



Questions



Our Strength is in Our Broad Statewide Participation

Sacramento Valley

City of American Canyon
Colusa County
Colusa County Water Agency
Cortina Water District
Davis Water District
Dunnigan Water District
Glenn County
Glenn-Colusa Irrigation District
LaGrande Water District
Placer County Water Agency
Reclamation District 108
City of Roseville
Sacramento County Water Agency
City of Sacramento
Tehama-Colusa Canal Authority
Westside Water District
Western Canal Water District

Bay Area

Santa Clara Valley Water District
Zone 7 Water Agency

San Joaquin Valley

Wheeler Ridge-Maricopa Water Storage
District
Rosedale-Rio Bravo Water Storage
District

Southern California

Antelope Valley - East Kern Water
Agency
Coachella Valley Water District
Desert Water Agency
Irvine Ranch Water District
Metropolitan Water District
San Bernardino Valley Municipal Water
District

Waiting List

Cal-Am Sacramento
City of Napa
Delta View WDA
Glenn County
La Cumbre MWC
Madera County
Pacific Resources MWC
Palmdale WD
Santa Clara Valley WD
Western Municipal WD
Westlands WD
Wheeler Ridge Maricopa WSD
Woodland Davis CWA



Sites Project Authority

- Joint Powers Authority established under California law
- Authority member agencies located in the Sacramento Valley
- Reservoir Committee made up statewide agencies investing in the Sites Project
- The Sites Project Authority will own and operate Sites Reservoir

Board of Directors:

Colusa County
Colusa County Water District
Glenn County
Glenn-Colusa Irrigation District
Placer County Water Agency/City of Roseville
Reclamation District 108
Sacramento/Sac County Water Agency
Tehama-Colusa Canal

Project Next Steps/Goals: 2022 - 2024

- ✓ Secure Final Prop 1 Funding award with CWC
- ✓ Execute Final Operations Agreement
- ✓ Secure WIIN and BIL Federal Funding
- ✓ Complete WIFIA/USDA Loan Agreements
- ✓ Execute Benefits and Obligations Contracts
- ✓ Complete Final EIR/EIS
- ✓ Obtain Critical Environmental Permits (BO, ITP, 404)
- ✓ Receive Water Right Order and Permit
- ✓ Obtain Local Agency Agreements and Permits
- ✓ Execute Benefits Contracts with DWR and

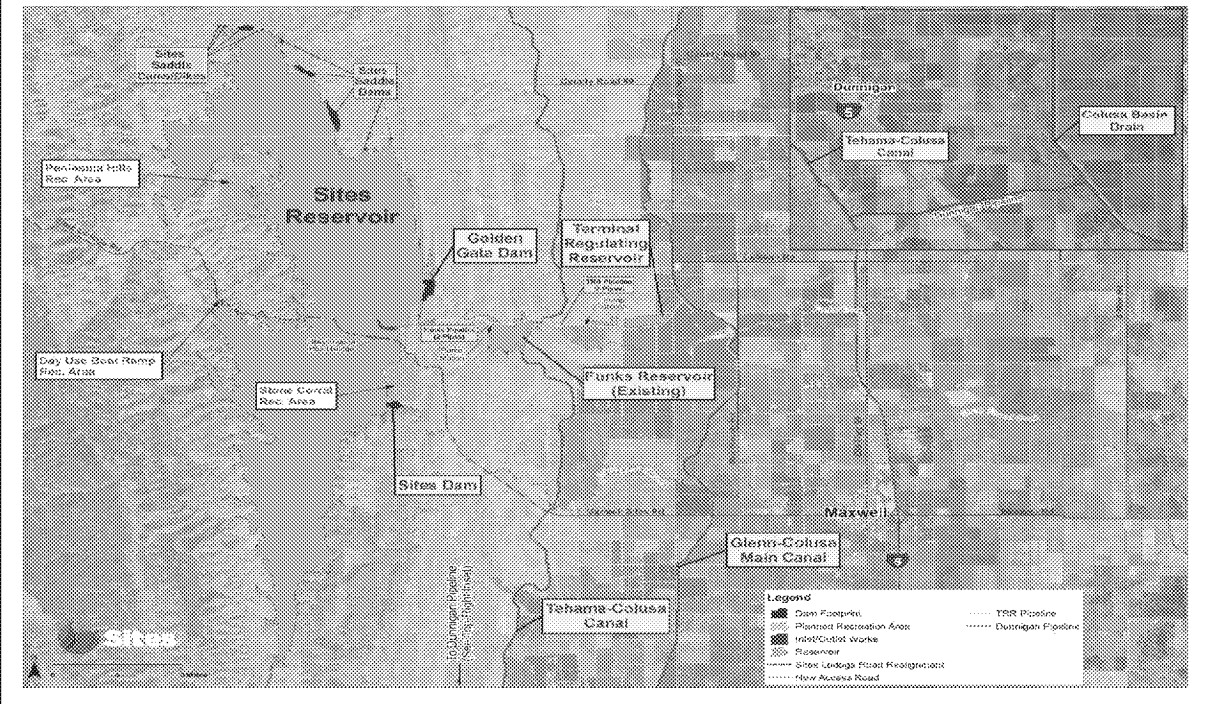


Project Next Steps/Goals: 2022 - 2024

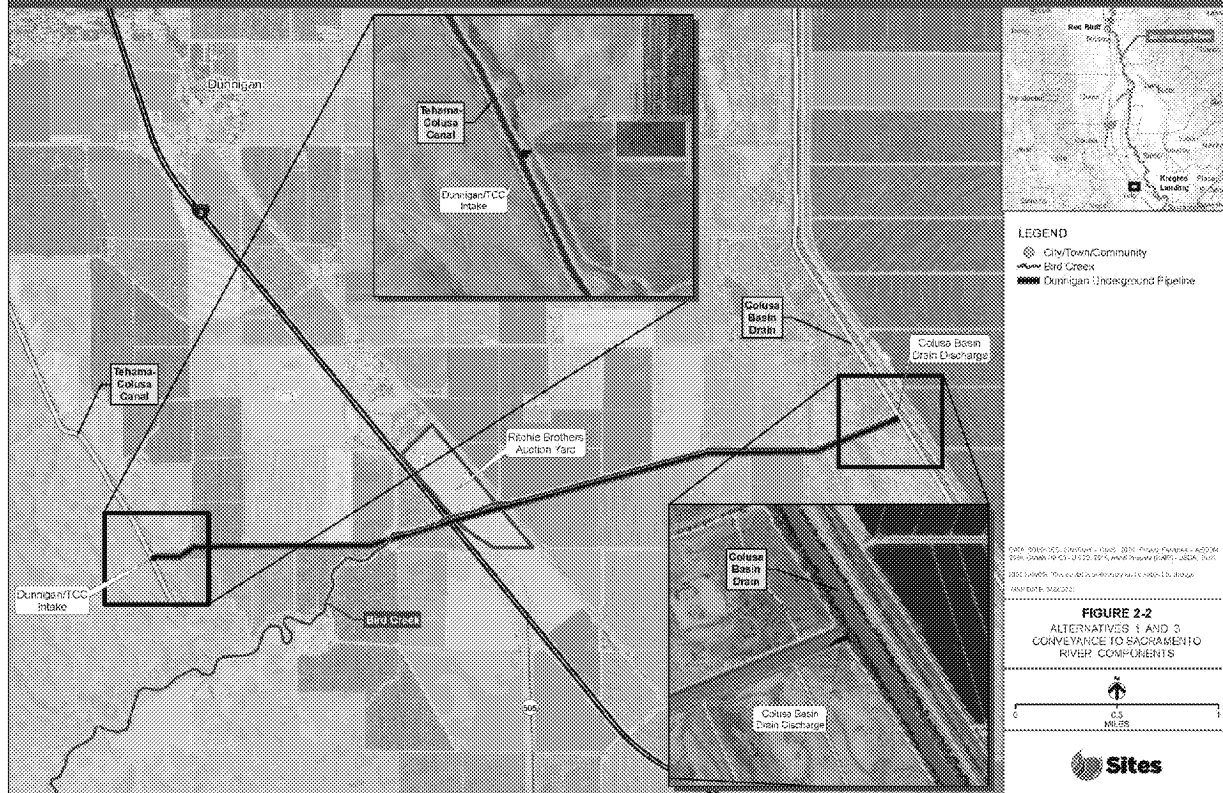
- ✓ Develop Mitigation Acquisition Master Plan
- ✓ Initiate Application for DSOD Permit to Construct
- ✓ Advance Engineering Design to achieve Level 3 cost estimate
- ✓ Determine Procurement and Delivery Strategy
- ✓ Determine Overall Project Schedule
- ✓ Develop and Implement Land Acquisition Master Plan
- ✓ Conduct Geotech Investigations and Evaluations
- ✓ Perform Geotech Evaluation of all "Willing Seller" Properties
- ✓ Determine Organization Structure and Governance



Project Facilities



Project Facilities



Sites Reservoir Project Overview

Westside Water District
Board of Directors Meeting

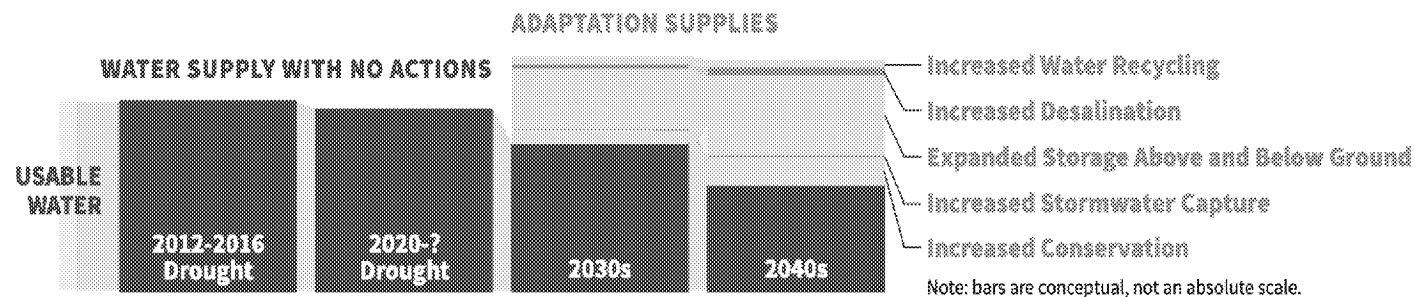
April 13, 2023



What Problem Does the Sites Project Help Solve?

Over the next 20 years, California could lose 10 percent¹ of its water supplies.

Our climate has changed, and the West continues to get hotter and drier. As it does, we will see on average less snowfall, more evaporation, and greater consumption of water by vegetation, soil, and the atmosphere itself.



In previous droughts the ratio of precipitation to evaporation to runoff has been similar. However, as temperatures rise, evaporation increases, with the consequence of a fall in runoff. As average temperatures continue to increase, the increase in evaporation will continue, with a concurrent drop in runoff.

Excerpted from Aug 2022 "California's Water Supply Strategy, Adapting to a Hotter Drier Future"

‘What if we had Sites?’ – most recent storms update

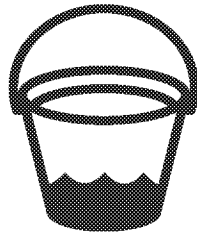
- Revised estimate for January 2023 storms - ~250,000af
- Current March-April 2023 forecasted filling is ~250,000af
- If spilling occurs from Lake Shasta, filling opportunities could continue
- Sites team will continue to monitor conditions and adjust forecasts as needed
- Real time monitoring continues to show Project capabilities are in line with modeling projections



How big would Sites be when built relative to other reservoirs in the state?

CALIFORNIA'S LARGEST RESERVOIRS					
Rank	Name	County	Acre-Feet	Outflow	Dam
1	Lake Shasta	Shasta	4,552,000	Sacramento River	Shasta Dam
2	Lake Oroville	Butte	3,537,577	Feather River	Oroville Dam
3	Trinity Lake	Trinity	2,448,000	Trinity River	Trinity Dam
4	New Melones Lake	Tuolumne, Calaveras	2,400,000	Stanislaus River	New Melones Dam
5	San Luis Reservoir #	Merced	2,041,000	San Luis Creek	San Luis Dam
6	Don Pedro Reservoir	Tuolumne	2,030,000	Tuolumne River	New Don Pedro Dam
7	Lake Berryessa	Napa	1,602,000	Putah Creek	Monticello Dam
8	Sites Reservoir #	Colusa, Glenn	1,500,000	Stone Corral & Funks Creeks	Sites & Golden Gate Dams
9	Lake Almanor	Plumas	1,308,000	North Feather River	Canyon Dam
10	Folsom Lake	Sacramento, El Dorado, Placer	1,120,200	American River	Folsom Dam
		# - off stream reservoir			

What Do You Get With Your Investment in Sites?



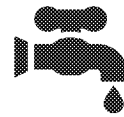
1. Share of Storage Space – your own bucket
2. Access to Proportionate Share of Water Diverted to Storage - X% of 300 TAF annual average (estimated)



Hold Water



Lease Storage



Take Water

Sell Water



Investor Decides - Local control of storage space and stored water

Allocation of Active Storage

Reservoir Size: 1,470,000 AF

Dead Pool: 60,000 AF

Active Storage: 1,410,000 AF

Participant Name	Amendment 3 Participation Level	Amendment 3 Storage Allocation	% Active Storage
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City of American Canyon	4,000	24,936	1.8%
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Desert WA	6,500	40,521	2.9%
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Allocation of Active Storage

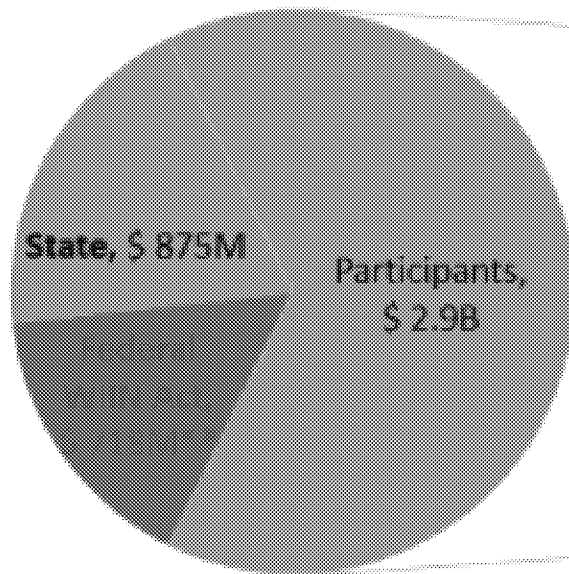
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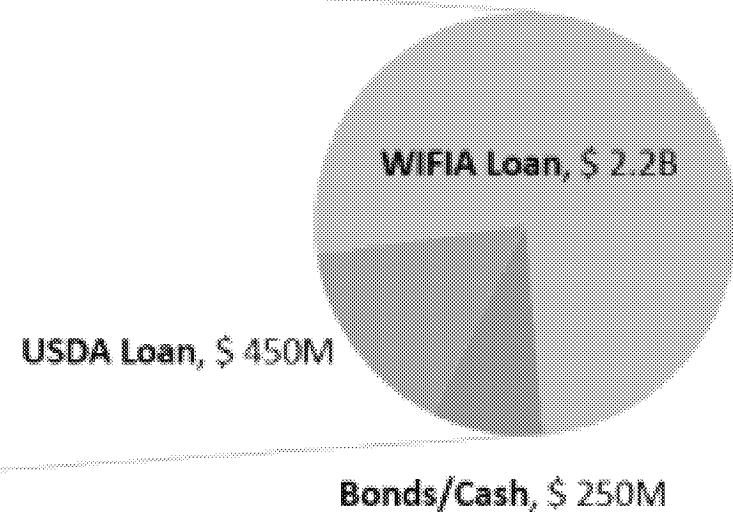
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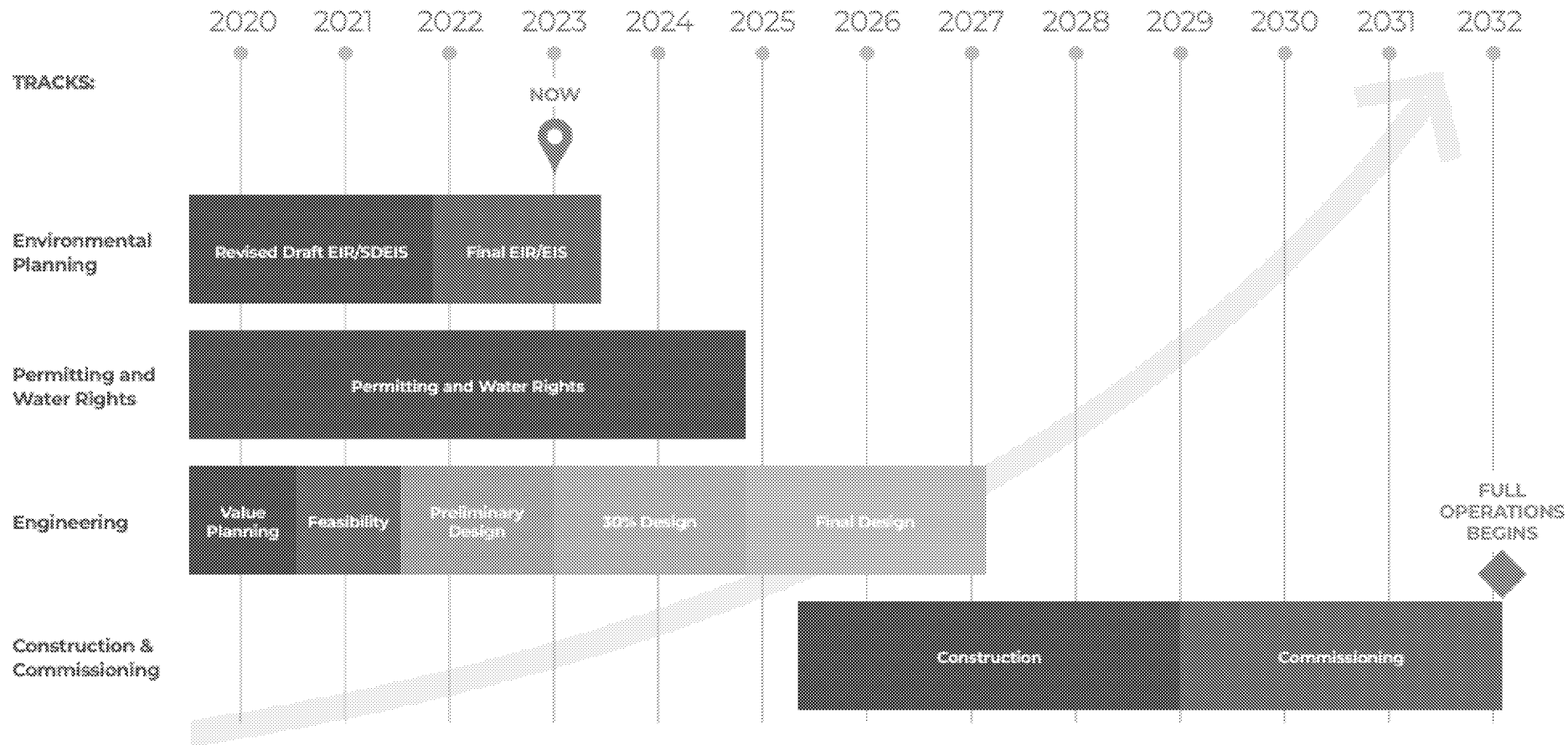
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Project Schedule

Sites Reservoir Project Schedule



Other Considerations Specific to Westside Water District

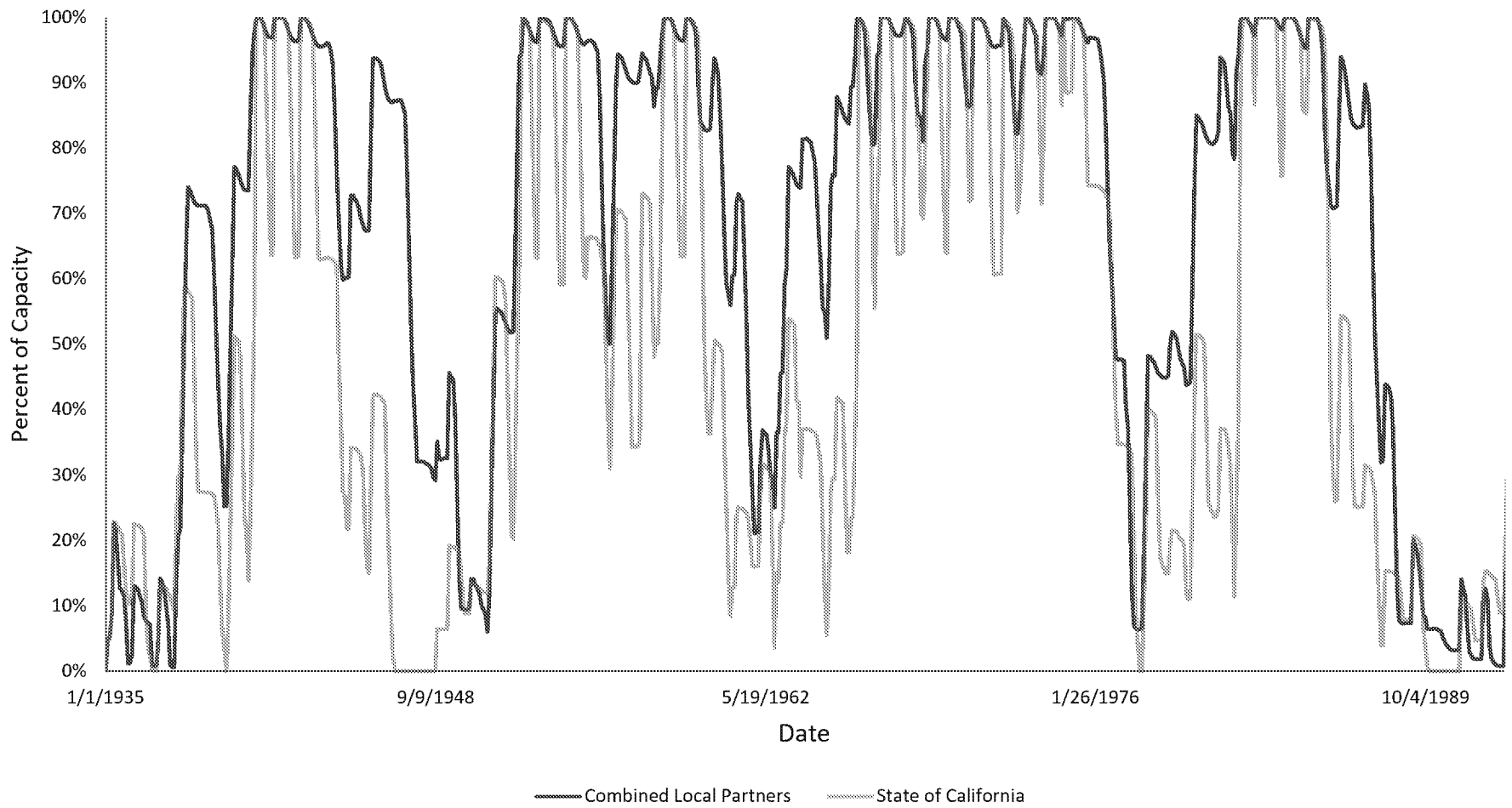
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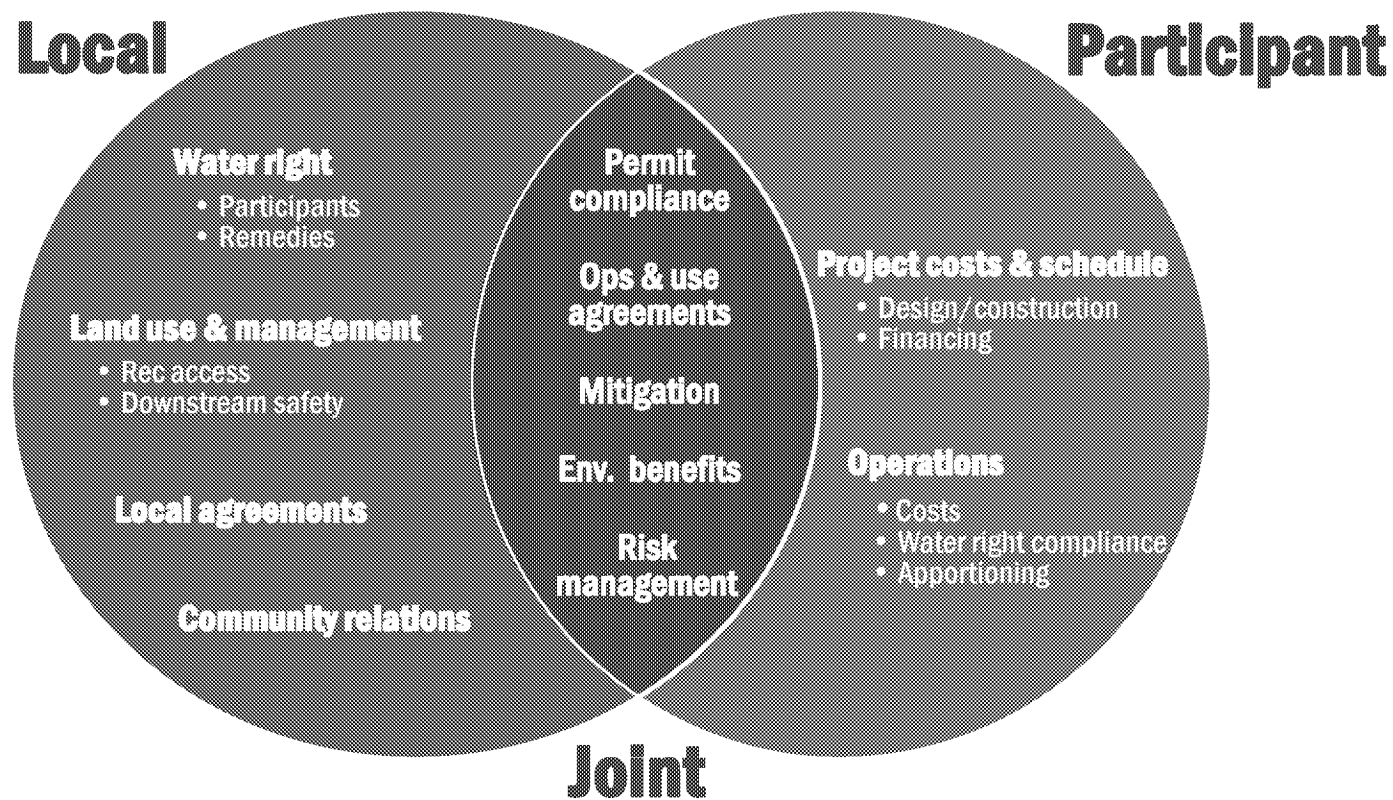


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Project Construction and Operations Oversight Considerations



Questions



From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 4/12/2023 9:42:30 AM
To: steve.micko@jacobs.com; Leaf, Rob/SAC [Rob.Leaf@jacobs.com]; Thayer, Reed/SAC [Reed.Thayer@jacobs.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Sites Project - Water Availability Analysis Adjustments

FYI

From: Holland, Matthew@Waterboards <Matthew.Holland@waterboards.ca.gov>
Sent: Thursday, April 6, 2023 6:32 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites Project - Water Availability Analysis Adjustments

CAUTION - EXTERNAL SENDER: This email originated from outside of the organization. Only open links from **TRUSTED** sources.

Hi Angela,

The models, results, and postprocessing inputs have been posted by DWR on their cloud file sharing service at the following location:

[DRAFT CS3 VA version 4 - SBR | Powered by Box](#)

The most pertinent files to your specific questions are:

- CalSim3_v4_results.xlsx – flow results exported from the two CalSim 3 studies that were used in the draft report
- CalSim3_v4_WYT.xlsx – CalSim 3 simulated Sacramento 40-30-30 water year types
- VA_Delta_outflow_postprocess_data.xlsx – postprocessing inputs for both baseline and VA

To answer your questions regarding the postprocessed baseline and VA time series, they were not actually produced as time series, per se. Rather, we produced seasonal, water year type averaged volumes, as described in sections 4.12.1 and 4.12.2 of the report. We assumed that the flows that were being added to Delta outflow from water purchases and the lower San Joaquin tributaries would be provided in April and May, which are the common months in the all of the flow-abundance relationships applied in the report. The primary reason for this was that the evaluation was focused on long term average changes in flow by water year type, and the average changes in flow between the two baseline scenarios considered result from the interaction between hydrology and operations, so they would not be expected to show up in the fixed volumes by water year type. If you wished to produce monthly time series for these outflow scenarios, you could construct them with the information in the spreadsheets linked above, but I would interpret them with care. The values resulting from the seasonal calculations are shown in Table 4-11 of the Draft Scientific Basis Report Supplement.

Let me know if you'd like to discuss further.

Thanks,
Matt

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Thursday, April 6, 2023 1:39 PM
To: Holland, Matthew@Waterboards <Matthew.Holland@waterboards.ca.gov>
Subject: RE: Sites Project - Water Availability Analysis Adjustments

EXTERNAL:

Matt –

Apologies for the second email, but I should have mentioned that I am trying to focus in on the results. Particularly, the resulting modeled Delta outflow, the post-processed baseline (4.12.1), and VA post-processing (4.12.2). If that information is available as a timeseries, that would be very helpful.

Thanks again,
Angela

From: Angela Bezzone

Sent: Thursday, April 6, 2023 12:13 PM

To: 'Holland, Matthew@Waterboards' <Matthew.Holland@waterboards.ca.gov>

Subject: RE: Sites Project - Water Availability Analysis Adjustments

Hi Matt,

I am not sure if you are the best person to contact with this request, but I thought I'd start with you since you had directed us to the FTP sites below. The Scientific Basis Report Supplement for Voluntary Agreements mentions the CalSim 3 VA Draft Model released on November 16, 2022 (see pg 4-1). I have not been able to provide a copy of the released CalSim 3 Model. Can you direct me to where this is located or send me a copy of what was released?

Thanks in advance for your help!

Angela Bezzone, P.E.

MBK Engineers

455 University Ave Suite 100
Sacramento, CA 95825

(916) 456-4400 – Phone

(775) 450-6408 – Cell

(916) 456-0253 – Fax

Operations & Engineering Workgroup

April 12, 2023



Draft - Predecisional Working Document - For Discussion Purposes Only

Draft_0024017

Agenda

- 1.1 Discuss reservoir losses and active storage
- 1.2 Review Project Baseline Schedule and alternatives analyses
- 1.3 Discuss Soft Call considerations
- Engineering and Construction Manager's Report
 - Suggestions for future agenda items

Material Change Categories for Today's Topics (per current Bylaws)

1.1 Discuss reservoir losses and active storage

- ✓ Water Supply
- ✓ Participant Commitments
- ✓ Operational Risks

1.2 Review Project Baseline Schedule and alternatives analyses

- ✓ Approved Budget
- ✓ Construction Schedule
- ✓ Direct Construction Cost

1.3 Discuss Soft Call considerations

- ✓ Planned Budget
- ✓ Project Funding
- ✓ Direct Construction Cost

Agenda Item 1.1

Reservoir Losses and Active Storage

Angela Bezzone and JP Robinette



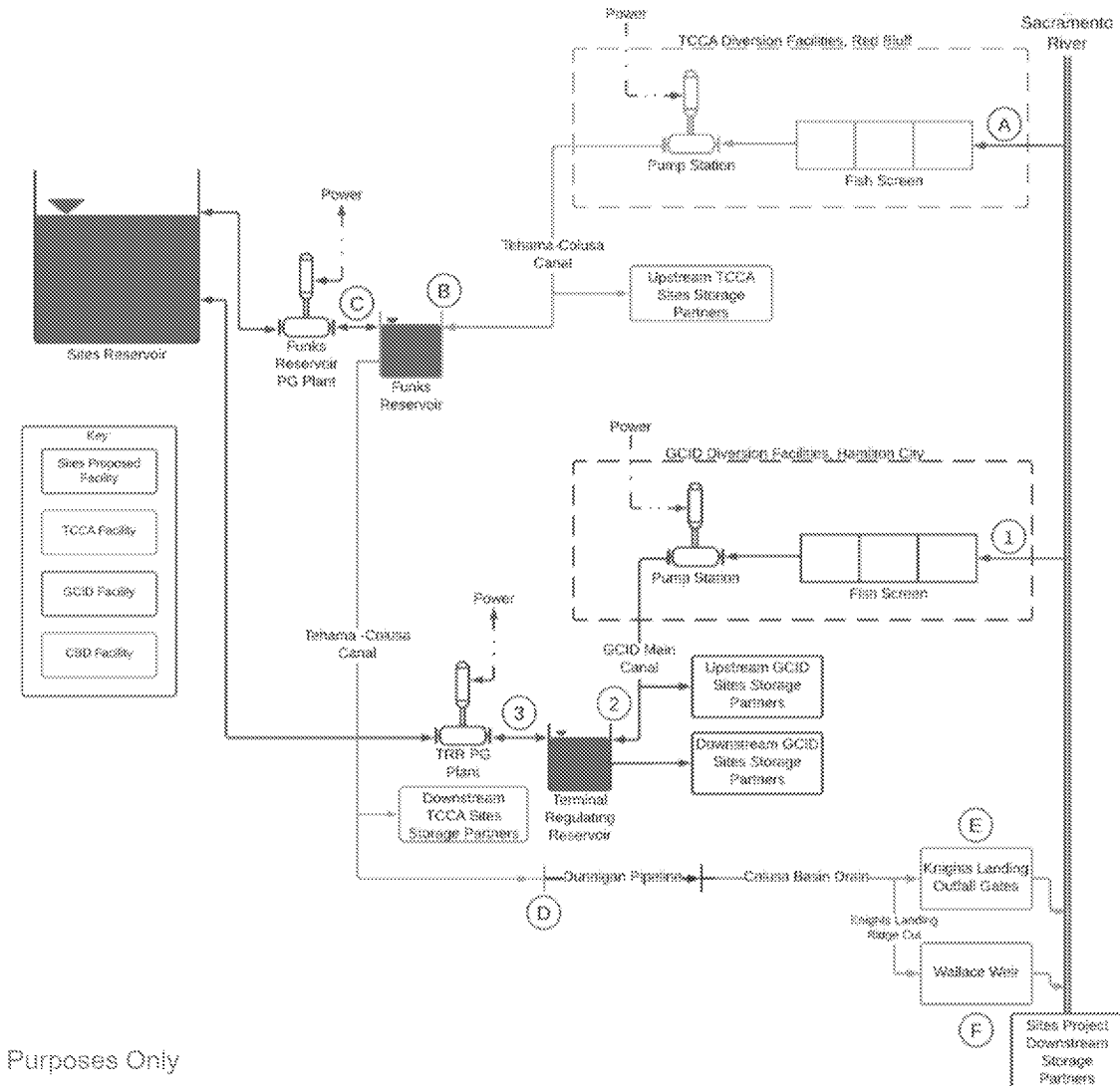
Purpose

- Review assumptions for water losses which occur along the flow path from points of diversion to points of delivery
- Reaffirm change in dead pool storage from 120 TAF to 60 TAF and confirm active storage assumption of 1.41 MAF
- Discuss concept for managing reservoir at low volumes if there is a water quality concern

Sites Project Facilities

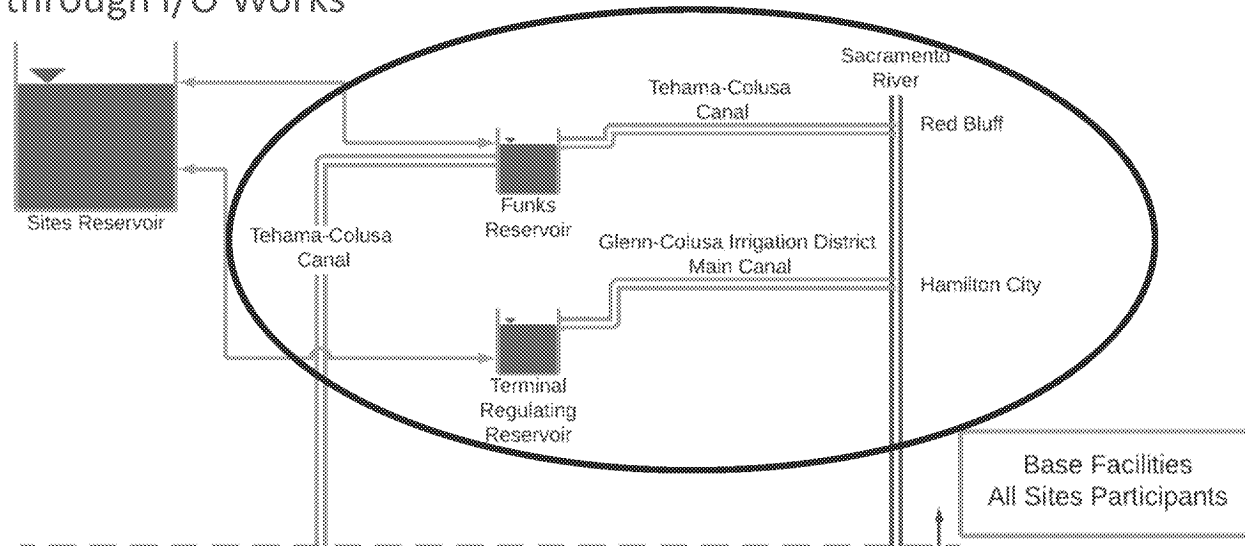
• Sites Flow Path

- Sacramento River
 - TC diversion and canal
 - GCID diversion and canal
- Funks/TRR to Sites Reservoir
- Sites Reservoir to TC Canal and GCID Canal
- Dunnigan Pipeline, Colusa Basin Drain, and Sacramento River
- Delta export facilities and/or participant point of delivery



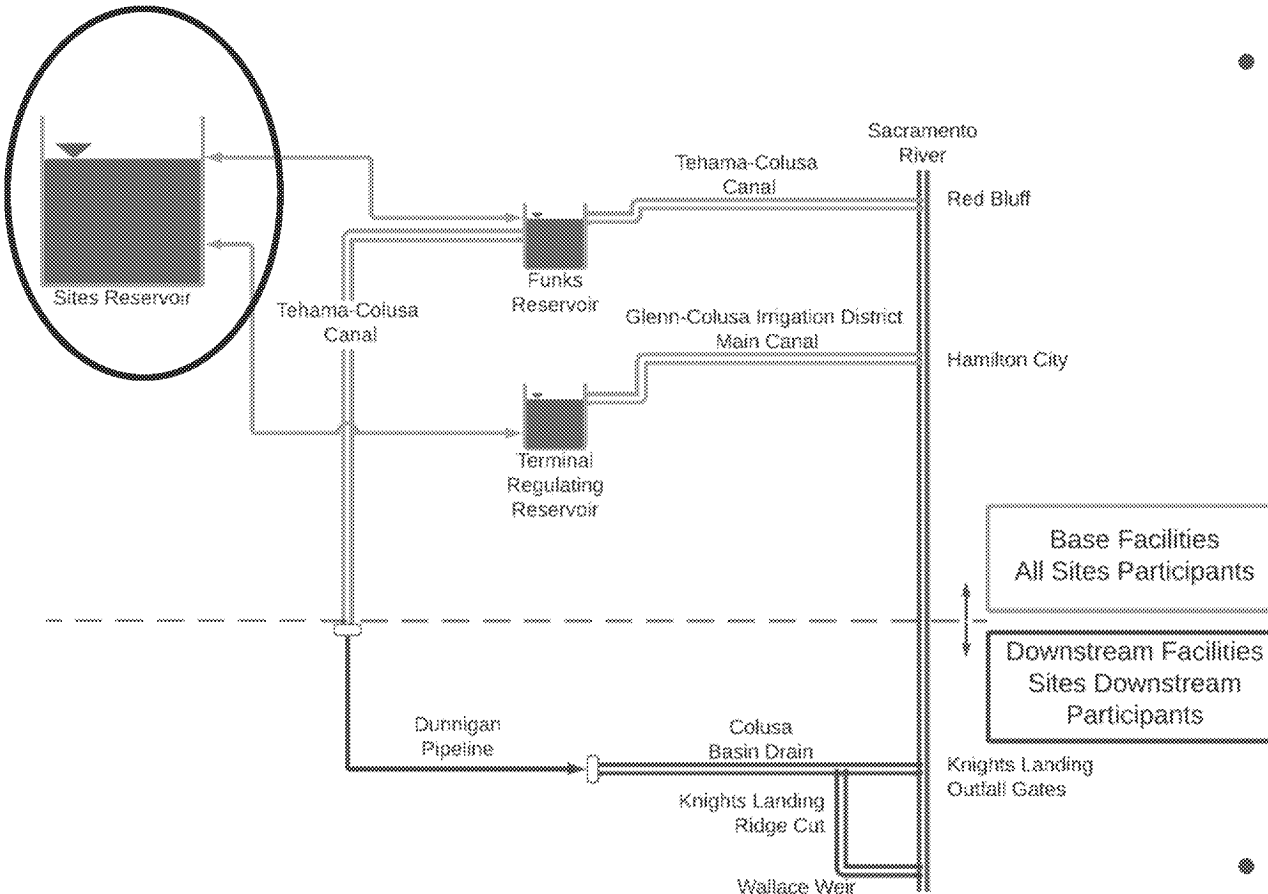
Modeled Losses – Diversions

- Tehama-Colusa Canal is concrete lined
 - Up to 2,200 cfs diversion
 - Estimated 1% loss for modeling purposes from RBPP to Sites Reservoir
- Glenn-Colusa ID Main Canal is unlined
 - Up to 2,000 cfs diversion
 - Estimated 2% or 13%, depending on season, loss for modeling purposes from Hamilton City to Sites Reservoir
- Losses occur prior to reaching Reservoir
 - Volume added to each Storage Partners' storage space will be based on amount entering through I/O Works



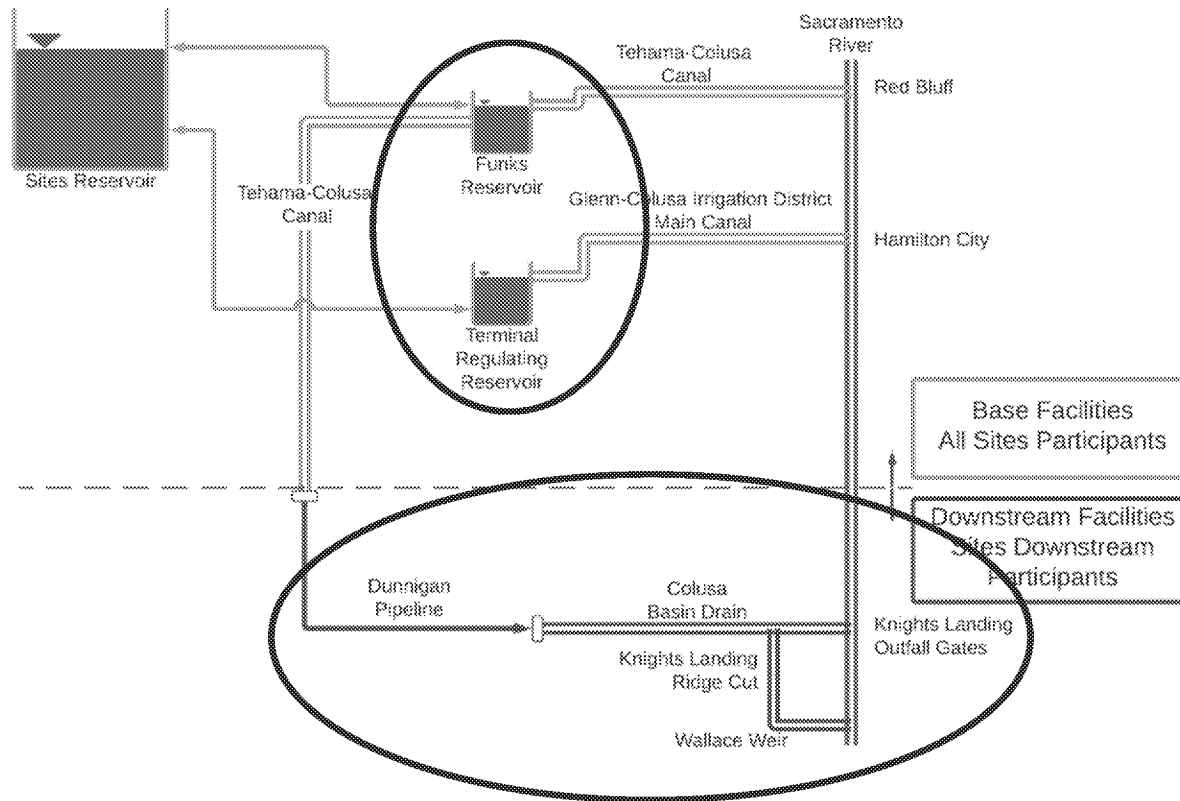
Draft - Predecisional
Working Document -
For Discussion
Purposes Only

Losses – Reservoir



- Evaporation
 - Estimated as approx. 10% per year
 - Planned to be refined with future measurements
 - Will be “charged” to Storage Partners proportionally
- Seepage and other calculated losses may also be applied proportionally

Losses – Releases for Storage Partners



- The primary point of delivery will be Funks or TRR
- The Sites Authority may retain control to facilitate a secondary point of delivery
- Storage Partners are responsible for losses after the primary point of delivery

Losses – Releases for Storage Partners

- Deliveries to NOD Storage Partners
 - No losses assumed in Project modeling
 - However, losses will be defined in wheeling agreements, if applicable
 - No modeled deliveries to NOD partners along Sacramento River below KLOG (losses would need to be assessed in the future for these deliveries)
- Deliveries to Yolo Bypass (State)
 - Assumed 13% loss during April through October when deliveries will be made
 - May be need for downstream measurement location (e.g., Wallace Weir) to quantify volume delivered for Prop 1 benefits

Losses – Releases for Storage Partners

- Deliveries to North Bay Aqueduct
 - Modeled assumption:
 - If delivered via Yolo Bypass, 13% loss is currently assumed
 - If delivered via Delta, model assumes losses would be consistent with below
 - Working with American Canyon on conformance with SWP contract
- Deliveries through Delta to Export Facilities
 - No modeled losses applied in Sacramento River from KLOG to Freeport (may need evaluation)
 - Average estimated at 23% in modeling, but is highly dependent of water year type and calculations
 - Carriage Water will be assessed and determined consistent with current practices for transfer water

Summary of Losses

Facility	Modeled Loss	Applied Loss
TC Canal	1% year-round	Difference of measured diversions and total pumped into Reservoir through I/O Tower
GCID Main Canal	2% or 13% seasonally	
Reservoir – Evaporation	10% long-term average	
Reservoir – Seepage/other	~4% for 1.8 MAF reservoir	Refined with future measurements
NOD Deliveries	None modeled	Pending wheeling agreements
Yolo Bypass	13% loss April – October	n/a
North Bay Aqueduct	13% via Yolo Bypass	Consistent with State Water Contract or DWR Wheeling Agreement
	23% long-term average Carriage Water via Delta	Consistent with State Water Contract
Delta Export Facilities	23% long-term average Carriage Water	Consistent with current practices for calculating CW

Confirmation of Active Storage

- The EIR/EIS describes a 1.5 MAF nominal reservoir with a footprint based on a water surface elevation of 498ft
- Based on 2022 LIDAR information, a WSE of 498ft has an estimated storage volume of 1.47 MAF
- The dead pool is currently assumed to be 60 TAF
 - Dead pool will not be “charged” losses (e.g., evaporation)
- With survey refinements, and 60 TAF dead pool, active storage is 1.41 MAF
- 1.41 MAF represents the **Active Storage** to be offered to Storage Partners and will be used in updated financial modeling

Dead Pool Considerations

- Establishing a dead pool is a form of risk management
 - As dead pool shrinks, more shares/volume can be sold to reduce costs
 - But increases risk that water in storage gets “stuck” when storage is low
- Even with dead pool, there is still some risk
 - Any water in a Storage Partner’s account will not be lost, just held until water quality conditions improve (likely the following year)

Potential Water Quality Constraints

- Potential for releases to be limited/constricted when Sites Reservoir approaches dead pool
 - Ex. If a water quality issue is identified when storage is at 100 TAF, then 40 TAF of Storage Partner water may not be able to be released from Sites

Frequency of Reservoir Nearing Dead Pool based on 2035CT Hydrology under Alt 3B (16 % Reclamation Investment)

	# of Times at or Below 200,000 AF	# of Times at or Below 120,000 AF	# of Times at or Below 60,000 AF
Frequency in All Months	164 (17%)	84 (9%)	8 (1%)
Frequency in May	7 (9%)	4 (5%)	0 (%)
Frequency in September	20 (24%)	10 (12%)	1 (1%)

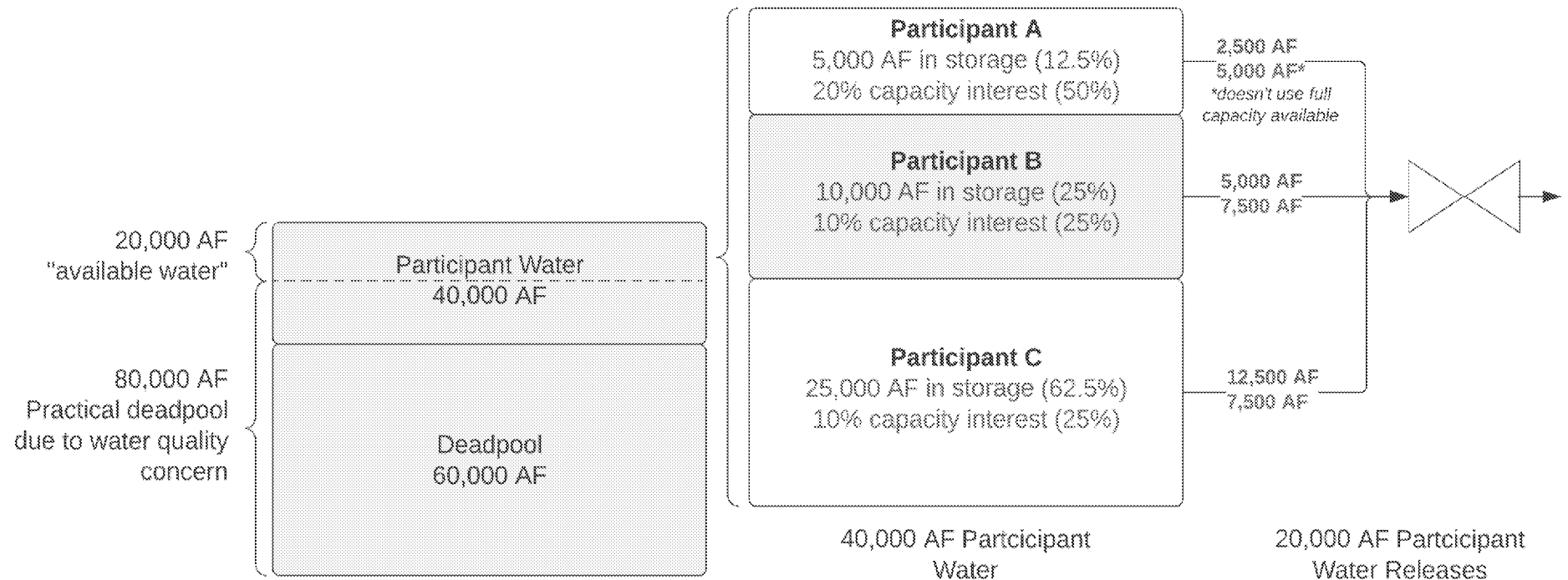
Potential Water Quality Constraints

- Initial concept to be considered for Project documents

Restrictions on Releases in Low Reservoir Elevations – In the event that the Authority, in working with the Reservoir Committee, anticipates restrictions on releases as a result of water quality considerations, the Authority in working with the Reservoir Committee and State and Federal Storage Partners will develop a procedure to release water as requested by Participants based in proportion to the [amount of water remaining in storage] or [capacity interest in the project].

Example Scenario

(Simplified, for illustration purposes only)



Conclusion

- Losses are assessed from point of diversion to point of delivery and the process will be described in the operations plan
- The active storage in the Sites Reservoir is 1.41 MAF and assumes a 60 TAF Deadpool
 - 1.41 MAF is allocated to storage partners
- A “low storage level” occurs infrequently in the model (<10% of the time below 120,000 AF)
 - Allocating capacity in these scenarios can get complicated and would benefit from operating experience
 - Cover this process in the operations plan, define the process for defining and changing the operations plan in the B&O Contract

Questions?



Agenda Item 1.2

Project Baseline Schedule and Alternative Analysis

JP Robinette, Marcus Maltby, Henry Luu



Recap from February O&E Workgroup

- Draft schedule places substantial completion in late 2033
- Staff is evaluating opportunities to improve schedule while managing risk
- In April, seek adoption for:
 - Program Baseline Schedule
 - Early Acquisition Program

Project Baseline Schedule Update

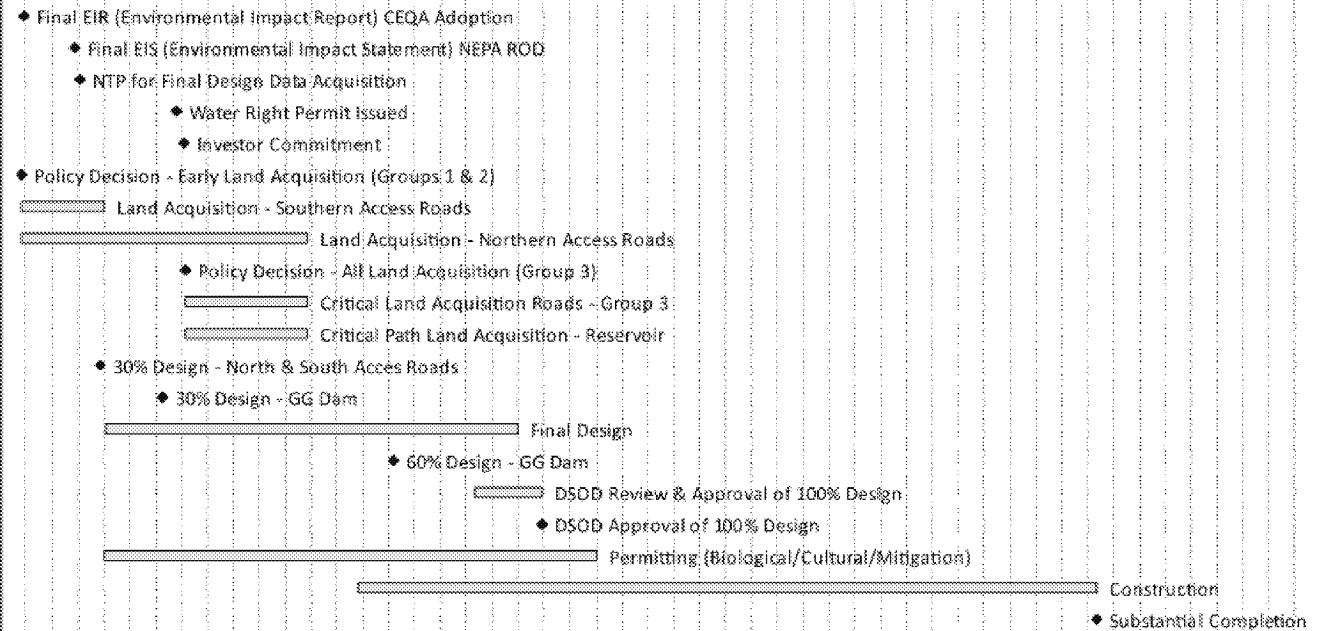
- Deferring baseline schedule adoption to June
 - Better understanding of Water Right timeline
 - Opportunity to explore additional schedule reducing measures
- Focus remains on improving the baseline schedule
 - Advance early acquisition program
 - Prioritize road design
 - Set priority feature footprints
 - Accelerate key permits
 - Procure a CMAR for the Reservoir package (risk management)

Simplified Critical Path for the Reservoir Package

Advancement of access roads ahead of investor commitment provides relief to *near-critical path* activities

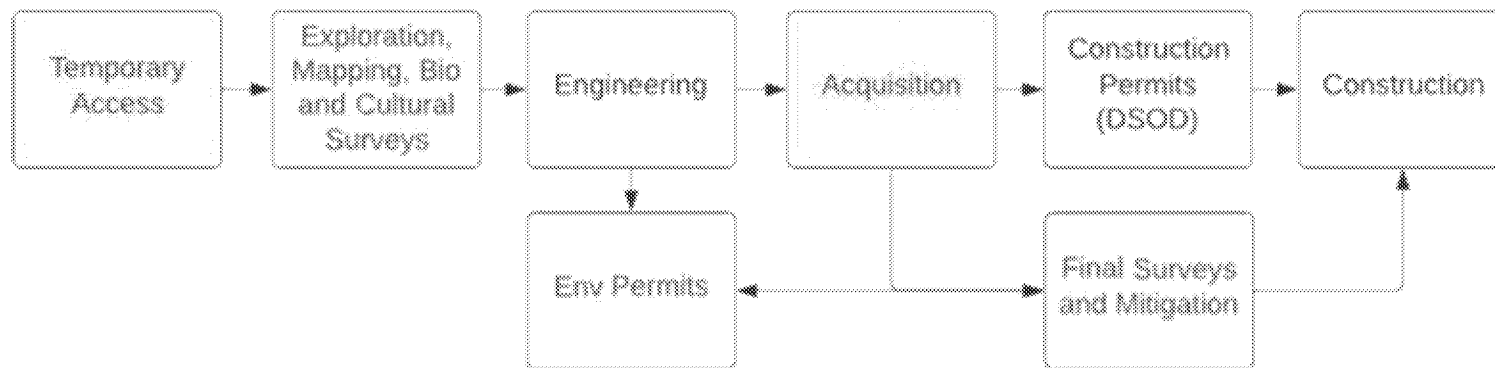
Sites Reservoir Project: April 2023

Final EIR (Environmental Impact Report) CEQA Adoption
 Final EIS (Environmental Impact Statement) NEPA ROD
 NTP for Final Design Data Acquisition
 Water Right Permit Issued
 Investor Commitment
 Policy Decision - Early Land Acquisition (Groups 1 & 2)
 Land Acquisition - Southern Access Roads
 Land Acquisition - Northern Access Roads
 Policy Decision - All Land Acquisition (Group 3)
 Critical Land Acquisition Roads - Group 3
 Critical Path Land Acquisition - Reservoir
 30% Design - North & South Access Roads
 30% Design - GG Dam
 Final Design
 60% Design - GG Dam
 DSOD Review & Approval of 100% Design
 DSOD Approval of 100% Design
 Permitting (Biological/Cultural/Mitigation)
 Construction
 Substantial Completion



Prioritizing Roadway Footprint

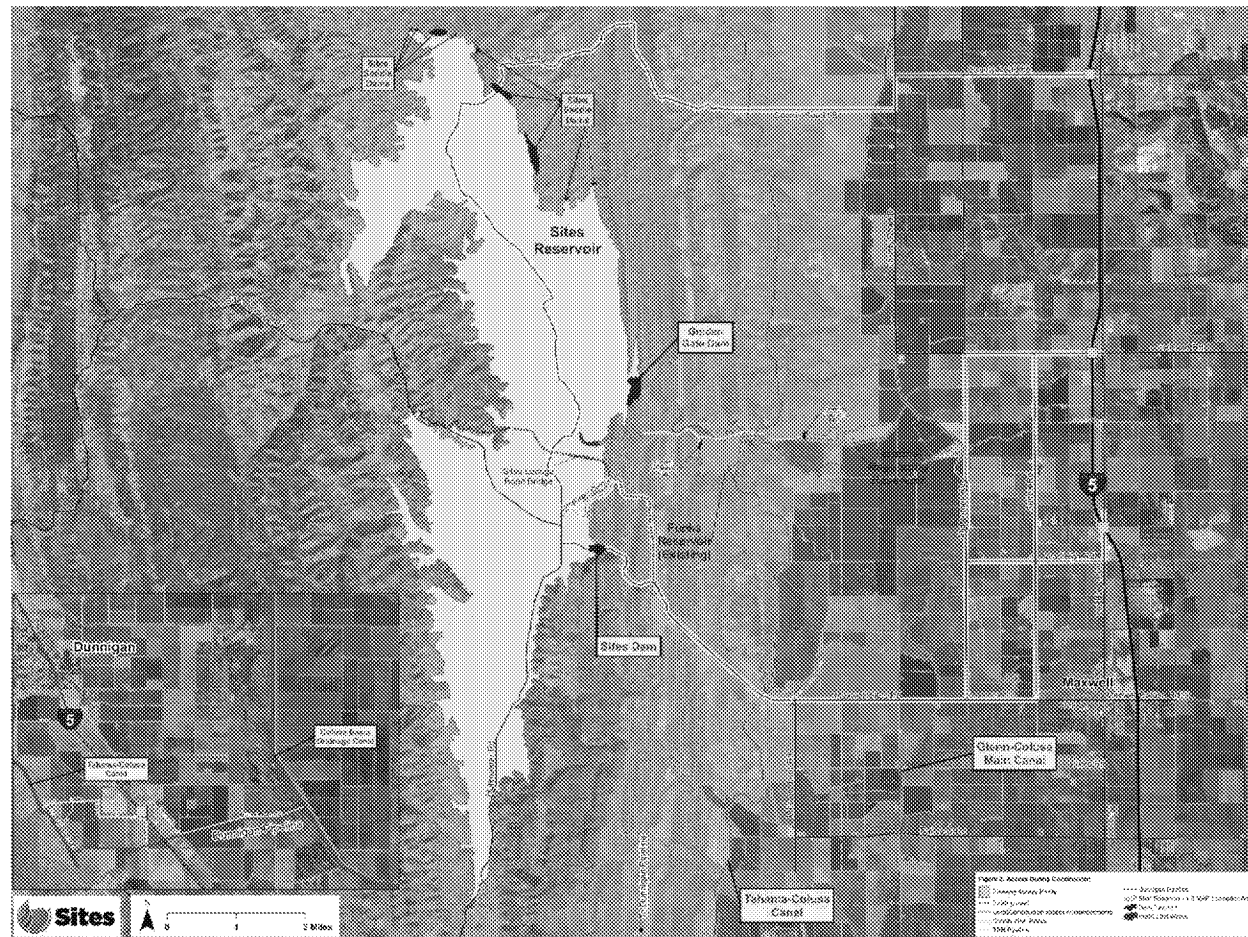
- Advancing definition of construction roads is a critical first step to initiate activities leading to construction
 - Land access & acquisition: long linear footprint requires coordination with multiple property owners
 - Environmental permitting: phased clearance approach



Local Community Working Group Roadway Considerations



Construction Roads



Procurement Strategy

- Adoption in Summer 2023
- Proposes a 2-step, 2-contract approach to procuring the CMAR for the Reservoir
- Will include a check-in on water rights, key permits, CEQA, and financing before initiating procurement
- Goal to have CMAR on-board in 2025 (to assist in developing 60% design)

Questions?



Agenda Item 1.3

Soft Call Considerations

JP Robinette



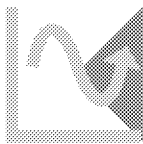
The soft call represents Agency Staff's thinking and is important because it allows...



Staff to update Participants who have requested more capacity, Reclamation, and "Waitlisted" Participants



Time for different credit scenarios to be evaluated



Operational assumptions to be modeled and infrastructure sizing to be validated



Avoid last minute surprises

Targeted for June, 2023

In May, we will discuss the three big questions and the soft call

What do we get?

- The contract and operations of the Sites Project

How much does it cost?

- Accounting for today's interest rates, market volatility, and escalation in our plan of finance

How do we pay for it?

- Progress securing project financing and Participant revenue sources to pay for the project

What do we get?

The contract and operations of the Sites Project

- Project operations and benefits overview
 - Operations Plan and which topics are included
- Overview of assumptions on Participant demand
- Benefits and Obligations Contract Development
 - Ownership of capacity interest (Base and Downstream), relation to storage and conveyance
 - What is in the contract vs. in other documents
- Others?

How much does it cost?

Accounting for today's interest rates, market volatility, and escalation in our plan of finance

- Review the components of cost and what is included
- Updated cost tables
- Timeline for cost estimate updates
- Others?

How do we pay for it?

Progress securing project financing and Participant revenue sources to pay for the project

- WIFIA update and indicative rating process takeaways
- Updated financing strategy
- Update on Participants securing revenue through
 - DWR
 - CCFCWCD (for certain Sac Valley irrigation districts)
 - Rates and charges
 - Other
- Others?

Questions?



Engineering and Construction Manager's Report

JP Robinette



Sites, DWR, & Reclamation Ops Agreement

- A complete first draft has been circulated amongst Parties
- Continue to meet to discuss concepts for future coordination
- Review and substantial engagement with Reclamation is pending their Basis of Negotiation (BON)
 - Reclamation staff not able to provide comments until BON is approved
 - Currently being prepared by staff and CVO management has been engaged

Questions?



Thank you!

Next Meeting: Wednesday, June 7, 2023 (1:30 pm – 3:30 pm)



DSOD Technical Progress Meeting Notes



To: Sites Project Authority
CC: Henry Luu, P.E. (HDR)
Date: April 9, 2023
From: Benjamin Aldridge, P.E., G.E.; Mike Smith, P.E., G.E.
Subject: Notes from DSOD Meeting on April 6, 2023

Participants:

Mikhail Ermakovich	DSOD	Mike Smith	AECOM
Erik Malveck	DSOD	Ben Aldridge	AECOM
Wallace Lam	DSOD	Idit Zarchi	AECOM
Chris Tracy	DSOD	Mike Forrest	AECOM
David French	DSOD	Brendan O'Rourke	AECOM
Andrew Lutz	DSOD	Jeff Herrin	AECOM
Eddy C.	DSOD	Jeff Unruh	LCI
JP Robinette	Sites Project Authority	Ivan Wong	LCI
Henry Luu	HDR	Pete Rude	Jacobs
Dave Gutierrez	GEI	Wayne Ohlin	Jacobs

Introductory Comments

Erik (DSOD)

- There is a push on both sides (DSOD and Sites Authority) to finish the project in a timely manner
- DSOD would like the Authority and their consultants to work closely with DSOD to improve efficiency.
 - Submit information and informal TMs for review as they become available.
 - Have fewer large meetings that are difficult to coordinate.
- Preference to receiving materials prior to meetings so that DSOD can provide more substantial discussion.

Seismic Hazard Presentation (Jeff Unruh)

- Andy (DSOD): Question on northeast trending faults and other similar faults and their connection to the Fruto Fault:
 - Could the northeast trending faults rupture at the same time as the Fruto Fault, thus changing the energy in the event and/or the distance to the seismic source? Would the faults "channel" motions or cause other effects?
 - Jeff U. (LCI) notes that the max magnitude from these smaller faults is likely about M4
 - Chris T. (DSOD): What percent of slip occurs on the surface faults compared to the Fruto Fault? DSOD recommends we think of if those northeast trending faults (and similar) have primary versus secondary offset. (Fruto Fault: M7 at 6 km)

- AECOM team will update the analysis of this issue in the WLA (2002) report for the current Sites complex study.
- DSOD hasn't formally reviewed and accepted the 2002 WLA report.
- DSOD expressed concern/interest in the first blowoffs being at Funks and TRR and thus needing to cross several faults. They also expressed that their field branch may have an issue with having the pipes to TRR be jurisdictional.
 - Suggestion/discussion item: Put blowoffs closer to ridge forming the reservoir. These blowoffs could be in addition to the blowoffs at Funks and TRR if there are concerns of eroding the creek bed, and would provide system redundancy.
 - DSOD considers all reservoir infrastructure jurisdictional down to the nearest blowoff required to meet the emergency drawdown criteria.
- Andy (DSOD): Overview of DSOD review of seismic motion/hazard
 - DSOD will consider the amount of research and data available in an area and if less data is available possibly recommend higher design motions.
 - Blind thrust faults are difficult to classify and study, resulting in high uncertainty that may need to be addressed in the design.
 - DSOD may not agree that the northeast-trending GG and S faults will not contribute significantly to ground motions at the site.
 - DSOD may want higher return period motions due to lack of certainty in the models; uncertainty also exists in the return period estimates also exists (example Napa Earthquake where additional information lowered return period on some dams).
 - Will have risk-informed decision process to develop the motions.
- Chris T. (DSOD): Do we have our own custom seismic source model?
 - Yes, and we can share (not proprietary).
- DSOD: General comments
 - Should look at site-source distance for individual structures as needed.
 - Should consider risk for each structure when selecting motion (potentially use different motions for structures with different risk).
 - Perform deterministic analysis and then inform with probabilistic analysis.

PMF Study and Spillway Design Presentation (Idit Zarchi)

- An update on progress regarding the PMF study for a 1.5 MAF reservoir was presented.
- Two spillway configurations are being considered at the 30% level of design:
 - An ogee crest weir at El. 498 ft.
 - An ogee crest weir at El. 504 ft with a notch (or lower spillway) at El. 498 ft
- The notched spillway is being considered in order to attenuate PMF flows in Hunters Creek (reduce flooding).
- Discussion of Notch:
 - Mikhail asked about the capacity of the notch.
 - Idit/Brendan: The design can be adjusted. At present a capacity of approximately 400 cfs with WSL is at El. 504 ft is being considered.
 - Erik noted that DSOD does not have immediate issues or concerns with a notched spillway
 - Erik noted it's important to consider secondary effects on the notch such as debris.
 - Idit/Brendan: The notch is currently assumed to be 10 ft wide.

Reservoir Outlets and Emergency Drawdown (Idit Zarchi)

- An update was provided on the storage-elevation curve for the reservoir.
 - Data from a 2022 Lidar survey was used to create a new storage-elevation curve at one (1) foot increments.
 - The overall reservoir capacity is about 2-3% less than what was considered in the 2004 storage-elevation curve.
- Work has been done on outlet size optimization. The following parameters were assessed: outlet tunnel lining, flow allocation between outlets, and emergency drawdown criteria.

- The assumed final lining at the feasibility level design (reinforced concrete) limited velocities per Reclamation guidelines.
 - The 30% design will include a steel liner for the tunnels, which will allow for greater velocities, therefore decreasing their diameters.
- Flow allocation between the two main outlets is being assessed considering a 50/50% flow split between the I/O Works and the Sites outlet.
 - Sites Authority is in the process of assessing if this flow allocation is acceptable.
- Average discharges required to meet either the 7 or 10 day emergency drawdown were presented. A discussion on emergency drawdown is presented below.
- The emergency drawdown guidelines state that the reservoir must be drawn down "...by 10 percent within 7 or 10 days..." However, these are guidelines that can be assessed on a project by project basis and are typically applied to smaller reservoirs.
- Given the large size of Sites Reservoir, and the volumes that would need to be released in the upper 10% of reservoir storage, DSOD may consider a longer drawdown period.
- Sites Authority designers should present a case that considers how dam safety will be maintained.
 - Consider what failure modes we see in analyses on dam. Use this to help determine what level the reservoir needs to be drawn down to (how much of crest would be taken out with those failures? Cracking depth?).
 - DSOD would find it useful to see a flood map for the 10-day drawdown
 - Impacts from rapid drawdown around the outlets is important, less so for reservoir rim except where thin ridges exist (failure causes release of reservoir).
 - DSOD recommends looking at emergency drawdown guidance from Reclamation and the Army Corps, etc.
- A memorandum on emergency drawdown criteria should be submitted to DSOD for concurrence. State what drawdown criteria will be used for design and what mitigation measures will be taken in design, construction, and operation to reduce dam safety risks.
 - Before submitting we can have call with DSOD to discuss.
- DSOD said they can provide guidance by July 2023 if we get information to them (memo above) by mid-May.
- In a side conversation between Erik (DSOD) and Idit (AECOM), Erik mentioned we should also consider how much more drawdown ability we have compared to the inflow (mentioned one issue with Oroville was outlet couldn't drain reservoir faster than inflows) as well as the outlet's capacity relative to anticipated PMF flows.
- Emergency Drawdown Blowoff Locations
 - See discussion in seismic hazard portion of presentation (reiterated and discussed similar items during this presentation).

Final Comments/Questions

- Andy (DSOD): What is status of investigation (in relation to 30% design timeline)?
 - JP (Authority): Exploration program will ramp up over the next year.
 - DSOD Comments/requests:
 - Want detailed plan for fault trench for DSOD to review so we can make sure to get all the information we (including DSOD) need from the fault trenches.
 - DSOD expressed interest in going to the site (and possibly seeing the fault trenches?).

Action Items

- 1) Provide fault trench work plan to DSOD for their review.
- 2) Prepare and provide to DSOD an emergency drawdown criteria memo.
- 3) Provide current exploration schedule.
- 4) Provide Lidar data to DSOD.



From: Janis Offermann [jaoffermann@montrose-env.com]
Sent: 4/18/2023 8:25:40 AM
To: Laverne Bill [LBill@paskenta.org]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: agenda for this morning's meeting
Attachments: 20230418_Paskenta_Agenda.docx

Good morning, Laverne
Attached is a draft agenda for our meeting this morning.
Please feel free to add any other topics you wish to discuss.
As always, we are looking forward to seeing you.

thanks
janis

--

Janis Offermann, M.A., RPA

Senior Cultural Resources Manager

M: 530.220.4918

jaoffermann@montrose-env.com

Please note new email address after April 1, 2023. I can still receive emails as janis@horizonh2o.com; however, all of my outgoing emails to you will be from jaoffermann@montrose-env.com.

Montrose Environmental
1801 7th Street, Suite 100, Sacramento, CA 95811



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Sites Project meeting with Paskenta Band of Nomlaki Indians Agenda



Our Core Values – Safety, Trust and Integrity, Respect for Local Communities, Environmental Stewardship, Shared Responsibility and Shared Benefits, Accountability and Transparency, Proactive Innovation, Diversity and Inclusivity
Our Commitment – To live up to these values in everything we do

Meeting Information:

Date: April 18, 2023 **Location:** Virtual
Start Time: 9:30 a.m. **Finish Time:** 10:30 a.m.
Purpose: Continued Consultation on the Sites Reservoir Project between the Sites Project Authority and Representatives of the Paskenta Band of Nomlaki Indians

Meeting Participants:

Laverne Bill, Cultural Resources Director, Paskenta	Laurie Warner Herson, Sites Integration	Name
Ali Forsythe, Sites Authority	Janis Offermann, Montrose	Name
Kevin Spesert, Sites Authority	Name	

Agenda:

Discussion Topic	Topic Leader	Time Allotted
1. Overview	Ali	5 minutes
a. Introductions		
b. Objectives		
2. Upcoming Geotechnical Studies	Ali	5 minutes
3. Status of EIR Process and Paskenta's Review	Ali/Laverne	20 minutes
4. Paskenta Concerns/General Discussion	All	20 minutes
5. Action Items	All	5 minutes
6. Next Steps	All	5 minutes

DRAFT MEETING NOTES AND ACTION ITEMS

Sites Authority & RD 108 Partnership on the Lower CBD System

Kickoff Meeting, April 13, 2023

- Permitting on Lower CBD
 - Who will be responsible? Which entities will be involved?
 - Note in O&M and Capital Improvements (e.g., levee improvements) sections
 - Coordinate write-up with Ali's group (Rich to reach out to John and Lori to schedule a meeting to discuss)
- Wallace Weir EIR and the Hershey Agreement
 - Review documents
 - Reference in water rights/O&M/Capital Improvements?
 - Consider how releases into Yolo Bypass should be included in this effort (discuss with John/Lori)
 - Follow up with RD 108 on discussions with DWR re studying how Wallace Weir operations have changed since Hershey Agreement (Lewis noted need for funding studies)
 - Need to better characterize KLRC/Wallace Weir/Sac River interactions so Sites can better determine potential project impacts
 - Follow up with Angela on her efforts on this
- Explore Losses pertaining to capacity in the CBD
 - Discuss in measurement/monitoring under water rights
 - Consider seepage losses in O&M
 - Include system losses analysis being completed by Angela
 - Follow up with Angela
- Subsidence and any impacts to CBD
 - Consider subsidence in the capacity discussion - follow up with Henry/Eng Team
 - Follow up on DWR/KSN work—get more info from Lewis for contact info etc.
 - Is there SGMA-related work on this?
- Communication with DWR re their Flood Operations
 - Note the need for communication/coordination (e.g., KLOG setpoint)
 - DWR maintains channels in KLRC
- RD 108 Business Analysis
 - Incorporate into O&M
 - Who will have liability for O&M activities?
 - Potential need for additional staffing
 - RD 108 not a union shop—any potential issues?
- Institutional Complexity
 - Colusa Basin Drainage District will be key in discussions
 - Need to address land rights and authorities of various entities
- Principles of Use of Lower CBD System
 - Critical Landowner Outreach – no specific entities identified
 - Need to clarify operations/interests of Sites Reservoir; recognize that local landowners rely on the CBD system etc. for their living—it's more personal for them; state that Sites

will try to avoid and mitigate any impacts (e.g., seepage, potential flooding); Sites will measure and monitor conditions; Sites will be transparent; Sites will use combination of engineering and local experience to inform planning and decisions

- Rich and Amparo can help draft principles language

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 4/19/2023 8:20:08 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

Keeping you in the loop

John Spranza

D 916.679.8858 M 818.640.2487

From: Tannourji, Danielle <Danielle.Tannourji@icf.com>
Sent: Tuesday, April 18, 2023 10:14 PM
To: Conner McDonald <conner@cmdwest.com>; Spranza, John <John.Spranza@hdrinc.com>
Cc: Risse, Danielle <danielle.risse@hdrinc.com>; Arsenijevic, Jelica <jelica.arsenijevic@hdrinc.com>
Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thank you to the team for a great call today! Below is a summary of what we covered.

- 1) Geotech is heading out tomorrow, April 19, for precon surveys of GCID and TCCA lands. Pablo and Christiaan from ICF will be there for bio and cultural clearance.
- 2) Aquatics Team will be heading out on Thursday, April 20th, to meet Conner, John, and myself to install the HOBO data logger at SCC Hydro/BA #1 on the Banyan property. Pablo will also be driving within the County ROW to conduct an eagle nest survey. John and Conner will coordinate on- and off-site access for the Aquatics Team with Danielle. A group text will be sent out every 2 hours to keep Kevin in the loop. Pablo will also send texts to the eagle group every few hours as he has done so before during the 2022 surveys.
- 3) Surveys for cultural on Banyan are proposed for May 15th-17th. Aquatics will likely come back to check the datalogger this week as well.
- 4) Surveys for wildlife on Banyan are proposed for May 22-24th.
- 5) Waiting to get confirmation for botanical but will either be concurrent with cultural or wildlife.
- 6) Danielle to upload the final Redstick and Funks Survey Work Plans this week for Conner, Danielle R., and John's review, with County Roads to follow early next week.
- 7) Conference call for Cemetery work plan to be set for 3pm on April 27th, Conner to send meeting invite.

Thanks,
Danielle

Danielle Tannourji, MS | Senior Biologist – Conservation Planning | 408-887-3414 (cell – primary phone) |
Danielle.Tannourji@icf.com

From: Conner McDonald <conner@cmdwest.com>
Sent: Friday, April 7, 2023 12:55 PM
To: Tannourji, Danielle <Danielle.Tannourji@icf.com>; 'Spranza, John' <John.Spranza@hdrinc.com>
Cc: 'Risse, Danielle' <danielle.risse@hdrinc.com>; 'Arsenijevic, Jelica' <jelica.arsenijevic@hdrinc.com>
Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

Hey Danielle,

Thanks – let's discuss on our Tuesday Call. I'll do my homework over here, and anticipate that we'll be clear to move forward following our check-in on Tuesday.

-thanks!

CONNER McDONALD – SR/WA / Right-of-Way Services



c/ 530-750-9912 e/ CONNER@CMDWEST.COM

From: Tannourji, Danielle <Danielle.Tannourji@icf.com>

Sent: Wednesday, April 5, 2023 2:22 PM

To: Spranza, John <John.Spranza@hdrinc.com>; Conner McDonald <conner@cmdwest.com>

Cc: Risse, Danielle <danielle.risse@hdrinc.com>; Arsenijevic, Jelica <jelica.arsenijevic@hdrinc.com>

Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

Ok thanks John for your feedback on this and the JHA!

Conner, I spoke to Pablo and he said he is pretty flexible next week, but mentioned 11th or 12th to go out to do a general recon of the nest sites. Pablo would stay on County Roads and pull off on the side of the roadway where safe to view nests with his binos or birding scope.

We can also set up a quick call this week to go over these details with Pablo before we set a date if that would help. Just let me know what you need so we can move this request forward.

Thanks,

Danielle Tannourji, MS | Senior Biologist – Conservation Planning | 408-887-3414 (cell – primary phone) |
Danielle.Tannourji@icf.com

From: Spranza, John <John.Spranza@hdrinc.com>

Sent: Wednesday, April 5, 2023 10:34 AM

To: Tannourji, Danielle <Danielle.Tannourji@icf.com>

Cc: Risse, Danielle <danielle.risse@hdrinc.com>; Arsenijevic, Jelica <jelica.arsenijevic@hdrinc.com>; Conner McDonald <conner@cmdwest.com>

Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

Hi, see below for my responses.

John Spranza

D 916.679.8858 M 818.640.2487

From: Tannourji, Danielle <Danielle.Tannourji@icf.com>

Sent: Tuesday, April 4, 2023 5:42 PM

To: Spranza, John <John.Spranza@hdrinc.com>

Cc: Risse, Danielle <danielle.risse@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Conner McDonald <conner@cmdwest.com>

Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi John, sorry we missed you on our weekly call today, below is a summary and a few questions for you highlighted in yellow:

- 1) Schedule is still working itself out pending Kevin's approval and pending precipitation.
- 2) A staggered survey approach is preferred, with one team on site per day. Instead of starting the week of April 10th, now it is looking more like late April or early May.
- 3) I would still like to push for the Aquatics Team to get out there the week of April 17th for 1 day at Banyan and 1 day at TCCA. Fingers crossed.
- 4) Geotech is hoping to start up April 24th, but was asking about the status of the eagle nest. Would you like to have us send Pablo out there in the next week or two to do a ground check along the roadway? The Geotech Precon Survey for GCID and TCCA locations is set for April 19th, but we could get Pablo out there sooner. Pablo was out there a few weeks ago driving through the area and noticed the GE pair were in a different tree one canyon over to the northwest of the 2022 location.

JJS: I'm good with him going out for a general recon survey of the area, Tracy suggested we do so to document any nests. Please make sure Conner is good with this approach and has ample time to notify folks if required,

- 5) We have finalized the Banyan survey plan for Kevin. Once he reviews and edits, I can then move forward with finalizing the other 3 work plans we have drafted. A question for you, are we still asking for permission from select landowners that have aquatic features on their lands to conduct CRLF aquatic habitat assessments 1 mile out from the project footprint? From our call with Ali last week, it sounded like this ask was going to be a "no-go" for this year's surveys, can you confirm?

JJS: This is a no-go for right now.

- 6) County ROW survey will need to go to Kevin and then to the County for approvals. Hoping to get out there by June. Thank you for confirming that the County approved the aquatics survey plan last week, YAY 🙌

Thanks,
Danielle

Danielle Tannourji, MS | Senior Biologist – Conservation Planning | 408-887-3414 (cell – primary phone) | Danielle.Tannourji@icf.com

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Wednesday, March 29, 2023 8:16 AM
To: Tannourji, Danielle <Danielle.Tannourji@icf.com>
Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

Thank you

John Spranza

D 916.679.8858 M 818.640.2487

From: Tannourji, Danielle <Danielle.Tannourji@icf.com>
Sent: Tuesday, March 28, 2023 6:52 PM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Spranza, John <John.Spranza@hdrinc.com>; Conner McDonald <conner@cmdwest.com>
Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Team,

Attached are the KMZs you requested that show the proposed aquatic sampling locations and the two additional survey areas on Red Stick parcels. Thanks again for the call today, below are some highlights:

- 1) Schedule is still working itself out pending rain in the forecast.
- 2) A staggered survey approach is preferred, with one team on site per day. Could start as early as April 10th.
- 3) Per Ali's direction, I will update all survey plans this week and get them back to Jelica and Conner to finalize so they can go to Kevin.
- 4) County ROW survey will need to go to Kevin and then to the County for approvals. Hoping to get out there by June.
- 5) John to send out an update to this team by COB Friday about Aquatics Plan. If approved, it would be great to send out the Aquatics team for 1 day the week of April 10th to get a high flow water quality sample. Sampling can be taken from the top of bank. It would be a quick visit (half day) with 3 staff members and 2 cars. If safe conditions persist, they could also install the HOBO datalogger. The team is available between the 10th and 12th to conduct the 1-day field visit.
- 6) We can wait and push out the other surveys on Banyan towards the later half of the month to coincide with Geotech or try for the week of April 17th pending weather.

Thanks,
Danielle

Danielle Tannourji, MS | Senior Biologist – Conservation Planning | 408-887-3414 (cell – primary phone) |
Danielle.Tannourji@icf.com

From: Tannourji, Danielle

Sent: Wednesday, March 22, 2023 8:59 AM

To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Spranza, John <John.Spranza@hdrinc.com>

Cc: Conner McDonald <conner@cmdwest.com>

Subject: RE: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary

Hi John,

Below are some notes from our coordination meeting yesterday with regards to overall project surveys on upcoming private properties via geotech access.

Overall project surveys still planned concurrent with geotech, but the team would like to talk to you about potentially starting later in the week, like Wednesday April 12th after Geotech is up and running smoothly. After the last three Geotech start-ups, Conner and Jelica thought it might be easier to get off on the right foot if we start a few days after Geotech.

The Banyan survey plan is updated but awaiting some key decisions from Ali on the topics we spoke about last week on our call (i.e., survey buffer, CNDDDB reference, tribal reps/USACE visits). Once finalized, I can quickly finish the Red Stick survey plan and move onto the other three we have in the works.

Real Estate is meeting with Banyan landowners this weekend and will be discussing the land access agreement. Parking was a question Jelica and I had during the meeting, so Conner will be sure to ask about that as well. I also asked that we get permission to climb under/through the existing fences near the roadway to access the survey areas to the north and south.

I have sent out a few maps showing the survey plan areas within the Colusa/Glenn ROWs, as well as on Reclamation/TCCA property surrounding Funks Reservoir and survey plans for these areas are being drafted as well.

Jeriann has a visual schedule in the works for Geotech and once we receive it, I can use her template for the field survey schedule. Lastly, we will be meeting on Friday morning to discuss the Sites Cemetery field survey plan. ICF has met internally on this and looks forward to sharing their ideas with the team on survey and access approach.

Jelica and Conner, please add in anything I may have missed.

Thanks,
Danielle

Danielle Tannourji, MS | Senior Biologist – Conservation Planning | 408-887-3414 (cell – primary phone) |
Danielle.Tannourji@icf.com

From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Wednesday, March 8, 2023 10:36 AM
To: Spranza, John <John.Spranza@hdrinc.com>
Cc: Tannourji, Danielle <Danielle.Tannourji@icf.com>; Conner McDonald <conner@cmdwest.com>
Subject: Sites: Overall Project Surveys via Geotech Access 3/7/2023 Meeting Summary
Importance: High

Hi John

Wanted to give you a heads up on our coordination meeting yesterday with Danielle T regarding overall project surveys on upcoming private properties via geotech access. Going forward , I'll have Danielle T give us a summary .

Conner, Danielle, and I agreed that overall project surveys , concurrent with geotech , would begin the second week of April (week of April 10th). Surveys would begin on the Banyan property. Danielle is preparing workplans to share with the real estate team per property (maps of survey area, summary of work, number of staff, survey schedule). Following Banyan is the Red Stick property.

Danielle T will also be preparing a workplan for areas within the Colusa/Glenn right of ways, as well as on Reclamation/TCCA property (surrounding Funks Reservoir). These should be “easy” access areas . Just prior to Danielle submitting these workplans, Conner and I will chat with Kevin, get his blessing on approaching the counties, Reclamation and TCCA. Following the blessing, you're going to be the key in meeting with the Colusa/Glenn/Reclamation/TCCA to walk them through of the “survey ask” . Assuming they say “yes” , the real-estate team will start the encroachment permit process. Goal is to get out to all of these areas before things start drying up (we have rain in our favor).

I think these the main highlights from our meeting last night! Danielle and Conner, please add anything that I may have missed or misstated.

Jelica Arsenijevic
Environmental Project Manager



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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/19/2023 10:03:00 AM
To: Spranza, John [john.spranza@hdrinc.com]
Subject: Sites Project - Construction ITP Comments

Sorry these are so late. I have a few little nits, but I am ignoring those right now. The biggest concern that I had was how we relate the take numbers to the new construction tables.

For example, Table 4-1 has modeled habitat loss for Swainson's hawk with a total loss of 14,175 acres. Table 5-1 shows this acreage as 14,080 acres with mitigation acres at 8,082 acres. But back on Table 7-1, we cost out 8,499 acres of permanent habitat loss for take. None of these numbers jive. And its not clear what the difference is or what we are asking for take for.

Same for the other species – sometimes in the text too. For example, above Table 4-2 we say take for tricolored is 4,155 acres of foraging and 0.5 nesting, but table 4-2 shows way different numbers and there is nothing to explain why or what is happening here. If these numbers should be different, then we need to be clear in the text why, what we are actually asking for in take, and why there are differences. We should also cross reference in the notes in the tables so that its super clear where the numbers come from, why they are different and what we are asking for in terms of take and mitigation provided. If these numbers are supposed to match, then we need to make adjustments to the document as most of them don't match at all.

Page 7-2 – Delete first paragraph on the LOC. I still don't understand why we need a LOC if we are committing to mitigate ahead of the impact. Isn't the LOC there in case we don't mitigate? But the mitigation would already be completed, so I don't understand why we would need to have a LOC.

Section 3.2.1.3 – This section makes commitments for Reclamation that should be changed to the Authority. The last two sentences in this section – we need to change Reclamation to Authority.

Construction schedule in section 3.2.12 is not consistent with the construction schedule back in Chapter 4. In Section 3.2.12, we say construction is 6 years, but back in Chapter 4, we should 8 years. Need to make these consistent and I think the 8 years is more accurate.

BMPs in Chapter 5 should be checked on last time against the Final EIR/EIS updates. Some of these have changed. I realize we cant keep chasing the changes, but lets done one last check for consistency.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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April 19, 2023

SITES RESERVOIR PROJECT – PROJECT PLANNING BIOLOGICAL AND CULTURAL FIELD WORK

Beginning April 20, 2024, the Sites Project Authority will be performing non-invasive wildlife, botanical, aquatic and cultural resources surveys within Glenn, Colusa, and Yolo Counties. The purpose of this effort is to conduct field investigations and surveys to obtain data and information needed to update and refine the general understanding of the biological and cultural resources within the areas that could be affected by the construction and operation of the reservoir. This information will be used to better understand the potential effects of the project and would be key to the preparation of permit applications for the proposed Sites Reservoir and associated facilities in the western Sacramento Valley. Surveys could occur on partner agency property, Bureau of Reclamation property, within the public right of way, or on private property with landowner approval. The various methods will be employed, including:

- Reconnaissance Cultural Resource Inventory: These surveys would document existing cultural resources within a pre-approved designated area by conducting a pedestrian survey, also known as a reconnaissance-level survey, to visually search a site and document any observable cultural resources. A “cultural resource” is defined as a district, site, building, structure, or object generally more than 50 years old. “Cultural resources” encompass everything from precontact Native American sites to historic-era refuse dumps to early 20th century buildings. When a resource is located, the cultural resources specialists will record a written description of the resource on standard California Department of Parks and Recreation cultural resource forms, map the location using a Global Positioning System (GPS) unit, and take photographs. No artifact collection or ground disturbing activities will occur during the inventory stage. If necessary, any future more extensive investigations (e.g., archaeological excavations) that could occur would be coordinated with the landowner on a case-by-case basis.
- Reconnaissance Biological Resource Surveys: These surveys would document existing biological, botanical, and aquatic resources within a pre-approved designated area by conducting a pedestrian survey, also known as a reconnaissance-level survey, to visually search a site and document baseline conditions of the site characterizing the existing biological resources (e.g., plants, animals, streams, wetlands and habitats). Biologists and botanists would traverse the approved project area in meandering transects to ensure full coverage of accessible areas mapping natural communities in the field with handheld GPS units and/or directly onto field maps. During the survey,



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a general inventory of plant and general wildlife species detected by sight, calls, tracks, scat, or other signs will be compiled. In some stream sections that have been pre-approved, physical measurements of the stream channel would be taken (e.g., width and depth cross sections), fish sampling could occur, and small flow and water quality loggers may be deployed to provide continuous measurement for use in determining the creek's annual flow regime and changes in water quality.

The investigations are not expected to have noise impacts or access impacts. Crews will be respectful of property boundaries and nearby property owners. The surveys would typically occur between 7 a.m. and 7 p.m. and could include weekend work.

About Sites Reservoir

Located 10 miles west of the town of Maxwell in the Antelope Valley of Glenn and Colusa Counties, the Sites Reservoir would be a 1.5 million acre-foot environmentally beneficial, off-river reservoir that will capture excess water from major storms, and save it for drier periods, helping California's farms, businesses, and cities to continue supplying reliable water when other sources are low.

When operated in coordination with other Northern California reservoirs such as Shasta, Oroville, and Folsom, which function as the backbone to both the Central Valley Project and the State Water Project, Sites Reservoir will increase the flexibility, reliability, and resiliency of statewide water supplies in drier periods.

Contact Information

For questions, comments, or more information about these activities, please contact Conner McDonald at 530-750-9912 and/or Conner@CMDWest.com. For more information about the project, please visit www.sitesproject.org.



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Sites Reservoir is generational opportunity to construct a multi-benefit water storage project that helps restore flexibility, reliability, and resiliency to our statewide water supply. Simply put, no other storage project currently under consideration in California can positively influence the operational efficiencies of our existing statewide water.

Perhaps what makes Sites Reservoir so unique is that it is not a “traditional” reservoir project. It is an off-stream facility that does not dam a major river system and would not block fish migration or spawning. Rather, Sites Reservoir offers a significant water storage opportunity that benefits both people and the environment.

Sites Reservoir captures and stores stormwater flows from the Sacramento River—after all other water rights and regulatory requirements are met—for release primarily in dry and critical years for environmental use and for California communities, farms, and businesses when it is so desperately needed. Sites Reservoir is designed to be adaptable to a changing climate. As snowpack declines due to climate change and more of our water comes in the form of atmospheric rivers – Sites Reservoir will become even more vital to the future resiliency of our statewide water supply.



How It Works

Located 10 miles west of the town of Maxwell in rural Glenn and Colusa counties, the Sites Reservoir would be an off-stream storage facility that captures and stores stormwater flows in the Sacramento River—after all other water rights and regulatory requirements are met—for release in dry and critical years for environmental use and for California communities, farms and businesses when it is so desperately needed.

When operated in coordination with other Northern California reservoirs such as Shasta, Oroville and Folsom, which function as the backbone to both the Central Valley Project and the State Water Project, Sites Reservoir will greatly increase flexibility, reliability and resiliency of statewide water supplies in drier periods.

With Sites Reservoir, California has a rare opportunity to enhance statewide water supplies and provide a dedicated allocation of water specifically for the environment.

It provides federal and state resource agencies with a dedicated and reliable supply of water they can manage to provide environmental benefits, especially during drier years.

A significant portion of the project's annual water supplies will be provided for environmental flows, which will help to improve conditions for Delta smelt; help preserve cold-water pools in Shasta later into the summer months to support salmon development, spawning and rearing; and improve Pacific Flyway habitat for migratory birds and other native species.

Sites Reservoir Fast Facts



Provide water for up to **1.5 million homes and businesses** for one year



Increases Sacramento Valley water storage capacity



Creates **reliable supplies** for environmental, agricultural, and municipal uses

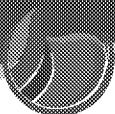


29 participating agencies representing communities across California



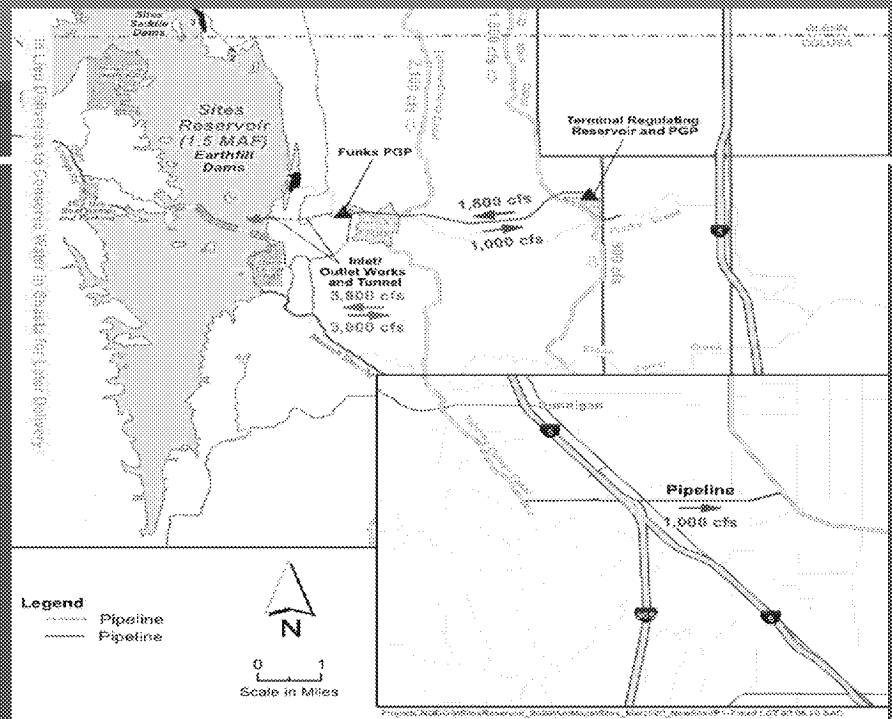
Sites Reservoir Benefits

- **Reliable dry-year water supply for California communities, farms and businesses**
- **Improved water quality**
- **Groundwater recharge**
- **Flood management**
- **Contribution to California's renewable energy goals**
- **Environmental water in drier periods for native fish and Pacific Flyway habitat for migratory birds and other native species**
- **Recreational opportunities**
- **Creation and protection of middle class jobs, including a large skilled work force during seven-year construction**



Support and Funding

Widely supported both regionally and statewide, the project has made significant progress. A bipartisan group of more than 175 organizations, agencies, businesses and elected officials support the Sites Reservoir Project. In 2018, the project was awarded \$816 million in funding from California's Proposition 1 water bond, and secured a \$449 million investment from the United States Department of Agriculture. The United States Bureau of Reclamation is also a significant project partner.



The Sites Reservoir would be an off-stream storage facility located 10 miles west of the town of Maxwell, California in rural Colusa County.

Sites Reservoir Participating Entities

Colusa County *
Colusa County Water District *
Glenn-Colusa Irrigation District *
Glenn County *
Placer County Water Agency &
City of Roseville *
Reclamation District 108 *
Sacramento County Water Agency &
City of Sacramento *
Tehama-Colusa Canal Authority *
Westside Water District *
TC 4 **
Western Canal Water District **
American Canyon, City of
Antelope Valley-East Kern Water Agency
CA Department of Water Resources
(Ex Officio)
Carter Municipal Water Company
Coachella Valley Water District
Cortina Water District
Davis Water District
Desert Water Agency
Dunnigan Water District
LaGrande Water District
Metropolitan Water District
San Bernardino Valley
Municipal Water District
San Geronimo Pass Water Agency
Santa Clara Valley Water District
Santa Clarita Valley Water Agency
US Bureau of Reclamation (Cost-share)
Wheeler Ridge-Maricopa Water
Storage District
Zone 7 Water Agency

* Authority Board Member
** Associate Board Member



What Makes Sites Reservoir Different?

Features	Benefits
Off-stream storage	Does not create barriers to native fish migration Improves local flood management Improved conservation of stored water to be available when it is needed most
Cooperative operations	Increases effectiveness and efficiency of existing water storage infrastructure
Sacramento Valley-led	Aligns with Sacramento Valley's values Authority will be an integral part of community Fosters regional and statewide collaboration
Beneficiary pays	Provides equity among participating partners Improves accountability and value creation
Federal and state agencies manage environmental water	Adaptable to current and future conditions and priorities Ensures federal and state environmental priorities are met—today and into the future
Adaptable to climate change	Operational flexibility to ensure the water will be applied to the highest beneficial uses despite an uncertain future

FOR MORE INFORMATION, PLEASE VISIT WWW.SITESPROJECT.ORG



April 19, 2023

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DSOD Technical Progress Meeting Notes



To: Sites Project Authority
CC: Henry Luu, P.E. (HDR)
Date: April 9, 2023
From: Benjamin Aldridge, P.E., G.E.; Mike Smith, P.E., G.E.
Subject: Notes from DSOD Meeting on April 6, 2023

Participants:

Mikhail Ermakovich	DSOD	Mike Smith	AECOM
Erik Malveck	DSOD	Ben Aldridge	AECOM
Wallace Lam	DSOD	Idit Zarchi	AECOM
Chris Tracy	DSOD	Mike Forrest	AECOM
David French	DSOD	Brendan O'Rourke	AECOM
Andrew Lutz	DSOD	Jeff Herrin	AECOM
Eddy C.	DSOD	Jeff Unruh	LCI
JP Robinette	Sites Project Authority	Ivan Wong	LCI
Henry Luu	HDR	Pete Rude	Jacobs
Dave Gutierrez	GEI	Wayne Ohlin	Jacobs

Introductory Comments

Erik (DSOD)

- There is a push on both sides (DSOD and Sites Authority) to finish the project in a timely manner
- DSOD would like the Authority and their consultants to work closely with DSOD to improve efficiency.
 - Submit information and informal TMs for review as they become available.
 - Have fewer large meetings that are difficult to coordinate.
- Preference to receiving materials prior to meetings so that DSOD can provide more substantial discussion.

Seismic Hazard Presentation (Jeff Unruh)

- Andy (DSOD): Question on northeast trending faults and other similar faults and their connection to the Fruto Fault:
 - Could the northeast trending faults rupture at the same time as the Fruto Fault, thus changing the energy in the event and/or the distance to the seismic source? Would the faults "channel" motions or cause other effects?
 - Jeff U. (LCI) notes that the max magnitude from these smaller faults is likely about M4
 - Chris T. (DSOD): What percent of slip occurs on the surface faults compared to the Fruto Fault? DSOD recommends we think of if those northeast trending faults (and similar) have primary versus secondary offset. (Fruto Fault: M7 at 6 km)

- AECOM team will update the analysis of this issue in the WLA (2002) report for the current Sites complex study.
- DSOD hasn't formally reviewed and accepted the 2002 WLA report.
- DSOD expressed concern/interest in the first blowoffs being at Funks Pumping Generating Plant (PGP) and TRR PGP and thus needing to cross several faults. They also expressed that their field branch may have an issue with having the pipes to TRR be jurisdictional.
 - Suggestion/discussion item: Put blowoffs closer to ridge forming the reservoir. These blowoffs could be in addition to the blowoffs at Funks PGP and TRR PGP if there are concerns of eroding the creek bed, and would provide system redundancy.
 - DSOD considers all reservoir infrastructure jurisdictional down to the nearest blowoff required to meet the emergency drawdown criteria.
- Andy (DSOD): Overview of DSOD review of seismic motion/hazard
 - DSOD will consider the amount of research and data available in an area and if less data is available possibly recommend higher design motions.
 - Blind thrust faults are difficult to classify and study, resulting in high uncertainty that may need to be addressed in the design.
 - DSOD may not agree that the northeast-trending GG and S faults will not contribute significantly to ground motions at the site.
 - DSOD may want higher return period motions due to lack of certainty in the models; uncertainty also exists in the return period estimates also exists (example Napa Earthquake where additional information lowered return period on some dams).
 - Will have risk-informed decision process to develop the motions.
- Chris T. (DSOD): Do we have our own custom seismic source model?
 - Yes, and we can share (not proprietary).
- DSOD: General comments
 - Should look at site-source distance for individual structures as needed.
 - Should consider risk for each structure when selecting motion (potentially use different motions for structures with different risk).
 - Perform deterministic analysis and then inform with probabilistic analysis.

PMF Study and Spillway Design Presentation (Idit Zarchi)

- An update on progress regarding the PMF study for a 1.5 MAF reservoir was presented.
- Two spillway configurations are being considered for Saddle Dam 8b at the 30% level of design:
 - An ogee crest weir at El. 498 ft.
 - An ogee crest weir at El. 504 ft with a notch (or lower spillway) at El. 498 ft
- The notched spillway is being considered in order to attenuate PMF flows in Hunters Creek (reduce flooding).
- Discussion of Notch:
 - Mikhail asked about the capacity of the notch.
 - Idit/Brendan: The design can be adjusted. At present a capacity of approximately 400 cfs with WSL is at El. 504 ft is being considered.
 - Erik noted that DSOD does not have immediate issues or concerns with a notched spillway
 - Erik noted it's important to consider secondary effects on the notch such as debris.
 - Idit/Brendan: The notch is currently assumed to be 10 ft wide.

Reservoir Outlets and Emergency Drawdown (Idit Zarchi)

- An update was provided on the storage-elevation curve for the reservoir.
 - Data from a 2022 Lidar survey was used to create a new storage-elevation curve at one (1) foot increments.
 - The overall reservoir capacity is about 2-3% less than what was considered in the 2004 storage-elevation curve.
- Work has been done on outlet size optimization. The following parameters were assessed: outlet tunnel lining, flow allocation between outlets, and emergency drawdown criteria.

- The assumed final tunnel lining at the feasibility level design (reinforced concrete) limited velocities per U.S. Bureau of Reclamation (Reclamation) guidelines.
 - The 30% design will include a steel liner for the tunnels, which will allow for greater velocities, therefore decreasing their diameters.
- Flow allocation between the two main outlets is being assessed considering a 50/50% instead of the 77/23% (from feasibility design) flow split between the I/O Works and the Sites outlet.
 - Sites Authority is in the process of assessing if this flow allocation is acceptable.
- Average discharges required to meet either the 7 or 10 day emergency drawdown were presented. A discussion on emergency drawdown is presented below.
- The emergency drawdown guidelines state that the reservoir must be drawn down "...by 10 percent within 7 or 10 days..." However, these are guidelines that can be assessed on a project by project basis and are typically applied to smaller reservoirs.
- Given the large size of Sites Reservoir, and the volumes that would need to be released in the upper 10% of reservoir storage, DSOD may consider a longer drawdown period.
- Sites Authority designers should present a case that considers how dam safety will be maintained.
 - Consider what failure modes we see in analyses on dam. Use this to help determine what level the reservoir needs to be drawn down to (how much of crest would be taken out with those failures? Cracking depth?).
 - DSOD would find it useful to see a flood map for the 10-day drawdown
 - Impacts from rapid drawdown around the outlets is important, less so for reservoir rim except where thin ridges exist (failure causes release of reservoir).
 - DSOD recommends looking at emergency drawdown guidance from Reclamation and the Army Corps, etc.
- A memorandum on emergency drawdown criteria should be submitted to DSOD for concurrence. State what drawdown criteria will be used for design and what mitigation measures will be taken in design, construction, and operation to reduce dam safety risks.
 - Before submitting we can have call with DSOD to discuss.
- DSOD said they can provide guidance by July 2023 if we get information to them (memo above) by mid-May.
- In a side conversation between Erik (DSOD) and Idit (AECOM), Erik mentioned we should also consider how much more drawdown ability we have compared to the inflow (mentioned one issue with Oroville was outlet couldn't drain reservoir faster than inflows) as well as the outlet's capacity relative to anticipated PMF flows.
- Emergency Drawdown Blowoff Locations
 - See discussion in seismic hazard portion of presentation (reiterated and discussed similar items during this presentation).

Final Comments/Questions

- Andy (DSOD): What is status of investigation (in relation to 30% design timeline)?
 - JP (Authority): Exploration program will ramp up over the next year.
 - DSOD Comments/requests:
 - Want detailed plan for fault trench for DSOD to review so we can make sure to get all the information we (including DSOD) need from the fault trenches.
 - DSOD expressed interest in going to the site (and possibly seeing the fault trenches?).

Action Items

- 1) Provide fault trench work plan to DSOD for their review.
- 2) Prepare and provide to DSOD an emergency drawdown criteria memo.
- 3) Provide current exploration schedule.
- 4) Provide Lidar data to DSOD.

DSOD Technical Progress Meeting Notes



Commented [LH1]: Use current Authority template at INT-TEM-Agenda and Minutes Combined-202011.docx

To: Sites Project Authority
CC: Henry Luu, P.E. (HDR)
Date: April 9, 2023
From: Benjamin Aldridge, P.E., G.E.; Mike Smith, P.E., G.E.
Subject: Notes from DSOD Meeting on April 6, 2023

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Wallace Lam	DSOD	Idit Zarchi	AECOM
Chris Tracy	DSOD	Mike Forrest	AECOM
David French	DSOD	Brendan O'Rourke	AECOM
Andrew Lutz	DSOD	Jeff Herrin	AECOM
Eddy C.	DSOD	Jeff Unruh	LCI
JP Robinette	Sites Project Authority	Ivan Wong	LCI
Henry Luu	HDR	Pete Rude	Jacobs
Dave Gutierrez	GEI	Wayne Ohlin	Jacobs

Introductory Comments

Erik (DSOD)

- There is a push on desire from both sides teams (DSOD and Sites Authority) to finish collaboratively deliver this project in an effective and timely manner.
- DSOD would like the Authority and their consultants to work closely with DSOD to improve efficiency.
 - Submit information and informal TMs for review as they become available.
 - Have fewer large meetings that are difficult to coordinate.
- Preference to receiving materials prior to meetings so that DSOD can provide more substantial substantive discussion.

Seismic Hazard Presentation (Jeff Unruh)

- Andy (DSOD): Question on northeast trending faults and other similar faults and their connection to the Fruto Fault:
 - Could the northeast trending faults rupture at the same time as the Fruto Fault, thus changing the energy in the event and/or the distance to the seismic source? Would the faults "channel" motions or cause other effects?
 - Jeff U. (LCI) notes that the max magnitude from these smaller faults is likely about M4

- Chris T. (DSOD): What percent of slip occurs on the surface faults compared to the Fruto Fault? DSOD recommends we think of it as the Site Project team evaluate whether the northeast trending faults (and similar) have primary versus secondary offset. (Fruto Fault: M7 at 6 km)
 - AECOM team will update the analysis of this issue in the WLA (2002) report for the current Sites complex study.
- DSOD hasn't formally reviewed and accepted the 2002 WLA report.
- DSOD expressed concern/interest in the first blowoffs being at Funks and TRR and thus needing to cross several faults. They also expressed that their field branch ~~may have an issue with having the pipes to will need to provide input if the TRR pipes are identified to be~~ jurisdictional.
 - Suggestion/discussion item: Put blowoffs closer to ridge forming the reservoir. These blowoffs could be in addition to the blowoffs at Funks and TRR if there are concerns of eroding the creek bed, and would provide system redundancy.
 - DSOD considers all reservoir infrastructure jurisdictional down to the nearest blowoff required to meet the emergency drawdown criteria.
- Andy (DSOD): Overview of DSOD review of seismic motion/hazard
 - DSOD will consider the amount of research and data available in an area and if less data is available possibly recommend higher design motions.
 - Blind thrust faults are difficult to classify and study, resulting in high uncertainty that may need to be addressed in the design.
 - DSOD may not agree that the northeast-trending GG and S faults will not contribute significantly to ground motions at the site.
 - DSOD may want higher return period motions due to lack of certainty in the models; uncertainty also exists in the return period estimates also exists (example Napa Earthquake where additional information lowered return period on some dams).
 - Will have risk-informed decision process to develop the motions.
- Chris T. (DSOD): Do we have our own custom seismic source model?
 - Yes, and we can share (not proprietary).
- DSOD: General comments
 - Should look at site-source distance for individual structures as needed.
 - Should consider risk for each structure when selecting motion (potentially use different motions for structures with different risk).
 - Perform deterministic analysis and then inform with probabilistic analysis.

PMF Study and Spillway Design Presentation (Idit Zarchi)

- An update on progress regarding the PMF study for a 1.5 MAF reservoir was presented.
- Two spillway configurations are being considered at the 30% level of design:
 - An ogee crest weir at El. 498 ft.
 - An ogee crest weir at El. 504 ft with a notch (or lower spillway) at El. 498 ft
- The notched spillway is being considered in order to attenuate PMF flows in Hunters Creek (reduce flooding).
- Discussion of Notch:
 - Mikhail asked about the capacity of the notch.
 - Idit/Brendan: The design can be adjusted. At present a capacity of approximately 400 cfs with WSL ~~is~~ at El. 504 ft is being considered.
 - Erik noted that DSOD does not have immediate issues or concerns with a notched spillway
 - Erik noted it's important to consider secondary effects on the notch such as debris.
 - Idit/Brendan: The notch is currently assumed to be 10 ft wide.

Reservoir Outlets and Emergency Drawdown (Idit Zarchi)

- An update was provided on the storage-elevation curve for the reservoir.
 - Data from ~~a the Sites Authority~~ 2022 Lidar survey was used to create a new storage-elevation curve at one (1) foot increments.

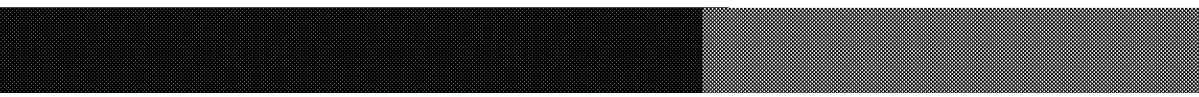
- The overall reservoir capacity is about 2-3% less than what was considered in the 2004 storage-elevation curve.
- Work has been done on outlet size optimization. The following parameters were assessed: outlet tunnel lining, flow allocation between outlets, and emergency drawdown criteria.
 - The assumed final lining at the feasibility level design (reinforced concrete) limited velocities per Reclamation guidelines.
 - The 30% design will include a steel liner for the tunnels, which will allow for greater velocities, therefore decreasing their diameters.
 - Flow allocation between the two main outlets is being assessed considering a 50/50% flow split between the I/O Works and the Sites outlet.
 - Sites Authority is in the process of assessing if this flow allocation is acceptable.
 - Average discharges required to meet either the 7 or 10 day emergency drawdown were presented. A discussion on emergency drawdown is presented below.
- The emergency drawdown guidelines state that the reservoir must be drawn down "...by 10 percent within 7 or 10 days..." However, these are guidelines that can be assessed on a project by project basis and are typically applied to smaller reservoirs.
- Given the large size of Sites Reservoir, and the volumes that would need to be released in the upper 10% of reservoir storage, DSOD may consider a longer drawdown period.
- Sites Authority designers should present a case that considers how dam safety will be maintained.
 - ~~Consider what failure modes we see in analyses on dam. Use this to evaluate potential failure modes and consequence analysis to help determine justify preferred design approach what level the reservoir needs to be drawn down to (e.g., how much of crest would be taken out with those due to failures? Cracking depth?).~~
 - DSOD would find it useful to see a flood map for the 10-day drawdown
 - Impacts from rapid drawdown around the outlets is important, less so for reservoir rim except where thin ridges exist (failure causes release of reservoir).
 - DSOD recommends looking at emergency drawdown guidance from other jurisdictional public agencies such as Reclamation and the Army Corps, etc.
- A memorandum on emergency drawdown criteria should be submitted to DSOD for concurrence. State what drawdown criteria will be used for design and what mitigation measures will be taken in design, construction, and operation to reduce dam safety risks. Identify analyses that will be undertaken to support design approach/assumptions.
 - Before submitting we can have call with DSOD to discuss.
- DSOD said they can provide guidance by July 2023 if we get information to them (memo above) by mid-May.
- In a side conversation between Erik (DSOD) and Idit (AECOM), Erik mentioned we should also consider how much more drawdown ability we have compared to the inflow (mentioned one issue with Oroville was outlet couldn't drain reservoir faster than inflows) as well as the outlet's capacity relative to anticipated PMF flows.
- Emergency Drawdown Blowoff Locations
 - See discussion in seismic hazard portion of presentation (reiterated and discussed similar items during this presentation).

Final Comments/Questions

- Andy (DSOD): What is status of investigation (in relation to 30% design timeline)?
 - JP (Authority): Exploration program will ramp up over the next year.
 - DSOD Comments/requests:
 - Want detailed plan for fault trench for DSOD to review so we can make sure to get all the information we (including DSOD) need from the fault trenches.
 - DSOD expressed interest in going to the site (and possibly seeing the fault trenches?).

Action Items

- 1) Provide fault trench work plan to DSOD for their review.

- 
- 2) Prepare and provide to DSOD an emergency drawdown criteria memo.
 - 3) Provide current exploration schedule.
 - 4) Provide Lidar data to DSOD.

Sites Reservoir Project Overview

San Jose Chamber of Commerce
Water Committee

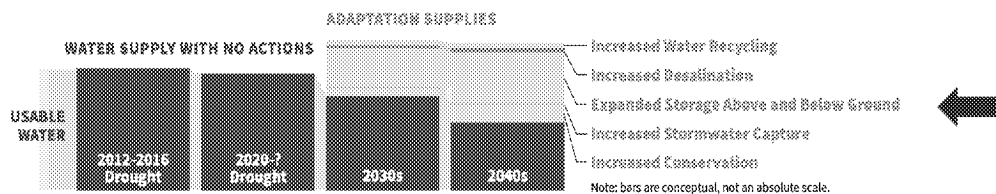
April 24, 2023



What Problem Does the Sites Project Help Solve?

Over the next 20 years, California could lose 10 percent¹ of its water supplies.

Our climate has changed, and the West continues to get hotter and drier. As it does, we will see on average less snowfall, more evaporation, and greater consumption of water by vegetation, soil, and the atmosphere itself.



In previous droughts the ratio of precipitation to evaporation to runoff has been similar. However, as temperatures rise, evaporation increases, with the consequence of a fall in runoff. As average temperatures continue to increase, the increase in evaporation will continue, with a concurrent drop in runoff.

Excerpted from Aug 2022 "California's Water Supply Strategy, Adapting to a Hotter Drier Future"

'What if we had Sites?' – most recent storms update

- Revised estimate for January 2023 storms - ~250,000af
- Current March-April 2023 forecasted filling is ~250,000af
- If spilling occurs from Lake Shasta, filling opportunities could continue
- Sites team will continue to monitor conditions and adjust forecasts as needed
- Real time monitoring continues to show Project capabilities are in line with modeling projections



A Walk Down Memory Lane....

1957: DWR publishes Bulletin No. 3 – The California Water Plan. Includes ~5MAF Golden Gate Dam and Reservoir (the precursor to Sites Reservoir).

1962-2009: Various efforts by Reclamation and DWR to develop the “NODOS” (CALFED) Project. All efforts are unsuccessful.

2010: The Sites Project Authority is formed. Initiates the Sites Reservoir Project as a local led project.

2014: Proposition 1 is passed by voters dedicating \$2.7 billion to water storage projects.

2015 - 2016: Local and out-of-area public water agencies become investors in the Project.

2017 : Draft EIR/EIS released covering a 1.8 MAF reservoir. Significant public comment.

2018: California Water Commission conditionally awards Proposition 1 funds. Sites awarded \$816 million- the largest award given to any storage project.

2019-2020: Sites Project Authority conducts “Value Planning Process”. Achieves an affordable/permittable project.



Sites Project Authority

- Joint Powers Authority established under California law
- Authority member agencies located in the Sacramento Valley
- Reservoir Committee made up statewide agencies investing in the Sites Project
- The Sites Project Authority will own and operate Sites Reservoir

Board of Directors:

Colusa County
Colusa County Water District
Glenn County
Glenn-Colusa Irrigation District
Placer County Water Agency/City of Roseville
Reclamation District 108
Sacramento/Sac County Water Agency
Tehama-Colusa Canal

Our Strength is in Our Broad Statewide Participation

Sacramento Valley

City of American Canyon
Colusa County
Colusa County Water Agency
Cortina Water District
Davis Water District
Dunnigan Water District
Glenn County
Glenn-Colusa Irrigation District
LaGrande Water District
Placer County Water Agency
Reclamation District 108
City of Roseville
Sacramento County Water Agency
City of Sacramento
Tehama-Colusa Canal Authority
Westside Water District
Western Canal Water District

Bay Area

Santa Clara Valley Water District
Zone 7 Water Agency

San Joaquin Valley

Wheeler Ridge-Maricopa Water Storage
District
Rosedale-Rio Bravo Water Storage
District

Southern California

Antelope Valley - East Kern Water
Agency
Coachella Valley Water District
Desert Water Agency
Irvine Ranch Water District
Metropolitan Water District
San Bernardino Valley Municipal Water
District

Waiting List

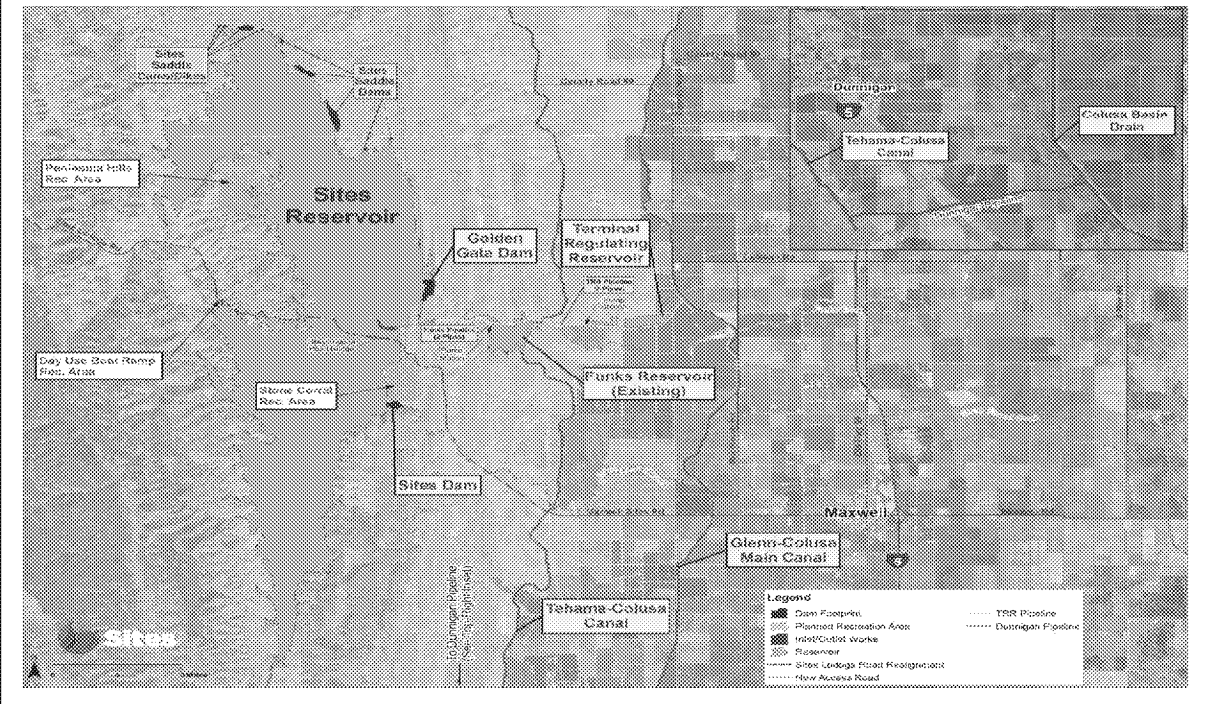
Cal-Am Sacramento
City of Napa
Delta View WDA
Glenn County
La Cumbre MWC
Madera County
Pacific Resources MWC
Palmdale WD
Santa Clara Valley WD
Western Municipal WD
Westlands WD
Wheeler Ridge Maricopa WSD
Woodland Davis CWA



Overview of Sites Reservoir Project

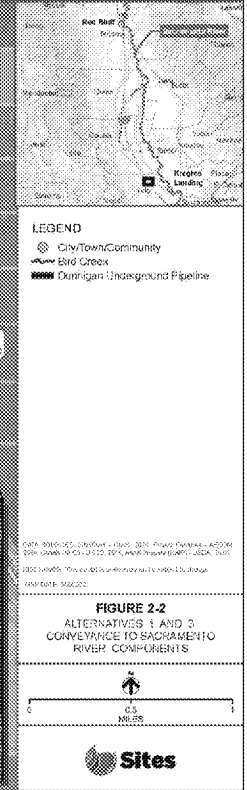
- The Project is a multi-benefit, beneficiary pays off-stream surface storage project that will help provide needed flexibility, reliability and resiliency to California's water supply
- **The Project will capture and store stormwater flows from the Sacramento River (after all other water rights and regulatory requirements are met) for release primarily in dry and critical years for California communities, farms, and ecosystems.**
- The Project will use existing intakes with state-of-the-art fish screens. Diversions would only occur when permitted river flows exist that are protective of the river and Delta aquatic species
- The Sites Authority has applied for a new water right to divert water from the Sacramento River at Red Bluff and Hamilton City.
- The Project includes about 180 miles of conveyance. Only about 20 miles is new facilities. The remainder is shared existing infrastructure.
- **Sites water will be conveyed "through Delta" to southern California participants - not reliant upon the proposed Delta Conveyance Project.**
- The Project is climate resilient; it does not rely on snowmelt but will capture winter river runoff from uncontrolled streams below existing reservoirs in the Sacramento Valley
 - As such, it will inherently adapt to future climate conditions and will be operated to improve water supply resilience to predicted changes in weather

Project Facilities

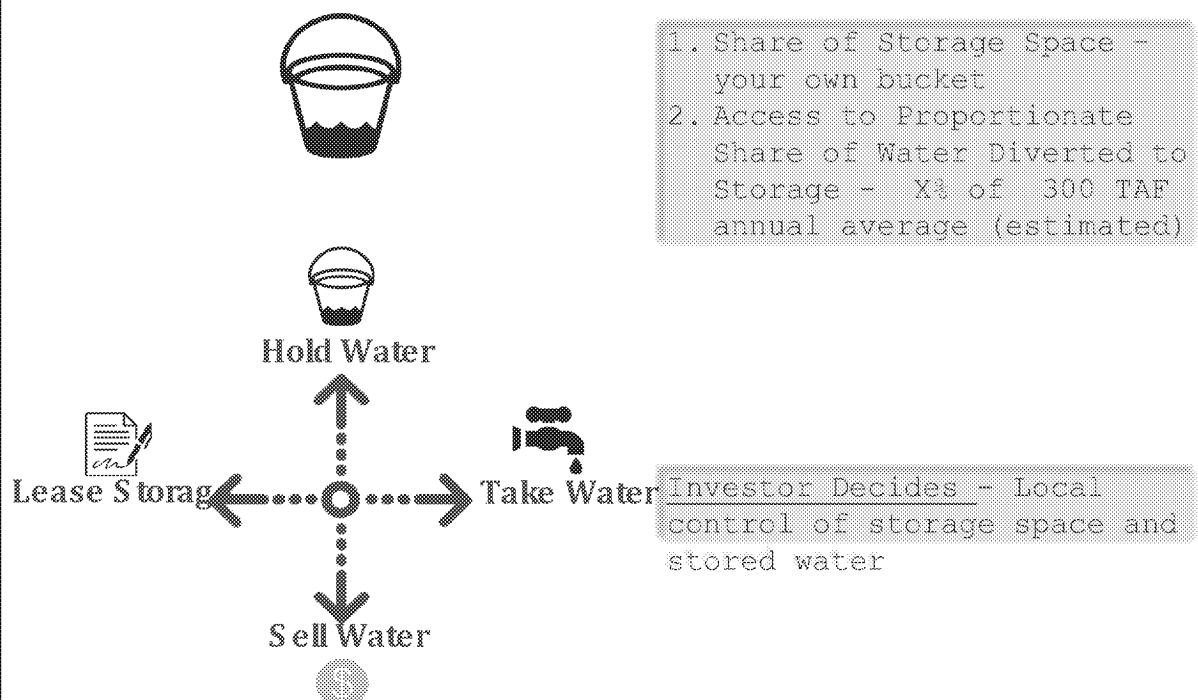


The map shows the Colusa Basin area with the following labels:

- Dunsmuir
- Tehama-Colusa Canal
- Dunsmuir/CC Intake
- Bird Creek
- Colusa Basin Drain
- Colusa Basin Drain Discharge
- Colusa Basin Evaporation
- Colusa Basin Drain Discharge

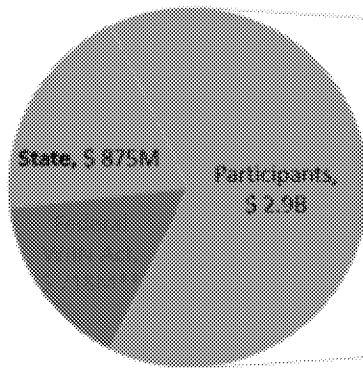


What Do You Get With Your Investment in Sites Reservoir?

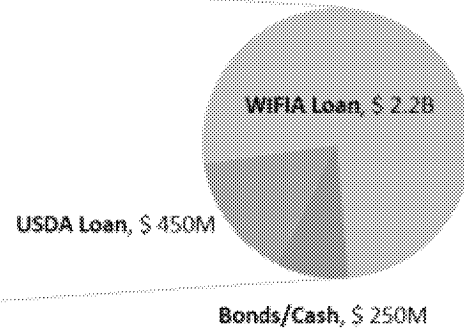


Project Funding Sources

Project Investors



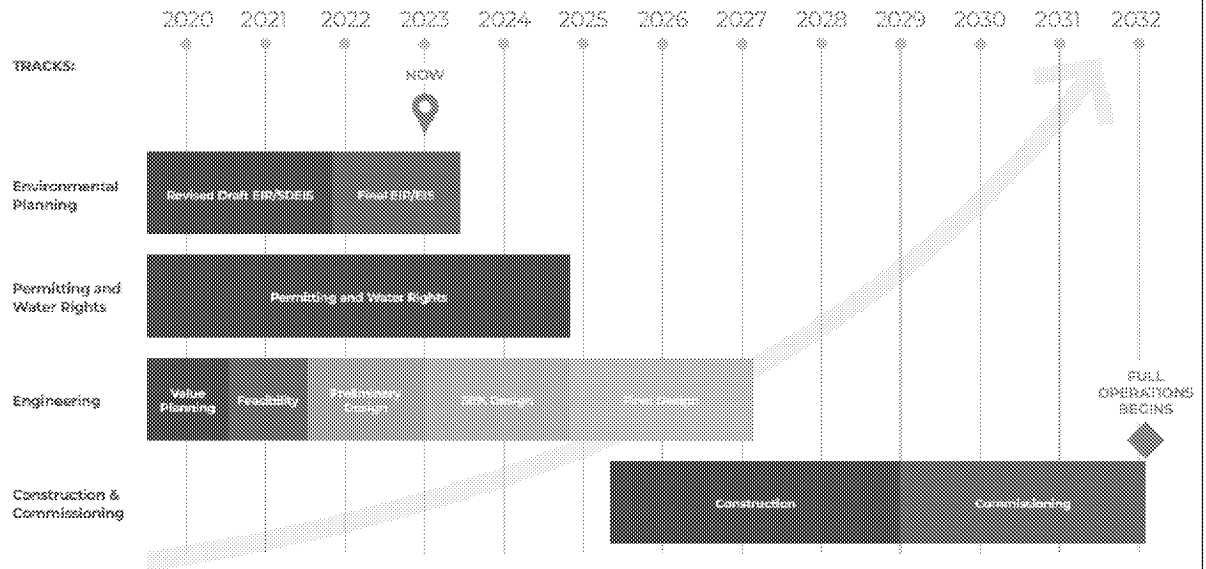
Participant Funding Sources



**WIFIA Act funding is based on 16% Reclamation investment under Alternative 3 (Preferred Project) and is reported in future dollars.

Project Schedule

Sites Reservoir Project Schedule



Draft - Predecisional Working Document - For Discussion Purposes Only

12

Speaker: Laurie

Draft - Predecisional Working Document - For Discussion Purposes Only

What is the Sites Authority's 'Ask'?

- Support your local water district's efforts to secure reliable, sustainable water supplies for your area including supporting revenue increases needed to pay for projects.
- Publicly express your support for the Sites Project where appropriate – upcoming potential opportunities include:
 - Water Rights Noticing – May 2023
 - EIR/EIS Final Approval – August 2023
 - Federal Appropriations and State Budget Funding - Ongoing
- Sites Authority would like to hear from you if there are any concerns or questions. The Sites team pledges to work in an open and transparent manner to constructively solve challenges and explore opportunities.
- Sites Authority believes that working together, we will get this project built within the next decade.



Questions



Upcoming Challenges and Opportunities



Environmental Planning & Permitting Update

- Environmental Impact Report
 - 2017 Draft Document
 - 2021 Revised Draft document
 - Released for public review in November 2021
 - Comment period closed in January 2022
 - 2023 Final document
 - Expected in June 2023
 - All concerns evaluated
 - Revisions to 2021 draft included
 - Response to comments
- Water Right Permit
 - Submitted application to State Board in May 2022
 - Expect Board to complete review and notice for public review/protests in April 2023

Engineering Update

- **2021** - Completed the Feasibility Analysis
 - The California Water Commission Determined the Project is Feasible
- **2022-2024** - Conducting Field Studies
 - Survey Mapping & Geotechnical Investigations to Inform Preliminary Engineering Analysis and Design
- **2024** - Complete 30% Design
 - Update Project Cost Estimate
- **2024** and Beyond - Key Agency Reviews and Approvals
- **2025** - Begin Construction

Real Estate Update

- Coordinating with Landowners on the project design. Two most frequently asked questions:
 - anticipated land needs and
 - timing for acquisition
- Securing Temporary Rights of Entry (TROE) and other agreements to conduct necessary technical field activities
- Having acquisition discussions on key project parcels or parcels associated with major project infrastructure
- Acquisition transactions not likely to occur sooner than 2024.

Summary of Water Availability Results

Approach	Result Take-away	Annual Average Available (AFY)	Max Water Available (AF)
Historical	Water available in all year types* and 18 of 22 years	748,000	3,879,000
CalSim II			
Historical hydrology	Water available in all year types and 74 of 82 years	1,448,000	5,249,000
Climate change -- 2035 Central Tendency	Water available in all year types and 73 of 82 years	1,518,000	5,330,000
Climate change -- 2070 Central Tendency	Water available in all year types and 70 of 82 years	1,455,000	5,176,000
Unimpaired Flow -- Based on Reclamation's Alternative 4 in their 2019 Reconsultation EIS	Water available in all year types and 73 of 82 years	1,518,000	5,330,000
Face Value	Water available mainly in wet and above normal years and 55 of 93 years	1,118,000	8,681,000

*Based on the Sacramento Valley Water Year Index (40-30-30 Index)

Summary of WRLCM Results

- The Project has a slightly positive effect on winter-run with the potential to increase the overall population
- Benefits to winter-run are associated with periodic reductions in late summer water temperatures that decreases salmon egg mortality
 - Likely driven mostly by Reclamation's investment and exchanges with Reclamation
- Model runs included Alternative 3 with Reclamation investment at both a 25% (Alt 3A) and 16% (Alt 3B)
 - Alt 3A has slightly greater benefits than Alt 3B

Draft - Predecisional Working Document - For Discussion Purposes Only

20

Speaker: Ali

Draft - Predecisional Working Document - For Discussion Purposes Only

Overview of Amendment 3 Participants

- Participants generally include large urban water wholesalers downstream ("South of Delta") and small agricultural districts primarily located in the Sacramento Valley ("North of Delta")

- South of Delta participants comprise 59% of Participants and 76% of total Project subscriptions

- North of Delta participants comprise 41% of Participants and 24% of total Project subscriptions

- 65% of total Project subscriptions are rated A or higher by S&P

- Four Participants (Metropolitan Water District of Southern California, San Bernardino Valley Municipal Water District, Zone 7 Water Agency, and Coachella Valley Water District) are rated AAA/AA+ by S&P and account for 55% of total Project subscriptions

- The single largest user of water from Sites is the ecosystem portion of the State's Prop 1 investment.

Sites Amendment 3 Participants	Acre Foot Participation
Antelope Valley-East Kern WA	500
City of American Canyon	4,000
Coachella Valley WD	10,000
Colusa County*	10,000
Colusa County WD*	9,256
Cortina WD*	450
Davis WD*	2000
Desert WA	6,500
Dunnigan WD*	2972
Glenn-Colusa ID*	5000
Irvine Ranch WD	1,000
La Grande WD*	1000
Metropolitan Water District of SC	50,000
Reclamation District 108*	4000
Rosedale-Rio Bravo WD	500
San Bernardino Valley Municipal WD	21,400
San Geronio Pass WA	14,000
Santa Clara Valley WD	500
Santa Clarita Valley WA	5,000
Westside WD*	5375
Wheeler Ridge - Maricopa WSD	3050
Zone 7 WA	10,000
Total	166,503

*Denotes North of Delta participant

Denotes agricultural participant

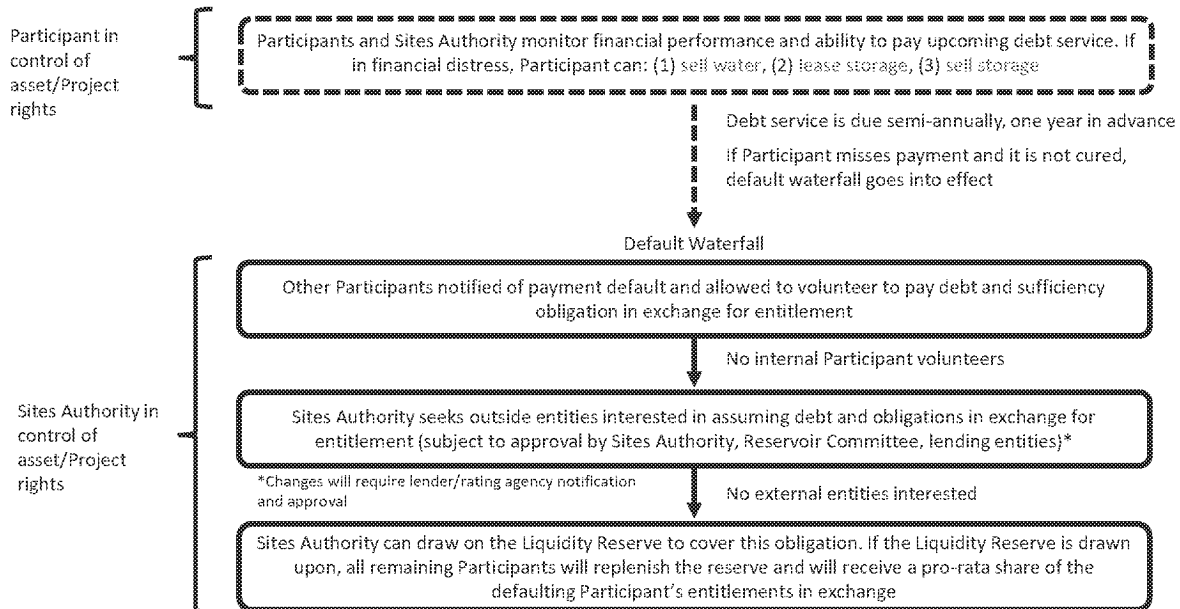
Securing Revenue to Meet WIFIA Loan Debt Service

- Prior to execution of the WIFIA loan, Sites Authority will enter into a Sites Reservoir Benefits and Obligations Contract (Contract) with Participants that will require Participants to collect revenue sufficient to fund their share of pooled debt service
- Participants have several potential sources of funds that can be used to meet Project financial obligations: (1) include costs on Participant's DWR State Water Project Annual Statement of Charges; (2) levy benefit assessments or other land-based charges; (3) incorporate costs into water rates and charges; or (4) pay-go their share of costs

Rates and Charges or Benefit Assessment (with or without Prop 218)	Land-Based Charges	State Water Project Statement of Charges (through property taxes)
City of American Canyon	Colusa County ¹	Antelope Valley-East Kern
Glenn Colusa Irrigation District	Colusa County WD	Coachella Valley WD
Irvine Ranch Water District ³	Cortina WD	Desert WA
MWD of Southern California	Davis WD	San Bernardino Valley MWD
Santa Clara Valley WD	Dunnigan WD	San Geronio Pass WA
Santa Clarita Valley WA	La Grande WD	
Reclamation District 108 ¹	Reclamation District 108 ¹	
Rosedale-Rio Bravo WSD	Westside WD	
Zone 7 WA	Wheeler Ridge Maricopa WSD ²	
Notes:		
1. Still to be determined whether using Rates and Charges or District-wide land-based charges		
2. Land-based charges imposed via recorded Benefits and Obligations Contracts on Certain Lands		
3. Irvine Ranch Water District is exploring funding its share of capital costs separately from the group participating in the pooled Loan borrowing, but is currently included in the group financing for purposes of the pro forma		
4. Colusa County is exploring funding its share of capital costs as a General Fund obligation		

Summary of Key Security Covenants/Terms

- Contract will also include a default “waterfall” process that will be utilized if a Participant fails to pay by the due date. If Participant efforts outlined below are not successful, the Authority will have the right to suspend or terminate the Contract, including selling water and storage



Discuss JPA rights in case of default

Project Next Steps/Goals: 2022 - 2024

- ✓ Secure Final Prop 1 Funding award with CWC
- ✓ Execute Final Operations Agreement
- ✓ Secure WIIN and BIL Federal Funding
- ✓ Complete WIFIA/USDA Loan Agreements
- ✓ Execute Benefits and Obligations Contracts
- ✓ Complete Final EIR/EIS
- ✓ Obtain Critical Environmental Permits (BO, ITP, 404)
- ✓ Receive Water Right Order and Permit
- ✓ Obtain Local Agency Agreements and Permits
- ✓ Execute Benefits Contracts with DWR and 

Project Next Steps/Goals: 2022 - 2024

- ✓ Develop Mitigation Acquisition Master Plan
- ✓ Initiate Application for DSOD Permit to Construct
- ✓ Advance Engineering Design to achieve Level 3 cost estimate
- ✓ Determine Procurement and Delivery Strategy
- ✓ Determine Overall Project Schedule
- ✓ Develop and Implement Land Acquisition Master Plan
- ✓ Conduct Geotech Investigations and Evaluations
- ✓ Perform Geotech Evaluation of all "Willing Seller" Properties
- ✓ Determine Organization Structure and Governance



Sites Imported Aggregate Briefing

April 20, 2023

Agenda

- Project Description
- Dam Filter, Drain and Transition Zones
- Road Base
- Concrete Aggregate
- Summary of Quantities
- Questions

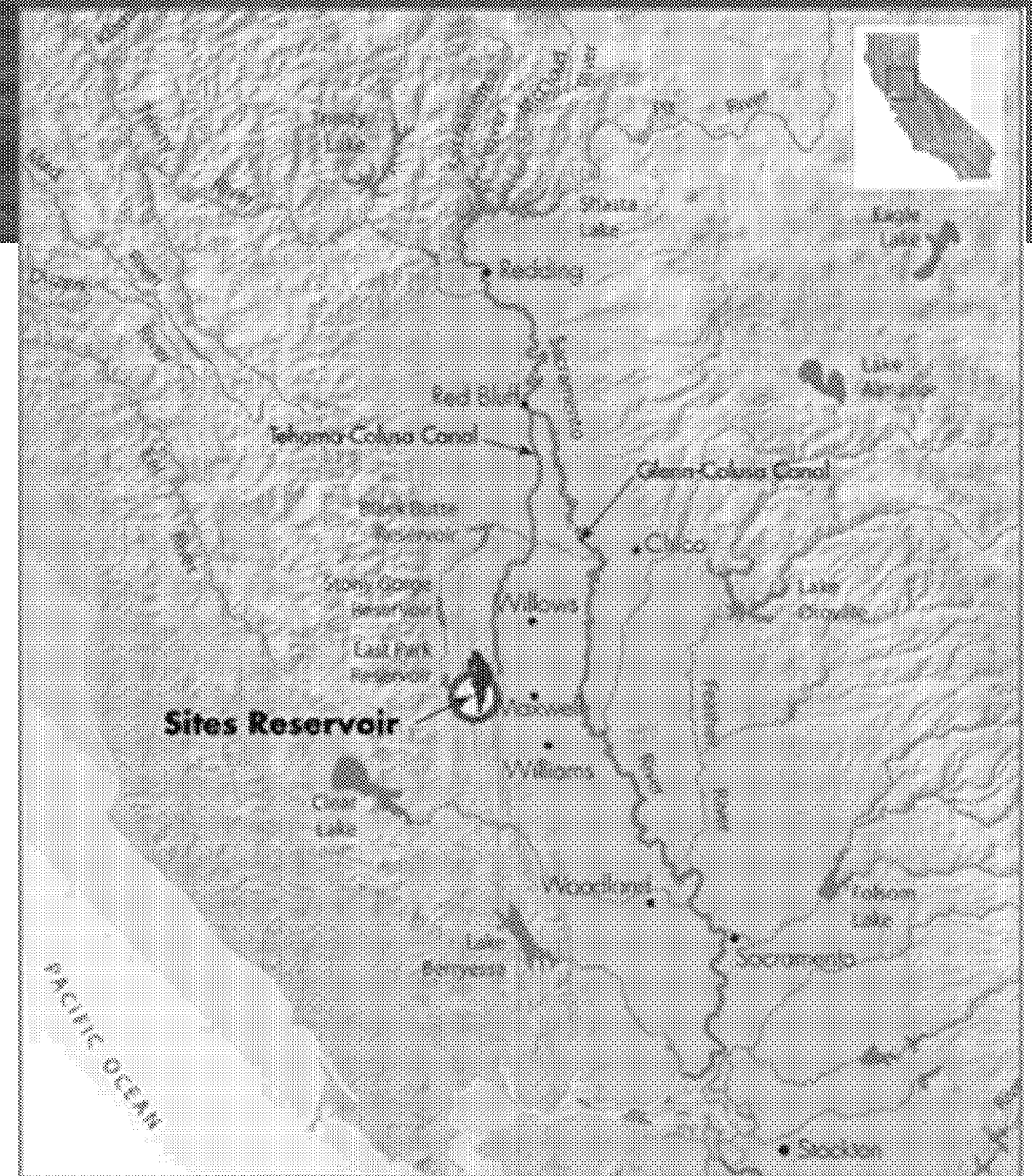
Project Description

Project Location

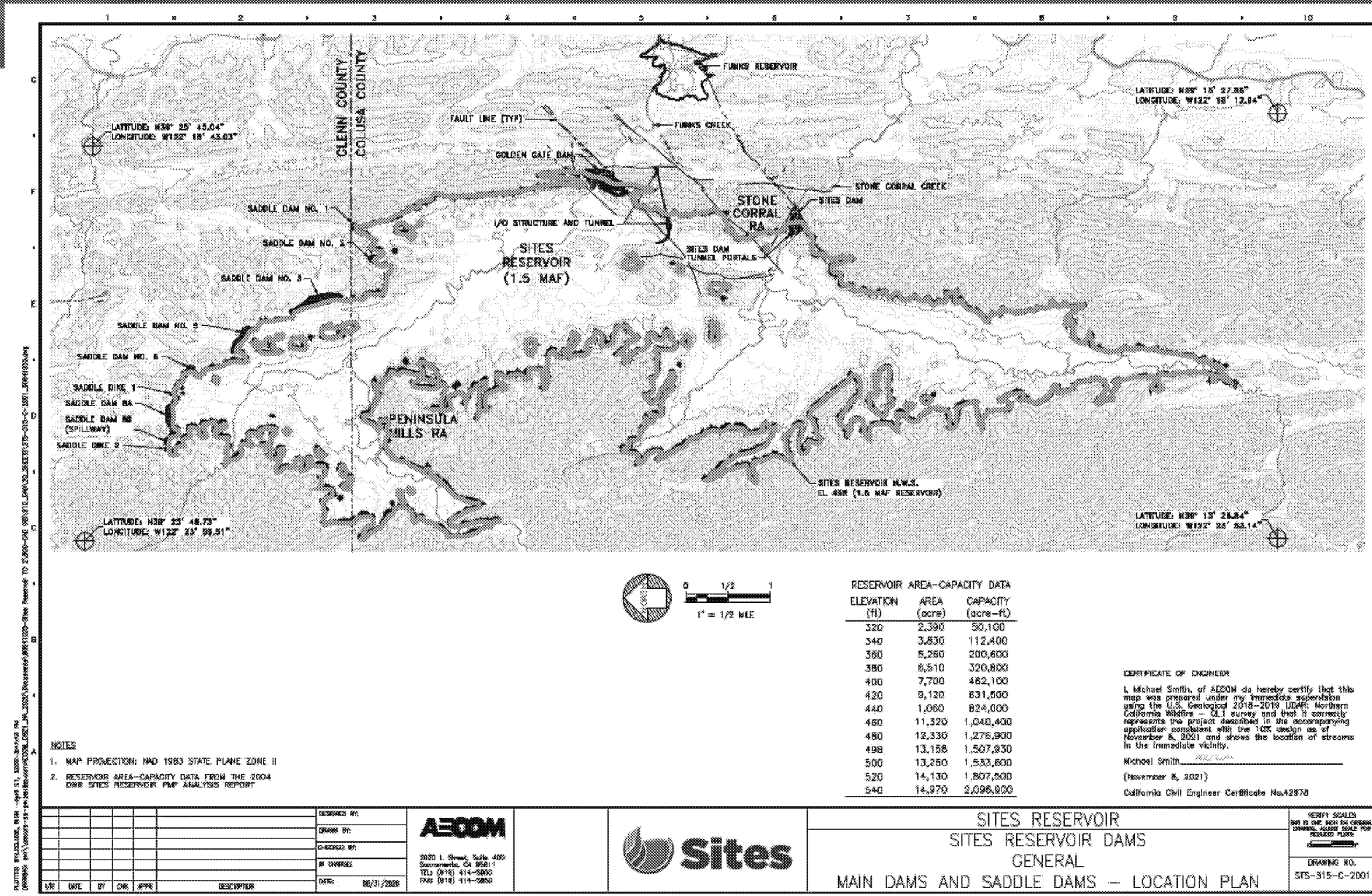
80 miles north of Sacramento

10 miles west of Maxwell

45 miles south of Orland



Sites Reservoir Features

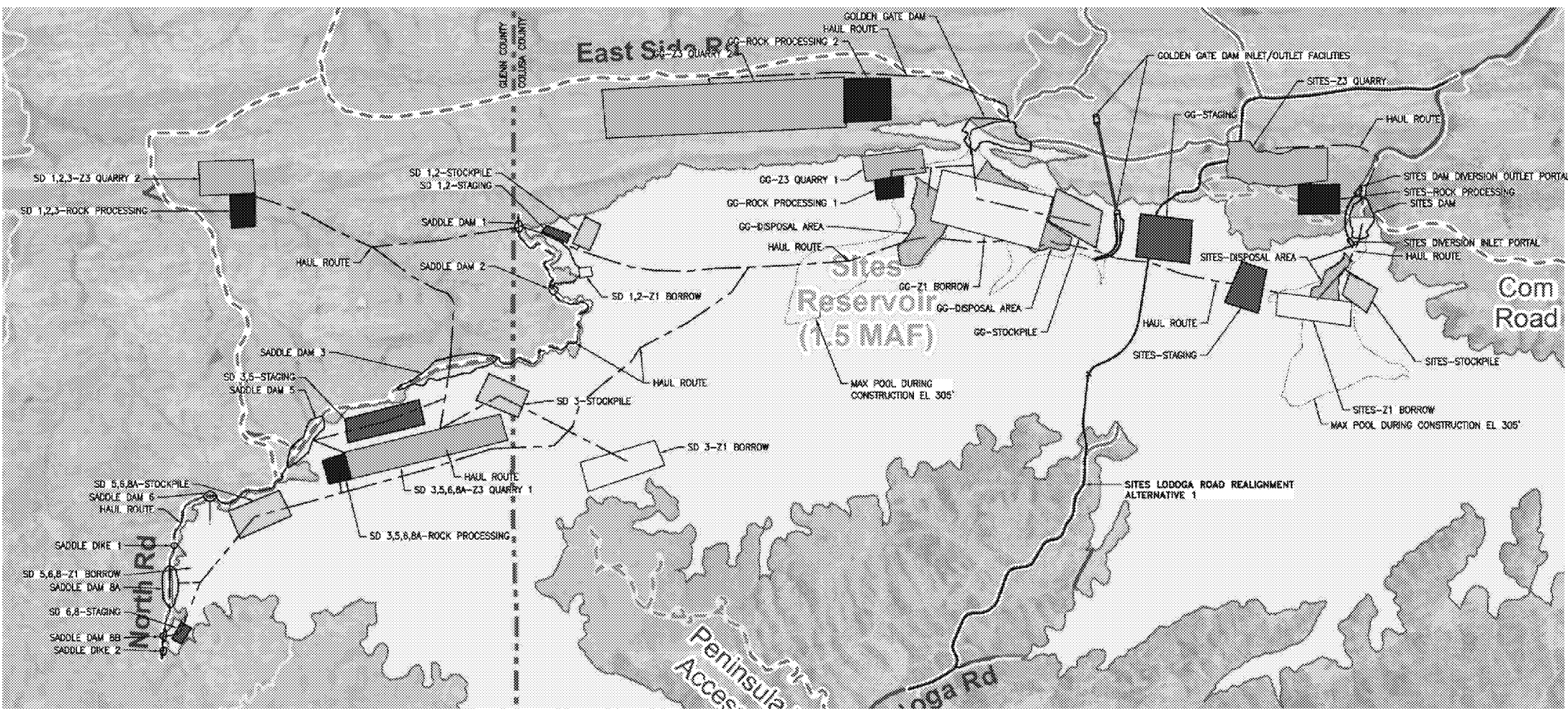


Sites Reservoir Features

Total Storage Capacity	1.5 MAF
Active Storage Capacity	1.4 MAF
Approximate Inundation Area	13,200 acres
Approximate Watershed Area	54,150 acres (84.6 mi ²)
Dam/Saddle Dam/Dike Crest Elevation (Without Camber)	517 feet
Dam Heights (approx. - max. ht. above streambed): Golden Gate Dam Sites Dam 7 Saddle Dams*/2 Saddle Dikes (for freeboard)	287 feet 267 feet 12 – 107 feet
Maximum Operating Water Elevation	498 feet
Minimum Operating Water Elevation	340 feet
Top of Dead Pool	300 feet
Inlet/Outlet Facilities:	
I/O Tunnel (single), with sloping intake (south of GG Dam)	32 feet ID
Sites Diversion Tunnel (north abutment of Sites Dam)	12 feet ID

* Saddle Dam 8B is the spillway location.

Sites Reservoir Features – Construction



LEGEND

- BORROW AREA
- DISPOSAL AREA
- STAGING AREA
- STOCKPILE AREA
- ROCK PROCESSING AREA
- QUARRY AREA
- HAUL ROUTE

NOTES

1. FOR OFFSITE BORROW AREA SEE DRAWING STS-315-C-2002
2. FOR LARGER VIEW SEE DRAWING STS-315-C-2003
3. POTENTIAL BORROW SITES ARE FROM DWR, 2002

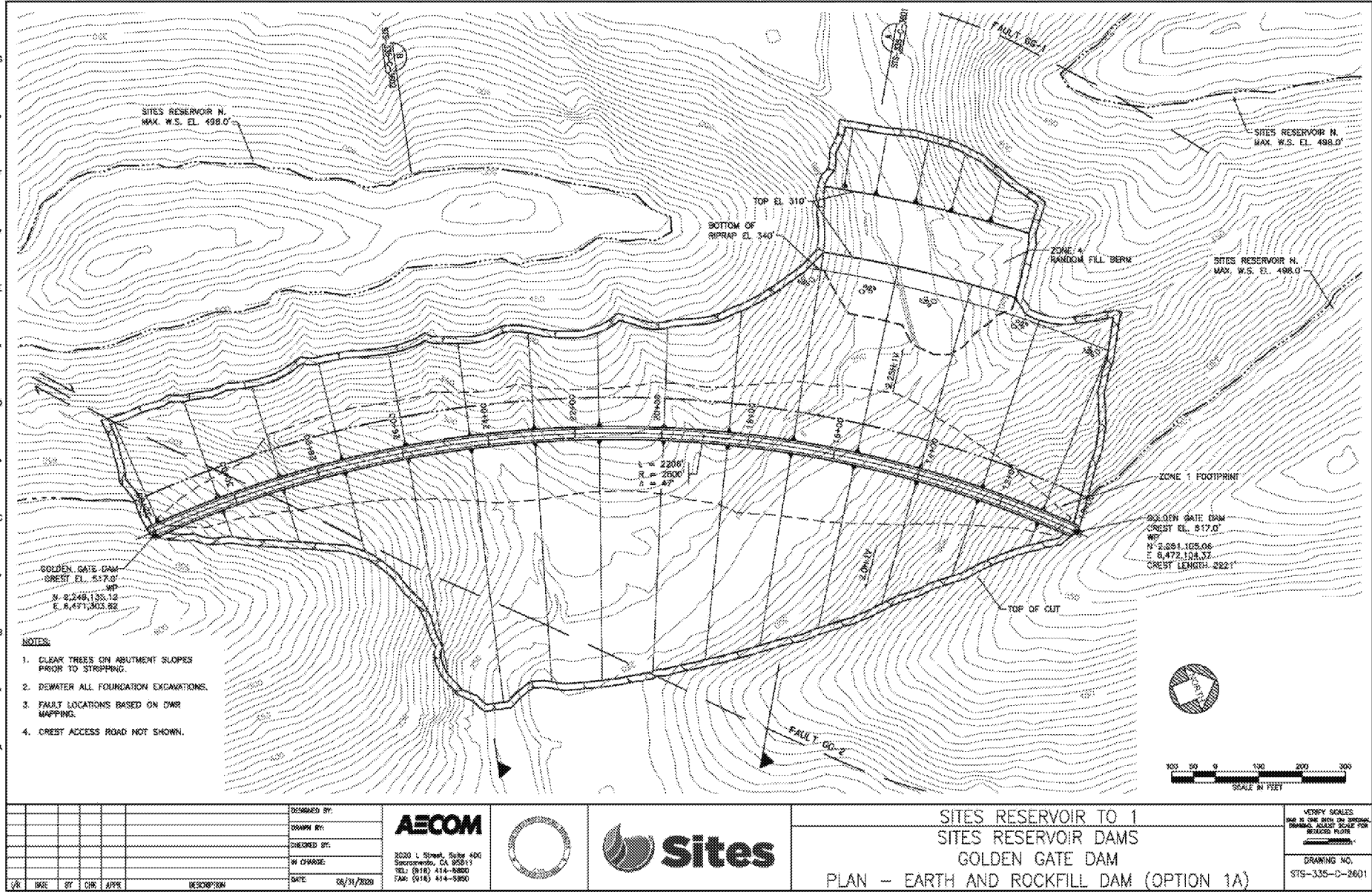
HAUL ROUTES, BORROW, DISPOSAL, STOCKPILE, STAGING, AND ROCK PROCESSING AREAS (EXPANDED VIEW)

SCALE: 1" = NTS

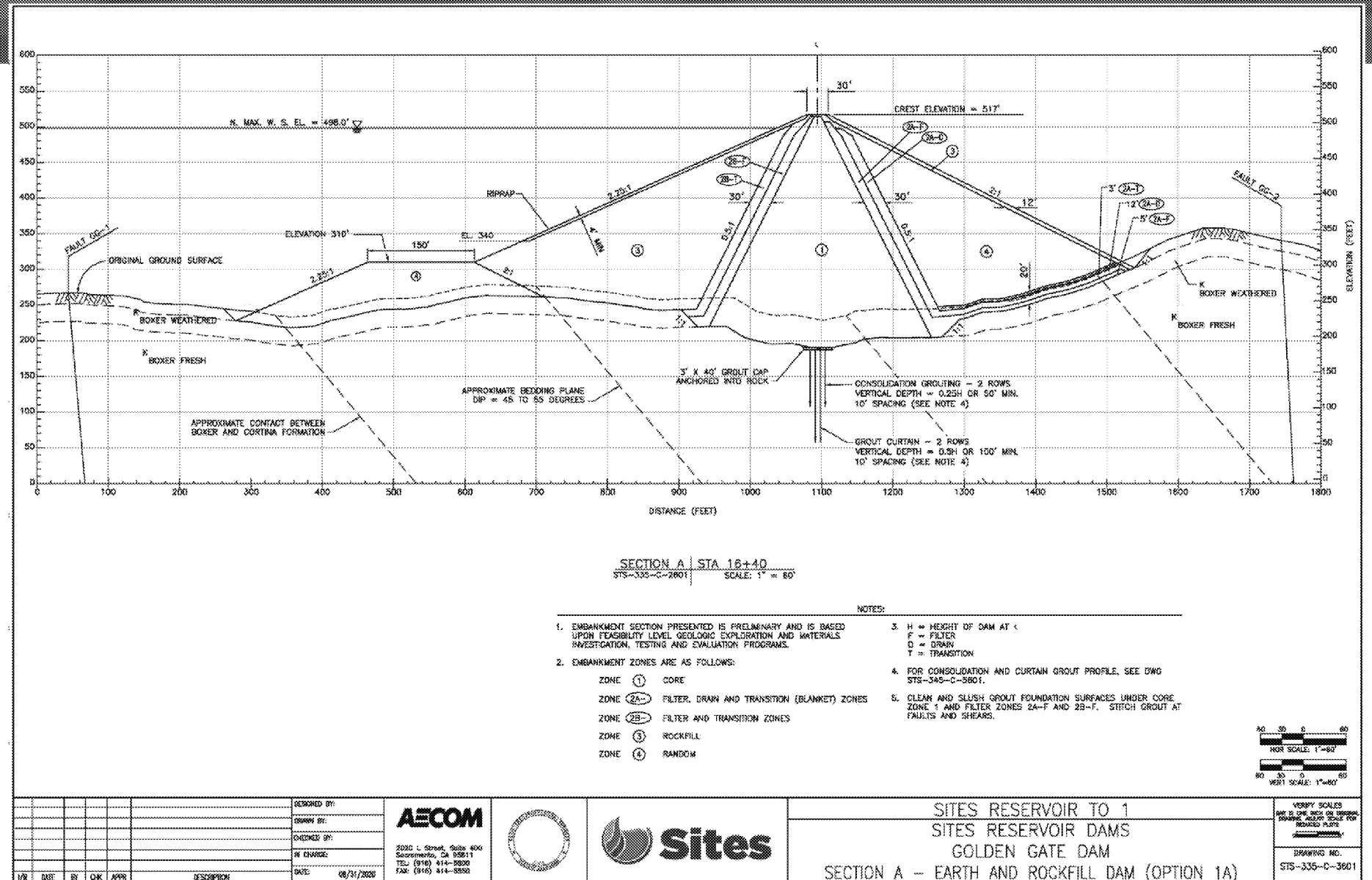


Dam Filter, Drain and Transition Zones

Golden Gate Dam



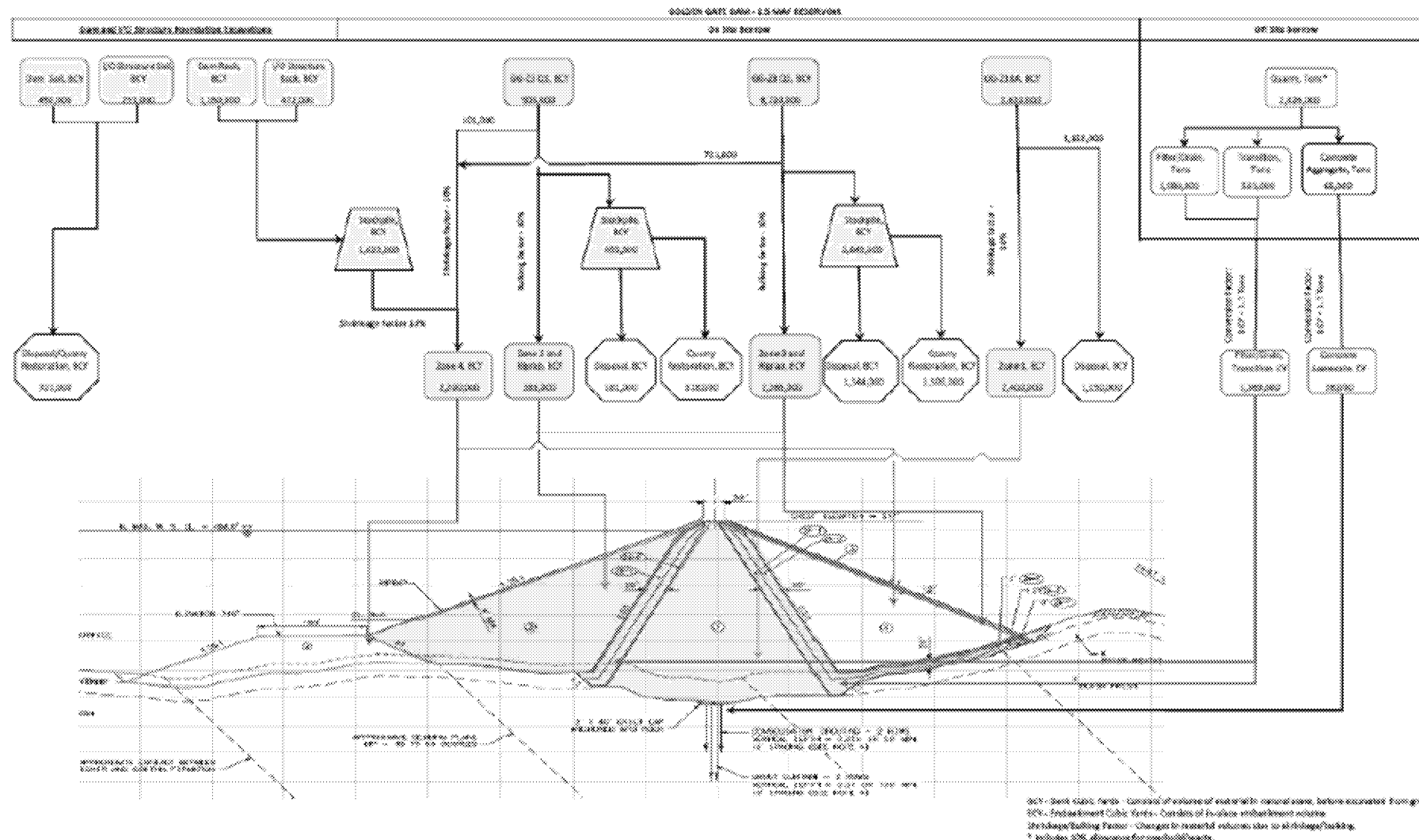
Typical Golden Gate and Sites Dam Section



Material Balance Golden Gate Dam

MATERIALS BALANCE
GOLDEN GATE DAM - 1.5 MAF RESERVOIR

Submitted by: Mr.
 Received by: Mr.
 Date received: 2021



Examples of Dam Construction



Examples of Dam Construction



Examples of Dam Construction



Examples of Dam Construction

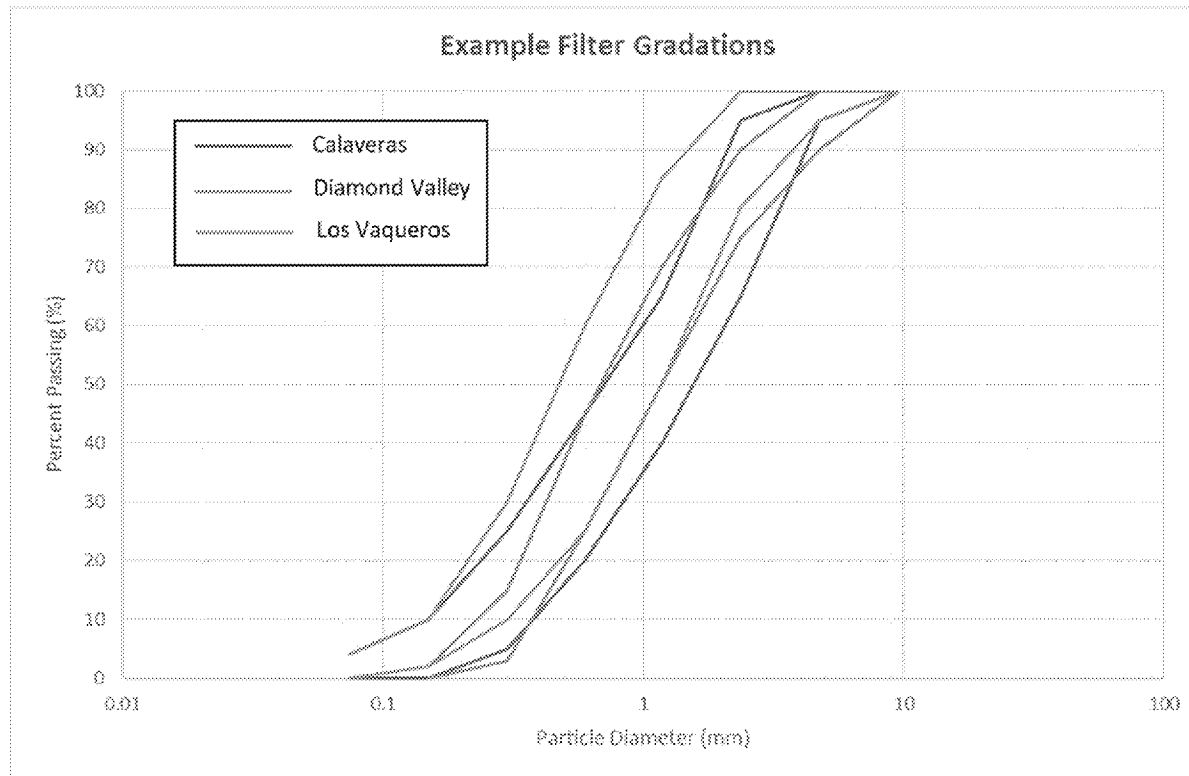


Examples of Filter Gradations and Requirements

Generally meet the soundness requirements of ASTM C33 for fine aggregate plus requirements below

Test Type	Acceptability Standard	Criteria
Specific Gravity	ASTM C127	Greater than 2.6
Abrasion Resistance	ASTM C131	10 percent maximum loss by weight at 100 revolutions, and 40 percent loss of weight at 500 revolutions
	ASTM C535	40 percent maximum loss of weight at 1000 revolutions
Sodium Sulfate Soundness	ASTM C88	10 percent maximum weighted average loss by weight, after five cycles
Shape		Particles shall be generally equidimensional
Elongated Particles	CRD-C-119 and CRD-C-120	Not greater than 15 percent by weight
Other		Material shall be free of clay balls, organics, soft particles, and other impurities

Examples of Filter Gradations and Requirements



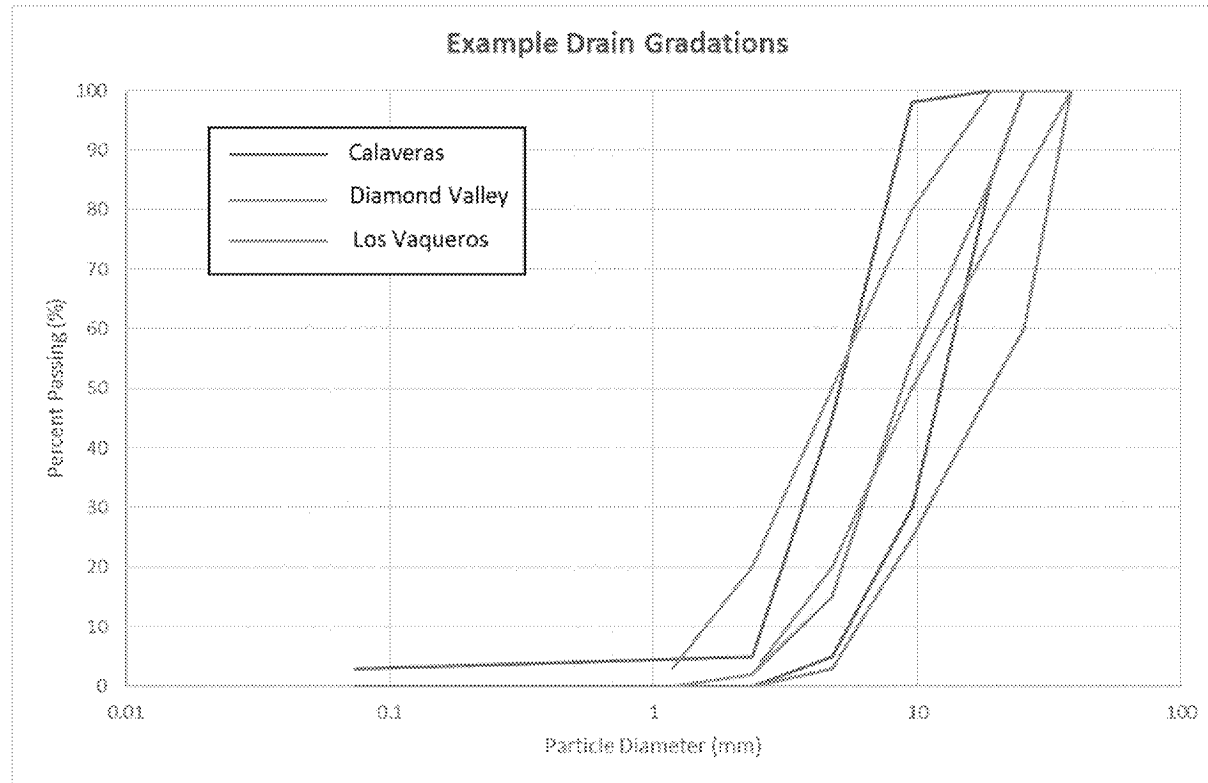
Note: No gap or skip grading between any two consecutive sieves

Sieve Size	Calaveras	Diamond Valley	Los Vaqueros
3/8-inch	100	100	100
No. 4	95 – 100	90 – 100	95 – 100
No. 8	65 – 95	75 – 90	80 – 100
No. 16	40 – 65	50 – 70	50 – 85
No. 30	20 – 45	25 – 45	25 – 60
No. 50	5 – 25	3 – 15	10 – 30
No. 100	0 – 10	0 – 2	2 – 10
No. 200	0 – 4	-	0 – 4

Examples of Drain Gradations and Requirements

Test Type	Acceptability Standard	Criteria
Adsorption	ASTM C127	Greater than 2.6
Specific Gravity	ASTM C127 and C128	Greater than 2.6
Abrasion Resistance	ASTM C131	10 percent maximum loss by weight at 100 revolutions, and 40 percent loss of weight at 500 revolutions
Sodium Sulfate Soundness	ASTM C88	10 percent maximum weighted average loss by weight, after five cycles
Shape		Particles shall be generally equidimensional
Elongated Particles	CRD-C-119 and CRD-C-120	Not greater than 15 percent by weight
Other		Material shall be free of clay balls, organics, soft particles, and other impurities

Examples of Drain Gradations and Requirements



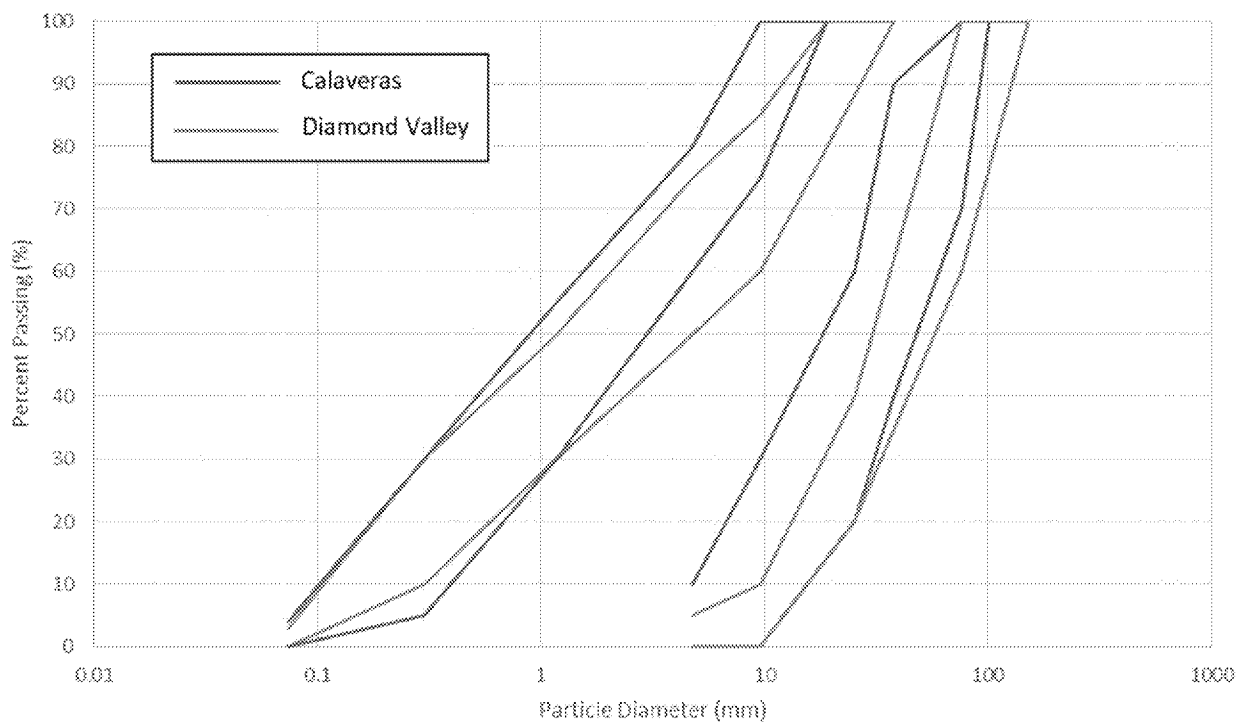
Note: No gap or skip grading between any two consecutive sieves

Sieve Size	Calaveras	Diamond Valley	Los Vaqueros
1.5-inch	-	100	100
1-inch	100	60 – 100	-
3/4-inch	85 – 100	50 – 85	75 – 100
3/8-inch	30 – 98	25 – 55	50 – 80
No. 4	5 – 45	3 – 15	20 – 50
No. 8	0 – 5	0 – 2	2 – 20
No. 16	-	-	0 – 3
No. 200	0 – 3	-	-

Examples of Transition Gradations and Requirements

- Similar soundness requirements to filter and drain

Example Transition Gradations



Sieve Size	Calaveras (Upstream)	Calaveras (Downstream)	Diamond Valley (Upstream)	Diamond Valley (Downstream)
6-inch	-	-	-	100
4-inch	-	100	-	-
3-inch	-	70 – 100	-	60 – 100
1.5-inch	-	40 – 90	100	-
1-inch	-	20 – 60	-	20 – 40
¾-inch	100	-	80 – 100	-
3/8-inch	75 – 100	0 – 30	60 – 85	0 – 10
No. 4	60 – 80	0 – 10	50 – 75	0 – 5
No. 16	30 – 55	-	30 – 50	-
No. 50	5 – 30	-	10 – 30	-
No. 200	0 – 4	-	0 – 3	-

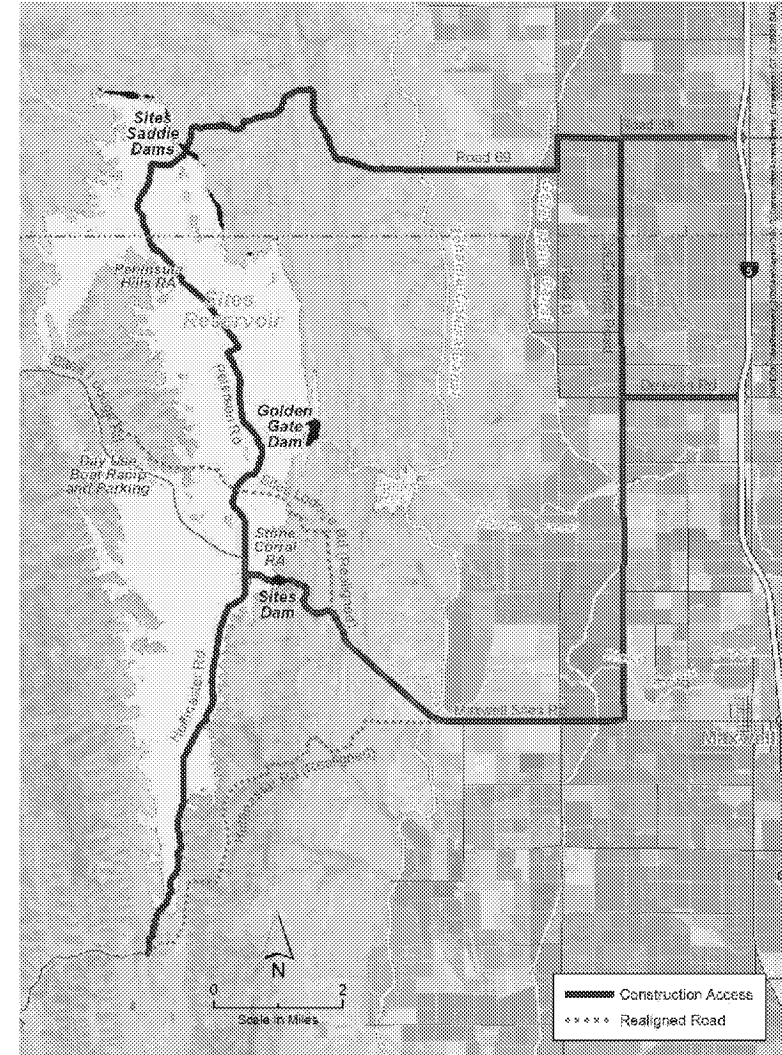
Road Base

Road Base

- Caltrans Class 2 Aggregate Base (standard specifications 26-1.02)
 - Consists of clean broken stone, crushed gravel, natural rough-surfaces gravel, sand, and/or processed reclaimed AC, PCC, LCB, or CTB

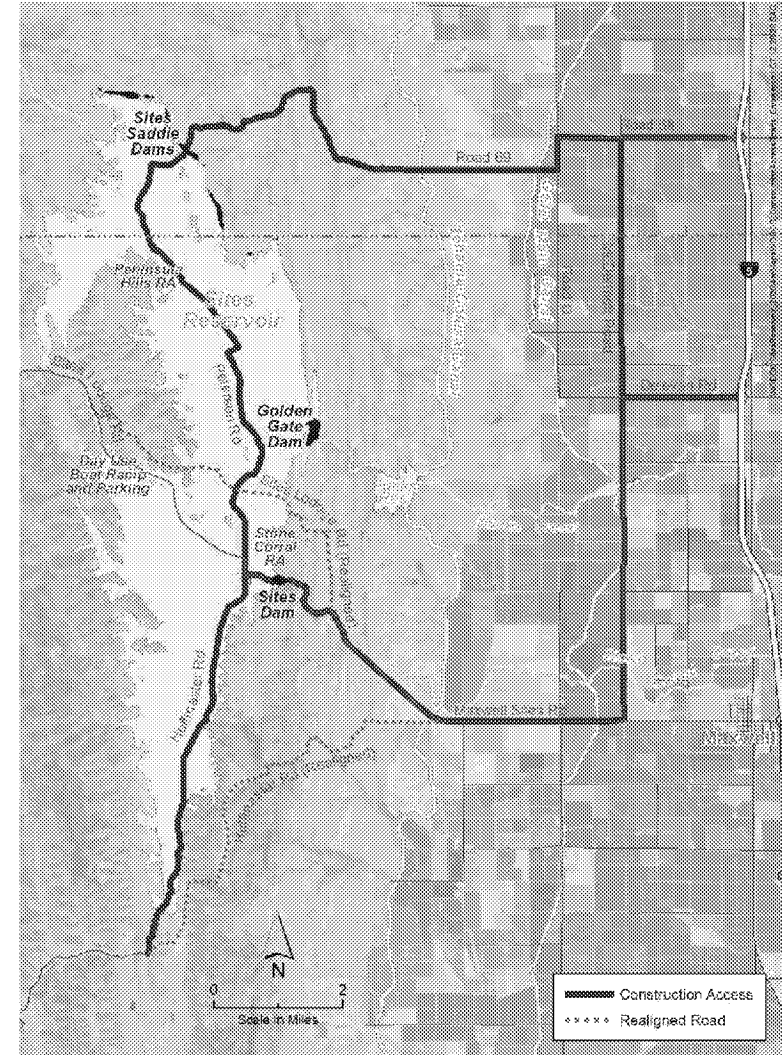
Sieve size	Percentage passing			
	1-1/2 inch maximum		3/4 inch maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	--	--
1-1/2"	90-100	87-100	--	--
1"	--	--	100	100
3/4"	50-85	45-90	90-100	87-100
No. 4	25-45	20-50	35-60	30-65
No. 30	10-25	6-29	10-30	5-35
No. 200	2-9	0-12	2-9	0-12

Quality characteristic	Requirement	
	Operating range	Contract compliance
Resistance (R-value, min)	--	78
Sand equivalent (min)	25	22
Durability index (min)	--	35



Road Base

- Caltrans Class 4 Aggregate Subbase (standard specifications 25-1.02)
 - Consists of clean broken stone, crushed gravel, natural rough-surfaces gravel, sand, and/or processed reclaimed AC, PCC, LCB, or CTB
 - Gradation and quality requirements to be decided based on project needs, but likely to have a minimum sand equivalent of about 20 and R-value of about 40



Concrete Aggregate

Concrete Aggregate

- Need to meet quality requirements of ASTM C33, Concrete Aggregates

Location	Approximate Quantities (tons)
Spillway (Saddle Dam 8B)	19,500
Inlet/Outlet Structure	115,900
Sites Diversion Tunnel	10,400
Golden Gate Dam Bypass	35,000
Sites Lodoga Bridge	45,585

Summary of Quantities

Summary of Quantities

Location	Approximate Quantities (Million Tons)
Zone 2A – Downstream Filter	1.5
Zone 2A – Downstream Drain	1.6
Zone 2A – Downstream Transition	0.3
Zone 2B – Upstream Filter	0.6
Zone 2B – Upstream Transition	0.6
Class 4 Aggregate Subbase	0.3
Class 2 Aggregate Base	0.5
Concrete Aggregate	0.6
Total	6.0 million tons

Crude Average Delivery Schedule

- **Overall Project Schedule = 800 to 1200 days**
- **Overall Quantity of Material = 6 million tons**
- **Average Delivery = 6,000 to 7,500 tons per day**

Questions

Questions

- Do you have the quality of materials needed and their location(s)?
- Do you have the plants to create the materials in spec and their location(s)?
- Do you have the capacity to deliver the quality and quantities of materials in the time needed?

Questions – cont'd.

- Do you have technical specifications/lab certifications such as durability, gradation, petrographic analysis, LA rattler, R-value, available?
- What is the location of quarry and type of material; alluvium, hard rock, soft rock?
- What are the available material remaining/duration of permitted operations?

Questions – cont'd.

- What are the productivity rates for different materials?
- What is the maximum amount of material you can deliver per day?
- What are the approximate at plant costs for different materials?
- Will you be using prevailing labor rates for trucking?

From: [Leaf, Rob/SAC](#)
To: [Alicia Forsythe](#)
Cc: [Heydinger, Erin](#); [Spranza, John](#); [Micko, Steve/SAC](#); [Thayer, Reed/SAC](#)
Subject: RE: Sites Project - Trinity River Small Group Discussion
Date: Wednesday, March 10, 2021 1:30:11 PM
Attachments: [image002.png](#)
[image004.png](#)
[image009.png](#)
[SitesMetrics_rev14_4scn_ALT1B_011221_SA_unfixTrinity.pdf](#)
[NODOS Trend Reporting_rev44dpcy_DV6_MultiClim_CALSIM_NAA_ALT1B_011221_SA_unfixTrinity.xlsm](#)

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Ali,

As you know, for all of the Sites Project alternatives we have held the operations of the Trinity River “fixed” to the No Action alternative condition instead of allowing CalSim II to dynamically operate the river in the with project alternatives. This was based on comments we received from Reclamation during the development of the 2020 Federal Feasibility Report model runs.

With the reformulated project (VP7) and the new diversion/operations criteria we have developed, we don’t expect significant changes to the Trinity River operations regardless of the approach to Trinity River operations. For the EIRS and WSIP analyses we have continued to “fix” Trinity River operations rather than let the model dynamically operate the river.

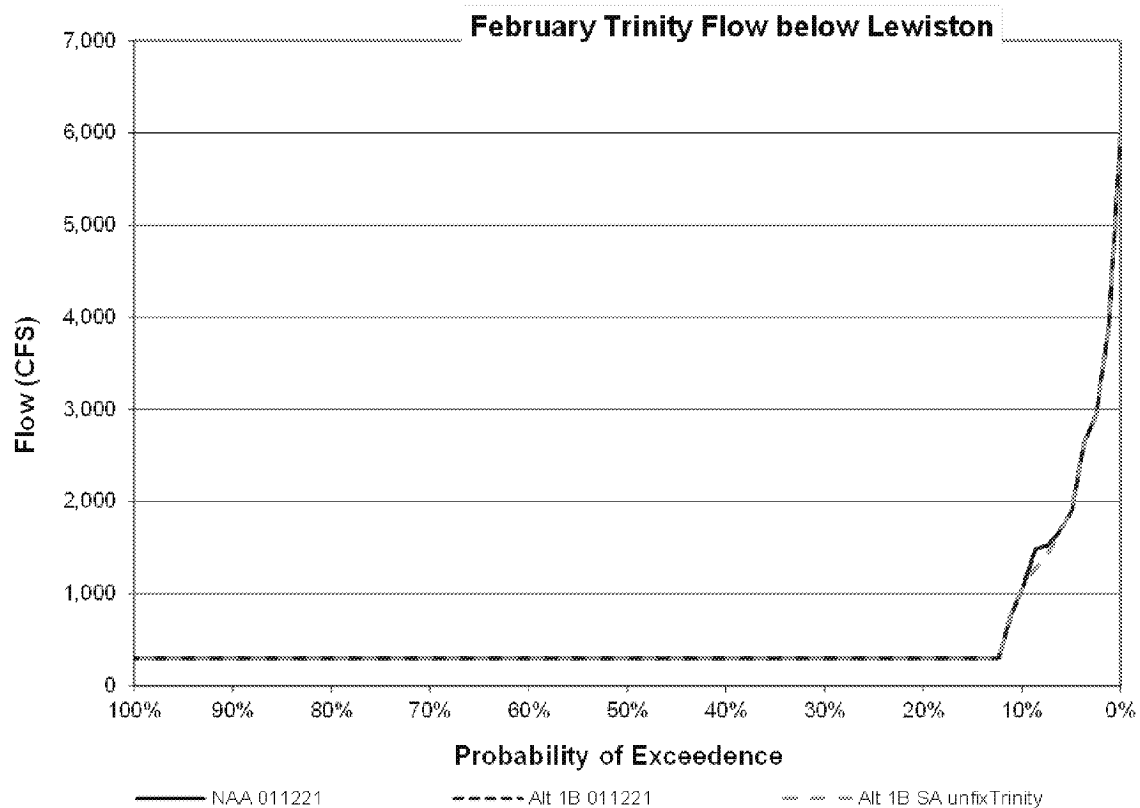
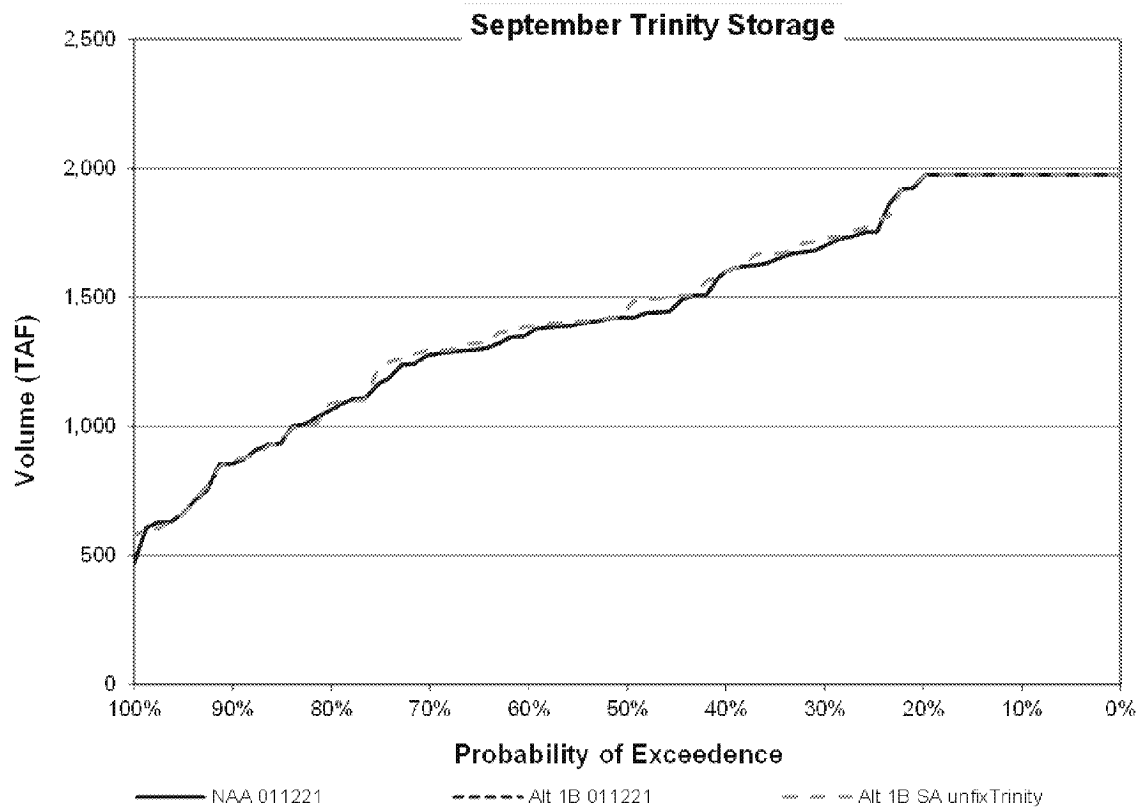
Without further background information, I expect that we will be criticized for not allowing CalSim II to dynamically operate the Trinity River. We would even be accused of “hiding” potential impacts. For that reason, I have prepared a sensitivity analysis of Alternative 1B comparing the approaches. Please see the attached.

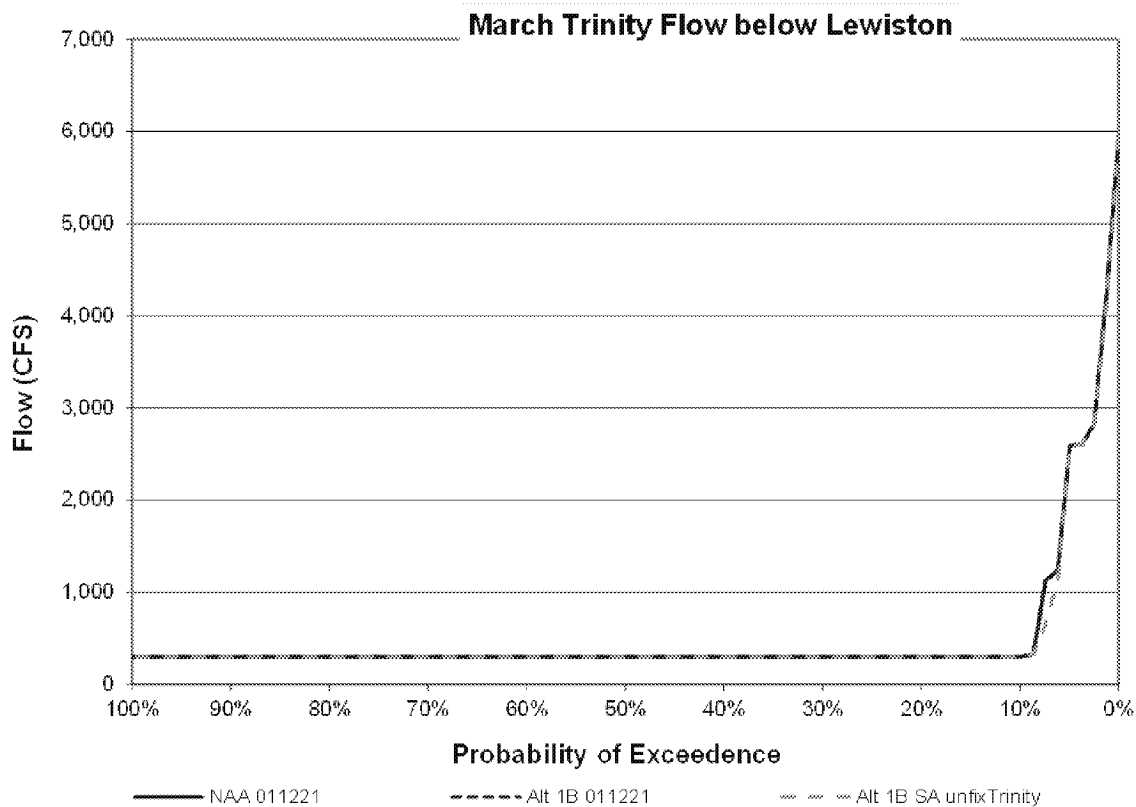
The conclusion is that changes to the performance of Alternative 1B are negligible overall. There however is a potential increased benefit to storage in the Trinity River from the dynamic approach. This increase in Trinity Lake storage is associated with a slight reduction in flows down the Trinity River in a few years in February and March apparently in below normal conditions. I expect these changes are less than significant.

Either approach is reasonable under the reasoning that Reclamation’s operational flexibility to operate Shasta and Trinity Lakes as needed is not limited by the Sites Project. In fact Reclamation has an opportunity to improve both and may so choose. The two approaches represent two out of many options Reclamation could consider. It is in Reclamation’s hands either way and not the responsibility of the Sites Project.

See below for some selected charts from the trend reporting spreadsheet attached.

Rob





From: Alicia Forsythe <aforseythe@sitesproject.org>

Sent: Tuesday, March 2, 2021 10:52 AM

To: tstokely@att.net; J C POLOS <summerchum@yahoo.com>; Hank Seemann <HSeemann@co.humboldt.ca.us>; Craig Tucker <craig@suitsandsigns.com>; rebecca wu <rebeccadawnwu@yahoo.com>; john@goldengatesalmon.org

Cc: Heydinger, Erin <erin.heydinger@hdrinc.com>; Spranza, John <john.spranza@hdrinc.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>; Leaf, Rob/SAC <Rob.Leaf@jacobs.com>

Subject: [EXTERNAL] Sites Project - Trinity River Small Group Discussion

Hi all – You have all expressed an interest in learning more about how the Sites Project may affect the Trinity River. We'd like to host a small group meeting to share results from our CalSim modeling and talk about how we are approaching the Trinity River issues in our EIR/EIS and get your input and feedback.

Below is a doodle poll to schedule this meeting. I will use the results from the Doodle Poll as of close of business Friday to schedule the meeting, so please complete the poll as soon as possible.

https://www.doodle.com/poll/inhc2e7egbmzf94g2utm_source=poll&utm_medium=link

An agenda will be provided with the meeting invite.

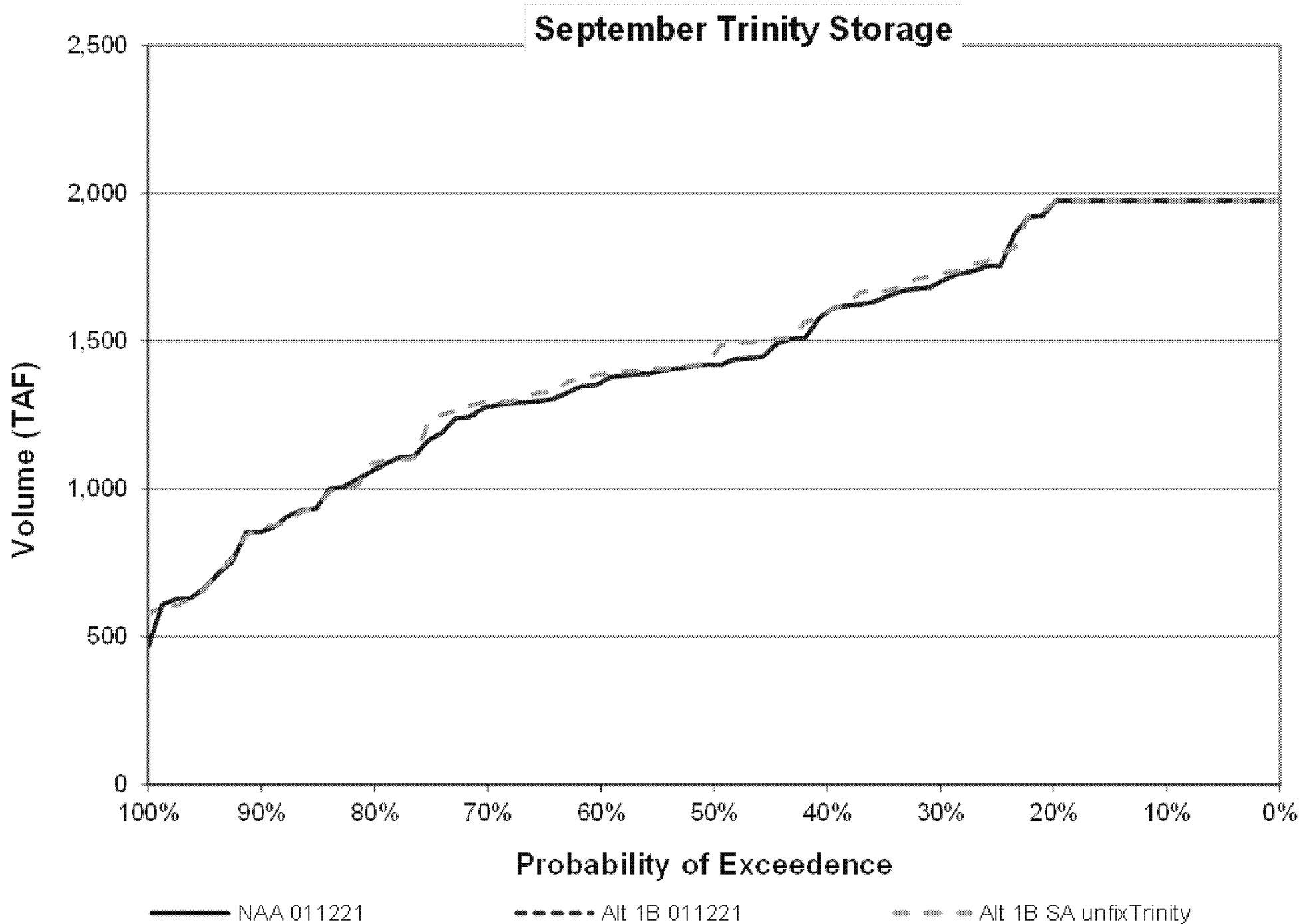
We look forward to the discussion.

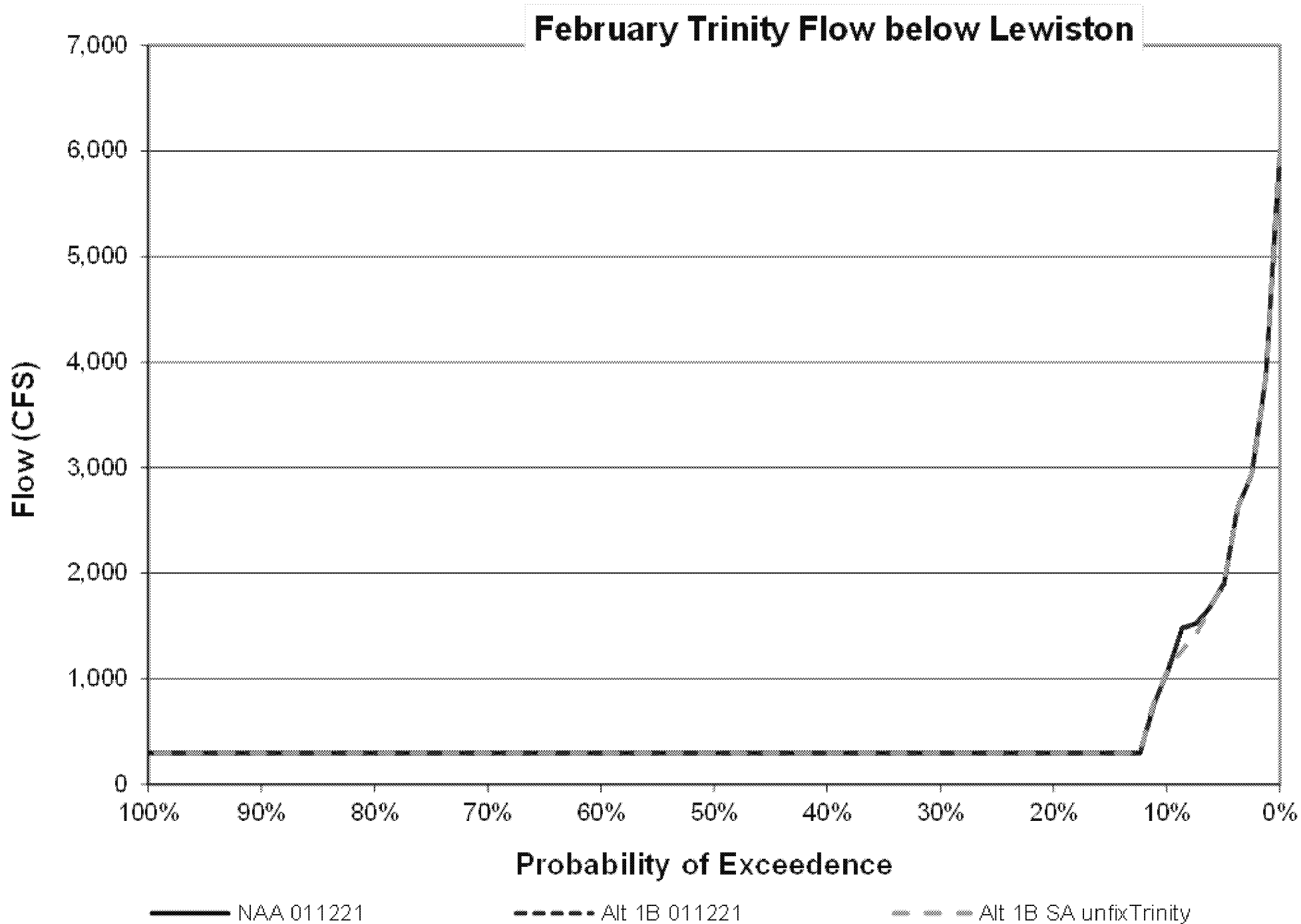
Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project |
916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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File Provided Natively

Agenda Item 3.3

Allocations of Storage Space

Joint Authority Board & Reservoir Committee

April 21, 2023



Assumptions for Storage Space Allocation

- Changes in Available Storage
 - Dead storage reduced from 120 TAF to 60 TAF
 - Recent survey refinements estimate capacity of Sites Reservoir at 1.47 MAF
 - Results in total Available Storage of 1.41 MAF
- Allocation of Available Storage prior to Reclamation interest in increasing investment to 16%
 - Amendment 3 PWA = ~1.038 MAF
 - State of California = 244 TAF
 - Reclamation = 91 TAF (~7%)

Assumptions for Storage Space Allocation

- Change in reservoir active storage and decreases in local storage partner participation provides 37 TAF
- Reclamation currently allocated change in active storage of 37 TAF as increase in storage allocation
 - Total storage allocation becomes 128 TAF (9%)
 - Less than 225.6 TAF (16%)
- Maintains preliminary equation to establish storage allocation for local Partners applied to Amendment 3 Participation

Existing participation x 6.234 = Storage Allocation

Allocation of Active Storage

Reservoir Size: 1,470,000 AF

Dead Pool: 60,000 AF

Available Storage: 1,410,000 AF

Participant Name	Amendment 3 Participation Level	Amendment 3 Storage Allocation	% Available Storage
Antelope Valley-East Kern WA	500	3,117	0.2%
City of American Canyon	4,000	24,936	1.8%
Coachella Valley WD	10,000	62,340	4.4%
Colusa County	10,000	62,340	4.4%
Colusa County WD	9,256	57,702	4.1%
Cortina WD	450	2,805	0.2%
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LaGrande WD	1,000	6,234	0.4%

Allocation of Active Storage

Participant Name	Amendment 3 Participation Level	Amendment 3 Storage Allocation	% Available Storage
Metropolitan Water District of SC	50,000	311,700	22.1%
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San Bernardino Valley Municipal WD	21,400	133,408	9.5%
San Geronio Pass WA	14,000	87,276	6.2%
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Westside WD	5,375	33,508	2.4%
Wheeler Ridge - Maricopa WSD	3,050	19,014	1.3%
Zone 7 WA	10,000	62,340	4.4%
State of California - Total	—	244,000	17.3%
Reclamation**	—	128,020	9.1%
Available Storage Total	166,503	1,410,000	100.0%

- Water diverted will be allocated to each Storage Partner's storage space proportional to its Storage Allocation (i.e., percent of Available Storage)

Next Steps

- Seek approval to make transition to Storage Allocation based participation in May
 - Approve calculations in table on prior slides considering change in dead pool, recent survey refinements to reservoir capacity, and increase in Reclamation investment
 - Discussions going forward would be based around storage instead of annualized supply

Meeting: **Joint Sites Reservoir Committee &
Authority Board**

**April 21, 2023
9:00 AM – Noon**

Locations: **Click here to join the meeting**

122 Old Hwy 99W, Maxwell, CA 95955

See additional locations below.

Call in: **1-916-538-7066**

Code: **916 475 053#**

Authority Board Chair:	Fritz Durst (Reclamation District 108)
Authority Board Vice Chair:	Jeff Sutton (Tehama-Colusa Canal Authority)
Reservoir Committee Chair:	Valerie Pryor (Zone 7 Water Agency)
Reservoir Committee Vice-Chair:	Mike Azevedo (Colusa County)
Treasurer:	Jamie Traynham (Davis Water District)

AGENDA

ROLL CALL & CALL TO ORDER:

- Introductions.
- Pledge of Allegiance.
- Approval of April 21, 2023, Joint Meeting Agenda.
- Announcement of Closed Session.
- Period for Public Comment.

Any person may speak about any subject of concern, provided it is within the Reservoir Committee's and Authority Board's jurisdiction, and a public comment card is submitted. The time allotted for receiving such public communication shall be 3 minutes per person. Note: No action shall be taken on comments made during this period.

1. Consent Agenda:

Approximate start time 9:10 am

The Executive Director reviewed the following items. To his knowledge, there is no opposition to the action. The items can be acted on in one consolidated motion as recommended or may be removed from the Consent Calendar and separately considered at the request of any person. Each item indicates the body authorized to approve such actions according to the JPA, Bylaws and Project Agreement.

- 1.1 Reservoir Committee and Authority Board consider approval of March 17, 2023, Joint Reservoir Committee and Authority Board Meeting Minutes. **(Attachments A & B)**
- 1.2 Reservoir Committee and Authority Board consider acceptance of the Sites Project Authority Treasurer's Report. **(Attachment A)**
- 1.3 Reservoir Committee and Authority Board consider approval of the Payment of Claims. **(Attachments A & B)**

2. **Action Items:** Approximate start time 9:15 am
- None.
3. **Discussion and Information Items:** Approximate start time 9:20 am
No action from the Reservoir Committee or Authority Board.
- 3.1 Review and comment on the Final Environmental Impact Statement /Environmental Impact Report, Part 3 status briefing in preparation for approval of the Project. **(Attachments A & B)**
- 3.2 Review and comment on modeled conveyance and storage losses and confirm the available storage assumptions. **(Attachments A & B)**
- 3.3 Review allocations of storage space and proportionate shares of diverted water for participants based on conditional State and Federal participation. **(Attachment A)**
- 3.4 Receive an update on the status of Amendment 3 2023 cash call funds received to date.
4. **Reports:** Approximate start time 10:00 am
- 4.1 **Chairpersons' Reports:**
- This time is set aside to allow the Reservoir Committee & Authority Board Chair/Co-Chair an opportunity to disclose/discuss items related to the Sites Project.
- 4.2 **Committee & Workgroup Chairpersons' Reports:**
- This time is set aside to allow the Committee & Workgroup Chairpersons an opportunity to disclose/discuss items related to the Sites Project.
- 4.3 **Authority Board & Reservoir Committee Participant Reports:**
- This time is set aside to allow Representatives or their Alternates an opportunity to disclose/discuss items related to the Sites Project.
- 4.4 **Executive Director's Reports:**
- Monthly status report. **(Attachment A)**
 - Work Plan Key Deliverables Report. **(Attachment B)**
 - Meetings Action Items Summary. **(Attachment C)**
5. **Closed Session:** Approximate start time 10:15 am

5.1 Negotiations concerning Sites Project operation terms, conditions and agreements with the United States Fish & Wildlife Service and the National Marine Fisheries Service (Govt. Code §§54956.9(c)).

5.2 Negotiations concerning water rights permit terms and conditions (Govt. Code §54956.9(c) and §54956.9(d)(4)).

6. **Report from Closed Session** Approximate start time 11:00 am

7. **Recap:** Approximate start time 11:05 am

7.1 Suggested Future Agenda Items.

7.2 Upcoming Meetings:

Joint Reservoir Committee & Authority Board

Friday, May 19, 2023 (9:00 am to noon)

Meetings are held in the Maxwell Project Office & Virtual.

Virtual Information will be provided before all meetings at [Sitesproject.org](https://sitesproject.org).

ADJOURN

ADA COMPLIANCE: Upon request, agendas will be made available in alternative formats to accommodate persons with disabilities. In addition, any person with a disability who requires a modification or accommodation to participate or attend this meeting may request the necessary accommodation. Please make your request to the Board Clerk, specifying your disability, the format in which you would like to receive this Agenda and any other accommodation required no later than 24 hours before the start of the meeting.

This meeting will be recorded.

Alternate Meeting Locations:

City of American Canyon, 4381 Broadway Street, American Canyon, CA 94503

Coachella Valley Water District, 75515 Hovely Lane East, Palm Desert, CA 92211

Colusa County Water District, 436 Market Street, Colusa, CA 95932

Desert Water Agency, 1200 S. Gene Autry Trail, Palm Springs, CA 92264

Irvine Ranch Water District, 15600 Sand Canyon Avenue, Irvine, CA 92618

Metropolitan Water District, 1121 L Street, Suite 900, Sacramento, CA 95814

Rosedale-Rio Bravo Water Storage District, 849 Allen Road, Bakersfield, CA 93314

San Bernardino Valley Municipal Water District, 380 E. Vanderbilt Way, San Bernardino, CA 92408

Santa Clarita Valley Water Agency, 26501 Summit Circle, Santa Clarita, CA 91350

San Geronio Pass Water Agency, 1210 Beaumont Avenue, Beaumont, CA 92223

Santa Clarita Valley Water Agency, 26501 Summit Circle, Santa Clarita, CA 91350

Agenda Item 3.3

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From: Jerry Brown [jbrown@sitesproject.org]
Sent: 4/24/2023 10:38:52 AM
To: Marcia Kivett [MKivett@sitesproject.org]
Subject: RC/AB Mtg Follow-up Items
Attachments: 20230217_Comparison of Diversion Criteria.docx

Here's my notes from the meeting. We should compare before communicating these to the team. Thanks

1. Would like to integrate our comparison table of 2017 Project vs 2023 Project into our outreach materials for final EIR approval, referring to attached doc produced by EPP.
2. Investigate appropriate frequency of loss assignment among Storage Partners (daily, monthly, seasonally, annually) and address in the next update of the operations plan.
3. Ensure that losses in the Colusa Basin Drain (currently assumed ion ops modeling to be zero) are accounted for in the next update of the Operations Plan.
4. Work with Participants to efficiently identify a means by which to review alternative demand patterns. The intent is to arrive at an understanding of possible operating scenarios and potential operational limitations that may not be apparent with the current assumed demand patterns.
5. Include an example of how losses would be calculated and applied in the next update of the Operations Plan.

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/24/2023 1:01:25 PM
To: Katherine Maher [KMaher@valleywater.org]
Subject: Sites Project - Environmental Benefits
Attachments: 20210311_Sites Prop 1 Benefits Small Group_Presentation.pptx; Sites_Prop 1 Benefits Summary_20211006.docx; Michel et al 2021 nonlinearflow.pdf

Katherine – It was great to chat on Friday.

Here's a start on the materials that I am going to send over. I'll send more later today also.

1. Proposition 1 water – Attached is a PowerPoint Slide Deck on the Prop 1 benefits. Its an old presentation, but figured that some of the slides/materials might be helpful. I just skimmed it and the biggest difference is that the Water Commission has now allocated us additional funding. Otherwise, I think its all still relevant. I've also attached a file summarizing the Prop 1 benefits from our State Feasibility Report. These are deliveries – so includes conveyance losses – and would be the water actually delivered to these benefit areas. And there is more info on the Refuge program here with a great map that we frequently use: [Refuge Water Supply Program Details \(ca.gov\)](#)
2. Michel et al paper – This is the basis of the 10,700 cfs at Wilkins Slough. Although the publication is long, in essence it found that, based on the data analyzed, the survival of juvenile salmon though the Sacramento River was substantially greater when flows at Wilkins Slough were equal to or greater than 10,712 cfs. I think the quick synopsis is in Figure 6 on page 10 and the paragraph to the right of the figure.

In the conclusion on page 11, the authors go on to state “High flows promote favorable outmigration conditions for Chinook salmon juveniles, resulting in increased survival to the ocean (Connor et al. 2003, Smith et al. 2003). We identified an optimal threshold of 10,712 cfs, which we labeled historic mean, as it is similar to the longterm average of natural spring flow conditions under which Chinook salmon have evolved in this system (Fig. 1).

I've got to hop on a call for a bit but will get more over later today.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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Nonlinear survival of imperiled fish informs managed flows in a highly modified river

CYRIL J. MICHEL^{1,†}, JEREMY J. NOTCH¹, FLORA CORDOLEANI¹,
ARNOLD J. AMMANN², AND ERIC M. DANNER²

¹*Institute of Marine Sciences, University of California, Santa Cruz, Santa Cruz, California 95060 USA*

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Citation: Michel, C. J., J. J. Notch, F. Cordoleani, A. J. Ammann, and E. M. Danner. 2021. Nonlinear survival of imperiled fish informs managed flows in a highly modified river. *Ecosphere* 12(5):e03498. 10.1002/ecs2.3498

Abstract. Water is a fundamental resource in freshwater ecosystems, and streamflow plays a pivotal role in driving riverine ecology and biodiversity. Ecologically functional flows, managed hydrographs that are meant to reproduce the primary components of the natural hydrograph, are touted as a potential way forward to restore ecological functions of highly modified rivers, while also balancing human water needs. A major challenge in implementing functional flows will be establishing the shape of the managed hydrograph so as to optimize improvements to the ecosystem given the limited resources. Identifying the shape of the flow–biology relationship is thus critical for determining the environmental consequences of flow regulation. In California’s Central Valley, studies have found that increased streamflow can improve survival of imperiled juvenile salmon populations during their oceanward migration. These studies have not explored the potential nonlinearities between flow and survival, giving resource managers the difficult task of designing flows intended to help salmon without clear guidance on flow targets. We used an information theoretic approach to analyze migration survival data from 2436 acoustic-tagged juvenile Chinook salmon from studies spanning differing water years (2013–2019) to extract actionable information on the flow–survival relationship. This relationship was best described by a step function, with three flow thresholds that we defined as minimum (4259 cfs), historic mean (10,712 cfs), and high (22,872 cfs). Survival varied by flow threshold: 3.0% below minimum, 18.9% between minimum and historic mean, 50.8% between historic mean and high, and 35.3% above high. We used these thresholds to design alternative hydrographs over the same years that included an important component of functional flows: spring pulse flows. We compared predicted cohort migration survival between actual and alternative hydrographs. Managed hydrographs with pulse flows that targeted high survival thresholds were predicted to increase annual cohort migration survival by 55–132% without any additions to the water budget and by 79–330% with a modest addition to the water budget. These quantitative estimates of the biological consequences of different flow thresholds provide resource managers with critical information for designing functional flow regimes that benefit salmon in California’s highly constrained water management arena.

Key words: California; flow regulation; functional flows; migration; resource management; salmon; survival; telemetry.

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INTRODUCTION

In rivers, natural flow regimes are directly linked with ecological processes that govern the life history of aquatic organisms, and are a major determinant of biodiversity (Bunn and Arthington 2002). Identifying the shapes of flow–ecology relationships is therefore critical for determining the biological consequences of water withdrawal or flow regulation on the ecosystem and to establish well-informed water management rules and recommendations (Rosenfeld 2017). Water resource use and development in watersheds has altered natural flow regimes, which in turn has altered riverine ecosystems, and is generally acknowledged to have considerable negative impacts on native biota (Pringle et al. 2000). As water resources become increasingly overtaxed due to population growth and climate change (Tanaka et al. 2006, Palmer et al. 2008), the task of balancing human and ecosystem needs will become more urgent and politically charged (Arthington et al. 2018). More than ever, objective, science-based approaches are needed for informing the development of water resource allocation targets (Petts 2009).

Few freshwater systems illustrate the management challenges of balancing environmental resources with the restoration of a collapsing ecosystem better than California's Central Valley (CCV) watershed. Here, water is heavily regulated as it supports a multi-billion dollar agricultural economy as well as tens of millions of urban and suburban water users (Speir et al. 2015). The ecosystem is vastly different than it was historically, with many native fish populations diminishing, and increasingly extreme climatic events impacting water availability (Hanak and Lund 2012). Researchers at the nonpartisan Public Policy Institute of California have suggested that restoration of native fish populations and general ecosystem health in the CCV is unattainable under the current regulatory status quo (Mount et al. 2019). These same authors propose that ecosystem-based management of the CCV is a potential way forward. Two key changes would be the adoption of ecologically functional flows (Yarnell et al. 2015, 2020) and an ecosystem water budget. Functional flows are managed hydrographs that are meant to reproduce the primary components of the natural, unimpaired

hydrograph so as to restore related geomorphic, biogeochemical, or ecological functions, while also balancing human water needs. An ecosystem water budget is essentially a water right for the environment: a set amount of water than may be allocated as resource managers see fit to improve the condition of the ecosystem. If these two key changes were implemented throughout the CCV, one of the major challenges will be establishing the shape and magnitude of the managed hydrograph so as to optimize improvements to the ecosystem, given a fixed water budget. A key part of this challenge is predicting the biotic responses to different flow targets.

In the CCV, hydrologic infrastructure and water management have strongly modified the hydrograph of most river systems, including the Sacramento River, resulting in reduced winter and spring discharges (Brown and Bauer 2009). The spring rainfall and snowmelt recession is a critical facet of the CCV Mediterranean-type flow regime, and alterations to this hydrograph strongly affect riverine species which have evolved to use high spring flows resulting from winter and spring rain-fed and snowmelt runoff (Yarnell et al. 2010). Among them, CCV Chinook salmon (*Oncorhynchus tshawytscha*) populations have been particularly impacted by water management in frastructure and altered flow regimes (Yoshiyama et al. 1998, Kimmerer 2008). Of the five historic Chinook salmon populations in the CCV, one has been extirpated, one is listed as endangered, one is listed as threatened, and the other two are listed as Species of Concern under the Endangered Species Act (ESA).

One of the primary impacts of the water management infrastructure and altered flow regimes in the CCV on salmon is the reduction in spring outmigration (i.e., seaward) survival of juvenile salmon (Kjelson et al. 1981, Notch et al. 2020). Importantly, the survival bottleneck at this life stage has significant repercussions throughout the Chinook salmon lifecycle (Michel 2019). Therefore, one vital aspect for implementation of functional flows in the CCV is to assess how they will impact juvenile Chinook salmon during their spring outmigration to the Pacific Ocean. One promising component of proposed functional flows in the CCV is the implementation of spring pulse flows (Yarnell et al. 2015), as these may recreate the ideal outmigration conditions salmon historically benefitted from.

To date, studies have found strong, positive linear relationships between survival and flow in CCV rivers (Kjelson et al. 1981, Zeug et al. 2014, Henderson et al. 2019, Notch et al. 2020). However, when environmental resources are also commercially important for competing needs, this creates a problem: How to allocate limited resources if the only guidance managers have is that more is better for the population or ecosystem process in question? This difficulty often results from the statistical techniques traditionally used by ecologists, which by design only reveal linear relationships between populations or ecosystem processes and the environment. Yet, these relationships are rarely linear (Hunsicker et al. 2016, Rosenfeld 2017), and these nonlinearities can play a critical role in the population or ecosystem dynamics. Several studies have shown that nonlinear responses of ecosystems to environmental resource changes could initiate catastrophic regime shifts and local population extinction events (Scheffer et al. 2001). Therefore, it is important to explore possible nonlinearities between environmental resources and ecosystem processes, with the particular objective of finding information that is more actionable to resource managers. This is especially pertinent to Pacific salmon stocks that are often found in the middle of constrained resource management arenas (Munsch et al. 2020).

We investigated the link between flow variations in the Sacramento River, the primary Chinook salmon river in the CCV watershed, and outmigration survival of juvenile Chinook salmon. We also evaluated hypothetical outmigration survival rates in the context of alternative flow regimes. We addressed the following questions: (1) Is there evidence of nonlinearity in the flow–survival relationship in the Sacramento River? (2) If so, how can knowledge of the nonlinear relationship be used to enact ecologically functional flows that benefit juvenile Chinook salmon? Finally, we weigh the efficacy of two different alternative flow regimes on increasing population-level Chinook salmon outmigration survival rates.

METHODS

Study area

The Sacramento River is the largest river in California and supports the second largest

population complex of Chinook salmon on the U.S. West Coast. However, the Sacramento River has been severely altered from its historic state, with major dams constructed throughout its watershed, extensive water diversions in place for municipal, industrial, and agricultural uses, and diking for flood control and land reclamation. Shasta Reservoir and its downstream forebay Keswick Reservoir are key components in the interface between human alterations and the ecosystem in the Sacramento River. These reservoirs block passage to historic salmonid spawning and rearing habitat upstream and also regulate downstream flow. During all months, the large majority of streamflow in the Sacramento River is regulated by reservoir operations, which alters the seasonal patterns of the natural hydrograph, including the homogenization and reduction of flows during some critical salmon rearing and migration periods (Brown and Bauer 2009), as well as altering other environmental conditions, such as water temperature and turbidity.

All of the juvenile winter-run Chinook salmon (ESA endangered status), significant portions of the juvenile spring-run Chinook salmon (ESA threatened status), and juvenile fall/late-fall-run Chinook salmon (ESA species of concern) must navigate a portion of the Sacramento River with several large-scale, and hundreds of small-scale, water diversions. In the late spring, when a large portion of these juveniles outmigrate, natural seasonal reductions in tributary inputs coincide with increases in water diversions; the cumulative impacts of which result in incrementally lower flows in the more downstream reaches, until the confluence with the Feather River, the largest tributary of the Sacramento River (Fig. 1). This pattern is primarily expressed in a region (hereafter “region of interest”) extending from the last major tributary before the Feather River on the upper end, the confluence with Deer Creek (Tehama County, river kilometer [rkm—distance from the Pacific Ocean by way of river] 425), to the Feather River confluence on the lower end (Sutter County, rkm 204; Fig. 2). We presume that detrimental impacts of low flows are primarily expressed in this region, where flows in the late spring are often the lowest of the year. In addition, flows in this region are considerably lower relative to the portions of the Sacramento

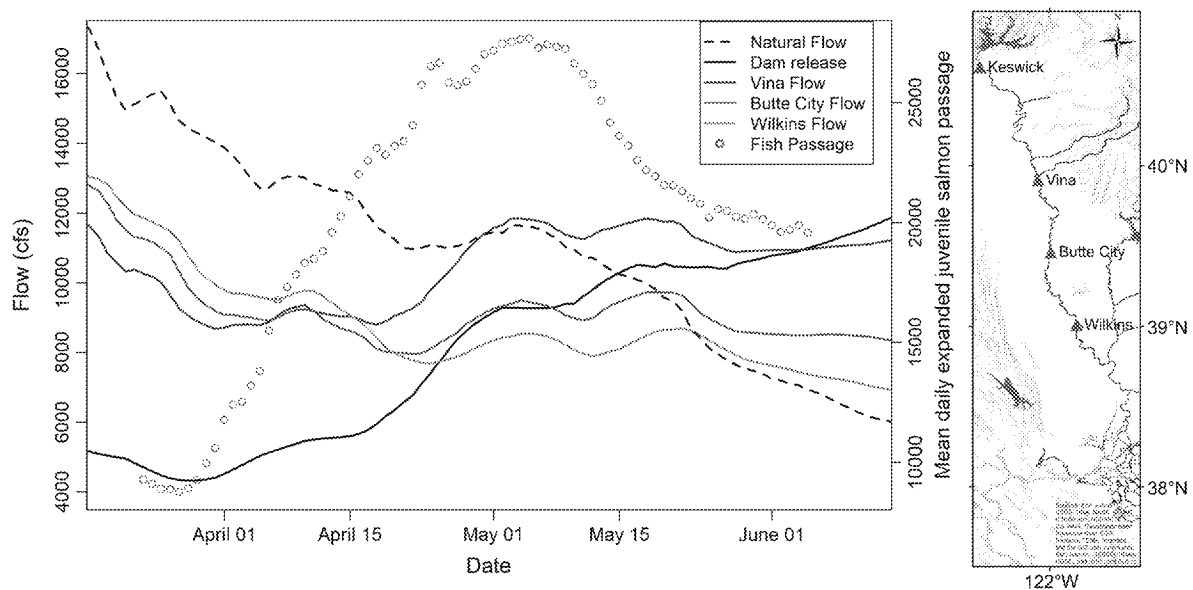


Fig. 1. Mean daily Sacramento River hydrographs for the spring period from 2000 to 2019, (excluding those classified as wet: 2006, 2011, 2017, 2019), mean daily natural hydrograph (dashed line), and mean daily expanded juvenile salmon passage (gray points, data from USFWS Red Bluff rotary screw traps, 38 rkm upstream of the region of interest). Flow levels (in cfs) are plotted through time at several gauges along the river, starting from Keswick gauge (dam release: USGS station number 11370500) on the upstream end to Wilkins Slough gauge (USGS station number 11390500) on the downstream end (color legend inset has gauges listed in order from upstream to downstream). The mean daily natural flow regime is the sum of the full natural flow statistic on the California Data Exchange Center (<http://cdec.water.ca.gov>) for the Bend Bridge (BND) gauging station, along with the daily flow from Mill Creek (USGS 11381500) and Deer Creek (USGS 11383500) gauges. It is therefore representative of the estimated full natural flow entering the region of interest. A 10-d moving average smoothing has been applied to all hydrographs and fish passage data. All stream gauges are operated by either USGS, US Bureau of Reclamation, or California Department of Water Resources.

River upstream and downstream, both of which are not characteristic of historic conditions. The survival rate of acoustic-tagged juvenile Chinook salmon in certain sections of this region is the lowest on the Sacramento River (Michel et al. 2015, Notch et al. 2020).

Study fish and season

The large majority of juvenile Chinook salmon in the Sacramento River rear and outmigrate during the winter or spring months (Fisher 1994). Historically, these seasons typically provided adequate flows and cool water temperatures to allow for juveniles to rear in, and transit through, downstream regions. At present, flows are only occasionally adequate for outmigration or off-channel rearing in most years. This is primarily

due to reduced reservoir releases in order to store water for use in the summer months, after the outmigration window (Sturrock et al. 2020). In the winter and early spring, flows increase in the downstream direction from Keswick to Wilkins Slough until mid-April (Fig. 1), driven by tributary inflows that greatly exceed diversions. After mid-April, there is an inversion in this pattern, and flows are substantially lower at Wilkins Slough compared to Keswick (Fig. 1), resulting from cumulative diversions greatly exceeding tributary inflows during the agricultural irrigation season. It is during this same mid- to late spring period, after the inversion, that a significant portion of natural-origin juvenile salmon outmigrate through this region (Fig. 1). In addition, most CCV juvenile Chinook salmon

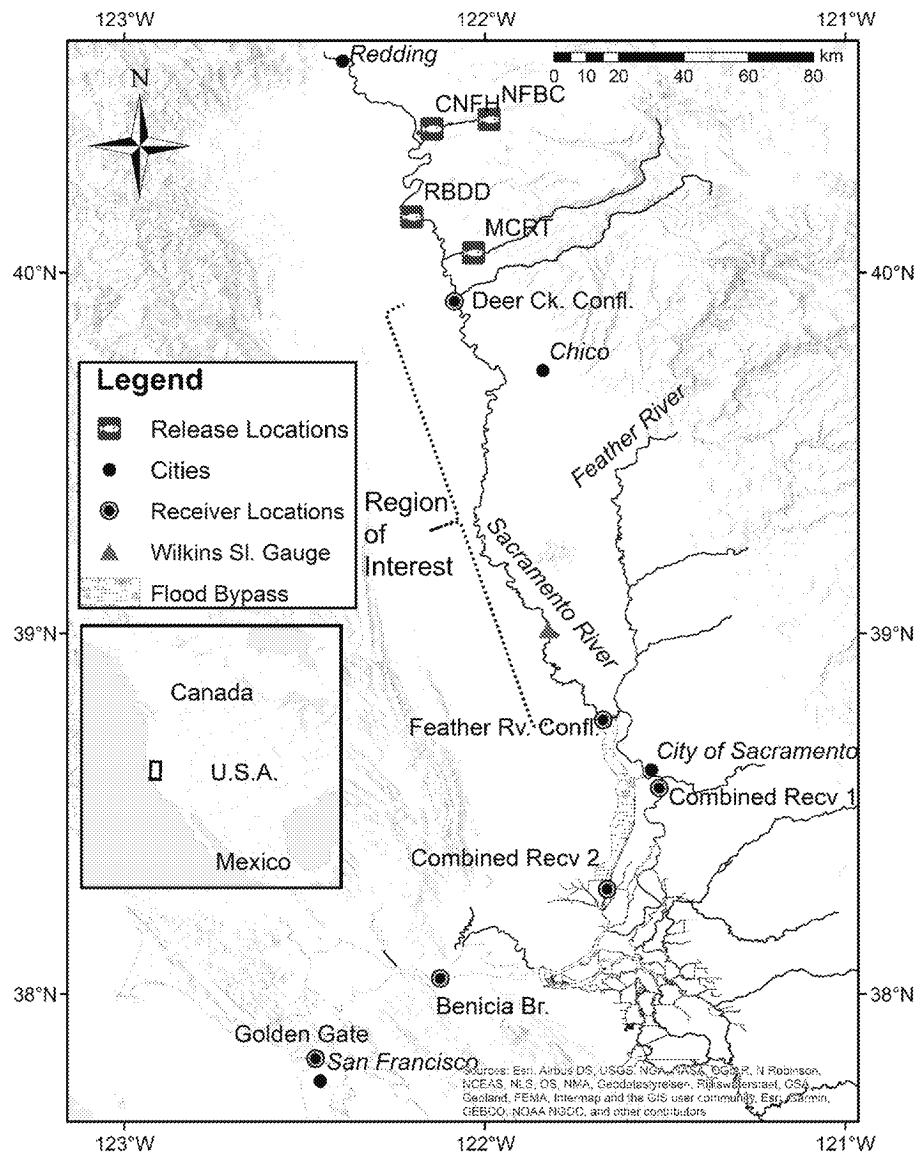


Fig. 2. Study area, release locations, and receiver locations. Region of interest spans from the confluence with Deer Creek to the confluence with Feather River. Release location abbreviations are CNFH, Coleman National Fish Hatchery; NFBC, North Fork Battle Creek; RBDD, Red Bluff Diversion Dam; and MCRT, Mill Creek rotary screw trap.

hatchery releases also peak in spring (Huber and Carlson 2015), during which their outmigration survival rates also appear to be sensitive to flow rates (Zeug et al. 2020).

Acoustic telemetry studies investigating the survival and movement of juvenile salmon in the Sacramento River have proliferated in recent years (Michel et al. 2015, Cordoleani

et al. 2018, Notch et al. 2020). We compiled all the available spring period (15th March–15th June) acoustic tagging data for the Sacramento River and selected fish that were released upstream of the region of interest (above rkm 425): 3402 in total. Of those fish, only fish that were known to have entered the region of interest played a large role in parameterization

of the flow–survival relationship explored in this analysis. Fish that did not appear to survive to the region of interest may have simply not been detected entering the region and therefore play a small role in the parameterization of the flow–survival relationship. The number of fish that were known to enter the region of interest amounted to 2436 acoustic-tagged fish from six different years, including wild and hatchery fish, and fish from three of the four Sacramento River Chinook salmon populations (Table 1).

Acoustic telemetry

Wild fish were collected using rotary screw traps deployed in the Sacramento River and Mill Creek, while hatchery fish were collected from hatchery raceways. Fish were tagged using similar methods across years and populations as described by Deters et al. (2010). Acoustic tags were surgically implanted into the coelomic cavity of the anesthetized fish and closed using one or two interrupted sutures, depending on tag model. Wild fish were allowed to recover in a net pen for approximately 12 h post-surgery and released on-site after sunset. Hatchery fish were allowed to recover for up to 24 h post-surgery and released on-site, or trucked to a release location using an aerated hatchery transport tanker. All release sites were located at least 25 rkm

upstream of the region of interest (Fig. 2), such that by the time fish arrived to the region of interest any potential influences of handling, trucking, or release site on survival should have largely been expressed and should have little to no effect on survival estimates in the region of interest.

All fish were tagged and tracked using the Juvenile Salmon Acoustic Telemetry System (McMichael et al. 2010). Tags were programmed to transmit at three-, five-, or ten-second intervals depending on tag type, enabling them to function for a minimum of 27, 32, and 52 d, respectively. Tag size depended on the study population and ranged in size from 10.5 mm long × 5.2 mm high × 3.0 mm wide to 10.7 mm long × 5.0 mm high × 2.8 mm wide. The transmissions from the tags were detected and the unique tag number recorded by autonomous receivers from different manufacturers (ATS [Isanti, Minnesota, USA], Teknologic [Edmonds, Washington, USA] or Lotek Wireless [Newmarket, Ontario, Canada]). All receiver locations had two or more receivers to maximize detection probability. In an effort to reduce the tag burden in study fish, a maximum 5% tag-to-fish weight ratio was observed. This allowed for fish as small as 75 mm to be tagged and released. Fish tagged ranged from 75 to 120 mm fork length (mean 86.8, standard deviation [SD] 5.8).

Table 1. Wild and hatchery tagged fish groups included in our analysis from 2013 to 2019.

Population	Origin	Year	Release dates	Release location	N	Genetic population origin
Mill Creek	Wild	2013	Mid-April to mid-May	MCRT	48	74% CCV fall-run 26% CCV spring-run
Coleman	Hatchery	2013	Mid-April	CNFH	285	100% CCV fall-run
Mill Creek	Wild	2015	Mid-April to mid-May	MCRT	110	44% CCV fall-run 56% CCV spring-run
Coleman	Hatchery	2016	Early-April to late-April	CNFH	540	100% CCV fall-run
Mill Creek	Wild	2017	Mid-April to late-April	MCRT	24	100% CCV fall-run
Coleman	Hatchery	2017	Early-April to late-April	CNFH	370	100% CCV fall-run
Sacramento River	Wild†	2017	June 6	RBDD	33	100% CCV fall-run
Sacramento River	Wild†	2018	Early-May to early-June	RBDD	207	100% CCV fall-run
Livingston Stone	Hatchery	2019	March 26	NFBC	199	100% Sacramento winter-run
Coleman	Hatchery	2019	April 11	CNFH	140	100% CCV fall-run
Coleman	Hatchery	2019	Late-May	RBDD	480	100% CCV fall-run
Total		2013–2019	Late-March to early-June		2436	

Notes: CCV, California's Central Valley. Release locations are further described in Fig. 2. Genetic population assignments made using protocols outlined in Clemente et al. (2011).

† Fish captured in rotary screw traps in the Sacramento River and tagged were assumed to be wild, although some hatchery fish may have been misidentified and incidentally tagged.

Cormack-Jolly-Seber model

We used the Cormack-Jolly-Seber (CJS) model for live recaptures within Program MARK (White and Burnham 1999) using the RMark package (Laake 2013) in R statistical software (vers. 3.6.1; R Core Team 2019) to estimate survival as well as to assess the fit of different flow relationships with survival. For species that express an obligate migratory behavior such as Chinook salmon, a spatial form of the CJS model can be used, in which recaptures (i.e., tagged fish detected downstream from release) occur along a migratory corridor. The model determines if a fish not detected at a given receiver location was ever detected at any receiver downstream of that specific receiver, thus enabling calculation of maximum-likelihood estimates for detection probability of all receiver locations (p), survival (Φ), and 95% confidence intervals for both (Lebreton et al. 1992).

If a predator consumes an acoustic-tagged salmon and swims downstream past the next receiver location, the CJS model would incorrectly assign that fish as having survived the reach in which it was consumed. In the river above tidal influence, Chinook salmon express obligate anadromy and do not typically travel upstream (i.e., against current) once migration has begun; any movements in the upstream direction are likely predator movements. We therefore used the entirety of detection data available in the Sacramento River for each year (>12 receiver locations per year) to truncate the detection history of each fish to only include detections leading up to the first upstream movement, if one occurred.

We then subset the remaining detection data to only include receiver locations that bookend the region of interest. After release, the first receiver location was at the Deer Creek confluence (rkm 425), at the upstream end of the region of interest. The second receiver location was located just below or above the Feather River confluence depending on the year (rkm 204 or 211, respectively), and therefore, the reach between these receiver locations encompassed the entire region of interest (Fig. 2). We also included additional receiver locations further downstream in the detection history to allow for an estimation of detection probability at the Feather River confluence location. However, during high flow events, such as in 2017 and 2019, a portion of the

Sacramento River spilled into a flood bypass located just upstream of the Feather River confluence (Fig. 2). Since this introduced a secondary migration route, we used a combination of receivers at the end of the bypass (located at Liberty Island, Solano County) and receivers in the mainstem Sacramento River (located at City of Sacramento, Sacramento County) to create a synthetic recapture event in the detection history, ensuring both potential routes were covered. These data were only included in the analysis to better estimate detection probability at the end of the region of interest. Finally, we also used two downstream receiver locations to further improve detection probability estimation, one at Benicia Bridge (Contra Costa County, rkm 52) and at the Golden Gate, the entrance to the Pacific Ocean (rkm 1).

Flow–survival relationship

Each fish was assigned a value equal to the mean flow over the entire travel time from passing the Deer Creek confluence to first detection at the Feather River confluence. For fish not detected at the Feather River confluence (either due to mortality upstream, or imperfect detection probability; representing 75.3% of all fish), we imputed travel time by creating probability density functions (p.d.f.s) from all known travel times for each tagging group (i.e., rows in Table 1) using kernel density estimation (“density” function in R statistical software). We then imputed travel time by randomly selecting a point along the p.d.f. for that fish’s tagging group. We used flow values from the United States Geological Survey’s (USGS) Sacramento River at Wilkins Slough gauging station (USGS station number 11390500). This location was nearest to the downstream end of the region of interest and represented the minimum flows that fish would experience during the late spring period (15th April and later; Fig. 1).

We created an initial CJS model by grouping fish based on 5% quantile bins of the flows they experienced. These survival groups, parameterized in the model by dummy variables, were allowed to only impact survival estimates of the region of interest (i.e., reach 2: Deer Creek confluence to Feather River confluence, Φ_{reach2}).

To explore nonlinearity in the flow–survival relationship, we employed model selection using

the Bayesian Information Criterion (BIC) to assess the parsimony of different flow–survival modeling structures. We created multiple CJS models that allowed the relationship between flow and survival in the region of interest (reach 2: Deer Creek confluence to Feather River confluence) to take linear, log-linear, polynomial, cubic spline curve, and threshold (i.e., step function) forms. We used flow values for individual fish as individual covariates in the first four model types and as a grouping variable (dummy variable) for the threshold model. We also explored the potential for multiple thresholds in the flow–survival relationship. For all models, detection probability was allowed to vary by receiver location and tagging group. More details on the flow–survival modeling effort can be found in Appendix S1.

Spring pulse flow scenarios and theoretical survival improvements

Where we found strong evidence of a nonlinear flow–survival relationship, we assessed different management strategies that could use this information to improve cohort outmigration survival of salmon in the Sacramento River. We generated two hypothetical implementations of pulse flows during the spring period for the study years (2013–2019). The first implementation scenario allowed for sustained flows that would result in the highest survival rates based on the nonlinear flow–survival relationship. Sustained flows were centered around the average date of peak spring juvenile salmon outmigration (April 19th, based on 2005–2019 expanded juvenile salmon capture data from USFWS's Red Bluff rotary screw traps, https://www.fws.gov/redbluff/rbdd_biweekly_final.html) and scheduled to last as long as possible given the water budget. The second scenario represented an adaptive management implementation of spring pulse flows: Following a substantial increase in daily catch rates at the Red Bluff rotary screw traps, flows were temporarily increased (for four days) to the levels that would result in the highest survival rates based on the nonlinear flow–survival relationship. The maximum number of four-day pulse flow events was enacted given the available water budget. Days with substantial increases in catch rates at the rotary screw traps are proximate estimates of periods of peak

outmigration of juvenile salmon, and we estimated these days to be when both (1) total expanded catch exceeded 10,000 juvenile salmon and (2) the increase was more than one standard deviation over the mean from the previous 10 d. Finally, we used two water budgets for these scenarios: a realized water budget (which consisted of the totality of water released from Keswick Dam during the spring of each year) and an ecosystem water budget, which added 150 thousand acre-feet (TAF) to the realized water budget each year.

We used the expanded combined daily catch of all runs of Chinook salmon for determining peak outmigration triggers. Expansion factors were based on capture efficiency trials operated by USFWS Red Bluff Office, and the resulting expanded total catch numbers represent the total number of fish passing the screw trap at Red Bluff. The rotary screw traps are 38 river kilometers upstream of the region of interest and therefore approximately represent the daily number of fish entering the region of interest during their outmigration. The screw traps are operated continuously, except during the passage of significant numbers of hatchery fish or during storm conditions (B. Poytress, *personal communication*). As a result, some spring sampling days are missing from our study period. Furthermore, some days of significant hatchery fish catches were also removed from the dataset; these days were identified as days when expanded daily catch total surpassed 80,000 fish.

To estimate the realized water budget, we multiplied the sum of the mean daily flow estimates (cfs) from 15th March to 15th June from the Keswick Dam gauge (USGS station number 11370500) by 1.983×10^{-3} to convert to volume (TAF). To benefit outmigrating salmon, the nonlinear flow–survival targets from the most parsimonious CJS model would need to be realized at the Wilkins Slough gauge, so we estimated a daily net change between Keswick Dam and Wilkins Slough. This approximates the net difference between water inputs (tributaries) and water exports (water diversions) between the Keswick Dam and Wilkins Slough at a daily time step. Finally, all alternative flow regimes had three important regulatory constraints: (1) minimum Keswick flows of 3250 cfs (National Marine Fisheries Service 2009 Biological Opinion and

Conference Opinion on the Long-Term Operations of the Central Valley Project and State Water Project: NMFS 2009 BiOp), (2) maximum Keswick flow reduction rate of 15% per day (U.S. Bureau of Reclamation 2008 Central Valley Project Biological Assessment), and (3) no alteration to any daily Keswick releases that were deemed to be for flood control (>20,000 cfs).

We then modeled the impact of the different flow implementation scenarios on cohort outmigration survival of spring-outmigrating juvenile Chinook salmon. We used parametric bootstrapping, where the pertinent logit-transformed survival distribution from the CJS model (given flow levels at Wilkins Slough for that day) was resampled corresponding to the expanded daily total catch at the Red Bluff screw traps. We estimated the mean logit-scale survival from the totality of samples across all days of the spring period, and then re-scaled (inverse-logit transform). For missing daily catch values, we imputed catch using a linear interpolation of the time series. Finally, to provide a baseline for assessing the potential survival gains of each scenario, we estimated the cohort outmigration survival for the status quo (using the observed spring hydrograph in the years 2013–2019).

RESULTS

We found strong evidence of nonlinearity in the flow–survival relationship (CJS model with grouping based on 5% quantile flow bins, Fig. 3). Survival was positively related to flow for values up to 10,000 cfs, followed by a sharp increase in survival near 10,000 cfs, at which point survival asymptotes at approximately 50%.

Out of 724,567 models we tested, the triple threshold models were the most parsimonious, with 12 that were within two BIC points of the top model. We estimated survival parameters and threshold values (4259, 10,712, and 22,872 cfs) from these 12 models using model averaging. The threshold models were substantially better supported than any of the other model types tested ($\Delta\text{BIC} > 29$). Furthermore, these threshold models, as well as all polynomial and spline models, were better supported than the linear, log-linear, and full models ($\Delta\text{BIC} > 146$), indicating strong support of a non-linear flow–survival relationship.

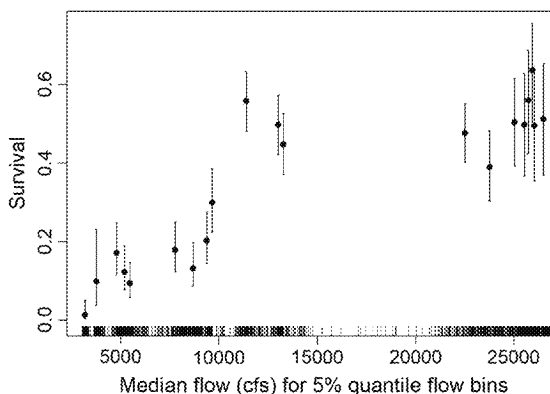


Fig. 3. Survival as a function of flow. Survival estimates (points) with 95% confidence intervals (bars) for groups at 5% quantile bins of experienced flow, plotted at the median value of bins (in cfs) on the x-axis. Flow experienced per fish is indicated by vertical tick marks along the x-axis.

In order to better understand model fit across the range of potential flow thresholds, for each flow value tested in the threshold models, we estimated the mean BIC of all models that included that flow value as one of its thresholds (Fig. 4). With similar results to the model selection exercise, models with flow thresholds around 4259, 10,712, and 22,872 cfs had strong support (i.e., lower mean BIC). We labeled these minimum (4259 cfs), historic mean (10,712 cfs), and high (22,872 cfs). The historic mean threshold had highest support of the three thresholds

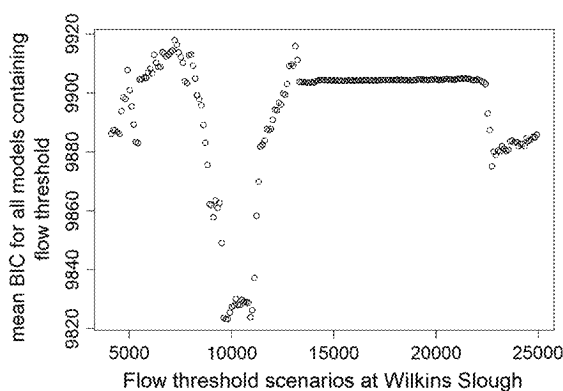


Fig. 4. Mean BIC scores per threshold value as a function of flow. A lower BIC value indicates a stronger supported model.

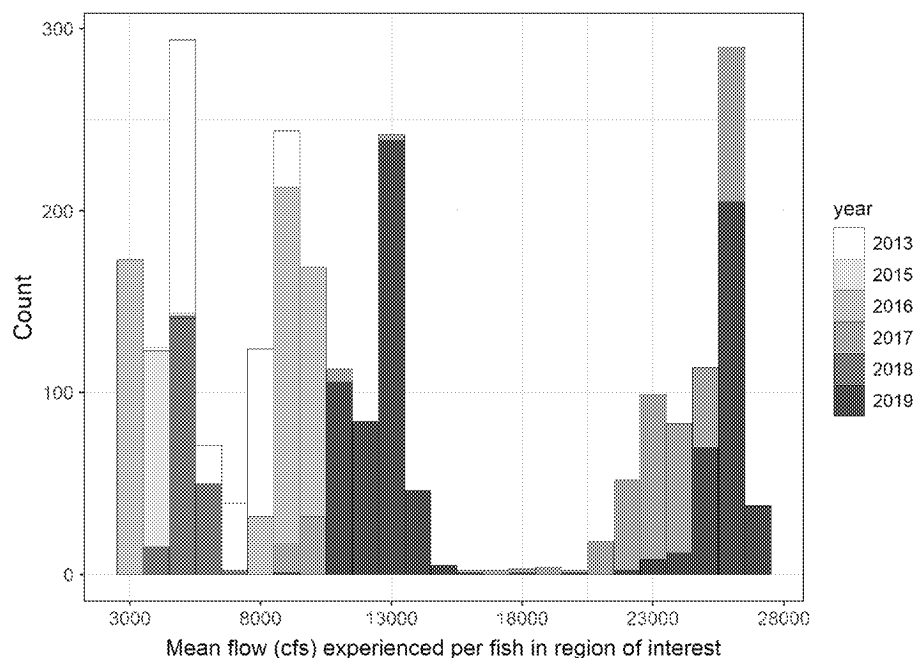


Fig. 5. Frequency of flow values used in analysis by year. Values are mean flow (cfs, as measured at Wilkins Slough gauge), both empirical and imputed, for all fish. Flow bin sizes are 1000 cfs, and bar colors indicate the relative number of fish by year for each flow bin.

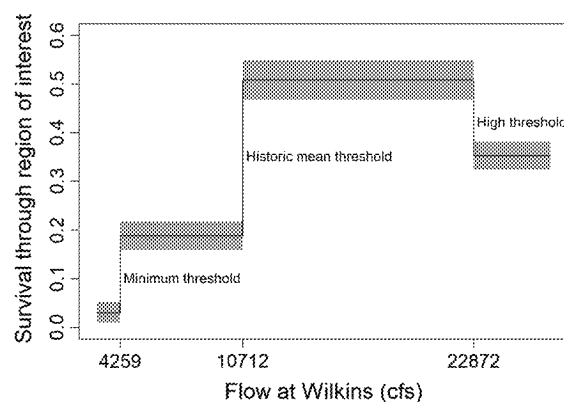


Fig. 6. Thresholds of predicted survival as a function of flow at Wilkins Slough. Predictions are based on the model averaged parameters from the most parsimonious triple threshold models, with mean thresholds at 4259, 10,712, and 22,872 cfs, with 95% confidence intervals (gray fill).

(Fig. 4). Few fish experienced flow values between approximately 14,000 and 21,000 cfs (Fig. 5), and therefore, model fit did not vary significantly with thresholds found in this range.

We used model averaged parameter estimates to predict survival for the range of flow values (Fig. 6). There was a 6.3-fold increase in survival from flows below 4259 cfs (0.03) to flows between 4259 and 10,712 cfs (0.189). There was a 2.7-fold increase in survival from flows between 4259 and 10,712 cfs to flows above 10,712 cfs (0.508). Overall, there was a 16.9-fold increase in survival from flow below 4259 to flows above 10,712 cfs. Finally, survival decreased above the 22,872 cfs threshold to 0.353. Survival was significantly different between groups, with non-overlapping 95% confidence intervals. The 22,872 cfs threshold may be an artifact of lower detection efficiencies associated with fish utilizing additional high flow migration routes with less receiver coverage.

We compared modeled cohort outmigration survival rates among five different water release scenarios for five water years with the modeled survival rates for actual flows (Fig. 7). Water years 2013 (dry), 2014 and 2015 (critical), and 2016 and 2018 (below normal) represent three classes of water supply scarcity in the Sacramento River Basin (<http://cdec.water.ca.gov/re>

portapp/javareports?name=WSIHIST). For dry year 2013 and below normal years 2016 and 2018, the three alternative scenarios using the available water budget resulted in survival rate increases ranging from 55% to 98%, while the scenarios with an additional 150 TAF resulted in survival rates increases ranging from 79% to 119%.

For critical years 2014 and 2015, the realized water budgets were not sufficient to allow for the alternative release scenarios, beyond just maintaining flows above the low flow threshold for as long as possible (resulting in survival rate increases of 83% and 132%, respectively). Scenarios using an additional 150 TAF resulted in survival rate increases ranging from 130% to 330%.

DISCUSSION

Streamflow is a master variable in stream ecology, influencing biological and physical habitat characteristics, and if not managed properly, flow alteration can be a serious threat to freshwater ecosystems. Yet, water management decisions continue to be poorly informed by environmental research (Davies et al. 2013, Horne et al. 2016). In the Sacramento River Basin, surface water demands exceed supplies in all but the wettest years (Grantham and Viers 2014), and there is a pressing need to optimally allocate those limited resources to meet management objectives, including ecosystem benefits. We identified threshold responses in salmon outmigration survival across a range of observed instream flow rates. These relationships are valuable tools for updating water management practices aimed at balancing competing demands. Applying our minimum threshold (4259 cfs) as a lower critical flow boundary for spring flows could result in a 6.3-fold increase in outmigration survival. Flows above the historic mean threshold (10,712 cfs) could provide an additional 2.7-fold increase in survival. Flows above this threshold could be enacted when the resources are available, especially if coordinated with hatchery releases or peak wild salmon migration periods. All else being equal, these survival gains could result in concomitant increases in adult escapement. These modeled survival benefits justify the need to identify ways to exceed these flow thresholds

more consistently and for longer periods during the spring months.

High flows promote favorable outmigration conditions for Chinook salmon juveniles, resulting in increased survival to the ocean (Connor et al. 2003, Smith et al. 2003). We identified an optimal threshold of 10,712 cfs, which we labeled historic mean, as it is similar to the long-term average of natural spring flow conditions under which Chinook salmon have evolved in this system (Fig. 1). One potential mechanism for this threshold is high flows typically increase water turbidity, which may aid juveniles in evading predators (Gregory and Levings 1998). Alternatively, it is known that outmigrating juveniles move at higher speeds with higher flow (Berggren and Filardo 1993), limiting their exposure time to predators and other hazards. Movement speeds and survival rates of wild Chinook salmon juveniles in this section of the river are strongly correlated (Notch et al. 2020). Therefore, to determine whether movement speeds may be one of the mechanisms driving the 10,712 cfs threshold, we conducted a post hoc analysis of fish travel times through the region of interest as grouped by the flow threshold boundaries. A Kruskal–Wallis test indicated significant differences in travel time distributions between the groups ($P < 0.001$), and a Dunn's multiple comparison test indicated that travel times for fish experiencing flows between 10,712 and 22,872 cfs were significantly shorter than for fish experiencing all other flow levels (Fig. 8).

Flow levels above the historic mean threshold represent normal spring time flows under natural runoff and streamflow conditions up until approximately 15th May (Fig. 1). Yet, from 1993 to 2019 such flows were only achieved in 37% of days during the 15 April–15 May peak outmigration period, and only 10% of days in below average water years (Fig. 9), and were even less likely to occur later in the spring (Fig. 10). In late spring (after approximately 15 April), tributary flows subside and demand for agricultural water deliveries increase dramatically, a combination that creates progressively diminished instream flow in downstream reaches (Fig. 1). Sturrock et al. (2020) found that under current water management regimes, the low flows and high water temperatures that occur in the late spring are selective forces against the later-migrating smolt

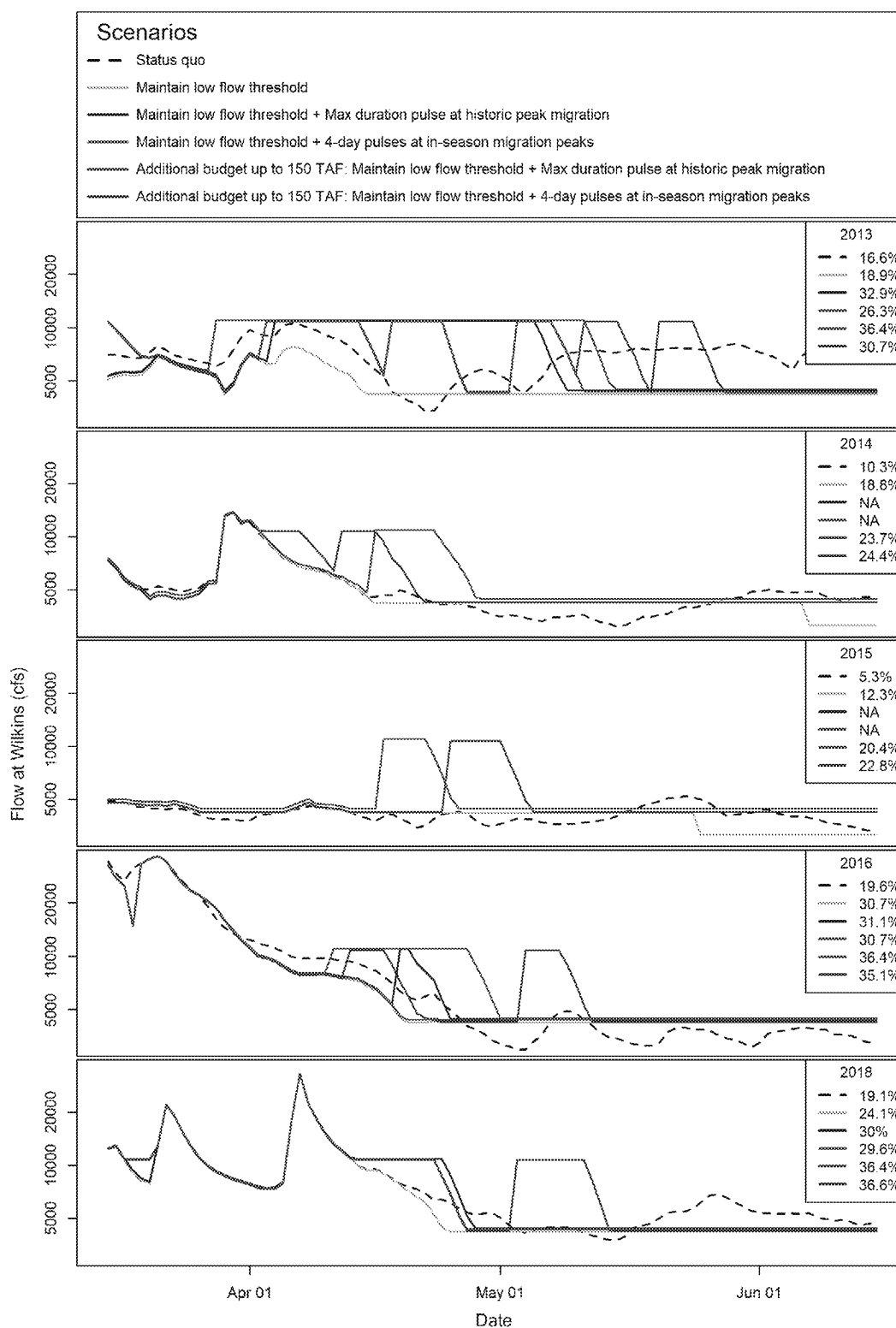


Fig. 7. Alternative flow scenario hydrographs using the flow–survival nonlinearities found in this study. Predicted cohort spring outmigration survival based on flow scenarios and daily fish passage at Red Bluff rotary

Fig. 7. Continued

screw traps are depicted in figure legends. Scenarios for 2017 and 2019 water years are not depicted, as wet conditions in those years precluded the need for pulse flows. In the historic drought years of 2014 and 2015, pulse flows were not possible based on realized water budget (NA for respective survival estimates in legend).

juvenile life-history type (>75 mm fork length [FL]). The implementation of spring pulse flows above the 10,712 cfs threshold could be a powerful tool to restore functional parts of the natural flow regime during critical periods of the salmon life history, and ultimately, the increased heterogeneity of flows may promote increased population diversity.

The mechanism driving the lower flow threshold (4259 cfs) is unclear. Anecdotal observations indicate that under certain low flow conditions, sections of the Sacramento River may have increased habitat heterogeneity, in particular with regard to pools and riffles where predator ambush habitat is likely created (C. J. Michel, *personal observation*). Flow influences other important environmental variables, such as water temperature, that might also have nonlinear

relationships with survival. Because temperature and flow are highly correlated (flow and temperature experienced for these fish as measured at Wilkins Slough had a Pearson's correlation coefficient of 0.93) and flow is the most persistent driver of survival in the CCV (Henderson et al. 2019, Notch et al. 2020), we did not include temperature in this analysis. At very low flows during the latter end of the spring period, water temperature in the lower Sacramento River can approach the thermal tolerance of juvenile Chinook salmon. For fish outmigrating during flows lower than the low flow threshold, mean water temperature experienced was 19.9°C (0.5 SD) as measured at the Wilkins Slough gauge. At this temperature, salmon health and vulnerability to predation can be affected and ultimately lead to lowered survival (Marine and Cech 2004, Miller et al. 2014, Lehman et al. 2017, Michel et al. 2020). During most years, spring outmigration flows are above the lower threshold, and these unfavorable conditions are usually only observed during years of drought (e.g., 1994, 2013–2015; Fig. 10). However, in recent years, spring flows below this lower threshold have occurred in years of near average precipitation (i.e., 2016, 2018; Fig. 10), likely resulting from a complex suite of factors, including reservoir management strategies for conserving cold water for endangered winter-run Chinook salmon, and increasing water deliveries for out-of-stream uses during the summer months.

Of the models we tested, the threshold models had strongest support, possibly because they allow for a sharp transition between survival levels as a result of small changes in flow across some ecologically important value. For example, exceeding a given threshold can lead to river bank overflow, which activates seasonal floodplains, providing juvenile salmon an alternative downstream migration route. This is the hypothesized mechanism for the high threshold (22,872 cfs): Tisdale Weir, within the region of interest, overtops at approximately this flow value, allowing fish to enter the Sutter Bypass. Survival decreased at flows above this

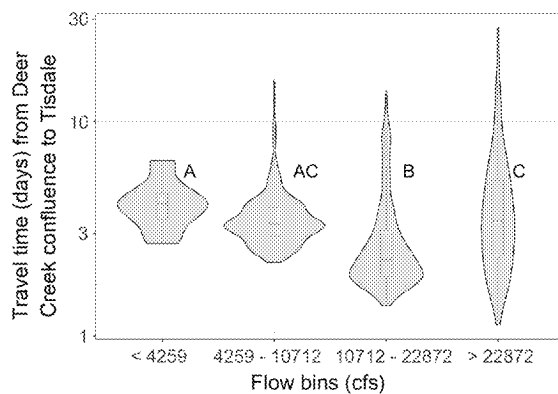


Fig. 8. Distribution of fish travel times (log-scale) through the area of interest as a function of flows experienced with respects to the flow thresholds. Travel time is calculated for fish detected both at Deer Creek confluence and at Tisdale (rkm 269), representing the upper 74% of the region of interest. Travel times to the end of the region of interest (Feather River confluence) were not used as too few fish remained in the <4259 cfs group to accurately represent travel times for that group. Letters within the plot frame indicate significant differences between travel time distributions from a Dunn's multiple comparison test, at the 0.05 level.

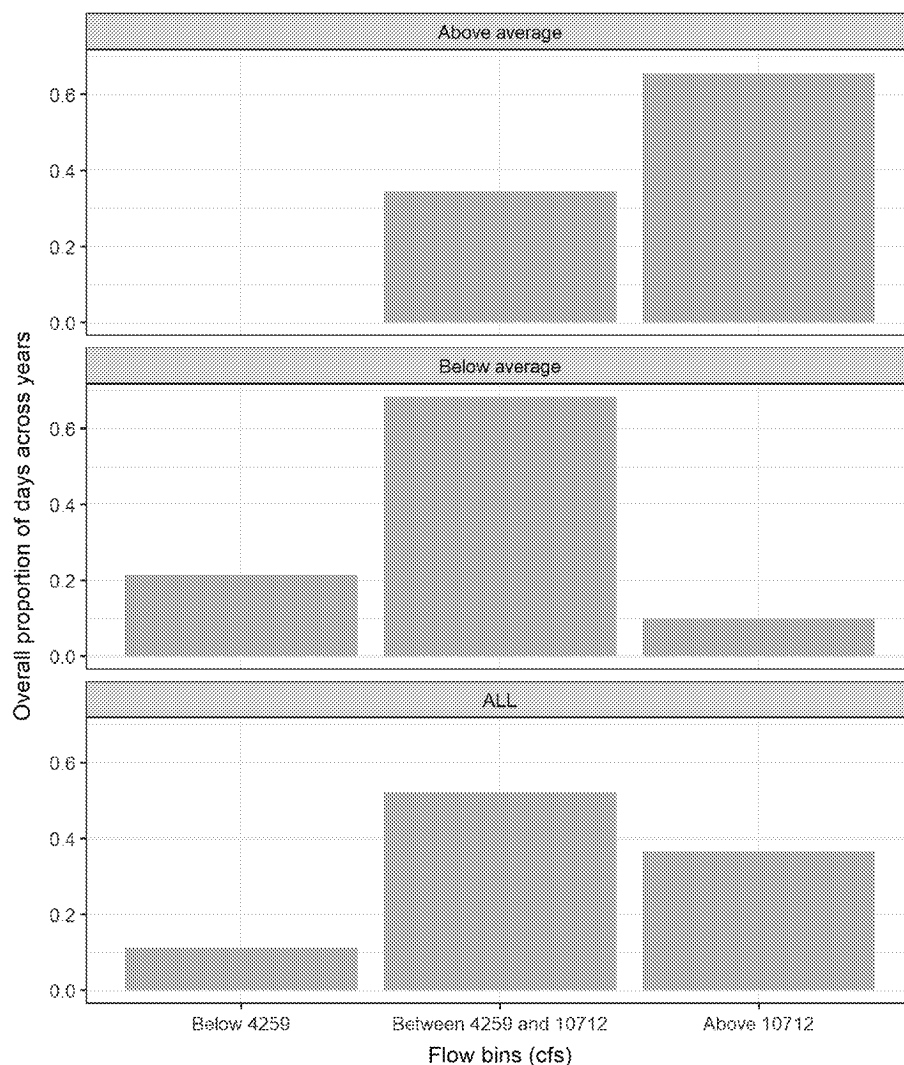


Fig. 9. Proportion of daily flows at Wilkins Slough that fall below, between, or above the two lower flow thresholds from 15th April to 15th May period from 1993 to 2019, split out by above average (i.e., wet and above normal) and below average (i.e., below normal, dry, and critically dry) water years, according to the Water Year Hydrologic Classification Index for the Sacramento Valley (<http://cdec.water.ca.gov/reportapp/javareports?name=WSIHIST>).

threshold, which could be evidence that fish utilizing this alternate route experienced decreased survival compared to fish remaining in the Sacramento River. While flood bypasses are generally considered to be high-quality rearing habitat for juvenile salmon (Sommer et al. 2001), there is little known about the relative survival of fish utilizing these habitats. Travel times for fish above the high threshold were significantly higher and are more widely

distributed than for fish just below this threshold (Fig. 8), with fish taking up to 27 d to transit the region of interest. These slower moving fish may have been delayed as a result of spending time on floodplains, and their increased exposure time to potential stressors may explain their decreased survival in comparison to fish just below the high threshold that could not access the floodplains. This is consistent with the results of a similar study

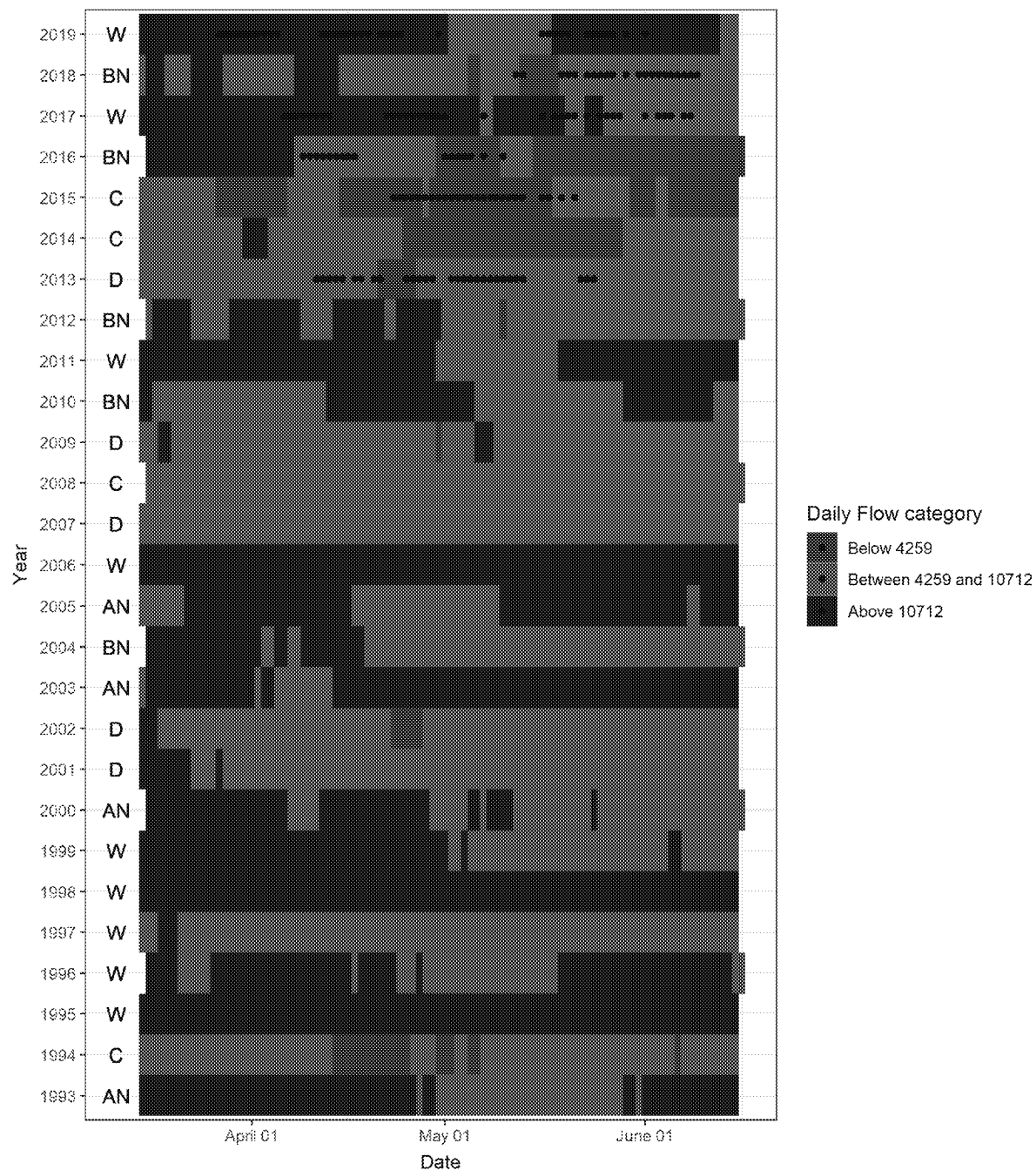


Fig. 10. Classification of flow values into the below 4259 cfs, between 4259 and 10,712 cfs, and above 10,712 cfs categories for each day of the spring outmigration period (15th March–15th June) for the years 1993–2019. Flow values are as measured at USGS Wilkins Slough gauging station on the Sacramento River. Black points represent days when acoustic-tagged fish were entering the region of interest. Text within box indicates the Water Year Hydrologic Classification Index for the Sacramento Valley (<http://cdec.water.ca.gov/reportapp/java/reports?name=WSIHIST>); year type codes are W, wet; AN, above normal; BN, below normal; D, dry; and C, critically dry.

where survival per day was similar between release groups that traveled through a floodplain compared to those that traveled through the mainstem river, and yet due to longer travel times through the floodplain, the floodplain groups experienced overall lower survival rates (Pope et al. 2018). It should again be noted that the detection probability of fish utilizing the bypass route is likely lower, which could be a confounding driver of the high threshold.

The alternative flow regimes indicated that substantial survival gains over the status quo were possible by leveraging the thresholds we identified. These flow scenarios lead to increases in annual outmigration survival ranging between 57% and 130% without additions to the water budget and increases ranging from 79% to 330% with a modest 150 TAF addition to the water budget (Fig. 7). There were no clear and consistent differences in survival between the historic peak migration pulse flow scenario and the four-day adaptive pulse flow scenario, whether with the realized water budget or with the additional environmental water budget. We included an additional scenario where flows mimicked the status quo hydrograph, but flows were not allowed to dip below the minimum threshold, which alone led to substantial gains in survival in the Critical Dry water years 2014 and 2015 (Fig. 7). Adaptive pulse flow scenarios may be preferable to a single-pulse, fixed calendar date scenario in ways not measured in this study. For example, the adaptive implementation will be more responsive to hydrologic or biotic nuances of a given year and promote more diversity in outmigration timing.

Our analysis is consistent with many studies concluding that flow is a strong driver for Chinook salmon smolt spring outmigration survival. This period of time coincides with peak hatchery releases and peak natural-origin outmigration of fall-run Chinook salmon, the stock that supports an important commercial and recreational fishery, as well as peak outmigration of ESA threatened wild spring-run Chinook salmon smolts from Sacramento River tributaries. Spring-run Chinook salmon populations historically spawn at high elevations and therefore experience slower growth rates and delayed outmigration timing compared to other Chinook salmon populations (Yoshiyama et al. 1998). This delayed

outmigration timing makes them particularly vulnerable to low flows in the late spring. Further, these late outmigrants are subject to asynchronous flow conditions between natal streams (when their initial downstream migration is triggered by snow melt or spring freshets in the tributary) and the mainstem Sacramento River, where they experience periods of low managed flows. Restoring the functionality of the spring flow regime during wild smolt outmigration is a critical step toward promoting sustainable fisheries (Jager and Rose 2003), as well as restoring a threatened population of salmon.

Other CCV native fish species may require different flow conditions during the spring, potentially creating water management conflicts. For example, high flows and cold water from dam releases may have detrimental impacts on threatened green sturgeon (*Acipenser medirostris*) in the Sacramento River (Zarri et al. 2019). Similarly, endangered winter-run Chinook salmon rely on cold water released from Shasta Reservoir during egg development in the summer, which is contingent on water operations that allow sufficient cold water availability in Shasta Reservoir for the summer months (Martin et al. 2017). Increasing spring flows for the benefit of fall-run and threatened spring-run Chinook salmon requires carefully balancing the needs of other protected species in the Sacramento River.

Our study focused on the flow–survival relationship for the smolt outmigration life history, as it was based on acoustically tagged fish, and tag size constraints precluding the tagging of smaller juveniles. However, other juvenile life-history types, namely fry and parr (approximately <55 mm and 55–75 mm FL, respectively), are important contributors to CCV Chinook salmon populations (Sturrock et al. 2020). While higher winter and spring flows also benefit fry and parr life histories (Sturrock et al. 2015, 2020), the flow thresholds defined in this study are for smolt outmigration and are likely not directly compatible with fry and parr life histories, which need flows appropriate for rearing. In addition, wild smolts were underrepresented in this analysis due to the difficulty in capturing adequately sized individuals for tagging, and the results we present are likely driven largely by survival dynamics of hatchery fish. Nonetheless, targeting ecologically functional flows that mimic the

shape of the historic flow regime under which these fish evolved should also benefit these other populations and promote life-history diversity.

Our study identifies key thresholds in the flow–survival relationships that can help water and fisheries managers evaluate trade-offs associated with different water management options that are, by law, supposed to balance instream and out-of-stream management objectives. We recommend that future studies attempt flow experiments to verify that migrating salmon would benefit as predicted from managed flow augmentation (such as pulse flows). It is likely that such pulse flows will engendered larger cohort-wide survival gains than predicted here: Flow pulses are known to promote juvenile Chinook salmon to initiate their downstream migration (Sykes et al. 2009), allowing a larger portion of the population to take advantage of the associated improvements in survival. Courter et al. (2016) used managed flow releases in the Yakima River, Washington, to show the positive impact of increased flow on Chinook salmon smolt survival, which was then used to implement a minimum flow target. Experimental pulse flows may also help decouple the mechanisms driving increased survival, because increased flows through reservoir releases may not affect temperature and turbidity the same as storm-related flow increases. Ultimately, functional flows in CCV should include a spring pulse flow component that mimics the characteristics of spring freshets and snowmelt events of a natural flow regime. These will benefit outmigrating smolts and also engender many other benefits to the ecosystem (Poff et al. 1997, Kiernan et al. 2012).

This is timely research as the frequency of drought events is predicted to increase in the CCV, creating additional stress to already vulnerable salmon populations (Yates et al. 2008). Munsch et al. (2019) showed a truncation of fish size and outmigration timing of juvenile Chinook salmon from the Sacramento River during warmer springs, which could lead to lower ocean survival. This highlights the influence of climate change on salmon species phenology and dynamics and the need for new flow management policies that include the potential impacts of future climate warming. In the Sacramento River, finding functional flows that could simulate ecologically critical aspects of the natural

spring flow regime, especially in increasingly common dry water years, is a critical step in ensuring the resiliency of juvenile Chinook salmon and other native fish species into the 21st century.

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DATA AVAILABILITY

The data that support the findings of this study are openly available from the National Oceanic and Atmospheric Administration's ERDDAP data server at: https://oceanview.pfeg.noaa.gov/erddap/tabledap/FED_JSATS_detects.html. The authors report no conflict of interest.

SUPPORTING INFORMATION

Additional Supporting Information may be found online at: <http://onlinelibrary.wiley.com/doi/10.1002/ecs2.3498/full>

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/24/2023 2:07:17 PM
To: Katherine Maher [KMaher@valleywater.org]
Subject: RE: Sites Project - Environmental Benefits
Attachments: 20230112_TWG Notificaiton Letter_Formatted_YochaDehe_Roberts.pdf; App H - Water Rights Terms.pdf; 03-02P Winter- Run Life Cycle Model Results.pptx; WRLCMreportMultiScenSitesAlt3AMod_Alt3BMod 2023_03_29_final.pdf; 202303_Enviro Work Group_Presentation.pptx

A few more things –

1. Letter to Yocha Dehe Tribe inviting them to the Tribal Working Group – I mentioned this working group on our call. We haven't yet met for the first time, we are working with the tribes to get the first meeting scheduled. But the letter describes a little bit more of the working group and the continued collaboration we are working towards with the Tribes.
2. Trinity River Term – This is the language that we worked with a small group of Trinity River interests, including non-governmental organizations to provide firm protections for the Trinity River. We submitted this term in our January 6 water right application package, requesting that the State Board put the term in our water right permit.
3. Winter-run Life Cycle Model – I've attached a short PowerPoint on the results from an RC/AB meeting, one from a workgroup meeting (which is a little more detailed), and a short summary of the results from the modeling team.

I am working on the following 3 items and should have more to you shortly:

1. #'s for salmon benefits, cold water pool, spring pulse and fall flow stability
2. Confirm \$4.5 billion or identify correct numbers to use
3. Final EIR/EIS modeling results

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe
Sent: Monday, April 24, 2023 12:59 PM
To: Katherine Maher <KMaher@valleywater.org>
Subject: Sites Project - Environmental Benefits

Katherine – It was great to chat on Friday.

Here's a start on the materials that I am going to send over. I'll send more later today also.

1. Proposition 1 water – Attached is a PowerPoint Slide Deck on the Prop 1 benefits. Its an old presentation, but figured that some of the slides/materials might be helpful. I just skimmed it and the biggest difference is that the Water Commission has now allocated us additional funding. Otherwise, I think its all still relevant. I've also attached a file summarizing the Prop 1 benefits from our State Feasibility Report. These are deliveries – so includes conveyance losses – and would be the water actually delivered to these benefit areas. And there is more info on the Refuge program here with a great map that we frequently use: [Refuge Water Supply Program Details \(ca.gov\)](#)

2. Michel et al paper – This is the basis of the 10,700 cfs at Wilkins Slough. Although the publication is long, in essence it found that, based on the data analyzed, the survival of juvenile salmon though the Sacramento River was substantially greater when flows at Wilkins Slough were equal to or greater than 10,712 cfs. I think the quick synopsis is in Figure 6 on page 10 and the paragraph to the right of the figure.

In the conclusion on page 11, the authors go on to state “High flows promote favorable outmigration conditions for Chinook salmon juveniles, resulting in increased survival to the ocean (Connor et al. 2003, Smith et al. 2003). We identified an optimal threshold of 10,712 cfs, which we labeled historic mean, as it is similar to the longterm average of natural spring flow conditions under which Chinook salmon have evolved in this system (Fig. 1).

I've got to hop on a call for a bit but will get more over later today.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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January 12, 2023

Yocha Dehe Wintun Nation
Mr. Anthony Roberts, Chairperson
P.O. Box 18
Brooks, CA 95606

Subject: Invitation to Participate in a Tribal Working Group; Sites Reservoir Project in
Glenn, Colusa, Tehama, and Yolo Counties, California

Dear Honorable Chairperson Roberts:

The Sites Project Authority has periodically reached out to you over the past several years to provide you information about the progress of the Sites Reservoir Project (Proposed Project or Project), and to invite you to consult on the Project under Assembly Bill 52 (AB 52), pursuant to Public Resources Code § 21080.3.1, as a tribe with a traditional and cultural affiliation with the Proposed Project area. We understand that not all tribes have the availability to consult under AB 52, but we continue to value your input on the Proposed Project. To this end, we are inviting you to participate in a Tribal Working Group (TWG) to address topics of concern and interest to tribes who have a traditional and cultural affiliation with the Proposed Project area.

We envision the TWG to include only those tribes with a direct ancestral relationship with the Project area: Cachil Dehe Band of Wintun Indians; Kletsel Dehe Wintun Nation; Yocha Dehe Wintun Nation; Grindstone Indian Rancheria of Wintun-Wailaki Indians; and Paskenta Band of Nomlaki Indians. The TWG would be organized and facilitated by Ali Forsythe, the Authority's Environmental Planning and Permitting Manager, and Kevin Spesert, the Authority's External Affairs Manager, along with the Authority's consultant team currently working with Yocha Dehe under AB 52. To facilitate communication within the Authority, a member of the Sites Reservoir Board of Directors and a Sites Reservoir Committee would be invited to attend meetings.

The need for confidentiality regarding information shared about sensitive topics is fully acknowledged and understood by the Authority which is one of the reasons we propose the meetings be held by invitation only. It is anticipated that sensitive topics, such as tribal cultural resources, would only be addressed at a very general level within the TWG. It is understood that individual tribes may not wish to share some information with their neighboring tribes and that such discussions would be managed appropriately and respectfully.



P.O. Box 517
Maxwell, CA 95955
530.438.2309



It is expected that the first meeting would be held in February 2023 with an expected frequency of bi-monthly. This meeting would be introductory, be about 2 hours and would provide a status update about the Proposed Project and a discussion with participants about administrative items such as meeting schedule and time, holding in-person or virtual meetings, and agreeing on goals and objectives for the group through mutual development of a TWG chartering document. The Authority will staff and pay for the meeting facilitation and provide all of the technical support needed for the meetings. Subsequent meetings would address topics generated by the interests of the TWG members. To kickstart the process, we have considered the following as potential topics for discussion:

- Workforce development including jobs for Tribal members during construction and implementation of the Project;
- Discussing any Tribal member concerns with local transportation impacts that might be associated with construction of the Project;
- Tribal interests in the recreational areas and amenities planned for the Project;
- Tribal interests in the biological mitigation sites to be developed as part of the project, including use of Tribal Ecological Knowledge; and
- Tribal interests in stewardship and future access to Project lands and resources that are not otherwise used for Project activities.

We anticipate that there will be other topics that you will want to address and are open to discussing topics of interest to the TWG members.

We hope that you will accept this invitation to be part of the TWG and help us better understand the challenges and concerns of the local Native American community relative to the Proposed Project, as well as explore opportunities to productively address these same issues. Both Ali and Kevin (mentioned above) are available if you have any questions about the TWG. Ali can be reached at aforsythe@sitesproject.org or (916) 880-0676 , and Kevin at kspesert@sitesproject.org or (530) 632-4071. One of them will be contacting you directly in the upcoming weeks to further discuss formation of the TWG.

Sincerely,

A handwritten signature in dark ink that reads 'Fritz Durst'.

Fritz Durst
Chair



P.O. Box 517
Maxwell, CA 95955
530.438.2309



Cc: Ms. Yvonne Perkins, Tribal Historic Preservation Officer
Yocha Dehe Wintun Nation
P.O. Box 18
Brooks, CA 95606



P.O. Box 517
Maxwell, CA 95955
530.438.2309

Proposed Sites-Specific Water Right Terms

Since submitting its water right application on May 11, 2022, the Sites Project Authority (Authority) has continued to coordinate with the Department of Water Resources (DWR) and the Bureau of Reclamation) to develop a mutually agreeable, Sites-specific term. In addition, the Authority has proactively reached out to water agencies, regulatory agencies, tribal entities, and non-governmental organizations to discuss the Project's water right application approach, identify concerns, and proactively address those concerns. As a result of this ongoing coordination, the Authority requests that the two additional terms below be included in the Project's water right permit.

Central Valley Project & State Water Project Term

No diversion is authorized that would adversely affect the operation of the Central Valley Project or State Water Project under the Projects' existing water rights in effect on the date of this Order and as such existing water rights may be modified. An adverse effect shall be deemed to result from permittee's diversion at any time the Bureau of Reclamation and the Department of Water Resources have declared the Delta to be in balanced water conditions under the Coordinated Operation Agreement, unless otherwise agreed by the Bureau of Reclamation and the Department of Water Resources. An adverse effect shall also include any time that such diversion would directly or indirectly require the Central Valley Project or the State Water Project to release water from storage or to reduce their diversion or redirection of water from the Delta to provide or assure flow in the Delta required to meet any applicable provision of state or federal law. All Sites Project diversions shall comply with the provisions of any operations agreement among the Department of Water Resources of the State of California, the Bureau of Reclamation, and the Sites Reservoir Joint Powers Authority, as may be amended from time to time.

Trinity River Term

The Sites Project's diversions to storage under this Permit shall not include the diversion or redirection of Trinity River water (water diverted by the Bureau of Reclamation from the Trinity River watershed into the Sacramento River watershed pursuant to its water rights) unless the Trinity River water is abandoned in the Sacramento River and all other diversion criteria in this Permit are met.

Furthermore, the Sites Project's diversions to storage under this Permit shall not negatively impact Trinity River obligations of the Bureau of Reclamation, including but not limited to those obligations specified in the 1959 Contract between the United States and Humboldt County, the Trinity River Mainstem Fishery Restoration Record of Decision, and the Long-Term Plan to Protect Adult Salmon in the Lower Klamath River, and related obligations in the Bureau of Reclamation's water right permits 11966, 11967, 11968, 11969, 11970, 11971, 11972, and 11973.

Reservoir Committee and Authority Board Meeting

Agenda Item 3.2: Winter-run Chinook Salmon
Life Cycle Model Results

March 17, 2023



Model Background

- Evaluates the effects of water operations on the population dynamics of Sacramento River winter-run Chinook salmon
 - Integrate effects across entire life-cycle and multiple environmental conditions
 - Evaluates effects to the abundance, distribution and survival of specific life stages in the river system, and ultimately to predict the effects at a population level
 - Requested by NMFS and CDFW for Federal and State ESA consultation

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2

Speaker: Ali

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Summary of WRLCM Key Results

- The Project has a slightly positive effect on winter-run with the potential to increase the overall population
- Benefits to winter-run are associated with periodic reductions in late summer water temperatures in critical water years that decreases salmon egg mortality
- Alternative 3A (Reclamation investment at 25%) has slightly greater benefits than Alternative 3B (16% investment)
 - May be able to create same benefits with more exchanges

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Speaker: Ali

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Summary of WRLCM Key Results (cont)

- Model accounts for diversion of water but applies parameters on the effect of diversions that may be overly conservative
- Project results in a slightly positive mean change in abundance of in-river spawners when averaged across all years of the model
- Average number of future spawning fish produced by each spawning adult is slightly higher with the Project (i.e., more offspring live to reproduce per spawning fish)

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Speaker: Ali

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Next Steps

- Continue discussions with agencies on interpretation of effects
- Incorporate results into Biological Opinion and Operations ITP application

Speaker: Ali

Questions?





WRLCM Report 2035, Sites Alt3A_Mod, Alt3B_Mod, and NAA DRAFT

QEDA Consulting, LLC

March 29, 2023

Note: For the WRLCM figures that are broken out by WYT, results for some lifestages (e.g., egg survival) will be summarized by the Water Year that matches the broodyear, whereas other lifestages (e.g., fry survival, smolt survival) will be summarized by the following year, when fry rearing and smolt outmigration occurs (water year = broodyear + 1).

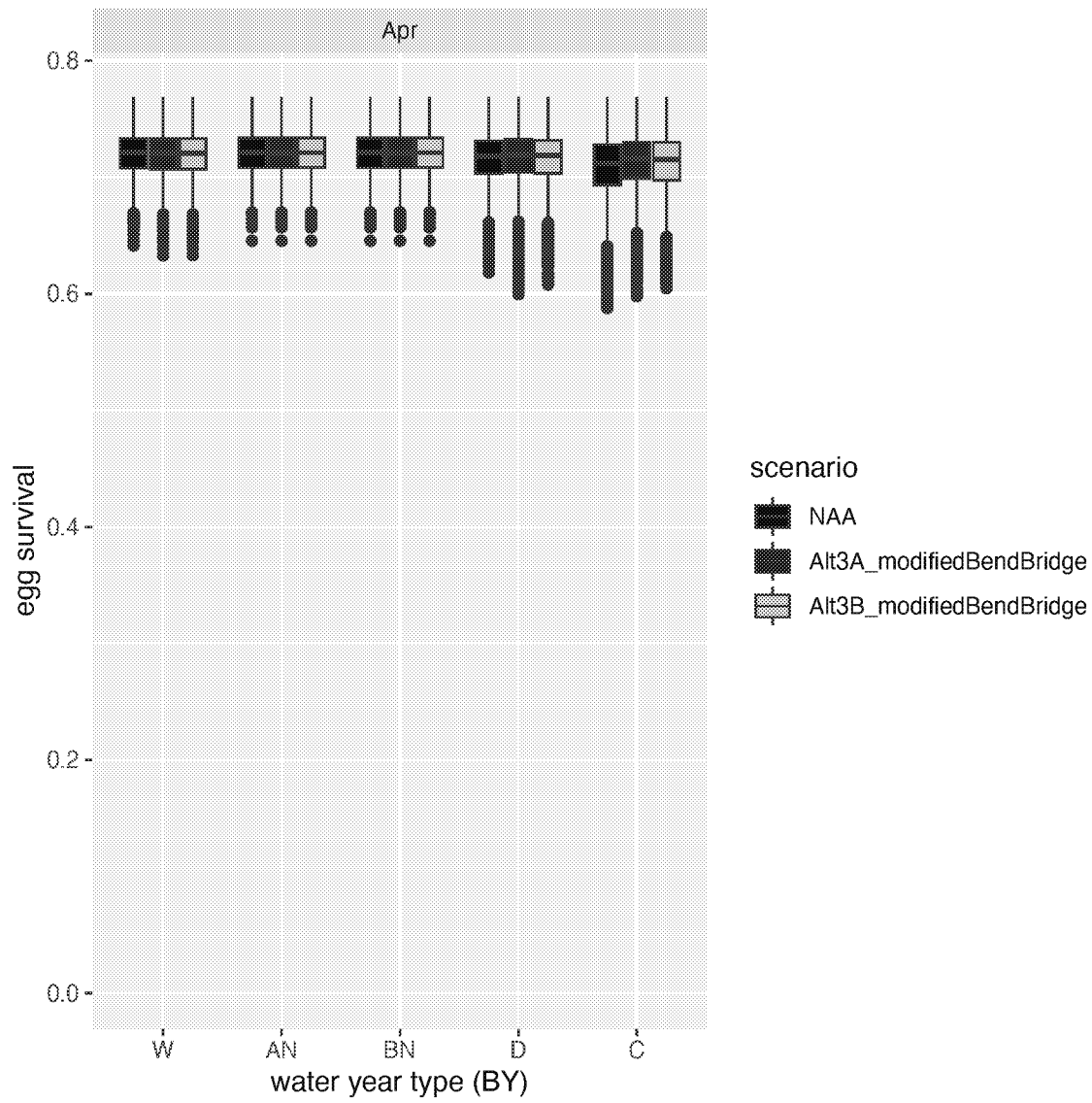


Figure 1: Apr egg survival by water year type.

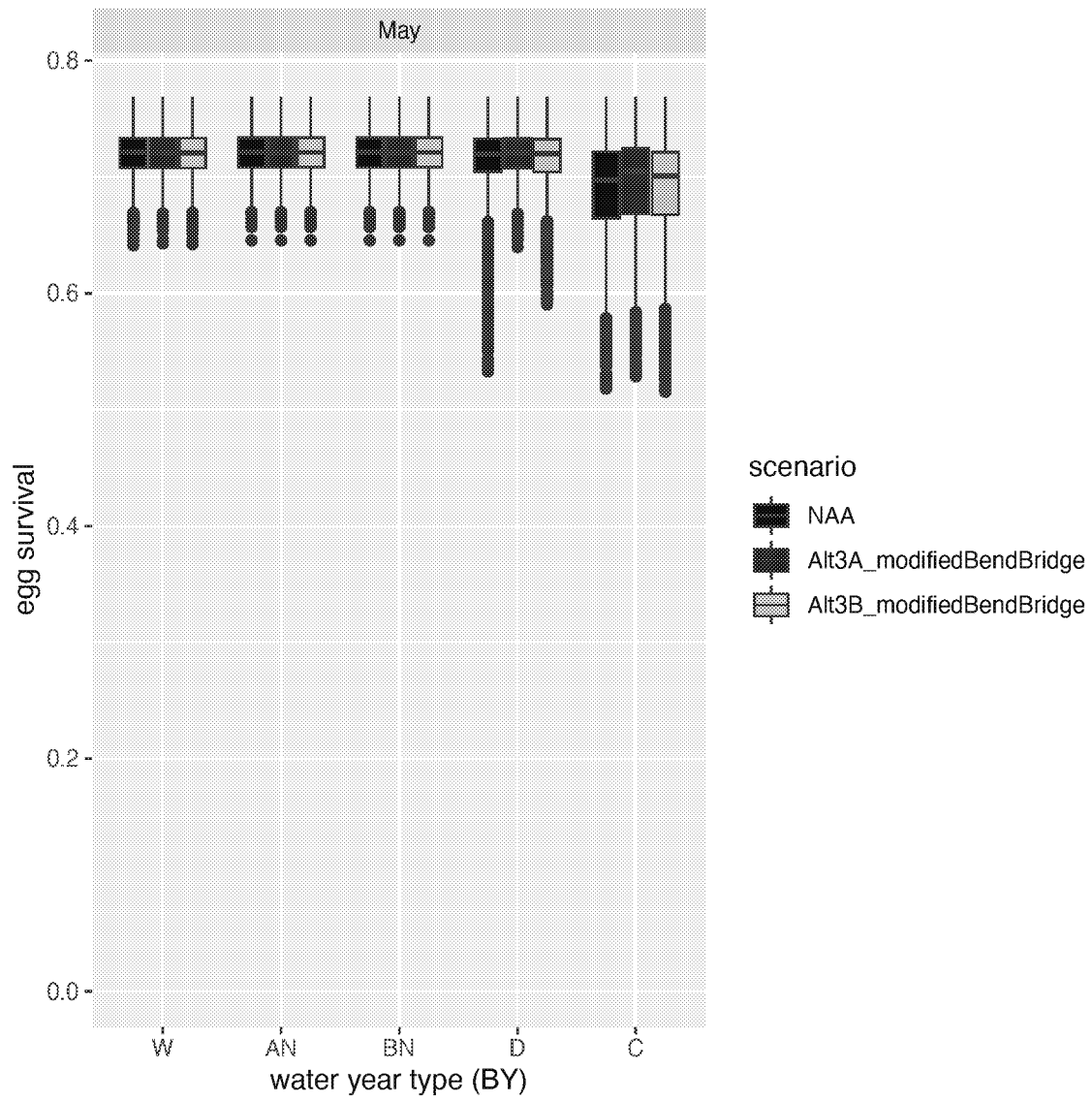


Figure 2: May egg survival by water year type.

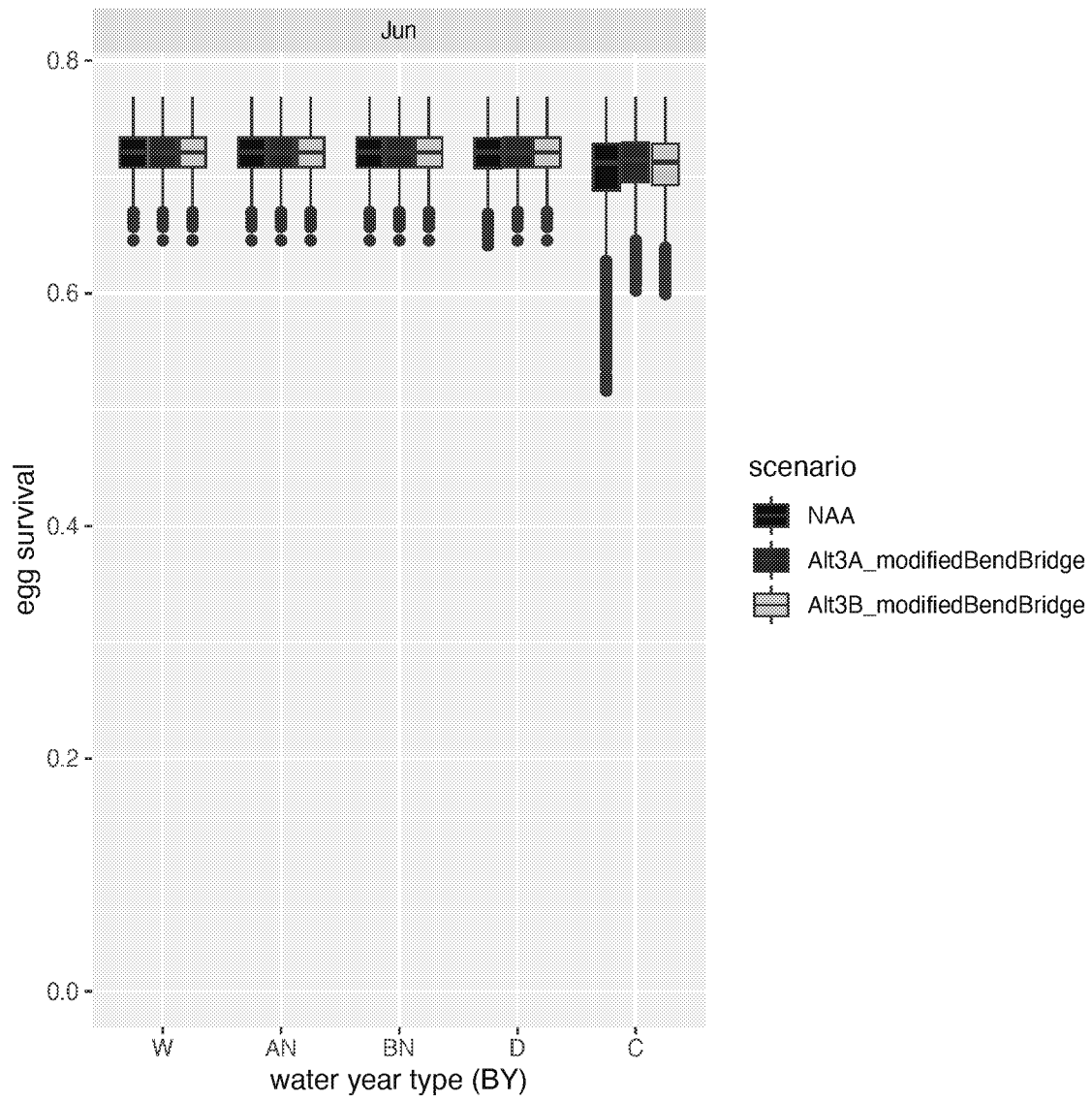


Figure 3: Jun egg survival by water year type.

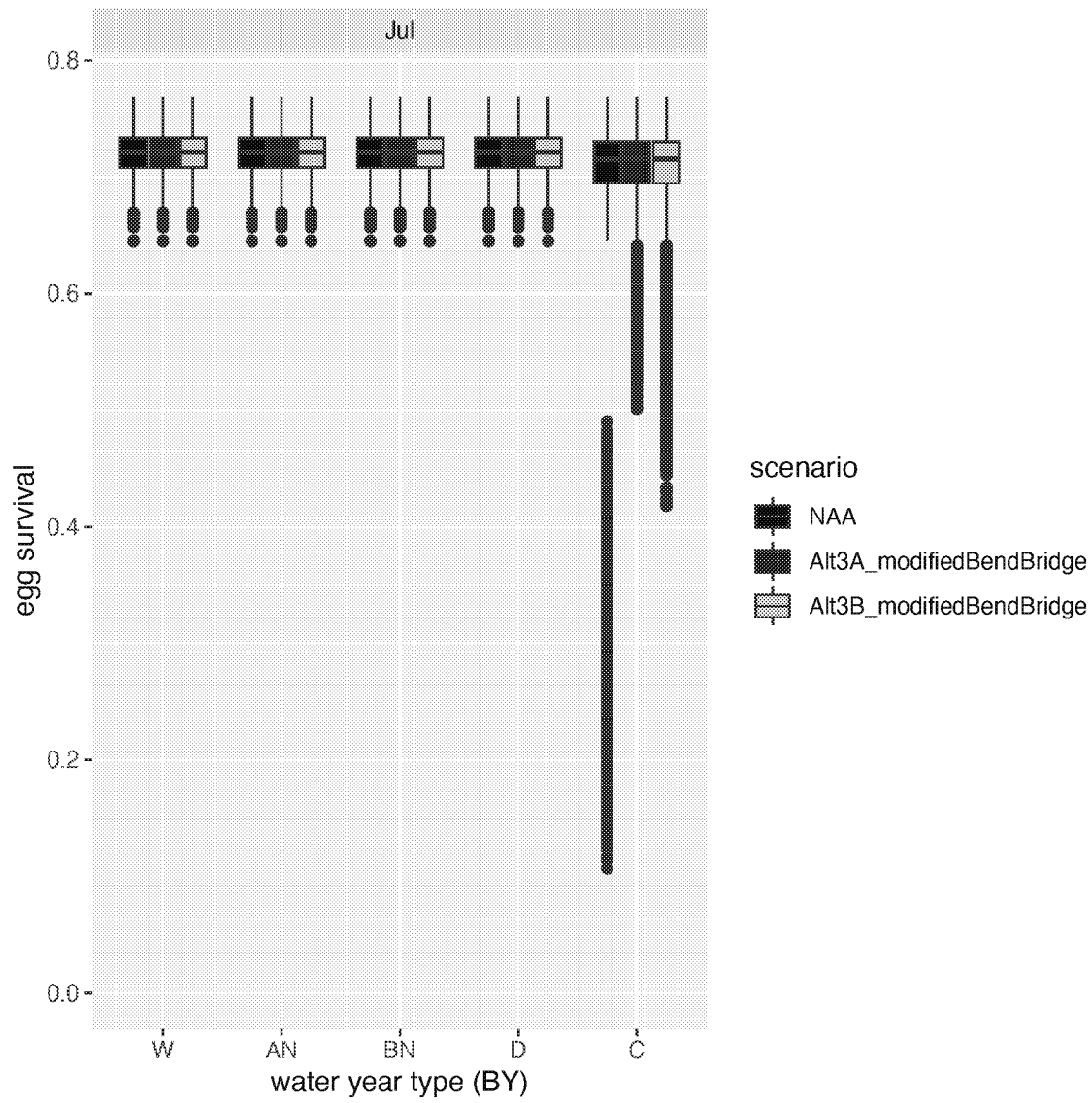


Figure 4: Jul egg survival by water year type.

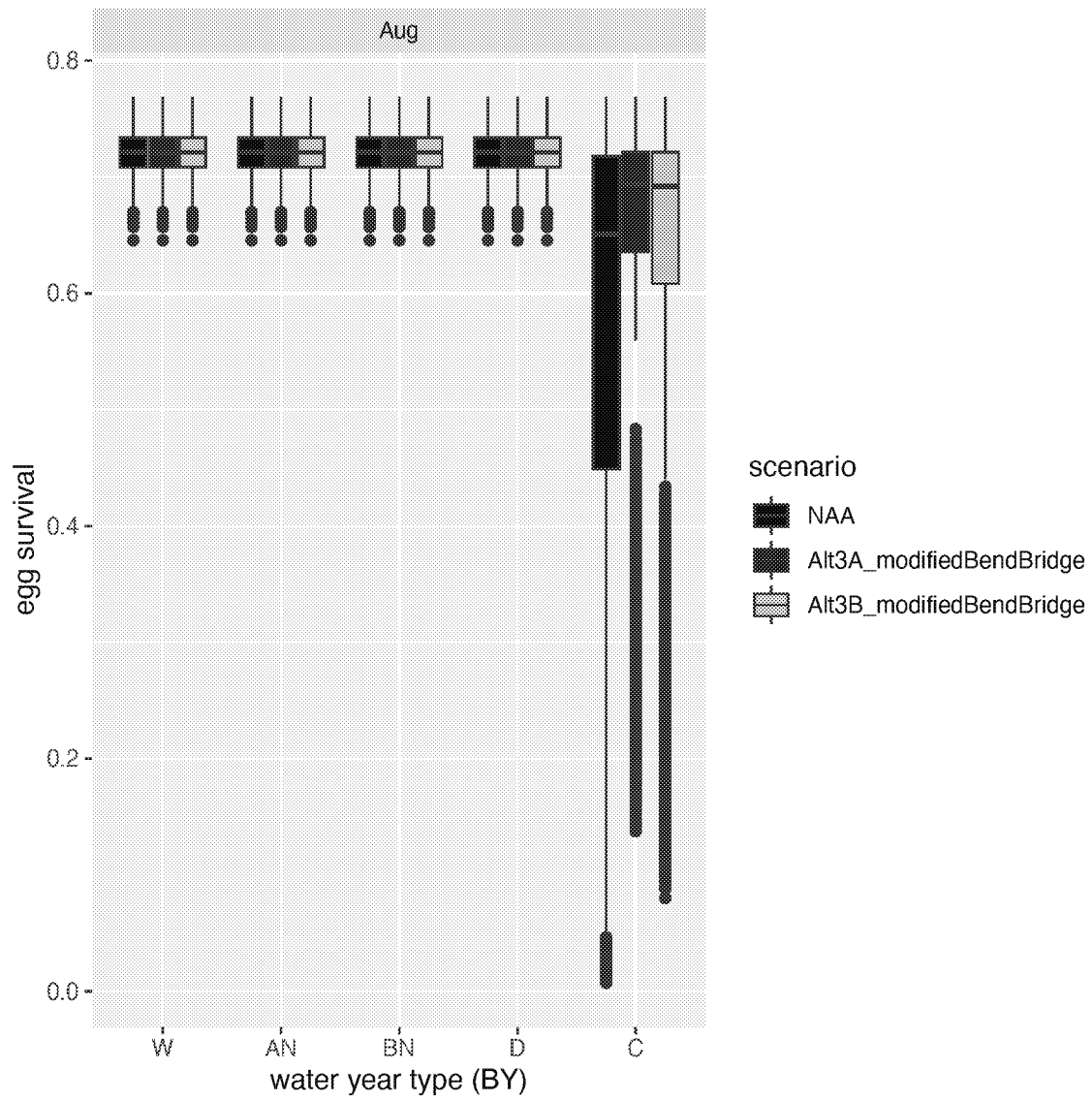


Figure 5: Aug egg survival by water year type.

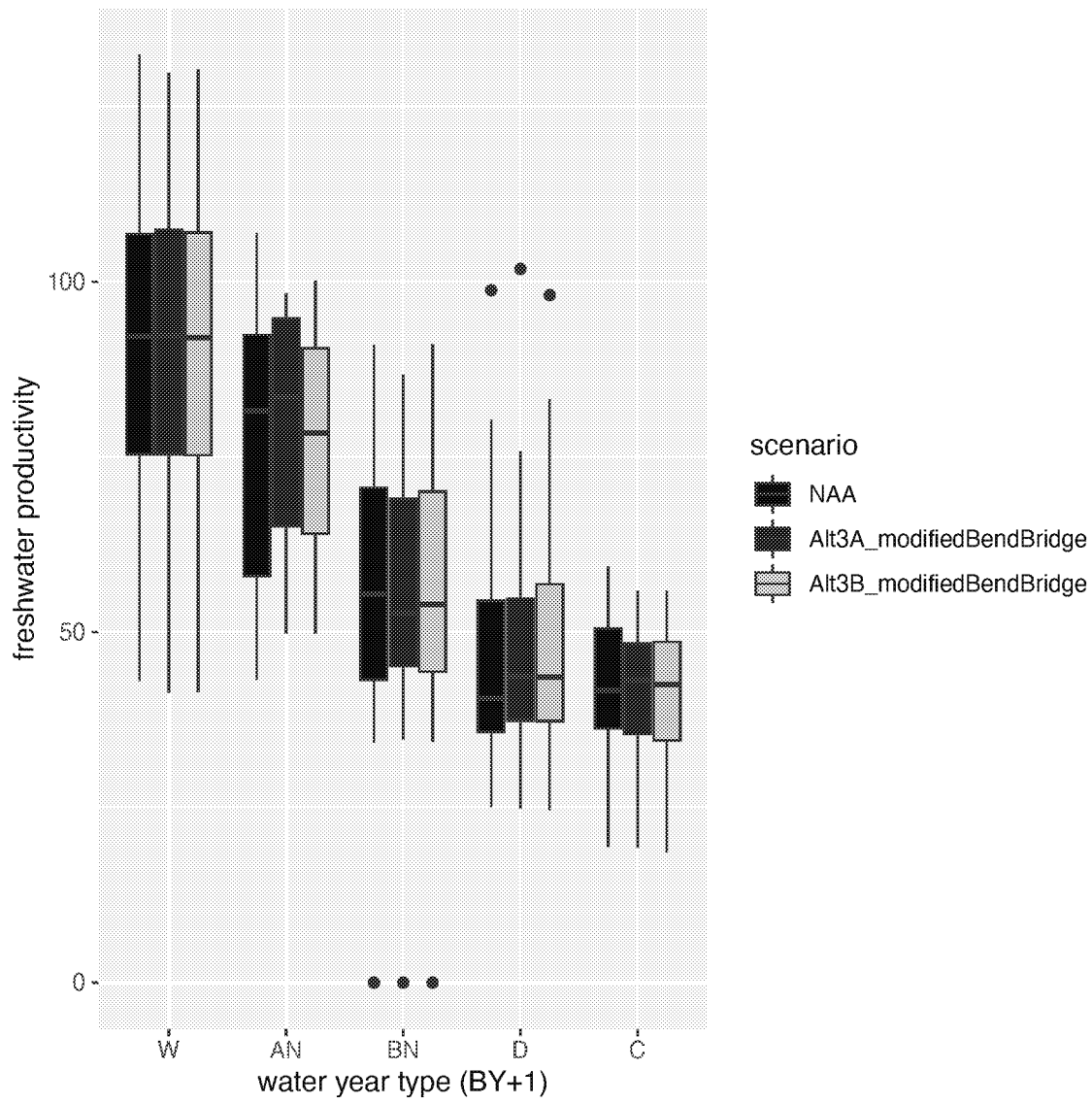


Figure 6: Boxplots of median freshwater productivity (gulf smolts per spawner) by water year type.

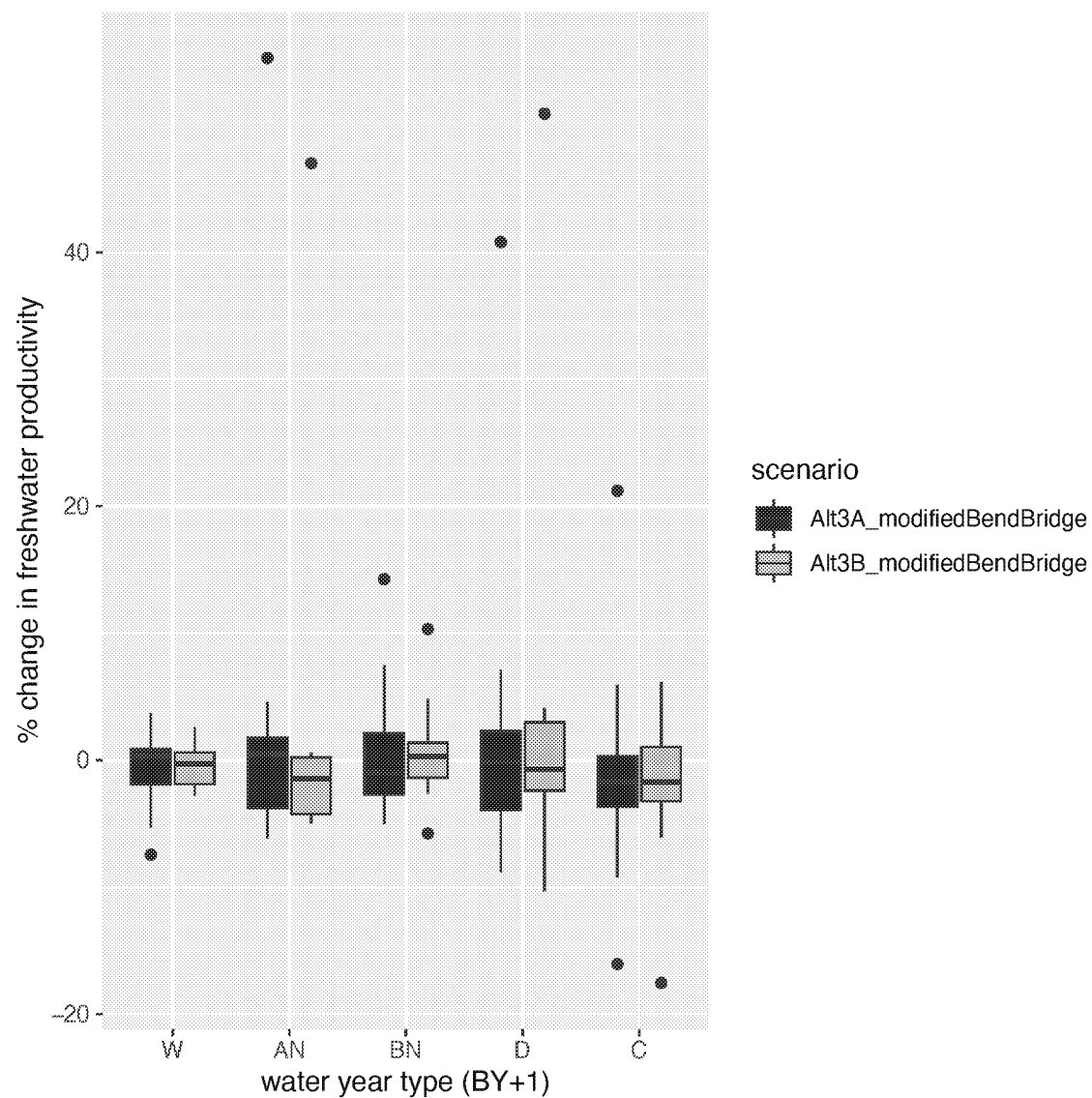


Figure 7: Boxplots of percent change in median freshwater productivity (gulf smolts per spawner) by water year type.

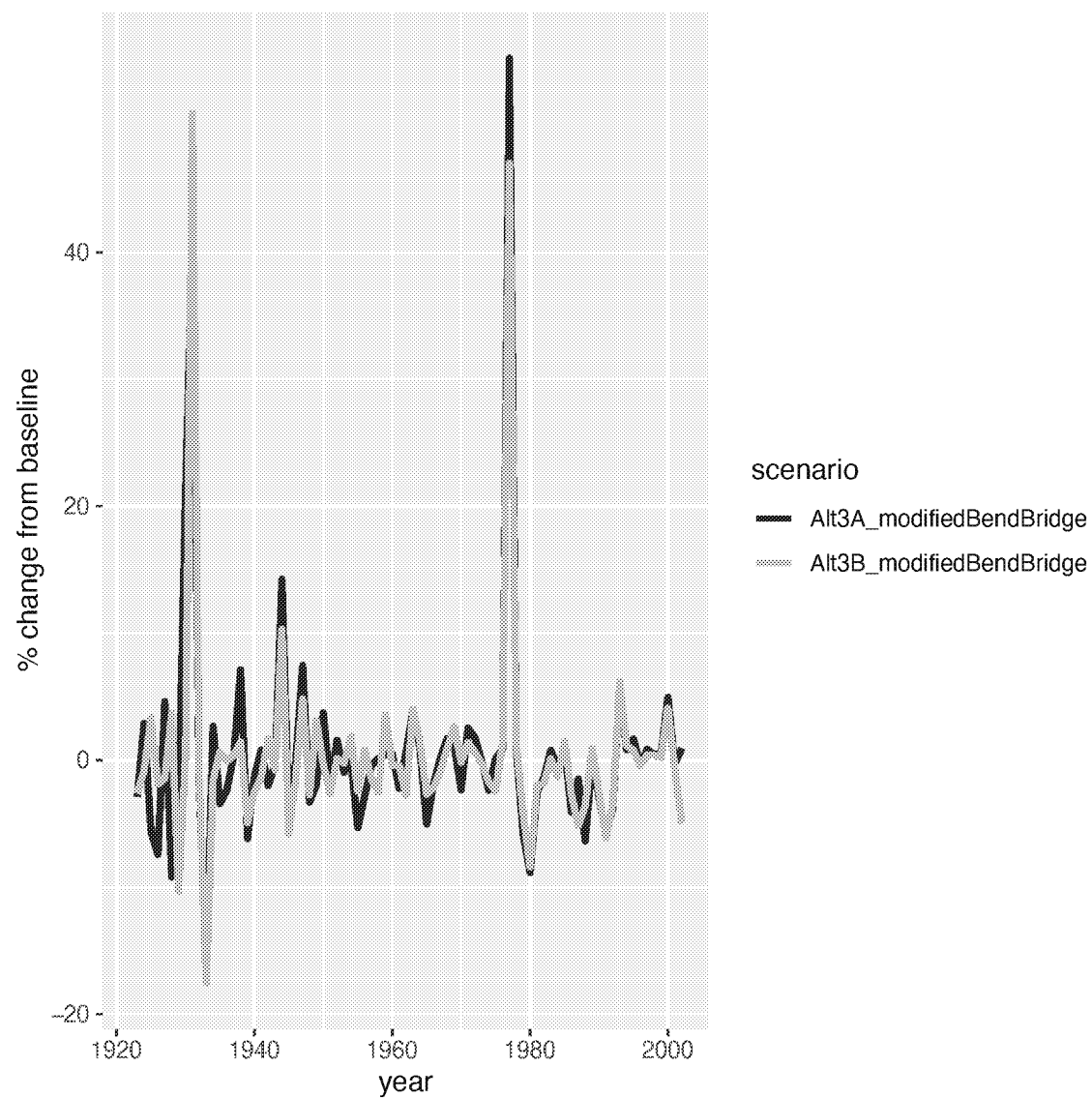


Figure 8: Percent change in freshwater productivity (gulf smolts per spawner).

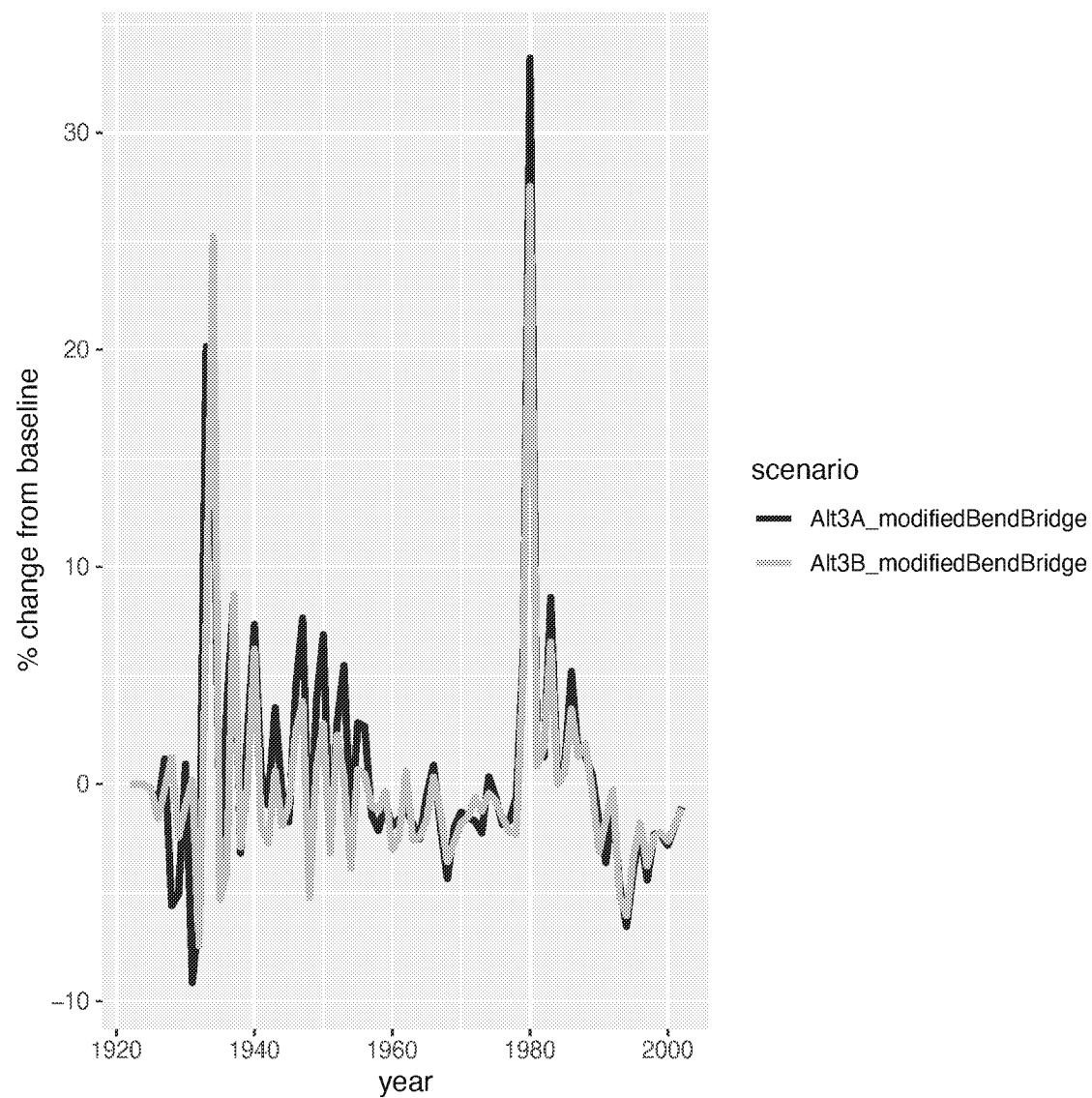


Figure 9: Percent change in annual escapement.

scenario	mean % change in abundance	95% CI	Pr(Alt>baseline)
Alt3A_modifiedBendBridge	1.08	[-5.93, 9.19]	0.65
Alt3B_modifiedBendBridge	0.34	[-9.12, 10.09]	0.55

Table 1: Mean of percent change in annual abundance (sum of in-river, natural, and hatchery-origin spawners) averaged across all years. Pr(Alt>baseline) is the probability that a realization of the alternative scenario will have a positive percent change averaged across all years.

scenario	mean % change in productivity
Alt3A_modifiedBendBridge	0.67
Alt3B_modifiedBendBridge	0.45

Table 2: Mean percent change in freshwater productivity (gulf smolt per spawner) relative to baseline

scenario	mean % change in CRR	95% CI	Pr(Alt>baseline)
Alt3A_modifiedBendBridge	1.37	[-1.02, 3.13]	0.76
Alt3B_modifiedBendBridge	1.31	[-1.71, 3.03]	0.67

Table 3: Mean of percent change in cohort replacement rate (CRR) averaged across all years. Pr(Alt>baseline) is the probability that a realization of the alternative scenario will have a positive percent change averaged across all years.

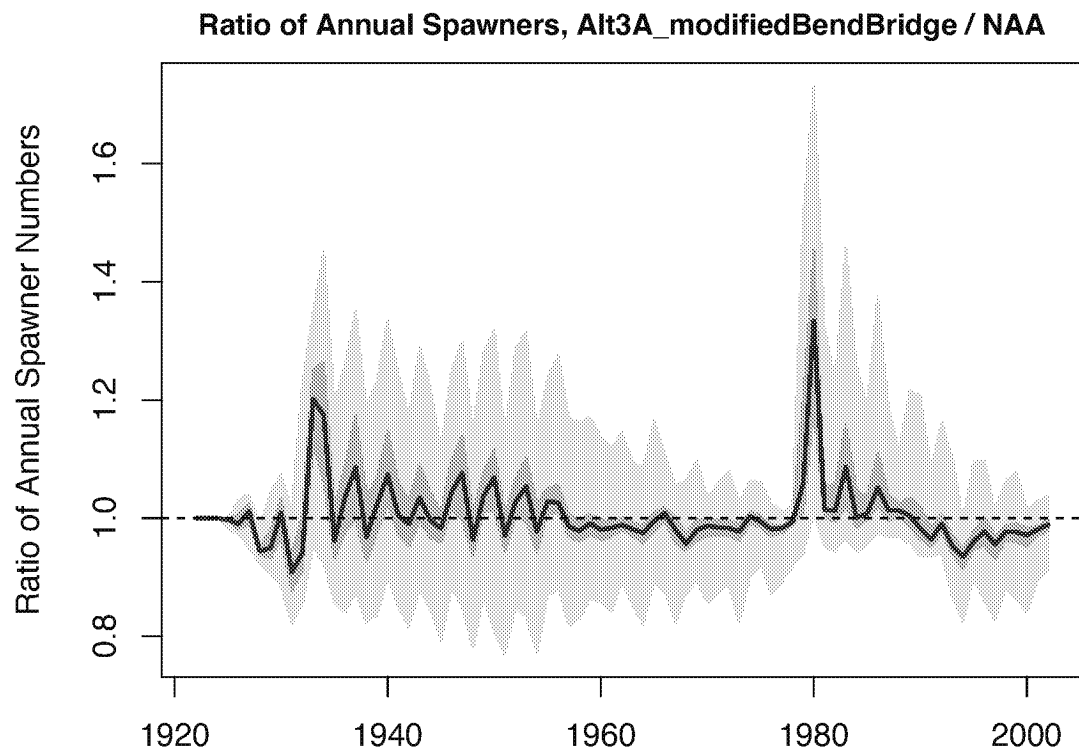


Figure 10: Ratio of number of annual spawners

Smolt (in Gulf) per Spawner from Each Habitat, by WYT (BY+1)

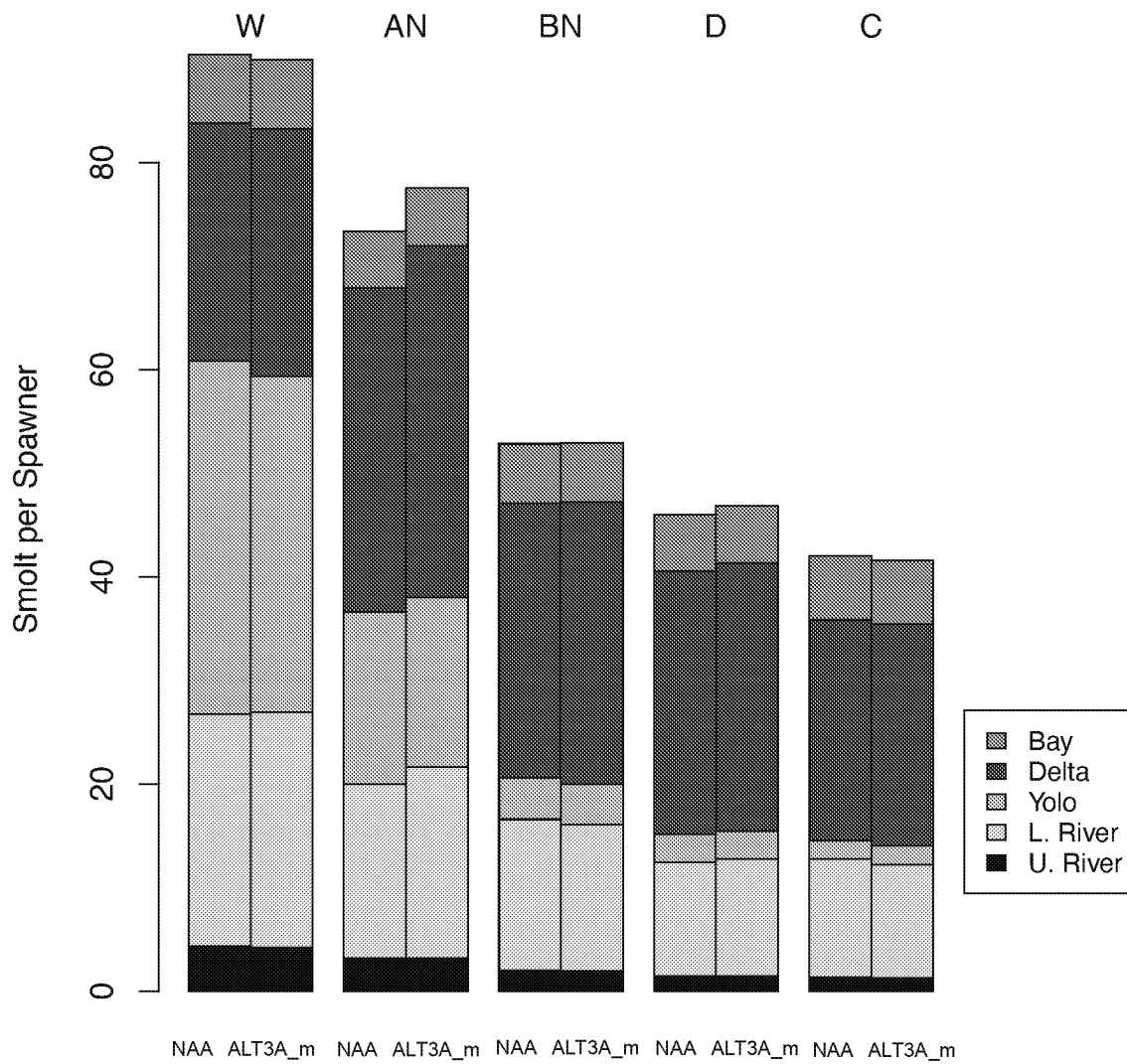


Figure 11: Median smolt per spawner by habitat and water year type

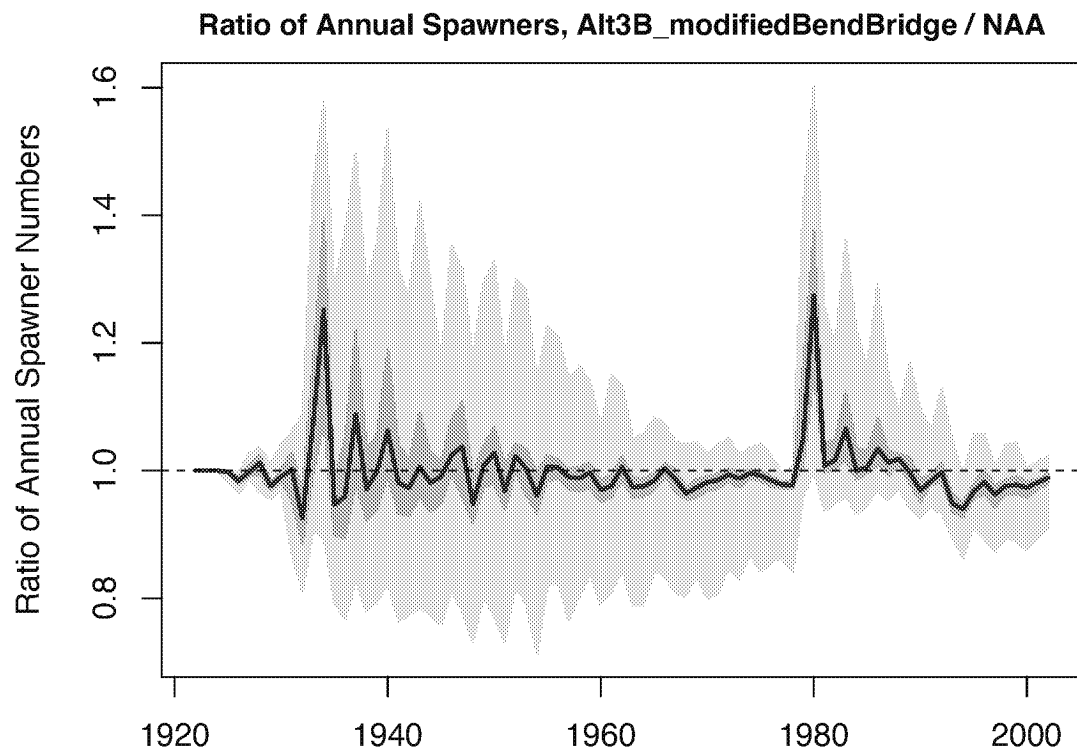


Figure 12: Ratio of number of annual spawners

Smolt (in Gulf) per Spawner from Each Habitat, by WYT (BY+1)

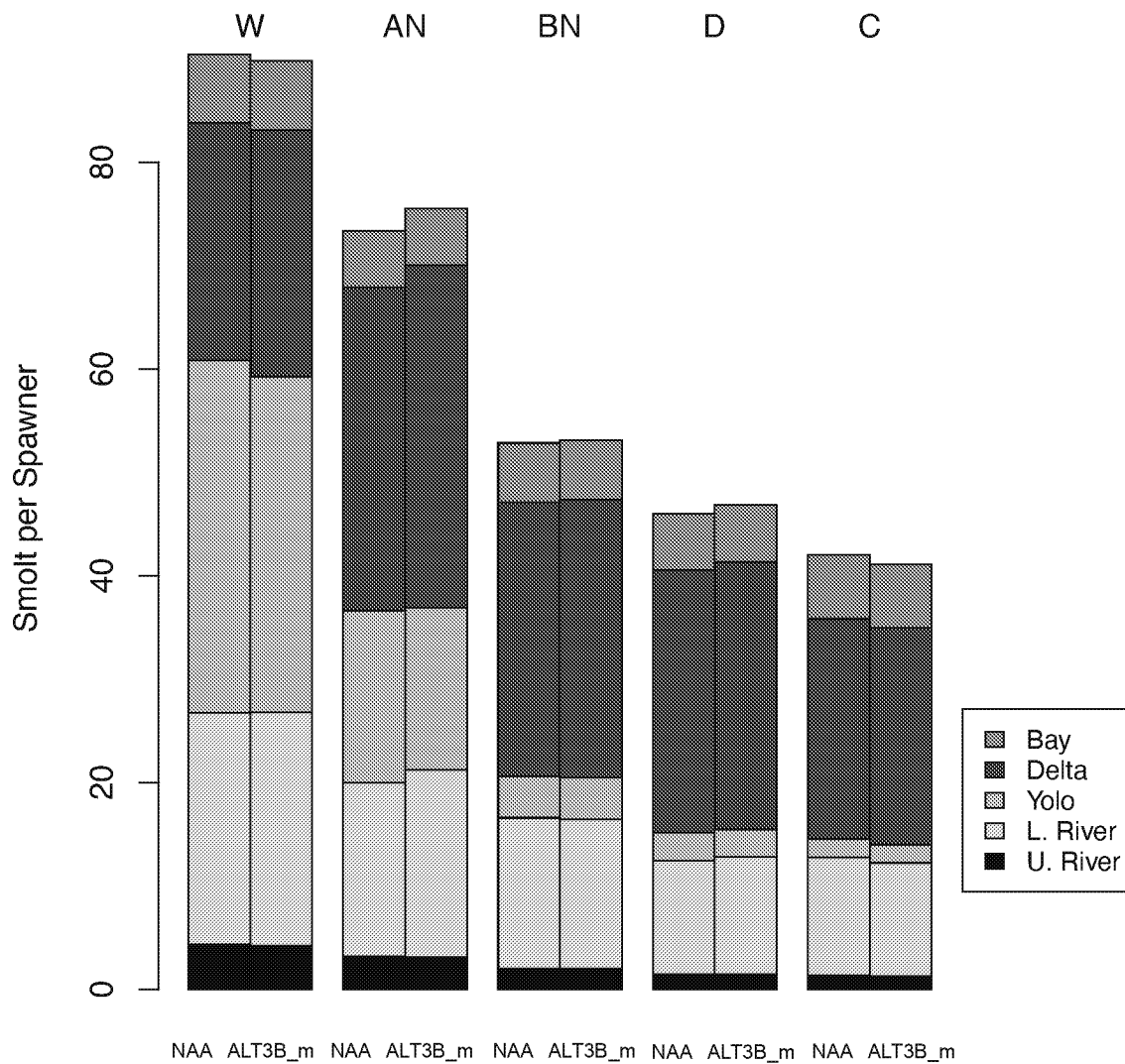


Figure 13: Median smolt per spawner by habitat and water year type

Environmental Planning and Permitting Work Group

March 6, 2023



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Agenda

- 1.1 Review and comment on Part 2 of 3, Status Briefing on the Final EIR/EIS, in preparation for approval of the Project
- 1.2 Review and comment on initial results of the Winter-Run Life Cycle Model
- 1.3 Review and comment on short-term eagle permit mitigation requirements and consideration of entering into a contract to complete compensatory mitigation requirements
- 2.0 EPP Manager's Report

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2

Speaker: Ali

Status Briefing on the Final EIR/EIS, Part 2 of 3

Ali Forsythe and Laurie Warner Herson

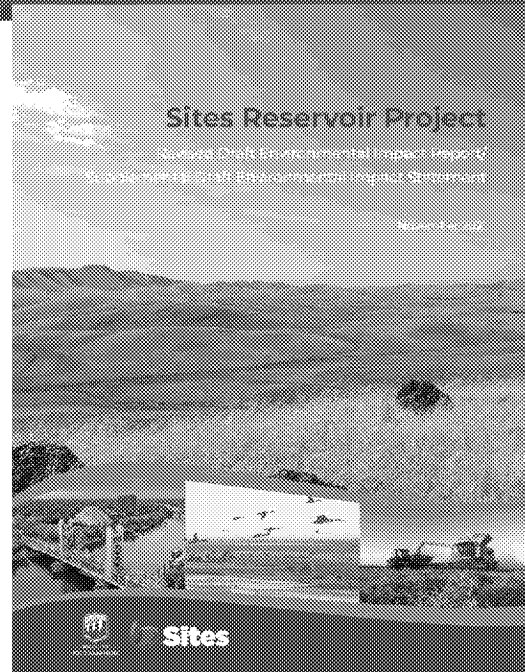


Final EIR/EIS Briefings in Preparation for Approval of Project

- March 2023, Part 2 of 3
 - Overview of key comments and master responses; ongoing public and local community outreach; ongoing tribal outreach and AB 52 consultation
- April 2023, Part 3 of 3
 - Overview of refinements to impacts and mitigation measures; Mitigation Monitoring and Reporting Program
- May 2023, Part 3 of 3, continued
 - Overview of Findings and Statement of Overriding Considerations
- June 2023, Board Hearing
 - Any last items and next steps post EIR
 - EIR Certification
 - Decision to Approve Project

RDEIR/SDEIS Comments

- Received 101 unique letters or communications
- Approximately 1,000 discrete comments



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Speaker: Laurie

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Key Comment Topic Areas

- Major topic areas with frequent comments included:
 - General merits of the Project
 - Adequacy of the project description
 - Stakeholder engagement and the public outreach process
 - AB 52 consultation and Tribal coordination
 - Service impacts to local residents
 - Modeling approach including baseline and use of CALSIM II
 - Range of alternatives and need for different operating criteria
 - Surface water quality impacts
 - Trinity River impacts
 - Aquatic biological resources impacts
 - Terrestrial wildlife and vegetation impacts

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Speaker: Laurie

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Approach to Responses to Comments

- Final EIR must include:
 - Comments and recommendations received on the draft EIR
 - A list of persons, organizations, and public agencies commenting on the draft EIR
 - Responses of the Lead Agency to significant environmental comments
- Volume 3, Responses to Comments includes:
 - Indices of comments received on the RDEIR/SDEIS that list the comment letters and identifies commenters
 - Individual responses to all comments
 - Master Responses provide responses to frequently raised topics, themes, or issues

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Speaker: Laurie

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Master Responses to Comments

- MR1, CEQA and NEPA Process, Regulatory Requirements, and General Comments
 - Public review and outreach process, the CEQA and NEPA process, regulatory requirements
- MR2, Alternatives Description and Baseline
 - Adequacy of the Project description
 - Appropriate use of existing conditions baseline and the No Project Alternative/No Action Alternative
 - Refinements to Project facilities and operations since the RDEIR/SDEIS

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Speaker: Laurie

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Master Responses to Comments (cont)

- MR3, Hydrology and Hydrologic Modeling
 - Hydrologic model description and use of CALSIM II
 - Modeling period and time step
 - Modeling modifications in response to comments and revised modeling results
- MR4, Water Quality
 - Concerns about metals and metalloids other than mercury
 - Adequacy of mitigation

Speaker: Laurie

Master Responses to Comments (cont)

- MR5, Aquatic Biological Resources
 - Flow impacts and mitigation measures
 - Planned adaptability and additional studies to address current uncertainties
 - Longfin smelt and delta smelt impact analyses and associated mitigation
 - Project benefits to fisheries
- MR6, Vegetation, Wetland, and Wildlife Resources
 - Baseline conditions and use of habitat modeling and reliance on aerial imagery interpretation for wetlands
 - Adequacy of mitigation

Speaker: Laurie

Master Responses to Comments (cont)

- MR7, Tribal Coordination, Consultation, and Engagement
 - Tribal consultation efforts under AB 52 and Section 106 and additional Tribal outreach activities
 - Federal trust responsibility over Indian Trust Assets
- MR8, Trinity River
 - Protection under existing water rights, laws and regulations
 - Project water right application
 - Modeling and potential for water temperature impacts in the Trinity River

Speaker: Laurie

Master Responses to Comments (cont)

- MR9, Alternatives Development
 - Application of the objectives and purpose and need for the Project to develop a reasonable range of feasible alternatives
 - Feasibility and applicability of other suggested alternatives identified by commenters

Speaker: Laurie

Ongoing Public and Local Outreach

- Local Community Working Group
 - Intended to represent a broad cross-section of local agencies and community organizations in the Colusa, Glenn and Yolo County areas
 - Provides a forum for efficient, effective, and meaningful local community input into the development of the project
 - Meetings have been ongoing since October 2022
- One-on-one discussions with many landowners

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Speaker: Laurie/ICF?

Potential Speaking Notes in case people are interested in Master Responses

Master responses will ultimately be informed by comments in comment response tables and revised hydrologic modeling results

Preliminary Master Responses Currently Include:

Responses to General Comments: May have separate public outreach and Tribal engagement, coordination, consultation master response

Alternatives Description and Baseline

Hydrology & Hydrologic Modeling

Water Quality

Aquatic Biological Resources

Trinity River

Alternatives Screening and Selection

Other Analyses and/or Other Modeling (e.g., climate change)

Ongoing Tribal Outreach and Coordination

- AB 52 Consultation
 - Formal consultation ongoing with Yocha Dehe and Cachil Dehe, meetings with Yocha Dehe scheduled monthly
 - Preparation of a draft MOA outline for continued consultation and collaboration
- Tribal Government Working Group
 - Intended to represent tribes with traditional or cultural affiliation with the Project area
 - Provides a forum for efficient, effective, and meaningful tribal input into the development of the project
 - Formal invitation letters to the above-listed tribes were sent on January 12, 2023

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14

Speaker: Laurie/ICF?

Potential Speaking Notes in case people are interested in Master Responses

Master responses will ultimately be informed by comments in comment response tables and revised hydrologic modeling results

Preliminary Master Responses Currently Include:

Responses to General Comments: May have separate public outreach and Tribal engagement, coordination, consultation master response

Alternatives Description and Baseline

Hydrology & Hydrologic Modeling

Water Quality

Aquatic Biological Resources

Trinity River

Alternatives Screening and Selection

Other Analyses and/or Other Modeling (e.g., climate change)

Ongoing Non-governmental Organization Outreach

- September 20, 2022 – Held meeting with various NGOs to give an overview of the approach to the Sites water right application
- January 31, 2023 – Held meeting with various NGOs to review supplemental materials submitted to SWRCB in regard to water rights application
- Two more meetings planned on modeling and water quality
- Small group and one-on-one discussions

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Speaker: Laurie/ICF?

Potential Speaking Notes in case people are interested in Master Responses

Master responses will ultimately be informed by comments in comment response tables and revised hydrologic modeling results

Preliminary Master Responses Currently Include:

Responses to General Comments: May have separate public outreach and Tribal engagement, coordination, consultation master response

Alternatives Description and Baseline

Hydrology & Hydrologic Modeling

Water Quality

Aquatic Biological Resources

Trinity River

Alternatives Screening and Selection

Other Analyses and/or Other Modeling (e.g., climate change)

Next Steps in Briefing Process

- April 2023, Part 3 of 3
 - Overview of any refinements to impacts and mitigation measures
 - Overview of Mitigation Monitoring and Reporting Program
- May 2023, Part 3 of 3 (continued)
 - Overview of Findings and Statement of Overriding Considerations

Speaker: Laurie

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Final EIR Certification Targeted for June 2023

- June 2023, Board Hearing
 - Any last items
 - Reminders on Findings, Statement of Overriding Considerations and Mitigation, Monitoring and Reporting Program
 - EIR Certification
 - Decision to Approve Project
 - Next Steps
 - Local considerations with MOUs and Local Community Working Group
 - Tribal considerations with MOA and Tribal Working Group

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Speaker: Laurie

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Winter-run Life Cycle Model Initial Results

John Spranza



Model Background

- Evaluates the effects of water operations on the population dynamics of Sacramento River winter-run Chinook salmon
 - Integrate effects across entire life-cycle and multiple environmental conditions
 - Evaluates effects to the abundance, distribution and survival of specific life stages in the river system, and ultimately to predict the effects at a population level
 - Requested by NMFS and CDFW for Federal and State ESA consultation

Speaker: Ali

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Model Background (con't)

- Pros of the model:
 - Specifically designed to assess the effects of water operations and habitat restoration
 - Predicts changes in habitat characteristics (quality and quantity of habitat, water velocity, temperature, etc) and the resulting effects of a proposed action at the population level
 - Provides some understanding of effects at each life stage
- Cons of the model:
 - Full model and sub-models have not been released publicly
 - Mixed confidence in the model's ability to account for the effects of uncertainty
 - Questionable statistical ability to disseminate between effects of similar scenarios

Speaker: Ali

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Summary of WRLCM Results

- The Project has a slightly positive effect on winter-run with the potential to increase the overall population
- Benefits to winter-run are associated with periodic reductions in late summer water temperatures that decreases salmon egg mortality
 - Likely driven mostly by Reclamation's investment and exchanges with Reclamation
- Model runs included Alternative 3 with Reclamation investment at both a 25% (Alt 3A) and 16% (Alt 3B)
 - Alt 3A has slightly greater benefits than Alt 3B

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Speaker: Ali

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Mean Change in Abundance

scenario	mean % change in abundance	95% CI	Pr(Alt>baseline)
Alt3A__modifiedBendBridge	1.08	[-5.93, 9.19]	0.65
Alt3B__modifiedBendBridge	0.34	[-9.12, 10.09]	0.55

Mean % change in abundance greater than 0 = positive effect;
less than 0 = negative effect

- Project results in a slightly positive mean change in abundance of in-river spawners when averaged across all years of the model
- Project has a slightly positive effect on winter-run populations

Speaker: Ali

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Mean Change in Cohort Replacement Ratio

scenario	mean % change in CRR	95% CI	Pr(Alt>baseline)
Alt3A_modifiedBendBridge	1.37	[-1.02, 3.13]	0.76
Alt3B_modifiedBendBridge	1.31	[-1.71, 3.03]	0.67

Mean % change in cohort replacement ratio greater than 0 = positive effect;
less than 0 = negative effect

- Average number of future spawning fish produced by each spawning adult is slightly higher with the Project (i.e., more offspring live per fish)

Speaker: Ali

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Next Steps

- Continue discussions with agencies on interpretation of effects
- Incorporate results into Biological Opinion and Operations ITP application

Speaker: Ali

Short-term Eagle Permit Mitigation Requirements & Contract to Complete

John Spranza



Background

- Last discussed in June 2022
 - Reservoir Committee and Authority Board authorized the Executive Director to submit the short-term eagle take permit application
- Permit application submitted to USFWS August 2022
- USFWS posted permit application and associated EA/FONSI on February 10, 2023
 - 30-day public notice period prior to permit issuance
 - Permit, assuming USFWS issues one, expected around mid March

Speaker: Ali

Anticipated Mitigation – Avoidance and Minimization

- Avoid activities within buffer areas of active nests to the extent possible
 - 1 mile of active golden eagle nests and 660 feet of active bald eagle
- Monitor active nests within breeding season when activities conducted within nest buffers
 - Costs for monitoring included in Amendment 3
 - Successful nesting with work inside of buffer would not necessarily use a mitigation credit
- Year-end reporting required

Speaker: Ali

Anticipated Mitigation – Compensatory Mitigation

- Compensatory mitigation for disturbance of 1 nest for 4 years, and 2 nests for 1 year
 - Credits not used can roll forward into future years
- Only USFWS-approved compensatory mitigation nationwide is power pole replacement
 - Authority perform this OR can contract with others
- RFP issued Feb 28 for compensatory mitigation
 - Anticipated cost to be no more than \$450,000 in total (all 4 years)
 - Base contract with task orders issued annually
 - Fixed-price fee for the first year with agreed upon escalation for subsequent years
 - Mitigation contractor would take on all liability and responsibility for fulfil our compensatory mitigation requirement

Speaker: Ali

Eagle Permit Next Steps

- March Reservoir Committee and Authority Board, requesting action to authorize Executive Director to:
 - Sign the permit
 - Enter into a contract with mitigation contractor and pay mitigation fee
- Review and select mitigation contractor
- Review and sign permit
- Execute contract and provide payment for first year mitigation

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Speaker: John

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Environmental Planning and Permitting Manager Report

Ali Forsythe



Dashboard Update

Deliverable	Finish	Status	Notes, New or Potential Issues
Water Right Application			
• Submit to State Board	May-22		Application Submitted May
• Complete Protest Resolution Period	Oct-23		
• Receive Water Right Permit	Sept-24	N/S	
Federal ESA			
• Reclamation Initiates Consultation	Mar-23		
• Receive BIOps	Nov-23	N/S	
State ITPs			
• Receive Construction ITP	Oct-23		
• Submit Operations ITP to CDFW	Mar-23		
• Receive Operations ITP	Nov-23	N/S	

N/S = Not Started;  = On track;  = Area of Potential Concern;  = Delayed;  = Completed
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Speaker: Modeling complete

Seeing and assessing some unexpected results

ICF continuing to assess and determine impacts and mitigation (if needed)

Updating mitigation needs and cost estimates

Mitigation for aquatic species tends to have more negotiation

Generally not established or precedential ratios like terrestrial

Meeting with CDFW, USFWS and NMFS on financial assurances and timing of required mitigation

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Dashboard Update

Deliverable	Finish	Status	Notes, New or Potential Issues
Section 106 – Cultural Resources			
• Final Programmatic Agreement	Aug-23		
• Programmatic Historic Properties Management Plan	Jun-23		
Clean Water Act 404/401			
• Submit Final Permit Applications	May-23		
• Receive 404 and 401 Permits	May-24		
Streambed Alteration Agreement			
• Prepare and Submit Application	Mar-23		
• Receive Master Agreement	Sept-23		
Eagle Permit			
• Short-Term and Nest Take Permits Issued	Mar-23		
• Long-Term Permit Issued	Mar-24		

N/S = Not Started;  = On track;  = Area of Potential Concern;  = Delayed;  = Completed
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Speaker: Ali

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Dashboard Update

Deliverable	Finish	Status	Notes, New or Potential Issues
Final EIR/EIS			
• Complete Final EIR/EIS	June-23		Date adjusted
• Certify Final EIR/EIS and approve preferred project and MMRP	June-23		Date adjusted

N/S = Not Started;  = On track;  = Area of Potential Concern;  = Delayed;  = Completed
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Speaker: Ali

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Upcoming Meetings

- Next Work Group Meeting –
April 12, 2023, 10 to 11 AM
 - Topics –
 - Continued Final EIR/EIS briefings
 - Water right permit status
- Other upcoming meetings
 - Joint Reservoir Committee and Authority Board
 - Friday, March 17, 2023 - 9:00 AM to 12:00 PM
 - Environmental Planning and Permitting Workgroup
 - Wednesday, April 12, 2023 - 10:00 AM to 11:00 AM

Speaker: Ali

Thank you!





Public Agency Comments

- Tribal:
 - United Auburn Indian Council
 - Winnemem Wintu Tribe (with NGO group)
 - Yocha Dehe Wintun Nation
- Federal:
 - National Marine Fisheries Service
 - US Environmental Protection Agency
- State:
 - California Department of Fish and Wildlife
 - CA Office of Environmental Health and Hazard Assessment
 - Central Valley Regional Water Quality Control Board
 - State Water Resources Control Board, Water Rights Division
- Regional:
 - Contra Costa Water District
 - East Bay Municipal Utility District
 - Local Agencies of the North Delta
- Local:
 - Colusa County Board of Supervisors
 - Maxwell Fire Protection District
 - Maxwell Public Utility District
 - Maxwell Unified School District
- Water NGOs:
 - State Water Contractors
 - Northern California Water Association

Speaker: Laurie

Non-Governmental Organizations

Comments

- AquAlliance
- Bay Institute
- California Indian Environmental Alliance
- California Sportfishing Protection Alliance
- CalWild
- Center for Biological Diversity
- Defenders of Wildlife
- Friends of the River
- Golden State Salmon Association
- Golden West Women Flyfishers
- Institute for Fisheries Resources
- Natural Resources Defense Council
- Northern California Council Fly Fishers International
- North Coast Rivers Alliance
- Planning and Conservation League
- Pacific Coast Federation of Fishermen's Associations
- Restore the Delta
- San Francisco Baykeeper
- Save California Salmon
- Sierra Club California

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Speaker: Laurie

CEQA Requirements (continued)

- CEQA also specifies that:
 - The response to comments may take the form of a revision to the draft EIR or may be a separate section in the final EIR. Where the response to comments makes important changes in the information contained in the text of the draft EIR, the lead agency should consider either: (1) Revise the text in the body of the EIR, or (2) Include marginal notes showing that the information is revised in the response to comments. (CEQA Guidelines Section 15088(d))

Speaker: Laurie

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Sites Reservoir Final EIR/EIS

- Volumes 1 and 2, Chapters and Appendices
 - Revisions to REDIR/SDEIS text due to responses to comments are noted by vertical lines in the left margin
- Volume 3, Responses to Comments includes:
 - Indices of comments received on the RDEIR/SDEIS that list the comment letter numbers, names of commenters, and titles, when provided
 - Individual responses to comments include the substance of each comment and a response
 - Master Responses provide responses to frequently raised topics, themes, or issues to avoid repetition and to provide a more comprehensive response

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/24/2023 2:43:06 PM
To: steve.micko@jacobs.com
CC: Angela Bezzone [bezzone@mbkengineers.com]
Subject: Sites Project -

Hi Steve – Katherine with Valley Water contacted me last week. They are updating one of their committees on all of their key projects and Sites is coming up at the next meeting. She was asking mostly about environmental benefits.

But she asked me two things that I wanted to confirm with you:

1. #’s for salmon benefits, cold water pool, spring pulse and fall flow stability – I know we did those graphics for Reclamation when we were doing the modeling. Mostly to convey the changes and how the revised modeling increased anadromous fish benefits. Did we ever updated these graphics and numbers for the Final EIR/EIS modeling? She’s looking for a way to say “Sites results n XX,000 AF more cold water pool for fish” or something to convey what these benefits are in a way that her Board members can understand. Any thoughts on this?
2. Final EIR/EIS modeling results – I think I can dig out what she needs here, so I am going to do this and will have you review the info before I send to her.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 4/24/2023 4:39:01 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites: Sensitivity CalSim II Simulations for CDFW

Good!

John Spranza

D 916.679.8858 M 818.640.2487

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, April 24, 2023 4:20 PM
To: Spranza, John <john.spranza@hdrinc.com>
Subject: FW: Sites: Sensitivity CalSim II Simulations for CDFW

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

FYI. I also authorized Steve to send these to CDFW

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Monday, April 24, 2023 10:58 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>
Cc: Leaf, Rob <Rob.Leaf@jacobs.com>; Thayer, Reed <Reed.Thayer@jacobs.com>
Subject: Sites: Sensitivity CalSim II Simulations for CDFW

Hi Ali and Angela,

At this  link, we've posted CalSim II studies for the following alternatives:

- NAA 041222 2035CT
- No Action Alternative (for the BA/ITP)
- ALT 3A 041122 2035CT
- Alternative 3A (for the BA/ITP)
- 1.5 MAF Sites Reservoir
- 25% Reclamation Investment
- Includes Shasta exchanges
- ALT 3B 041122 2035CT

- Alternative 3B (for the BA/ITP)
- 1.5 MAF Sites Reservoir
- 16% Reclamation investment
- Includes Shasta exchanges
- ALT 1A 062222 2035CT
- Alternative 1A at 2035CT climate (as requested by CDFW)
- 1.5 MAF Sites Reservoir
- No Reclamation investment
- Includes Shasta exchanges
- ALT 1A 062222 noShaEXCH 2035CT
- Alternative 1A at 2035CT climate without Shasta exchange (as requested by CDFW)
- 1.5 MAF Sites Reservoir
- No Reclamation investment
- No Shasta exchanges

A trend reporting spreadsheet, with results of the alternatives above, is also posted to the link above.

Please let me know if you're good with me sending this link directly to CDFW (Rob S., Jon William and Kristal Davis-Fadtke).

Thanks,
Steve

Steve Micko, PE (he/him) | [Jacobs](#) | Project Manager
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

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From: Sherrick, Robert@Wildlife [Robert.Sherrick@Wildlife.ca.gov]
Sent: 4/25/2023 11:26:56 AM
To: steve.micko@jacobs.com; Davis-Fadtke, Kristal@Wildlife [Kristal.Davis-Fadtke@wildlife.ca.gov]; Williams, Jonathan@Wildlife [Jonathan.Williams@wildlife.ca.gov]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]; Angela Bezzone [bezzone@mbkengineers.com]; Leaf, Rob [Rob.Leaf@jacobs.com]; Thayer, Reed [Reed.Thayer@jacobs.com]
Subject: RE: Sites Project - Operations ITP, Continued Modeling Discussion

Received, thank you Steve.

Rob Sherrick, PE
(916) 516-4233

From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Monday, April 24, 2023 5:28 PM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Sherrick, Robert@Wildlife <Robert.Sherrick@Wildlife.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; Angela Bezzone <bezzone@mbkengineers.com>; Leaf, Rob <Rob.Leaf@jacobs.com>; Thayer, Reed <Reed.Thayer@jacobs.com>
Subject: RE: Sites Project - Operations ITP, Continued Modeling Discussion

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hi Kristal, Jon and Rob,

At this [link](#), we've posted CalSim II studies for the following alternatives:

- NAA 041222 2035CT
 - No Action Alternative (for the BA/ITP)
- ALT 3A 041122 2035CT
 - Alternative 3A (for the BA/ITP)
 - 1.5 MAF Sites Reservoir
 - 25% Reclamation Investment
 - Includes Shasta exchanges
- ALT 3B 041122 2035CT
 - Alternative 3B (for the BA/ITP)
 - 1.5 MAF Sites Reservoir
 - 16% Reclamation investment
 - Includes Shasta exchanges
- ALT 1A 062222 2035CT
 - Alternative 1A at 2035CT climate (as requested by CDFW)
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- ALT 1A 062222 noShaEXCH 2035CT
 - Alternative 1A at 2035CT climate without Shasta exchange (as requested by CDFW)
 - 1.5 MAF Sites Reservoir
 - No Reclamation investment
 - No Shasta exchanges

A trend reporting spreadsheet, with results of the alternatives above, is also posted to the link above.

Please let me know if you have any questions.

Thanks,
Steve

Steve Micko, PE (he/him) | [Jacobs](#) | Project Manager
O:916.286.0358 | M:408.834.6614 | Steve.Micko@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833

-----Original Appointment-----

From: Alicia Forsythe <aforsythe@sitesproject.org>

Sent: Monday, April 3, 2023 10:57 AM

To: Alicia Forsythe; Davis-Fadtke, Kristal@Wildlife; Williams, Jonathan@Wildlife; Spranza, John; Micko, Steve; Angela Bezzone

Subject: Sites Project - Operations ITP, Continued Modeling Discussion

When: Monday, April 17, 2023 1:00 PM-2:00 PM (UTC-08:00) Pacific Time (US & Canada).

Where: Microsoft Teams Meeting

Just a small group discussion on modeling. Steve and Angela, hopefully you both can join.

Microsoft Teams meeting

Join on your computer, mobile app or room device

[Click here to join the meeting](#)

Meeting ID: 266 274 400 733

Passcode: 5Ye23W

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From: Sara M. Katz [skatz@katzandassociates.com]
Sent: 4/25/2023 11:56:02 AM
To: Jerry Brown [jbrown@sitesproject.org]
CC: Kevin Spesert [kspesert@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Video Recording

Thanks Jerry.



Sara M. Katz
Founder/CEO
mobile: 619.813.9551
[San Diego](#) · [Los Angeles](#) · [San Francisco](#)

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Tuesday, April 25, 2023 11:44 AM
To: Sara M. Katz <skatz@katzandassociates.com>
Cc: Kevin Spesert <kspesert@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: Sites Video Recording

I will reach out to rob again and let you know. Richard Welch.

Sent from my iPhone

On Apr 25, 2023, at 1:40 PM, Sara M. Katz <SKatz@katzandassociates.com> wrote:

Not sure where we go from here. I am happy to circle back and inquire, but Rob did not attend the board meeting on Friday, so we were unsuccessful in nailing down this video interview. He seems as though he wanted someone else to do it, largely based on protocol, but don't want to complicate this situation if you have other insights to share? We did film Richard Welsh (sp?), the gentleman from BOR since he was in fact at the board meeting and very amenable. Thanks



Sara M. Katz
Founder/CEO
mobile: 619.813.9551
[San Diego](#) · [Los Angeles](#) · [San Francisco](#)

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Tuesday, April 11, 2023 11:42 AM
To: Sara M. Katz <skatz@katzandassociates.com>
Cc: Kevin Spesert <kspesert@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Re: Sites Video Recording

Update – Rob is running his talking points up the chain of command and awaiting confirmation of their approval for him to make video taped remarks. He will let me know by COB Wed 4/19 if he is given the go ahead or if someone else up the chain wishes to be filmed. If he is given the go ahead, he will attend the Board mtg on 4/21 in person and would like to be video taped after the open session and while closed session is occurring, since he does not attend closed session.

From: Jerry Brown <jbrown@sitesproject.org>

Date: Tuesday, April 4, 2023 at 4:09 PM

To: "Sara M. Katz" <skatz@katzandassociates.com>

Cc: Kevin Spesert <kspesert@sitesproject.org>, Alicia Forsythe <aforsythe@sitesproject.org>

Subject: FW: Sites Video Recording

Could your team consider Rob's input and let me know if this changes anything? thanks

From: Rob Cooke <rcooke1956@gmail.com>

Date: Tuesday, April 4, 2023 at 4:05 PM

To: Jerry Brown <jbrown@sitesproject.org>

Subject: Re: Sites Video Recording

Yes. What ever is needed.

But wouldn't the DWR and Bureau heads be better? Or if it has just an environmental focus, would you want our Environmental Branch

Manager? They work closer with NGO's and would garner more trust with them because they are the ones that actually reviewed the documents for DWR and have a more trusted relationship.

What ever you think is best.

Rob-

Rob Cooke

On Tue, Apr 4, 2023, 3:48 PM Jerry Brown <jbrown@sitesproject.org> wrote:

Hi Rob – Sites is preparing a video to be for education and outreach related to the Final EIR/EIS (to be issued ~June). We're asking for a state and federal representative to participate in the video. Would you be able to be that person for the State? If so, we're trying to organize the filming around our April 21 board meeting. Would you be able to attend the meeting in person and then stick around for 15 minutes after to be filmed while making remarks about the state/federal/local collaboration on the project?

Let me know.

Jerry

Agreement for Sale of Mitigation Credits

Bald Eagle and Golden Eagle Electrocution Prevention In-lieu Fee Program

This Agreement is entered into this 25 of April 2023 by and between Eagle Electrocution Solutions, LLC (herein referred to as the "Program Sponsor", and Sites Project Authority (herein referred to as the "Authorized User") jointly referred to as the "Parties," as follows:

RECITALS

- A. The Bald Eagle and Golden Eagle Electrocution Prevention In-lieu Fee Program ("ILF Program") was approved by the U. S. Fish and Wildlife Service ("USFWS") on October 9, 2018, and is currently in good standing with the USFWS; and
- B. The Program Sponsor has received approval from the USFWS to sell mitigation credits ("Credits") for power pole retrofits as compensation for incidental take to Bald Eagles and/or Golden Eagles; and
- C. The Authorized User is seeking to purchase mitigation credits for activities which could incidentally take eagles as set forth in Exhibit A, at the Project listed on Exhibit A ("Project"). To compensate for those impacts, the Authorized User proposes to purchase credits from the ILF Program as authorized and directed by the USFWS; and the Authorized User has been authorized by USFWS to purchase Credits from the ILF Program; and
- D. The Authorized User desires to purchase from the Program Sponsor and the Program Sponsor desires to sell Credits to the Authorized User.

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

- 1. Upon exercise of the Authorized User's right to purchase, further described in Section 5 below, the Program Sponsor will sell to Authorized User and Authorized User will purchase from the Program Sponsor 21 credits for \$ \$5,500 per credit, for a total of \$ \$115,500. Upon full payment, the Program Sponsor will deliver to Authorized User an executed Transaction Receipt in the manner and form as attached hereto and marked Exhibit B.
- 2. The sale and transfer of the Credits herein is not intended as a sale or transfer to the Authorized User of a security, license, lease, easement, or possessory or non-possessory interest in real property, nor the granting of any interest of the foregoing.
- 3. Program Sponsor shall be liable for and have the obligation, and Authorized User shall have no obligation whatsoever by reason of the purchase of the Credits, to support, pay for, monitor, report on, or otherwise be obligated or liable for the success or continued expense or maintenance of the Credits sold. The Program Sponsor shall monitor and make reports to the USFWS on the status of any Credits sold to the Authorized User. Program Sponsor represents and warrants that the Credits fulfill Authorized User's permit requirements for eagle compensatory mitigation. Program Sponsor shall defend, indemnify and hold Authorized User harmless from and against any and all claims, demands, liabilities, damages, losses, liens, obligations, costs and expenses related to and arising from Program Sponsor's obligations or failure to uphold its obligations under this Section 3.

CONFIDENTIAL BUSINESS INFORMATION

4. The Credits sold and transferred to the Authorized User pursuant to the Agreement shall be non-transferable and non-assignable except for the successor of interest or assignee of the Project specifically referenced in the attached Exhibits A and B. The Credits shall not be used as compensatory mitigation for any other Project or purpose other than as described in Exhibits A and B, except as mutually agreed to by the Parties in a signed written amendment to this Agreement.
5. Within thirty (30) days of the effective date of this Agreement, the Authorized User must exercise its right to purchase the Credits by submitting the Purchase Price to the Program Sponsor. If the Authorized User fails to submit the full Credit Purchase Price to the Program Sponsor within thirty (30) days of the Effective Date of this Agreement, this Agreement shall be null and void.
6. This Agreement shall be effective when fully executed by all parties and delivered. Each party by executing this Agreement represents that he or she has full right and authority to execute same.
7. This Agreement shall be governed by and construed in accordance with the internal laws of the State of Colorado without giving effect to any choice or conflict of law provision or rule. Any legal suit, action or proceeding arising out of or related to this Agreement or the matters contemplated hereunder shall be instituted exclusively in the federal courts of the United States or the courts of the State of Colorado in each case located in the city of Fort Collins and County of Larimer, and each Party irrevocably submits to the exclusive jurisdiction of such courts in any such suit, action or proceeding and waives any objection based on improper venue or *forum non conveniens*.

IN WITNESS WHEREOF, the parties have executed this Agreement as follows.

By: _____ Dated: _____

Name: Elizabeth Mojica

Title: Program Director

Company Name: Eagle Electrocution Solutions, LLC, Program Sponsor

By: _____ Dated: _____

Name: Jerry Brown

Title: Executive Director

Company Name: _____, Sites Project Authority, Authorized User

EXHIBIT A

DESCRIPTION OF PROJECT OR OTHER AUTHORIZED USE
BALD EAGLE AND GOLDEN EAGLE ELECTROCUTION PREVENTION
IN-LIEU FEE PROGRAM

Project Description:

Authorized User Name: Sites Project Authority

Project Name: Sites Reservoir Project geotechnical evaluation

Project City, State: Glenn and Colusa Counties, CA

Project Township, Section, Range: Project area general coordinates 39.286886,-122.3954753

USFWS determination of compensatory mitigation requirements for power pole retrofits:

Species	Number of Poles	Eagle Management Unit	Credit length
Bald Eagle			
Golden Eagle	<u>21</u>	<u>Pacific Flyway</u>	30 years

Transaction Receipt
BALD EAGLE AND GOLDEN EAGLE ELECTROCUTION PREVENTION
IN-LIEU FEE PROGRAM

Program Sponsor	Eagle Electrocution Solutions, LLC
Authorized User	<u>Sites Reservoir Authority</u>
Project Name or Other Action Name	<u>Sites Reservoir Project geotechnical evaluation</u>
Project or Other Action Location	<u>Glenn and Colusa Counties, CA</u>
USFWS Permit	<u>MBPER13909794</u>
USFWS Region	<u>Pacific Southwest Region</u>
USFWS Migratory Bird Point of Contact	<u>Tracy Borneman</u>

Species	Number of Poles	Eagle Management Unit	Credit length	Credit Fee	Mitigation Fee
Bald Eagle					
Golden Eagle	<u>21</u>	Golden Eagle Pacific Flyway	30 years	<u>5,500</u>	<u>115,500.00</u>
Total Mitigation Fees Received					<u>115,500.00</u>

In consideration of \$, \$\$115,500.00, receipt of which is hereby acknowledged on , the Program Sponsor does hereby bargain, sell, and transfer to the Authorized User all of Program Sponsor's right, title and interest to 21 Credits for the Golden Eagle Pacific Flyway Eagle Management Unit as mitigation for the Project or other authorized activity, from the Bald Eagle and Golden Eagle Electrocution Prevention In-lieu Fee Program (ILF Program) approved by the USFWS. Such Credits are expressly non-assignable and non-transferrable, except to a successor in interest or assignee of this specific Project listed above.

The Program Sponsor hereby accepts the Mitigation Fees set forth in compliance with the ILF Program and compensatory mitigation of impacts to Bald Eagles and/or Golden Eagles as set forth in this Transaction Receipt.

A Confirmation Document from the USFWS must be attached to this Transaction Receipt for it to be valid for completion of permit requirements.

By: _____ Dated: _____
Name: Elizabeth Mojica
Title: Program Director
Company Name: Eagle Electrocution Solutions, LLC, Program Sponsor

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 4/25/2023 2:54:03 PM
To: Kevin Spesert [kspesert@sitesproject.org]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Janis Offermann [jaoffermand@montrose-env.com]
Subject: RE: CICC request for membership

I just found this in the June 2018 meeting minutes:

Chairman Durst informed the Board members of the decision of the Colusa Indian Community (CICC) to withdraw their request for membership in the Authority. Mr. Serrano stated the Authority Board will be receiving a formal letter from the CICC regarding same. He stated further the Tribe will continue to attend SPA Board meetings as a federally recognized Tribe and stakeholder and also continue to work with the JPA Board through government-to-government consultation and through AB52 consultation. A brief discussion followed with Chairman Durst thanking CICC for their interest.

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Sent: Tuesday, April 25, 2023 2:05 PM
To: Kevin Spesert (kspesert@sitesproject.org) <kspesert@sitesproject.org>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Janis Offermann <jaoffermand@montrose-env.com>
Subject: CICC request for membership

Hi Kevin

According to an April 23, 2018 staff report, the "Colusa Indian Community Council (CICC) sent a letter requesting membership to the Sites Project Authority Board of Directors on December 7, 2017 (see Attachment A). Representatives from the Council participated in a presentation at the Sites Project Authority Board meeting on December 18, 2017 and expressed their interest in the project and their desire to participate in the planning, construction and future operation of the project."

[https://sitesreservoirproject.sharepoint.com/exemgmtadmin/Exec%20MgmtAdmin/1.3%20Meetings%20%26%20Supporting%20Docs%20\(AB,%20RC,%20Agents,%20Leadership,%20etc.\)/1-AB%20%26%20RC%20Agenda%20Packets/Archived%20Agenda%20Packets/2-Authority%20Board%20Agenda%20Packet/2018/04-April%202018/06-1-Authority_CICC2018April23vB.pdf](https://sitesreservoirproject.sharepoint.com/exemgmtadmin/Exec%20MgmtAdmin/1.3%20Meetings%20%26%20Supporting%20Docs%20(AB,%20RC,%20Agents,%20Leadership,%20etc.)/1-AB%20%26%20RC%20Agenda%20Packets/Archived%20Agenda%20Packets/2-Authority%20Board%20Agenda%20Packet/2018/04-April%202018/06-1-Authority_CICC2018April23vB.pdf)

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They subsequently sent the attached letter withdrawing their request (<file:///H:/AB%2052/06-13-18%20Ltr%20from%20CICC%20re%20withdraw%20consideration%20to%20join%20SPA.pdf>) Were you working on this project at that time? Do you know the reason they withdrew their request? I remember someone telling me that it had to do with preserving their sovereignty. Note that the chairman at the time was Wayne R. Mitchum, Jr., which is who we met with last week.

Thanks,

Laurie

Laurie Warner Herson
Principal/Owner



Environmental Planning

916.201.3935

laurie.warner.herson@phenixenv.com

State of California Small Business (#1796182)

Supplier Clearinghouse Women Business Enterprise (#16000323)

<http://phenixenv.com/>

NEPA Coordination Meeting - Agenda



Our Core Values – Safety, Trust and Integrity, Respect for Local Communities, Environmental Stewardship, Shared Responsibility and Shared Benefits, Accountability and Transparency, Proactive Innovation, Diversity and Inclusivity
Our Commitment – To live up to these values in everything we do

Meeting Information:

Date: April 26, 2023
Location: Teams
Start Time: 10:00 a.m.
Finish Time: 11:00 a.m.
Purpose: Standing Coordination Meeting for Final EIR/EIS Preparation/Process

Meeting Participants:

David Brick, Reclamation	Melissa Dekar, Reclamation	Melissa Harris, ICF
Ariel Cohen, HDR	Ali Forsythe, Sites Authority	Allison Jacobson, Reclamation
		Laurie Warner Herson, Integration

Agenda:

Discussion Topic	Topic Leader	Time Allotted
1. Schedule a. AB52 and tribal coordination b. WQ – ongoing efforts to bolster c. August 2023 completion of Final EIR/EIS	Laurie	10 min
2. Final EIR/EIS status a. Text changes – process for review b. 508 compliance update c. FPPA – Appendix 15A – need to recreate data ?	Melissa H	20 min
3. Next Steps a. Anticipated schedule for SES and Solicitor submittal	Melissa H	10 min
4. PAM/CAR – Shane to follow up	Melissa D	5 min
5. Action Items	All	5 min

Water Storage Investment Program Quarterly Report

The Quarterly Report is intended to document applicants' progress toward complying with regulation section 6013 and receiving final WSIP funding, including any changes in the magnitude of public benefits that could affect cost allocation. Applicants must provide a summary level update of the project status for the requirements and milestones listed below. The template may be modified as necessary to effectively communicate information. If minimal activities occurred during a reporting period, the report can be condensed.

- Note any issues or concerns that have, will, or could affect milestones or requirements.
- Identify key issues, including legal issues such as lawsuits or injunctions related to the project, that need to be resolved.
- Discuss how the actual schedule is progressing in comparison to the schedule provided in the Initial Report or the last reported schedule.
- Update the project schedule as needed.
- Note any milestones or accomplishments that occurred since submittal of the prior Quarterly Report.

Project Information

Project Name:

Sites Reservoir Project

Applicant Name:

Sites Project Authority (Authority)

Date:

April 25, 2023

Reporting Period:

January 1, 2023 through March 31, 2023

General Update and Key Issues

Please provide a general update and describe any key issues that occurred during this reporting period. You may attach additional documents or pages if more space is needed:

The Sites Project Authority continues to advance the permits, approvals and agreements necessary for construction and operations in a reasonable timeframe and with Prop 1 requirements.

Refer to Attachment A for additional information.

Items Required Prior to Scheduling a Final Award Hearing

The following items must be provided prior to scheduling a hearing. As applicable, please describe the status, estimated completion date, and percent complete of:

1. Contracts for non-public cost share:

Status: Multiple agreements are planned. Refer to Attachment A
Estimated Completion Date: June 2023
Percent Complete: 95%

2. Contracts for administration of public benefits:

Status: In Progress. Refer to Attachment A
Estimated Completion Date: December 2023
Percent Complete: 10%

3. Completed feasibility studies:

Status: Complete. Refer to Attachment A
Completion Date: November 2021
Percent Complete: 100%

4. Final environmental documentation:

Status: In Progress. Refer to Attachment A
Estimated Completion Date: August 2023
Percent Complete: 92%

5. All required federal, state, and local approvals, certifications, and agreements:

Status: In Progress. Refer to Attachment A
Estimated Completion Date: December 2023
Percent Complete: 42%

Items Required to Execute a Funding Agreement

Please provide an update, as applicable, on the following documents, which are needed to execute a funding agreement for the project:

- Applicant's audited financial statements
- Final project costs, schedule, and scope of work
- Evidence of bilateral communications
- Limited waiver of sovereign immunity (see regulations section 6013(f)(8))

Updates to information provided in the Initial Report or prior Quarterly Reports are only needed when a significant change has occurred. The Commission may request submittal of updated information prior to executing a funding agreement.

- Applicant's Audited Financial Statements: The Authority has initiated the financial audit for Fiscal Year 2022 (which ended on December 31, 2022). The audit is expected to be completed in May 2023 and approved by the Authority Board at their June 2023 meeting.
- Final Project Costs, Schedule, and Scope of Work: Consistent with the draft feasibility and draft environmental documentation that include a range of project sizes, operations, benefits, and effects, the Authority continues to advance the studies needed to define the "right size project" to build under current conditions. This includes an updated due diligence of the project that prioritizes the creation of:
 - (1) Eligible public benefits (as defined in Proposition 1, Section 79753(a)) and consistent with both the Water Commission's July 2018 determinations and the Authority's application (i.e., in accordance with the beneficiary pays principle; state's resource managers would manage the state's investment, which includes operational decisions that are on an equal footing as agencies managing their investment to create non-Prop 1 water supply reliability benefits; and having the ability to provide these benefits over the project's service life);
 - (2) Water supply reliability benefits that are not eligible for funding under Prop 1, but are funded by the agencies who have been funding the studies to date.
- Evidence of Bilateral Communications: The Authority, Bureau of Reclamation (Reclamation) and Department of Water Resources (DWR) continue to maintain effective communication and collaboration. DWR and Reclamation are active in the Authority's Reservoir Committee. Additionally, the Authority and Reclamation participate in regular Project Integration meetings, Federal Feasibility Study meetings, engineering/geotechnical coordination meetings, and environmental coordination meetings.
- Limited Waiver of Sovereign Immunity: Not applicable.

Status Update

Provide a status update for the following, as applicable:

- Labor Compliance
- Urban Water Management Plans
- Agricultural Water Management Plans
- Groundwater Management or Groundwater Sustainability Plans
- Potential effect of other conditionally eligible projects on the applicant's public benefits

Updates to information provided in the Initial Report or prior Quarterly Reports are only needed when a significant change has occurred. The Commission may request submittal of updated information prior to executing a funding agreement.

Labor Compliance - No change

Urban Water Management Plans - Not applicable

Agricultural Water Management Plans - Not applicable

Groundwater Management or Groundwater Sustainability Plans - No change

Potential effect of other conditionally eligible projects on the applicant's public benefits –

No change

Attachment A: Supplement for Reporting Period Ending March 31, 2022



Summary:

The Sites Project is a multi-benefit solution to improve water supplies for people and the environment as well as to provide recreation and local flood control benefits. Foundational to the Project is the beneficiary pays principle and cooperative operations with the Central Valley Project and State Water Project. The WSIP application, that was the basis for the Water Commission's conditional determination in July 2018, was based on the Project's full build-out (i.e., 1,800,000 acre-feet of storage) to maximize water supply benefits for a diverse group of local agencies; the state, in accordance with Proposition 1 requirements; and federal agencies, in accordance with the Water Infrastructure Investment for the Nation Act requirements. These benefits were estimated using the conditions incorporated into the CalSim model that was provided to all applicants and included a future climate change scenario.

Today, the Project continues to advance in parallel with other water management efforts throughout the State. The conditional commitments by the 30 participants from across the state in the Project, 22 of whom are investing to receive a direct water supply benefit, combined with the conditional state investment and level of federal interest, has identified that a "right sized" Project (i.e., closer to 1,500,000 acre-feet of storage along with additional facility changes) is more cost-effective and permissible. This "right-sized" Project continues to provide long-term annualized water supply benefits for both the local agencies and the State, in accordance with Proposition 1 requirements, while also preserving the ability for a federal role.

To advance this "right sized" Project, additional technical and environmental studies are being undertaken which will form the basis of the final Prop 1 award:

- **Contracts for non-public cost share** – In November 2021, the Authority submitted the 75% Local Cost Share Commitment letter to the Director of the Department of Water Resources. Over the next year, the Authority will advance the documents that will represent local cost share commitment culminating in the Sites Reservoir Benefits and Obligations Contract with Participants.
- **Feasibility Determination** – The Reclamation Compliant Feasibility Study was completed in December 2020. The Authority completed the State Compliant Feasibility Study in November 2021. The California Water Commission made a determination of project feasibility on December 15, 2021.
- **Final Environmental Documentation** – The Authority and Reclamation released the Revised Draft EIR/Supplemental Draft EIS for public review and comment in November 2021. Work to advance the Final EIR/EIS is ongoing.

1.0 Items Required Prior to Scheduling a Final Award Hearing

1) Contracts for non-public cost share (ongoing)

Based on the following, the estimated completion date is June 2023 and the estimated percent complete is approximately 95%.

Local Project Participants (Participants): The original participation agreements were signed in 2016 and were replaced with new agreements effective April 1, 2019. The agreements were subsequently amended in November 2020 to fund activities through the end of 2021. In September 2021, the Authority approved the Amendment 3 Project Agreement and associated work plan to fund work beyond 2021. The Participants worked with their respective home boards to sign the Amendment 3 Project Agreement by April 1, 2022. Over the next year, the Authority will work with Participants to update the 2021 Draft Plan of Finance and 2021 Draft Guiding Principles and Preliminary Terms which will be incorporated into the Sites Reservoir Benefits and Obligations Contract.

Sites Reservoir Benefits and Obligations Contract:

- Estimated Completion Date: June 2023
- Percent Complete: 10%

75% Non-Public Cost Share Commitment Letter:

- Completion Date: November 2021
- Percent Complete: 100%

Amendment 3 Project Agreement:

- Completion Date: September 2021
- Percent Complete: 100%

Reclamation: The Authority and Reclamation amended the existing cost share agreement (2015) for continued planning and pre-construction activities. This first amendment extends the term for 5 additional years from the date it was signed (through 2024). In addition, the Authority executed a Financial Assistance Agreement with Reclamation in August 2020 to advance Project studies.

In November 2021, the Authority worked with Reclamation to amend the existing Financial Assistance Agreement to reflect additional scope to advance environmental planning and permitting activities. The Authority worked with Reclamation to execute a new Financial Assistance Agreement to include engineering, operations modeling, geotechnical, and real estate activities to advance the Project.

During this reporting period, the Authority continued discussions with Reclamation involving the benefits and obligations for their investment in the Project. These discussions will lead to negotiation of a benefits and obligation contract between Sites and Reclamation which will track along a similar timeline to the benefits and obligation contract with participants.

Signed Cost Share Amendment:

- Completion Date: December 16, 2019
- Percent Complete: 100%

Financial Assistance Agreement Amendments

Amendment 01

- Completion Date: November 2021
- Percent Complete: 100%

Amendment 02

- Completion Date: June 2022
- Percent Complete: 100%

Financial Assistance Agreement (New Agreement)

- Completion Date: September 2022
- Percent Complete: 100%

The Authority is working with Reclamation on a third FAA and have it fully executed prior to September 30, 2023.

2) Contracts for administration of public benefits (ongoing)

Based on the following, the estimated completion date is December 2023 and the estimated percent complete is approximately 10%.

State of California (WSIP): The Authority and the California Department of Fish and Wildlife (CDFW) are conducting focused discussions on aspects of a benefits agreement for ecosystem benefits. Preliminary discussions with the California Department of Water Resources on a contract for administration of recreation and flood protection public benefits continued during this reporting period. Alongside the other WSIP Projects, the Authority met with CWC, CDFW, State Water Resources Control Board (SWRCB), and DWR staff to discuss the initial draft templates for the ecosystem benefits agreement and associated adaptive management plan.

- Estimated Completion Date: December 2023
- Percent Complete: 10%

3) Completed Feasibility Studies (complete)

Based on the following, the completion date was November 2021 and the estimated percent complete is approximately 100%.

Ongoing coordination efforts between the Authority and Reclamation culminated in the release of the Reclamation Compliant Feasibility Study (Final Feasibility Report) in December 2020. Completion of this study will allow for continued federal participation in the Project.

After responding to CWC staff and reviewers' comments, the Authority submitted the final WSIP Compliant Feasibility report in November 2021.

Reclamation Compliant Feasibility Study:

- Completion Date: December 2020
- Percent Complete: 100%

WSIP Compliant Feasibility Study:

- Estimated Completion Date: November 2021
- Percent Complete: 100%

4) Final Environmental Documentation (ongoing)

Based on the following, the estimated completion date is August 2023 and the estimated percent complete is approximately 92%.

The Authority, as the state lead agency, and Reclamation, as the federal lead agency, completed the public comment period on the Revised Draft Environmental Impact Report / Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) on January 28, 2022. The Authority and Reclamation received 101 comment letters including a single form letter sent by 113 individuals. The Authority and Reclamation have numbered all comments and continue preparation of responses to comments and the Final EIR/EIS. Over this time period, the Authority completed an administrative Final EIR/EIS for Authority, Reclamation, NEPA Cooperating Agency, and CEQA Responsible Agency review.

Draft EIR/EIS:

- Completion Date: August 2017
- Percent Complete: 100%

Revised Draft EIR/Supplemental Draft EIS:

- Completion Date: November 2021
- Percent Complete: 100%

Final EIR/EIS:

- Estimated Completion Date: August 2023
- Percent Complete: 83%

5) **All required federal, state, and local approvals, certifications, and agreements (ongoing)**

Based on the following, the estimated completion date is December 2023 and the estimated percent complete is approximately 42%.

Federal: The Authority and Reclamation continue to prepare the draft Biological Assessment in compliance with the Federal Endangered Species Act and the draft Programmatic Agreement in compliance with Section 106 of the National Historic Preservation Act. In addition, the Authority is working with the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act and provided a draft Clean Water Act permit application to the USACE for its initial review summer 2022. Revisions to the Section 404 permit application are underway.

- Estimated Completion Date: December 2023
- Percent Complete: 50%

State of California: The Authority continues to have productive meetings with CDFW to discuss the Project, the permit application process, and supporting information to include in the permit applications. The Project's Construction Incidental Take Permit application was submitted to CDFW in January 2022. Work is underway to address CDFW's comments on the Construction Incidental Take Permit application and also revise the application to add in recently listed bumble bees. Ongoing work on the Operations Incidental Take Permit application has continued to focus on the preparation of an administrative draft application package. The Authority submitted its Water Right Application to the SWRCB in May 2022. The SWRCB accepted the application in August and requested additional information prior to noticing the application. The Authority completed the analyses requested and responded to the information request on January 6, 2023. The Authority also continued preparation of a Clean Water Act, Section 401 Individual Permit application and associated discussions with the SWRCB. The Authority provided a draft Clean Water Act permit application to the SWRCB for its initial review summer 2022 and revisions to the application are underway. The Authority continues to engage with DWR Division of Safety of Dams (DSOD) to discuss the Project, the permit application process, and supporting information required to satisfy approvals for construction.

- Estimated Completion Date: December 2023
- Percent Complete: 34%

From: Janis Offermann [jaoffermann@montrose-env.com]
Sent: 4/25/2023 4:46:37 PM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Kevin Spesert [kspesert@sitesproject.org]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: [EXTERNAL] RE: CICC request for membership

Yes, especially since they say they will continue to work on AB 52 consultations.
Thanks for finding this, Laurie.

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, April 25, 2023 2:54 PM
To: Kevin Spesert (kspesert@sitesproject.org) <kspesert@sitesproject.org>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Janis Offermann <jaoffermann@montrose-env.com>
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[https://sitesreservoirproject.sharepoint.com/exemgmtadmin/Exec%20MgmtAdmin/1.3%20Meetings%20%26%20Supporting%20Docs%20\(AB,%20RC,%20Agents,%20Leadership,%20etc.\)/1-AB%20%26%20RC%20Agenda%20Packets/Archived%20Agenda%20Packets/2-](https://sitesreservoirproject.sharepoint.com/exemgmtadmin/Exec%20MgmtAdmin/1.3%20Meetings%20%26%20Supporting%20Docs%20(AB,%20RC,%20Agents,%20Leadership,%20etc.)/1-AB%20%26%20RC%20Agenda%20Packets/Archived%20Agenda%20Packets/2-)

Authority%20Board%20Agenda%20Packet/2017/12-December%202017/05-
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Thanks,

Laurie

Laurie Warner Herson
Principal/Owner



Environmental Planning

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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/26/2023 10:16:39 AM
To: Angela Bezzone [bezzone@mbkengineers.com]
CC: Spranza, John [john.spranza@hdrinc.com]
Subject: RE: WR App Errata

Yes. I think this is good. BUT – the Operations ITP modeling uses the 2035 CT, NOT historical hydrology. Does that change anything?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Wednesday, April 26, 2023 8:59 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Spranza, John <john.spranza@hdrinc.com>
Subject: WR App Errata

Ali – We talked about this a while ago, but I want to confirm that I have the right language to describe how Alternative 3A is now proposed to be used. The screenshot below is from the WAA Report and comes from a question from Jelena asking why the Admin Final EIS/EIR diversions weren't exactly in line with the WAA. The answer is that there were minor code differences between Alt 3 and 3A, even though they use the same assumptions.

I'm trying to make as minor of a change as possible, so the only change is adding the underlined text. Is "Incidental Take Permit for Project Operations" the correct language to use?

The CalSim II model used for this analysis is the Alternative 3A model produced by the Authority in support of the Final Environmental Impact Report/ Environmental Impact Statement²² and the Incidental Take Permit for Project Operations, both of which are currently in preparation. The relevant supply and demand inputs used in this copy of the CalSim II model include²³:

Thanks!

Angela Bezzone, P.E.

MBK Engineers
455 University Ave Suite 100
Sacramento, CA 95825

(916) 456-4400 – Phone
(775) 450-6408 – Cell

(916) 456-0253 – Fax

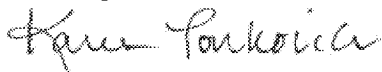
Quality Control Certification

For Draft Remnant Historic Investigation Features Evaluation/Mitigation Strategy Technical Memorandum for the Sites Project Authority

Completion of Internal Quality Control

Fugro USA Land, Inc. (Firm) has completed the Draft Remnant Historic Investigation Features Evaluation/Mitigation Strategy Technical Memorandum. This Draft Remnant Historic Investigation Features Evaluation/Mitigation Strategy Technical Memorandum was produced in compliance with the Firm's quality control process.

All quality control procedures and processes were complied with including verification of project criteria; reviews of assumptions, methods, procedures, and material properties used in analyses; reviews of the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the scope of work of the Sites Project Authority consistent with Quality & Environmental Management Systems (QEMS) and State and Federal laws and regulations. Documentation of the quality control process is attached. The undersigned recommends certification of the internal quality control process for this work product.

3/3/2023

Quality Control, Karen Emery-Tonkovich, P.G., Fugro USA Land, Inc.

Date

Certification of Internal Quality Control

I hereby certify that the Draft Remnant Historic Investigation Features Evaluation/Mitigation Strategy Technical Memorandum was completed in full compliance with either this quality control plan, or a plan equally as rigorous and meets the Authority's requirements for this analysis.

3/3/2023

Lead Geotechnical Engineer, Jeriann Alexander, P.E., Fugro USA Land, Inc. Date

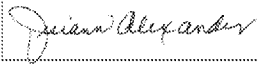
Status: Draft
Filename: Sites QC Form Remnant Features TM
Notes:

Revision:
Date: 3/3/2023
Page: 1 of 2

Document Quality Control Record

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Project Name	Sites Reservoir Project	Document Due Date	3/3/2023
Document Author(s)*	Jeriann Alexander		

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Document Approved for Issue By					
Print Name	Jeriann Alexander, P.E.	Signature		Date	3/3/2023

Remnant Historic Investigation Features Evaluation/Mitigation Strategy

Technical Memorandum



To:	Henry Luu, PE, HDR, Jelica Arsenijevic, HDR
CC:	File
Date:	March 3, 2023
From:	Jeriann Alexander, PE, Fugro
Quality Review:	Karen Emery-Tonkovich, PG, Fugro
Authority Agent Review:	Henry Luu, PE, HDR
Subject:	Remnant Historic Investigation Features Evaluation/Mitigation Strategy

Observed Remnant Features

Historic geotechnical field investigation activities conducted by the United States Bureau of Reclamation (USBR) and Department of Water Resources (DWR) and their subcontractors have left behind various boring completion features referred to herein as remnant features. The observed features noted to date include metal stove pipes, which have been observed sticking up from the ground surface. The features have been observed by Sites Authority Agents while conducting site visits to owner properties where new investigations are planned, and recently by Fugro during AM3 investigations. During conversations with various property owners, Sites Authority Agents, and representatives, the owners have often mentioned these remnant features as they are a nuisance condition they have had to work around for years.

While conducting historic investigation research Fugro noted that there is no mention in the reports about County well permits being taken out to install the borings or the wells, a practice which is being undertaken for all the borings and piezometers completed to support Sites Project Authority design investigations. A number of historic boring logs mention the use of metal stove pipes to protect water level piezometers which had been constructed in select boreholes. While all boring and piezometer construction details vary, the piezometers which are being protected by the metal stove pipes comprise tens of feet of plastic pipe and packers used to hold the pipe in place to a given depth, and the bottom of the borings are open holes cored in rock units. Some boring logs also indicate that older piezometers/wells were protected below grade and marked with square wooden stakes.

Regulatory Requirements and Potential Consequences

In the State of California, the DWR has the responsibility for developing standards for wells for the protection of water quality under California Water Code Section 231, which was enacted in 1949. Statewide standards for water wells were first formally published in 1968 as DWR Bulletin 74, *Water Well Standards: State of California*. Local jurisdictions have the authority to adopt standards which

meet or exceed the Bulletin 74 standards. Well standards are administered and enforced at the local level. The process, from standards development through enforcement, is detailed in Water Code Sections 13800 - 13806. The standard defines a “well” as any hole in the ground.

Customary and responsible practice for well and piezometer installation, as well as for conducting borings includes obtaining a permit from the local jurisdictions. However, many governmental agencies believe that their work does not need to follow local jurisdictional requirements. As such, it is common to find that federal and state governmental agency practices did not include obtaining permits for the wells, piezometers and borings, and there was no supervision by the local agencies for the completed work.

In addition to ensuring that surface sealing for any boring occurs, and that wells/piezometers are properly constructed, there are local requirements which indicate that wells and piezometers which are no longer in use are to be properly abandoned. Bulletin 74-90, the current standard, summarizes why proper construction and abandonment is important:

Improperly constructed, altered, maintained, or destroyed wells are a potential pathway for introducing poor quality water, pollutants, and contaminants to good-quality groundwater. The potential for groundwater quality degradation increases as the number of well Improperly constructed, altered, maintained, or destroyed wells can facilitate groundwater quality degradation by allowing:

- *Pollutants, contaminants, and water to enter a well bore or casing;*
- *Poor quality surface and subsurface water, pollutants, and contaminants to move between the casing and borehole wall;*
- *Poor quality groundwater, pollutants, and contaminants to move from one stratum or aquifer to another; and,*
- *The well bore to be used for illegal waste disposal.*

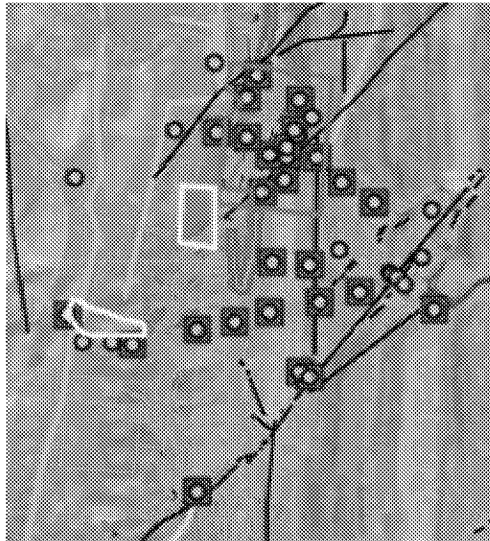
Permanently inactive or “abandoned” wells that have not been properly destroyed pose a serious threat to water quality. They are frequently forgotten and become dilapidated with time, and thus can become conduits for groundwater quality degradation. In addition, humans and animals can fall into wells left open at the surface.

Value of Remnant Features in the Short Term

There is a chance that wells/piezometers may provide an opportunity to further evaluate the occurrence of water in the project areas. The features would need to be evaluated to determine viability/useability and then permitted and rehabilitated in accordance with local jurisdictional approval and oversight.

These historic features which have been gleaned from the available reports, have been compiled onto a GIS layer. A few of the Sites Reservoir Project planned construction areas showing where these investigation remnant features are located are shown in the inset images which follow. The remnant features appear as blue boxes with gold centers. The polygons are proposed AM3 investigation areas.

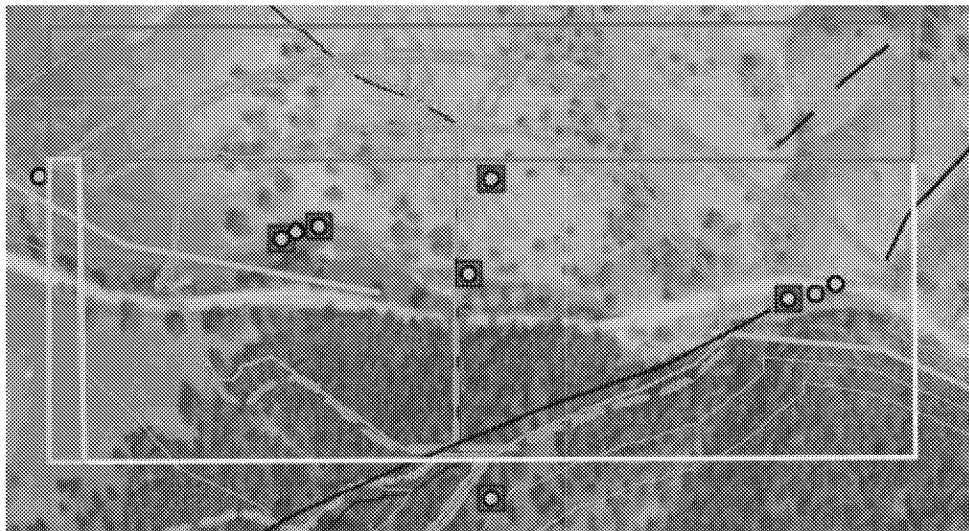
Proposed Golden Gate Dam Area



Proposed Saddle Dam Area



Proposed Sites Dam Area



Feature Abandonment/Destruction

At some point these remnant features, as well as all wells/piezometers installed for design and all agricultural and residential wells within the footprint of the Sites Reservoir Project will need to be properly abandoned/destroyed. County Environmental Health Services departments are the regulating agencies for permitting and destruction of borings, wells, and piezometers.

As an example of local requirements governing well abandonment and destruction, Colusa County requirements state the following regarding “Destruction of Wells”:

Purpose of Destruction: *A well that is no longer useful (including exploration and test holes) must be destroyed in order to:*

1. *Assure that the ground water supply is protected and preserved for further use.*

2. *Eliminate the potential for physical hazard.*

Colusa County considers a well which has been inactive for more than 1 year, abandoned. Colusa County allows these abandoned features to be destroyed by filling them with an inert material after they have been “cleared of all obstructions”. Whether or not the noted plastic pipe and packers which have been left in the remnant feature piezometers would be determined to be “obstructions” or not would need to be clarified with this particular County during the planning and permitting for the destruction. Glenn County and Yolo County likely have similar requirements.

Management Strategy

As the historic remnant investigation features have been long abandoned and the Sites Project Authority would like to remain responsible in their stewardship of the watershed, it would be reasonable to develop a strategy to manage these features during the rest of the design and construction phases of work for the remnant features which occur within the proposed reservoir Area of Potential Effect(APE). To this end, the following strategy elements may lead to informing a management strategy. Other wells used for agricultural and ranching and rural residential use could also be managed within this strategy, as they too will need to be properly destroyed.

- Consider whether the remnant features provide meaningful value for the project.
- When they are observed in the field conduct an early evaluation of useability of the feature and document their location and conditions.
- Meet and discuss these features with the local agencies to develop plan(s) for rehabilitation and use and future destruction concurrent with construction activities.
- Once identified remnant features are evaluated and their presence, reuse, and destruction means and methods are discussed with the local agencies, a cost estimate can be prepared to quantify an entry for the project cost estimate.

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/26/2023 10:38:47 AM
To: Micko, Steve [Steve.Micko@jacobs.com]
CC: Angela Bezzone [bezzone@mbkengineers.com]; Leaf, Rob [Rob.Leaf@jacobs.com]
Subject: RE: Sites Project -

Thanks Steve. Super helpful!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Tuesday, April 25, 2023 12:01 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Angela Bezzone <bezzone@mbkengineers.com>; Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: RE: Sites Project -

Hi Ali,

I calculated resultant volumes of beneficiary Shasta operations for ALT3 051722, by operation.
See long-term averages in the first table below.

I also summarized SALMOD results for NAA 051422 and ALT3 051722 (alternatives from the Final EIR/EIS) in the second table below.

Note that the Spring Pulse Release volume in the table below differs from the value in the Sites Metrics.
The value below reflects the increased incremental volume from Spring Pulses, not considering flood control releases.
This avoids a potential of double-counting.

Let me know if you have any questions, or believe a figure may better suit Katherine's needs.
I'll also add this to our meeting agenda for tomorrow.

Thanks,
Steve

Additional Volume to Support Shasta Beneficiary Operations

Action	Long-Term Average (TAF)
Spring Pulse Release	1
Fall Flow Stability	23
Shasta Carryover (for cold water pool)	102
Total	126

Annual Production (no. fish per year)

	NAA 051422	ALT3 051722	Difference	Percent Change
Winter-Run	1,924,118	1,948,791	24,673	1.3
Spring-Run	447,691	447,648	-44	0.0
Fall-Run	18,263,699	18,375,634	111,935	0.6
Late Fall-Run	2,882,503	2,916,949	34,447	1.2

From: Alicia Forsythe <aforsythe@sitesproject.org>

Sent: Monday, April 24, 2023 2:43 PM

To: Micko, Steve <Steve.Micko@jacobs.com>

Cc: Angela Bezzone <bezzone@mbkengineers.com>

Subject: [EXTERNAL] Sites Project -

Hi Steve – Katherine with Valley Water contacted me last week. They are updating one of their committees on all of their key projects and Sites is coming up at the next meeting. She was asking mostly about environmental benefits.

But she asked me two things that I wanted to confirm with you:

1. #’s for salmon benefits, cold water pool, spring pulse and fall flow stability – I know we did those graphics for Reclamation when we were doing the modeling. Mostly to convey the changes and how the revised modeling increased anadromous fish benefits. Did we ever updated these graphics and numbers for the Final EIR/EIS modeling? She’s looking for a way to say “Sites results n XX,000 AF more cold water pool for fish” or something to convey what these benefits are in a way that her Board members can understand. Any thoughts on this?
2. Final EIR/EIS modeling results – I think I can dig out what she needs here, so I am going to do this and will have you review the info before I send to her.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/26/2023 12:45:30 PM
To: Katherine Maher [KMaher@valleywater.org]
Subject: FW: Sites Modeling Follow-Up

Hi Katherine – I took a look at this and in reading the footnotes in detail, I think this is still relevant. These values were based on the BA modeling and assuming Alternative 3B, which has Reclamation at 16% investment. These numbers are our current values and are good to continue to use. Apologies for taking so long to get to this.

Ali

Annualized participation (TAF/yr)	Storage in reservoir (1:6.234 conversion factor)	Percent diversions received*	Approximate releases (TAF/yr, long-term average) ***	Approximate releases (TAF/yr, dry and critical years)
500	3,117	0.2%	510	1,030
6,000	37,404	2.6%	6,115	12,330
8,000	49,872	3.5%	8,150	16,440
10,000	62,340	4.4%	10,190	20,550

*Percent diversions received is calculated based on percent active storage allocated to the participant. The active storage in the reservoir is estimated to be 1.44 MAF based on a 60 TAF deadpool .The percent diversions is the storage allocated to the participant divided by the total active storage.
**Estimated releases are based on modeled operational assumptions.
***Based on Alternative 3B results (16% federal storage allocation) for the Biological Assessment using 2035 CT climate hydrology

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Sent: Friday, May 27, 2022 9:25 AM
To: Katherine Maher <KMaher@valleywater.org>; Cindy Kao <CKao@valleywater.org>
Cc: Patel, Trishna <Trishna.Patel@hdrinc.com>
Subject: RE: Sites Modeling Follow-Up

Hi Katherine and Cindy,

I just wanted to follow-up with a note I should have included in my email. All numbers are provided in releases from the reservoir, and therefore don't include any losses through the Delta.

Thanks,
Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

From: Heydinger, Erin
Sent: Thursday, May 26, 2022 10:57 AM
To: kmaher@valleywater.org; Cindy Kao <CKao@valleywater.org>
Cc: Patel, Trishna <Trishna.Patel@hdrinc.com>
Subject: Sites Modeling Follow-Up

Hi Cindy and Katherine-

Below are answers to your questions from our call on Monday. I asked the Jacobs team about the CalSim 2/3 expected difference and hope to hear back from them before the end of the week. I will forward their response when I get it.

- **Regulatory assumptions and level of development:** All models that have been run for the Sites project over the past year (including the WSIP Feasibility Study, draft EIR/EIS) include both ROC on LTO and the SWP ITP in the baseline. All models used a 2030 planning level of development (comparable to assumptions for system-wide demands). This is consistent with other documents that have been recently produced, such as the SWP ITP and ROC on LTO.
- **Releases from Reservoir with climate change:** you requested numbers showing releases under the 2070 climate scenario. The table below shows estimate releases for Alternative 1B under historic, 2030, and 2070 climate conditions.

	Historic hydrology	2030 climate change (WSIP hydrology)	2070 climate change (WSIP hydrology)
Reservoir releases (TAF, long-term average)	234	253	259

- The diversion criteria table is attached
- Estimated storage and releases for Valley Water at various participations levels based on latest modeling. Please see below. Note that this is a back-of-the envelope estimate and should be considered approximate.

Annualized participation (TAF/yr)	Storage in reservoir (1:6.234 conversion factor)	Percent diversions received*	Approximate releases (TAF/yr, long-term average) ***	Approximate releases (TAF/yr, dry and critical years)
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Please let me know if you have questions on this or if anything else comes up.

Thanks and have a great Memorial Day!
Erin

Erin Heydinger, PE, PMP
Project Manager - Water

HDR
2379 Gateway Oaks Dr, #200
Sacramento, CA 95833
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/26/2023 1:22:51 PM
To: Katherine Maher [KMaher@valleywater.org]
Subject: RE: Sites Modeling Follow-Up

Yes. It does. This was hot off the press when Erin sent this to you and this does reflect the current diversion criteria.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Katherine Maher <KMaher@valleywater.org>
Sent: Wednesday, April 26, 2023 1:10 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Modeling Follow-Up

Hi Ali,

Thanks, we'll keep this in the memo. Does this modeling reflect the current diversion criteria?

Katherine

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 26, 2023 12:46 PM
To: Katherine Maher <KMaher@valleywater.org>
Subject: FW: Sites Modeling Follow-Up

*** This email originated from outside of Valley Water. Do not click links or open attachments unless you recognize the sender and know the content is safe. ***

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Please let me know if you have questions on this or if anything else comes up.

Thanks and have a great Memorial Day!

Erin

Erin Heydinger, PE, PMP
Project Manager - Water

HDR
2379 Gateway Oaks Dr, #200
Sacramento, CA 95833
D 916.679.8863 M 651.307.9758

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From: Janis Offermann [jaoffermann@montrose-env.com]
Sent: 4/26/2023 1:24:18 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
CC: Risse, Danielle [Danielle.Risse@hdrinc.com]
Subject: Consultation timelines for Yocha Dehe, CICC, and Paskenta
Attachments: Consultation Timeline Cachil Dehe Band of Wintun Indians_04262023.docx; Consultation Timeline Yocha Dehe Wintun Nation_04262023.docx; Consultation Timeline Paskenta Band of Nomlaki Indians_04262023.docx

Hi, Everyone

I have completed the detailed consultation timelines for the three tribes that are consulting on the Sites Project. I think it would be good to append them to the AB 52 Summary technical memo, so I will add a reference to them in that. I will also go back and update the memo to include recent events.

Please take a look and let me know if there is anything else I should add.

Thanks

janis

Janis Offermann, M.A., RPA

Senior Cultural Resources Manager

M: 530.220.4918

jaoffermann@montrose-env.com

Please note new email address after April 1, 2023. I can still receive emails as janis@horizonh2o.com; however, all of my outgoing emails to you will be from jaoffermann@montrose-env.com.

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Timeline of AB 52 Consultation between the Sites Project Authority and the Yocha Dehe Wintun Nation

[Note: Consultations with tribal governments started in the late 1990s through the CALFED program, nearly two decades before implementation of AB 52. The Sites Reservoir Project (then known as North-of-Delta Offstream Storage, or NODOS) Study Team (CALFED, California Department of Water Resources (DWR), and Department of the Interior, Bureau of Reclamation (Reclamation)) identified the following tribes that could be affected by implementation of the Sites Reservoir: Cachil Dehe Band of Wintun Indians (Cachil Dehe); Cortina Indian Rancheria of Wintun Indians; Grindstone Indian Rancheria of Wintun-Wailaki; Paskenta Band of Nomlaki Indians; Round Valley Indian Tribe of Round Valley; Wintun Tribe in Redding; and Yocha Dehe Wintun Nation. The NODOS Study Team developed the “Guiding Principles: Working with Indian Tribes on North-of-the-Delta Offstream Storage” in consultation with the tribes to direct planning activities involving the tribes. The NODOS Study Team met at a scoping meeting on January 23, 2002 and at eight subsequent meetings and one field tour of Sites Reservoir location through March 2004 to provide updates on the NODOS progress and to encourage input on issues of concern from the tribes. A Tribal Forum on the Project was held by DWR and Department of the Interior on February 26, 2004.]

DATE	ACTION
February 10, 2017	Project notification letter sent from the Authority to the Paskenta Band of Nomlaki Indians (Paskenta) pursuant to Cal. Pub. Res. Code 21080.3.1(d).
April 7, 2017	Follow-up Project notification letter sent to the Tribe.
April 14, 2017	Telephone call from the Tribe requesting that the notification letter be resent to a different Tribal contact.
April 19, 2017	Authority called the Tribal contact, leaving a message.
April 20, 2017	Email from Yocha Dehe requesting project information, including maps and shapefiles; the Authority emailed a map of the project on the same day.
May 19, 2017	Letter from Yocha Dehe to the Authority requesting consultation on the Sites Project, as well as additional information.
June 22, 2017	The Authority provided the additional requested information and the draft archaeological survey report
February 2019	Project notification letter sent from the Authority to the Yocha Dehe pursuant to Cal. Pub. Res. Code 21080.3.1(d) for upcoming geotechnical investigations.
March 7, 2019	Letter from the Tribe requesting consultation on the geotechnical studies.
June 28, 2019	AB 52 consultation meeting at the Tribal office to discuss the project. Ended up explaining the entire project, not just the geotechnical studies.
July 1, 2019	Yocha Dehe followed up by emailing the Tribe’s Treatment Protocol for Handling Human Remains and Cultural Items Affiliated with the Yocha Dehe Wintun Nation, should any be discovered. The tribe also requested that the historic sites be separated out from the resource GIS data.
July 5, 2019	Sent Native American archaeological site GIS data to the tribe.
July 10, 2019	Yocha Dehe received a flash drive from the Authority containing the EIR/EIS, Feasibility Study, geotechnical investigation environmental commitments, and prior AB 52 correspondence
July 12, 2019	Yocha Dehe acknowledged receipt of the files.
June 30, 2020	AB 52 consultation meeting to provide project updates and plans for recirculating the EIR in 2021. Yocha Dehe requested GIS information for

	recorded sites. The Authority noted that it is being compiled and should be available in the fall.
September 30, 2020	Updated project information sent to the Tribe in preparation for upcoming meeting.
October 6, 2020	AB 52 consultation meeting with the Tribe. Yocha Dehe requested a visit to the project area.
November 14, 2020	Updated project notification letter sent from the Authority to the Yocha Dehe pursuant to Cal. Pub. Res. Code 21080.3.1(d), due to Project modifications and recirculation of the EIR.
November 19, 2020	Letter from the Tribe requesting continued consultation and a site visit.
January 11, 2021	Site visit to the Project area by Yocha Dehe members with the Authority.
January 12, 2021	Email to Yocha Dehe as follow-up to yesterday's meeting in which requested information was provided regarding tribal monitors during the original surveys in 2003-2004.
February 12, 2021	Yocha Dehe emailed the Authority with a request for the archaeological site records and for the site record data to be linked to GIS information. Emails pertaining to the transfer of archaeological site records and site record data embedded in the GIS data are discussed in Section 5, Yocha Dehe Ongoing Consultation and GIS and Site Record Data, of the AB 52 summary technical memorandum, and are compiled in Attachment W to that document. As communications relevant to this topic were quite extensive and extend through May 2022, they are not listed here.
March 15, 2021	The Authority provided the Tribe with an updated Project Description.
May 21, 2021	AB 52 consultation meeting with the Tribe. Yocha Dehe requires site records in order to help define areas that need protection.
July 29, 2021	AB 52 consultation meeting with the Tribe. The mitigation measures in the EIR were discussed and there was a discussion about identifying areas outside of the reservoir footprint for reinterring human burials currently located within the reservoir. Also established monthly meetings in lieu of quarterly meetings.
August 25, 2021	AB 52 consultation meeting with the Tribe. Yocha Dehe was expecting to receive site records from the DWR soon.
September 16, 2021	AB 52 consultation meeting with the Tribe. Status of EIR discussed, along with notification that public meetings would be in November. Tribe met with DWR earlier in the week and expects to receive site records soon.
October 7, 2021	Email to Yocha Dehe providing a status update of the Section 106 Programmatic Agreement.
November 12, 2021	The Authority issued a Notice of Availability announcing the public review and comment period for the RDEIR/SDEIS and dates of virtual public meetings. The virtual public meetings were held on December 15 and 16, 2021. The public review and comment period ended January 28, 2022. The Tribe was included in the issuance of the Notice.
December 10, 2021	Authority sent the confidential cultural report that is an appendix to the revised EIR. Yocha Dehe called later that day to discuss mitigation measures in the Revised EIR.
December 13, 2021	At the request of Yocha Dehe during the call on December 10, 2021, the Authority sent the EIR mitigation measures to the Tribe via an email. The email also reminded the Tribe that two virtual public meetings on the Revised EIR

	were scheduled to be held that week and included the website link to the Revised EIR.
January 25, 2022	Meeting with the Tribe to discuss tribal monitoring of upcoming geotechnical studies. GIS data of study locations were supplied to the Tribe.
January 27, 2022	Authority reached out to Yocha Dehe to discuss a request from the United Auburn Indian Community (UAIC) for the cultural resources report prepared in support of the EIR.
January 31, 2022	Telephone call with Yocha Dehe about UAIC's request for the confidential report. Yocha Dehe said they would discuss it with UAIC.
February 1, 2022	Letter from the Tribe noting that they will need additional time to review the document but they intend to provide comments on the RDEIRE/SDEIS.
February 4, 2022	Sites 2022-2024 Geotechnical Investigations project notification letter sent from the Authority to the Yocha Dehe pursuant to Cal. Pub. Res. Code 21080.3.1(d).
March 1, 2022	Authority executed a contract (\$590,400.00) with Yocha Dehe to supply tribal monitors for upcoming geotechnical work.
March 29, 2022	Cultural Resources Sensitivity Analysis Report for the 2022-2024 Sites Reservoir Geotechnical Investigations document submitted to the Tribe.
May 19, 2022	AB 52 consultation meeting with Tribe. Authority requested that comments on the EIR be submitted by August. Discussion about monitoring of upcoming geotechnical work. Site record data had been submitted to Yocha Dehe the prior week.
August 1, 2022	AB 52 consultation meeting with Tribe. During this meeting the Authority introduced the concept of using a Memorandum of Agreement (MOA) to close out AB52 consultations. Discussion of upcoming geotechnical work and inclusion of tribal monitors for both pre-work surveys and field work.
August 30, 2022	Post Review Discovery Plan, Archaeological Monitoring Plan, and Burial Treatment Plan for geotechnical studies submitted to the Tribe.
September 13, 2022.	The Cultural Resources Sensitivity Analysis Report for the 2023-2024 Sites Reservoir Test Pits, Fault Studies, and Quarry Studies, Colusa, Glenn, and Yolo Counties, California, was submitted to Yocha Dehe. That same day, the Tribe provided some initial comments on the document over the phone.
September 30, 2022	Letter from Tribe providing comments on the Sensitivity Analysis Report for the 2023-2024 Sites Reservoir geotechnical report provided to the Yocha Dehe on September 13.
October 31, 2022	AB 52 consultation meeting with Tribe. The Yocha Dehe Tribal Historic Preservation Officer and other Cultural Committee members attended. The Authority requested comments on the EIR by November, but could take them through mid-January 2023, if necessary. Discussion of the MOA and Tribal Working Group. Discussion of geotechnical work. The Authority acknowledged the comments Yocha Dehe provided on the Post Review Discovery Plan and noted that the comments would be incorporated into other project cultural resources documents
November 9, 2022	The revised Cultural Resources Sensitivity Analysis Report for the 2023-2024 Sites Reservoir geotechnical report was re-submitted to the Tribe showing the edits made in track changes, according to the Tribe's request.

December 8, 2022	AB 52 consultation meeting with Tribe. Yocha Dehe still reviewing the EIR and asked about a hard date for completing the review; the Authority said January 20, 2023. Brief discussions about status of MOA review and the Tribal Working Group, as well as verifying that new contract for upcoming geotechnical monitoring had been finalized.
January 5, 2023	AB 52 consultation meeting with Tribe. The tribal representative said that they would work to provide comments on the EIR by January 20, 2023 and comments on the MOA by the end of the month. Discussion about providing access to areas that the Tribe is interested in visiting, as the real estate branch is currently reaching out to land owners, but the Authority needs to know where those areas are located. Yocha Dehe will provide such information shortly. It was agreed to establish monthly meetings for the remainder of the year.
January 12, 2023	Authority sent letter inviting the Tribe to participate in a Tribal Working Group.
January 20, 2023	Post Review Discovery Plan, Archaeological Monitoring Plan, and Burial Treatment Plan for the 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations report submitted to the Tribe.
February 9, 2023	AB52 meeting with the Tribe, which was attended by the Tribe's attorney. The Authority provided a status of the EIR and Yocha Dehe said they would provide comments by the end of the month. The tribe also said that they would review the MOA by the end of the month; the Authority resubmitted the MOA brief to Yocha Dehe, per their request, after the meeting. The Tribal Working Group and geotechnical study monitoring were briefly touched upon. The Authority's real estate branch is working with land owners for access, and the tribe was reminded to let the Authority know what areas they are interested in accessing.
February 23, 2023	Post-Investigation Cultural Resources Monitoring Report Summary for Work Package 1 of the 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations submitted to the Tribe.
April 13, 2023	AB 52 consultation meeting with Tribe: Meeting canceled by Tribe at the last minute

Timeline of AB 52 Consultation between the Sites Project Authority and the Paskenta Band of Nomlaki Indians

[Note: Consultations with tribal governments started in the late 1990s through the CALFED program, nearly two decades before implementation of AB 52. The Sites Reservoir Project (then known as North-of-Delta Offstream Storage, or NODOS) Study Team (CALFED, California Department of Water Resources (DWR), and Department of the Interior, Bureau of Reclamation (Reclamation)) identified the following tribes that could be affected by implementation of the Sites Reservoir: Cachil Dehe Band of Wintun Indians; Cortina Indian Rancheria of Wintun Indians; Grindstone Indian Rancheria of Wintun-Wailaki; Paskenta Band of Nomlaki Indians; Round Valley Indian Tribe of Round Valley; Wintun Tribe in Redding; and Yoche Dehe Wintun Nation. The NODOS Study Team developed the “Guiding Principles: Working with Indian Tribes on North-of-the-Delta Offstream Storage” in consultation with the tribes to direct planning activities involving the tribes. The NODOS Study Team met at a scoping meeting on January 23, 2002 and at eight subsequent meetings and one field tour of Sites Reservoir location through March 2004 to provide updates on the NODOS progress and to encourage input on issues of concern from the tribes. A Tribal Forum on the Project was held by DWR and Department of the Interior on February 26, 2004. The Paskenta Band routinely participated in these early meetings.]

DATE	ACTION
February 10, 2017	Project notification letter sent from the Authority to the Paskenta Band of Nomlaki Indians (Paskenta) pursuant to Cal. Pub. Res. Code 21080.3.1(d).
November 13, 2020.	Updated project notification letter sent from the Authority to Paskenta pursuant to Cal. Pub. Res. Code 21080.3.1(d).
December 17, 2020	Follow-up email to November 13, 2020 letter
January 12, 2023	Authority sent letter inviting the Tribe to participate in a Tribal Working Group (TWG)
February 7, 2023	Follow-up email to January 12, 2023 letter
February 9, 2023	Email exchange regarding TWG and request from Paskenta for a copy of the U.S. Bureau of Reclamation’s Section 106 consultation letter, which was provided the same day
March 8, 2023	To Paskenta: email follow-up regarding TWG and consultation with the Authority.
March 9, 2023	Response from Paskenta requesting a meeting with the Authority and requesting cultural reports
March 10, 2023	Sent existing cultural reports to the tribe
March 21, 2023	Virtual meeting with Laverne Bill; copy of MOA brief sent to tribe after meeting
March 28, 2023	To Paskenta: email reporting on status of Section 106 consultation request with USBR
March 29, 2023	To Paskenta: Sent KMZs of site locational data in the project footprint and copies of site records for resources located in Glenn County

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/26/2023 2:32:11 PM
To: Spranza, John [john.spranza@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: FW: Sites PAM/FWCA status update

We have more work to do on the PAM / Coordination Act Report. John, lets talk on our Friday morning call.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Brick, David A <dbrick@usbr.gov>
Sent: Wednesday, April 26, 2023 10:52 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Dekar, Melissa D <mdekar@usbr.gov>
Subject: FW: Sites PAM/FWCA status update

Hi Ali, see Steve's response below. Feel free to FWD to anyone who should be included in this conversation.

David

From: Schoenberg, Steven <steven_schoenberg@fws.gov>
Sent: Thursday, April 20, 2023 3:24 AM
To: Brick, David A <dbrick@usbr.gov>
Cc: Jacobson, Allison M <ajacobson@usbr.gov>; Dekar, Melissa D <mdekar@usbr.gov>; Hunt, Shane D <shunt@usbr.gov>; Reaves, Brittany L <brittany_reaves@fws.gov>; Millsap, Stephanie D <stephanie_millsap@fws.gov>
Subject: Sites PAM/FWCA status update

Hi David, thanks for the reminder:

I can give you an update, although, it may not show the level of progress you may be hoping for - it does honestly inform you the state of affairs.

What Spranza provided in the "last Monday" referred to in your 3/3/2023 email was a 2022 response memorandum that had a lot of generalities - frequently referencing the same information that I used to develop the PAM, so I'm not seeing it as very responsive. There was one call with Spranza/Forsythe since to discuss some of this and there were going to be some activities that HDR was going to work further on (e.g., an implementation strategy). Much of what is in the 2022 response, was bouncing back with the same information or saying it was or will be revised in subsequent versions of the environmental documents since the admin draft I used to develop the PAM.

That may be true (or not), but, due primarily to multiple other priority project assignments this calendar year - I simply have not had the time to review those environmental documents, nor work on a FWCA report. Some of what I mentioned - such as the need to assess the effect of diversion and associated stage reduction on near-channel overbanking and related habitat (including SRA cover), may not have been done.

Let me go over some of these in summary for your meeting later this morning (underlined subjects are those from the ICF memo in response to the PAM):

"Upland Effects": This was in response to the need for greater specificity than the mere strategy of saying there will be compensation somewhere in some form, and the lack thereof is excused for the ostensible reason that there is no access at present. This is completely insufficient. Sites/Reclamation must be able to provide a reasonable estimate of compensation needs, even if not precise, and potential locations and quantities. I have asked that the existing Recovery Plans be used to better associate mitigation with recovery needs. What I remember from last discussions with Spranza is that a consultant is tasked to develop some kind of implementation strategy that would provide that specificity, but haven't seen anything since.

"Level 4 water concerns": This was in response to the assertion that amounts of water, alone, do not sufficiently describe the benefits to refuges. In response, what I am seeing in the memo is equally non-responsive (another table with amounts of water), and non-quantitative narration. This needs to be narrated in terms of actual habitat benefits - areas, durations, and degree of certainty. What I've done is have some discussions with other FWS staff in how this might be better explained; but I haven't developed it further and received no similar further explanation from Sites/Reclamation on this.

"geomorphic effects...": Here, the response seems to purposely truncate what it discusses to eliminate mention of some factors which the PAM specifically mentions (underlined in excerpt), discussing only those which are already in the appendices (p. 4, PAM: "geomorphic effects of flow reduction in the higher flow range on habitat (cut bank formation, cottonwood seed dispersion/regeneration processes, wood transport) and sensitive species which use it (e.g., bank swallows, yellow-billed cuckoo), reduction in near-channel overbanking/inundation, and effects of exchanges on the American and Feather Rivers.") The response references chapter 7 which only is about sinuosity and meandering, a proxy for cut bank formation.

Again, this is one that was mentioned in a recent call with Spranza and Forsythe, and it was understood there needed to be more, but I don't have it yet.

"additional review needed...for listed species": I'm going to pass on that one in this email for now.

"better demonstration of temperature benefit": This I gather was in response to my analysis that, given what was provided in the admin draft, the benefit did not appear to be very much since the 90 TAF equated to about a foot of Shasta elevation, and the temperature-frequency tables suggested at best a benefit in 10% of years. The narrative response to the PAM just explains things in qualitative terms, with qualifying verbs "may" do this or that benefit. It isn't any more convincing or quantitative. It is possible there could be more in the revised documents, which I haven't yet reviewed.

"Wilkins Slough/need more flow; overuse of WUA; sturgeon": The bypass flows at Wilkins have been revised/increased so that response seems adequate. The response sites analysis in Chapter 11 involving side channels and floodplain habitats to support an insignificant effect finding; I would have to look at that, however as previously mentioned, at the flow stage differences in the range for THIS project, effects are not restricted to side channels and floodplains (which activate at higher flows) but, possibly, the main channel edge and associated habitat which could be reduced in value as the stage lowers (less submerged edge

vegetation, wood - only riprap). But I don't know this - it would some evaluation. The sturgeon concern does indeed seem to be addressed by raising the bypass flow.

"exchange effects - American/Feather Rivers": There's a paragraph response referencing chapter 11 and saying there's no significant differences, but no specific citations to tables therein that were the basis of my concerns and what I saw in the admin draft were occasional large differences that resulted from exchanges in certain months. Absent a more detailed response, I would need to take a look at the revised information to see if there's something different with the revised operations.

In sum, no, the questions have not been answered. That said, many of these information gaps are typical and often resolved with further coordination that I would initiate. I believe there is sufficient information to begin to develop a FWCA report, but the reason it has not yet started is more that it would conflict with other project assignments of mine that have to be worked on to completion and cannot be deferred or reprioritized. It would be inappropriate based on the overall circumstance for me to estimate or state a schedule for the FWCA report at this time, although, it would be useful for FWS to know Reclamation/Sites' need date for the document.

Hope this helps!

Steve (Steven Schoenberg, cell phone during telework: 916-494-2904)

From: Brick, David A <dbrick@usbr.gov>
Sent: Wednesday, April 19, 2023 4:02 PM
To: Schoenberg, Steven <steven_schoenberg@fws.gov>
Cc: Jacobson, Allison M <ajacobson@usbr.gov>; Dekar, Melissa D <mdekar@usbr.gov>; Hunt, Shane D <shunt@usbr.gov>; Reaves, Brittany L <brittany_reaves@fws.gov>
Subject: RE: Followup on Sites PAM

Hi Steve, Sites was hoping for an update for our internal meeting tomorrow on Thursday. If you have time could you provide a status update on the PAM & CAR for the Sites Project? Any level of detail would be helpful. Thanks Steve

David

From: Brick, David A
Sent: Friday, April 14, 2023 11:42 AM
To: Schoenberg, Steven <Steven_Schoenberg@fws.gov>
Cc: Jacobson, Allison M <ajacobson@usbr.gov>; Dekar, Melissa D <mdekar@usbr.gov>
Subject: RE: Followup on Sites PAM

Hi Steve, following up on this email from last month. We had an internal meeting this week requesting the status of the PAM and CAR for the Sites project. Do you have any updates at this time?

Thanks for your help,
David

From: Brick, David A
Sent: Tuesday, March 7, 2023 12:46 PM
To: Schoenberg, Steven <Steven_Schoenberg@fws.gov>
Cc: Jacobson, Allison M <ajacobson@usbr.gov>
Subject: Followup on Sites PAM

Hi Steve,

I wanted to follow-up on the email John Spranza sent to you last Monday regarding the Sites Planning Aid Memo. I wanted to ensure all of your questions had been answered, and offer to organize a meeting with Sites and Reclamation if needed to review any items of concern. Let me know if there's anything we can do. Thanks Steve!

David

Final Feasibility-Level Cost Estimate Technical Memorandum



To: Sites Project Authority
CC: Henry Luu, P.E. (HDR)
Date: May 20, 2021
From: Mike Forrest, P.E., G.E.; Abrie Horak (AECOM)
Quality Review: Peter Morris (AECOM)
Authority Agent Review: Henry Luu, P.E. (HDR)
Subject: Final Feasibility-Level Cost Estimate
Task Order No. 2 – Task HR56

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(Costs in March 2021 Dollars)

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(Costs in July 2019 Dollars)

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Appendix B Construction Feasibility-Level Cost Estimate Tables – HR – Alternative 2 (includes VE cost back-up)

Appendix C Responses to Comments on the Draft Cost Estimate Technical Memorandum

Appendix D Responses to Metropolitan Water District's Comments on Draft Cost Estimate

Acronyms and Abbreviations

AACE	Association for the Advancement of Cost Engineering
APS	Alternative Procurement Strategy
Authority	Sites Project Authority
Caltrans	California Department of Transportation
cfs	cubic feet per second
DSOD	State of California Department of Water Resources, Division of Safety of Dams
DWR	California Department of Water Resources
FOB	Free on Board
GL	General Liability
I/O	Inlet/Outlet Works
LMC	Land Management Committee
MAF	million-acre-foot
NMWS	normal maximum operating water surface
OPCC	Opinion of Probable Construction Cost
PL/PD	Public Liability/Property Damage
QA	Quality Assurance
TM	technical memorandum
VE	value engineering

Executive Summary

This technical memorandum presents AECOM's feasibility-level cost estimate (an "Opinion of Probable Construction Cost", OPCC) for the reservoir facilities contract (HR) that include the main and saddle dams, spillway, inlet/outlet tunnels and tower, construction diversion tunnel and pipelines, and roads and bridges. Cost for the conveyance facilities contract (HC) are presented in a separate technical memorandum by Jacobs Engineering. The costs are presented in both 2021 dollars and 2019 dollars (for comparison to previous value planning estimates) for two reservoir capacities: Alternative 1 reservoir with a storage capacity of 1.5 million acre-feet (MAF), and for an Alternative 2 reservoir with a storage capacity of 1.3 MAF.

Cost Estimate Classification

The estimate presented herein is a Class 4 cost estimate as defined by the Association for the Advancement of Cost Engineering (AACE) International. Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete.

Feasibility-Level Cost Estimate Summary

The feasibility-level cost estimate summaries for Alternatives 1 and 2 are presented in Table ES-1 (in March 2021 dollars) and Table ES-2 (in July 2019 dollars). The costs shown in these tables include the direct construction costs (labor, materials, equipment and subcontractors), mobilization/demobilization and contractor mark-ups (overhead, profit, insurance and bond). Certain Owner-related costs are also added (design and construction contingencies and allowances, and non-contract costs). Key exclusions from the feasibility-level cost estimate are also discussed.

The feasibility-level cost estimates are based on the construction sequencing and schedule presented in the Constructability Analysis Technical Memorandum. Changes in the construction sequencing or schedule could affect the construction cost.

Construction Cost Uncertainty

The range of expected accuracy for the cost estimates decreases with increasing project definition in the design process. The ultimate cost at award can reasonably be expected to fall within a range from 15% to 30% below to 20% to 50% above the current Class 4 estimate after contingencies. The expected range of accuracy for this Class 4 feasibility-level cost estimate is +/-20%.

Design contingencies (applicable prior to bid) were selected as 10% to 15% to account for uncertainty related to undefined scope items within the current design in this feasibility-level cost estimate. A construction contingency allowance of 15% has been allowed for construction phase changes. This Technical Memorandum (TM) indicates key exclusions from this estimate. An "Owner's contingency" is not included in this feasibility-level cost estimate and should be considered by the Authority to establish its own contingency.

A risk register should be maintained throughout the design process to track risks and their potential impact on project cost.

Value Engineering Ideas to Reduce Construction Cost

Feasibility-level costs have increased significantly from the costs presented in the Value Planning Report (Authority, April, 2020). We also note that the costs presented in this TM have not been optimized. Selected value engineering (VE) options to provide cost savings were accepted and are included in the updated baseline estimates presented herein. Sufficient information currently exists to include these in the costs for Alternatives 1 and 2. Other VE options were identified as items that require further evaluation in preliminary engineering to clarify whether they are feasible. These items are not included in the baseline estimates as they will need Authority and State of California Department of Water Resources, Division of Safety of Dams (DSOD) acceptance.

Table ES-1. Feasibility-Level Cost Estimate – Executive Summary for HR Facilities (Alternatives 1 & 2)
(Costs in March 2021 Dollars)

WBS No	Work / Facility Package	Alt 1 Total Feasibility-Level Cost Estimate (Issue 04/16/2021)	Alt 2 Total Feasibility-Level Cost Estimate (Issue 04/16/2021)
20	Site Demolition and Clearing Work	33,015,981	33,015,981
21	Golden Gate Dam	695,724,122	589,052,931
22	Sites Dam	361,046,214	324,368,994
23	Saddle Dam 3	248,303,733	136,396,023
24	Saddle Dam 5	93,453,884	75,384,567
25	Other Saddle Dams/Dikes	142,972,082	78,805,695
26	IO Facility and Diversion Work	263,557,497	259,105,049
27	Road Work		
27.01	Public Roadway: Sites Lodoga Road Realignment (Alt 1) / South Road (Alt 2)	194,346,912	515,408,760
27.02	Public Roadway: Huffmaster Road Realignment	45,475,007	-
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	29,239,425	29,239,425
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	33,192,535	33,192,535
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	28,462,170	38,101,562
27.06	Recreation Roads - Peninsula Hills	9,232,630	9,232,630
27.07	Sites Lodoga Road Realignment Bridges	172,675,817	-
Total Feasibility-Level Cost Estimate (March 2021)		2,350,700,000	2,121,300,000

Total Feasibility-Level Cost Estimate (March 2021)	2,350,700,000	2,121,300,000
Estimated Range – Low (-20%)	1,880,560,000	1,697,040,000
Estimated Range – High (+20%)	2,820,840,000	2,545,560,000

Table ES-2. Feasibility-Level Cost Estimate – Executive Summary for HR Facilities (Alternatives 1 & 2)
(Costs in July 2019 Dollars)

WBS No	Work / Facility Package	Alt 1 Total Feasibility-Level Cost Estimate (Issue 04/16/2021)	Alt 2 Total Feasibility-Level Cost Estimate (Issue 04/16/2021)
20	Site Demolition and Clearing Work	32,027,650	32,027,650
21	Golden Gate Dam	674,897,687	571,419,688
22	Sites Dam	350,238,330	314,659,039
23	Saddle Dam 3	240,870,785	132,313,022
24	Saddle Dam 5	90,656,351	73,127,937
25	Other Saddle Dams/Dikes	138,692,227	76,446,655
26	IO Facility and Diversion Work	255,667,929	251,348,764
27	Road Work		
27.01	Public Roadway: Sites Lodoga Road Realignment / South Road	188,529,156	499,980,049
27.02	Public Roadway: Huffmaster Road Realignment	44,113,717	-
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	28,364,146	28,364,146
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	32,198,920	32,198,920
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	27,610,158	36,960,995
27.06	Recreation Roads - Peninsula Hills	8,956,252	8,956,252
27.07	Sites Lodoga Road Realignment Bridges	167,506,783	-
Total Feasibility-Level Cost Estimate (July 2019)		2,280,330,000	2,057,800,000

Total Feasibility-Level Cost Estimate (July 2019)	2,280,330,000	2,057,800,000
Estimated Range – Low (-20%)	1,824,264,000	1,646,240,000
Estimated Range – High (+20%)	2,736,396,000	2,469,360,000

1.0 Introduction

1.1 Background

The Value Planning VP-7 (appraisal level) estimate was completed in April 2020 (Authority, 2020). The objective of the value planning document was to determine the appropriate size and configuration for the reservoir (Alternative VP-7 has a 1.5 MAF reservoir). In August 2020, AECOM submitted seven technical memoranda (TMs) under Task Order No. 1 that advanced the design for VP-7 and described the feasibility engineering of the HR facilities (see References, Section 15.0). Those Task Order No. 1 TMs form the basis for the HR feasibility-level cost estimate presented in this TM. Appendix A and Appendix B provide the back-up for the Alternative 1 and Alternative 2 feasibility-level cost estimates, respectively. The feasibility-level cost estimate will be further refined during preliminary engineering as the project definition is improved.

This estimate has been through an extensive review by the Authority, including the following review meetings:

- On February 15, 2021, the initial draft of the feasibility-level cost estimate was presented to the Ad-Hoc Operations and Engineering Workgroup.
- On March 3, 2021, AECOM presented its in-progress draft feasibility-level cost estimate on the HR facilities dated February 3, 2021, to the Land Management Committee (LMC) in Maxwell, CA. This meeting discussed Authority concerns with the cost growth that occurred between the Value Planning Estimate for recommended alternative VP-7 developed in April 2020 and the in-progress feasibility-level cost estimate developed in February 2021 (AECOM, 2021b).
- On March 15, 2021, a review of progress of the cost estimates was made to the Ad Hoc Operations and Engineering Workgroup to receive feedback on the estimation process. Due to the cost growth, AECOM developed and presented value engineering (VE) ideas and associated approximate cost reductions for the in-progress estimate intended to reduce the construction costs.
- On April 20, 2021, a second presentation to the LMC took place to discuss revisions to this Revised Draft Feasibility-Level Cost Estimate.
- On April 29, 2021 the Value Planning Work Group was subsequently briefed regarding the status of the estimate and next steps.

AECOM submitted a draft TM on March 25, 2021, that responded to the LMC's e-mailed comments on the in-progress cost estimate pertaining to the HR facilities. The revised version of that TM is included in Appendix C, which incorporates responses to comments on the TM received from HDR on April 2, 2016. Besides responding to specific comments, that TM also compared the estimated 2019 costs for the HR items for the 1.5 MAF Alternative 1 reservoir in the VP-7 cost estimate (total cost of \$1.5 billion) and the items in the feasibility cost estimate (total cost of \$2.3 billion). VE ideas with their associated cost reductions were also included.

AECOM responded to Metropolitan Water District's Comments on the Draft Feasibility-Level Cost Estimate (AECOM, 2021b). Comment responses are included in Appendix D.

1.2 Project Overview and Reservoir Alternatives

The Sites Project Authority (Authority) is preparing a feasibility-level evaluation for a 1.5-MAF reservoir as a preferred alternative for the Sites Reservoir Project. The principal storage feature is Sites Reservoir. Figure 1-1 shows the location of Sites Reservoir, and the various dams to be constructed to form the reservoir. Sites Reservoir would have a nominal storage capacity of 1.5 MAF for Alternative 1, and 1.3

MAF for Alternative 2. Table 1-1 outlines key aspects of the reservoir alternatives for the reservoir engineering (HR) contract.

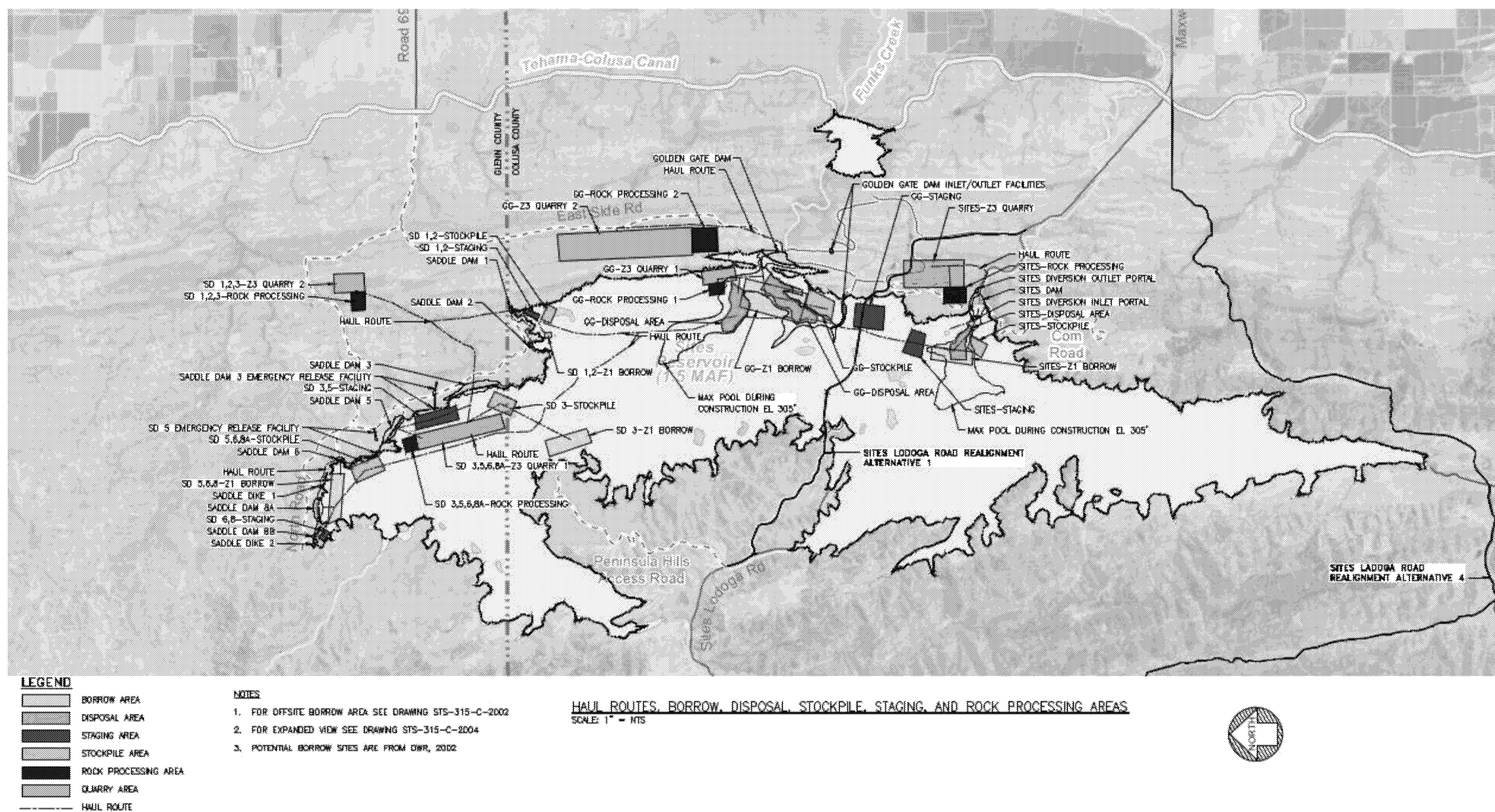


Table 1-1. Sites Reservoir Alternatives

Alternative Reservoir	Alternative 1 – 1.5 MAF	Alternative 2 – 1.3 MAF
Active Storage Capacity	1.4 MAF	1.2 MAF
Approximate Inundation Area	13,200 acres	12,400 acres
Dam/Saddle Dam Crest Elevation (Without Camber)	517 feet	500 feet
Maximum Operating Water Elevation	498 feet	482 feet
Minimum Operating Water Elevation	340 feet	340 feet
Top of Dead Pool Elevation	300 feet	300 feet
Inlet/Outlet Facilities Conveyance Capacity:		
Tehama-Colusa Canal	2,100 cfs	2,100 cfs
Glenn-Colusa Irrigation District Canal	1,800 cfs	900 cfs

cfs = cubic feet per second
MAF = million acre feet

Water in Sites Reservoir would be impounded by the Golden Gate Dam on Funks Creek, the Sites Dam on Stone Corral Creek, and by a series of saddle dams and dikes along the eastern and northern rims of the reservoir. The reservoir would be filled through conveyance facilities from the Glen-Colusa Canal and the Tehama Colusa Canal to the east of the reservoir that connect to the reservoir Inlet/Outlet Works (I/O) situated to the south of Golden Gate Dam. The same I/O works would be used to make releases from Sites Reservoir back to the canals. The I/O works includes two large-diameter tunnels through the ridge, a vertical I/O tower in the reservoir that would control flows, and a system of piping connecting the downstream tunnel portals to the pumping facilities. Releases to or from the reservoir would be made through an array of gated outlet ports on multiple sides of the vertical I/O tower at various elevations to accommodate varying reservoir water levels, and to regulate outlet water temperature. The I/O works concept would be the same for the 1.5-MAF and 1.3-MAF reservoirs; the height of the structure and number of gated ports would be smaller for the smaller reservoir.

Sites Reservoir construction would require relocating Sites-Lodoga Road prior to the Sites Dam construction. Other new paved or unpaved roads would also be provided to access project facilities from existing roads, and for operation and maintenance access between main dam and saddle dam areas.

In the reservoir area, demolition and removal of the town of Sites and other ranch buildings within the reservoir area would be required, along with the removal of metal fencing, asphalt-concrete paving, overhead utilities, and other buildings. Water wells would be closed, septic tanks would be removed, and proper plugging of existing gas exploration wells would be verified. Trees would be removed within one foot of grade in all areas located below the normal maximum operating water surface (NMWS). Stumps will not be removed.

This TM reflects the constructability considerations presented in a separate constructability TM for the following reservoir (HR) facilities (Figure 1-1). The key dimensions of the Alternative 1 and 2 facilities are included in Table 1-2.

- **Main Dams, Saddle Dams and Dikes, and Reservoir Rim:** The Sites Reservoir dams include two main dams, Golden Gate Dam on Funks Creek and Sites Dam on Stone Corral Creek, and saddle dams and dikes on the reservoir rim on tributaries to the Hunters Creek drainage.

Table 1-2. Alternative 1 & Alternative 2 Reservoirs – Facility Descriptions

Subject	Alternative 1 (1.5 MAF Reservoir)	Alternative 2 (1.3 MAF Reservoir)
Reservoir Elevation at full pool (feet)	498.0	482.0
Reservoir Area at full pool (acres)	13,200	12,600
Dam / Dike Crest Elevation (feet) (without camber)	517.0	500.0
Main Dams	2 main dams – see below	2 main dams – see below
Saddle Dams	7 saddle dams and 2 saddle dikes – see below	4 saddle dams and 3 saddle dikes – see below
Dam / Dike:	<u>Max. Ht. Above Streambed / Crest Length (ft)</u>	<u>Max. Ht. Above Streambed / Crest Length (ft)</u>
Golden Gate Dam	287 / 2,221	270 / 2,063
Sites Dam	267 / 781	250 / 729
Saddle Dam 1	27 / 318	None (see Saddle Dike 1 below)
Saddle Dam 2	57 / 250	None (see Saddle Dike 2 below)
Saddle Dam 3	107 / 3,422	90 / 2,677
Saddle Dam 5	77 / 1,894	60 / 1,747
Saddle Dam 6	47 / 362	None (see Saddle Dike 3 below)
Saddle Dam 8A	82 / 1,300	62 / 1,140
Saddle Dam 8B	37 / 475	20 / 277
Saddle Dike 1	12 / 122	10 (near Saddle Dam 1) / 148
Saddle Dike 2	12 / 198	20 (near Saddle Dam 2) / 79
Saddle Dike 3	Not required	30 (near Saddle Dam 6) / 247
I/O Tower	Top elev. 558 ft. 258 ft high / 7 elevations to draw water from reservoir	Top elev. 543 ft. 243 ft high / 6 elevations to draw water from reservoir
I/O Tunnels	Approx. 3,110 ft long/Dual 23 ft Internal diameter tunnels	Nearly the same as Alt. 1
Sites Diversion/Outlet Tunnels	Approx. 1,590 ft long/12 ft internal diameter tunnel	Nearly the same as Alt. 1
Spillway	Weir crest length = 85.5 feet, crest elevation = 504 feet	Weir crest length = 200 feet, crest elevation = 487 feet

Alt = Alternative
ft = feet
I/O = Inlet/outlet works
MAF = million acre feet

- **Spillway:** This structure is a concrete overflow spillway located at Saddle Dam 8B that would discharge into Hunter’s Creek to the north.
- **I/O Works:** These facilities include a vertical tower with multiple intake levels connected to two inlet/outlet tunnels. These provide for normal reservoir operation and for making the major portion of emergency reservoir releases. The tunnels connect to reservoir conveyance pipelines (HC) at the downstream tunnel portal.
- **Sites Dam Outlet Works:** This outlet works tunnel would be located in the north abutment of Sites Dam; it would be used initially for construction diversion for both main dams and subsequently for stream maintenance and a portion of the emergency reservoir releases to Stone Corral Creek after construction.
- **Creek Diversions during Construction:** The Sites Dam outlet works (above) would be used for diversion of flows to Stone Corral Creek during construction. A 4-foot diameter steel pipe encased in reinforced concrete in the foundation of Golden Gate Dam would be used to divert flows to Funks Creek; the steel pipe would be plugged with concrete at the completion of construction.
- **Roads:** Roads include local roads (recreational use and public access), maintenance roads, and construction access roads.
- **Bridge:** The cost estimate provided includes a single bridge crossing the eastern portion of the reservoir (length of 1,633 feet for the east bridge) with fill prisms, providing an east-west connection from rural communities of Maxwell, Lodoga, and Stonyford for Alternative 1 only. For Alternative 2, there will be a southern road alignment around the south end of reservoir, providing an east-west connection from rural communities Maxwell, Lodoga, and Stonyford.

1.3 Purpose and Scope

The purpose of this task is to develop an Association for the Advancement of Cost Engineering (AACE) Class 4 feasibility-level cost estimate (an “Opinion of Probable Construction Cost”, OPCC) estimate, as defined by the AACE Recommended Practice No. 12R-97, Cost Estimate Classification System (AACE, 2016). This TM discusses the construction activities and draws upon the schedule, productivities, and labor and equipment crews discussed in the Constructability Analysis TM (HR 53) (AECOM, 2021a).

Project costs in this TM include direct construction costs (labor, materials, equipment and subcontractors), mark-up (overhead, profit, insurance and bond), mobilization/demobilization, design and construction contingencies and allowances, and non-contract costs.

1.4 Limitations

The scope of work for this TM was restricted to the development of the feasibility-level construction cost estimate for the Sites Reservoir under the Reservoir (HR) contract. Conveyance facilities are separately considered in a companion TM for the HC contract.

The information presented in this TM was based on available geotechnical investigation data and topographic contours that originated from California Department of Water Resources (DWR) for their 2003 studies. Updated site-specific topographic maps will need to be prepared for use in preliminary and final phases of design. Our estimate is limited by the quality of the best available information.

This estimate includes a very preliminary estimate for non-contract costs (applied as a percentage of the total construction cost). This is an approximation of Owner's costs. The Authority does not have a detailed plan of future Owner's costs to base a more detailed estimate on at this time. As the project progresses, a separate estimate should be prepared by the Authority to forecast its internal costs and the costs of its agents.

AECOM represents that our services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client.

This TM is intended for the sole use of the Sites Project Authority. The scope of services performed may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 Feasibility-Level Cost Estimate – HR Facilities

2.1 Cost Summary

The estimated feasibility-level costs for the Alternative 1 and Alternative 2 HR facilities (main and saddle dams, spillway, inlet/outlet tunnels and tower, construction diversion tunnel and pipe, and roads and bridges) are summarized below for both March 2021 dollars and July 2019 dollars. Refer to Table 1-2 for a summary of the facilities that are included in Alternative 1 and Alternative 2.

March 2021 dollars:

- Table 2-1A: Alternative 1 - \$2.35B
- Table 2-1B: Alternative 2 - \$2.12B

July 2019 dollars:

- Table 2-2A: Alternative 1 - \$2.28B
- Table 2-2B: Alternative 2 - \$2.06B

The estimated cost ranges are shown in these tables considering an expectancy range of +/-20%, which applies to an AACE Class 4 estimate. The feasibility-level cost estimates are based on the construction sequencing and schedule presented in the Constructability Analysis Technical Memorandum (AECOM, 2021a). Changes in the construction sequencing or schedule could affect the construction cost.

As discussed in Section 14.0, the feasibility-level costs in this TM include the VE options that were accepted for inclusion in the updated baseline estimates presented herein (see Table 14-1). Sufficient information currently exists to include these in the costs for Alternatives 1 and 2. Also as discussed in Section 14.0, other VE options were identified as items that require further evaluation in preliminary engineering to clarify whether or not they are feasible (see Table 14-2). These items are not included in the baseline estimates as they will need Authority and DSOD acceptance.

The total costs include Direct Construction Cost (a), Indirect Cost and Contractor Markups (b), Non-Contract Cost (d) and de-escalation (f) to the July 2019 base date using an escalation rate of 3% per annum. The Design-, Construction- and Bidding Contingency totals are included within the Mark-up costs (b). Feasibility-Level Cost estimate details are included in Appendix A for Alternative 1 and in Appendix B for Alternative 2. The back-up for the VE costs for these two alternatives is contained at the ends of these two appendices.

Table 2-1A. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 1
(Costs in March 2021 Dollars)

Soft cost / non-contract cost allowance	
Dams and Outlet Works	17.0%
Road and Clearing Work	15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate (Issue 04/16/2021)
				c = a + b		e = c + d		h = e + f		j = e + i			
20	Site Demolition and Clearing Work	0.05	2/19/2021	16,599,710	12,109,838	28,709,548	4,306,432	33,015,981	NA	NA			33,015,981
21	Golden Gate Dam	0.08	3/1/2021	352,593,965	253,090,726	605,684,691	102,966,398	708,651,089	NA	NA	(12,926,968)	1	695,724,122
22	Sites Dam	0.09	4/16/2021	176,240,299	126,504,676	302,744,975	51,466,646	354,211,621	NA	NA	6,834,593	1	361,046,214
23	Saddle Dam 3	0.09	4/16/2021	149,262,469	107,140,083	256,402,552	43,588,434	299,990,986	NA	NA	(51,687,253)	1, 4	248,303,733
24	Saddle Dam 5	0.09	4/16/2021	71,826,106	51,556,530	123,382,636	20,975,048	144,357,684	NA	NA	(50,903,800)	1, 4	93,453,884
25	Other Saddle Dams/Dikes	0.08	3/1/2021	71,429,050	51,271,524	122,700,574	20,859,098	143,559,672	NA	NA	(587,589)	1	142,972,082
26	IO Facility and Diversion Work	0.09	4/16/2021	170,115,943	122,108,634	292,224,577	49,678,178	341,902,755	NA	NA	(78,345,258)	2, 3	263,557,497
27	Road Work												
27.01	Public Roadway: Sites Lodoga Road Realignment	0.11	3/1/2021	117,947,799	73,459,486	191,407,285	28,711,093	220,118,378	NA	NA	(25,771,466)	8, 10	194,346,912
27.02	Public Roadway: Huffmaster Road Realignment	0.12	3/1/2021	27,129,105	16,896,374	44,025,479	6,603,822	50,629,301	NA	NA	(5,154,293)	7, 9	45,475,007
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	15,369,166	10,056,421	25,425,587	3,813,838	29,239,425	NA	NA			29,239,425
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	17,447,045	11,416,029	28,863,074	4,329,461	33,192,535	NA	NA	Included	5, 6	33,192,535
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	14,960,614	9,789,099	24,749,713	3,712,457	28,462,170	NA	NA			28,462,170
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	4,852,962	3,175,412	8,028,374	1,204,256	9,232,630	NA	NA			9,232,630
27.07	Sites Lodoga Road Realignment Bridges	0.12	3/1/2021	86,817,610	63,335,275	150,152,885	22,522,933	172,675,817	NA	NA			172,675,817
Total Feasibility-Level Cost Estimate (March 2021)				1,292,591,843	911,910,107	2,204,501,950	364,738,093	2,569,240,043	NA	NA	(218,542,035)		2,350,700,000

Total Feasibility-Level Cost Estimate (March 2021)	2,350,700,000
Estimated Range – Low (-20%)	1,880,560,000
Estimated Range – High (+20%)	2,820,840,000

Notes:

- Costs in USD
- Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
- Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
- The baseline cost date has been set as 31 March 2021 (column e)
- High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:

27.08	Local/ Construction - Sites Lodoga Road Temporary Detour	0.10	2/19/2021	11,525,131	7,541,177	19,066,308	2,859,946	21,926,254	NA	NA			21,926,254
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Table 2-1B. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 2
(Costs in March 2021 Dollars)

Soft cost / non-contract cost allowance	
Dams and Outlet Works	17.0%
Road and Clearing Work	15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate (Issue 04/16/2021)
				c = a + b		e = c + d		h = e + f		j = h + i			
20	Site Demolition and Clearing Work	0.05	2/19/2021	16,599,710	12,109,838	28,709,548	4,306,432	33,015,981	NA	NA			33,015,981
21	Golden Gate Dam	0.09	3/1/2021	298,528,075	214,282,420	512,810,495	87,177,784	599,988,279	NA	NA	(10,935,349)	1	589,052,931
22	Sites Dam	0.10	4/16/2021	163,312,242	117,224,962	280,537,204	47,691,325	328,228,529	NA	NA	(3,859,535)	1	324,368,994
23	Saddle Dam 3	0.09	3/1/2021	68,184,786	48,942,803	117,127,589	19,911,690	137,039,279	NA	NA	(643,256)	1	136,396,023
24	Saddle Dam 5	0.09	3/1/2021	37,668,110	27,038,039	64,706,149	11,000,045	75,706,195	NA	NA	(321,628)	1	75,384,567
25	Other Saddle Dams/Dikes	0.09	3/1/2021	39,370,315	28,259,876	67,630,191	11,497,132	79,127,323	NA	NA	(321,628)	1	78,805,695
26	IO Facility and Diversion Work	0.10	4/16/2021	167,233,813	120,039,854	287,273,667	48,836,523	336,110,190	NA	NA	(77,005,141)	2, 3	259,105,049
27	Road Work												
27.01	Public Roadway - South Road	0.13	3/1/2021	243,034,541	205,146,990	448,181,531	67,227,230	515,408,760	NA	NA			515,408,760
27.02	Public Roadway: Huffmaster Road Realignment			-	-	-	-	-	NA	NA			-
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	15,369,166	10,056,421	25,425,587	3,813,838	29,239,425	NA	NA			29,239,425
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	17,447,045	11,416,029	28,863,074	4,329,461	33,192,535	NA	NA	Included	5, 6	33,192,535
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	20,027,385	13,104,408	33,131,793	4,969,769	38,101,562	NA	NA			38,101,562
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	4,852,962	3,175,412	8,028,374	1,204,256	9,232,630	NA	NA			9,232,630
27.07	Sites Lodoga Road Realignment Bridges			-	-	-	-	-	NA	NA			-
Total Feasibility-Level Cost Estimate (March 2021)				1,091,628,150	810,797,052	1,902,425,202	311,965,486	2,214,390,689	NA	NA	(93,086,536)		2,121,300,000

Total Feasibility-Level Cost Estimate (March 2021)	2,121,300,000
Estimated Range – Low (-20%)	1,697,040,000
Estimated Range – High (+20%)	2,545,560,000

- Notes:
- Costs in USD
 - Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
 - Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
 - The baseline cost date has been set as 31 March 2021 (column e)
 - High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:

27.08	Local/ Construction - Sites Lodoga Road Temporary Detour	0.10	2/19/2021	13,180,295	8,624,191	21,804,486	3,270,673	25,075,158	NA	NA			25,075,158
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Table 2-2A. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 1
(Costs in July 2019 Dollars)

Soft cost / non-contract cost allowance	
Dams and Outlet Works	17.0%
Road and Clearing Work	15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate (Issue 04/16/2021)
				c = a + b		e = c + d		h = e + f		j = h + i			
20	Site Demolition and Clearing Work	0.05	2/19/2021	16,599,710	12,109,838	28,709,548	4,306,432	33,015,981	(988,330)	32,027,650			32,027,650
21	Golden Gate Dam	0.08	3/1/2021	352,593,965	253,090,726	605,684,691	102,966,398	708,651,089	(33,753,402)	687,437,687	(12,540,000)	1	674,897,687
22	Sites Dam	0.09	4/16/2021	176,240,299	126,504,676	302,744,975	51,466,646	354,211,621	(3,973,291)	343,608,330	6,630,000	1	350,238,330
23	Saddle Dam 3	0.09	4/16/2021	149,262,469	107,140,083	256,402,552	43,588,434	299,990,986	(59,120,201)	291,010,785	(50,140,000)	1, 4	240,870,785
24	Saddle Dam 5	0.09	4/16/2021	71,826,106	51,556,530	123,382,636	20,975,048	144,357,684	(53,701,333)	140,036,351	(49,380,000)	1, 4	90,656,351
25	Other Saddle Dams/Dikes	0.08	3/1/2021	71,429,050	51,271,524	122,700,574	20,859,098	143,559,672	(4,867,445)	139,262,227	(570,000)	1	138,692,227
26	IO Facility and Diversion Work	0.09	4/16/2021	170,115,943	122,108,634	292,224,577	49,678,178	341,902,755	(86,234,826)	331,667,929	(76,000,000)	2, 3	255,667,929
27	Road Work												
27.01	Public Roadway: Sites Lodoga Road Realignment	0.11	3/1/2021	117,947,799	73,459,486	191,407,285	28,711,093	220,118,378	(31,589,222)	213,529,156	(25,000,000)	8, 10	188,529,156
27.02	Public Roadway: Huffmaster Road Realignment	0.12	3/1/2021	27,129,105	16,896,374	44,025,479	6,603,822	50,629,301	(6,515,583)	49,113,717	(5,000,000)	7, 9	44,113,717
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	15,369,166	10,056,421	25,425,587	3,813,838	29,239,425	(875,279)	28,364,146			28,364,146
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	17,447,045	11,416,029	28,863,074	4,329,461	33,192,535	(993,615)	32,198,920	Included	5, 6	32,198,920
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	14,960,614	9,789,099	24,749,713	3,712,457	28,462,170	(852,012)	27,610,158			27,610,158
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	4,852,962	3,175,412	8,028,374	1,204,256	9,232,630	(276,378)	8,956,252			8,956,252
27.07	Sites Lodoga Road Realignment Bridges	0.12	3/1/2021	86,817,610	63,335,275	150,152,885	22,522,933	172,675,817	(5,169,034)	167,506,783			167,506,783
Total Feasibility-Level Cost Estimate (July 2019)				1,292,591,843	911,910,107	2,204,501,950	364,738,093	2,569,240,043	(288,909,952)	2,492,330,091	(212,000,000)		2,280,330,000

Total Feasibility-Level Cost Estimate (July 2019)	2,280,330,000
Estimated Range – Low (-20%)	1,824,264,000
Estimated Range – High (+20%)	2,736,396,000

- Notes:
- Costs in USD
 - Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
 - Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
 - The baseline cost date has been set as 31 March 2021 (column e)
 - The total project cost is represented in July 2019 Dollars (column j)
 - High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:													
27.08	Local/ Construction - Sites Lodoga Road Temporary Detour	0.10	2/19/2021	11,525,131	7,541,177	19,066,308	2,859,946	21,926,254	(656,360)				21,269,894

Table 2-2B. Feasibility-Level Cost Estimate Summary for HR Facilities – Alternative 2
(Costs in July 2019 Dollars)

Soft cost / non-contract cost allowance

Dams and Outlet Works

17.0%

Road and Clearing Work

15.0%

WBS No	Work / Facility Package	Est rev	Estimate Issue	a. Direct Cost	b. Mark-up Costs	c. Field Cost Total	d. Non-Contract Costs	e. Project Cost Total (2021)	f. Escalation to July 2019	h. Project Cost Total (2019)	i. VE Adjustment	VE Reference	j. Total Feasibility-Level Cost Estimate (Issue 04/16/2021)
				c = a + b		e = c + d		h = e + f		j = h + i			
20	Site Demolition and Clearing Work	0.05	2/19/2021	16,599,710	12,109,838	28,709,548	4,306,432	33,015,981	(988,330)	32,027,650			32,027,650
21	Golden Gate Dam	0.09	3/1/2021	298,528,075	214,282,420	512,810,495	87,177,784	599,988,279	(28,568,591)	582,027,688	(10,608,000)	1	571,419,688
22	Sites Dam	0.10	4/16/2021	163,312,242	117,224,962	280,537,204	47,691,325	328,228,529	(13,569,489)	318,403,039	(3,744,000)	1	314,659,039
23	Saddle Dam 3	0.09	3/1/2021	68,184,786	48,942,803	117,127,589	19,911,690	137,039,279	(4,726,258)	132,937,022	(624,000)	1	132,313,022
24	Saddle Dam 5	0.09	3/1/2021	37,668,110	27,038,039	64,706,149	11,000,045	75,706,195	(2,578,258)	73,439,937	(312,000)	1	73,127,937
25	Other Saddle Dams/Dikes	0.09	3/1/2021	39,370,315	28,259,876	67,630,191	11,497,132	79,127,323	(2,680,669)	76,758,655	(312,000)	1	76,446,655
26	IO Facility and Diversion Work	0.10	4/16/2021	167,233,813	120,039,854	287,273,667	48,836,523	336,110,190	(84,761,426)	326,048,764	(74,700,000)	2, 3	251,348,764
27	Road Work												
27.01	Public Roadway - South Road	0.13	3/1/2021	243,034,541	205,146,990	448,181,531	67,227,230	515,408,760	(15,428,711)	499,980,049			499,980,049
27.02	Public Roadway: Huffmaster Road Realignment			-	-	-	-	-	-	-			-
27.03	Maintenance Roads - North Access Road 69 and Saddle Dam Roads	0.11	3/1/2021	15,369,166	10,056,421	25,425,587	3,813,838	29,239,425	(875,279)	28,364,146			28,364,146
27.04	Local Construction Roads - County, Delevan & Maxwell Roads	0.11	3/1/2021	17,447,045	11,416,029	28,863,074	4,329,461	33,192,535	(993,615)	32,198,920	Included	5, 6	32,198,920
27.05	Maintenance Roads - Access Roads A, B, C & Comm Roads	0.11	3/1/2021	20,027,385	13,104,408	33,131,793	4,969,769	38,101,562	(1,140,567)	36,960,995			36,960,995
27.06	Recreation Roads - Peninsula Hills	0.11	3/1/2021	4,852,962	3,175,412	8,028,374	1,204,256	9,232,630	(276,378)	8,956,252			8,956,252
27.07	Sites Lodoga Road Realignment Bridges			-	-	-	-	-	-	-			-
Total Feasibility-Level Cost Estimate (July 2019)				1,091,628,150	810,797,052	1,902,425,202	311,965,486	2,214,390,689	(156,587,570)	2,148,103,118	(90,300,000)		2,057,800,000

Total Feasibility-Level Cost Estimate (July 2019)

2,057,800,000

Estimated Range – Low (-20%)

1,646,240,000

Estimated Range – High (+20%)

2,469,360,000

Notes:

- Costs in USD
- Column 'b. Mark-ups' includes Contractor Overhead, Profit, Insurances & Bonds, Mobilization, Design Contingency and Construction Contingency
- Soft cost / non-contract cost allowance included (17% for Dam and Outlet Works; 15% for Road and Clearing Work)
- The baseline cost date has been set as 31 March 2021 (column e)
- The total project cost is represented in July 2019 Dollars (column j)
- High probability VE Items have been incorporated as part of updated baseline estimate

Other Costs:

27.08	Local/ Construction - Sites Lodoga Road Temporary Detour	0.10	2/19/2021	13,180,295	8,624,191	21,804,486	3,270,673	25,075,158	(750,622)				24,324,536
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2.2 Construction Cost Uncertainty

Table 2-3 shows that the range of expected accuracy for the cost estimates decreases with increasing project definition and design stage, from Class 5 to Class 1. The table shows that the ultimate cost at award can reasonably be expected to fall within a range from 15% to 30% below to 20% to 50% above the current Class 4 estimate after contingencies. The expected range of accuracy for this Class 4 feasibility-level cost estimate is +/-20% as stated in Section 2.1.

Table 2-3. Project Definition and Expected Accuracy Range by Estimate Class¹

Design Stage	Project Definition (% of complete definition)	AACE Estimate Class	End Usage of Estimate (Purpose of estimate)	Expected Accuracy Range (Typical variation in low and high ranges ²)
1	0%to 2%	5	Concept screening	L: -20% to -50% H: +30% to +100%
2	1% to 15%	4	Study or feasibility	L: -15% to -30% H: +20% to +50%
3	10%to 40%	3	Budget authorization or control	L: -10% to -20% H: +10% to +30%
4	30%to 75%	2	Control or bid/tender	L: -5% to -15% H: +5% to +20%
5	65%to 100%	1	Check estimate or bid/tender	L: - 3% to -10% H: +3% to + 15%

¹ Based on AACEI 18R-97 (2016).

² Typical percentage variation of actual costs from the cost estimate.

As stated in Section 9.0, design contingencies (applicable prior to bid) were selected as 10% to 15% to account for uncertainty related to undefined scope items within the current design in this feasibility-level cost estimate. Section 13.0 lists key exclusions from this estimate. The first exclusion, "Owner's contingency", should be considered by the Authority to establish its own contingency.

A risk register should be maintained throughout the design process to track risks and their potential impact on project cost.

3.0 Estimate Methodology

AECOM compiled the feasibility-level cost estimate for the Sites Reservoir based on an assumed work approach and considering design and quantity information available. We reviewed the labor, material and equipment requirements for each facility and we considered several sources for our costs including, but not limited to active projects, internal historic rate data, contractor's quotes and other sources such as Caltrans (2021) and R.S. Means.

This feasibility-level cost estimate is based on standard industry practice, professional experience, knowledge of the local construction market costs, and represents AECOM's judgment as professional construction consultant familiar with the construction industry. The intention of this estimate is to reflect fair market value for the construction, and it is not a prediction of the low bid. AECOM have no control over the material and labor costs, contractors' methods of establishing prices or the market and

bidding conditions at the time of bid. AECOM does not guarantee that the bids received will not vary from this feasibility-level cost estimate.

Pricing is based upon competitive bidding with a minimum of five qualified General Contractors familiar with the conditions of working on this project. Pricing reflects probable construction costs obtainable in the project locality on the date of this statement of probable costs.

4.0 Estimate Classification

Our OPCC estimate represents an AACE Class 4 estimate that is described by the Association for the Advancement of Cost Engineering International (AACE, 2016). Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete. Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side (AACE, 2016). For this Sites Class 4 OPCC, the costs are expected to fall within an accuracy range from -20% on the low side to +20% on the high side of the actual construction cost.

5.0 General Approach

Individual bid packages are assumed to be bid separately, so each project carries its own Field and Home Office overhead, insurance, and profit, including any temporary site access. From the Constructability Analysis TM (AECOM, 2021a), and considering the site arrangement, contractor resources, and work type, potential contract packages were anticipated as follows:

- Roadway construction contracts and bridge as Design-Build Contracts, possibly numerous contracts grouped logically by road type, location, and overall Sites Reservoir program schedule;
- Golden Gate and Sites Dams, including Golden Gate and Sites Bypass Facilities (Funks Creek and Stone Corral Creek);
- Saddle Dams, including Spillway Structure 8B; and
- Inlet/Outlet Facilities, including the approach channel.

All projects include mobilization, demobilization and repair and make-good of permanent facilities (public roads, work on other contracts) affected by their operations.

Field and home office overhead are calculated independently for each project based on anticipated method of contracting/procurement/execution.

6.0 Direct Cost

Direct Cost includes Labor, Material, Equipment and Subcontractor costs applied to measured units by Pay Item.

All Direct costs are estimated using a Cost Data Date of March 31, 2021, as a common baseline, with no escalation. Escalation will be handled separately based on approved schedule.

Direct costs are based on reasonable crew mixes and construction approaches, using estimator judgment to establish a basis for a composite assembly cost as defined by AACE Level 4 estimating

requirements. It is recognized that, at the feasibility level, the design has not been progressed to identify all components or the optimum method of construction, and that there are many potential alternative approaches to developing crews, equipment and materials that can be further evaluated in the future as the level of design detail increases and contract packaging is further refined.

6.1 Labor

Labor costs include the following:

- Published prevailing wages for the project location
- Labor fringe costs
 - Employee benefits: healthcare, vacations, etc.
 - Dues and fees
 - Personal small tools
- Burden
 - Payroll tax
 - Federal and State Unemployment Insurance
 - Workers' Compensation Insurance.

Overtime and shift pay are included only for specific tasks which require extended working hours, such as mass pours of concrete, etc. The contractor may elect to work crews for extended hours or multiple shifts in order to achieve economies in other areas: these costs are not included since they relate to "means and methods" that are beyond the scope of the cost model.

The site location is assumed to be within normal commute range for construction workers in California, in consequence, workforce housing, per-diem, or other commute incentive is not included.

6.2 Material

Material Costs include the following

- Direct cost of material
- Freight and delivery, FOB jobsite/work location
- Sales Tax. Colusa County Sales tax is 7.75%

Material quotes were obtained where possible considering the current level of design. Generally, given the early stage of design, meaningful quotes are not possible in most cases.

Concrete pricing is based on standard transit mix (ready-mix). Concrete may be procured by the contractor using standard transit mix (ready-mix) delivery or batched on site, at their election.

6.3 Equipment

Equipment Costs include the following:

- Hourly equipment rental rates based on published Caltrans rates
- Equipment maintenance and operation (fuel, lubrication, etc.) are included in the Caltrans rates
- Delivery to and from work location

All equipment is priced using hourly rates following Caltrans guide for equipment ownership (Caltrans, 2021).

6.4 Subcontractors

Subcontractor costs include the selling price to the prime, including all subcontractor overhead, profit, etc.

7.0 Mark-up

7.1 Contractor Overhead

Subcontractor overhead is included in the direct cost lines for subcontractors.

The Contractor Overhead includes the following items:

- Site General Conditions (10%)
 - General and non-working supervision
 - Subcontractor oversight & coordination
 - Field layout and surveying
 - Safety and traffic management
 - Maintenance of temporary facilities and roads
 - Small truck and tools
 - Consumables
 - Miscellaneous materials and supplies
 - Contractor initiated testing (concrete, welding, compaction, etc.)
 - Permit and agency fees that the contractor will need to obtain for construction.
- Field and Home Office Overhead (5%-6%):
 - Site Management and Engineering staff
 - Contractor QA and validation

- Field offices, supplies and utilities
- Project accounting & billing, reporting, etc.
- Direct overhead related to project management and oversight. For this estimate, it is assumed that the majority of engineering, legal and accounting work will be provided in the field. Actual cost distribution will be at the discretion of the contractor.

7.2 Contractor Profit

The profit could range from 3% to 10%, depending on competition at the time of bid. For this OPCC, it is set at 8% for the dam facilities and at 5% for all other facilities. Subcontractor profit is included in the direct cost lines for subcontractors.

7.3 Insurance

Insurance covers Contractor provided insurance, including Public Liability/Property Damage (PL/PD) and General Liability (GL) coverage. Insurance is set at 1.1% for all projects. Insurance carried by the owner, including Property, Fire, and All Risk, is excluded.

7.4 Bonds

Bonds covers contractor provided bonds, including performance and payment bonds. The pricing assumes that bonds will be adjusted to reflect actual value at risk. Bonds are set at 0.6% for all projects.

8.0 Mobilization/Demobilization

Mobilization/Demobilization is priced separately as a percentage allowance, using 3% to 5% across all projects.

Mobilization (ranging from 2% to 4%) includes all costs associated with individual project set-up, including:

- Initial site survey and inspection
- Existing condition documentation and site acceptance by contractor and owner.
- Installation of temporary facilities including fencing, temporary erosion and sedimentation control, safety provisions, staging areas, etc.
- Equipment and material staging/move-on

Demobilization (1%) includes all costs associated with individual project clean-up and demobilization, including:

- Final site surveys and inspections
- Work area clean-up, removal of debris
- Demolition of all temporary facilities

- Restoration and rehabilitation of disturbed areas
- Project close-out documentation, warranties, operation manuals, etc.
- Contract Contingencies and Cost Allowances

9.0 Contingencies and Allowances

Contingencies and allowances have been calculated/assessed independently for each project component.

9.1 Line Item Allowances

Line item allowances have been included to address specific and reasonably foreseeable scope items that lack definition for estimating.

9.2 Design Contingencies

The feasibility-level cost estimates presented in this TM include items, quantities, requirements, and constraints that have not been fully identified, or else are not fully investigated or designed. In later stages of design, the scope of the project also tends to expand as more detail is developed and as regulatory agencies undertake more detailed reviews. To account for the items that have not yet been fully developed, a design contingency allowance has been included in the feasibility-level cost estimates.

The amount of design contingency reflects the degree of uncertainties, particularly with respect to geotechnical and topographical conditions, as well as the completeness of the design detail for the major categories. The design contingency is based on, and added to, the subtotal of construction costs because it represents an unknown portion of the total estimated construction cost. The recommended design contingency normally decreases as the project design advances, more information becomes available, project requirements become better defined, and more design detail is captured in the subtotal of construction costs.

The feasibility-level cost estimates presented in this TM each include a design contingency, incorporated as an integral part of the estimated construction cost to accommodate those features and items of the work that cannot yet be fully assessed due to the conceptual level of the current design.

Design Contingencies vary from 10% to 15% depending on the level of detail and the potential for additional unforeseen site conditions identified during the design phase. A design contingency of 15% was used for demolition and clearing and for bridge construction; 10% was used for the other work.

Refer to the cost tables in Appendix A and Appendix B for the design contingency allowances.

9.3 Construction Contingencies

The construction contingency is intended to cover unforeseen conditions or changes post contract award. It remains under the control of the owner, separate from the bid award. An allowance of 15% has been applied to all projects. The construction contingency does not cover items such as safety incidents, force majeure (floods, etc.) or labor issues. Refer to the cost tables in Appendix A and Appendix B for the construction contingency allowances.

10.0 Non-Contract Costs

Non-contract costs include geotechnical investigation, engineering, construction management, administration, real estate, legal services, insurance, permitting costs, environmental monitoring, and other owner costs attributable to the project. These costs are distinguished from Contract Costs (costs to the construction contractor). An estimate for the non-contract cost has been developed, but it has also been applied as a percentage to each of the project facilities for presentation purposes. The non-contract cost estimate is estimated at 15% to 17% of the construction cost, including real estate. These costs are significant and it is recommended that the Authority develop a more detailed estimate for its internal costs in the future. Reclamation has suggested that non-contract costs typically range from 25% to 30% when environmental mitigation is included. The current estimate for non-contract cost including mitigation cost is at 28% of the total cost.

11.0 Escalation from Cost Data Date to Report Issue Date

All costs are based on a Cost Data Date of March 31, 2021. Escalation to the Notice to Proceed date has not been included. Escalation will have a significant effect on project costs and is accounted for in the project's financial model. For purposes of comparison to the value planning report, costs de-escalated to 2019 have also been provided in this report.

The following sections describe sources of escalation.

11.1 Input Cost Inflation

Input cost inflation drives construction inflation by increasing the cost of labor, material equipment and subcontractors to the prime contractor. The extent to which these can be passed through in the bid price depends greatly on Demand Pull inflation noted below.

The majority of the cost in this project is labor and equipment; material and subcontract make up a relatively small portion of the overall cost. Labor escalation has been running at a relatively low rate, typically in the range of 2.5% to 3.5% per annum. Equipment escalation also falls into this range. Material costs are more volatile, with significant fluctuation depending on material and demand: material inflation has ranged from peaks in excess of 10% for materials such as reinforcing steel to deflation in the range of -10% for cement. These peaks and troughs, however, tend to be transient, and the long-term trend for construction materials is in the 3% range.

The long-term trend in Bureau of Labor Statistic Producer Price Index for construction input has been 2.7%

11.2 Demand-Pull Inflation

Demand-Pull inflation drives construction inflation by reducing overall competitiveness and allowing bidders to increase profit and risk premiums. This is the dominant inflation factor in periods of very high or low construction demand.

While much of urban California has been experiencing very strong demand for construction over the past ten years, leading to very high levels of Demand-Pull inflation significantly in excess of Input Cost Inflation, Northern California has experienced very little demand-pull inflation. Construction activity and demand in the region to the north of Sacramento has hardly grown in the past ten years, with annual growth rates averaging less than 1%. We do not see any demand driven escalation at this point.

11.3 Forecast Escalation

The historic escalation trend in the region has been running at around 3% per annum, primarily driven by Cost Push. Economic forecasts for the region do not indicate any appreciable change in the level of economic activity. The proposed project will be one of the largest economic drivers in the region, but it is unlikely to create its own demand led inflation. Peak employment is likely to reach around 1,000 workers, which should be well within the region's absorption capacity.

Based on this, we recommend using the long-term average trend for Cost-Push inflation which is 3% per annum.

12.0 Conditions of Construction

The following key assumptions were used as part of compiling the feasibility-level cost estimate:

- All work, except for tunneling and mass concrete pours, will be performed using five 10-hour work shift per week. Tunneling and mass concrete placements will be performed using double shifts. Overtime and shift premiums are included.
- Contractor will be required to pay prevailing wages at a minimum.
- Sales tax will be paid on all materials incorporated into the project.
- Other than for the town of Sites, no hazmat abatement work or hazardous soil removal work is anticipated.
- The identified work approach has been considered as part of developing this estimate (AECOM, 2021).
- The site and all work areas will have been vacated prior to construction, and all work areas will be under the full control of the contractor at all times. Public rights of way will be maintained at all times.
- Disposal areas nearby will be utilized, no-offsite dumping is required.
- The work will be performed under the standard rules of the Colusa County Air Pollution Control District, with no additional air quality monitoring or management requirements and standard dust management/palliation requirements.
- There will be no noise-related work restrictions.
- Due to the potential issues discussed in Appendix C, Section 3.2.1, our feasibility-level cost estimate assumes the quarries will be under the control of the Construction Contractor.

13.0 Key Exclusions

The following are some of the key exclusions to be noted:

- Owner's contingency.

- Utility company charges, including work required off-Site and utilities rates.
- Maintenance and operational work unless otherwise noted.
- Phasing allowance.
- Escalation beyond the specified reporting period.
- Any unforeseen conditions.
- Restrictive technical specifications or excessive contract conditions.
- Non-competitive bidding conditions.
- Sole source specifications of materials or products.

14.0 Value Engineering

We have evaluated VE options to determine those that should be included in the updated baseline estimate and those that require further evaluation in preliminary engineering when additional investigation data is available to resolve uncertainties regarding VE implementation. The VE items mentioned in this section have been expanded from those identified in the Draft Feasibility-Level Cost Estimate TM (AECOM, 2021b) based on input from the Authority stemming from the March 3, 2021, LMC meeting.

Table 14-1 identifies the VE actions and associated costs in July 2019 dollars that have been included in the updated baseline estimate. Sufficient information currently exists to include these in the preferred cost alternative.

Table 14-2 identifies the VE actions and associated costs in July 2019 dollars that require further evaluation in preliminary engineering to clarify whether or not they are feasible. Some of these items will need Authority and DSOD acceptance.

**Table 14-1. VE Actions that were Included in Updated Baseline Estimate
(2019 dollars)**

(Tables 2-2A and 2-2B in Section 2.0 include VE costs shown in this table.)

VE Action	Approx. Savings		Commentary
	Alt. 1	Alt. 2	
1. Produce embankment transition zones on site	\$19M <u>Breakdown per Facility:</u> <i>Golden Gate: (\$12M)</i> <i>Sites Dam: (\$5M)</i> <i>Saddle Dam 3: (\$1M)</i> <i>Saddle Dam 5: (\$0.5M)</i> <i>Other Saddle Dams: (\$0.5M)</i>	\$16M <u>Breakdown per Facility:</u> <i>Golden Gate: (\$10M)</i> <i>Sites Dam: (\$4M)</i> <i>Saddle Dam 3: (\$1M)</i> <i>Saddle Dam 5: (\$0.5M)</i> <i>Other Saddle Dams: (\$0.5M)</i>	It may be possible to produce embankment transition zone materials from on-site quartzite rather than importing them. This would remove the purchase cost and the 35-mile hauling cost of these materials, but would add on-site quarrying and processing costs to produce these materials. The net cost would result in a savings. To be confirmed based on geotechnical data.
2. Replace dual I/O tunnels with a single tunnel	\$48M	\$48M	The current design includes two parallel inlet/out tunnels to provide system redundancy. However, it is typical for dams to operate a single outlet since full shutdowns are rare and inspections/maintenance can be coordinated with operating schedules. This would reduce costs. The single tunnel diameter would be somewhat larger than for two parallel tunnels. The diameters will vary by allowable discharge velocities, which depends on tunnel lining type and requirements from permitting agencies. High velocities are anticipated in the tunnels during the first few days of an emergency drawdown situation.
3. Use a sloping intake structure	\$28M	\$27M	The intake structure is currently an inundated tower accessed by a bridge from the adjacent ridge. A sloping intake founded on the rock surface along the ridge slope would require less seismic reinforcement and be less costly than a tower. The bridge would also be eliminated from the design, but the access road would still be required. O&M access for the sloping intake would need to be considered and compared with that of the tower.

VE Action	Approx. Savings		Commentary
	Alt. 1	Alt. 2	
4. Eliminate Emergency Release Structures	\$87M <i>Breakdown per Facility:</i> <i>Sites Dam: \$11M</i> <i>Saddle Dam 3: (\$49M)</i> <i>Saddle Dam 5: (\$49M)</i>	N/A	Accepted by LMC.
5. Use full depth reclamation for County roads	Prev. incorporated (Approx. \$19M)*	Prev. incorporated (Approx. \$16.5M)*	Use of full-depth recycling pavement rehabilitation ¹ of County Roads would be a cost saving measure.
6. Place temporary bridges over existing bridges or use intermediate supports for shoring	Prev. incorporated (Approx. \$3M)*	Prev. incorporated (Approx. \$2.5M)*	Instead of replacing the smaller existing bridges to handle construction traffic, temporary bridges could be placed over the existing bridges. Also, shoring up the existing bridges with intermediate supports to shorten spans could be done.
7. Reduce width/depth of gravel for Huffmaster Road Realignment	Prev. incorporated (Approx. \$33M)*	N/A	Road width reduced from 24' to 15' and the depth of gravel reduced from 18" to 12".
8. Adjust Sites Lodoga Road alignment so it is closer to the reservoir water's edge	\$12M	N/A	Refer to Appendix C.
9. Tie Huffmaster Road Realignment into the existing Huffmaster Road north of "Ladybug's" house to shorten the road length	\$5M	N/A	Refer to Appendix C.

¹ Full depth recycling is a pavement rehabilitation technique in which the full thickness of the asphalt pavement and a portion of the underlying layers, along with a small percentage of added cement, are pulverized to provide a homogeneous pavement material. The stabilized material is then compacted in-place with rollers, resulting in a stiff, stabilized base course ready for a new surface course.

VE Action	Approx. Savings		Commentary
	Alt. 1	Alt. 2	
10. Replacement of the west bridge span with embankment	\$13M	N/A	A consideration would be to eliminate west bridge and replace it with an embankment fill. This approach would have to address compressible alluvium beneath the fill and resulting settlement of the embankment. Refer to Appendix C.
Total Estimated VE Savings (approx.) (2019 dollars) *Does not include previously incorporated amounts in parentheses.	\$212M	\$90M	

O&M = Operations and Maintenance

**Table 14-2. VE Actions to be Further Evaluated in Preliminary Engineering
(2019 dollars)**

VE Action	Potential Approx. Savings		Commentary
	Alt. 1	Alt. 2	
11. Replace a portion of the upstream shell zone with random fill and eliminate upstream filter and drain for Golden Gate Dam and Sites Dam	\$199M	\$136M	To make better use of materials availability for the main dams, it may be possible to replace a part (or all) of the upstream shell zone with random Zone 4 to reduce the use of the more expensive Zone 3 rockfill; this would necessitate flattening the upstream slope and increase dam volume. There is an excess of Zone 4 materials and an economical approach would be to place those materials in the upstream shell of the dam. Also, with this approach, the upstream filter and transition may be eliminated. With a flatter upstream slope, more riprap would be required. To be confirmed based on geotechnical data. Will require DSOD approval.
12. Adopt a 10-day emergency drawdown	\$17M	\$18M	Current design criteria for emergency reservoir drawdown conservatively assumes that the upper 10% of the reservoir head will need to be drawn down in seven days. DSOD may allow a 10-day drawdown period. This would significantly reduce the discharge flows, which would reduce the reservoir outlet works infrastructure sizes near Golden Gate Dam. The estimated savings was based on a vertical tower concept. Will require DSOD approval.
13. Evaluate alternative sources for sand and gravel for filters and drains	TBD	TBD	To be confirmed based on geotechnical data and permitting requirements.
14. Generate on-site materials for structural road section	\$4M	\$6M	To be confirmed based on geotechnical data
15. Spillway conduit	\$5M	\$1M	The spillway currently includes a concrete gravity dam structure. It may be possible to use a less expensive emergency spillway conduit depending on DSOD's criteria for required spill capacity after full storage of the Probable Maximum Flood (PMF). A tradeoff between spillway capacity and freeboard would need to be evaluated. Will require DSOD approval.
Total Est. Potential VE Savings (approx.) (2019 dollars)	\$225M	\$161M	Not including #13 (VE Savings TBD)

TBD = To be determined

The total estimated savings indicated in Tables 14-1 and 14-2 are not directly additive. For example, VE Action 11 (Replace a portion of the upstream shell zone with random fill and eliminate upstream filter and drain for Golden Gate Dam and Sites Dam) and VE Action 1 (Produce embankment transition zones on site) are not additive because VE Action 10 precludes the need for VE Action 1. Also, VE Action 12 (Adopt a 10-day emergency drawdown) in Table 14-2 is not additive because this action was based on a vertical tower, and not a sloping intake indicated in Table 14-1.

15.0 References

AECOM (2020). Task Order No. 1 Technical Memoranda:

- Design Criteria, Basis of Feasibility Design, Task Order No. 1, Task HR2.6, 8/24/20
- Geology and Seismicity – Sites Reservoir, Task Order No. 1, Task HR2.91, 8/18/20
- Main Dams and Saddle Dams, Task Order No.1, Task HR2.92, 8/19/20
- Inlet/Outlet (I/O) Tower & Tunnels, Task Order No. 1, Task HR2.93, 8/19/20
- Funks and Stone Corral Creeks, Reservoir Operating Elevations and Emergency Release Management, Task Order No.1, Task HR2.94, 8/18/20
- Diversion during Construction, Task Order No. 1, Task HR 2.95, 8/20/20
- Roads and Bridge, Task Order No.1, Task HR2.96, 8/21/20

AECOM (2021a). Constructability Analysis Technical Memorandum, HR 53, Final. April 14.

AECOM (2021b). Draft Feasibility-Level Cost Estimate Technical Memorandum. February 3.

Association for the Advancement of Cost Engineering (AACE) International (2016). Recommended Practice No. 12R-97, Cost Estimate Classification System. March 1.

Authority (2020). Value Planning Report. April.

California Department of Transportation (Caltrans) (2021). Labor Surcharge and Equipment Rental Rates, Effective April 1, 2020 through March 31, 2021.

Appendix A

Construction Feasibility-Level Cost Estimate Tables – HR – Alternative 1

Sites Reservoir (Alt 1): Site Demolition and Clearing Work
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
February 19, 2021

20. Construction Cost Summary: Site Demolition and Clearing Work				
		Unit Cost Rate (\$/ACRE)		Total Cost
		ACRE:	1,050	
Total Direct Cost			15,809.25	16,599,710
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			15,809.25	16,599,710
General Conditions				
Mobilization		5.0%	790.46	829,986
Site General Conditions & Requirements		10.0%	1,659.97	1,742,970
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	200.86	210,899
Bonds		0.6%	110.76	116,301
GC Field and Home Office Overhead		5.0%	928.56	974,993
GC Profit		5.0%	974.99	1,023,743
Total Contractor Indirect Markups			4,665.61	4,898,892
TOTAL DIRECT COST BEFORE CONTINGENCIES			20,474.86	21,498,602
Contingencies				
Design Contingencies		15.0%	3,071.23	3,224,790
Construction Contingencies		15.0%	3,531.91	3,708,509
Total Contingency Allowance			6,603.14	6,933,299
TOTAL DIRECT COST BEFORE ESCALATION			27,078.00	28,431,901
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	264.43	277,647
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			27,342.43	28,709,548

Item	Description	Quantity	Unit	Lower Bid	Est. Unit Price	Maximum Price	Subcontractor Bid	U.P. Bid	Price	Comment
1	General Clearing and Grubbing									
1.001	Clearing and Grubbing	289	ACRE	\$ 2,460.94	\$ 1,484.32	\$ -	\$ -	\$ 3,945.25	\$ 1,140,179	Light vegetation clearing work (1050 Acres of clearing work)
2	Reservoir Clearing and Demolition (Carried over from May 2020 NODOS Estimate)									Reference Estimate: 2.NODOS_Clear-Grade_2020-04-30
2.001	Remove and Dispose of Trees - Oak Woodlands a. Oak woodland around reservoir b. Remove and dispose off site c. Cut stumps within 12" of ground d. Stump removal not required e. Provide access to tree cutting locations	700	ACRE	\$ 2,600.00	\$ 1,500.00	\$ -	\$ 6,400.00	\$ 10,500.00	\$ 7,350,000	Costs as per May 2020 NODOS Estimate
2.002	Vegetation Removal - Occupied Areas a. Trees, shrubs b. Town of Sites and homesteads c. Remove and dispose off site d. Cut tree stumps within 12" of ground e. Tree Stump removal not required	61	ACRE	\$ 37,000.00	\$ 33,000.00	\$ -	\$ 10,500.00	\$ 80,500.00	\$ 4,910,500	
2.003	Demolish Residential Housing a. Demolish, remove, dispose off site b. Remove concrete foundations and walls in designated borrow areas	24	EA	\$ -	\$ -	\$ -	\$ 10,000.00	\$ 10,000.00	\$ 240,000	
2.004	Demolish Barns a. Demolish, remove, dispose off site	29	EA	\$ -	\$ -	\$ -	\$ 7,900.00	\$ 7,900.00	\$ 229,100	
2.005	Demolish Out-buildings - Sheds & Garages a. Demolish, remove, dispose off site	36	EA	\$ -	\$ -	\$ -	\$ 8,100.00	\$ 8,100.00	\$ 291,600	
2.006	Demolish silos & water towers a. Demolish, remove, dispose off site	12	EA	\$ -	\$ -	\$ -	\$ 11,000.00	\$ 11,000.00	\$ 132,000	
2.007	Remove Motor Homes a. Demolish, remove, dispose off site	2	EA	\$ -	\$ -	\$ -	\$ 5,000.00	\$ 5,000.00	\$ 10,000	
2.008	Demolish and clean Septic Systems a. Pump and dispose of contents b. Remove and dispose of lid, walls, bottom c. Remove any gravel surround d. Backfill excavation with clay soils	28	EA	\$ 2,700.00	\$ 5,800.00	\$ -	\$ 3,600.00	\$ 11,900.00	\$ 333,200	
2.009	Plug Groundwater Wells a. Follow Calusa or Glenn County standards b. Remove and dispose of pumps, motors, electrical	38	EA	\$ 1,350.00	\$ 2,800.00	\$ 300.00	\$ 2,600.00	\$ 7,070.00	\$ 268,660	
2.010	Remove Underground Fuel Tanks a. Follow County/State Standards b. Dispose off site c. Remove contaminated soils, backfill excavation with clay soils	15	EA	\$ 2,700.00	\$ 5,800.00	\$ -	\$ 3,300.00	\$ 11,600.00	\$ 174,000	
2.011	Remove Metal Fencing and Posts (No Salvage) a. Dispose off site	40	MILE	\$ -	\$ -	\$ -	\$ 13,500.00	\$ 13,500.00	\$ 540,000	
2.012	Remove Asphalt Paving (Two-Lane Roads) a. Dispose off site b. All removal not required if present c. Does not include removal of temporary north bypass road in reservoir (in road estimates)	73.906	SY	\$ 3.10	\$ 5.60	\$ -	\$ 1.05	\$ 9.75	\$ 720,586	As per Alt 1 roadwork sheet
2.013	Locate Decommissioned Gas Wells, Verify Closure a. Locate wells, excavate top, verify closure b. Wells in reservoir identified as plugged dry gas wells in DOGGR records	10	EA	\$ -	\$ -	\$ -	\$ 3,000.00	\$ 3,000.00	\$ 30,000	
2.014	Cost escalation on May 2020 NODOS Estimate items carried over	1.51%	LS				\$ 15,229,646	\$ 15,229,646	\$ 229,886	Escalation from May 2020 to Dec 2020 at a rate of 3% per annum
Total Direct Cost		1,260	ACRE	\$ 4,037.03	\$ 4,755.92	\$ 11.50	\$ 6,400.00	\$ 15,029.25	\$ 14,996,710	

21. Construction Cost Summary: Golden Gate Dam

Total Cost

Total Direct Cost 352,593,965

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 352,593,965

General Conditions

Mobilization	5.0%	17,629,698
Site General Conditions & Requirements	10.0%	37,022,366
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	4,479,706
Bonds	0.6%	2,470,354
GC Home Office Overhead	6.0%	24,851,765
GC Profit	8.0%	35,123,828

Total Contractor Indirect Markups 121,577,717

TOTAL DIRECT COST BEFORE CONTINGENCIES 474,171,682

Contingencies

Design Contingencies	10.0%	47,417,168
Construction Contingencies	15.0%	78,238,328

Total Contingency Allowance 125,655,496

TOTAL DIRECT COST BEFORE ESCALATION 599,827,178

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	5,857,513
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 685,684,691

Item	Sub-Item	Description	Quantity	Unit	Unit Price (\$)	Material (\$)	Transportation (\$)	Installation (\$)	Other (\$)	Subtotal (\$)	Unit Price (\$)	Material (\$)	Transportation (\$)	Installation (\$)	Other (\$)	Subtotal (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES																	
1.001	Demolition Work		-	LS	\$	-	\$	-	\$	-						Elsewhere	
1.002	Clearing and Grubbing		53	ACRE	\$	3,134.83	\$	5,471.22	\$	-	\$	8,606.05	\$	456,120		Heavy vegetation removal	
1.003	Reservoir Clearing		-	ACRE	\$	-	\$	-	\$	-	\$	-	\$	-		Elsewhere costed	
1.004	Erosion and Sediment Control		53	ACRE	\$	-	\$	-	\$	-	\$	3,760.50	\$	3,760.50	\$	199,307	Allowed 50.25/5% to 30% of the total area
2 Process and Haul Filter Materials to Project																	
2.001	Process and Stockpile on Project - Zone 2A - Filter		726,000	Tons							\$	37.14	\$	26,964,478			
2.002	Purchase processed material from quarry		726,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	16,114,658			Include 10% waste factor / additional material supply
2.003	Haul material from quarry to site stockpile/fill location, 35 mile haul		491,138	LCY	\$	10.50	\$	11.58	\$	-	\$	22.09	\$	10,845,819			1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004	Process and Stockpile on Project - Zone 2A - Drain		803,000	Tons							\$	37.15	\$	29,832,148			
2.005	Purchase processed material from quarry		803,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	17,824,790			Include 10% waste factor / additional material supply
2.006	Haul material from quarry to site stockpile/fill location, 35 mile haul		543,206	LCY	\$	10.50	\$	11.58	\$	-	\$	22.11	\$	12,005,329			1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007	Process and Stockpile on Project - Zone 2A - Transition		107,800	Tons							\$	37.21	\$	4,011,061			
2.008	Purchase processed material from quarry		107,800	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	2,392,783			Include 10% waste factor / additional material supply
2.009	Haul material from quarry to site stockpile/fill location, 35 mile haul		72,924	LCY	\$	10.50	\$	11.59	\$	-	\$	22.19	\$	1,618,270			1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010	Process and Stockpile on Project - Zone 2B - Filter		451,000	Tons							\$	37.16	\$	16,759,577			
2.011	Purchase processed material from quarry		451,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	10,010,603			Include 10% waste factor / additional material supply
2.012	Haul material from quarry to site stockpile/fill location, 35 mile haul		305,090	LCY	\$	10.57	\$	11.58	\$	-	\$	22.12	\$	6,749,955			1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.013	Process and Stockpile on Project - Zone 2B - Transition		473,000	Tons							\$	37.16	\$	17,578,911			
2.014	Purchase processed material from quarry		473,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	10,498,945			Include 10% waste factor / additional material supply
2.015	Haul material from quarry to site stockpile/fill location, 35 mile haul		519,971	LCY	\$	10.57	\$	11.58	\$	-	\$	22.13	\$	7,075,907			1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
Foundation Preparation and Grouting																	
3 Foundation Excavation																	
3.001	Topsoil Salvage		125,000	BCY							\$	8.51	\$	1,064,098			
3.002	Excavations - remove top soil layer		137,300	LCY	\$	3.08	\$	2.04	\$	-	\$	3.08	\$	305,283			Include 10% swell factor
3.003	Load and haul to disposal site, 0.5 mile haul		137,300	LCY	\$	1.18	\$	1.06	\$	-	\$	4.01	\$	538,787			
3.004	Dam Foundation Excavation - Common		325,000	BCY							\$	8.55	\$	2,778,464			
3.005	Excavations - remove top soil layer		357,300	LCY	\$	3.15	\$	2.23	\$	-	\$	3.70	\$	1,344,673			Include 10% swell factor
3.006	Load and haul to disposal site, 0.5 mile haul		317,040	LCY	\$	1.12	\$	1.00	\$	-	\$	4.01	\$	1,433,790			
3.007	Dam Foundation Rock Exc - Ripplable Rock		991,000	BCY							\$	11.71	\$	11,608,464			
3.008	Rock excavations - no blasting		1,136,850	LCY	\$	3.51	\$	3.67	\$	-	\$	6.18	\$	7,043,522			Include 10% swell factor
3.009	Load and haul to stockpile, 0.5 mile haul		1,139,030	LCY	\$	3.12	\$	2.80	\$	-	\$	4.01	\$	4,641,981			
3.010	Dam Foundation Rock Exc - Drill and Shoot		159,000	BCY							\$	24.11	\$	3,833,900			
3.011	Blasting operations		199,200	LCY	\$	4.26	\$	5.09	\$	4.85	\$	14.00	\$	2,823,238			Include 10% swell factor
3.012	Load and haul to stockpile, 1 mile haul		190,840	LCY	\$	1.48	\$	1.80	\$	-	\$	3.50	\$	1,010,460			
3.013	Crush and screen material		190,300	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			Not crushing and screening required
4 Foundation Preparation and Grouting																	
Foundation Preparation - Beneath Core																	
4.001	Initial Foundation Cleaning - Core		65,000	SY							\$	20.06	\$	1,304,206			
4.002	Initial foundation core cleanup		65,000	SY	\$	21.48	\$	5.52	\$	-	\$	17.00	\$	1,105,176			
4.003	Load and haul to disposal area, 0.5 mile haul		17,875	CY	\$	3.75	\$	2.40	\$	-	\$	11.13	\$	199,050			Assume removal of top layer, 0.25' thick
4.004	Final Foundation Cleaning - Core		65,000	SY							\$	17.00	\$	1,105,176			
4.005	Final foundation core cleanup		65,000	SY	\$	21.48	\$	5.52	\$	-	\$	17.00	\$	1,105,176			
4.006	Load and haul to disposal area, 0.5 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			Not required
4.007	Dental Excavation		3,700	CY							\$	120.02	\$	444,064			
4.008	Dental excavations		4,070	LCY	\$	67.96	\$	80.79	\$	-	\$	92.69	\$	405,960			Include 10% swell factor
4.009	Load and haul to site stockpile, 0.5 mile haul		4,070	LCY	\$	3.82	\$	6.60	\$	-	\$	10.43	\$	42,454			
4.010	Dental Concrete		3,700	CV	\$	44.39	\$	20.16	\$	183.12	\$	-	\$	916,398			
4.011	Groin Cap with Anchors		9,900	CV	\$	78.42	\$	22.69	\$	519.68	\$	4.07	\$	624.86	\$	6,186,119	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
4.012	Curtain Grouting		96,100	LF							\$	78.68	\$	7,561,102			
4.013	Drill setup for all holes		1,291	ea.	\$	191.11	\$	319.00	\$	-	\$	510.51	\$	654,641			Assume 75' drilling lengths
4.014	Drill curtain grout holes		95,100	ft	\$	10.34	\$	11.14	\$	-	\$	21.45	\$	2,046,372			
4.015	Reinforce grout holes		6,820	ft	\$	19.42	\$	11.24	\$	-	\$	21.56	\$	255,172			Assume 10% to be drilled
4.016	Reinforce to grout holes and grout nipples		4,845	ea.	\$	91.40	\$	6.00	\$	-	\$	91.40	\$	439,400			1 x Rebar, embed 20"
4.017	Inject Portland cement grout		6,407	hr	\$	465.23	\$	160.02	\$	-	\$	525.25	\$	3,346,497			allow 5 hours per hole
4.018	Perform hydraulic conductivity tests		1,381	ea.	\$	-	\$	-	\$	-	\$	347.39	\$	479,017			
4.019	Consolidation Grouting		40,000	LF							\$	78.69	\$	3,147,635			
4.020	Drill setup for all holes		530	ea.	\$	191.31	\$	320.23	\$	-	\$	511.44	\$	272,767			Assume 75' drilling lengths
4.021	Drill curtain grout holes		40,000	ft	\$	10.33	\$	11.14	\$	-	\$	21.47	\$	856,713			
4.022	Reinforce grout holes		4,000	ft	\$	10.43	\$	11.24	\$	-	\$	21.56	\$	85,739			Assume 10% to be drilled
4.023	Reinforce to grout holes and grout nipples		2,040	ea.	\$	91.38	\$	6.00	\$	-	\$	91.38	\$	182,770			1 x Rebar, embed 20"
4.024	Inject Portland cement grout		2,657	hr	\$	465.45	\$	160.07	\$	-	\$	525.31	\$	1,361,913			allow 5 hours per hole
4.025	Perform hydraulic conductivity tests		333	ea.	\$	-	\$	-	\$	-	\$	347.39	\$	115,727			

Page 3

Item	Description	Quantity	Unit	Unit Price	Subtotal Price	Material Price	Labor Price	Equipment Price	Subtotal Price	Unit Price	Subtotal Price	Comments
7.049	Excavations in common soil	945,500	LCY	\$ 1.58	\$ 2.20	\$ -	\$ -	\$ -	\$ 2.73	\$ 3,543,337	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor	
7.049	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	No crushing and screening required	
7.049	Direct hauling from quarry excavation, 1 mile haul	945,500	LCY	\$ 1.23	\$ 3.48	\$ -	\$ -	\$ -	\$ 4.73	\$ 4,388,704	Include 15% swell factor; no stockpiling required; direct haul	
7.049	Load at stockpile and haul to fill location, 0.5 mile haul	1,154,700	LCY	\$ 1.06	\$ 2.78	\$ -	\$ -	\$ -	\$ 3.81	\$ 6,075,979	Include 15% swell factor	
7.049	Spread and compact	2,539,000	LCY	\$ 1.43	\$ 2.22	\$ -	\$ -	\$ -	\$ 3.68	\$ 9,345,020		
7.051	Furnish and Install Riprap	98,000	ECY						\$ 40.14	\$ 3,933,501		
7.052	Blasting operations	117,600	LCY	\$ 4.10	\$ 5.73	\$ 4.85			\$ 14.90	\$ 1,752,047	Include 20% swell factor	
7.052	Load and haul to processing area, 1 mile haul	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
7.054	Crush and screen material	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -	Not required	
7.055	Load and haul to fill location, 0.5 mile haul	117,600	LCY	\$ 0.43	\$ 2.55	\$ -			\$ 3.45	\$ 405,856	No crushing and screening required	
7.056	Place placement	117,600	LCY	\$ 6.00	\$ 6.10	\$ -			\$ 12.10	\$ 1,775,360		
8	Other Work											
8.001	GG Dam - Bypass Pipeline and U/S Cofferdam										Elsewhere	
8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	\$ -	\$ -	\$ -		\$ 2,300,000.00	\$ 2,300,000.00	\$ 2,300,000	Allowance	
8.003	Seeding and Mulching	261,360	SF	\$ -	\$ -	\$ -		\$ 0.69	\$ 0.69	\$ 180,338		
8.004	Restoration										Elsewhere	
8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	2,500	CY						\$ 85.72	\$ 214,291		
8.006	Purchase and import gravel to fill location and stockpile, 30 mi haul	2,675	LCY	\$ 10.26	\$ 11.11	\$ 37.73			\$ 29.11	\$ 186,929	Include 15% swell factor	
8.007	Place and compact	2,875	LCY	\$ 3.03	\$ 10.40	\$ -			\$ 13.43	\$ 44,362		
8.008	Developing haul routes - Haul routes inside reservoir	12	ACRES						\$ 27,947.01	\$ 335,364	Clear, grade, provide gravel fill layer and compact	
8.009	Clear and grub	521,720	SF	\$ 0.09	\$ 0.12	\$ -			\$ 0.20	\$ 104,850		
8.010	Load and haul earth fill	6,680	CY	\$ 1.73	\$ 4.75	\$ -			\$ 6.49	\$ 62,792	Use existing earth fill material from stockpile	
8.010	Grade and Compact surface for earthen road	522,720	SF	\$ 0.14	\$ 0.18	\$ -			\$ 0.32	\$ 167,322		
8.011	Developing haul routes - Haul routes outside reservoir	25	ACRES						\$ 27,008.54	\$ 675,213	Clear, grade, provide gravel fill layer and compact	
8.012	Clear and grub	1,069,000	SF	\$ 0.09	\$ 0.12	\$ -			\$ 0.19	\$ 202,299		
8.012	Load and haul earth fill	20,197	CY	\$ 1.73	\$ 4.72	\$ -			\$ 6.45	\$ 135,071	Use existing earth fill material from stockpile	
8.013	Grade and Compact surface for earthen road	1,069,000	SF	\$ 0.14	\$ 0.18	\$ -			\$ 0.31	\$ 333,844		
8.014	Rock processing areas										Not required	
8.015	Mass Concrete / Backfill Concrete	8,700	CY	\$ 34.61	\$ 50.34	\$ 233.06			\$ 378.01	\$ 3,288,706		
8.016	Mass Concrete for spillway	-	CY	\$ -	\$ -	\$ -			\$ -	\$ -	Not required	
8.017	Concrete Gravity Dam	-	CY						\$ -	\$ -	Not required	
8.018	Clay Backfill	-	CY						\$ -	\$ -	Not required	
8.018	Clear excavations from borrow area	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.019	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.021	Place clay backfill material	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.022	Riprap and Drain	-	CY						\$ -	\$ -	Not required	
8.023	Blasting operations	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.024	Load and haul to processing area, 1 mile haul	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.025	Crush and screen material	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.026	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.027	Spread riprap	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
8.028	Rim Grouting	-	LF	\$ -	\$ -	\$ -			\$ -	\$ -	Not required	
8.029	Bridge	-	SF	\$ -	\$ -	\$ -			\$ -	\$ -	Not required	
8.030	Dewatering allowance	1	LS	\$ -	\$ -	\$ -		\$ 1,150,000.00	\$ 1,150,000.00	\$ 1,150,000	Allowance	
9	Golden Gate Dam Bypass Pipeline Facilities											
9.001	Upstream Cofferdam	-	CY								Included above	Earth fill coffer dam; included within zone 4 fill work
9.002	Sheet pile cofferdams	-	SF	\$ -	\$ -	\$ -			\$ -	\$ -	Not required; Earth fill coffer dam	
9.003	Excavations - remove top soil layer and stockpile	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
9.005	Pneumatic processed material from quarry	-	Ton						\$ -	\$ -		
9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
9.007	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
9.008	Spread and compact	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -		
9.009	Install 48-inch Steel Pipe and Encasement	2,100	LF						\$ 1,893.98	\$ 3,977,357		
9.010	Excavate trench in bedrock	4,197	LCY	\$ 71.91	\$ 11.89	\$ -			\$ 123.58	\$ 526,879		
9.011	Load and haul material to disposal site, 0.5 mile haul	4,197	LCY	\$ 3.11	\$ 7.79	\$ -			\$ 10.89	\$ 44,740		
9.012	48" steel pipe placement	2,100	LF	\$ 90.87	\$ 27.46	\$ 113.32			\$ 203.56	\$ 1,654,640		
9.013	Concrete backfill for pipe trench (dam joint/point)	2,200	CY	\$ 33.28	\$ 21.01	\$ 194.22			\$ 290.51	\$ 656,609		
9.014	Reinforcement for concrete backfill	132	TON	\$ 133.21	\$ 9.33	\$ 2,043.56			\$ 2,204.18	\$ 310,616	Allow 80lbs/cy for reinforcement	
9.015	48" flex pipe vials for controlled release (truffed head, no energy dissipation chamber)	1	LS	\$ 21,679.85	\$ 6,197.40	\$ 161,625.00			\$ 189,502.31	\$ 189,502		
9.016	Concrete manhole intake, 19' high (assumed precast) reinforcement for concrete manhole (633 lbs)	10	LF	\$ -	\$ -	\$ -		\$ 3,450.00	\$ 3,450.00	\$ 34,500		
9.017	Install 48" vial debris rack on conc. manhole	1	LS	\$ -	\$ -	\$ -		\$ 3,878.00	\$ 3,878.00	\$ 3,878		
9.018	Grout pipe	1,050	CY	\$ 26.27	\$ 5.20	\$ 171.73			\$ 193.26	\$ 191,420	Allow 0.5CY of grout/ft of pipe	
9.019	Field Survey	1	LS	\$ -	\$ -	\$ -		\$ 15,753.00	\$ 15,753.00	\$ 15,753		
9.020	Riprap Discharge Channel	75	CY						\$ 460.11	\$ 34,508	Include 20% swell factor	
9.021	Blasting operations	90	LCY	\$ 35.14	\$ 113.82	\$ 4.85			\$ 203.81	\$ 18,353	Include 20% swell factor	
9.022	Excavate	90	LCY	\$ 25.12	\$ 61.19	\$ -			\$ 64.25	\$ 5,783		
9.023	Crush and screen material	-	LCY	\$ -	\$ -	\$ -			\$ -	\$ -	Not required	
9.024	Load and haul to stockpile, 0.5 mile haul	90	LCY	\$ 18.89	\$ 12.80	\$ -			\$ 31.75	\$ 4,637		
9.025	Place at the channel	90	LCY	\$ 17.60	\$ 15.72	\$ -			\$ 33.62	\$ 5,723		
10	Misc allowance for small items, allow 1%	1.0%	%						\$ 349,102.936	\$ 349,102.936	\$ 3,491,029	
Total Direct Cost		53	Acres	\$ 1,903,780.47	\$ 2,985,718.10	\$ 1,607,431.23		\$ 151,835.43	\$ 6,852,718.33	\$ 352,893,966		

Sites Reservoir (Alt 1): Sites Dam
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

22. Construction Cost Summary: Sites Dam

Total Cost

Total Direct Cost 176,240,299

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 176,240,299

General Conditions

Mobilization	5.0%	8,812,015
Site General Conditions & Requirements	10.0%	18,505,231
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	2,239,133
Bonds	0.6%	1,234,780
GC Home Office Overhead	6.0%	12,421,887
GC Profit	8.0%	17,556,268

Total Contractor Indirect Markups 60,769,314

TOTAL DIRECT COST BEFORE CONTINGENCIES 237,009,613

Contingencies

Design Contingencies	10.0%	23,700,961
Construction Contingencies	15.0%	39,106,586

Total Contingency Allowance 62,807,547

TOTAL DIRECT COST BEFORE ESCALATION 299,817,160

Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2,927,815
Escalation to Mid-point of Construction		<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 302,744,975

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Item	Description	Quantity	Unit	Unit Price	Material Price	Transport Price	Subtotal Price	Unit Price	Material Price	Transport Price	Subtotal Price	Notes
4.026	Type III Cement	1,600	Tons	\$ 177.36	\$ 73.26	\$ 113.14	\$ -	\$ 363.75	\$ 582,007			
4.027	Backfill Concrete	-	CY	\$ -	\$ -	\$ -	\$ -		Elsewhere			
5	Foundation Preparation - Beneath Shell											
5.001	Initial Foundation Cleaning - Shell	69,100	SY					\$ 3.69	\$ 255,280			
5.002	Initial clean shell cleanup	69,100	SY	\$ 1.97	\$ 0.42	\$ -	\$ -	\$ 1.78	\$ 123,200			
5.003	Load and haul to disposal area, 0.5 mile haul	12,868	LCY	\$ 3.53	\$ 6.59	\$ -	\$ -	\$ 10.43	\$ 132,093			Assume removal of top layer, 0.5' thick
6	Foundation Drainage											
6.001	Furnish and Install Foundation Drain Pipe	500	LF	\$ 43.36	\$ 26.91	\$ 35.56	\$ -	\$ 105.83	\$ 52,914			
6.002	Furnish and Install Foundation Drain Manholes	1	EA	\$ 1,670.31	\$ 1,017.05	\$ 3,070.88	\$ -	\$ 5,758.23	\$ 5,758			
6.003	Seepage Partition Walls	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			Not required
7	Embankment											
7.001	Develop Burrow Areas	1	LS						Included below			
7.002	Z1 Strip/Overburden/Waste to Stockpile	339,000	BCY					\$ 7.50	\$ 2,544,108			Assumed common earth, 3000' haul w/ scraper
7.003	Embankment excavations	172,900	LCY	\$ 0.08	\$ 2.89	\$ -	\$ -	\$ 3.67	\$ 1,355,027			Include 10% swell factor
7.004	Load and haul to site stockpile, 0.25 mile haul	272,900	LCY	\$ 0.85	\$ 2.31	\$ -	\$ -	\$ 3.16	\$ 1,175,282			
7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	1,768,000	BCY					\$ 9.02	\$ 15,940,219			
7.006	Embankment excavations	1,648,800	LCY	\$ 1.43	\$ 1.02	\$ -	\$ -	\$ 4.46	\$ 8,053,832			Include 10% swell factor
7.007	Load and haul to site stockpile, 0.25 mile haul	1,245,800	LCY	\$ 1.03	\$ 2.70	\$ -	\$ -	\$ 3.74	\$ 2,274,307			
7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY					\$ -	\$ -			
7.009	Embankment excavations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			Include 10% swell factor
7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			
7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					\$ -	\$ -			
7.012	Embankment excavations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			
7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			
	Restore Burrow Areas											
7.014	Replace Overburden from Stockpile	526,750	ECY					\$ 6.73	\$ 3,547,105			Backfill burrow area using material from stockpile, allow 25% of stripping material
7.015	Load and haul to site stockpile, 0.25 mile haul	579,425	LCY	\$ 1.10	\$ 2.90	\$ -	\$ -	\$ 4.00	\$ 2,313,808			
7.016	Spread and compact	579,425	LCY	\$ 1.15	\$ 0.02	\$ -	\$ -	\$ 2.00	\$ 1,154,797			
7.017	Topsoil Replacement	58,000	ECY					\$ 9.82	\$ 569,581			Backfill burrow area using material from stockpile
7.018	Excavate, load and haul excavated backfill material to fill location, 1 mile	83,800	LCY	\$ 1.70	\$ 8.03	\$ -	\$ -	\$ 6.77	\$ 563,331			
7.019	Spread and compact	68,600	LCY	\$ 1.18	\$ 0.97	\$ -	\$ -	\$ 2.16	\$ 1,471,649			
7.020	Furnish and Install Zone 1 - Core	710,000	ECY					\$ 13.11	\$ 9,305,924			
7.021	Excavate from borrow area	781,000	LCY	\$ 1.43	\$ 1.00	\$ -	\$ -	\$ 4.43	\$ 3,478,400			Include 10% swell factor
7.022	Load and haul to zone-1 fill location, 1 mile haul	781,000	LCY	\$ 1.04	\$ 2.70	\$ -	\$ -	\$ 3.74	\$ 2,920,207			No stockpiling required
7.023	Spread and compact	781,000	LCY	\$ 1.10	\$ 2.12	\$ -	\$ -	\$ 3.72	\$ 2,908,724			
7.024	Load, Haul and Place - Zone 2A - Filter	242,000	Tons					\$ 3.23	\$ 782,749			
7.025	Load at stockpile and haul to fill location, 0.5 mile haul	48,112	LCY	\$ 0.83	\$ 2.68	\$ -	\$ -	\$ 3.47	\$ 170,575			Assume 1.75m/ly, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.026	Direct hauling from quarry	114,594	LCY						Elsewhere			Assume 1.75m/ly, included a 15% swell factor; 70% of material will be hauled directly
7.026	Spread and compact	183,206	LCY	\$ 1.48	\$ 2.28	\$ -	\$ -	\$ 3.74	\$ 682,129			Include 15% swell factor
7.027	Load, Haul and Place - Zone 2A - Drain	297,000	Tons					\$ 3.22	\$ 955,339			
7.028	Load at stockpile and haul to fill location, 0.5 mile haul	60,273	LCY	\$ 0.83	\$ 2.62	\$ -	\$ -	\$ 3.44	\$ 207,123			Assume 1.75m/ly, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.029	Direct hauling from quarry	140,438	LCY						Elsewhere			Assume 1.75m/ly, included a 15% swell factor; 70% of material will be hauled directly
7.029	Spread and compact	200,912	LCY	\$ 1.47	\$ 2.38	\$ -	\$ -	\$ 3.72	\$ 748,213			Include 15% swell factor
7.030	Load, Haul and Place - Zone 2A - Transition	42,900	Tons					\$ 3.39	\$ 145,383			
7.031	Load at stockpile and haul to fill location, 0.5 mile haul	8,706	LCY	\$ 1.00	\$ 3.20	\$ -	\$ -	\$ 4.20	\$ 36,552			Assume 1.75m/ly, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.031	Direct hauling from quarry	20,314	LCY						Elsewhere			Assume 1.75m/ly, included a 15% swell factor; 70% of material will be hauled directly
7.032	Spread and compact	29,021	LCY	\$ 1.48	\$ 2.27	\$ -	\$ -	\$ 3.73	\$ 108,831			Include 15% swell factor
7.033	Load, Haul and Place - Zone 2B - Filter	148,500	Tons					\$ 3.45	\$ 512,200			
7.034	Load at stockpile and haul to fill location, 0.5 mile haul	30,137	LCY	\$ 1.12	\$ 3.04	\$ -	\$ -	\$ 4.36	\$ 131,202			Assume 1.75m/ly, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.034	Direct hauling from quarry	70,319	LCY						Elsewhere			Assume 1.75m/ly, included a 15% swell factor; 70% of material will be hauled directly
7.035	Spread and compact	100,456	LCY	\$ 1.30	\$ 2.30	\$ -	\$ -	\$ 3.76	\$ 380,907			Include 15% swell factor
7.036	Load, Haul and Place - Zone 2B - Transition	159,500	Tons					\$ 3.25	\$ 517,771			
7.037	Load at stockpile and haul to fill location, 0.5 mile haul	31,349	LCY	\$ 0.83	\$ 2.50	\$ -	\$ -	\$ 3.33	\$ 108,056			Assume 1.75m/ly, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.037	Direct hauling from quarry	75,528	LCY						Elsewhere			Assume 1.75m/ly, included a 15% swell factor; 70% of material will be hauled directly
7.038	Spread and compact	107,897	LCY	\$ 1.49	\$ 2.49	\$ -	\$ -	\$ 3.78	\$ 406,110			Include 15% swell factor
7.039	Furnish and Install Zone 3 - Rockfill	1,050,000	ECY					\$ 26.75	\$ 28,087,300			
7.040	Blasting operations	1,250,000	LCY	\$ 4.26	\$ 3.69	\$ 4.93	\$ -	\$ 14.88	\$ 10,544,018			Include 20% swell factor
7.041	Load over haul to processing area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			No stockpiling required, material to be hauled to fill location directly
7.042	Crush and screen material	1,250,000	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			Not required
7.043	Load and haul to zone-3, 1 mile haul	1,250,000	LCY	\$ 0.98	\$ 2.93	\$ -	\$ -	\$ 3.91	\$ 4,906,309			No stockpiling required, direct haul
7.044	Spread and compact	1,250,000	LCY	\$ 1.49	\$ 2.49	\$ -	\$ -	\$ 3.98	\$ 4,936,308			
7.045	Furnish and Install Zone 4 - Random	660,000	ECY					\$ 10.82	\$ 7,142,033			
7.046	Excavations in common pit	358,000	LCY	\$ 1.42	\$ 2.32	\$ -	\$ -	\$ 3.64	\$ 1,308,239			No blasting machinery because of excavations covered within dam foundation excavation work refer to material balance diagrams; include 15% swell factor
7.047	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -			No crushing and screening required

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23. Construction Cost Summary: Saddle Dam 3

Total Cost

Total Direct Cost 149,262,469

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 149,262,469

General Conditions

Mobilization	5.0%	7,463,123
Site General Conditions & Requirements	10.0%	15,672,559
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	1,896,380
Bonds	0.6%	1,045,767
GC Home Office Overhead	6.0%	10,520,418
GC Profit	8.0%	14,868,857

Total Contractor Indirect Markups 51,467,104

TOTAL DIRECT COST BEFORE CONTINGENCIES 200,729,573

Contingencies

Design Contingencies	10.0%	20,072,957
Construction Contingencies	15.0%	33,120,380

Total Contingency Allowance 53,193,337

TOTAL DIRECT COST BEFORE ESCALATION 253,922,910

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	2,479,642
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 256,402,552

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Labor (\$)	Equipment (\$)	Overhead & Profit (\$)	Total (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES											
1.001	Demolition Work	-	LS	\$	-	\$	-	\$	-	-	Elsewhere
1.002	Cleaning and Grubbing	63	ACRE	\$	3,076.78	\$	5,569.90	\$	-	\$	8,446.68 \$ 532,141 Heavy vegetation removal
1.003	Reservoir Cleaning	-	ACRE	\$	-	\$	-	\$	-	\$	Elsewhere costed
1.004	Erosion and Sediment Control	63	ACRE	\$	-	\$	-	\$	-	\$	3,760.50 \$ 3,760.50 \$ 236,912 Allowed 50.25/5% to 30% of the total area
2 Process and Haul Filter Materials to Project											
2.001	Process and Stockpile on Project - Zone 2A - Filter	319,000	Tons							\$	37.01 \$ 11,806,791
2.002	Purchase processed material from quarry	319,000	Tons	\$	-	\$	-	\$	-	\$	22.20 \$ 7,062,684 Include 10% waste factor / additional material supply
2.003	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	215,794	LCY	\$	10.40	\$	11.48	\$	-	\$	21.90 \$ 4,725,108 1.75xFCY and 1.15 swell factor (FCY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004	Process and Stockpile on Project - Zone 2A - Drain	319,000	Tons							\$	37.01 \$ 11,806,791
2.005	Purchase processed material from quarry	319,000	Tons	\$	-	\$	-	\$	-	\$	22.20 \$ 7,062,684 Include 10% waste factor / additional material supply
2.006	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	215,794	LCY	\$	10.40	\$	11.48	\$	-	\$	21.90 \$ 4,725,108 1.75xFCY and 1.15 swell factor (FCY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007	Process and Stockpile on Project - Zone 2A - Transition	92,400	Tons							\$	37.12 \$ 3,430,171
2.008	Purchase processed material from quarry	92,400	Tons	\$	-	\$	-	\$	-	\$	22.20 \$ 2,050,927 Include 10% waste factor / additional material supply
2.009	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	62,505	LCY	\$	10.54	\$	11.52	\$	-	\$	22.07 \$ 1,379,214 1.75xFCY and 1.15 swell factor (FCY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons							\$	- \$ - Not required
2.011	Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	- \$ -
2.012	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	- \$ -
2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons							\$	- \$ - Not required
2.014	Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	- \$ -
2.015	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	- \$ -
Foundation Preparation and Grouting											
3 Foundation Excavation											
3.001	Topsoil Salvage	106,000	BCY							\$	8.13 \$ 861,309
3.002	Excavations - remove top soil layer	115,800	LCY	\$	3.46	\$	2.98	\$	-	\$	3.58 \$ 425,065 Include 10% swell factor
3.003	Load and haul to disposal site, 0.5 mile haul	115,800	LCY	\$	1.00	\$	2.67	\$	-	\$	3.71 \$ 432,285
3.004	Dam Foundation Excavation - Common	81,000	BCY							\$	8.19 \$ 662,988
3.005	Excavations - remove top soil layer	89,100	LCY	\$	1.56	\$	2.21	\$	-	\$	3.77 \$ 334,268 Include 10% swell factor
3.006	Load and haul to disposal site, 0.5 mile haul	89,100	LCY	\$	1.00	\$	2.63	\$	-	\$	3.67 \$ 318,420
3.007	Dam Foundation Rock Exc - Ripplable Rock	565,000	BCY							\$	11.33 \$ 6,400,291
3.008	Rock excavations, no blasting	646,750	LCY	\$	2.53	\$	3.68	\$	-	\$	6.18 \$ 4,017,080 Include 10% swell factor
3.009	Load and haul to stockpile, 0.5 mile haul	646,750	LCY	\$	1.00	\$	2.63	\$	-	\$	3.67 \$ 2,362,923
3.010	Dam Foundation Rock Exc - Drill and Shoot	-	BCY							\$	- \$ -
3.011	Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	- \$ -
3.012	Explosives, load and haul to stockpile, 3 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	- \$ - Include 20% swell factor
3.013	Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	- \$ - Not required
4 Foundation Preparation and Grouting											
Foundation Preparation - Beneath Core											
4.001	Initial Foundation Cleaning - Core	48,000	SY							\$	19.26 \$ 924,595
4.002	Initial foundation core cleanup	95,040	SY	\$	11.50	\$	5.54	\$	-	\$	17.06 \$ 1,618,461
4.003	Load and haul to disposal area, 0.5 mile haul	13,700	CY	\$	2.66	\$	5.52	\$	-	\$	8.21 \$ 112,755 Assume removal of top layer, 0.75' thick
4.004	Final Foundation Cleaning - Core	48,000	SY							\$	17.06 \$ 818,861
4.005	Final foundation core cleanup	95,040	SY	\$	11.50	\$	5.54	\$	-	\$	17.06 \$ 1,618,461
4.006	Load and haul to disposal area, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	- \$ - Not required
4.007	Dental Excavation	2,300	CY							\$	121.68 \$ 279,860
4.008	Dental excavations	2,530	LCY	\$	65.40	\$	80.87	\$	-	\$	80.43 \$ 203,357 Include 10% swell factor
4.009	Load and haul to site stockpile, 0.5 mile haul	2,530	LCY	\$	8.13	\$	7.08	\$	-	\$	11.19 \$ 28,303
4.010	Dental Concrete	2,300	CY	\$	44.74	\$	20.32	\$	183.12	\$	248.18 \$ 570,819
4.011	Grout Cap with Anchors	7,600	CY	\$	78.94	\$	22.84	\$	519.68	\$	626.76 \$ 4,763,347 3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
4.012	Curtain Grouting	36,700	LF							\$	91.78 \$ 3,368,338
4.013	Drill setup for all holes	499	ea.	\$	194.61	\$	323.68	\$	-	\$	520.29 \$ 254,562 Assume 75' drilling lengths
4.014	Drill curtain grout holes	35,700	ft	\$	10.95	\$	11.18	\$	-	\$	22.13 \$ 784,350
4.015	Reinfit grout holes	3,670	ft	\$	12.57	\$	12.26	\$	-	\$	24.83 \$ 90,739 Assume 10% to be re-drilled
4.016	Mixup to grout holes and grout mixers	1,835	cu. yd	\$	21.80	\$	-	\$	-	\$	21.80 \$ 40,000
4.017	Inject portland cement grout	2,447	cu. yd	\$	46.50	\$	190.05	\$	-	\$	525.45 \$ 1,273,392 Allow 5 hours per hole
4.018	Perform hydraulic conductivity tests	2,433	ea.	\$	-	\$	-	\$	-	\$	347.30 \$ 843,200
4.019	Consolidation Grouting	-	LF							\$	- \$ - Not required
4.020	Drill setup for all holes	-	ea.	\$	-	\$	-	\$	-	\$	- \$ -
4.021	Drill curtain grout holes	-	ft	\$	-	\$	-	\$	-	\$	- \$ -
4.022	Reinfit grout holes	-	ft	\$	-	\$	-	\$	-	\$	- \$ -
4.023	Mixup to grout holes and grout mixers	-	cu. yd	\$	-	\$	-	\$	-	\$	- \$ -
4.024	Inject portland cement grout	-	cu. yd	\$	-	\$	-	\$	-	\$	- \$ -
4.025	Perform hydraulic conductivity tests	-	ea.	\$	-	\$	-	\$	-	\$	- \$ -
4.026	Type III Cement	1,300	Tons	\$	177.65	\$	73.38	\$	113.14	\$	364.16 \$ 473,414
4.027	Backfill Concrete	-	CY	\$	-	\$	-	\$	-	\$	- \$ - Elsewhere
5 Foundation Preparation - Beneath Shell											
5.001	Initial Foundation Cleaning - Shell	172,000	SY							\$	4.79 \$ 824,002
5.002	Initial dam shell cleanup	172,000	SY	\$	3.13	\$	6.40	\$	-	\$	7.72 \$ 1,325,679

Item	Sub Item	Description	Quantity	Unit	Unit Price	Subtotal Price	Material Price	Transport Price	Production Price	Unit Price	Total Price	Comments
5.001		Load and haul to disposal area, 0.5 mile haul	47,500	LCY	\$ 4.11	\$ 7.06	\$ -	\$ -	\$ -	\$ 11.17	\$ 528,222	Assume removal of top layer, 0.72' thick
6		Foundation Drainage										
6.001		Furnish and Install Foundation Drain Pipe	1,000	LF	\$ 45.53	\$ 28.28	\$ 35.56	\$ -	\$ -	\$ 109.34	\$ 109,342	
6.002		Furnish and Install Foundation Drain Manholes	3	EA	\$ 1,670.31	\$ 1,017.05	\$ 3,070.88	\$ -	\$ -	\$ 5,758.23	\$ 17,275	
6.003		Seepage Partition Walls	600	CY	\$ 524.39	\$ 116.74	\$ 465.37	\$ -	\$ -	\$ 1,106.49	\$ 663,897	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		Embankment										
7.001		Develop Burrow Areas	1	LS							Included below	
7.002		Z1 Strip/Overburden/Waste to Stockpile	431,000	BCY						\$ 7.55	\$ 3,254,962	Assumed common earth, 3000' haul w/ scraper
7.002		Embankment excavations	475,100	LCY	\$ 0.88	\$ 2.78	\$ -	\$ -	\$ -	\$ 3.66	\$ 1,745,258	Include 15% swell factor
7.004		Load and haul to site stockpile, 0.25 mile haul	475,100	LCY	\$ 0.85	\$ 2.38	\$ -	\$ -	\$ -	\$ 3.18	\$ 1,506,228	
7.005		Z3 Strip/Overburden/Waste to Stockpile-Q1	304,000	BCY						\$ 9.04	\$ 2,749,110	
7.005		Embankment excavations	315,400	LCY	\$ 1.64	\$ 5.13	\$ -	\$ -	\$ -	\$ 4.47	\$ 1,404,542	Include 15% swell factor
7.007		Load and haul to site stockpile, 0.25 mile haul	315,400	LCY	\$ 1.04	\$ 2.71	\$ -	\$ -	\$ -	\$ 3.75	\$ 1,154,568	
7.008		Z3 Strip/Overburden/Waste to Stockpile-Q2	195,000	BCY						\$ 9.12	\$ 1,778,836	
7.008		Embankment excavations	214,300	LCY	\$ 1.45	\$ 3.06	\$ -	\$ -	\$ -	\$ 4.51	\$ 957,032	Include 15% swell factor
7.010		Load and haul to site stockpile, 0.25 mile haul	214,300	LCY	\$ 1.05	\$ 2.78	\$ -	\$ -	\$ -	\$ 3.78	\$ 811,779	
7.011		Z4 Strip/Overburden/Waste to Stockpile	-	BCY						\$ -	\$ -	Not required
7.012		Embankment excavations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
7.013		Load and haul to site stockpile, 0.25 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
		Restore Burrow Areas										
7.014		Replace Overburden from Stockpile	232,500	ECY						\$ 6.22	\$ 1,446,089	Backfill burrow area using material from stockpile, allow 25% of stripping material
7.015		Load and haul to site stockpile, 0.25 mile haul	255,750	LCY	\$ 1.16	\$ 2.98	\$ -	\$ -	\$ -	\$ 3.59	\$ 917,515	
7.016		Spread and compact	255,750	LCY	\$ 1.14	\$ 0.93	\$ -	\$ -	\$ -	\$ 2.07	\$ 525,574	
7.017		Topsoil Replacement	106,000	ECY						\$ 9.81	\$ 1,039,643	Backfill burrow area using material from stockpile
7.018		Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	115,800	LCY	\$ 1.75	\$ 5.04	\$ -	\$ -	\$ -	\$ 6.79	\$ 781,894	
7.019		Spread and compact	116,600	LCY	\$ 1.17	\$ 0.95	\$ -	\$ -	\$ -	\$ 2.12	\$ 247,769	
7.020		Furnish and Install Zone 1 - Core	800,000	ECY						\$ 14.88	\$ 13,380,275	
7.021		Excavate from borrow area	800,000	LCY	\$ 1.43	\$ 3.05	\$ -	\$ -	\$ -	\$ 4.45	\$ 3,528,121	Include 15% swell factor
7.022		Load and haul to zone 1 fill location, 1.25 mile haul	800,000	LCY	\$ 1.35	\$ 3.99	\$ -	\$ -	\$ -	\$ 5.35	\$ 4,238,145	No stockpiling required
7.023		Spread and compact	800,000	LCY	\$ 1.00	\$ 2.12	\$ -	\$ -	\$ -	\$ 3.72	\$ 2,988,819	
7.024		Load, Haul and Place - Zone 2A - Filter	319,000	Tons						\$ 3.20	\$ 1,019,717	
7.025		Load at stockpile and haul to fill location, 0.5 mile haul	64,750	LCY	\$ 0.81	\$ 2.55	\$ -	\$ -	\$ -	\$ 3.35	\$ 217,091	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.026		Direct hauling from quarry	151,056	LCY						Elsewhere		Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.028		Spread and compact	215,794	LCY	\$ 1.47	\$ 2.28	\$ -	\$ -	\$ -	\$ 3.72	\$ 802,626	Include 15% swell factor
7.027		Load, Haul and Place - Zone 2A - Drain	319,000	Tons						\$ 3.20	\$ 1,019,717	
7.029		Load at stockpile and haul to fill location, 0.5 mile haul	64,750	LCY	\$ 0.81	\$ 2.55	\$ -	\$ -	\$ -	\$ 3.35	\$ 217,091	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.030		Direct hauling from quarry	151,056	LCY						Elsewhere		Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.032		Spread and compact	215,794	LCY	\$ 1.47	\$ 2.28	\$ -	\$ -	\$ -	\$ 3.72	\$ 802,626	Include 15% swell factor
7.030		Load, Haul and Place - Zone 2A - Transition	92,400	Tons						\$ 3.29	\$ 303,629	
7.031		Load at stockpile and haul to fill location, 0.5 mile haul	18,212	LCY	\$ 0.88	\$ 2.89	\$ -	\$ -	\$ -	\$ 3.85	\$ 70,364	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.0311		Direct hauling from quarry	41,754	LCY						Elsewhere		Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.032		Spread and compact	62,508	LCY	\$ 1.46	\$ 2.44	\$ -	\$ -	\$ -	\$ 3.70	\$ 231,265	Include 15% swell factor
7.033		Load, Haul and Place - Zone 2B - Filter	-	Tons						\$ -	\$ -	Not required
7.034		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
7.0341		Direct hauling from quarry	-	LCY						Elsewhere		
7.035		Spread and compact	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
7.036		Load, Haul and Place - Zone 2B - Transition	-	Tons						\$ -	\$ -	Not required
7.037		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
7.0371		Direct hauling from quarry	-	LCY						Elsewhere		
7.039		Spread and compact	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
7.039		Furnish and Install Zone 3 - Rockfill	610,000	ECY						\$ 27.50	\$ 16,774,034	
7.040		Blasting operations	752,000	LCY	\$ 3.26	\$ 5.70	\$ 4.85	\$ -	\$ -	\$ 14.80	\$ 10,632,259	Include 15% swell factor
7.043		Excavate, Load and haul to stockpile, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	No stockpiling required; material to be hauled to fill location directly
7.042		Crush and screen material	781,000	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	No crushing and screening required
7.043		Load and haul to zone 3, 1.5 mile haul	712,000	LCY	\$ 1.09	\$ 3.35	\$ -	\$ -	\$ -	\$ 4.41	\$ 3,143,218	No stockpiling required; direct haul
7.044		Spread and compact	712,000	LCY	\$ 1.45	\$ 2.13	\$ -	\$ -	\$ -	\$ 3.65	\$ 2,599,639	
7.045		Furnish and Install Zone 4 - Random	1,663,000	ECY						\$ 12.97	\$ 21,576,334	
7.046		Excavations in common soil	1,475,450	LCY	\$ 1.42	\$ 2.20	\$ -	\$ -	\$ -	\$ 3.62	\$ 5,336,403	No blasting required; balance of excavations covered within dam foundation excavation work refer to material balance diagrams; include 15% swell factor
7.047		Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	No crushing and screening required
7.048		Direct hauling from quarry excavations, 1 mile haul	1,475,450	LCY	\$ 1.38	\$ 3.87	\$ -	\$ -	\$ -	\$ 3.25	\$ 4,794,882	Include 15% swell factor; no stockpiling required; direct haul
7.049		Load at stockpile and haul to fill location, 0.5 mile haul	1,912,450	LCY	\$ 0.79	\$ 2.49	\$ -	\$ -	\$ -	\$ 3.25	\$ 6,213,213	Include 15% swell factor
7.050		Spread and compact	1,912,450	LCY	\$ 1.45	\$ 2.23	\$ -	\$ -	\$ -	\$ 3.66	\$ 7,045,796	
7.051		Furnish and Install Riprap	130,000	ECY						\$ 39.90	\$ 5,186,819	
7.052		Blasting operations	135,000	LCY	\$ 4.27	\$ 5.72	\$ 4.85	\$ -	\$ -	\$ 14.94	\$ 2,314,277	Include 15% swell factor

Item	Sub Item	Description	Quantity	Unit	Unit Price	Material Price	Transport Price	Installation Price	Other Price	Subtotal	Unit Price	Material Price	Transport Price	Installation Price	Other Price	Subtotal	Comments
7.051		Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
7.054		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
7.055		Load and haul to fill location, 0.5 mile haul	156,000	LCY	\$	0.80	\$	2.32	\$	-	\$	-	\$	3.32	\$	518,800	No crushing and screening required
7.056		Riprap placement	156,000	LCY	\$	0.00	\$	0.00	\$	-	\$	-	\$	15.00	\$	2,340,000	
8		Other Work															
8.001		GG Dam - Bypass Pipeline and U/S Cofferdam															Elsewhere
8.002		Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	\$	-	\$	-	\$	-	\$	402,500.00	\$	402,500.00	\$	402,500	Allowance
8.003		Seeding and Mulching	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.004		Restoration															Elsewhere
8.005		Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	3,800	CY													
8.006		Purchase and import gravel to fill location and stockpile, 35 mi haul	4,370	LCY	\$	20.69	\$	11.40	\$	37.73	\$	-	\$	50.91	\$	221,624	Include 15% swell factor
8.007		Place and compact	4,370	LCY	\$	4.86	\$	10.38	\$	-	\$	-	\$	15.23	\$	66,943	
8.008		Developing haul routes - Haul routes inside reservoir	51	ACRES													Clear, grade, provide gravel fill layer and compact
8.009		Clear and grub	2,221,560	SF	\$	0.07	\$	0.12	\$	-	\$	-	\$	0.19	\$	416,509	
8.010		Load and haul earth fill, 0.5 mile haul	41,140	CY	\$	1.72	\$	4.72	\$	-	\$	-	\$	6.43	\$	264,626	Use existing earth fill material from stockpile
8.011		Grade and Compact surface for earthen road	2,221,560	SF	\$	0.13	\$	0.18	\$	-	\$	-	\$	0.31	\$	690,345	
8.012		Developing haul routes - Haul routes outside reservoir	12	ACRES													Clear, grade, provide gravel fill layer and compact
8.013		Clear and grub	122,790	SF	\$	0.06	\$	0.12	\$	-	\$	-	\$	0.20	\$	104,630	
8.014		Load and haul earth fill, 0.5 mile haul	9,660	CY	\$	1.78	\$	4.72	\$	-	\$	-	\$	6.49	\$	62,790	Use existing earth fill material from stockpile
8.015		Grade and Compact surface for earthen road	122,790	SF	\$	0.14	\$	0.18	\$	-	\$	-	\$	0.32	\$	157,902	
8.016		Rock processing areas															Not required
8.017		Mass Concrete / Backfill Concrete	6,400	CY	\$	94.71	\$	50.40	\$	333.06	\$	-	\$	378.17	\$	2,420,290	
8.018		Mass Concrete for spillway	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.019		Concrete Gravity Dam	-	CY													Not required
8.020		Clay Backfill	-	CY													Not required
8.021		City excavators from borrow area	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.022		Load and haul, from stockpile to fill location, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.023		Place clay backfill material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.024		Riprap and Drain	-	CY													Not required
8.025		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.026		Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.027		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.028		Load and haul from stockpile to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.029		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.030		Rim Grouting	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.031		Bridge	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.032		Dewatering allowance	1	LS	\$	-	\$	-	\$	-	\$	287,500.00	\$	287,500.00	\$	287,500	
9		Golden Gate Dam Bypass Pipeline Facilities															Included within the Golden Gate Dam Estimate
9.001		Upstream Cofferdam	-	CY													
9.002		Sheet pile cofferdams	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.003		Excavations - remove top soil layer and stockpile	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.004		Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.005		Purchase processed material from quarry	-	TON	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.006		Haul material from quarry to site stockpile, 40 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.007		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.008		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.009		Install 48-Inch Steel Pipe and Encasement	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.010		Excavate trench in bedrock	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.011		Load and haul material to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.012		48" steel pipe placement	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.013		Concrete backfill for pipe trench (dam footings)	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.014		Reinforcement for concrete backfill	-	TON	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.015		48" fixed gate valve for controlled release (baffled head, no energy dissipation chamber)	-	LS	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.016		Concrete masonry units, 12" high (assume precast) reinforcement for concrete masonry (483 lbs)	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.017		Install 48"x48" steel rock on rock, Monolithic	-	LS	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.018		Grout pile	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.019		Head Survey	-	LS	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.020		Riprap Discharge Channel	-	CY													
9.021		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.022		Excavate	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.023		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
9.024		Load and haul to stockpile, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
9.025		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10		Sites Dam Diversion Facilities															Included within the Sites Dam Estimate
10.001		Upstream Cofferdam	-	CY													Included above
10.002		Sheet pile cofferdams	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.003		Excavations - remove top soil layer and stockpile	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.004		Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.005		Purchase processed material from quarry	-	TON	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.006		Import material to site stockpile, 40 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.007		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.008		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.009		Upstream Portal Excavation and Rock Bolts	-	CY													
10.010		Excavate and load material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.011		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.012		Shutcrete portal fans	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
10.013		Steel fiber for shutcrete	-	TON	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	

Item	Sub Item	Description	Quantity	Unit	Base Price	Excavate Price	Transport Price	Placement Price	Unit Price	Cost	Notes
10.014		20 ft rock bolts, 5 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$	
10.015		3.5" diam grouted hole with #10 bar	-	CY	\$	\$	\$	\$	\$	\$	
10.016		Upstream Portal Backfill	-	CY	\$	\$	\$	\$	\$	\$	
10.017		Load on stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	
10.018		Spread and compact	-	LCY	\$	\$	\$	\$	\$	\$	
10.019		Inlet and Valve Structures	-	CY	\$	\$	\$	\$	\$	\$	
10.020		Pour inlet and valve structure	-	CY	\$	\$	\$	\$	\$	\$	
10.021		Downstream Portal Excavation and Rock Bolts	-	CY	\$	\$	\$	\$	\$	\$	
10.022		Excavate and load material	-	LCY	\$	\$	\$	\$	\$	\$	
10.023		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	
10.024		Shotcrete portal face	-	CY	\$	\$	\$	\$	\$	\$	
10.025		Steel fiber for shotcrete	-	TON	\$	\$	\$	\$	\$	\$	
10.026		20 ft rock bolts, 5 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$	
10.027		3.5" diam grouted hole with #10 bar	-	CY	\$	\$	\$	\$	\$	\$	
10.028		Downstream Portal Backfill	-	CY	\$	\$	\$	\$	\$	\$	
10.029		Load on stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	
10.030		Spread and compact	-	LCY	\$	\$	\$	\$	\$	\$	
10.031		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	\$	\$	\$	\$	\$	
10.032		Tunnel Concrete Lining	-	LF	\$	\$	\$	\$	\$	\$	
10.033		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	\$	\$	\$	\$	\$	
10.034		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	\$	\$	\$	\$	\$	
10.035		Riprap Discharge Channel	-	CY	\$	\$	\$	\$	\$	\$	
10.036		Allowing operations	-	LCY	\$	\$	\$	\$	\$	\$	
10.037		Excavate, load and haul to stockpile/processing area, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	
10.038		Crush and screen material	-	\$	\$	\$	\$	\$	\$	\$	
10.039		Load and haul to stockpile, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	
10.040		Place at the channel	-	LCY	\$	\$	\$	\$	\$	\$	
11		ERS Facility									
11.001		Upstream Portal Excavation and Rock Bolts	27,500	CY					\$ 17.50	\$ 481,348	
			30,250	LCY	\$ 1.43	\$ 2.49	\$	\$	\$ 3.57	\$ 112,129	Assumed excavating material is either common earth, loamy sand, clay or loose material.
11.002		Excavate and load material		LCY	\$ 1.48	\$ 1.80	\$	\$	\$ 3.06	\$ 153,543	
11.003		Haul to disposal site, 0.5 mile haul		LCY	\$ 36.72	\$ 12.12	\$ 263.47	\$	\$ 325.30	\$ 130,525	
11.004		Shotcrete portal face		CY	\$	\$	\$ 2,478.23	\$	\$ 2,478.23	\$ 11,724	
11.005		Steel fiber for shotcrete		TON	\$	\$	\$	\$	\$	\$ 24,608	
11.006		20 ft rock bolts, 5 ft on center - Drilling		EA	\$ 30.87	\$ 39.38	\$ 2,512.70	\$	\$ 2,851.62	\$ 41,819	
11.007		3.5" diam grouted hole with #6 bar		CY	\$	\$	\$	\$	\$	\$	
11.008		Upstream Portal Backfill	24,800	CY					\$ 9.74	\$ 241,655	
11.009		Load and haul material from stockpile, 0.5 mi assumed	27,280	LCY	\$ 0.83	\$ 1.68	\$	\$	\$ 4.42	\$ 121,496	
11.010		Backfill/Compact and grade	27,280	LCY	\$ 2.18	\$ 2.23	\$	\$	\$ 4.40	\$ 120,150	
11.011		Inlet and Valve Structures	2,250	CY					\$ 1,092.50	\$ 2,458,125	
11.012		Pour inlet and valve structures	2,250	CY	\$	\$	\$	\$ 1,092.50	\$ 1,092.50	\$ 2,458,125	
11.013		Downstream Portal Excavation and Rock Bolts	35,100	CY					\$ 19.13	\$ 671,638	
11.014		Excavate and load material	36,610	LCY	\$ 1.39	\$ 2.43	\$	\$	\$ 3.82	\$ 147,539	
11.015		Haul to disposal site, 1 mile haul	35,010	LCY	\$ 1.46	\$ 1.36	\$	\$	\$ 2.01	\$ 194,208	
11.016		Shotcrete portal face	509	CY	\$ 83.98	\$ 39.60	\$ 221.97	\$	\$ 245.44	\$ 203,619	
11.017		Steel fiber for shotcrete	9	TON	\$	\$	\$ 2,478.23	\$	\$ 2,478.23	\$ 11,912	
11.018		20 ft rock bolts, 5 ft on center - Drilling	497	EA	\$ 35.40	\$ 22.63	\$	\$	\$ 78.04	\$ 38,810	
11.019		3.5" diam grouted hole with #6 bar	23	CY	\$ 310.78	\$ 92.47	\$ 2,512.70	\$	\$ 2,925.45	\$ 66,143	
11.020		Downstream Portal Backfill	37,900	CY					\$ 9.71	\$ 368,005	
11.021		Haul excavated material and stockpile, 1 mi assumed	41,690	LCY	\$ 0.84	\$ 3.27	\$	\$	\$ 4.30	\$ 187,767	
11.022		Backfill/Compact and grade	41,690	LCY	\$ 2.14	\$ 2.18	\$	\$	\$ 4.32	\$ 184,758	
11.023		Tunnel Excavation and Initial Support (Double Shift)	828	LF	\$	\$	\$	\$ 7,304.42	\$ 7,304.42	\$ 6,048,057	Second shift work will apply
11.024		Tunnel Concrete Lining	828	LF	\$	\$	\$	\$ 7,205.71	\$ 7,205.71	\$ 5,966,327	Second shift work will apply
11.025		10-Ft Steel Pipe Cut and Cover Section	388	LF	\$	\$	\$	\$ 8,094.08	\$ 8,094.08	\$ 3,140,504	Second shift work will apply
11.026		Mechanical, Valves, Trash rack, and Metals	1	LS	\$	\$	\$	\$ 4,887,500	\$ 4,887,500	\$ 4,887,500	Allowance
11.027		Riprap Discharge Channel	5,000	CY					\$ 56.71	\$ 283,563	
11.028		Allowing operations	5,000	LCY	\$ 5.14	\$ 2.63	\$ 4.83	\$	\$ 15.79	\$ 105,719	
11.029		Excavate, load and haul to stockpile/processing area, 1 mile haul	5,000	LCY	\$ 2.49	\$ 2.44	\$	\$	\$ 9.73	\$ 106,592	
11.030		Crush and screen material		LCY	\$	\$	\$	\$	\$	\$	
11.031		Load and haul to stockpile, 0.5 mile haul	5,000	LCY	\$ 1.03	\$ 4.50	\$	\$	\$ 5.52	\$ 33,125	
11.032		Place at the channel	5,000	LCY	\$ 8.25	\$ 8.17	\$	\$	\$ 25.22	\$ 91,318	
12		Misc allowance for small items, allow 1%	1.0%	%				147,784.623	\$ 147,784.623	\$ 1,477,846	
Total Direct Cost			81	Acres	\$ 591,364.11	\$ 930,596.00	\$ 434,708.89	\$ 406,076.45	\$ 2,369,245.54	\$ 149,282,468	

24. Construction Cost Summary: Saddle Dam 5

Total Cost

Total Direct Cost 71,826,106

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 71,826,106

General Conditions

Mobilization	5.0%	3,591,305
Site General Conditions & Requirements	10.0%	7,541,741
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	912,551
Bonds	0.6%	503,230
GC Home Office Overhead	6.0%	5,062,496
GC Profit	8.0%	7,154,994

Total Contractor Indirect Markups 24,766,317

TOTAL DIRECT COST BEFORE CONTINGENCIES 96,592,423

Contingencies

Design Contingencies	10.0%	9,659,242
Construction Contingencies	15.0%	15,937,750

Total Contingency Allowance 25,596,992

TOTAL DIRECT COST BEFORE ESCALATION 122,189,415

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	1,193,221
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 123,382,636

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Transport (\$)	Installation (\$)	Other (\$)	Total (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES											
1.001	Demolition Work	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
1.002	Cleaning and Grubbing	42	ACRE	\$ 3,164.68	\$ 5,523.33	\$ -	\$ -	\$ -	\$ 8,688.01	\$ 364,896	Heavy vegetation removal
1.003	Reservoir Cleaning	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere costed
1.004	Erosion and Sediment Control	42	ACRE	\$ -	\$ -	\$ -	\$ -	\$ 3,760.50	\$ 3,760.50	\$ 157,941	Allowed 50.25/5% to 30% of the total area
2 Process and Haul Filter Materials to Project											
2.001	Process and Stockpile on Project - Zone 2A - Filter	121,000	Tons						\$ 37.09	\$ 4,487,950	
2.002	Purchase processed material from quarry	121,000	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 26.70	\$ 2,642,779	Include 10% waste factor / additional material supply
2.003	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	61,853	LCY	\$ 10.52	\$ 11.50	\$ -	\$ -	\$ -	\$ 22.02	\$ 1,802,173	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 80% of material to be delivered to stockpile, 20% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004	Process and Stockpile on Project - Zone 2A - Drain	126,500	Tons						\$ 37.02	\$ 4,683,589	
2.005	Purchase processed material from quarry	126,500	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 26.70	\$ 2,667,857	Include 10% waste factor / additional material supply
2.006	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	62,374	LCY	\$ 10.47	\$ 11.45	\$ -	\$ -	\$ -	\$ 21.92	\$ 1,875,751	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 80% of material to be delivered to stockpile, 20% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007	Process and Stockpile on Project - Zone 2A - Transition	36,300	Tons						\$ 37.39	\$ 1,357,419	
2.008	Purchase processed material from quarry	36,300	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 26.70	\$ 925,753	Include 10% waste factor / additional material supply
2.009	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	24,535	LCY	\$ 10.73	\$ 11.72	\$ -	\$ -	\$ -	\$ 22.47	\$ 551,686	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 80% of material to be delivered to stockpile, 20% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons						\$ -	\$ -	Not required
2.011	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.012	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons						\$ -	\$ -	Not required
2.014	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.015	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Foundation Preparation and Grouting											
3 Foundation Excavation											
3.001	Topsoil Salvage	58,000	BCY						\$ 8.65	\$ 501,933	
3.002	Excavations - remove top soil layer	62,800	LCY	\$ 3.46	\$ 2.22	\$ -	\$ -	\$ -	\$ 3.74	\$ 156,568	Include 10% swell factor
3.003	Load and haul to disposal site, 0.5 mile haul	62,800	LCY	\$ 3.12	\$ 2.89	\$ -	\$ -	\$ -	\$ 4.13	\$ 263,363	
3.004	Dam Foundation Excavation - Common	24,000	BCY						\$ 9.36	\$ 224,729	
3.005	Excavations - remove top soil layer	25,000	LCY	\$ 3.70	\$ 2.42	\$ -	\$ -	\$ -	\$ 4.12	\$ 104,280	Include 10% swell factor
3.006	Load and haul to disposal site, 0.5 mile haul	26,400	LCY	\$ 1.22	\$ 3.17	\$ -	\$ -	\$ -	\$ 4.38	\$ 115,368	
3.007	Dam Foundation Rock Exc - Ripplable Rock	256,000	BCY						\$ 11.77	\$ 3,013,095	
3.008	Rock excavations - no blasting	264,000	LCY	\$ 2.52	\$ 3.70	\$ -	\$ -	\$ -	\$ 6.22	\$ 1,631,804	Include 10% swell factor
3.009	Load and haul to stockpile, 0.5 mile haul	264,400	LCY	\$ 1.12	\$ 2.89	\$ -	\$ -	\$ -	\$ 4.01	\$ 1,020,770	
3.010	Dam Foundation Rock Exc - Drill and Shoot	-	BCY						\$ -	\$ -	
3.011	Blasting operations - no blasting	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Include 10% swell factor
3.012	Load and haul to stockpile, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
3.013	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4 Foundation Preparation and Grouting											
Foundation Preparation - Beneath Core											
4.001	Initial Foundation Cleaning - Core	23,000	SY						\$ 19.61	\$ 451,092	
4.002	Initial foundation core cleanup	23,000	SY	\$ 11.60	\$ 5.58	\$ -	\$ -	\$ -	\$ 17.18	\$ 395,173	
4.003	Load and haul to disposal area, 0.5 mile haul	6,525	CY	\$ 2.87	\$ 5.98	\$ -	\$ -	\$ -	\$ 8.85	\$ 57,977	Assume removal of top layer, 0.25' thick
4.004	Final Foundation Cleaning - Core	23,000	SY						\$ 17.18	\$ 395,115	
4.005	Final foundation core cleanup	23,000	SY	\$ 11.60	\$ 5.58	\$ -	\$ -	\$ -	\$ 17.18	\$ 395,173	
4.006	Load and haul to disposal area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.007	Dental Excavation	1,300	CY						\$ 123.15	\$ 160,094	
4.008	Dental excavations	1,430	LCY	\$ 62.00	\$ 80.79	\$ -	\$ -	\$ -	\$ 92.76	\$ 141,323	Include 10% swell factor
4.009	Load and haul to site stockpile, 0.5 mile haul	1,430	LCY	\$ 4.85	\$ 8.33	\$ -	\$ -	\$ -	\$ 13.19	\$ 19,869	
4.010	Dental Concrete	1,300	CY	\$ 44.14	\$ 20.05	\$ 183.12	\$ -	\$ -	\$ 247.32	\$ 321,511	
4.011	Grout Cap with Anchors	4,200	CV	\$ 78.98	\$ 22.86	\$ 519.68	\$ 9.58	\$ 631.10	\$ 2,650,622	\$ 3' x 40' cap, includes formwork and reinforcement (50lbs/cy)	
4.012	Curtain Grouting	14,600	LF						\$ 79.65	\$ 1,162,939	
4.013	Drill setup for all holes	195	ea.	\$ 192.18	\$ 321.39	\$ -	\$ -	\$ -	\$ 513.77	\$ 105,015	Assume 75' drilling lengths
4.014	Drill curtain grout holes	14,600	ft	\$ 10.56	\$ 13.40	\$ -	\$ -	\$ -	\$ 23.95	\$ 320,852	
4.015	Reinfit grout holes	1,460	ft	\$ 12.44	\$ 12.32	\$ -	\$ -	\$ -	\$ 22.76	\$ 33,095	Assume 10% to be drilled
4.016	Mixup to grout holes and grout samples	230	hr	\$ 26.80	\$ -	\$ -	\$ -	\$ -	\$ 96.50	\$ 88,311	1.4 hours per hole
4.017	Inject portland cement grout	973	hr	\$ 468.78	\$ 190.23	\$ -	\$ -	\$ -	\$ 507.21	\$ 171,377	
4.018	Perform hydraulic conductivity tests	193	ea.	\$ -	\$ -	\$ -	\$ 347.30	\$ 347.30	\$ -	\$ 67,608	
4.019	Consolidation Grouting	-	LF						\$ -	\$ -	Not required
4.020	Drill setup for all holes	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.021	Drill curtain grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.022	Reinfit grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.023	Mixup to grout holes and grout samples	-	hr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024	Inject portland cement grout	-	hr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.025	Perform hydraulic conductivity tests	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.026	Type III Cement	520	Tons	\$ 177.07	\$ 73.14	\$ 113.14	\$ -	\$ 363.34	\$ 188,939	\$ -	
4.027	Backfill Concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
5 Foundation Preparation - Beneath Shell											
5.001	Initial Foundation Cleaning - Shell	73,000	SY						\$ 4.87	\$ 355,784	
5.002	Initial dam shell cleanup	73,000	SY	\$ 3.16	\$ 6.42	\$ -	\$ -	\$ -	\$ 1.77	\$ 179,360	
5.003	Load and haul to disposal area, 0.5 mile haul	20,075	LCY	\$ 4.10	\$ 7.39	\$ -	\$ -	\$ -	\$ 11.28	\$ 215,425	Assume removal of top layer, 0.25' thick

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Item	Sub Item	Description	Quantity	Unit	Unit Price (\$)	Material (\$)	Transport (\$)	Installation (\$)	Other (\$)	Per Unit Total (\$)	Unit Price (\$)	Rate	Rate	Comments		
10.023		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$			
10.024		Shotcrete portal face	-	CY	\$	-	\$	-	\$	-	\$	-	\$			
10.025		Steel fiber for shotcrete	-	TON	\$	-	\$	-	\$	-	\$	-	\$			
10.026		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	-	\$			
10.027		3.5" diam grouted hole with #10 bar	-	CY	\$	-	\$	-	\$	-	\$	-	\$			
10.028		Downstream Portal Backfill	-	CY							\$	-	\$			
10.029		Load of shotcrete and haul to fill location, 0.5 mile haul	-	BCY	\$	-	\$	-	\$	-	\$	-	\$			
10.030		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	\$			
10.031		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	-	\$	-	\$			
10.032		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	-	\$	-	\$			
10.033		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	-	\$	-	\$			
10.034		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	-	\$	-	\$			
10.035		Riprap Discharge Channel	-	CY							\$	-	\$			
10.036		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$			
10.037		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$			
10.038		Crush and screen material	-		\$	-	\$	-	\$	-	\$	-	\$			
10.039		Load and haul to stockpile, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$			
10.040		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	-	\$			
11		ERS Facility														
11.001		Upstream Portal Excavation and Rock Bolts	27,215	CY							\$	17.68	\$	481,220		
11.002		Excavate and load material	29,937	LCY	\$	1.42	\$	2.40	\$		\$	3.91	\$	117,029		
11.003		Haul to disposal site, 0.5 mile haul	29,937	LCY	\$	1.86	\$	3.73	\$		\$	5.22	\$	156,381		
11.004		Shotcrete portal face	361	CY	\$	95.27	\$	43,199	\$	221.97	\$	336.33	\$	126,676		
11.005		Steel fiber for shotcrete	5	TON	\$	-	\$	-	\$	2,478.25	\$	2,478.25	\$	13,424		
11.006		20 ft rock bolts, 8 ft on center - Drilling	305	EA	\$	57.85	\$	23,511	\$		\$	81.06	\$	24,698		
11.007		3.5" diam grouted hole with #10 bar	14	CY	\$	328.29	\$	102.63	\$	2,822.70	\$	2,961.52	\$	41,012		
11.008		Upstream Portal Backfill	24,500	CY							\$	9.87	\$	241,794		
11.009		Haul excavated material and stockpile, 0.5 mi assumed	26,930	LCY	\$	1.00	\$	3.72	\$		\$	4.72	\$	117,097		
11.010		Backfill: Compact and grade	26,930	LCY	\$	2.11	\$	2,151	\$		\$	4.26	\$	114,897		
11.011		Inlet and Valve Structures	2,200	CY							\$	1,092.50	\$	2,403,500		
11.012		Place inlet and valve structures	2,200	CY	\$		\$		\$	1,092.50	\$	1,092.50	\$	2,403,500		
11.013		Downstream Portal Excavation and Rock Bolts	31,867	CY							\$	22.30	\$	710,742		
11.014		Excavate and load material	35,034	LCY	\$	1.17	\$	2.40	\$		\$	3.77	\$	132,294		
11.015		Haul to disposal site, 0.5 mile haul	35,034	LCY	\$	1.43	\$	3.00	\$		\$	3.04	\$	176,729		
11.016		Shotcrete portal face	719	CY	\$	85.01	\$	42,611	\$	221.97	\$	348.39	\$	156,468		
11.017		Steel fiber for shotcrete	71	TON	\$	-	\$	-	\$	2,478.25	\$	2,478.25	\$	26,710		
11.018		20 ft rock bolts, 8 ft on center - Drilling	805	EA	\$	53.71	\$	21,981	\$		\$	75.56	\$	45,657		
11.019		3.5" diam grouted hole with #10 bar	38	CY	\$	354.80	\$	79,061	\$	2,512.70	\$	2,655.51	\$	78,426		
11.020		Downstream Portal Backfill	34,400	CY							\$	10.47	\$	360,275		
11.021		Haul excavated material and stockpile, 0.5 mi assumed	37,840	LCY	\$	1.10	\$	4.10	\$		\$	5.19	\$	196,420		
11.022		Backfill: Compact and grade	37,840	LCY	\$	3.18	\$	2,131	\$		\$	4.59	\$	188,450		
11.023		Tunnel Excavation and Initial Support (Double Shift)	832	LF	\$	-	\$	-	\$	-	\$	7,304.42	\$	7,304.42	\$	6,077,275
11.024		Tunnel Concrete Lining	832	LF	\$	-	\$	-	\$	-	\$	7,205.71	\$	7,205.71	\$	5,995,149
11.025		10-Ft Steel Pipe Cut and Cover Section	400	LF	\$	-	\$	-	\$	-	\$	8,094.08	\$	8,094.08	\$	3,237,633
11.026		Mechanical, Valves, Trash rack, and Metals	1	LS	\$	-	\$	-	\$	-	\$	4,887,500	\$	4,887,500	\$	4,887,500
11.027		Riprap Discharge Channel	4,200	CY							\$	57.61	\$	241,972		
11.028		Blasting operations	5,040	LCY	\$	4.50	\$	6.10	\$	4.85	\$	15.51	\$	78,157		
11.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	5,040	LCY	\$	3.22	\$	6.46	\$		\$	4.69	\$	43,794		
11.030		Crush and screen material		LCY	\$	-	\$	-	\$	-	\$	-	\$			
11.031		Load and haul to stockpile, 1 mile haul	5,040	LCY	\$	1.45	\$	6.38	\$		\$	7.71	\$	30,830		
11.032		Place at the channel		LCY	\$	6.40	\$	6.70	\$		\$	16.11	\$	81,170		
12		Misc allowance for small items, allow 1%	1.0%	%						71,114,956	\$	71,114,956	\$	711,150		
Total Direct Cost			43	Acres	\$	938,190.31	\$	523,343.75	\$	270,801.78	\$	777,895.66	\$	1,710,145.38	\$	71,824,106

25. Construction Cost Summary: Other Saddle Dams/Dikes

Total Cost

Total Direct Cost 71,429,050

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 71,429,050

General Conditions

Mobilization	5.0%	3,571,453
Site General Conditions & Requirements	10.0%	7,500,050
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	907,506
Bonds	0.6%	500,448
GC Home Office Overhead	6.0%	5,034,510
GC Profit	8.0%	7,115,441

Total Contractor Indirect Markups 24,629,403

TOTAL DIRECT COST BEFORE CONTINGENCIES 96,058,453

Contingencies

Design Contingencies	10.0%	9,605,846
Construction Contingencies	15.0%	15,849,646

Total Contingency Allowance 25,455,492

TOTAL DIRECT COST BEFORE ESCALATION 121,513,950

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	1,186,624
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 122,700,574

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Transport (\$)	Processing (\$)	Other (\$)	Total (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES											
1.001	Demolition Work	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
1.002	Cleaning and Grubbing	49	ACRE	\$ 3,164.68	\$ 5,523.33	\$ -	\$ -	\$ -	\$ 8,688.01	\$ 425,712	Heavy vegetation removal
1.003	Reservoir Cleaning	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere costed
1.004	Erosion and Sediment Control	49	ACRE	\$ -	\$ -	\$ -	\$ -	\$ 3,760.50	\$ 3,760.50	\$ 184,265	Allowed 50.25/5F to 30% of the total area
2 Process and Haul Filter Materials to Project											
2.001	Process and Stockpile on Project - Zone 2A - Filter	175,800	Tons						\$ 37.22	\$ 6,469,064	
2.002	Purchase processed material from quarry	175,800	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 3,912,752	Include 10% waste factor / additional material supply
2.003	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	117,571	LCY	\$ 10.61	\$ 1,248,000	\$ -	\$ -	\$ -	\$ 22.21	\$ 2,611,312	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 20% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004	Process and Stockpile on Project - Zone 2A - Drain	177,606	Tons						\$ 37.00	\$ 6,571,933	
2.005	Purchase processed material from quarry	177,606	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 3,941,252	Include 10% waste factor / additional material supply
2.006	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	120,145	LCY	\$ 10.48	\$ 1,260,000	\$ -	\$ -	\$ -	\$ 21.89	\$ 2,626,702	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007	Process and Stockpile on Project - Zone 2A - Transition	48,400	Tons						\$ 37.01	\$ 1,791,502	
2.008	Purchase processed material from quarry	48,400	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 1,074,311	Include 10% waste factor / additional material supply
2.009	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	32,741	LCY	\$ 10.47	\$ 3,428,000	\$ -	\$ -	\$ -	\$ 21.60	\$ 717,191	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons						\$ -	\$ -	Not required
2.011	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.012	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons						\$ -	\$ -	Not required
2.014	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.015	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Foundation Preparation and Grouting											
3 Foundation Excavation											
3.001	Topsoil Salvage	74,000	BCY						\$ 8.41	\$ 622,397	
3.002	Excavations - remove top soil layer	81,400	LCY	\$ 3.42	\$ 2,783,000	\$ -	\$ -	\$ -	\$ 3.53	\$ 285,275	Include 10% swell factor
3.003	Load and haul to disposal site, 0.5 mile haul	81,400	LCY	\$ 3.12	\$ 2,539,000	\$ -	\$ -	\$ -	\$ 4.01	\$ 328,280	
3.004	Dam Foundation Excavation - Common	33,500	BCY						\$ 8.54	\$ 286,018	
3.005	Excavations - remove top soil layer	36,850	LCY	\$ 1.55	\$ 57,117	\$ 2.21	\$ -	\$ -	\$ 3.76	\$ 138,422	Include 10% swell factor
3.006	Load and haul to disposal site, 0.5 mile haul	36,830	LCY	\$ 1.12	\$ 41,250	\$ 2.80	\$ -	\$ -	\$ 4.01	\$ 147,396	
3.007	Dam Foundation Rock Exc - Ripplable Rock	302,500	BCY						\$ 11.71	\$ 3,543,342	
3.008	Rock excavations - no blasting	347,875	LCY	\$ 2.53	\$ 889,924	\$ 3.68	\$ -	\$ -	\$ 6.19	\$ 2,151,220	Include 10% swell factor
3.009	Load and haul to stockpile, 0.5 mile haul	347,875	LCY	\$ 1.13	\$ 393,000	\$ 2.80	\$ -	\$ -	\$ 4.00	\$ 1,381,623	
3.010	Dam Foundation Rock Exc - Drill and Shoot	-	BCY						\$ -	\$ -	Not required
3.011	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
3.012	Explosives, load and haul to stockpile, 3 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
3.013	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4 Foundation Preparation and Grouting											
Foundation Preparation - Beneath Core											
4.001	Initial Foundation Cleaning - Core	16,400	SY						\$ 12.13	\$ 198,945	
4.002	Initial foundation core cleanup	16,400	SY	\$ 7.60	\$ 124,640	\$ 2.23	\$ -	\$ -	\$ 9.83	\$ 161,627	
4.003	Load and haul to disposal area, 0.5 mile haul	4,510	CY	\$ 2.78	\$ 12,518	\$ 5.50	\$ -	\$ -	\$ 8.27	\$ 37,316	Assume removal of top layer, 0.25' thick
4.004	Final Foundation Cleaning - Core	16,400	SY						\$ 9.86	\$ 161,627	
4.005	Final foundation core cleanup	16,400	SY	\$ 7.60	\$ 124,640	\$ 2.23	\$ -	\$ -	\$ 9.83	\$ 161,627	
4.006	Load and haul to disposal area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.007	Dental Excavation	1,500	CY						\$ 121.44	\$ 182,160	
4.008	Dental excavations	1,630	LCY	\$ 62.14	\$ 101,386	\$ 30.82	\$ -	\$ -	\$ 92.96	\$ 148,192	Include 10% swell factor
4.009	Load and haul to site stockpile, 0.5 mile haul	1,630	LCY	\$ 4.79	\$ 7,800	\$ 7.23	\$ -	\$ -	\$ 11.44	\$ 18,869	
4.010	Dental Concrete	1,500	CY	\$ 44.85	\$ 67,275	\$ 20.38	\$ 183.12	\$ -	\$ 248.35	\$ 372,524	
4.011	Grout Cap with Anchors	4,900	CV	\$ 79.22	\$ 389,198	\$ 22.92	\$ 519.68	\$ 8.21	\$ 630.04	\$ 3,087,200	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
4.012	Curtain Grouting	16,200	LF						\$ 78.49	\$ 1,271,561	
4.013	Drill setup for all holes	216	ea.	\$ 163.84	\$ 35,387	\$ -	\$ -	\$ -	\$ 505.12	\$ 109,107	Assume 75' drilling lengths
4.014	Drill curtain grout holes	16,200	ft	\$ 10.91	\$ 176,742	\$ -	\$ -	\$ -	\$ 25.42	\$ 412,934	
4.015	Reinfit grout holes	1,620	ft	\$ 10.11	\$ 16,378	\$ -	\$ -	\$ -	\$ 21.42	\$ 34,698	Assume 10% to be re-drilled
4.016	Mixup to grout holes and grout mixers	810	ea.	\$ 21.77	\$ 17,433	\$ -	\$ -	\$ -	\$ 91.17	\$ 73,850	
4.017	Inject Portland cement grout	1,080	hr	\$ 46.83	\$ 50,576	\$ -	\$ -	\$ -	\$ 525.11	\$ 567,028	Allow 5 hours per hole
4.018	Perform hydraulic conductivity tests	324	ea.	\$ -	\$ -	\$ -	\$ -	\$ 347.30	\$ 347.30	\$ 73,012	
4.019	Consolidation Grouting	-	LF						\$ -	\$ -	Not required
4.020	Drill setup for all holes	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.021	Drill curtain grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.022	Reinfit grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.023	Mixup to grout holes and grout mixers	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024	Inject Portland cement grout	-	hr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.025	Perform hydraulic conductivity tests	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.026	Type III Cement	571	Tons	\$ 177.11	\$ 101,709	\$ 73.16	\$ 113.14	\$ -	\$ 363.41	\$ 207,507	
4.027	Backfill Concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
5 Foundation Preparation - Beneath Shell											
5.001	Initial Foundation Cleaning - Shell	38,400	SY						\$ 3.85	\$ 147,952	
5.002	Initial dam shell cleanup	38,400	SY	\$ 3.18	\$ 121,920	\$ 0.42	\$ -	\$ -	\$ 1.76	\$ 67,760	

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Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAACEI Class 4
April 16, 2021

26. Construction Cost Summary: Inlet/Outlet & Diversion Works				
				Total Cost
Total Direct Cost				170,115,943
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				170,115,943
General Conditions				
Mobilization		5.0%		8,505,797
Site General Conditions & Requirements		10.0%		17,862,174
Phasing	Not included	0.0%		-
General Contractor Overhead and Fees				
Insurance		1.1%		2,161,323
Bonds		0.6%		1,191,871
GC Home Office Overhead		6.0%		11,990,226
GC Profit		8.0%		16,946,187
Total Contractor Indirect Markups				58,657,578
TOTAL DIRECT COST BEFORE CONTINGENCIES				228,773,521
Contingencies				
Design Contingencies		10.0%		22,877,352
Construction Contingencies		15.0%		37,747,631
Total Contingency Allowance				60,624,983
TOTAL DIRECT COST BEFORE ESCALATION				289,398,504
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2,826,073
Escalation to Mid-point of Construction		Not included	0%	-
ESTIMATED CONSTRUCTION COST				292,224,577

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Item	Sub Item	Description	Quantity	Unit	Unit Price	Subtotal Price	Material Price	Labor Price	Equipment Price	Other Price	Total Price	Notes
11.011		Inlet and Valve Structures	-	CY								
11.012		Pipe inlet and valve structures	-	CY	\$	\$	\$	\$	\$	\$	\$	
11.013		Downstream Portal Excavation and Rock Bolts	-	CY								
11.014		Excavate and load material	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.016		Shuttercrete portal face	-	CY	\$	\$	\$	\$	\$	\$	\$	
11.017		Steel fiber for shuttercrete	-	TON	\$	\$	\$	\$	\$	\$	\$	
11.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$	\$	
11.019		3.5" diam grouted hole with #8 bar	-	CY	\$	\$	\$	\$	\$	\$	\$	
11.020		Downstream Portal Backfill	-	CY								
11.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.022		Backfill: Compact and grade	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	\$	\$	\$	\$	\$	\$	
11.024		Tunnel Concrete Lining	-	LF	\$	\$	\$	\$	\$	\$	\$	
11.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	\$	\$	\$	\$	\$	\$	
11.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	\$	\$	\$	\$	\$	\$	
11.027		Riprap Discharge Channel	-	CY								
11.028		Blasting operations	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.029		Excavate, haul and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.030		Crush and screen material	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
11.032		Place at the channel	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12		ERS Facility 2									\$	Included within Saddle Dam 5 Estimate
12.001		Upstream Portal Excavation and Rock Bolts	-	CY								
12.002		Excavate and load material	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.003		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.004		Shuttercrete portal face	-	CY	\$	\$	\$	\$	\$	\$	\$	
12.005		Steel fiber for shuttercrete	-	TON	\$	\$	\$	\$	\$	\$	\$	
12.006		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$	\$	
12.007		3.5" diam grouted hole with #8 bar	-	CY	\$	\$	\$	\$	\$	\$	\$	
12.008		Upstream Portal Backfill	-	CY								
12.009		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.010		Backfill: Compact and grade	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.011		Inlet and Valve Structures	-	CY								
12.012		Pipe inlet and valve structures	-	CY	\$	\$	\$	\$	\$	\$	\$	
12.013		Downstream Portal Excavation and Rock Bolts	-	CY								
12.014		Excavate and load material	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.016		Shuttercrete portal face	-	CY	\$	\$	\$	\$	\$	\$	\$	
12.017		Steel fiber for shuttercrete	-	TON	\$	\$	\$	\$	\$	\$	\$	
12.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$	\$	
12.019		3.5" diam grouted hole with #8 bar	-	CY	\$	\$	\$	\$	\$	\$	\$	
12.020		Downstream Portal Backfill	-	CY								
12.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.022		Backfill: Compact and grade	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	\$	\$	\$	\$	\$	\$	
12.024		Tunnel Concrete Lining	-	LF	\$	\$	\$	\$	\$	\$	\$	
12.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	\$	\$	\$	\$	\$	\$	
12.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	\$	\$	\$	\$	\$	\$	
12.027		Riprap Discharge Channel	-	CY								
12.028		Blasting operations	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.029		Excavate, haul and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.030		Crush and screen material	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
12.032		Place at the channel	-	LCY	\$	\$	\$	\$	\$	\$	\$	
13		IO Facility									\$	168,431,626
		Clearing Work										
13.001		Demolition Work	-	LS	\$	\$	\$	\$	\$	\$	\$	
13.002		Clearing and Grubbing	9	ACRE	\$	1,230.71	\$	2,147.96	\$	\$	\$	3,379
13.003		Erosion and Sediment Control	9	ACRE	\$		\$		\$	\$	\$	3,761
		Access Roads										
13.004		Develop temporary access roads										Elsewhere
		Foundations										
13.005		Foundation piling	540.00	LF							\$	450.72
13.006		Drilling rig mobilization/demobilization allowance	2.00	EA	\$	15,000.00	\$	10,000.00	\$	\$	\$	15,000.00
13.007		Foundation piles - drilled piers	540.00	LF	\$	49.00	\$	43.25	\$	\$	\$	145.00
13.008		Concrete in piles										included above
13.009		Pile reinforcement allowance	45	TON	\$	770.50	\$	217.50	\$	\$	\$	2,373.00
13.010		Pile testing allowance	15.0%	%	\$		\$		\$	\$	\$	243,387.50
13.011		Pile cap / base slab	489	CY								\$
13.012		Cast in place concrete	489	CY	\$	65.37	\$	57.68	\$	\$	\$	32,618.83
13.013		Formwork	971	SF	\$	18.25	\$	2.34	\$	\$	\$	17,635.50
13.014		Concrete reinforcement	37	TON	\$	742.68	\$	371.49	\$	\$	\$	2,760.43
		Intake and Outlet Structures										
13.015		Multi-Level Inlet/Outlet Tower Cast In Place Concrete	8,369	CY								
13.016		Walls	7,535	CY								\$
13.017		Cast in place concrete	7,535	CY	\$	65.37	\$	57.68	\$	\$	\$	402,618.83
13.018		Formwork	101,729	SF	\$	15.25	\$	2.34	\$	\$	\$	2,361,208.50
13.019		Concrete reinforcement	942	TON	\$	742.68	\$	371.49	\$	\$	\$	3,498.371

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Sites Reservoir (Alt 1): Sites Lodoga Road Realignment
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAEII Class 4
March 1, 2021

27.01. Construction Cost Summary: Sites Lodoga Road Realignment					
				Unit Cost Rate (\$/LF)	Total Cost
				LF:	28,972
Total Direct Cost				4,071.10	117,947,799
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				4,071.10	117,947,799
General Conditions					
Mobilization			3.0%	122.13	3,538,434
Site General Conditions & Requirements			10.0%	419.32	12,148,623
Phasing		Not included	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	50.74	1,469,983
Bonds			0.6%	27.98	810,629
GC Field and Home Office Overhead			5.0%	234.56	6,795,773
GC Profit			5.0%	246.29	7,135,562
Total Contractor Indirect Markups				1,101.03	31,899,004
TOTAL DIRECT COST BEFORE CONTINGENCIES				5,172.12	149,846,803
Contingencies					
Design Contingencies			10.0%	517.21	14,984,680
Construction Contingencies			15.0%	853.40	24,724,722
Total Contingency Allowance				1,370.61	39,709,402
TOTAL DIRECT COST BEFORE ESCALATION				6,542.74	189,556,205
Escalation to Report Date		3/31/2021 @ 3.00% p.a.	0.977%	63.89	1,851,080
Escalation to Mid-point of Construction		Not included	0%	-	-
ESTIMATED CONSTRUCTION COST				6,606.63	191,407,285

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comment
Sites Lodoga Road Realignment										
	Road Length (LF)	28,972	LF							
	Road Length (Miles)	6	MILES							
	Road Area (SF)	985,048	SF							
	Road Area (SV)	109,450	SV							
	Road Area (Acres)	23	ACRE							
1 Clearing and Demolition Work										
1.001	Demolition Work	-	SV							Elsewhere
1.002	Asphalt removal work	-	SV	\$	-	\$	-	\$	-	Included elsewhere
1.003	Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	
1.004	Clearing and Grubbing	70	ACRE	\$	1,115.34	\$	1,835.55	\$	2,950.89	Light vegetation clearing work
Roads and Road Structures										
2 Road Excavations										
2.001	Temporary Silt Fence	21,600	LF					\$	4.10	\$ 88,479
2.002	Setup temporary silt fence	21,600	LF	\$	3.72	\$	0.23	\$	2.94	\$ 63,279
2.003	Silt fence removal	21,600	LF	\$	0.62	\$	0.37	\$	1.16	\$ 24,979
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CV					\$	-	-
2.005	Roadway excavations including existing asphalt layer removal	-	LCY	\$	-	\$	-	\$	-	-
2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.007	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	-
2.008	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	-
2.009	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CV					\$	-	-
2.011	Roadway excavations, common earth	-	LCY	\$	-	\$	-	\$	-	-
2.012	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.013	Roadway Excavation (Cut to Waste Disposal Area)	165,900	CV					\$	10.72	\$ 1,778,290
2.014	Roadway excavations	165,900	LCY	\$	2.59	\$	3.72	\$	4.29	\$ 712,958
2.015	Load and haul to disposal site, 0.5 mile haul	165,900	LCY	\$	1.48	\$	2.58	\$	3.06	\$ 995,382
2.016	Roadway Excavation (Rock Cut)	75,400	CV					\$	20.37	\$ 1,535,582
2.017	Blasting operations	27,144	LCY	\$	4.52	\$	4.32	\$	13.60	\$ 371,419
2.018	Rock-breaking operation	51,186	LCY	\$	2.67	\$	3.83	\$	5.79	\$ 436,156
2.019	Load and haul to processing area, 2 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.020	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	-
2.021	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	-
2.022	Load and haul to stockpile location, 2 mile haul	54,480	LCY	\$	2.29	\$	3.88	\$	6.11	\$ 734,007
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	1,492,700	CV					\$	9.72	\$ 14,511,292
2.024	Roadway excavations	1,612,920	LCY	\$	2.08	\$	2.72	\$	4.27	\$ 7,006,920
2.025	Load and haul to stockpile/fill location, 0.25 mile haul	1,645,570	LCY	\$	2.72	\$	3.81	\$	4.59	\$ 7,504,372
2.026	Crushing operations	-	CV	\$	-	\$	-	\$	-	-
2.027	Screening operations	-	CV	\$	-	\$	-	\$	-	-
3 Road Fill and Layer Work										
3.001	Roadway Embankment (from on-site excavation sources)	1,492,700	CV					\$	6.44	\$ 9,617,106
3.002	Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	1,492,700	LCY							Included above
3.004	Spread and compact	1,492,700	LCY	\$	3.32	\$	3.13	\$	6.44	\$ 9,617,106
3.005	Roadway Embankment (imported from other excavation sources)	4,696,700	CV					\$	7.17	\$ 33,683,040
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	5,186,370	LCY							Included above
3.007	Spread and compact	5,186,370	LCY	\$	3.32	\$	3.13	\$	6.44	\$ 33,683,040
3.008	Class 4 Aggregate subbase	17,200	CV					\$	61.75	\$ 1,062,173
3.009	Purchase processed material from quarry	29,240	TON	\$	-	\$	-	\$	15.15	\$ 442,960
3.010	Haul material from quarry to site stockpile/fill location, 0.5 mile haul	19,700	LCY	\$	15.63	\$	22.43	\$	23.08	\$ 456,531
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.012	Spread and compact	19,700	LCY	\$	4.23	\$	3.94	\$	8.27	\$ 162,610
3.013	Class 2 Aggregate base	17,200	CV					\$	61.75	\$ 1,062,173
3.014	Purchase processed material from quarry	29,240	TON	\$	-	\$	-	\$	15.15	\$ 442,960
3.015	Haul material from quarry to site stockpile/fill location, 0.5 mile haul	19,700	LCY	\$	15.63	\$	22.43	\$	23.08	\$ 456,531
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.017	Spread and compact	19,700	LCY	\$	4.23	\$	3.94	\$	8.27	\$ 162,610
3.018	Asphalt concrete	22,950	TON	\$	8.79	\$	4.85	\$	116.53	\$ 2,674,253
3.019	Tack Coat	17	TON	\$	995.95	\$	499.58	\$	4,160.38	\$ 71,143
4 Other Roadwork										
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	-
4.002	Midwest Guardrail System	2,897	LF	\$	5.82	\$	2.58	\$	51.95	\$ 150,502
4.003	Transition Railline (Type WB-31)	-	EA	\$	-	\$	-	\$	-	-
4.004	End Anchor Assembly (Type SFT)	-	EA	\$	-	\$	-	\$	-	-

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Sites Reservoir (Alt 1): Huffmaster Road Realignment
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAE Class 4
March 1, 2021

27.02. Construction Cost Summary: Huffmaster Road Realignment

		Unit Cost Rate (\$/LF)	Total Cost
	LF:	39,909	
Total Direct Cost		679.77	27,129,105
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS		679.77	27,129,105
General Conditions			
Mobilization	3.0%	20.39	813,873
Site General Conditions & Requirements	10.0%	70.02	2,794,298
Phasing	<i>Not included</i> 0.0%	-	-
General Contractor Overhead and Fees			
Insurance	1.1%	8.47	338,110
Bonds	0.6%	4.67	186,452
GC Field and Home Office Overhead	5.0%	39.17	1,563,092
GC Profit	5.0%	41.12	1,641,246
Total Contractor Indirect Markups		183.85	7,337,071
TOTAL DIRECT COST BEFORE CONTINGENCIES		863.62	34,466,176
Contingencies			
Design Contingencies	10.0%	86.36	3,446,618
Construction Contingencies	15.0%	142.50	5,686,919
Total Contingency Allowance		228.86	9,133,537
TOTAL DIRECT COST BEFORE ESCALATION		1,092.48	43,599,713
Escalation to Report Date	3/31/2021 @ 3.00% p.a. 0.977%	10.67	425,766
Escalation to Mid-point of Construction	<i>Not included</i> 0%	-	-
ESTIMATED CONSTRUCTION COST		1,103.15	44,025,479

Item		Description	Quantity	Unit	Local Price	Unit Price	Material Price	Subcontract Price	L&P Price	Price	Comments	
Huffmaster Road Realignment												
		Road Length (LF)	39,909	LF								
		Road Length (Miles)	9	MILES								
		Road Area (SF)	598,635	SF								
		Road Area (SV)	66,515	SV								
		Road Area (Acre)	14	ACRE								
1		Clearing and Demolition Work										
1.001		Demolition Work	-	SV							Elsewhere	
1.002		Asphalt removal work	-	SV	\$	-	\$	-	\$	-	Included elsewhere	
1.003		Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-		
1.004		Clearing and Grubbing	40	ACRE	\$	1,097.92	\$	1,806.87	\$	2,904.78	Light vegetation clearing work	
Roads and Road Structures												
2		Road Excavations										
2.001		Temporary Silt Fence	33,600	LF					\$	4.07	\$	136,792
2.002		Setup temporary silt fence	33,600	LF	\$	1.81	\$	0.23	\$	2.04	\$	100,219
2.003		Silt fence removal	33,600	LF	\$	0.68	\$	0.23	\$	1.19	\$	35,501
2.004		Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					\$	-	\$	-
2.005		Roadway excavations including existing asphalt base material	-	LCY	\$	-	\$	-	\$	-	\$	-
2.006		Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
2.007		Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-
2.008		Screening Operations (Post-crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-
2.009		Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
2.010		Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	886,500	CY					\$	10.16	\$	9,006,087
2.011		Roadway excavations, location work	1,019,475	LCY	\$	2.59	\$	2.17	\$	4.77	\$	4,346,978
2.012		Load and haul to stockpile/fill location, 0.25 mile haul	1,019,475	LCY	\$	1.92	\$	0.23	\$	4.57	\$	4,657,479
2.013		Roadway Excavation (Cut to Waste Disposal Area)	151,600	CY					\$	10.80	\$	1,637,156
2.014		Roadway excavations	174,340	LCY	\$	2.31	\$	2.16	\$	4.29	\$	2,46,417
2.015		Load and haul to disposal site, 0.5 mile haul	174,340	LCY	\$	1.48	\$	0.23	\$	3.19	\$	898,719
2.016		Roadway Excavation (Rock Cut)	46,900	CY					\$	35.66	\$	1,672,487
2.017		Roading operations	16,184	LCY	\$	4.54	\$	4.34	\$	13.70	\$	231,744
2.018		Rock-crushing operation	34,369	LCY	\$	2.59	\$	2.34	\$	5.82	\$	266,847
2.019		Load and haul to processing area, 0.2 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
2.020		Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-
2.021		Screening Operations (Post-crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-
2.022		Load and haul to stockpile location, 0.5 mile haul	56,180	LCY	\$	5.28	\$	0.34	\$	10.82	\$	1,171,896
2.023		Stripping Excavation for Embankment fill (Cut and Direct Haul)	478,000	CY					\$	9.73	\$	4,650,027
2.024		Roadway excavations	525,000	LCY	\$	2.10	\$	2.27	\$	4.27	\$	2,245,211
2.025		Load and haul to stockpile/fill location, 0.25 mile haul	525,000	LCY	\$	1.17	\$	0.23	\$	4.57	\$	2,404,716
2.026		Crushing operations	-	CY	\$	-	\$	-	\$	-	\$	-
2.027		Screening operations	-	CY	\$	-	\$	-	\$	-	\$	-
3		Road Fill and Layer Work										
3.001		Roadway Embankment (from on-site excavation sources)	478,000	CY					\$	6.53	\$	3,121,182
3.002		Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
3.003		Load and haul from excavation site to fill location, 0.25 mile haul	478,000	LCY								Included above
3.004		Spread and compact	478,000	LCY	\$	3.34	\$	2.19	\$	6.53	\$	3,121,182
3.005		Roadway Embankment (imported from other excavation sources)	-	CY								Not required
3.006		Load and haul from excavation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
3.007		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-
3.008		Class 4 Aggregate subbase	-	CY					\$	-	\$	-
3.009		Purchase processed material from quarry	-	TON	\$	-	\$	-	\$	-	\$	-
3.010		Haul material from quarry to site stockpile/fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
3.011		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
3.012		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-
3.013		Class 2 Aggregate base	22,200	CY					\$	61.08	\$	1,356,064
3.014		Purchase processed material from quarry	37,740	TON	\$	-	\$	29.33	\$	15.15	\$	371,727
3.015		Haul material from quarry to site stockpile/fill location, 0.5 mile haul	35,500	LCY	\$	32.43	\$	12.23	\$	21.65	\$	576,275
3.016		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-
3.017		Spread and compact	25,500	LCY	\$	4.15	\$	2.52	\$	6.07	\$	206,062
3.018		Asphalt concrete	-	TON	\$	-	\$	-	\$	-	\$	-
3.019		Tack Coat	-	TON	\$	-	\$	-	\$	-	\$	-
4		Other Roadwork										
4.001		Bridge Replacement	-	SF	\$	-	\$	-	\$	-	\$	-
4.002		Midwest Guardrail System	3,991	LF	\$	5.49	\$	2.44	\$	43.53	\$	51.46
4.003		Transition Railing (Type WB-31)	-	EA	\$	-	\$	-	\$	-	\$	-
4.004		End Anchor Assembly (Type SFT)	-	EA	\$	-	\$	-	\$	-	\$	-

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Sites Reservoir (Alt 1): North Access Road 69 and Saddle Dam Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAACEI Class 4
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27.03. Construction Cost Summary: North Access Road 69 and Saddle Dam Roads					
			Unit Cost Rate (\$/LF)	Total Cost	
			LF:	56,623	
Total Direct Cost				271.43	15,369,166
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				271.43	15,369,166
General Conditions					
Mobilization		5.0%	13.57		768,458
Site General Conditions & Requirements		10.0%	28.50		1,613,762
Phasing	Not included	0.0%	-		-
General Contractor Overhead and Fees					
Insurance		1.1%	3.45		195,265
Bonds		0.6%	1.90		107,680
GC Field and Home Office Overhead		5.0%	15.94		902,717
GC Profit		5.0%	16.74		947,852
Total Contractor Indirect Markups				80.10	4,535,734
TOTAL DIRECT COST BEFORE CONTINGENCIES				351.53	19,904,900
Contingencies					
Design Contingencies		10.0%	35.15		1,990,490
Construction Contingencies		15.0%	58.00		3,284,309
Bidding Contingencies / Alternative Procurement Strategy (APS)		0.0%	-		-
Total Contingency Allowance				93.15	5,274,799
TOTAL DIRECT COST BEFORE ESCALATION				444.69	25,179,699
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	4.34		245,888
Escalation to Mid-point of Construction	Not included	0%	-		-
ESTIMATED CONSTRUCTION COST				449.03	25,425,587

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Sites Reservoir (Alt 1): County, Delevan & Maxwell Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
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27.04. Construction Cost Summary: County, Delevan & Maxwell Roads				
		Unit Cost Rate (\$/LF)		Total Cost
		LF:	112,356	
Total Direct Cost			155.28	17,447,045
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			155.28	17,447,045
General Conditions				
Mobilization		5.0%	7.76	872,352
Site General Conditions & Requirements		10.0%	16.30	1,831,940
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	1.97	221,665
Bonds		0.6%	1.09	122,238
GC Field and Home Office Overhead		5.0%	9.12	1,024,762
GC Profit		5.0%	9.58	1,076,000
Total Contractor Indirect Markups			45.83	5,148,957
TOTAL DIRECT COST BEFORE CONTINGENCIES			201.11	22,596,002
Contingencies				
Design Contingencies		10.0%	20.11	2,259,600
Construction Contingencies		15.0%	33.18	3,728,340
Total Contingency Allowance			53.29	5,987,940
TOTAL DIRECT COST BEFORE ESCALATION			254.41	28,583,942
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	2.48	279,132
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			256.89	28,863,074

Item			Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comment							
County, Delevan & Maxwell Roads																		
		Road length (LF)	112,356	LF														
		Road length (Miles)	22	MILES														
		Road Area (SF)	3,145,968	SF														
		Road Area (SY)	349,552	SY														
		Road Area (Acre)	73	ACRE														
1	Clearing and Demolition Work																	
1.001	Demolition Work			-	SY						Included below							
1.002	Asphalt removal work			-	SY	\$	-	\$	-	\$	-							
1.003	Load and haul to disposal site, 3 mile haul			-	LCY	\$	-	\$	-	\$	-							
1.004	Clearing and Grubbing			38	ACRE	\$	1,155.70	\$	1,901.97	\$	-	\$	3,057.67	\$	116,191	Light vegetation clearing work		
Roads and Road Structures																		
2	Road Excavations																	
2.001	Temporary Silt Fence			18,310	LF						\$	4.51	\$	82,525				
2.002	Setup temporary silt fence			18,310	LF	\$	1.02	\$	0.28	\$	0.44	\$	3.14	\$	57,259			
2.003	Silt fence removal			18,310	LF	\$	0.78	\$	0.31	\$	-	\$	0.33	\$	1.36	\$	24,979	Include allowance for dump charges
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material			-	CY						\$	-	\$	-			Includes AB & AC material which needs to be crushed and screened for potential re-use, includes hauling to stockpile/direct fill location within 0.5 miles, assume 50% of total roadway excavations include for AB & AC excavations	
2.005	Roadway excavations including existing asphalt layer removal			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		Includes removal of asphalt top layer, include a 15% swell factor	
2.006	Load and haul to processing area, 0.5 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		Not required	
2.007	Crushing Operations			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		No crushing required	
2.008	Screening Operations (Post-crushing)			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		No screening required	
2.009	Load and haul to stockpile/fill location, 0.25 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		Haul to stockpile location, 0.25 mile hauling distance assumed	
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material			-	CY						\$	-	\$	-			Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 10% of total roadway stockpile cut in common earth excavations, no AB & AC material	
2.011	Roadway excavations, common earth			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		Common excavations include a 15% swell factor	
2.012	Load and haul to stockpile/fill location, 0.25 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		Haul to stockpile/fill location, 0.25 mile hauling distance assumed	
2.013	Roadway Excavation (Cut to Waste Disposal Area)			1,720	CY						\$	25.15	\$	43,252			Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 3 mile haul	
2.014	Roadway excavations			1,976	LCY	\$	3.20	\$	2.32	\$	-	\$	5.52	\$	10,974		Include a 15% swell factor	
2.015	Load and haul to disposal site, 3 mile haul			1,976	LCY	\$	4.05	\$	1.76	\$	-	\$	15.54	\$	30,341		Haul to disposal area, no permission for processing rubble material in dumping off-site, assumed 3 mile hauling distance	
2.016	Roadway Excavation (Rock Cut)			-	CY						\$	-	\$	-			Not required	
2.017	Blasting operations			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
2.018	Rock breaking operation			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
2.019	Load and haul to processing area, 3 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
2.020	Crushing Operations			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
2.021	Screening Operations (Post-crushing)			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
2.022	Load and haul to stockpile location, 3 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)			15,690	CY						\$	10.22	\$	160,346			Excavate common earth and direct haul to fill location	
2.024	Roadway excavations			17,159	LCY	\$	2.20	\$	2.38	\$	-	\$	4.69	\$	77,425		Include 10% swell factor	
2.025	Load and haul to stockpile/fill location, 0.25 mile haul			17,209	LCY	\$	3.48	\$	2.97	\$	-	\$	4.92	\$	82,921		Assumed 0.25 mile hauling distance	
2.026	Crushing operations			-	CY	\$	-	\$	-	\$	-	\$	-	\$	-		Not required	
2.027	Screening operations			-	CY	\$	-	\$	-	\$	-	\$	-	\$	-		Not required	
3	Road Fill and Layer Work																	
3.001	Roadway Embankment (from on-site excavation sources)			15,690	CY						\$	7.10	\$	111,359			From excavated suitable material, assume available on-site excavation	
3.002	Load at stockpile and haul to fill location, 0.25 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		No double handling and stockpiling required, all material to be hauled directly to fill location	
3.003	Load and haul from excavation site to fill location, 0.25 mile haul			15,690	LCY												assumed above	
3.004	Spread and compact			15,690	LCY	\$	3.78	\$	2.94	\$	-	\$	7.10	\$	111,359		Swell factor of 10% included, direct hauling work included elsewhere	
3.005	Roadway Embankment (imported from other excavation sources)			-	CY												Not required	
3.006	Load and haul from excavation site to fill location, 0.25 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
3.007	Spread and compact			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
3.008	Class 4 Aggregate subbase			-	CY						\$	-	\$	-			Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy	
3.009	Purchase processed material from quarry			-	TON	\$	-	\$	-	\$	-	\$	-	\$	-		Purchase from commercial quarry, 1.7ton/cy	
3.010	Haul material from quarry to site stockpile/fill location, 35 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		Haul to fill location, no stockpiling required	
3.011	Load at stockpile and haul to fill location, 0.5 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		No stockpiling needed	
3.012	Spread and compact			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
3.013	Class 2 Aggregate base			-	CY						\$	-	\$	-			Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy	
3.014	Purchase processed material from quarry			-	TON	\$	-	\$	-	\$	-	\$	-	\$	-		Purchase from commercial quarry, 1.7ton/cy	
3.015	Haul material from quarry to site stockpile/fill location, 35 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		Haul to fill location, no stockpiling needed	
3.016	Load at stockpile and haul to fill location, 0.5 mile haul			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		No stockpiling needed	
3.017	Spread and compact			-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
3.018	Asphalt concrete			39,330	TON	\$	8.55	\$	4.71	\$	102.88	\$	-	\$	116.15	\$	4,568,126	Assume HMA (Type A), 150lbs/cy
3.019	Tack Coat			58	TON	\$	921.76	\$	492.37	\$	2,500.59	\$	-	\$	3,884.73	\$	226,091	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
3.020	FDR-C			349,190	SCYD	\$	3.48	\$	2.60	\$	-	\$	-	\$	6.08	\$	2,123,975	Full Depth Reclamation
3.021	Cement			17,470	TON	\$	-	\$	-	\$	169.71	\$	-	\$	169.71	\$	2,994,849	
4	Other Roadwork																	

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Sites Reservoir (Alt 1): Access Roads A, B, C & Comm Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
March 1, 2021

27.05. Construction Cost Summary: Access Roads A, B, C & Comm Roads				
			Unit Cost Rate (\$/LF)	Total Cost
			LF:	26,766
Total Direct Cost			558.94	14,960,614
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			558.94	14,960,614
General Conditions				
Mobilization		5.0%	27.95	748,031
Site General Conditions & Requirements		10.0%	58.69	1,570,865
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	7.10	190,075
Bonds		0.6%	3.92	104,818
GC Field and Home Office Overhead		5.0%	32.83	878,720
GC Profit		5.0%	34.47	922,656
Total Contractor Indirect Markups			164.95	4,415,165
TOTAL DIRECT COST BEFORE CONTINGENCIES			723.90	19,375,779
Contingencies				
Design Contingencies		10.0%	72.39	1,937,578
Construction Contingencies		15.0%	119.44	3,197,004
Total Contingency Allowance			191.83	5,134,582
TOTAL DIRECT COST BEFORE ESCALATION			915.73	24,510,361
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	8.94	239,352
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			924.67	24,749,713

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comment				
	Access Roads A, B, C & Comm Roads													
	Road Length (LF)	26,766	LF											
	Road Length (Miles)	6	MILES											
	Road Area (SF)	401,490	SF											
	Road Area (SV)	44,610	SV											
	Road Area (Acre)	10	ACRE											
1	Clearing and Demolition Work													
1.001	Demolition Work	-	SV						Included below					
1.002	Asphalt removal work	-	SV	\$	-	\$	-	\$	-	\$				
1.003	Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$				
1.004	Clearing and Grubbing	24	ACRE	\$	1,219.91	\$	2,007.63	\$	3,227.54	\$	77,461	Light vegetation clearing work		
	Roads and Road Structures													
2	Road Excavations													
2.001	Temporary Silt Fence	4,800	LF					\$	6.05	\$	29,049			
2.002	Setup temporary silt fence	4,800	LF	\$	3.00	\$	0.51	\$	3.25	\$	15,611			
2.003	Silt fence removal	4,800	LF	\$	1.12	\$	0.40	\$	2.52	\$	12,435	Include allowance for dump charges		
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					\$	-	\$	-	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations		
2.005	Roadway excavations including existing asphalt layer removal	-	LCY	\$	-	\$	-	\$	-	\$	-			
2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-			
2.007	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-			
2.008	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-			
2.009	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-			
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	344,800	CY					\$	10.15	\$	3,500,883	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material		
2.011	Roadway excavations, common earth	344,800	LCY	\$	3.08	\$	2.17	\$	4.26	\$	1,600,416	Common excavations include a 15% swell factor		
2.012	Load and haul to stockpile/fill location, 0.25 mile haul	344,800	LCY	\$	1.22	\$	2.23	\$	4.57	\$	1,810,447	Haul to stockpile/fill location, 0.25 mile hauling distance assumed		
2.013	Roadway Excavation (Cut to Waste Disposal Area)	63,500	CY					\$	11.11	\$	705,671	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul		
2.014	Roadway excavations	73,025	LCY	\$	2.12	\$	2.25	\$	4.42	\$	327,072	Include a 15% swell factor		
2.015	Load and haul to disposal area, 0.5 mile haul	73,025	LCY	\$	1.54	\$	2.71	\$	5.25	\$	385,065	Haul to disposal area, no permission for processing rubble material in dumping off-site; assumed 0.5 mile hauling distance		
2.016	Roadway Excavation (Rock Cut)	9,300	CY					\$	18.71	\$	174,019	Excavated material to be stockpiled for re-use, average 0.5 mile haul		
2.017	Blasting operations	3,348	LCY	\$	4.58	\$	3.84	\$	13.90	\$	46,215	Assume 30% of volume will require blasting, assume rock blasting productivity rate of 100 cy/hr		
2.018	Rock breaking operation	2,512	LCY	\$	3.01	\$	2.83	\$	9.80	\$	53,759	Assume 70% of volume will be excavated with ripper		
2.019	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	No crushing and screening required		
2.020	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-	No crushing required		
2.021	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-	No screening required		
2.022	Load and haul to stockpile location, 0.5 mile haul	11,190	LCY	\$	3.90	\$	4.68	\$	6.60	\$	76,040	Haul to stockpile location, 0.5 mile hauling distance assumed		
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	226,300	CY					\$	9.80	\$	2,218,116	Excavate common earth and direct haul to fill location		
2.024	Roadway excavations	245,630	LCY	\$	2.11	\$	2.19	\$	4.30	\$	1,071,030	Include 10% swell factor		
2.025	Load and haul to stockpile/fill location, 0.25 mile haul	245,630	LCY	\$	1.26	\$	2.13	\$	4.61	\$	1,147,177	Assumed 0.25 mile hauling distance		
2.026	Crushing operations	-	CY	\$	-	\$	-	\$	-	\$	-	Not required	No crushing work required	
2.027	Screening operations	-	CY	\$	-	\$	-	\$	-	\$	-	Not required	No crushing work required	
3	Road Fill and Layer Work													
3.001	Roadway Embankment (from on-site excavation sources)	226,300	CY					\$	6.89	\$	1,559,021	From excavated suitable material, assume available on-site excavation		
3.002	Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	No crushing handling and stockpiling required; all material to be loaded directly to fill location		
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	216,300	LCY					Included above				Swell factor of 10% including direct hauling work included elsewhere		
3.004	Spread and compact	226,300	LCY	\$	3.65	\$	3.34	\$	6.99	\$	1,585,123	Swell factor of 10% included		
3.005	Roadway Embankment (imported from other excavation sources)	-	CY					Not required				Backfill material to be sourced from road excavations cut		
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-			
3.007	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-			
3.008	Class 4 Aggregate subbase	2,900	CY					\$	68.46	\$	198,528	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton/cy		
3.009	Purchase processed material from quarry	4,380	TON	\$	-	\$	-	\$	15.13	\$	66,035	Purchase from commercial quarry, 1.7 ton/cy		
3.010	Haul material from quarry to site stockpile/fill location, 30 mile haul	3,335	LCY	\$	12.60	\$	34.72	\$	27.30	\$	91,207	Haul to fill location, no stockpiling needed		
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	No stockpiling needed		
3.012	Spread and compact	3,335	LCY	\$	3.02	\$	4.24	\$	9.76	\$	32,536			
3.013	Class 2 Aggregate base	20,900	CY					\$	61.31	\$	1,281,303	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton/cy		
3.014	Purchase processed material from quarry	35,530	TON	\$	-	\$	-	\$	15.13	\$	538,248	Purchase from commercial quarry, 1.7 ton/cy		
3.015	Haul material from quarry to site stockpile/fill location, 25 mile haul	24,025	LCY	\$	10.65	\$	22.30	\$	22.78	\$	547,835	Haul to fill location, no stockpiling needed		
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	No stockpiling needed		
3.017	Spread and compact	24,025	LCY	\$	4.18	\$	3.94	\$	8.12	\$	196,216			
3.018	Asphalt concrete	3,500	TON	\$	9.88	\$	5.43	\$	102.88	\$	460,871	Not required		
3.019	Tack Coat	3	TON	\$	2,270.76	\$	1,139.04	\$	6,191.07	\$	9,600.86	\$	28,803	Not required
4	Other Roadwork													
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	\$	-	-	Not required	
4.002	Midwest Guardrail System	2,677	LF	\$	5.67	\$	2.52	\$	43.54	\$	51.73	\$	138,456	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'

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Sites Reservoir (Alt 1): Peninsula Hills Recreation Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
March 1, 2021

27.05. Construction Cost Summary: Peninsula Hills Recreation Roads					
				Unit Cost Rate (\$/LF)	Total Cost
				LF:	10,841
Total Direct Cost				447.65	4,852,962
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				447.65	4,852,962
General Conditions					
Mobilization			5.0%	22.38	242,648
Site General Conditions & Requirements			10.0%	47.00	509,561
Phasing		Not included	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	5.69	61,657
Bonds			0.6%	3.14	34,001
GC Field and Home Office Overhead			5.0%	26.29	285,041
GC Profit			5.0%	27.61	299,294
Total Contractor Indirect Markups				132.11	1,432,202
TOTAL DIRECT COST BEFORE CONTINGENCIES				579.76	6,285,164
Contingencies					
Design Contingencies			10.0%	57.98	628,516
Construction Contingencies			15.0%	95.66	1,037,052
Total Contingency Allowance				153.64	1,665,568
TOTAL DIRECT COST BEFORE ESCALATION				733.39	7,950,732
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	7.16	77,642
Escalation to Mid-point of Construction		Not included	0%	-	-
ESTIMATED CONSTRUCTION COST				740.55	8,028,374

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Item	Description	Quantity	Unit	Low Bid	Est. Price	Material Price	Subcontractor Price	Low Bid	Price	Comment
4.002	Midwest Guardrail System	1,084	LF	\$ 6.22	\$ 2.76	\$ 43.53	\$ -	\$ 52.52	\$ 56,934	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
4.003	Transition Railine (Type WB-31)	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.004	End Anchor Assembly (Type SFT)	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	402	LF					\$ 118.02	\$ 47,387	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
4.006	Culvert open excavations	299	LCY	\$ 6.28	\$ 6.57	\$ -	\$ -	\$ 13.52	\$ 3,985	
4.007	Load and haul material to disposal site, 3 mile haul	299	LCY	\$ 8.92	\$ 14.29	\$ -	\$ -	\$ 21.76	\$ 6,517	
4.008	24" Dia pipe, galvanized corrugated metal	402	LF	\$ 40.67	\$ 7.88	\$ 32.58	\$ -	\$ 40.59	\$ 32,476	
4.009	Load and haul to fill location, 0.5 mile haul	299	LCY	\$ 2.84	\$ 2.62	\$ -	\$ -	\$ 13.44	\$ 3,124	
4.010	Spill and haul	29	LCY	\$ -	\$ -	\$ -	\$ -	\$ 49.45	\$ 1,787	
4.011	Box culvert single cell	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.012	Paint Traffic Stripe - 6" Yellow	21,682	LF	\$ 0.26	\$ 0.15	\$ 0.70	\$ -	\$ 1.11	\$ 24,117	Includes 2 yellow stripes
4.013	Paint Traffic Stripe - 6" White	21,682	LF	\$ 0.26	\$ 0.15	\$ 0.70	\$ -	\$ 1.11	\$ 24,117	Assume 2 edge of traveled way stripes
4.014	Roadside Signs	11	EA	\$ 389.37	\$ 166.27	\$ 562.46	\$ -	\$ 1,118.09	\$ 12,299	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
4.015	Permanent Erosion Control (Hydroseed)	33,110	SF	\$ 0.08	\$ 0.03	\$ 0.07	\$ -	\$ 0.19	\$ 6,170	Includes seed mix, wood fiber
4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	5.87	CY	\$ -	\$ -	\$ 210.81	\$ -	\$ 210.81	\$ 1,237	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
4.017	Temporary Inlet/Outlet Protection	9	EA	\$ 171.53	\$ 66.69	\$ 71.96	\$ -	\$ 310.17	\$ 2,730	Includes install and removal, sandbag barriers, fiber rolls and stakes
4.018	Rock Anchor Assembly		LF							Not required
4.019	Erosion Control (Blanket) / Fiber roll	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Install slope protection matting, includes steel staples and blanket fabric
4.020	Retaining walls (Allowance)	-	SF					\$ -	\$ -	Not required
4.021	Setback and retaining framework	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.022	Concrete fill work	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.023	Provide/Install Reinforcing	-	TON	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024	Rock Slope Protection using rip rap	-	CY					\$ -	\$ -	Not required
4.025	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.026	Load and haul to processing area, 3 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.027	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.028	Load and haul to fill location, 3 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.029	Rip rap placement	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.030	RSP backing	-	CY					\$ -	\$ -	Not required
4.031	Load and haul material from stockpile to fill location, 2 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.032	Spread and compact	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.033	RSP Fabric backing material	-	SY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.034	Road pile work									Not required
5	Maintenance Work									
5.001	Public Road Maintenance Work (Roads identified within project boundary)	3	MILE	\$ -	\$ -	\$ -	\$ 50,000.00	\$ 50,000.00	\$ 150,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow \$50,000/mile for road patching and repair
6	Temporary Work									
6.001	General traffic management		MO	\$ -	\$ -	\$ -	\$ -			Elsewhere
6.002	Temporary road surfaces including removal work									Not required
6.003	Temporary Traffic Handling Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions. Bidirectional sand-filled module Temporary K-rolling pinned to pavement Temporary traffic stripe	-	DAYS	\$ -	\$ -	\$ -	\$ -			Not required
7	Highway and Other Road Connection Work									
7.001	Highway and other road connections			\$ -	\$ -	\$ -	\$ -			Not required
8	Misc Allowance									
8.001	Misc allowance for small items, allow 1.5%	1.5%	%				\$ 4,781,243	\$ 4,781,243	\$ 71,719	
Total Direct Cost				1,441	LF	\$ 1.26	\$ 175.81	\$ 117.14	\$ 3,110	\$ 487,465

Sites Reservoir (Alt 1): Sites Lodoga Road Realignment Bridges
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAACEI Class 4
April 16, 2021

27.07. Construction Cost Summary: Sites Lodoga Road Realignment Bridges					
				Unit Cost Rate (\$/SF)	Total Cost
				SF:	107,672
Total Direct Cost				806.32	86,817,610
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				806.32	86,817,610
General Conditions					
Mobilization		5.0%	40.32	4,340,880	
Site General Conditions & Requirements		10.0%	84.66	9,115,849	
Phasing		Not included	0.0%	-	
General Contractor Overhead and Fees					
Insurance		1.1%	10.24	1,103,018	
Bonds		0.6%	5.65	608,264	
GC Field & Home Office Overhead		5.0%	47.36	5,099,281	
GC Profit		5.0%	49.73	5,354,245	
Total Contractor Indirect Markups				237.96	25,621,537
TOTAL DIRECT COST BEFORE CONTINGENCIES				1,044.27	112,439,147
Contingencies					
Design Contingencies		15.0%	156.64	16,865,872	
Construction Contingencies		15.0%	180.14	19,395,753	
Total Contingency Allowance				336.78	36,261,625
TOTAL DIRECT COST BEFORE ESCALATION				1,381.05	148,700,772
Escalation to Report Date		3/31/2021 @ 3.00% p.a.	0.977%	13.49	1,452,113
Escalation to Mid-point of Construction		Not included	0%	-	-
ESTIMATED CONSTRUCTION COST				1,394.54	150,152,885

Item	Sub-Item	Description	Quantity	Unit	Low Bid	High Bid	Est. Price	Material Price	Subcontractor Price	L&P Price	Price	Comments					
		Sites Lodoga Road Realignment Bridges															
		Bridge length (LF)	3,033.00	LF								Bridge 1: 1400', Bridge 2: 1633'					
		Bridge width (LF)	35.50	LF													
		Bridge Area (SF)	107,671.50	SF													
1		Clearing and Demolition Work															
1.001		Demolition Work	-	SY								Assume no demolition work required					
1.002		Clearing and Grubbing	-	ACRE	\$	-	\$	-	\$	-	\$	-	Not required. Included elsewhere				
2		Temporary Access Road Development															
2.001		Develop Access Road to Abutments	3,033.00	LF						\$	195.31	\$	592,389	Cut-fill balance on hillside - Assumed 10 ft average cut/fill depth for earthwork; AB surfacing Assumed 12" thick aggregate surfacing; Assume average road width of 25'; Assume 1 x the bridge total bridge length			
2.002		Clear and grub	2.00	ACRE	\$	2,894.64	\$	5,832.52	\$	-	\$	7,697.55	\$	15,395	Clear, grub, provide gravel fill layer and compact		
2.003		Road excavation (earth trench cutting allowance)	30,861.67	LCY	\$	3.72	\$	3.93	\$	-	\$	4.63	\$	142,845	Assume average cut of say 10', average width of 25'; include 10% swell factor; assume common earth		
2.004		Load and haul to fill location, 0.5 mile haul	30,861.67	LCY	\$	0.53	\$	1.80	\$	-	\$	2.33	\$	70,980	Assume 0.5 mile haul, no stockpiling needed, direct haul		
2.005		Place and compact using excavated material (earth filling allowance)	30,861.67	LCY	\$	3.60	\$	2.90	\$	-	\$	4.40	\$	135,050	Assume average fill of say 10', average width of 25'; include 10% swell factor		
2.006		Purchase processed material from quarry	5,252.00	TON	\$	-	\$	-	\$	22.20	\$	22.20	\$	116,576	11" thick aggregate base layer; assume average width of 25' assume 1.7 ton/CY; purchase material from commercial source		
2.007		Haul material from quarry to subgrade/fill location, 3.0 mile haul	7,369.00	LCY	\$	12.39	\$	94.15	\$	-	\$	23.34	\$	89,244	11" thick aggregate base layer; assume average width of 25' assume 1.7 ton/CY; purchase material from commercial source		
2.008		Place and compact road base	2,099.00	LCY	\$	2.58	\$	2.12	\$	-	\$	5.13	\$	15,114	1.5 mile haul distance assumed		
2.009		Remove loose excess road	1.00	LCY						-	\$	-	\$	-	Not required		
3		Foundation Excavations															
3.001		Surveying allowance, survey access, pier, and abutment locations	150.00	DAYS	\$	3,054.53	\$	740.34	\$	-	\$	3,794.87	\$	569,230	150 day surveying allowance		
3.002		Structure Excavation	24,360.00	CY							\$	10.39	\$	252,993	Excavations for pier caps		
3.003		Bridge foundation excavations in soft rock / common soil	36,757.30	LCY	\$	1.53	\$	2.29	\$	-	\$	4.30	\$	158,006	Assume 70% of excavations in common earth		
3.004		Bridge foundation excavations in hard rock	6,036.00	LCY	\$	2.43	\$	2.70	\$	-	\$	5.20	\$	45,804	Assume 30% in weathered rock; provision for blasting and dewatering		
3.005		Load and haul to disposal site, 1 mile haul	36,796.00	LCY	\$	2.12	\$	3.46	\$	-	\$	4.57	\$	172,533	Assume 1 mile haul		
3.006		Footings Foundation Cleanup	107,671.50	SF							\$	1.30	\$	140,100	Assume bridge footprint for cleaning work		
3.007		Foundation cleaning	11,662.30	SY	\$	7.69	\$	2.93	\$	-	\$	10.71	\$	125,090			
3.008		Load and haul to disposal site, 1 mile haul	2,193.31	CY	\$	1.43	\$	4.03	\$	-	\$	5.46	\$	17,010	Assume removal of top layer, 0.5' thick		
4		Foundation Piling															
4.001		48" Cast-In-Drilled-Hole Concrete Piling	23,760.00	LF							\$	658.66	\$	15,649,880	CIH piles, assume average 60' deep, 35' to rock, 5' rock socketline		
4.002		Drilling rig and support crane mobilization/demobilization allowance	2.00	EA	\$	27,063.54	\$	35,631.64	\$	-	\$	47,614.17	\$	95,268	Mobilize piling rig, support crane, piling material and related equipment for operation		
4.003		CIH, 48" Dia. Calcrete CIH Piling	23,760.00	LF	\$	138.27	\$	50.15	\$	-	\$	194.42	\$	4,714,251	Assume 60' deep pile, 35g piles; Assume 40% soft to medium rock and 60% hard rock; include temporary steel casing to be used, permanent casing not required		
4.004		Remove/replace soil													Included above		
4.005		Load and haul to disposal site, 1 mile haul	12,364.25	LCY	\$	1.13	\$	3.73	\$	-	\$	4.86	\$	56,254			
4.006		Place Concrete Fill, 48" Dia. Calcrete CIH Piling	11,391.76	CY	\$	54.79	\$	44.90	\$	328.29	\$	-	\$	597,59	\$	4,725,121	Include rock socket, temporary steel casing to be used for 30% of the total pile length, permanent casing not required
4.007		Provide/Install Reinforcing for CIH Piles	1,405	TON	\$	55.058	\$	11.22	\$	2,377.62	\$	-	\$	3,536.71	\$	5,704,814	Allow 250 lb/cy reinforcement, include epoxy grouting
4.008		CIH Observation Tubes	2,376.00	EA	\$	-	\$	-	\$	-	\$	146.50	\$	346,512	\$	350,112	Allow 6 per pile
4.009		24" Cast-In-Drilled-Hole Concrete Piling	2,880.00	LF							\$	245.33	\$	706,552			CIH piles, assume average 60' deep, 35' to rock, 5' rock socketline
4.010		Drilling rig and support crane mobilization/demobilization allowance	-	EA	\$	-	\$	-	\$	-	\$	-	\$	-			Included above
4.011		CIH, 24" Dia. Calcrete CIH Piling	2,880.00	LF	\$	65.42	\$	36.88	\$	-	\$	112.30	\$	325,076			Assume 60' deep piles, 45 piles; Assume 40% common earth and 60% rock; include temporary steel casing to be used, permanent casing not required
4.012		Remove/replace soil															Included above
4.013		Load and haul to disposal site, 1 mile haul	368.51	LCY	\$	4.21	\$	21.98	\$	-	\$	15.29	\$	5,638			
4.014		Place Concrete Fill, 24" Dia. Calcrete CIH Piling	260.05	CY	\$	46.60	\$	18.83	\$	229.32	\$	-	\$	442.56	\$	126,346	Include rock socket, temporary steel casing to be used for 30% of the total pile length, permanent casing not required
4.015		Provide/Install Reinforcing for CIH Piles	26.01	TON	\$	220.18	\$	12.72	\$	2,137.82	\$	-	\$	3,572.51	\$	143,007	Allow 200 lb/cy reinforcement, include epoxy grouting
4.016		CIH Observation Tubes	288.00	EA	\$	-	\$	-	\$	-	\$	146.50	\$	42,096			Allow 6 per pile
4.017		Pile testing allowance	1.5%	%						\$	16,356,432	\$	16,356,432	\$	245,346	Pile testing allowance	
4.018		Inspection/observation tubes needed	1.00	LS													Included above
4.019		Pile caps	-	CY													Included below
5		Bridge Foundation Footings															
5.001		Structural Concrete, Bridge Footing	19,040.00	CY							\$	642.46	\$	12,232,352			Assume 1750CY per footing, include setting/removing formwork, 2,800 sf per footing; 250 lb/cy reinforcement
5.002		Footings excavations	-	LCY													Included above
5.003		Load and haul to disposal site, 1 mile haul		LCY													Included above
5.004		Setup and remaining formwork	31,122.00	SF	\$	12.47	\$	7.12	\$	94	\$	-	\$	18,74	\$	583,265	Steel framed around
5.005		Concrete pile work	59,680.00	CY	\$	32.58	\$	2.83	\$	326.62	\$	-	\$	266.09	\$	5,125,257	Concrete to be placed by 28M concrete pump truck
5.006		Provide/Install Reinforcing	2,180	TON	\$	512.62	\$	29.28	\$	1,493.42	\$	-	\$	2,742.31	\$	6,526,095	Allow 250 lb/cy reinforcement, include epoxy grouting
6		Bridge Structure															
6.001		Concrete pier / column	-	LF													Included below
6.002		Placement of precast concrete rings	-	LF													Cast in place columns, included elsewhere
6.003		Fill concrete shaft with concrete	-	CY													
6.004		Provide/Install Reinforcing	-	LF													
6.005		Pier cap at top	-	CY													Included below
																	Included elsewhere

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Sites Reservoir (Alt 1): Sites Lodoga Road Temporary Detour
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAEII Class 4
March 1, 2021

27.08. Construction Cost Summary: Sites Lodoga Road Temporary Detour				
			Unit Cost Rate (\$/LF)	Total Cost
			LF:	6,500
Total Direct Cost			1,773.10	11,525,131
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			1,773.10	11,525,131
General Conditions				
Mobilization		5.0%	88.65	576,257
Site General Conditions & Requirements		10.0%	186.18	1,210,139
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	22.53	146,427
Bonds		0.6%	12.42	80,748
GC Field and Home Office Overhead		5.0%	104.14	676,935
GC Profit		5.0%	109.35	710,782
Total Contractor Indirect Markups			523.28	3,401,288
TOTAL DIRECT COST BEFORE CONTINGENCIES			2,296.37	14,926,419
Contingencies				
Design Contingencies		10.0%	229.64	1,492,642
Construction Contingencies		15.0%	378.90	2,462,859
Total Contingency Allowance			608.54	3,955,501
TOTAL DIRECT COST BEFORE ESCALATION			2,904.91	18,881,920
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	28.37	184,388
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			2,933.28	19,066,308

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comment
Sites Lodoga Road Temporary Detour										
	Road Length (LF)	6,500	LF							
	Road Length (Miles)	2	MILES							
	Road Area (SF)	156,000	SF							
	Road Area (SV)	17,333	SV							
	Road Area (Acre)	4	ACRE							
1	Clearing and Demolition Work									
1.001	Demolition Work	-	SV						Included below	
1.002	Asphalt removal work	-	SV							
1.003	Load and haul to disposal site, 0.5 mile haul	-	LCY							
1.004	Clearing and Grubbing	11	ACRE	\$	1,330.81	\$	2,190.14	\$	3,520.95	Light vegetation clearing work
Roads and Road Structures										
2	Road Excavations									
2.001	Temporary Silt Fence	800	LF						\$ 18.05	\$ 14,443
2.002	Setup temporary silt fence	800	LF	\$	3.08	\$	2.63	\$	5.05	\$ 4,808
2.003	Silt fence removal	800	LF	\$	3.17	\$	1.48	\$	17.99	\$ 6,594
										Include allowances for dump charges
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CV						\$ -	\$ -
										Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
2.005	Roadway excavation including existing asphalt layer removal	-	LCY	\$	-	\$	-	\$	-	-
2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.007	Crushing operations	-	LCY	\$	-	\$	-	\$	-	-
2.008	Screening operations (Rock crushing)	-	LCY	\$	-	\$	-	\$	-	-
2.009	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	499,600	CV						\$ 10.16	\$ 5,077,616
										Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
2.011	Roadway excavations, location earth	574,340	LCY	\$	2.59	\$	3.12	\$	4.27	\$ 2,451,777
										Common excavations, include a 10% swell factor
2.012	Load and haul to stockpile/fill location, 0.25 mile haul	574,340	LCY	\$	3.37	\$	3.20	\$	4.57	\$ 2,625,819
										Haul to stockpile/fill location, 0.25 mile hauling distance assumed
2.013	Roadway Excavation (Cut to Waste Disposal Area)	69,000	CV						\$ 11.05	\$ 762,124
										Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
2.014	Roadway excavations	79,370	LCY	\$	2.13	\$	2.34	\$	4.39	\$ 345,470
										Include a 10% swell factor
2.015	Load and haul to disposal site, 0.5 mile haul	79,370	LCY	\$	1.53	\$	2.60	\$	5.21	\$ 413,214
										Haul to disposal area, no provision for processing rubble material or dumping off-site, assumed 0.5 mile hauling distance
2.016	Roadway Excavation (Rock Cut)	26,900	CV						\$ 21.11	\$ 567,753
										Excavate material to be stockpiled for re-use, average 1.5 mile haul
2.017	Blasting operations	9,584	LCY	\$	4.75	\$	4.54	\$	14.11	\$ 136,282
										Assume 20% of volume will require blasting, assume rock blasting productivity rate of 1000 cu/y/hr
2.018	Rock crushing operation	20,396	LCY	\$	3.82	\$	4.02	\$	7.84	\$ 160,308
										Assume 70% of volume will be excavated with crusher
2.019	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
										No crushing and screening required
2.020	Crushing operations	-	LCY	\$	-	\$	-	\$	-	-
										No crushing required
2.021	Screening operations (Rock crushing)	-	LCY	\$	-	\$	-	\$	-	-
										No screening required
2.022	Load and haul to stockpile location, 1.5 mile haul	31,180	LCY	\$	2.39	\$	6.32	\$	8.29	\$ 266,968
										Haul to stockpile location, 1.5 mile hauling distance assumed
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	121,200	CV						\$ 9.92	\$ 1,202,593
										Excavate common earth and direct haul to fill location
2.024	Roadway excavations	123,320	LCY	\$	2.34	\$	2.12	\$	4.26	\$ 520,252
										Include 10% swell factor
2.025	Load and haul to fill location, 0.25 mile haul	123,320	LCY	\$	3.40	\$	3.27	\$	4.66	\$ 601,909
										Assumed 0.25 mile hauling distance
2.026	Crushing operations	-	CV	\$	-	\$	-	\$	-	-
										Not required
2.027	Screening operations	-	CV	\$	-	\$	-	\$	-	-
										Not required
3	Road Fill and Layer Work									
3.001	Roadway Embankment (from on-site excavation sources)	121,200	CV						\$ 6.89	\$ 835,190
										From excavated suitable material, assume available on-site excavation
3.002	Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
										No double handling and rescheduling required, all material to be loaded directly to fill location
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	121,200	LCY						Included above	Swell factor of 10% included, direct hauling work included elsewhere
3.004	Spread and compact	121,200	LCY	\$	3.65	\$	3.24	\$	4.95	\$ 601,580
										Swell factor of 10% included
3.005	Roadway Embankment (imported from other excavation sources)	-	CV						Not required	Backfill material to be sourced from road excavations cut
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.007	Spread and compact	-	LCY	\$	-	\$	-	\$	-	-
3.008	Class 4 Aggregate subbase	3,850	CV						\$ 68.64	\$ 264,274
										Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cv
3.009	Purchase processed material from quarry	6,545	TON	\$	-	\$	40.25	\$	55.15	\$ 361,151
										Purchase from commercial quarry, 1.7 ton/cv
3.010	Haul material from quarry to site stockpile/fill location, 35 mile haul	4,428	LCY	\$	12.65	\$	16.84	\$	27.52	\$ 121,742
										Haul to fill location, no stockpiling needed
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
										No stockpiling needed
3.012	Spread and compact	4,428	LCY	\$	5.04	\$	4.76	\$	9.82	\$ 43,553
3.013	Class 2 Aggregate base	3,850	CV						\$ 68.64	\$ 264,274
										Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cv
3.014	Purchase processed material from quarry	6,545	TON	\$	-	\$	10.15	\$	15.15	\$ 98,151
										Purchase from commercial quarry, 1.7 ton/cv
3.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	4,428	LCY	\$	12.65	\$	16.84	\$	27.52	\$ 121,742
										Haul to fill location, no stockpiling needed
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
										No stockpiling needed
3.017	Spread and compact	4,428	LCY	\$	5.04	\$	4.76	\$	9.82	\$ 43,553
3.018	Asphalt concrete	5,200	TON	\$	3.24	\$	5.09	\$	117.22	\$ 609,525
										Assume HMA (Type A), 150lbs/cv
3.019	Tack Coat	4	TON	\$	873.37	\$	438.09	\$	3,161.90	\$ 12,331
										Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 mil/ton
4	Other Roadwork									
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	-
										Not required

Item	Description	Quantity	Unit	Low Bid	Est. Price	Material Price	Subcontractor Price	Low Bid	Price	Comment
4.002	Midwest Guardrail System	650	LF	\$ 7.78	\$ 3.46	\$ 43.56	\$ -	\$ 54.80	\$ 35,621	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
4.003	Transition Railing (Type WB-31)	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.004	End Anchor Assembly (Type SFT)	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	760	LF					\$ 115.32	\$ 87,645	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
4.006	Culvert open excavations	598	LCY	\$ 7.54	\$ 6.94	\$ -	\$ -	\$ 14.08	\$ 7,995	
4.007	Load and haul material to disposal site, 2 mile haul	596	LCY	\$ 7.22	\$ 12.63	\$ -	\$ -	\$ 21.96	\$ 13,094	
4.008	24" Dia pipe, galvanized corrugated metal	760	LF	\$ 82.99	\$ 7.14	\$ 32.12	\$ -	\$ 76.27	\$ 57,962	
4.006	Load and haul to disposal site, 2 mile haul	596	LCY	\$ 8.00	\$ 8.00	\$ -	\$ -	\$ 11.03	\$ 6,248	
4.010	Load and haul to disposal site, 2 mile haul	89	LCY	\$ -	\$ -	\$ -	\$ -	\$ 49.43	\$ 2,426	
4.011	Box culvert single cell	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.012	Paint Traffic Stripe - 6" Yellow	13,000	LF	\$ 0.29	\$ 0.17	\$ 0.70	\$ -	\$ 1.16	\$ 15,059	Includes 2 yellow stripes
4.013	Paint Traffic Stripe - 6" White	13,000	LF	\$ 0.29	\$ 0.17	\$ 0.70	\$ -	\$ 1.16	\$ 15,059	Assume 2 edge of traveled way stripes
4.014	Roadside Signs	7	EA	\$ 611.86	\$ 261.28	\$ 562.46	\$ -	\$ 1,435.60	\$ 10,049	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
4.015	Permanent Erosion Control (Hydroseed)	71,800	SF	\$ 0.08	\$ 0.03	\$ 0.07	\$ -	\$ 0.18	\$ 12,731	Includes seed mix, wood fiber
4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	8.67	CY	\$ -	\$ -	\$ 210.81	\$ -	\$ 210.81	\$ 1,827	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
4.017	Temporary Inlet/Outlet Protection	27	EA	\$ 55.91	\$ 21.74	\$ 71.96	\$ -	\$ 149.60	\$ 4,039	Includes install and removal, sandbag barriers, fiber rolls and stakes
4.018	Rock Anchor Assembly		LF							Not required
4.019	Erosion Control (Blanket) / Fiber roll	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.020	Retaining walls (Allowance)	19,500	SF					\$ 73.02	\$ 1,423,923	
4.021	Retaining wall construction	19,500	SF	\$ 9.58	\$ 0.18	\$ 7.29	\$ -	\$ 12.05	\$ 892,920	
4.022	Concrete fill work	1,434	CY	\$ 31.89	\$ 7.97	\$ 254.30	\$ -	\$ 293.74	\$ 282,933	
4.023	Provision for future financing	644	TUV	\$ 2,103.48	\$ 61.57	\$ 2,002.31	\$ -	\$ 3,667.27	\$ 575,050	
4.024	Rock Slope Protection using rip rap	-	CY					\$ -	\$ -	Not required
4.025	Placement operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.026	Load and haul to processing area, 2 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.027	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.028	Load and haul to fill location, 2 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.029	Rip rap placement	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.030	RSP backing	-	CY					\$ -	\$ -	Not required
4.031	Load and haul material from stockpile to fill location, 2 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.032	Form and concrete	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.033	RSP Fabric backing material	-	SY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.034	Road piling work									Not required
5	Maintenance Work									
5.001	Public Road Maintenance Work (Roads identified within project boundary)	2	MILE	\$ -	\$ -	\$ -	\$ 50,000.00	\$ 50,000.00	\$ 100,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow \$50,000/mile for road patching and repair
6	Temporary Work									
6.001	General traffic management		MO	\$ -	\$ -	\$ -	\$ -			Elsewhere Included within general conditions and requirements
6.002	Temporary road surfaces including removal work									Not required
6.003	Temporary Traffic Handling Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions. Bidirectional sand-filled module Temporary K-railing pinned to pavement Temporary traffic striping	-	DAYS	\$ -	\$ -	\$ -	\$ -			Not required
7	Highway and Other Road Connection Work									
7.001	Highway and other road connections			\$ -	\$ -	\$ -	\$ -			Not required
8	Misc Allowance									
8.001	Misc allowance for small items, allow 1.5%	1.5%	%				\$ 11,954.809	\$ 11,954.809	\$ 170,322	
Total Direct Cost				\$ 94.97	\$ 81.40	\$ 254.06	\$ 42.46	\$ 1,773.10	\$ 11,976,131	

VE Alternative 1

1. Construction Cost Summary: Produce embankment materials from on-site materials					Total Cost
Total Direct Cost Effect					(9,661,076)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS					(9,661,076)
General Conditions					
Mobilization		5.0%			(483,054)
Site General Conditions & Requirements		10.0%			(1,014,413)
Phasing	Not included	0.0%			-
General Contractor Overhead and Fees					
Insurance		1.1%			(122,744)
Bonds		0.6%			(67,688)
GC Home Office Overhead		6.0%			(680,938)
GC Profit		8.0%			(962,393)
Total Contractor Indirect Markups					(3,331,230)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES					(12,992,306)
Contingencies					
Design Contingencies		10.0%			(1,299,231)
Construction Contingencies		15.0%			(2,143,731)
Total Contingency Allowance					(3,442,962)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION					(16,435,268)
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%		(160,496)
Escalation to Mid-point of Construction		Not included	0%		-
ESTIMATED CONSTRUCTION COST SAVING					(16,595,764)

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Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAE Class 4
April 16, 2021

2. Construction Cost Summary: Use single tunnel				
				Total Cost
Total Direct Cost Effect				(24,378,541)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(24,378,541)
General Conditions				
Mobilization		5.0%		(1,218,927)
Site General Conditions & Requirements		10.0%		(2,559,747)
Phasing	Not included	0.0%		-
General Contractor Overhead and Fees				
Insurance		1.1%		(309,729)
Bonds		0.6%		(170,802)
GC Home Office Overhead		6.0%		(1,718,265)
GC Profit		8.0%		(2,428,481)
Total Contractor Indirect Markups				(8,405,951)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				(32,784,492)
Contingencies				
Design Contingencies		10.0%		(3,278,449)
Construction Contingencies		15.0%		(5,409,441)
Total Contingency Allowance				(8,687,890)
TOTAL DIRECT COST BEFORE ESCALATION				(41,472,382)
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(404,992)
Escalation to Mid-point of Construction		Not included	0%	-
ESTIMATED CONSTRUCTION COST SAVING				(41,877,374)

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SITES RESERVOIR (ALT 1) INLET/OUTLET & DIVERSION WORKS										
Item	Sub Item	Description	Quantity	Unit	Unit Price	Excavation Price	Transportation Price	Placement Price	Other Price	Total Price
11.012		Pour inlet and valve structures	-	CY	\$	\$	\$	\$	\$	\$
11.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	\$	\$	\$	\$	\$
11.014		Excavate and haul material	-	LCY	\$	\$	\$	\$	\$	\$
11.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$
11.016		Shutter plate panel face	-	CY	\$	\$	\$	\$	\$	\$
11.017		Steel plate for shutter plate	-	TON	\$	\$	\$	\$	\$	\$
11.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$
11.019		3.5" diam grouted hole with #6 bar	-	CY	\$	\$	\$	\$	\$	\$
11.020		Downstream Portal Backfill	-	CY	\$	\$	\$	\$	\$	\$
11.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$
11.022		Backfill: Compact and grade	-	LCY	\$	\$	\$	\$	\$	\$
11.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	\$	\$	\$	\$	\$
11.024		Tunnel Concrete Lining	-	LF	\$	\$	\$	\$	\$	\$
11.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	\$	\$	\$	\$	\$
11.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	\$	\$	\$	\$	\$
11.027		Riprap Discharge Channel	-	CY	\$	\$	\$	\$	\$	\$
11.028		Blowing operations	-	LCY	\$	\$	\$	\$	\$	\$
11.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$
11.030		Crush and screen material	-	LCY	\$	\$	\$	\$	\$	\$
11.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$
11.032		Place at the channel	-	LCY	\$	\$	\$	\$	\$	\$
12		ERS Facility 2								\$ - Included within Saddle Dam 5 Estimate
12.001		Upstream Portal Excavation and Rock Bolts	-	CY	\$	\$	\$	\$	\$	\$
12.002		Excavate and haul material	-	LCY	\$	\$	\$	\$	\$	\$
12.003		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$
12.004		Shutter plate panel face	-	CY	\$	\$	\$	\$	\$	\$
12.005		Steel plate for shutter plate	-	TON	\$	\$	\$	\$	\$	\$
12.006		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$
12.007		3.5" diam grouted hole with #6 bar	-	CY	\$	\$	\$	\$	\$	\$
12.008		Upstream Portal Backfill	-	CY	\$	\$	\$	\$	\$	\$
12.009		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$
12.010		Backfill: Compact and grade	-	LCY	\$	\$	\$	\$	\$	\$
12.011		Inlet and Valve Structures	-	CY	\$	\$	\$	\$	\$	\$
12.012		Pour inlet and valve structures	-	CY	\$	\$	\$	\$	\$	\$
12.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	\$	\$	\$	\$	\$
12.014		Excavate and haul material	-	LCY	\$	\$	\$	\$	\$	\$
12.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$
12.016		Shutter plate panel face	-	CY	\$	\$	\$	\$	\$	\$
12.017		Steel plate for shutter plate	-	TON	\$	\$	\$	\$	\$	\$
12.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$
12.019		3.5" diam grouted hole with #6 bar	-	CY	\$	\$	\$	\$	\$	\$
12.020		Downstream Portal Backfill	-	CY	\$	\$	\$	\$	\$	\$
12.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$
12.022		Backfill: Compact and grade	-	LCY	\$	\$	\$	\$	\$	\$
12.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	\$	\$	\$	\$	\$
12.024		Tunnel Concrete Lining	-	LF	\$	\$	\$	\$	\$	\$
12.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	\$	\$	\$	\$	\$
12.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	\$	\$	\$	\$	\$
12.027		Riprap Discharge Channel	-	CY	\$	\$	\$	\$	\$	\$
12.028		Blowing operations	-	LCY	\$	\$	\$	\$	\$	\$
12.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$
12.030		Crush and screen material	-	LCY	\$	\$	\$	\$	\$	\$
12.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$
12.032		Place at the channel	-	LCY	\$	\$	\$	\$	\$	\$
13		IO Facility								\$ 144,294,457
		Clearing Work								
13.001		Demolition Work	-	LS	\$	\$	\$	\$	\$	\$
13.002		Clearing and Grubbing	9	ACRE	\$ 1,230.71	\$ 2,147.96	\$	\$	\$ 3,379	\$ 30,408 Light vegetation removal
13.003		Erosion and Sediment Control	9	ACRE	\$	\$	\$	\$ 3,761	\$ 3,761	\$ 33,845 Allowed \$0.25/SF to 30% of the total area
		Access Roads								
13.004		Develop temporary access roads							Elsewhere	Included within dam and roadwork estimates
		Foundations								
13.005		Foundation piling	540.00	LF				\$ 450.72	\$ 243,388	4' dia, 60" deep, 9 piles - drilled piers/piles
13.006		Drilling rig mobilization/demobilization allowance	2.00	EA	\$ 15,000.00	\$ 30,000.00	\$	\$ 25,000.00	\$ 80,000	
13.007		Foundation piles - drilled piers	540.00	LF	\$ 48.50	\$ 26,100	\$ 76.25	\$	\$ 165,000	\$ 89,000
13.008		Concrete in piles						\$		Included above
13.009		Pile reinforcement allowance	41	TON	\$ 772.50	\$ 31,792.50	\$ 1,345.00	\$	\$ 2,575.00	\$ 104,268 Allow 150lbs/cy
13.010		Pile testing allowance	15.00	%	\$	\$	\$	\$ 243,387.50	\$ 243,387.50	\$ 96,508
13.011		Pile cap / base slab	489	CY				\$ 652.70	\$ 319,186	5' thick base slab
13.012		Cast in place concrete	409	CY	\$ 63.37	\$ 25,818.83	\$ 728.78	\$	\$ 326,626	\$ 192,400 36" thick slab
13.013		Formwork	912	SF	\$ 15.23	\$ 13,890.76	\$ 7.63	\$	\$ 25,389	\$ 13,106 Formwork to sides
13.014		Concrete reinforcement	37	TON	\$ 742.89	\$ 27,506.93	\$ 2,600.43	\$	\$ 3,714.60	\$ 136,233 Allow 150lbs/cy
		Intake and Outlet Structures								
13.015		Multi-Level Inlet/Outlet Tower Cast In Place Concrete	8,369	CY						
13.016		Wells	7,535	CY				\$ 1,133.76	\$ 8,542,844	
13.017		Cast in place concrete	7,535	CY	\$ 63.37	\$ 476,818.55	\$ 728.78	\$	\$ 550,833	\$ 2,832,804 average 4' thick
13.018		Formwork	101,728	SF	\$ 15.23	\$ 1,548,858.24	\$ 7.63	\$	\$ 25,389	\$ 13,106 Formwork to sides
13.019		Concrete reinforcement	942	TON	\$ 742.89	\$ 699,993.38	\$ 2,600.43	\$	\$ 3,714.60	\$ 136,233 Allow 150lbs/cy
13.020		Slabs - elevated decks	722	CY				\$ 833.82	\$ 602,020	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
13.021		Cast in place concrete	722	CY	\$ 63.37	\$ 45,752.54	\$ 728.78	\$	\$ 526.93	\$ 235,973 36" thick slab

Item	Description	Quantity	Unit	Unit Price	Subtotal	Excavation Rate	Backfill Rate	Reinforcement Rate	Formwork Rate	Other Rate	Notes	Comments
13.022	Formwork	6,489	SF	\$	13.23	\$	2.54	\$	7.61	\$		
13.023	Concrete reinforcement	34	TON	\$	742.88	\$	171.40	\$	2,600.43	\$		
13.024	Piers/Piles	-	CY									
13.025	Cast in place concrete	-	CY	\$		\$		\$		\$		
13.026	Formwork	-	SF	\$		\$		\$		\$		
13.027	Concrete reinforcement	-	TON	\$		\$		\$		\$		
13.028	Plug at base	-	CY									
13.029	Cast in place concrete	-	CY	\$		\$		\$		\$		
13.030	Formwork	-	SF	\$		\$		\$		\$		
13.031	Concrete reinforcement	-	TON	\$		\$		\$		\$		
13.032	Bridge Piers	112	CY									
13.033	Cast in place concrete	172	CY	\$	83.37	\$	32.03	\$	276.78	\$		
13.034	Formwork	1,360	SF	\$	13.23	\$	2.54	\$	7.61	\$		
13.035	Concrete reinforcement	17	TON	\$	742.88	\$	171.40	\$	2,600.43	\$		
											</	

Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

3. Construction Cost Summary: Use sloping intake and eliminate bridge				
				Total Cost
Total Direct Cost Effect				(14,334,823)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(14,334,823)
General Conditions				
Mobilization		5.0%		(716,741)
Site General Conditions & Requirements		10.0%		(1,505,156)
Phasing	Not included	0.0%		-
General Contractor Overhead and Fees				
Insurance		1.1%		(182,124)
Bonds		0.6%		(100,433)
GC Home Office Overhead		6.0%		(1,010,357)
GC Profit		8.0%		(1,427,971)
Total Contractor Indirect Markups				(4,942,782)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				(19,277,605)
Contingencies				
Design Contingencies		10.0%		(1,927,760)
Construction Contingencies		15.0%		(3,180,805)
Total Contingency Allowance				(5,108,565)
TOTAL DIRECT COST BEFORE ESCALATION				(24,386,170)
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(238,139)
Escalation to Mid-point of Construction	Not included	0%		-
ESTIMATED CONSTRUCTION COST SAVING				(24,624,309)

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Item	Sub Item	Description	Quantity	Unit	Unit Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Comments
11.012		Pour inlet and valve structures	-	CY	\$	-	\$	-	\$	-	\$	
11.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	
11.014		Excavate and load material	-	LCY	\$	-	\$	-	\$	-	\$	
11.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
11.016		Shutter plate aerial face	-	CY	\$	-	\$	-	\$	-	\$	
11.017		Steel fiber for shotcrete	-	TON	\$	-	\$	-	\$	-	\$	
11.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	
11.019		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	
11.020		Downstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	
11.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	
11.022		Backfill-Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	
11.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	-	\$	
11.024		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	-	\$	
11.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	-	\$	
11.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	-	\$	
11.027		Riprap Discharge Channel	-	CY	\$	-	\$	-	\$	-	\$	
11.028		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	
11.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
11.030		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	
11.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
11.032		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	
12		ERS Facility 2									\$	Included within Saddle Dam 5 Estimate
12.001		Upstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	
12.002		Excavate and load material	-	LCY	\$	-	\$	-	\$	-	\$	
12.003		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.004		Shutter plate aerial face	-	CY	\$	-	\$	-	\$	-	\$	
12.005		Steel fiber for shotcrete	-	TON	\$	-	\$	-	\$	-	\$	
12.006		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	
12.007		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	
12.008		Upstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	
12.009		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	
12.010		Backfill-Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	
12.011		Inlet and Valve Structures	-	CY	\$	-	\$	-	\$	-	\$	
12.012		Pour inlet and valve structures	-	CY	\$	-	\$	-	\$	-	\$	
12.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	
12.014		Excavate and load material	-	LCY	\$	-	\$	-	\$	-	\$	
12.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.016		Shutter plate aerial face	-	CY	\$	-	\$	-	\$	-	\$	
12.017		Steel fiber for shotcrete	-	TON	\$	-	\$	-	\$	-	\$	
12.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	
12.019		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	
12.020		Downstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	
12.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	
12.022		Backfill-Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	
12.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	-	\$	
12.024		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	-	\$	
12.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	-	\$	
12.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	-	\$	
12.027		Riprap Discharge Channel	-	CY	\$	-	\$	-	\$	-	\$	
12.028		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	
12.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.030		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	
12.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.032		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	
13		IO Facility									\$ 154,236,793	
		Clearing Work										
13.001		Demolition Work	-	LS	\$	-	\$	-	\$	-	\$	
13.002		Clearing and Grubbing	9	ACRE	\$	1,230.71	\$	2,147.96	\$	3,379	\$	30,408 Light vegetation removal
13.003		Erosion and Sediment Control	9	ACRE	\$	-	\$	-	\$	3,761	\$	33,845 Allowed \$0.25/SF to 30% of the total area
		Access Roads										
13.004		Develop temporary access roads										Elsewhere Included within dam and roadwork estimates
		Foundations										
13.005		Foundation piling	-	LF	\$	-	\$	-	\$	-	\$	4' dia, 60" deep, 9 piles - drilled piers/piles
13.006		Drilling rig mobilization/demobilization allowance	-	EA	\$	15,000.00	\$	15,000.00	\$	21,000.00	\$	
13.007		Foundation piles - drilled piers	-	LF	\$	48.50	\$	11.25	\$	76.25	\$	165.00
13.008		Concrete in piles	-	TON	\$	772.50	\$	222.50	\$	1,545.00	\$	2,575.00
13.009		Pile reinforcement allowance	-	%	\$	-	\$	-	\$	-	\$	Allow 150lbs/cy
13.010		Pile testing allowance	0.0%	%	\$	-	\$	-	\$	-	\$	
13.011		Pile cap / base slab	-	CY	\$	-	\$	-	\$	-	\$	5' thick base slab
13.012		Cast in place concrete	-	CY	\$	65.37	\$	52.68	\$	218.78	\$	326.83
13.013		Formwork	-	SF	\$	15.23	\$	2.54	\$	7.61	\$	25.39
13.014		Concrete reinforcement	-	TON	\$	742.85	\$	371.49	\$	2,600.43	\$	3,714.90
		Intake and Outlet Structures										
13.015		Multi-Level Inlet/Outlet Tower Cast In Place Concrete	-	CY	\$	-	\$	-	\$	-	\$	
13.016		Wells	-	CY	\$	-	\$	-	\$	-	\$	
13.017		Cast in place concrete	-	CY	\$	65.37	\$	52.68	\$	218.78	\$	326.83
13.018		Formwork	-	SF	\$	15.23	\$	2.54	\$	7.61	\$	25.39
13.019		Concrete reinforcement	-	TON	\$	742.85	\$	371.49	\$	2,600.43	\$	3,714.90
13.020		Slabs - elevated decks	-	CY	\$	-	\$	-	\$	-	\$	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
13.021		Cast in place concrete	-	CY	\$	65.37	\$	52.68	\$	218.78	\$	326.83

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Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

4. Construction Cost Summary: Eliminate ERS 1 & ERS 2

Total Cost

Total Direct Cost Effect (44,597,820)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (44,597,820)

General Conditions

Mobilization	5.0%	(2,229,891)
Site General Conditions & Requirements	10.0%	(4,682,771)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(566,615)
Bonds	0.6%	(312,463)
GC Home Office Overhead	6.0%	(3,143,374)
GC Profit	8.0%	(4,442,635)

Total Contractor Indirect Markups (15,377,749)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (59,975,569)

Contingencies

Design Contingencies	10.0%	(5,997,557)
Construction Contingencies	15.0%	(9,895,969)

Total Contingency Allowance (15,893,526)

TOTAL DIRECT COST BEFORE ESCALATION (75,869,095)

Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(740,887)
Escalation to Mid-point of Construction		<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (76,609,982)

Item	Sub Item	Description	Unit	QTY	Unit Price	Subtotal	Material Price	Material Subtotal	Installation Price	Installation Subtotal	Other Price	Other Subtotal	Notes
1 PRECONSTRUCTION ACTIVITIES													
1.001	Demolition Work		-	LS	\$	-	\$	-	\$	-			Elsewhere
1.002	Clearing and Grubbing		-	ACRE	\$	-	\$	-	\$	-	\$	-	Heavy vegetation removal
1.003	Reservoir Clearing		-	ACRE	\$	-	\$	-	\$	-	\$	-	Elsewhere costed
1.004	Erosion and Sediment Control		-	ACRE	\$	-	\$	-	\$	-	\$	-	Allowed 50.25/5F to 30% of the total area
9 Golden Gate Dam Bypass Pipeline Facilities													
9.001	Upstream Cofferdam		-	CY									Included with Golden Gate Dam Estimate
9.002	Sheet pile cofferdams		-	SF	\$	-	\$	-	\$	-	\$	-	
9.003	Excavations - remove top soil layer and stockpile		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.004	Load and haul to disposal site, 0.5 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.005	Purchase processed material from quarry		-	Ton	\$	-	\$	-	\$	-	\$	-	
9.006	Haul material from quarry to site stockpile, 40 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.007	Load on stockpile and haul to fill location, 0.5 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.008	Spread and compact		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.009	Install 48-inch Steel Pipe and Encasement		-	LF									
9.010	Excavate trench in bedrock		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.011	Load and haul material to disposal site, 0.3 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.012	48" steel pipe placement		-	LF	\$	-	\$	-	\$	-	\$	-	
9.013	Concrete barrels for pipe trench (dam footings)		-	CY	\$	-	\$	-	\$	-	\$	-	
9.014	Reinforcement for concrete barrel		-	Ton	\$	-	\$	-	\$	-	\$	-	
9.015	48" fixed crane value for concrete release (baffled head, no storage designation chamber)		-	LS	\$	-	\$	-	\$	-	\$	-	
9.016	Concrete manhole intake, 10' high (assume precast) reinforcement for concrete manhole (833 lbs)		-	LF	\$	-	\$	-	\$	-	\$	-	
9.017	Install 48" steel pipe on rock on site. Manhole		-	LS	\$	-	\$	-	\$	-	\$	-	
9.018	Grout pipe		-	CY	\$	-	\$	-	\$	-	\$	-	
9.019	Field Survey		-	LS	\$	-	\$	-	\$	-	\$	-	
9.020	Riprap Discharge Channel		-	CY									
9.021	Blasting operations		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.022	Excavate		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.023	Crush and screen material		-		\$	-	\$	-	\$	-	\$	-	Not required
9.024	Load and haul to stockpile, 0.5 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
9.025	Place at the channel		-	LCY	\$	-	\$	-	\$	-	\$	-	
10 Sites Dam Diversion Facilities													
10.000	Omit Sites Dam Diversion Work Estimate		(1)				\$	50,035,842	\$	50,035,842	\$	(50,035,842)	
10.001	Upstream Cofferdam		-	CY									Included above
10.002	Sheet pile cofferdams		-	SF	\$	-	\$	-	\$	-	\$	-	Earth fill coffer dam; included within zone 4 fill work.
10.003	Excavations - remove top soil layer and stockpile		-	LCY	\$	-	\$	-	\$	-	\$	-	Not required; Earth fill coffer dam
10.004	Load and haul to disposal site, 0.5 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
10.005	Purchase processed material from quarry		-	Ton	\$	-	\$	-	\$	-	\$	-	
10.006	Import material to site stockpile, 40 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
10.007	Load on stockpile and haul to fill location, 0.5 mile haul		-	LCY	\$	-	\$	-	\$	-	\$	-	
10.008	Spread and compact		-	LCY	\$	-	\$	-	\$	-	\$	-	
10.009	Upstream Portal Excavation and Rock Bolts		15,800	CY									
10.010	Excavate and load material		17,380	LCY	\$	1.39	\$	2.40	\$	-	\$	3.81	Assumed excavating material is either common earth, loam, sand, clay or loose material.
10.011	Haul to disposal site, 0.5 mile haul		17,380	LCY	\$	1.82	\$	3.17	\$	-	\$	6.19	
10.012	Shuttercrete portal face		848	CY	\$	36.42	\$	30.94	\$	271.97	\$	369.42	
10.013	Steel plate for shuttercrete		17	Ton	\$	26.25	\$	448.25	\$	2,478.25	\$	43,134	Allow 35lbs/cy of concrete
10.014	20 ft rock bolts, 5 ft on center - Drilling		390	EA	\$	50.25	\$	19,600	\$	-	\$	71,450	
10.015	3.5" diam grouted hole with #10 bar		39	CY	\$	263.48	\$	10,200	\$	2,520.70	\$	2,844.08	
10.016	Upstream Portal Backfill		24,500	CY									
10.017	Load at stockpile and haul to fill location, 0.5 mile haul		26,950	LCY	\$	0.89	\$	23.84	\$	-	\$	5.33	
10.018	Spread and compact		26,950	LCY	\$	2.11	\$	56.76	\$	-	\$	4.26	
10.019	Inlet and Valve Structures		2,200	CY									
10.020	Open inlet and valve structures		1,200	CY	\$	-	\$	-	\$	1,092.50	\$	2,403,500	
10.021	Downstream Portal Excavation and Rock Bolts		12,500	CY									
10.022	Excavate and load material		13,720	LCY	\$	1.48	\$	2.03	\$	-	\$	4.07	
10.023	Haul to disposal site, 0.5 mile haul		13,720	LCY	\$	1.85	\$	25.08	\$	-	\$	6.51	
10.024	Shuttercrete portal face		750	CY	\$	37.99	\$	28,300	\$	321.97	\$	335.36	
10.025	Steel plate for shuttercrete		15	Ton	\$	-	\$	-	\$	2,478.25	\$	37,527	Allow 35lbs/cy of concrete
10.026	20 ft rock bolts, 5 ft on center - Drilling		605	EA	\$	50.25	\$	30,400	\$	-	\$	78.38	
10.027	3.5" diam grouted hole with #10 bar		28	CY	\$	249.29	\$	7,000	\$	2,520.70	\$	2,844.08	
10.028	Downstream Portal Backfill		34,400	CY									
10.029	Load at stockpile and haul to fill location, 0.5 mile haul		37,840	LCY	\$	0.89	\$	33.68	\$	-	\$	4.90	
10.030	Spread and compact		37,840	LCY	\$	2.11	\$	79.85	\$	-	\$	6.33	
10.031	Tunnel Excavation and Initial Support (Double Shift)		1,590	LF	\$	-	\$	-	\$	7,913.12	\$	12,581,858	Second shift work will apply, 13' diameter tunnel
10.032	Tunnel Concrete Lining		1,590	LF	\$	-	\$	-	\$	7,025.57	\$	11,170,649	Second shift work will apply, 13' diameter tunnel
10.033	12-Ft Steel Pipe Lining		1,590	LF	\$	-	\$	-	\$	10,684.19	\$	16,987,862	Second shift work will apply, 12' diameter
10.034	Mechanical, Valves, Trash rack, and Metals		1	LS	\$	-	\$	-	\$	9,775,000	\$	9,775,000	Allowance
10.035	Riprap Discharge Channel		75	CY									
10.036	Blasting operations		90	LCY	\$	59.57	\$	5,361	\$	4,855	\$	458.82	
10.037	Excavate, load and haul to stockpile/processing area, 0.5 mile haul		90	LCY	\$	22.81	\$	2,053	\$	-	\$	90.98	
10.038	Crush and screen material		90		\$	-	\$	-	\$	-	\$	-	
10.039	Load and haul to stockpile, 0.5 mile haul		90	LCY	\$	13.36	\$	1,202	\$	-	\$	71.25	
10.040	Place at the channel		90	LCY	\$	35.55	\$	3,200	\$	-	\$	90.98	
11 ERS Facility 1													
11.001	Upstream Portal Excavation and Rock Bolts		(27,500)	CY									
11.002	Excavate and load material		(30,250)	LCY	\$	1.35	\$	40.84	\$	-	\$	3.70	Assumed excavating material is either common earth, loam, sand, clay or loose material.
11.003	Haul to disposal site, 0.5 mile haul		(30,250)	LCY	\$	1.43	\$	43.26	\$	-	\$	4.34	
11.004	Shuttercrete portal face		(180)	CY	\$	28.06	\$	5,051	\$	212.47	\$	3,568.89	
11.005	Steel plate for shuttercrete		(40)	Ton	\$	-	\$	-	\$	2,478.25	\$	71,530	
11.006	20 ft rock bolts, 5 ft on center - Drilling		(312)	EA	\$	50.25	\$	15,678	\$	-	\$	67.41	

Item	Sub Item	Description	Quantity	Unit	Unit Price	Subtotal	Material Price	Material Subtotal	Labor Price	Labor Subtotal	Equipment Price	Equipment Subtotal	Other Price	Other Subtotal	Total Price	Comments
11.007		3.5" diam grouted hole with #6 bar	(14)	CY	\$ 163.28	\$ 2,285.92	\$ 69.18	\$ 968.52	\$ 2,512.70	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,512.70	
11.008		Upstream Portal Backfill	(24,800)	CY											\$ 9.28	\$ (230,240)
11.009		Haul excavated material and stockpile, 0.5 mi assumed	(27,300)	LCY	\$ 0.89	\$ 24,303	\$ 3.34	\$ 91,182	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.24	\$ (113,543)
11.010		Backfill: Compact and grade	(27,280)	LCY	\$ 2.08	\$ 56,742	\$ 2.12	\$ 57,946	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.20	\$ (114,697)
11.011		Inlet and Valve Structures	(2,250)	CY											\$ 1,092.50	\$ (2,458,125)
11.012		Pour inlet and valve structures	(2,250)	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,092.50	\$ 2,458.13	\$ -	\$ -	\$ 1,092.50	\$ (2,458,125)
11.013		Downstream Portal Excavation and Rock Bolts	(35,100)	CY											\$ 15.54	\$ (550,697)
11.014		Excavate and haul material	(18,610)	LCY	\$ 1.34	\$ 24,937	\$ 2.25	\$ 41,773	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3.59	\$ (67,710)
11.015		Haul to disposal site, 0.5 mile haul	(38,610)	LCY	\$ 1.41	\$ 54,440	\$ 3.32	\$ 128,185	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.83	\$ (190,372)
11.016		Shoctora portal face	(500)	CY	\$ 76.88	\$ 38,440	\$ 36.30	\$ 18,150	\$ 221.97	\$ 110,985	\$ -	\$ -	\$ -	\$ -	\$ 332.15	\$ (169,550)
11.017		Steel fiber for shotcrete	(9)	TON	\$ -	\$ -	\$ -	\$ -	\$ 2,478.25	\$ 22,304	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (22,304)
11.018		20 ft rock bolts, 5 ft on center - Drilling	(497)	EA	\$ 20.35	\$ 10,114	\$ 20.28	\$ 10,080	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 70.94	\$ (35,262)
11.019		3.5" diam grouted hole with #6 bar	(29)	CY	\$ 217.18	\$ 6,308	\$ 61.68	\$ 1,789	\$ 2,527.70	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,795.13	\$ (59,592)
11.020		Downstream Portal Backfill	(37,900)	CY											\$ 10.10	\$ (382,753)
11.021		Haul excavated material and stockpile, 0.5 mi assumed	(41,600)	LCY	\$ 1.05	\$ 43,680	\$ 3.34	\$ 138,944	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.59	\$ (187,568)
11.022		Backfill: Compact and grade	(41,590)	LCY	\$ 2.07	\$ 86,181	\$ 2.12	\$ 88,171	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.19	\$ (174,716)
11.023		Tunnel Excavation and Initial Support (Double Shift)	(828)	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,304.42	\$ 7,304.42	\$ -	\$ -	\$ -	\$ (6,048,057)	Second shift work will apply
11.024		Tunnel Concrete Lining	(828)	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,205.71	\$ 7,205.71	\$ -	\$ -	\$ -	\$ (5,966,327)	Second shift work will apply
11.025		10-Ft Steel Pipe Cut and Cover Section	(388)	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 8,094.08	\$ 8,094.08	\$ -	\$ -	\$ -	\$ (3,140,504)	Second shift work will apply
11.026		Mechanical, Valves, Trash rack, and Metals	(1)	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,887,500	\$ 4,887,500	\$ -	\$ -	\$ -	\$ (4,887,500)	Allowance
11.027		Riprap Discharge Channel	(5,000)	CY											\$ 46.74	\$ (233,677)
11.028		Blasting operations	(5,000)	LCY	\$ 3.81	\$ 19,050	\$ 5.12	\$ 25,600	\$ 4.89	\$ 24,450	\$ -	\$ -	\$ -	\$ -	\$ 13.00	\$ (65,050)
11.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	(5,000)	LCY	\$ 1.87	\$ 9,350	\$ 4.43	\$ 22,150	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7.30	\$ (36,500)
11.030		Crush and screen material	(5)	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
11.031		Load and haul to stockpile, 1 mile haul	(6,000)	LCY	\$ 0.89	\$ 5,340	\$ 3.81	\$ 22,860	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.52	\$ (27,200)
11.032		Place at the channel	(6,000)	LCY	\$ 5.38	\$ 32,280	\$ 6.15	\$ 36,900	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13.51	\$ (81,180)
12		ERS Facility 2													\$ (24,498,389)	
12.001		Upstream Portal Excavation and Rock Bolts	(27,215)	CY											\$ 16.78	\$ (456,701)
12.002		Excavate and haul material	(18,607)	LCY	\$ 1.36	\$ 25,306	\$ 2.30	\$ 42,796	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3.74	\$ (70,102)
12.003		Haul to disposal site, 0.5 mile haul	(39,607)	LCY	\$ 1.43	\$ 56,638	\$ 3.32	\$ 131,515	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.86	\$ (196,953)
12.004		Shoctora portal face	(500)	CY	\$ 79.87	\$ 39,935	\$ 37.71	\$ 18,850	\$ 221.97	\$ 110,985	\$ -	\$ -	\$ -	\$ -	\$ 332.15	\$ (169,550)
12.005		Steel fiber for shotcrete	(9)	TON	\$ -	\$ -	\$ -	\$ -	\$ 2,478.25	\$ 22,304	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (22,304)
12.006		20 ft rock bolts, 5 ft on center - Drilling	(500)	EA	\$ 20.35	\$ 10,175	\$ 20.28	\$ 10,140	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 70.94	\$ (35,262)
12.007		3.5" diam grouted hole with #6 bar	(29)	CY	\$ 217.18	\$ 6,308	\$ 61.68	\$ 1,789	\$ 2,527.70	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,795.13	\$ (59,592)
12.008		Upstream Portal Backfill	(24,500)	CY											\$ 9.17	\$ (224,778)
12.009		Haul excavated material and stockpile, 0.5 mi assumed	(26,950)	LCY	\$ 0.89	\$ 23,986	\$ 3.32	\$ 89,574	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.29	\$ (113,543)
12.010		Backfill: Compact and grade	(26,940)	LCY	\$ 2.01	\$ 54,149	\$ 2.03	\$ 54,688	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.02	\$ (109,239)
12.011		Inlet and Valve Structures	(2,200)	CY											\$ 1,092.50	\$ (2,403,500)
12.012		Pour inlet and valve structures	(2,200)	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 1,092.50	\$ 2,403.50	\$ -	\$ -	\$ 1,092.50	\$ (2,403,500)
12.013		Downstream Portal Excavation and Rock Bolts	(31,867)	CY											\$ 21.53	\$ (686,222)
12.014		Excavate and haul material	(16,044)	LCY	\$ 1.32	\$ 21,177	\$ 2.31	\$ 37,061	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3.63	\$ (59,238)
12.015		Haul to disposal site, 0.5 mile haul	(33,044)	LCY	\$ 1.39	\$ 45,931	\$ 3.48	\$ 115,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.87	\$ (133,931)
12.016		Shoctora portal face	(500)	CY	\$ 80.28	\$ 40,140	\$ 37.90	\$ 18,990	\$ 221.97	\$ 110,985	\$ -	\$ -	\$ -	\$ -	\$ 340.14	\$ (140,309)
12.017		Steel fiber for shotcrete	(9)	TON	\$ -	\$ -	\$ -	\$ -	\$ 2,478.25	\$ 22,304	\$ -	\$ -	\$ -	\$ -	\$ -	\$ (22,304)
12.018		20 ft rock bolts, 5 ft on center - Drilling	(500)	EA	\$ 20.35	\$ 10,175	\$ 20.28	\$ 10,140	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 70.94	\$ (35,262)
12.019		3.5" diam grouted hole with #6 bar	(29)	CY	\$ 217.18	\$ 6,308	\$ 61.68	\$ 1,789	\$ 2,527.70	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 2,795.13	\$ (59,592)
12.020		Downstream Portal Backfill	(34,400)	CY											\$ 9.98	\$ (343,259)
12.021		Haul excavated material and stockpile, 0.5 mi assumed	(37,840)	LCY	\$ 1.03	\$ 38,975	\$ 3.25	\$ 122,880	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.89	\$ (164,855)
12.022		Backfill: Compact and grade	(37,840)	LCY	\$ 2.07	\$ 78,349	\$ 2.12	\$ 80,221	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.19	\$ (156,591)
12.023		Tunnel Excavation and Initial Support (Double Shift)	(832)	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,304.42	\$ 7,304.42	\$ -	\$ -	\$ -	\$ (6,077,275)	Second shift work will apply
12.024		Tunnel Concrete Lining	(832)	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7,205.71	\$ 7,205.71	\$ -	\$ -	\$ -	\$ (5,995,149)	Second shift work will apply
12.025		10-Ft Steel Pipe Cut and Cover Section	(400)	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 8,094.08	\$ 8,094.08	\$ -	\$ -	\$ -	\$ (3,237,633)	Second shift work will apply
12.026		Mechanical, Valves, Trash rack, and Metals	(1)	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4,887,500	\$ 4,887,500	\$ -	\$ -	\$ -	\$ (4,887,500)	Allowance
12.027		Riprap Discharge Channel	(4,200)	CY											\$ 44.37	\$ (186,371)
12.028		Blasting operations	(5,000)	LCY	\$ 3.04	\$ 15,200	\$ 4.09	\$ 20,450	\$ 4.89	\$ 24,450	\$ -	\$ -	\$ -	\$ -	\$ 11.95	\$ (59,238)
12.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	(5,000)	LCY	\$ 1.49	\$ 7,450	\$ 4.31	\$ 21,550	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5.79	\$ (29,195)
12.030		Crush and screen material	(5)	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
12.031		Load and haul to stockpile, 1 mile haul	(5,000)	LCY	\$ 0.89	\$ 4,450	\$ 4.10	\$ 20,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3.14	\$ (15,360)
12.032		Place at the channel	(5,000)	LCY	\$ 5.60	\$ 28,000	\$ 6.49	\$ 32,450	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 14.06	\$ (70,450)
13		IO Facility													\$ -	
		Clearing Work														
13.001		Demolition Work	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13.002		Clearing and Grubbing	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13.003		Erosion and Sediment Control	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13.004		Develop temporary access roads													Elsewhere	Included within dam and roadwork estimates
		Foundations														
13.005		Foundation piling	-	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13.006		Drilling rig mobilization/demobilization allowance	-	EA	\$ 11,000.00	\$ 11,000.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 11,000.00	\$ -
13.007		Foundation piles - drilled piers	-	LF	\$ 48.50	\$ -	\$ 12.25	\$ 74.25	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 165.00	\$ -
13.008		Concrete on piles	-		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Included above	\$ -
13.009		Pile vibration/seismic allowance	-	TON	\$ 772.50	\$ 277.50	\$ 3,545.00	\$ -	\$ -	\$ -	\$ 2,775.00	\$ -	\$ -	\$ -	\$ 2,775.00	\$ -
13.010		Pile testing allowance	0.0%	%	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13.011		Pile cap / base slab	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
13.012		Cast-in place concrete	-	CU	\$ 63.27	\$ -	\$ 82.68	\$ 218.78	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 326.53	\$ -
13.013		Formwork	-	YD	\$ 15.13	\$ -	\$ 1.54	\$ 7.61	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 23.29	\$ -
13.014		Concrete reinforcement	-	TON	\$ 242.88	\$ 871.69	\$ 2,800.43	\$ -	\$ -	\$ -	\$ 3,714.80	\$ -	\$ -	\$ -	\$ 3,714.80	\$ -
		Intake and Outlet Structures														
13.015		Multi-Level Inlet/Outlet Tower Cast In Place Concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

Item	Sub Item	Description	Quantity	Unit	Unit Price	Subtotal	Excavation	Concrete	Reinforcement	Formwork	Other	Notes
13.016		Wells	-	CY								
13.017		Cast in place concrete	-	CY	\$ 65.37	\$ 32.68	\$ 228.76	\$	\$ 326.83	\$		Average 4' thick
13.018		Formwork	-	SF	\$ 15.23	\$ 2.54	\$ 7.61	\$	\$ 25.39	\$		
13.019		Concrete reinforcement	-	TON	\$ 742.88	\$ 371.49	\$ 2,608.13	\$	\$ 3,714.90	\$		Allow 250lb/cy
13.020		Slabs - elevated decks	-	CY								
13.021		Cast in place concrete	-	CY	\$ 65.37	\$ 32.68	\$ 228.76	\$	\$ 326.83	\$		Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
13.022		Formwork	-	SF	\$ 15.23	\$ 2.54	\$ 7.61	\$	\$ 25.39	\$		36" thick slab
13.023		Concrete reinforcement	-	TON	\$ 742.88	\$ 371.49	\$ 2,608.13	\$	\$ 3,714.90	\$		Allow 250lb/cy
13.024		Piers/Piles	-	CY								
13.025		Cast in place concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		Included above
13.026		Formwork	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		Allow 300lb/cy
13.027		Concrete reinforcement	-	TON	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		Allow 250lb/cy
13.028		Plug at base	-	CY								
13.029		Cast in place concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		Included above
13.030		Formwork	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
13.031		Concrete reinforcement	-	TON	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		Not required
13.032		Bridge Piers	-	CY								
13.033		Cast in place concrete	-	CY	\$ 65.37	\$ 32.68	\$ 228.76	\$	\$ 326.83	\$		Assume 4 piers with a 4 ft diameter, 60 ft deep
13.034		Formwork	-	SF	\$ 15.23	\$ 2.54	\$ 7.61	\$	\$ 25.39	\$		Allow 300lb/cy
13.035		Concrete reinforcement	-	TON	\$ 742.88	\$ 371.49	\$ 2,608.13	\$	\$ 3,714.90	\$		Allow 250lb/cy
		Mechanical Work										
13.036		Gates, Mechanical, and Appurtenances	-	LS								Included below
13.037		Trash Racks, Miscellaneous Metals and Equipment	-	LS								Included below
13.038		Metal ladders	-	LF	\$ -	\$ -	\$ -	\$ 3,552.50	\$ 3,552.50	\$ -		As per May 2020 NODOS Estimate
13.039		Metal Platforms Intake Tower	-	EA	\$ -	\$ -	\$ -	\$ 507.50	\$ 507.50	\$ -		Not required
13.04		Roller Gates with hydraulic cylinders and lines	-	EA	\$ -	\$ -	\$ -	\$ 384,583.50	\$ 384,583.50	\$ -		As per May 2020 NODOS Estimate
13.041		Movable screens and hoists	-	EA	\$ -	\$ -	\$ -	\$ 76,125.00	\$ 76,125.00	\$ -		As per May 2020 NODOS Estimate
13.042		Sliding steel plates and hoists	-	EA	\$ -	\$ -	\$ -	\$ 101,500.00	\$ 101,500.00	\$ -		As per May 2020 NODOS Estimate
13.043		8 ton jib crane	-	EA	\$ -	\$ -	\$ -	\$ 121,800.00	\$ 121,800.00	\$ -		As per May 2020 NODOS Estimate
13.044		12 ft x 30 ft inlet tunnel roller gate	-	EA	\$ -	\$ -	\$ -	\$ 1,888,915.00	\$ 1,888,915.00	\$ -		As per May 2020 NODOS Estimate
13.045		12 ft x 25 ft outlet tunnel roller gates	-	EA	\$ -	\$ -	\$ -	\$ 1,609,790.00	\$ 1,609,790.00	\$ -		As per May 2020 NODOS Estimate
13.046		Other Metals Intake Tower	-	LS	\$ -	\$ -	\$ -	\$ 253,750.00	\$ 253,750.00	\$ -		As per May 2020 NODOS Estimate
13.047		Painting	-	LS	\$ -	\$ -	\$ -	\$ 50,750.00	\$ 50,750.00	\$ -		As per May 2020 NODOS Estimate
		Access bridge										
13.048		Access bridge	-	LS	\$ -	\$ -	\$ -	\$ 500.00	\$ 500.00	\$ -		Assume 500' x 20' wide bridge
		Electrical Power and Controls										
13.049		Power for gate hoists, hydraulic system, lighting	-	LS	\$ -	\$ -	\$ -	\$ 253,750.00	\$ 253,750.00	\$ -		As per May 2020 NODOS Estimate
		North & South Tunnels										
13.050		Excavation	-	LF	\$ -	\$ -	\$ -	\$ 8,491.49	\$ 8,491.49	\$ -		As per May 2020 NODOS Estimate
13.051		Concrete Liner	-	LF	\$ -	\$ -	\$ -	\$ 9,083.24	\$ 9,083.24	\$ -		As per May 2020 NODOS Estimate
13.052		Steel Liner	-	LF	\$ -	\$ -	\$ -	\$ 10,327.63	\$ 10,327.63	\$ -		As per May 2020 NODOS Estimate
13.053		Lower Intake Channel										
13.054		Excavations in common material	-	LCY	\$ 4.00	\$ 4.00	\$ -	\$ -	\$ 15.00	\$ -		Assume 70% in common earth and 30% rock include a 32% spoil factor
13.055		Excavations in rock	-	LCY	\$ 20.00	\$ 20.00	\$ -	\$ -	\$ 25.00	\$ -		
13.056		Haul to disposal site, 0.5 mile haul	-	LCY	\$ 1.75	\$ 3.50	\$ -	\$ -	\$ 7.00	\$ -		
13.057		Shotcrete partial face	-	CY	\$ 84.00	\$ 32.00	\$ 2,240.00	\$ -	\$ 220.00	\$ -		
13.058		Steel fiber for shotcrete	-	TON	\$ 300.00	\$ -	\$ 1,040.00	\$ -	\$ 1,300.00	\$ -		
13.059		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$ 187.50	\$ 67.50	\$ -	\$ -	\$ 250.00	\$ -		
13.060		3.3" diam grouted hole with #5 bar	-	CY	\$ 1,000.00	\$ 300.00	\$ 3,300.00	\$ -	\$ 5,000.00	\$ -		
		Downstream Portal										
13.061		Downstream Portal Excavation and Rock Bolts	-	CY								
13.062		Drainage and local material	-	LCY	\$ 20.00	\$ 15.00	\$ -	\$ -	\$ 23.00	\$ -		
13.063		Haul to disposal site, 0.5 mile haul	-	LCY	\$ 1.75	\$ 3.50	\$ -	\$ -	\$ 7.00	\$ -		
13.064		Shotcrete partial face	-	CY	\$ 84.00	\$ 32.00	\$ 2,240.00	\$ -	\$ 310.00	\$ -		
13.065		Steel fiber for shotcrete	-	TON	\$ 300.00	\$ -	\$ 1,040.00	\$ -	\$ 1,300.00	\$ -		
13.066		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$ 187.50	\$ 67.50	\$ -	\$ -	\$ 250.00	\$ -		
13.067		3.3" diam grouted hole with #5 bar	-	CY	\$ 1,000.00	\$ 300.00	\$ 3,300.00	\$ -	\$ 5,000.00	\$ -		
13.068		Downstream Portal Backfill	-	CY								Not required
13.069		Riprap	-	CY								Not required
14		Misc allowance for small items, allow 1%	1.0%	%								
		Total Direct Cost Effect										

Sites Reservoir (Alt 1): Sites Lodoga Road Realignment
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

8. Construction Cost Summary: Revised SLR - WatersEdge

		Unit Cost Rate (\$/LF)	Total Cost
	LF:	31,767	
Total Direct Cost Effect		(209.99)	(6,670,617)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS			(209.99) (6,670,617)
General Conditions			
Mobilization	3.0%	(6.30)	(200,119)
Site General Conditions & Requirements	10.0%	(21.63)	(687,074)
Phasing	<i>Not included</i> 0.0%	-	-
General Contractor Overhead and Fees			
Insurance	1.1%	(2.62)	(83,136)
Bonds	0.6%	(1.44)	(45,846)
GC Field and Home Office Overhead	5.0%	(12.10)	(384,340)
GC Profit	5.0%	(12.70)	(403,557)
Total Contractor Indirect Markups			(56.79) (1,804,072)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES			(266.78) (8,474,689)
Contingencies			
Design Contingencies	10.0%	(26.68)	(847,469)
Construction Contingencies	15.0%	(44.02)	(1,398,324)
Total Contingency Allowance			(70.70) (2,245,793)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION			(337.47) (10,720,482)
Escalation to Report Date	3/31/2021 @ 3.00% p.a. 0.977%	(3.30)	(104,689)
Escalation to Mid-point of Construction	<i>Not included</i> 0%	-	-
ESTIMATED CONSTRUCTION COST SAVING			(340.77) (10,825,171)

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comments
0	Omit Baseline Cost Estimate									
	Omit baseline estimate	-1	LS					\$ 117,947,799	\$ 117,947,799	(117,947,799)
	Omit Cost for Sites Lodoga Road Realignment Bridges as per baseline estimate	(1)	LS					\$ 86,817,610	\$ 86,817,610	(86,817,610)
	Add Cost for East Bridge Approach only	57,972	SF					\$ 806.32	\$ 806.32	\$ 46,743,323
1	Clearing and Demolition Work									
1.001	Demolition Work	-	SY							Elsewhere
1.002	Remove existing grade	-	SY	\$	-	\$	-	\$	-	included elsewhere
1.003	Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	
1.004	Clearing and Grubbing	76	ACRE	\$ 3,091.50	\$ 1,796.30	\$	-	\$ 2,887.80	\$ 219,472	Light vegetation clearing work
	Roads and Road Structures									
2	Road Excavations									
2.001	Temporary Silt Fence	23,200	LF					\$ 4.20	\$ 97,527	
2.002	Setup temporary silt fence	23,200	LF	\$ 3.79	\$ 0.73	\$ 0.44	\$	\$ 2.54	\$ 68,712	
2.003	Silt fence removal	23,200	LF	\$ 0.72	\$ 0.31	\$	-	\$ 0.55	\$ 12,815	include allowance for dump charges
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					\$	-	Not required
2.005	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	
2.006	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	
2.007	Screening Operations (Post-crushing)	-	LCY	\$	-	\$	-	\$	-	
2.008	Load and haul to stockpile location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	
2.009	Load and haul to stockpile location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CY					\$	-	Not required
2.011	Roadway excavation, common earth	-	LCY	\$	-	\$	-	\$	-	
2.012	Load and haul to stockpile location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	
2.013	Roadway Excavation (Cut to Waste Disposal Area)	164,800	CY					\$ 10.79	\$ 1,778,290	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
2.014	Roadway excavation	164,800	LCY	\$ 2.11	\$ 2.13	\$	-	\$ 4.29	\$ 702,955	Include a 15% swell factor
2.015	Load and haul to disposal site, 0.5 mile haul	164,800	LCY	\$ 1.48	\$ 2.62	\$	-	\$ 3.08	\$ 505,342	haul to disposal area, no operation for processing suitable material re, dumping off-site, assumed 0.5 mile hauling distance
2.016	Roadway Excavation (Rock Cut)	74,900	CY					\$ 20.29	\$ 1,519,721	Excavated material to be stockpiled for re-use, average 2 mile haul
2.017	Blasting operations	26,564	LCY	\$ 4.26	\$ 6.08	\$ 0.80	\$	\$ 13.19	\$ 350,558	Assume 30% of volume will require blasting, assume rock blasting productivity rate of 1500 cu/yd
2.018	Rock crushing operation	61,336	LCY	\$ 2.89	\$ 3.85	\$	-	\$ 6.84	\$ 420,156	Assume 70% of volume will be excavated with ripper
2.019	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	No crushing and screening required
2.020	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	No crushing required
2.021	Screening Operations (Post-crushing)	-	LCY	\$	-	\$	-	\$	-	No screening required
2.022	Load and haul to stockpile location, 2 mile haul	89,380	LCY	\$ 2.29	\$ 3.92	\$	-	\$ 6.17	\$ 549,027	Haul to stockpile location, 2 mile hauling distance assumed
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	1,483,300	CY					\$ 9.71	\$ 14,404,395	Excavate common earth and direct haul to fill location
2.024	Roadway excavation	1,483,300	LCY	\$ 2.59	\$ 2.72	\$	-	\$ 4.29	\$ 6,355,304	Include 10% swell factor
2.025	Load and haul to stockpile location, 0.5 mile haul	1,483,300	LCY	\$ 1.27	\$ 2.91	\$	-	\$ 4.57	\$ 6,845,091	Assumed 0.5 mile hauling distance
2.026	Crushing operations	-	CY	\$	-	\$	-	\$	-	Not required
2.027	Screening operations	-	CY	\$	-	\$	-	\$	-	Not required
3	Road Fill and Layer Work									
3.001	Roadway Embankment (from on-site excavation sources)	1,483,300	CY					\$ 6.45	\$ 9,564,933	From excavated suitable material, assume available on-site excavation
3.002	Load and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	No double handling and unloading required; all material to be loaded directly to fill location
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	1,483,300	LCY							included above
3.004	Spread and compact	1,483,300	LCY	\$ 3.32	\$ 3.13	\$	-	\$ 6.45	\$ 9,564,933	Swell factor of 10% included. Direct hauling work included elsewhere
3.005	Roadway Embankment (imported from other excavation sources)	7,984,700	CY					\$ 7.17	\$ 57,255,889	Backfill material to be sourced from road excavations cut
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	7,984,700	LCY							elsewhere
3.007	Spread and compact	7,984,700	LCY	\$ 3.85	\$ 3.14	\$	-	\$ 6.92	\$ 55,255,889	Backfilling work included within related excavation project
3.008	Class 4 Aggregate subbase	20,000	CY					\$ 61.38	\$ 1,227,690	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
3.009	Purchase processed material from quarry	34,000	TON	\$	-	\$ 35.25	\$	\$ 35.15	\$ 1,195,070	Purchase from commercial quarry, 1.7ton/cy
3.010	Load material from quarry to site stockpile location, 0.5 mile haul	34,000	LCY	\$ 12.26	\$ 12.14	\$	-	\$ 24.50	\$ 837,404	haul to fill location, no stockpiling needed
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	No stockpiling needed
3.012	Spread and compact	34,000	LCY	\$ 4.37	\$ 4.12	\$	-	\$ 8.49	\$ 289,216	
3.013	Class 2 Aggregate base	20,000	CY					\$ 61.38	\$ 1,227,690	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
3.014	Purchase processed material from quarry	34,000	TON	\$	-	\$ 35.25	\$	\$ 35.15	\$ 1,195,070	Purchase from commercial quarry, 1.7ton/cy
3.015	Load material from quarry to site stockpile location, 0.5 mile haul	34,000	LCY	\$ 12.26	\$ 12.14	\$	-	\$ 24.50	\$ 837,404	haul to fill location, no stockpiling needed
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	No stockpiling needed
3.017	Spread and compact	34,000	LCY	\$ 4.37	\$ 4.12	\$	-	\$ 8.49	\$ 289,216	
3.018	Asphalt concrete	27,000	TON	\$ 8.54	\$ 4.71	\$ 102.88	\$	\$ 116.13	\$ 3,135,597	Assume HMA (Type A), 150lb/cy
3.019	Tack Coat	20	TON	\$ 938.60	\$ 469.85	\$ 2,496.25	\$	\$ 3,004.80	\$ 78,096	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4	Other Roadwork									
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	Not required
4.002	Midwest Guardrail System	3,177	LF	\$ 5.31	\$ 2.30	\$ 43.54	\$	\$ 51.20	\$ 162,656	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
4.003	Transition Railing (Type WB-31)	-	EA	\$	-	\$	-	\$	-	Not required
4.004	End Anchor Assembly (Type SFT)	-	EA	\$	-	\$	-	\$	-	Not required

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Sites Reservoir (Alt 1): Huffmaster Road Realignment
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

9. Construction Cost Summary: Revised Huffmaster Road Realignment Design - Ladybug				
			Unit Cost Rate (\$/LF)	Total Cost
		LF:	35,923	
Total Direct Cost Effect			(74.76)	(2,685,647)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS			(74.76)	(2,685,647)
General Conditions				
Mobilization		3.0%	(2.24)	(80,569)
Site General Conditions & Requirements		10.0%	(7.70)	(276,622)
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	(0.93)	(33,471)
Bonds		0.6%	(0.51)	(18,458)
GC Field and Home Office Overhead		5.0%	(4.31)	(154,738)
GC Profit		5.0%	(4.52)	(162,475)
Total Contractor Indirect Markups			(20.22)	(726,333)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES			(94.98)	(3,411,980)
Contingencies				
Design Contingencies		10.0%	(9.50)	(341,198)
Construction Contingencies		15.0%	(15.67)	(562,977)
Total Contingency Allowance			(25.17)	(904,175)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION			(120.15)	(4,316,155)
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	(1.17)	(42,149)
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING			(121.32)	(4,358,304)

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	Lab Price	Price	Comment
0	Omit Baseline Cost Estimate	-1	LS							
	Exact baseline estimate								\$ 27,129,104.70	\$ 27,129,105 \$ (27,129,105)
1	Clearing and Demolition Work									
1.001	Demolition Work	-	SY							Elsewhere
1.012	Asphalt removal work	-	SY	\$	6	2	\$	5	5	-
1.019	Load and haul to disposal site, 3 mile haul	-	LCY	\$	2	-	\$	2	5	-
1.004	Clearing and Grubbing	37	ACRE	\$	1,188.94	\$	1,953.37	\$	3,140.31	\$ 116,191
										Light vegetation clearing work
	Roads and Road Structures									
2	Road Excavations									
2.001	Temporary Silt Fence	29,600	LF						\$ 4.13	\$ 122,185
2.002	Setup temporary silt fence	29,600	LF	\$	1.82	\$	0.73	\$	1.02	\$ 29,256
2.012	Silt fence removal	29,600	LF	\$	0.64	\$	0.32	\$	0.19	\$ 32,055
										Include allowance for dump charges
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY						\$ -	\$ -
										Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations
2.005	Roadway excavations including existing asphalt base removal	-	LCY	\$	-	\$	-	\$	-	-
2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.007	Crushing operations	-	LCY	\$	-	\$	-	\$	-	-
2.008	Screening operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	-
2.009	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	797,900	CY						\$ 10.15	\$ 8,097,461
										Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
2.011	Roadway excavations, common earth	917,582	LCY	\$	2.09	\$	2.17	\$	4.29	\$ 3,905,919
										Common excavations include a 15% swell factor
2.012	Load and haul to stockpile/fill location, 0.25 mile haul	917,582	LCY	\$	1.32	\$	3.20	\$	4.56	\$ 4,197,582
										Haul to stockpile/fill location, 0.25 mile hauling distance assumed
2.013	Roadway Excavation (Cut to Waste Disposal Area)	136,500	CY						\$ 10.75	\$ 1,467,795
										Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
2.014	Roadway excavations	156,575	LCY	\$	2.22	\$	3.18	\$	4.27	\$ 671,118
										Include a 15% swell factor
2.015	Load and haul to disposal site, 0.5 mile haul	156,575	LCY	\$	2.48	\$	2.54	\$	5.08	\$ 796,782
										Haul to disposal area, no provision for processing suitable material or changing off-site, assumed 0.5 mile hauling distance
2.016	Roadway Excavation (Rock Cut)	42,200	CY						\$ 36.44	\$ 1,537,620
										Excavated material to be stockpiled for re-use, average 8 mile haul
2.017	Blasting operations	15,132	LCY	\$	4.59	\$	4.34	\$	11.73	\$ 208,252
										Assume 20% of volume will require blasting, assume rock blasting productivity rate of 100 CY/hr
2.018	Rock breaking operations	35,446	LCY	\$	3.09	\$	2.65	\$	7.05	\$ 250,944
										Assume 70% of volume will be excavated with ripper
2.019	Load and haul to processing area, 2 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.020	Crushing operations	-	LCY	\$	-	\$	-	\$	-	-
2.021	Screening operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	-
2.022	Load and haul to stockpile location, 0 mile haul	50,640	LCY	\$	5.41	\$	12.25	\$	17.29	\$ 1,078,144
										Haul to stockpile location, 8 mile hauling distance assumed
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	430,200	CY						\$ 9.75	\$ 4,195,714
										Excavate common earth and direct haul to fill location
2.024	Roadway excavations	473,120	LCY	\$	2.13	\$	2.18	\$	4.29	\$ 2,025,942
										Include 10% swell factor
2.025	Load and haul to stockpile/fill location, 0.25 mile haul	473,120	LCY	\$	1.97	\$	3.11	\$	4.59	\$ 2,166,772
										Assumed 0.25 mile hauling distance
2.026	Crushing operations	-	CY	\$	-	\$	-	\$	-	-
										Not required
2.027	Screening operations	-	CY	\$	-	\$	-	\$	-	-
										Not required
3	Road Fill and Layer Work									
3.001	Roadway Embankment (from on-site excavation sources)	430,200	CY						\$ 6.52	\$ 2,805,557
										From excavated suitable material, assume available on-site excavation
3.002	Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
										No double handling and rescheduling required, all material to be loaded directly to fill location
3.009	Load and haul from excavation site to fill location, 0.25 mile haul	430,200	LCY							Included above
										Swell factor of 10% included; Direct hauling work included above
3.004	Spread and compact	430,200	LCY	\$	3.34	\$	2.14	\$	6.52	\$ 2,805,557
										Swell factor of 10% included
3.005	Roadway Embankment (imported from other excavation sources)	-	CY							Not required
										Backfill material to be sourced from road excavations cut
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.007	Spread and compact	-	LCY	\$	-	\$	-	\$	-	-
3.008	Class 4 Aggregate subbase	-	CY						\$ -	\$ -
										Not required
3.009	Aggregate processed material from quarry	-	TON	\$	-	\$	-	\$	-	-
3.010	Haul material from quarry to site stockpile/fill location, 30 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.012	Use road and compact	-	LCY	\$	-	\$	-	\$	-	-
3.013	Class 2 Aggregate base	20,000	CY						\$ 61.38	\$ 1,227,600
										Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
3.014	Purchase processed material from quarry	34,000	TON	\$	-	\$	-	\$	15.15	\$ 515,070
										Purchase from commercial quarry, 1.7 ton/cy
3.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	23,000	LCY	\$	12.26	\$	12.04	\$	21.50	\$ 517,404
										Haul to fill location, no stockpiling needed
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.017	Spread and compact	23,000	LCY	\$	4.22	\$	3.12	\$	5.49	\$ 195,216
										No stockpiling needed
3.018	Asphalt concrete	-	TON	\$	-	\$	-	\$	-	-
										Not Required
3.019	Tack Coat	-	TON	\$	-	\$	-	\$	-	-
										Not Required
4	Other Roadwork									
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	-
										Not required
4.002	Midwest Guardrail System	3,592	LF	\$	5.63	\$	2.50	\$	51.67	\$ 185,628
										Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
4.003	Transition Railine (Type WB 31)	-	EA	\$	-	\$	-	\$	-	-
										Not required
4.004	End Anchor Assembly (Type SFT)	-	EA	\$	-	\$	-	\$	-	-
										Not required
4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	4,230	LF						\$ 97.44	\$ 412,171
										Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections
4.006	Culvert pipe excavations	3,157	LCY	\$	4.45	\$	3.39	\$	5.55	\$ 27,913
4.007	Load and haul material to disposal site, 0.5 mile haul	3,157	LCY	\$	3.80	\$	6.69	\$	13.82	\$ 94,079

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Sites Reservoir (Alt 1): Sites Lodoga Road Realignment
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

10. Construction Cost Summary: Eliminate west bridge and replace with embankment fill				
			Unit Cost Rate (\$/LF)	Total Cost
LF:			30,324	
Estimated Cost Effect			(242.93)	(7,366,632)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS			(242.93)	(7,366,632)
General Conditions				
Mobilization		3.0%	(7.29)	(220,999)
Site General Conditions & Requirements		10.0%	(25.02)	(758,763)
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	(3.03)	(91,810)
Bonds		0.6%	(1.67)	(50,629)
GC Field and Home Office Overhead		5.0%	(14.00)	(424,442)
GC Profit		5.0%	(14.70)	(445,664)
Total Contractor Indirect Markups			(65.70)	(1,992,307)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES			(308.63)	(9,358,939)
Contingencies				
Design Contingencies		10.0%	(30.86)	(935,894)
Construction Contingencies		15.0%	(50.92)	(1,544,225)
Total Contingency Allowance			(81.79)	(2,480,119)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION			(390.42)	(11,839,058)
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	(3.81)	(115,612)
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING			(394.23)	(11,954,670)

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comments
0	Omit Baseline Cost / Baseline Cost Adjustment									
	Omit Cost for West Approach as per baseline estimate	(1)	LS					\$ 86,817,610	\$ 86,817,610	
	Omit Cost for Sites Lodge Road Realignment Bridges as per baseline estimate	(1)	LS					\$ 117,947,799	\$ 117,947,799	
	Add Cost for East Bridge Approach only	57,972	SF					\$ 806.32	\$ 46,743,323	
1	Clearing and Demolition Work									
1.001	Demolition Work	-	SY							Elsewhere
1.002	Remove existing grade	-	SY							included elsewhere
1.003	Load and haul to disposal site, 0.5 mile haul	-	LCY							
1.004	Clearing and Grubbing	70	ACRE	\$ 3,115.34	\$ 1,895.55	\$ -	\$ -	\$ 2,950.89	\$ 206,562	Light vegetation clearing work
	Roads and Road Structures									
2	Road Excavations									
2.001	Temporary Silt Fence	21,600	LF					\$ 4.10	\$ 88,479	
2.002	Setup temporary silt fence	21,600	LF	\$ 1.77	\$ 0.72	\$ 0.44	\$ -	\$ 2.64	\$ 63,276	
2.003	Silt fence removal	21,600	LF	\$ 0.62	\$ 0.27	\$ -	\$ -	\$ 0.87	\$ 24,976	include allowance for dump charges
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY							Not required
2.005	Load and haul to processing area, 0.5 mile haul	-	LCY							
2.006	Crushing Operations	-	LCY							
2.007	Screening Operations (Post-crushing)	-	LCY							
2.008	Load and haul to stockpile location, 0.25 mile haul	-	LCY							
2.009	Load and haul to stockpile location, 0.25 mile haul	-	LCY							
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	-	CY							Not required
2.011	Roadway excavation, common earth	-	LCY							
2.012	Load and haul to stockpile location, 0.25 mile haul	-	LCY							
2.013	Roadway Excavation (Cut to Waste Disposal Area)	165,900	CY					\$ 10.72	\$ 1,778,290	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
2.014	Roadway excavation	165,900	LCY	\$ 2.59	\$ 2.12	\$ -	\$ -	\$ 4.26	\$ 812,956	Include a 15% swell factor
2.015	Load and haul to disposal site, 0.5 mile haul	165,900	LCY	\$ 1.48	\$ 2.59	\$ -	\$ -	\$ 3.08	\$ 995,392	Assume 30% of volume will require blasting, assume rock blasting productivity rate of 1500 cu/y/hr
2.016	Roadway Excavation (Rock Cut)	75,400	CY					\$ 20.37	\$ 1,535,582	Excavated material to be stockpiled for re-use, average 2 mile haul
2.017	Blasting operations	27,144	LCY	\$ 4.52	\$ 6.32	\$ 8.80	\$ -	\$ 13.60	\$ 371,419	Assume 30% of volume will require blasting, assume rock blasting productivity rate of 1500 cu/y/hr
2.018	Rock crushing operation	50,189	LCY	\$ 2.87	\$ 3.93	\$ -	\$ -	\$ 6.79	\$ 437,156	Assume 70% of volume will be excavated with ripper
2.019	Load and haul to processing area, 2 mile haul	-	LCY							No crushing and screening required
2.020	Crushing Operations	-	LCY							No crushing required
2.021	Screening Operations (Post-crushing)	-	LCY							No screening required
2.022	Load and haul to stockpile location, 2 mile haul	50,480	LCY	\$ 2.29	\$ 3.98	\$ -	\$ -	\$ 6.11	\$ 734,027	Haul to stockpile location, 2 mile hauling distance assumed
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	1,492,700	CY					\$ 9.72	\$ 14,511,292	Excavate common earth and direct haul to fill location
2.024	Roadway excavation	1,641,970	LCY	\$ 2.59	\$ 2.12	\$ -	\$ -	\$ 4.27	\$ 7,006,820	Include 10% swell factor
2.025	Load and haul to stockpile location, 0.25 mile haul	1,641,970	LCY	\$ 1.27	\$ 2.91	\$ -	\$ -	\$ 4.57	\$ 7,504,372	Assume 0.25 mile hauling distance
2.026	Crushing operations	-	CY							Not required
2.027	Screening operations	-	CY							Not required
3	Road Fill and Layer Work									
3.001	Roadway Embankment (from on-site excavation sources)	1,492,700	CY					\$ 6.44	\$ 9,617,106	From excavated suitable material, assume available on-site excavation
3.002	Load and haul to fill location, 0.25 mile haul	-	LCY							No double handling and screening required; all material to be loaded directly to fill location
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	1,492,700	LCY							included above
3.004	Spread and compact	1,492,700	LCY	\$ 3.32	\$ 3.12	\$ -	\$ -	\$ 6.44	\$ 9,617,106	Swell factor of 10% included. Direct hauling work included elsewhere
3.005	Roadway Embankment (imported from other excavation sources)	7,966,500	CY					\$ 7.17	\$ 57,123,902	Backfill material to be sourced from road excavations cut
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	8,768,150	LCY							elsewhere
3.007	Load and haul to fill location	8,768,150	LCY	\$ 3.25	\$ 3.10	\$ -	\$ -	\$ 6.32	\$ 57,123,902	Hauling cost included within related excavation project
3.008	Class 4 Aggregate subbase	19,100	CY					\$ 62.50	\$ 1,193,666	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
3.009	Purchase processed material from quarry	32,470	TON			\$ 15.15	\$ -	\$ 15.15	\$ 491,862	Purchase from commercial quarry, 1.7ton/cy
3.010	Load material from quarry to site stockpile location, 25 mile haul	11,995	LCY	\$ 12.84	\$ 12.11	\$ -	\$ -	\$ 21.56	\$ 117,404	Load to fill location, no stockpiling needed
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY							No stockpiling needed
3.012	Spread and compact	11,995	LCY	\$ 4.32	\$ 4.00	\$ -	\$ -	\$ 8.39	\$ 184,271	
3.013	Class 2 Aggregate base	19,100	CY					\$ 62.50	\$ 1,193,666	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
3.014	Purchase processed material from quarry	32,470	TON			\$ 15.15	\$ -	\$ 15.15	\$ 491,862	Purchase from commercial quarry, 1.7ton/cy
3.015	Load material from quarry to site stockpile location, 25 mile haul	11,995	LCY	\$ 12.84	\$ 12.11	\$ -	\$ -	\$ 21.56	\$ 117,404	Load to fill location, no stockpiling needed
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY							No stockpiling needed
3.017	Spread and compact	11,995	LCY	\$ 4.32	\$ 4.00	\$ -	\$ -	\$ 8.39	\$ 184,271	
3.018	Asphalt concrete	25,780	TON	\$ 8.57	\$ 4.73	\$ 102.88	\$ -	\$ 116.18	\$ 2,995,234	Assume HMA (Type A), 150lb/cy
3.019	Tack Coat	19	TON	\$ 941.17	\$ 472.10	\$ 2,510.29	\$ -	\$ 3,923.56	\$ 74,548	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton
4	Other Roadwork									
4.001	Bridge Replacement	-	SF							Not required
4.002	Midwest Guardrail System	3,032	LF	\$ 5.56	\$ 2.47	\$ 43.53	\$ -	\$ 51.56	\$ 156,364	Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'
4.003	Transition Railing (Type WB-31)	-	EA							Not required
4.004	End Anchor Assembly (Type SFT)	-	EA							Not required

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11.1. Construction Cost Summary: Dam Shell Re-design

Total Cost

Total Direct Cost Effect (76,960,537)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (76,960,537)

General Conditions

Mobilization	5.0%	(3,848,027)
Site General Conditions & Requirements	10.0%	(8,080,856)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(977,784)
Bonds	0.6%	(539,203)
GC Home Office Overhead	6.0%	(5,424,384)
GC Profit	8.0%	(7,666,463)

Total Contractor Indirect Markups (26,536,717)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (103,497,254)

Contingencies

Design Contingencies	10.0%	(10,349,725)
Construction Contingencies	15.0%	(17,077,047)

Total Contingency Allowance (27,426,772)

TOTAL DIRECT COST BEFORE ESCALATION (130,924,026)

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	(1,278,517)
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (132,202,543)

Item	Sub Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Labor (\$)	Equipment (\$)	Subtotal (\$)	Unit Price (\$)	Subtotal (\$)	Notes
0		Omit Baseline Cost Estimate											
		Omit baseline estimate	1	LS	\$	-	\$	-	\$	-	\$	352,593,965	352,593,965 (\$ (352,593,965))
1		PRECONSTRUCTION ACTIVITIES											
	1.001	Demolition Work	-	LS	\$	-	\$	-	\$	-			Elsewhere
	1.002	Cleaning and Grubbing	59	ACRE	\$	3,078.85	\$	5,373.52	\$	-	\$	8,452.37	501,732 Heavy vegetation removal
	1.003	Reservoir Clearing	-	ACRE	\$	-	\$	-	\$	-	\$	-	Elsewhere costed
	1.004	Erosion and Sediment Control	59	ACRE	\$	-	\$	-	\$	-	\$	3,760.50	225,223 Allowed \$0.25/SF to 30% of the total area
2		Process and Haul Filter Materials to Project											
	2.001	Process and Stockpile on Project - Zone 2A - Filter	726,000	Tons							\$	37.14	26,964,478
	2.002	Purchase processed material from quarry	726,000	Tons	\$		\$		\$	12.20	\$	20.20	16,814,950
	2.003	Haul material from quarry to site stockpile/fill location, 35 mile haul	491,118	LCY	\$	10.16	\$	11.34	\$		\$	12.09	5,939,819
													Include 10% waste factor / additional material supply 1.7 tons/ECY and 5.55 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
	2.004	Process and Stockpile on Project - Zone 2A - Drain	803,000	Tons							\$	37.15	29,832,148
	2.005	Purchase processed material from quarry	803,000	Tons	\$		\$		\$	20.20	\$	17,024,750	17,024,750
	2.006	Haul material from quarry to site stockpile/fill location, 33 mile haul	513,246	LCY	\$	10.16	\$	11.34	\$		\$	20.11	12,008,359
													1.7 tons/ECY and 5.55 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
	2.007	Process and Stockpile on Project - Zone 2A - Transition	107,800	Tons							\$	37.21	4,011,061
	2.008	Purchase processed material from quarry	107,800	Tons	\$		\$		\$	12.20	\$	20.20	2,342,785
	2.009	Haul material from quarry to site stockpile/fill location, 35 mile haul	72,924	LCY	\$	10.00	\$	11.39	\$		\$	12.19	1,830,278
													1.7 tons/ECY and 5.55 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
	2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons							\$	-	-
	2.011	Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	-	-
	2.012	Haul material from quarry to site stockpile/fill location, 33 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-
													1.7 tons/ECY and 5.55 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
	2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons							\$	-	-
	2.014	Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	-	-
	2.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-
													1.7 tons/ECY and 5.55 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
		Foundation Preparation and Grouting											
3		Foundation Excavation											
	3.001	Topsoil Salvage	131,250	BCY							\$	8.41	1,104,253
	3.002	Excavations - remove top 124 layer	144,325	LCY	\$	1.42	\$	2.33	\$		\$	3.63	324,415
	3.003	Load and haul to disposal area, 0.5 mile haul	144,325	LCY	\$	1.32	\$	2.90	\$		\$	4.02	379,342
	3.004	Dam Foundation Excavation - Common	341,250	BCY							\$	8.56	2,921,473
	3.005	Excavations - remove top 124 layer	375,375	LCY	\$	1.16	\$	2.23	\$		\$	3.77	1,433,842
	3.006	Load and haul to disposal area, 0.5 mile haul	375,375	LCY	\$	1.12	\$	2.90	\$		\$	4.02	1,307,500
	3.007	Dam Foundation Rock Ex - Rippable Rock	1,040,550	BCY							\$	11.71	12,182,875
	3.008	Rock excavations, no blasting	1,195,833	LCY	\$	2.11	\$	9.92	\$		\$	6.16	7,398,539
	3.009	Load and haul to stockpile, 0.5 mile haul	1,195,833	LCY	\$	1.11	\$	2.89	\$		\$	4.00	4,784,330
	3.010	Dam Foundation Rock Ex - Drill and Shoot	166,950	BCY							\$	24.20	4,039,693
	3.011	Blasting operations	200,340	LCY	\$	4.26	\$	1.78	\$	4.80	\$	14.86	3,074,934
	3.012	Load and haul to stockpile, 1 mile haul	200,340	LCY	\$	1.10	\$	3.83	\$		\$	5.30	1,063,758
	3.013	Crush and screen material	200,340	LCY	\$		\$		\$		\$		Not required
													No crushing and screening required
4		Foundation Preparation and Grouting											Included below
		Foundation Preparation - Beneath Core											
	4.001	Initial Foundation Cleaning - Core	65,000	SY							\$	20.06	1,304,206
	4.002	Initial foundation core cleanup	65,000	SY	\$	17.88	\$	5.52	\$		\$	17.00	1,103,176
	4.003	Load and haul to disposal area, 0.5 mile haul	17,875	CY	\$	3.78	\$	7.40	\$		\$	11.18	339,030
	4.004	Final Foundation Cleaning - Core	65,000	SY							\$	17.00	1,105,176
	4.005	Final foundation core cleanup	65,000	SY	\$	17.88	\$	5.52	\$		\$	17.00	1,103,176
	4.006	Load and haul to disposal area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required
	4.007	Dental Excavation	3,700	CY							\$	120.02	444,064
	4.008	Dental excavations	4,070	LCY	\$	37.66	\$	35.73	\$		\$	95.58	401,609
	4.009	Load and haul to site stockpile, 0.5 mile haul	4,070	LCY	\$	3.88	\$	6.60	\$		\$	10.43	42,454
	4.010	Dental Concrete	3,700	CY	\$	44.39	\$	20.16	\$	183.12	\$	247.68	916,398
	4.011	Grout Cap with Anchors	9,900	CY	\$	78.42	\$	22.69	\$	519.68	\$	624.86	6,186,119
													3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
	4.012	Curtain Grouting	96,100	LF							\$	78.68	7,561,102
	4.013	Drill setup for all holes	1,243	ea.	\$	121.11	\$	219.89	\$		\$	319.91	632,921
	4.014	Drill curtain grout holes	96,100	ft.	\$	20.34	\$	11.14	\$		\$	21.48	2,054,377
	4.015	Redrill grout holes	5,650	ft.	\$	10.42	\$	11.34	\$		\$	21.76	122,172
	4.016	Hookup to grout holes and grout nipples	4,805	ea.	\$	21.43	\$		\$		\$	92.45	439,409
	4.017	Inject Portland cement grout	5,442	cu. yd.	\$	483.28	\$	100.02	\$		\$	383.25	3,749,497
	4.018	Perform hydraulic conductivity tests	1,291	ea.	\$	-	\$	-	\$		\$	347.30	445,007
	4.019	Consolidation Grouting	40,000	LF							\$	78.69	3,147,635
	4.020	Drill setup for all holes	513	ea.	\$	121.11	\$	220.18	\$		\$	319.91	212,707
	4.021	Drill curtain grout holes	40,000	ft.	\$	20.34	\$	11.14	\$		\$	21.47	658,713
	4.022	Redrill grout holes	2,000	ft.	\$	10.42	\$	11.34	\$		\$	21.76	86,729
	4.023	Hookup to grout holes and grout nipples	2,000	ea.	\$	21.38	\$		\$		\$	92.19	182,779
													1 x hookup every 20'

Item	Sub Item	Description	Quantity	Unit	Unit Price (\$)	Material Price (\$)	Transportation Price (\$)	Production Price (\$)	Subtotal (\$)	Unit Price (\$)	Subtotal (\$)	Comments
4.024		Inject grout and cement grout	2,867	hr	\$	488.48	\$	129.07	\$		\$ 292.55	1.501, 413
4.025		Perform hydraulic conductivity tests	533	test	\$		\$		\$	847.50	\$ 347.50	1.028, 127
4.026		Type III Cement	4,800	Tons	\$	176.73	\$	73.00	\$	113.14	\$ 362.87	1,741,756
4.027		Backfill Concrete	-	CY	\$	-	\$	-	\$	-	\$	Elsewhere
5		Foundation Preparation - Beneath Shell										
5.001		Initial Foundation Cleaning - Shell	170,240	SY						\$ 4.51	\$ 767,396	
5.002		Initial dam shell cleanup	170,240	SY	\$	1.31	\$	2.41	\$	-	\$ 1.76	298,879
5.003		Load and haul to disposal area, 0.3 mile haul	31,371	LCY	\$	5.15	\$	6.36	\$	-	\$ 15.11	471,710
6		Foundation Drainage										
6.001		Furnish and Install Foundation Drain Pipe	500	LF	\$	47.70	\$	29.60	\$	35.56	\$ 112.86	56,428
6.002		Furnish and Install Foundation Drain Manholes	3	EA	\$	1,670.31	\$	1,017.05	\$	3,070.98	\$ 5,758.23	17,275
6.003		Seepage Partition Walls	700	CY	\$	523.27	\$	116.49	\$	465.37	\$ 1,105.13	773,589
												3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7		Embankment										
7.001		Develop Burrow Areas	1	LS								Included below
7.002		Z1 Strip/Overburden/Waste to Stockpile	1,150,000	BCY						\$ 7.48	\$ 8,605,073	Assumed common earth, 3000' haul w/ scraper
7.003		Embankment excavations	1,265,000	LCY	\$	0.89	\$	2.69	\$	-	\$ 3.65	4,613,091
7.004		Load and haul to site stockpile, 0.23 mile haul	1,265,000	LCY	\$	0.84	\$	2.30	\$	-	\$ 3.15	3,981,942
7.005		Z3 Strip/Overburden/Waste to Stockpile-Q1	73,333	BCY						\$ 9.14	\$ 669,951	
7.006		Embankment excavations	80,666	LCY	\$	1.45	\$	3.08	\$	-	\$ 4.52	364,218
7.007		Load and haul to site stockpile, 0.23 mile haul	80,666	LCY	\$	1.06	\$	2.73	\$	-	\$ 3.79	305,755
7.008		Z3 Strip/Overburden/Waste to Stockpile-Q2	200,000	BCY						\$ 9.01	\$ 1,801,938	
7.009		Embankment excavations	220,000	LCY	\$	1.43	\$	3.02	\$	-	\$ 4.45	876,818
7.010		Load and haul to site stockpile, 0.23 mile haul	220,000	LCY	\$	1.04	\$	2.70	\$	-	\$ 3.76	821,312
7.011		Z4 Strip/Overburden/Waste to Stockpile	-	BCY						\$ -	\$ -	
7.012		Embankment excavations	-	LCY	\$	-	\$	-	\$	-	\$ -	
7.013		Load and haul to site stockpile, 0.23 mile haul	-	LCY	\$	-	\$	-	\$	-	\$ -	
		Restore Burrow Areas										
7.014		Replace Overburden from Stockpile	355,833	ECY						\$ 6.75	\$ 2,402,878	Backfill burrow area using material from stockpile, allow 25% of stripping material
7.015		Load and haul to site stockpile, 0.35 mile haul	361,412	LCY	\$	1.10	\$	2.97	\$	-	\$ 4.07	1,503,490
7.016		Spread and compact	361,412	LCY	\$	1.14	\$	0.93	\$	-	\$ 2.07	506,379
7.017		Topsoil Replacement	125,000	ECY						\$ 9.82	\$ 1,227,668	Backfill burrow area using material from stockpile
7.018		Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	137,500	LCY	\$	1.76	\$	3.05	\$	-	\$ 5.61	835,851
7.019		Spread and compact	137,500	LCY	\$	1.17	\$	0.93	\$	-	\$ 2.12	291,217
7.020		Furnish and Install Zone 1 - Core	2,400,000	ECY						\$ 13.56	\$ 32,549,513	
7.021		Excavate from burrow area	2,045,000	LCY	\$	1.43	\$	3.02	\$	-	\$ 4.45	9,103,300
7.022		Load and haul to zone 5 fill location, 0.5 mile haul	2,640,000	LCY	\$	1.28	\$	2.80	\$	-	\$ 4.16	10,978,144
7.023		Spread and compact	2,640,000	LCY	\$	1.30	\$	2.22	\$	-	\$ 3.72	9,918,968
7.024		Load, Haul and Place - Zone 2A - Filter	726,000	Tons						\$ 3.19	\$ 2,316,629	
7.025		Load at stockpile and haul to fill location, 0.5 mile haul	147,335	LCY	\$	0.82	\$	2.82	\$	-	\$ 3.44	507,319
7.0251		Direct hauling from quarry	541,762	LCY								Elsewhere
7.026		Spread and compact	491,128	LCY	\$	1.15	\$	2.23	\$	-	\$ 3.58	1,809,310
7.027		Load, Haul and Place - Zone 2A - Drain	803,000	Tons						\$ 3.20	\$ 2,570,498	
7.028		Load at stockpile and haul to fill location, 0.5 mile haul	162,962	LCY	\$	0.84	\$	2.38	\$	-	\$ 3.50	576,758
7.0281		Direct hauling from quarry	360,244	LCY								Elsewhere
7.029		Spread and compact	541,246	LCY	\$	1.40	\$	2.28	\$	-	\$ 3.60	1,998,704
7.030		Load, Haul and Place - Zone 2A - Transition	451,000	Tons						\$ 3.21	\$ 1,446,193	
7.031		Load at stockpile and haul to fill location, 0.5 mile haul	91,528	LCY	\$	0.83	\$	2.53	\$	-	\$ 3.42	317,075
7.0311		Direct hauling from quarry	213,562	LCY								Elsewhere
7.032		Spread and compact	300,080	LCY	\$	1.46	\$	2.34	\$	-	\$ 3.70	1,126,118
7.033		Load, Haul and Place - Zone 2B - Filter	-	Tons						\$ -	\$ -	
7.034		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$ -	
7.0341		Direct hauling from quarry	-	LCY								Elsewhere
7.035		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$ -	
7.036		Load, Haul and Place - Zone 2B - Transition	-	Tons						\$ -	\$ -	
7.037		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$ -	
7.0371		Direct hauling from quarry	-	LCY								Elsewhere
7.038		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$ -	
7.039		Furnish and Install Zone 3 - Rockfill	1,677,000	ECY						\$ 27.54	\$ 46,179,994	
7.040		Blowing operations	2,012,000	LCY	\$	4.26	\$	5.99	\$	8.85	\$ 14.10	28,727,169
7.041		Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$ -	
7.042		Crush and screen material	2,012,000	LCY	\$	-	\$	-	\$	-	\$ -	
7.043		Load and haul to zone 3, 1.25 mile haul	2,012,000	LCY	\$	3.13	\$	3.33	\$	-	\$ 4.47	9,008,736
7.044		Spread and compact	2,012,000	LCY	\$	1.40	\$	2.29	\$	-	\$ 3.60	7,414,090

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11.2. Construction Cost Summary: Dam Shell Re-design

Total Cost

Total Direct Cost Effect (25,175,369)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (25,175,369)

General Conditions

Mobilization	5.0%	(1,258,768)
Site General Conditions & Requirements	10.0%	(2,643,414)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(319,853)
Bonds	0.6%	(176,384)
GC Home Office Overhead	6.0%	(1,774,427)
GC Profit	8.0%	(2,507,857)

Total Contractor Indirect Markups (8,680,703)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (33,856,072)

Contingencies

Design Contingencies	10.0%	(3,385,607)
Construction Contingencies	15.0%	(5,586,252)

Total Contingency Allowance (8,971,859)

TOTAL DIRECT COST BEFORE ESCALATION (42,827,931)

Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(418,229)
Escalation to Mid-point of Construction		<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (43,246,160)

Item	Item Name	Quantity	Unit	Unit Price	Subtotal (\$)	Material (\$)	Labor (\$)	Equipment (\$)	Subtotal (\$)	Unit Price	Subtotal (\$)	Notes
0	Omit Baseline Cost Estimate											
	Omit baseline estimate	1	LS	\$	-	\$	-	\$	-	\$	176,240,299	
1	PRECONSTRUCTION ACTIVITIES											
	1.001 Demolition Work	-	LS	\$	-	\$	-	\$	-			Elsewhere
	1.002 Clearing and Grubbing	30	ACRE	\$	3,113.40	\$	5,433.93	\$	-	\$	8,547.23	258,468 Heavy vegetation removal
	1.003 Reservoir Clearing	-	ACRE	\$	-	\$	-	\$	-	\$	-	Elsewhere costed
	1.004 Erosion and Sediment Control	30	ACRE	\$	-	\$	-	\$	-	\$	3,760.50	3,760.50 Allowed \$0.25/SF to 30% of the total area
2	Process and Haul Filter Materials to Project											
	2.001 Process and Stockpile on Project - Zone 2A - Filter	242,000	Tons							\$	37.01	8,957,510
	2.002 Purchase processed material from quarry	242,000	Tons	\$		\$		\$	22.20	\$	5,372,355	Include 10% waste factor / additional material supply
	2.003 Haul material from quarry to site stockpile/fill location, 3.5 mile haul	163,709	LCY	\$	10.47	\$	11.64	\$		\$	23.90	3,883,332 1.7ton/ECY and 1.53 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
	2.004 Process and Stockpile on Project - Zone 2A - Drain	297,000	Tons							\$	36.99	10,987,457
	2.005 Purchase processed material from quarry	297,000	Tons	\$		\$		\$	22.20	\$	6,591,365	Include 10% waste factor / additional material supply
	2.006 Haul material from quarry to site stockpile/fill location, 3.3 mile haul	200,912	LCY	\$	23.43	\$	11.43	\$		\$	21.58	4,335,099 1.7ton/ECY and 1.15 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
	2.007 Process and Stockpile on Project - Zone 2A - Transition	42,900	Tons							\$	37.20	1,595,863
	2.008 Purchase processed material from quarry	42,900	Tons	\$		\$		\$	22.20	\$	952,330	Include 10% waste factor / additional material supply
	2.009 Haul material from quarry to site stockpile/fill location, 3.5 mile haul	25,021	LCY	\$	10.80	\$	11.38	\$		\$	22.15	493,633 1.7ton/ECY and 1.53 swell factor (ECY to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
	2.010 Process and Stockpile on Project - Zone 2B - Filter	-	Tons							\$	-	-
	2.011 Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	-	-
	2.012 Haul material from quarry to site stockpile/fill location, 3.3 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-
	2.013 Process and Stockpile on Project - Zone 2B - Transition	-	Tons							\$	-	-
	2.014 Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	-	-
	2.015 Haul material from quarry to site stockpile/fill location, 3.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-
	Foundation Preparation and Grouting											
3	Foundation Excavation											
	3.001 Topsoil Salvage	60,900	BCY							\$	8.57	522,010
	3.002 Excavations - remove top 124 layer	65,990	LCY	\$	1.48	\$	2.18	\$		\$	3.70	247,943
	3.003 Load and haul to disposal area, 0.5 mile haul	65,990	LCY	\$	1.34	\$	2.93	\$		\$	4.09	274,107
	3.004 Dam Foundation Excavation - Common	127,050	BCY							\$	8.52	1,082,784
	3.005 Excavations - remove top 124 layer	135,753	LCY	\$	1.25	\$	2.20	\$		\$	3.75	524,025
	3.006 Load and haul to disposal area, 0.5 mile haul	135,753	LCY	\$	1.11	\$	2.68	\$		\$	4.00	556,757
	3.007 Dam Foundation Rock Ex - Rippable Rock	361,200	BCY							\$	11.73	4,237,708
	3.008 Rock excavations, no blasting	475,350	LCY	\$	2.11	\$	9.88	\$		\$	6.19	2,971,978
	3.009 Load and haul to stockpile, 0.5 mile haul	475,350	LCY	\$	1.32	\$	2.89	\$		\$	4.01	1,953,729
	3.010 Dam Foundation Rock Ex - Drill and Shoot	49,350	BCY							\$	24.20	1,194,337
	3.011 Blasting operations	50,249	LCY	\$	4.27	\$	1.74	\$	4.80	\$	14.81	750,060
	3.012 Load and haul to stockpile, 0.5 mile haul	50,220	LCY	\$	1.49	\$	3.05	\$		\$	5.34	269,278
	3.013 Crush and screen material	50,220	LCY	\$		\$		\$		\$		Not required No crushing and screening required
4	Foundation Preparation and Grouting											Included below
	Foundation Preparation - Beneath Core											
	4.001 Initial Foundation Cleaning - Core	20,000	SY							\$	20.29	405,775
	4.002 Initial foundation core cleanup	25,000	SY	\$	17.60	\$	1.58	\$		\$	17.18	393,578
	4.003 Load and haul to disposal area, 0.5 mile haul	5,500	CY	\$	3.78	\$	7.52	\$		\$	11.31	62,197
	4.004 Final Foundation Cleaning - Core	20,000	SY							\$	17.18	343,578
	4.005 Final foundation core cleanup	25,000	SY	\$	17.60	\$	1.58	\$		\$	17.18	393,578
	4.006 Load and haul to disposal area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required
	4.007 Dental Excavation	800	CY							\$	122.13	97,700
	4.008 Dental excavations	800	LCY	\$	39.56	\$	31.24	\$		\$	100.30	80,200
	4.009 Load and haul to site stockpile, 0.3 mile haul	800	LCY	\$	3.94	\$	6.70	\$		\$	10.72	8,434
	4.010 Dental Concrete	800	CY	\$	44.52	\$	20.23	\$	183.12	\$		247.87
	4.011 Grout Cap with Anchors	3,500	CY	\$	80.66	\$	23.34	\$	519.68	\$	11.50	635.18
	4.012 Curbin Grouting	31,800	LF							\$	78.89	2,508,759
	4.013 Drill setup for all holes	424	ea.	\$	120.91	\$	321.33	\$		\$	374.61	218,124
	4.014 Drill curbin grout holes	11,600	ft.	\$	20.37	\$	11.18	\$		\$	21.55	249,234
	4.015 Redrill grout holes	3,180	ft.	\$	10.50	\$	11.82	\$		\$	25.82	81,303
	4.016 Hookup to grout holes and grout nipples	1,500	ea.	\$	21.73	\$		\$		\$	91.73	145,054
	4.017 Inject Portland cement grout	1,110	cu. yd.	\$	486.04	\$	100.10	\$		\$	386.18	5,242,811
	4.018 Perform hydraulic conductivity tests	424	ea.	\$	-	\$	-	\$		\$	347.30	147,235
	4.019 Consolidation Grouting	13,900	LF							\$	79.83	1,109,693
	4.020 Drill setup for all holes	145	ea.	\$	301.88	\$	387.79	\$		\$	330.61	105,013
	4.021 Drill curbin grout holes	13,800	ft.	\$	10.34	\$	11.23	\$		\$	21.84	101,585
	4.022 Redrill grout holes	3,300	ft.	\$	12.51	\$	12.95	\$		\$	25.95	84,605
	4.023 Hookup to grout holes and grout nipples	605	ea.	\$	23.98	\$		\$		\$	92.98	56,619

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Item	Sub Item	Description	Quantity	Unit	Unit Price	Subtotal Price	Material Price	Labor Price	Equipment Price	Subtotal Price	Unit Price	Quantity	Unit	Subtotal Price	Comments
7.045		Excavations in common soil	135,800	LCY	\$	1.42	\$	2.22	\$	-	\$	3.64	\$	1,305,759	No blasting required; balance of excavations covered within dam foundation excavation work (refer to material balance diagrams); include 15% swell factor
7.047		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No crushing and screening required
7.048		Direct hauling from quarry excavation, 1 mile haul	358,000	LCY	\$	1.26	\$	9.30	\$	-	\$	4.75	\$	1,705,317	Include 3 3/8" steel factor; no stockpiling required; direct haul
7.049		Load at stockpile and haul to fill location, 0.5 mile haul	1,780,200	LCY	\$	0.25	\$	2.51	\$	-	\$	3.20	\$	5,812,491	Include 15% swell factor
7.050		Spread and compact	2,119,000	LCY	\$	1.45	\$	2.23	\$	-	\$	3.69	\$	7,875,620	
7.051		Furnish and Install Riprap	152,000	ECY								39.93	\$	6,069,733	
7.052		Blasting operations	182,400	LCY	\$	4.28	\$	5.79	\$	4.89	\$	14.96	\$	2,719,482	Include 10% swell factor
7.053		Load and haul to processing area, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
7.054		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No crushing and screening required
7.055		Load and haul to fill location, 0.5 mile haul	182,400	LCY	\$	0.80	\$	2.54	\$	-	\$	3.34	\$	609,200	
7.056		Access placement	182,400	LCY	\$	3.80	\$	9.03	\$	-	\$	12.83	\$	2,349,481	
8		Other Work													
8.001		GG Dam - Bypass Pipeline and U/S Cofferdam													Elsewhere
8.002		Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	\$	-	\$	-	\$	-	\$	2,300,000.00	\$	2,300,000.00	Allowance
8.003		Seeding and Mulching	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	
8.004		Restoration													Elsewhere
8.005		Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	870	CY								100.72	\$	87,627	
8.006		Purchase and transport gravel to fill location and stockpile, 33 mi haul	1,001	LCY	\$	13.83	\$	14.34	\$	27.73	\$	65.41	\$	65,440	Include 3 3/8" steel factor
8.007		Place and compact	1,001	LCY	\$	7.28	\$	14.84	\$	-	\$	22.17	\$	22,181	
8.008		Developing haul routes - Haul routes inside reservoir	22	ACRES								26,990.65	\$	593,794	Clear, grade, provide gravel fill layer and compact
8.009		Clear and grub	958,320	SF	\$	0.07	\$	0.12	\$	-	\$	0.19	\$	183,137	
8.0091		Load and haul earth fill	17,747	CY	\$	1.69	\$	4.62	\$	-	\$	6.32	\$	112,120	Use existing earth fill material from stockpile
8.010		Grade and Compact surface for earthen road	958,320	SF	\$	0.13	\$	0.13	\$	-	\$	0.31	\$	298,329	
8.011		Developing haul routes - Haul routes outside reservoir	15	ACRES								27,785.55	\$	416,783	Clear, grade, provide gravel fill layer and compact
8.012		Clear and grub	651,400	SF	\$	0.08	\$	0.12	\$	-	\$	0.20	\$	130,812	
8.0121		Load and haul earth fill	11,100	CY	\$	1.79	\$	4.88	\$	-	\$	6.67	\$	80,723	Use existing earth fill material from stockpile
8.013		Grade and Compact surface for earthen road	651,400	SF	\$	0.14	\$	0.14	\$	-	\$	0.31	\$	205,230	
8.014		Rock processing areas													Not required
8.015		Mass Concrete / Backfill Concrete	2,700	CY	\$	94.53	\$	50.30	\$	233.06	\$	377.89	\$	1,020,296	
8.016		Mass Concrete for spillway	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.017		Concrete Gravity Dam	-	CY								-	\$	-	Not required
8.018		Clay Backfill	-	CY								-	\$	-	Not required
8.019		Clay excavations from borrow area	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.02		Load and haul from stockpile to fill location, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.021		Place clay backfill material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.022		Riprap and Drain	-	CY								-	\$	-	Not required
8.023		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.024		Load and haul to processing area, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.025		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.026		Load and haul from stockpile to fill location, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.027		Spread riprap	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
8.028		Rim Grouting	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.029		Bridge	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.030		Dewatering allowance	1	LS	\$	-	\$	-	\$	-	\$	575,000.00	\$	575,000.00	Allowance
9		Golden Gate Dam Bypass Pipeline Facilities													Included within Golden Gate Estimate
9.001		Upstream Cofferdam	-	CY								-	\$	-	
9.002		Sheet pile cofferdams	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	
9.003		Excavations - remove top soil layer and stockpile	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.004		Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.005		Purchase processed material from quarry	-	Ton	\$	-	\$	-	\$	-	\$	-	\$	-	
9.006		Haul material from quarry to site stockpile, 40 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.007		Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.008		Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.009		Install 48-inch Steel Pipe and Encasement	-	LF								-	\$	-	
9.010		Excavate trench in bedrock	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.011		Load and haul material to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.012		48" steel pipe placement	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	
9.013		Concrete backfill for pipe trench (plain concrete)	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.014		Reinforcement for concrete backfill	-	TON	\$	-	\$	-	\$	-	\$	-	\$	-	
9.015		48" flexi cone valve for controlled release (buffered head, no energy dissipation chamber)	-	LS	\$	-	\$	-	\$	-	\$	-	\$	-	
9.016		Cast into riprapable bridge, 10' high (assume precast) reinforcement for concrete riprapable (163.3 lbs)	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	
9.017		Install 48"x48" ductile rock on conc. riprapable	-	LS	\$	-	\$	-	\$	-	\$	-	\$	-	
9.018		Gravel pipe	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.019		Field Survey	-	LS	\$	-	\$	-	\$	-	\$	-	\$	-	
9.020		Riprap Discharge Channel	-	CY								-	\$	-	
9.021		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.022		Excavate	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.023		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
9.024		Load and haul to stockpile, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
9.025		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
10		Sites Dam Diversion Facilities													
10.001		Upstream Cofferdam	-	CY								-	\$	-	Included above
10.002		Sheet pile cofferdams	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	Not required; Earth fill coffer dam
10.003		Excavations - remove top soil layer and stockpile	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
10.004		Load and haul to disposal site, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	

Item	Sub Item	Description	Quantity	Unit	Unit Price (\$)	Material (\$)	Transport (\$)	Installation (\$)	Construction (\$)	Other (\$)	Total (\$)	Notes
10.003		Purchase processed material from quarry	-	Ton	\$	\$	\$	\$	\$	\$	\$	
10.004		Import material to site stockpile, 40 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
10.007		Load at stockpile and haul to fill location, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$	\$	
10.008		Spread and compact	-	LCY	\$	\$	\$	\$	\$	\$	\$	
10.009		Upstream Portal Excavation and Rock Bolts	15,800	CY							\$ 44.61	\$ 704,890
10.010		Excavate and load material	17,380	LCY	\$	1.39	\$	2.42	\$	\$	\$ 3.81	\$ 66,147
10.011		Haul to disposal site, 0.5 mile haul	17,380	LCY	\$	1.82	\$	6.37	\$	\$	\$ 8.19	\$ 142,815
10.012		Shutcrete portal face	940	CY	\$	88.88	\$	41.08	\$	\$	\$ 129.97	\$ 121,727
10.013		Steel plate for shutcrete	17	TON	\$	-	\$	-	\$	\$	\$ 2,478.25	\$ 41,714
10.014		20 ft rock bolts, 5 ft on center - Drilling	790	EA	\$	50.73	\$	26.73	\$	\$	\$ 77.46	\$ 58,451
10.015		3.5" diam grouted hole with #10 bar	30	CY	\$	263.46	\$	78.40	\$	\$	\$ 3,522.70	\$ 1,07,858
10.016		Upstream Portal Backfill	24,500	CY							\$ 10.54	\$ 258,283
10.017		Load at stockpile and haul to fill location, 0.5 mile haul	26,950	LCY	\$	0.98	\$	4.34	\$	\$	\$ 5.32	\$ 143,587
10.018		Spread and compact	26,950	LCY	\$	2.11	\$	7.15	\$	\$	\$ 8.26	\$ 224,697
10.019		Inlet and Valve Structures	2,200	CY							\$ 1,092.50	\$ 2,403,500
10.020		Pour inlet and valve structures	2,200	CY	\$	-	\$	-	\$	\$	\$ 1,092.50	\$ 2,403,500
10.021		Downstream Portal Excavation and Rock Bolts	12,500	CY							\$ 45.40	\$ 567,445
10.022		Excavate and load material	13,750	LCY	\$	1.18	\$	2.39	\$	\$	\$ 4.57	\$ 62,971
10.023		Haul to disposal site, 0.5 mile haul	13,750	LCY	\$	1.68	\$	4.56	\$	\$	\$ 6.24	\$ 85,497
10.024		Shutcrete portal face	750	CY	\$	89.86	\$	41.08	\$	\$	\$ 130.94	\$ 98,177
10.025		Steel plate for shutcrete	12	TON	\$	-	\$	-	\$	\$	\$ 2,478.25	\$ 29,739
10.026		20 ft rock bolts, 5 ft on center - Drilling	625	EA	\$	52.10	\$	26.73	\$	\$	\$ 78.83	\$ 49,067
10.027		3.5" diam grouted hole with #10 bar	28	CY	\$	289.78	\$	74.32	\$	\$	\$ 3,522.70	\$ 1,00,066
10.028		Downstream Portal Backfill	34,400	CY							\$ 10.22	\$ 351,620
10.029		Load at stockpile and haul to fill location, 0.5 mile haul	37,840	LCY	\$	0.96	\$	4.04	\$	\$	\$ 4.96	\$ 187,287
10.030		Spread and compact	37,840	LCY	\$	2.14	\$	7.19	\$	\$	\$ 8.33	\$ 313,852
10.031		Tunnel Excavation and Initial Support (Double Shift)	1,590	LF	\$	-	\$	-	\$	\$	\$ 7,304.42	\$ 11,614,023
10.032		Tunnel Concrete Lining	1,590	LF	\$	-	\$	-	\$	\$	\$ 7,205.71	\$ 11,457,076
10.033		10-Ft Steel Pipe Cut and Cover Section	1,590	LF	\$	-	\$	-	\$	\$	\$ 8,094.08	\$ 12,869,593
10.034		Mechanical, Valves, Trash rack, and Metals	1	LS	\$	-	\$	-	\$	\$	\$ 9,775,000	\$ 9,775,000
10.035		Riprap Discharge Channel	75	CY							\$ 458.82	\$ 34,412
10.036		Blowing operations	90	LCY	\$	59.57	\$	61.43	\$	\$	\$ 120.99	\$ 10,944
10.037		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	90	LCY	\$	22.91	\$	69.17	\$	\$	\$ 92.08	\$ 8,280
10.038		Crush and screen material	-		\$	-	\$	-	\$	\$	\$	
10.039		Load and haul to stockpile, 1 mile haul	90	LCY	\$	13.36	\$	58.38	\$	\$	\$ 71.75	\$ 6,455
10.040		Place at the channel	90	LCY	\$	33.55	\$	95.03	\$	\$	\$ 99.58	\$ 8,754
11		ERS Facility										Included within Saddle Dam 3 estimate
11.001		Upstream Portal Excavation and Rock Bolts	-	CY							\$	-
11.002		Excavate and load material	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.003		Haul to disposal site, 1 mile haul	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.004		Shutcrete portal face	-	CY	\$	-	\$	-	\$	\$	\$	-
11.005		Steel plate for shutcrete	-	TON	\$	-	\$	-	\$	\$	\$	-
11.006		20 ft rock bolts, 5 ft on center - Drilling	-	EA	\$	-	\$	-	\$	\$	\$	-
11.007		3.5" diam grouted hole with #10 bar	-	CY	\$	-	\$	-	\$	\$	\$	-
11.008		Upstream Portal Backfill	-	CY							\$	-
11.009		Haul excavated material and stockpile, 1 mi assumed	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.010		Backfill-Compact and grade	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.011		Inlet and Valve Structures	-	CY							\$	-
11.012		Pour inlet and valve structures	-	CY	\$	-	\$	-	\$	\$	\$	-
11.013		Downstream Portal Excavation and Rock Bolts	-	CY							\$	-
11.014		Excavate and load material	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.015		Haul to disposal site, 1 mile haul	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.016		Shutcrete portal face	-	CY	\$	-	\$	-	\$	\$	\$	-
11.017		Steel plate for shutcrete	-	TON	\$	-	\$	-	\$	\$	\$	-
11.018		20 ft rock bolts, 5 ft on center - Drilling	-	EA	\$	-	\$	-	\$	\$	\$	-
11.019		3.5" diam grouted hole with #10 bar	-	CY	\$	-	\$	-	\$	\$	\$	-
11.020		Downstream Portal Backfill	-	CY							\$	-
11.021		Haul excavated material and stockpile, 1 mi assumed	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.022		Backfill-Compact and grade	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	\$	\$	-
11.024		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	\$	\$	-
11.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	\$	\$	-
11.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	\$	\$	-
11.027		Riprap Discharge Channel	-	CY							\$	-
11.028		Blowing operations	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.029		Excavate, load and haul to stockpile/processing area, 1 mile haul	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.030		Crush and screen material	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	-	\$	-	\$	\$	\$	-
11.032		Place at the channel	-	LCY	\$	-	\$	-	\$	\$	\$	-
12		Misc allowance for small items, allow 1%	1.0%	%							\$ 149,569,238	\$ 149,569,238
Total Direct Cost Effect			27	Acres	\$	1,803,796.35	\$	1,754,955.00	\$	795,732.96	\$	4,354,484.31

Sites Reservoir (Alt 1): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

12. Construction Cost Summary: Assume 10% drawdown in 10 days

Total Cost

Total Direct Cost Effect (8,914,696)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (8,914,696)

General Conditions

Mobilization	5.0%	(445,735)
Site General Conditions & Requirements	10.0%	(936,043)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(113,261)
Bonds	0.6%	(62,458)
GC Home Office Overhead	6.0%	(628,332)
GC Profit	8.0%	(888,042)

Total Contractor Indirect Markups (3,073,871)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (11,988,567)

Contingencies

Design Contingencies	10.0%	(1,198,857)
Construction Contingencies	15.0%	(1,978,114)

Total Contingency Allowance (3,176,971)

TOTAL DIRECT COST BEFORE ESCALATION (15,165,538)

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	(148,097)
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (15,313,635)

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Cost Estimate
AAEI Class 4
April 16, 2021

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Sites Reservoir (Alt 1): Roadwork VE Review
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

14. Construction Cost Summary: Produce aggregate base materials from on-site materials				
			Unit Cost Rate (\$/LF)	Total Cost
LF:			284,337	
Estimated Cost Effect			(8.55)	(2,430,278)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS			(8.55)	(2,430,278)
General Conditions				
Mobilization		5.0%	(0.43)	(121,514)
Site General Conditions & Requirements		10.0%	(0.90)	(255,179)
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	(0.11)	(30,877)
Bonds		0.6%	(0.06)	(17,027)
GC Field and Home Office Overhead		5.0%	(0.50)	(142,744)
GC Profit		5.0%	(0.53)	(149,881)
Total Contractor Indirect Markups			(2.52)	(717,222)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES			(11.07)	(3,147,500)
Contingencies				
Design Contingencies		10.0%	(1.11)	(314,750)
Construction Contingencies		15.0%	(1.83)	(519,337)
Total Contingency Allowance			(2.93)	(834,087)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION			(14.00)	(3,981,587)
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	(0.14)	(38,882)
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING			(14.14)	(4,020,469)

Item	Description	Quantity	Unit	Lower Bid	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price
3	Road Fill and Layer Work												
3.008	Class 4 Aggregate subbase	(43,200)	CY							\$ 51.12	\$ (2,208,229)	Purchase from commercial quarry, includes placing, compaction, and spreading. Assume 1.7 ton/cy	
3.009	Purchase processed material from quarry	(23,480)	TON	\$		\$	18.53	\$		\$ 18.53	\$ (1,122,351)	Purchase from commercial quarry, 1.7ton/cy	
3.010	Haul material from quarry to site stockpile/fill location, 35 mile haul	(23,480)	LCY	\$	12.15	\$	12.62	\$		\$ 12.62	\$ (2,965,678)	Haul to fill location, no stockpiling needed	
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$		\$		\$		\$	\$	No stockpiling needed	
3.012	Spread and compact	-	LCY	\$		\$		\$		\$	\$	Not included as part of review	
3.013	Class 2 Aggregate base	(120,000)	CY							\$ 51.12	\$ (6,133,969)	Purchase from commercial quarry, includes placing, compaction, and spreading. Assume 1.7 ton/cy	
3.014	Purchase processed material from quarry	(65,400)	TON	\$		\$	18.53	\$		\$ 18.53	\$ (1,200,819)	Purchase from commercial quarry, 1.7ton/cy	
3.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	(65,400)	LCY	\$	12.15	\$	12.62	\$		\$ 12.62	\$ (8,243,559)	Haul to fill location, no stockpiling needed	
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$		\$		\$		\$	\$	No stockpiling needed	
3.017	Spread and compact	-	LCY	\$		\$		\$		\$	\$	Not included as part of review	
3.022	Produce aggregate base materials from on-site materials	163,200	CY							\$ 36.23	\$ 5,911,920		
3.021	Excavate material	(107,600)	LCY	\$		\$		\$	35.00	\$ 35.00	\$ (3,766,000)		
3.022	Haul excavated material to processing yard, 1 mile haul	(107,600)	LCY	\$		\$		\$	3.00	\$ 3.00	\$ (322,800)		
3.023	Crush material	(107,600)	LCY	\$		\$		\$	1.00	\$ 1.00	\$ (107,600)		
3.024	Screen material	(107,600)	LCY	\$		\$		\$	1.50	\$ 1.50	\$ (161,400)		
3.025	Haul to stockpile / haul to fill location, 1 mile haul	(107,600)	LCY	\$		\$		\$	3.00	\$ 3.00	\$ (322,800)		
Total Direct Cost Effect		284,337	LF	\$	(5.70)	\$	(7.80)	\$	(14.76)	\$	(41.76)	\$ (8.50)	\$ (2,436,278)

15. Construction Cost Summary: Use spillway conduit

Total Cost

Total Direct Cost Effect (2,553,167)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (2,553,167)

General Conditions

Mobilization	5.0%	(127,658)
Site General Conditions & Requirements	10.0%	(268,082)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(32,438)
Bonds	0.6%	(17,888)
GC Home Office Overhead	6.0%	(179,954)
GC Profit	8.0%	(254,335)

Total Contractor Indirect Markups (880,355)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (3,433,522)

Contingencies

Design Contingencies	10.0%	(343,352)
Construction Contingencies	15.0%	(566,531)

Total Contingency Allowance (909,883)

TOTAL DIRECT COST BEFORE ESCALATION (4,343,405)

Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(42,415)
Escalation to Mid-point of Construction		<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (4,385,820)

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	Item	Description	Quantity	Unit	Unit Price	Subtotal	Material Price	Subtotal	Subtotal	Unit Price	Subtotal	Comments	
6	6.001	Load and haul to disposal area, 0.5 mile haul	5,177	LCY	\$	4.34	\$	7.50	\$	12.54	\$	94,343 Assume removal of top layer, 0.5' thick	
	Foundation Drainage												
	6.001	Furnish and Install Foundation Drain Pipe	1,200	LF	\$	45.17	\$	28.03	\$	35.56	\$	130,508	
	6.002	Furnish and Install Foundation Drain Manholes	4	EA	\$	1,252.73	\$	762.78	\$	3,070.88	\$	20,346	
7	6.003	Seepage Partition Walls	-	CY	\$	-	\$	-	\$	-	\$	- Not required	
	Embankment												
	7.001	Develop Burrow Areas	1	LS								Included below	
	7.002	Z1 Strip/Overburden/Waste to Stockpile	212,000	BCY						\$	7.59	\$	1,608,774 Assumed common earth, 3000' haul w/ scraper
	7.003	Embankment excavations	231,200	LCY	\$	0.98	\$	2.27	\$	3.71	\$	854,317 Include 10% swell factor	
	7.004	Load and haul to site stockpile, 0.25 mile haul	231,200	LCY	\$	0.86	\$	2.04	\$	3.19	\$	744,458	
	7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	174,000	BCY						\$	9.03	\$	1,570,920
	7.006	Embankment excavations	191,400	LCY	\$	1.43	\$	1.03	\$	4.46	\$	851,024 Include 10% swell factor	
	7.007	Load and haul to site stockpile, 0.25 mile haul	191,400	LCY	\$	1.01	\$	1.70	\$	3.75	\$	716,898	
	7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	-	BCY						\$	-	\$	- Not required
7.009	Embankment excavations	-	LCY	\$	-	\$	-	\$	-	\$	-	-	
7.010	Load and haul to site stockpile, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-	
7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY						\$	-	\$	- Not required	
7.012	Embankment excavations	-	LCY	\$	-	\$	-	\$	-	\$	-	-	
7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-	
Restore Burrow Areas													
7.014	Replace Overburden from Stockpile	96,500	ECY						\$	7.03	\$	678,739 Backfill burrow area using material from stockpile, allow 25% of stripping material	
7.015	Load and haul to site stockpile, 0.25 mile haul	106,150	LCY	\$	1.28	\$	3.07	\$	4.37	\$	466,500		
7.016	Spread and compact	106,150	LCY	\$	1.11	\$	0.93	\$	2.07	\$	219,130		
7.017	Topsoil Replacement	58,000	ECY						\$	9.82	\$	569,581 Backfill burrow area using material from stockpile	
7.018	Excavate, load and haul excavated backfill material to fill location, 1 mile haul	63,800	LCY	\$	1.73	\$	9.02	\$	6.27	\$	401,931		
7.019	Spread and compact	63,800	LCY	\$	1.19	\$	0.92	\$	2.16	\$	137,649		
7.020	Furnish and Install Zone 1 - Core	470,000	ECY						\$	13.08	\$	6,147,931	
7.021	Excavate from borrow area	517,000	LCY	\$	1.44	\$	3.03	\$	4.47	\$	2,310,809		
7.022	Load and haul to zone-1 fill location, 0.25 mile haul	517,000	LCY	\$	1.14	\$	2.58	\$	3.69	\$	1,905,208		
7.023	Spread and compact	517,000	LCY	\$	1.51	\$	2.27	\$	3.78	\$	1,937,034		
7.024	Load, Haul and Place - Zone 2A - Filter	181,100	Tons						\$	3.25	\$	589,380	
7.025	Load at stockpile and haul to fill location, 0.5 mile haul	36,753	LCY	\$	0.94	\$	2.58	\$	3.45	\$	126,830		
7.026	Direct hauling from quarry	85,759	LCY									Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location	
7.027	Spread and compact	122,209	LCY	\$	1.49	\$	2.29	\$	3.79	\$	462,530		
7.028	Load, Haul and Place - Zone 2A - Drain	183,666	Tons						\$	3.28	\$	602,043	
7.029	Load at stockpile and haul to fill location, 0.5 mile haul	37,273	LCY	\$	1.00	\$	2.74	\$	3.74	\$	139,313		
7.030	Direct hauling from quarry	86,971	LCY									Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly	
7.031	Spread and compact	121,243	LCY	\$	1.47	\$	2.25	\$	3.72	\$	461,530		
7.032	Load, Haul and Place - Zone 2A - Transition	49,900	Tons						\$	3.49	\$	174,087	
7.033	Load at stockpile and haul to fill location, 0.5 mile haul	19,127	LCY	\$	1.01	\$	2.75	\$	3.76	\$	72,049		
7.034	Direct hauling from quarry	23,629	LCY									Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location	
7.035	Spread and compact	34,756	LCY	\$	1.58	\$	2.44	\$	4.01	\$	139,038		
7.036	Load, Haul and Place - Zone 2B - Filter	-	Tons						\$	-	\$	-	
7.037	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.038	Direct hauling from quarry	-	LCY	\$	-	\$	-	\$	-	\$	-	Elsewhere	
7.039	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	-	
7.040	Load, Haul and Place - Zone 2B - Transition	-	Tons						\$	-	\$	-	
7.041	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.042	Direct hauling from quarry	-	LCY	\$	-	\$	-	\$	-	\$	-	Elsewhere	
7.043	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	-	
7.044	Crush and screen material	289,200	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.045	Load and haul to zone-3, 0.5 mile haul	289,200	LCY	\$	1.15	\$	3.33	\$	5.41	\$	1,564,533		
7.046	Spread and compact	289,200	LCY	\$	1.17	\$	2.23	\$	3.71	\$	1,074,705		
7.047	Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.048	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.049	Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.050	Load and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.051	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.052	Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.054	Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.055	Load and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
7.056	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	Not required	
8	Other Work												
	8.001	GG Dam - Bypass Pipeline and U/S Cofferdam										Elsewhere	

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Appendix B

Construction Feasibility-Level Cost Estimate Tables – HR – Alternative 2

Sites Reservoir (Alt 2): Site Demolition and Clearing Work
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAEI Class 4
February 19, 2021

20. Construction Cost Summary: Site Demolition and Clearing Work				
			Unit Cost Rate (\$/ACRE)	Total Cost
			ACRE: 1,050	
Total Direct Cost			15,809.25	16,599,710
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			15,809.25	16,599,710
General Conditions				
Mobilization		5.0%	790.46	829,986
Site General Conditions & Requirements		10.0%	1,659.97	1,742,970
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	200.86	210,899
Bonds		0.6%	110.76	116,301
GC Field and Home Office Overhead		5.0%	928.56	974,993
GC Profit		5.0%	974.99	1,023,743
Total Contractor Indirect Markups			4,665.61	4,898,892
TOTAL DIRECT COST BEFORE CONTINGENCIES			20,474.86	21,498,602
Contingencies				
Design Contingencies		15.0%	3,071.23	3,224,790
Construction Contingencies		15.0%	3,531.91	3,708,509
Total Contingency Allowance			6,603.14	6,933,299
TOTAL DIRECT COST BEFORE ESCALATION			27,078.00	28,431,901
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	264.43	277,647
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			27,342.43	28,709,548

Item	Description	Quantity	Unit	Unit Price	Subtotal Price	Material Price	Material Price	Subtotal Price	Unit Price	Price	Comment
1	General Clearing and Grubbing										
1.001	Clearing and Grubbing	289	ACRE	\$ 2,460.94	\$ 1,484.32	\$ -	\$ -	\$ 3,945.25	\$ 1,140.179		Light vegetation clearing work (1050 Acres of clearing work)
2	Reservoir Clearing and Demolition (Carried over from May 2020 NODOS Estimate)										Reference Estimate: 2.NODOS_Clear-Grade_2020-04-30
2.001	Remove and Dispose of Trees - Oak Woodlands	700	ACRE	\$ 2,600.00	\$ 1,500.00	\$ -	\$ 6,400.00	\$ 10,500.00	\$ 7,350.000		Costs as per May 2020 NODOS Estimate
	a. Oak woodland around reservoir										
	b. Remove and dispose off site										
	c. Cut stumps within 12" of ground										
	d. Stump removal not required										
	e. Provide access to tree cutting locations										
2.002	Vegetation Removal - Occupied Areas	61	ACRE	\$ 37,000.00	\$ 33,000.00	\$ -	\$ 10,500.00	\$ 80,500.00	\$ 4,910,500		
	a. Trees, shrubs										
	b. Town of Sites and homesteads										
	c. Remove and dispose off site										
	d. Cut tree stumps within 12" of ground										
	e. Tree Stump removal not required										
2.003	Demolish Residential Housing	24	EA	\$ -	\$ -	\$ -	\$ 10,000.00	\$ 10,000.00	\$ 240,000		
	a. Demolish, remove, dispose off site										
	b. Remove concrete foundations and walls in designated borrow areas										
2.004	Demolish Barns	29	EA	\$ -	\$ -	\$ -	\$ 7,900.00	\$ 7,900.00	\$ 229,100		
	a. Demolish, remove, dispose off site										
2.005	Demolish Out-buildings - Sheds & Garages	36	EA	\$ -	\$ -	\$ -	\$ 8,100.00	\$ 8,100.00	\$ 291,600		
	a. Demolish, remove, dispose off site										
2.006	Demolish silos & water towers	12	EA	\$ -	\$ -	\$ -	\$ 11,000.00	\$ 11,000.00	\$ 132,000		
	a. Demolish, remove, dispose off site										
2.007	Remove Motor Homes	2	EA	\$ -	\$ -	\$ -	\$ 5,000.00	\$ 5,000.00	\$ 10,000		
	a. Demolish, remove, dispose off site										
2.008	Demolish and clean Septic Systems	28	EA	\$ 2,700.00	\$ 5,800.00	\$ -	\$ 3,600.00	\$ 11,900.00	\$ 333,200		
	a. Pump and dispose of contents										
	b. Remove and dispose of lid, walls, bottom										
	c. Remove any gravel surround										
	d. Backfill excavation with clay soils										
2.009	Plug Groundwater Wells	38	EA	\$ 1,350.00	\$ 2,800.00	\$ 300.00	\$ 2,600.00	\$ 7,070.00	\$ 268,660		
	a. Follow Calusa or Glenn County standards										
	b. Remove and dispose of pumps, motors, electrical										
2.010	Remove Underground Fuel Tanks	15	EA	\$ 2,700.00	\$ 5,800.00	\$ -	\$ 3,300.00	\$ 11,600.00	\$ 174,000		
	a. Follow County/State Standards										
	b. Dispose off site										
	c. Remove contaminated soils, backfill excavation with clay soils										
2.011	Remove Metal Fencing and Posts (No Salvage)	40	MILE	\$ -	\$ -	\$ -	\$ 13,500.00	\$ 13,500.00	\$ 540,000		
	a. Dispose off site										
2.012	Remove Asphalt Paving (Two-Lane Roads)	73.906	SY	\$ 3.10	\$ 5.60	\$ -	\$ 1.05	\$ 9.75	\$ 720,586		As per Alt 1 roadwork sheet
	a. Dispose off site										
	b. All removal not required if present										
	c. Does not include removal of temporary north bypass road in reservoir (In road estimates)										
2.013	Locate Decommissioned Gas Wells, Verify Closure	10	EA	\$ -	\$ -	\$ -	\$ 3,000.00	\$ 3,000.00	\$ 30,000		
	a. Locate wells, excavate top, verify closure										
	b. Wells in reservoir identified as plugged dry gas wells in DOGGR records										
2.014	Cost escalation on May 2020 NODOS Estimate items carried over	1.51%	LS				\$ 15,229,646	\$ 15,229,646	\$ 229,886		Escalation from May 2020 to Dec 2020 at a rate of 3% per annum
Total Direct Cost		1,260	ACRE	\$ 4,037.03	\$ 4,755.92	\$ 11.50	\$ 6,400.00	\$ 15,029.25	\$ 14,996,710		

21. Construction Cost Summary: Golden Gate Dam

Total Cost

Total Direct Cost 298,528,075

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 298,528,075

General Conditions

Mobilization	5.0%	14,926,404
Site General Conditions & Requirements	10.0%	31,345,448
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	3,792,799
Bonds	0.6%	2,091,556
GC Home Office Overhead	6.0%	21,041,057
GC Profit	8.0%	29,738,027

Total Contractor Indirect Markups 102,935,291

TOTAL DIRECT COST BEFORE CONTINGENCIES 401,463,366

Contingencies

Design Contingencies	10.0%	40,146,337
Construction Contingencies	15.0%	66,241,455

Total Contingency Allowance 106,387,792

TOTAL DIRECT COST BEFORE ESCALATION 507,851,158

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	4,959,337
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 512,810,495

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Transportation (\$)	Installation (\$)	Other (\$)	Total (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES											
1.001	Demolition Work	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
1.002	Clearing and Grubbing	46	ACRE	\$ 3,134.83	\$ 5,471.22	\$ -	\$ -	\$ -	\$ 8,606.05	\$ 395,304	Heavy vegetation removal
1.003	Reservoir Clearing	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere costed
1.004	Erosion and Sediment Control	46	ACRE	\$ -	\$ -	\$ -	\$ -	\$ 3,760.50	\$ 3,760.50	\$ 172,732	Allowed 50.25/5% to 30% of the total area
2 Process and Haul Filter Materials to Project											
2.001	Process and Stockpile on Project - Zone 2A - Filter	616,000	Tons						\$ 37.15	\$ 22,886,195	
2.002	Purchase processed material from quarry	616,000	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 13,673,048	Include 10% waste factor / additional material supply
2.003	Haul material from quarry to site stockpile/fill location, 35 mile haul	416,708	LCY	\$ 10.50	\$ 11.53	\$ -	\$ -	\$ -	\$ 22.11	\$ 9,213,153	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004	Process and Stockpile on Project - Zone 2A - Drain	682,000	Tons						\$ 37.16	\$ 25,344,198	
2.005	Purchase processed material from quarry	682,000	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 15,136,013	Include 10% waste factor / additional material supply
2.006	Haul material from quarry to site stockpile/fill location, 35 mile haul	481,253	LCY	\$ 10.57	\$ 11.58	\$ -	\$ -	\$ -	\$ 22.12	\$ 10,705,105	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007	Process and Stockpile on Project - Zone 2A - Transition	91,300	Tons						\$ 37.30	\$ 3,405,755	
2.008	Purchase processed material from quarry	91,300	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 2,016,940	Include 10% waste factor / additional material supply
2.009	Haul material from quarry to site stockpile/fill location, 35 mile haul	61,762	LCY	\$ 10.67	\$ 11.66	\$ -	\$ -	\$ -	\$ 22.13	\$ 1,379,214	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010	Process and Stockpile on Project - Zone 2B - Filter	385,000	Tons						\$ 37.15	\$ 14,301,573	
2.011	Purchase processed material from quarry	385,000	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 8,549,655	Include 10% waste factor / additional material supply
2.012	Haul material from quarry to site stockpile/fill location, 35 mile haul	262,441	LCY	\$ 10.56	\$ 11.54	\$ -	\$ -	\$ -	\$ 22.16	\$ 5,755,901	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.013	Process and Stockpile on Project - Zone 2B - Transition	407,000	Tons						\$ 37.15	\$ 15,120,908	
2.014	Purchase processed material from quarry	407,000	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 9,051,918	Include 10% waste factor / additional material supply
2.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	275,329	LCY	\$ 10.56	\$ 11.52	\$ -	\$ -	\$ -	\$ 22.11	\$ 6,066,932	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
Foundation Preparation and Grouting											
3 Foundation Excavation											
3.001	Topsoil Salvage	106,000	BCY						\$ 8.52	\$ 903,480	
3.002	Excavations - remove top soil layer	115,800	LCY	\$ 1.04	\$ 1.24	\$ -	\$ -	\$ -	\$ 3.98	\$ 459,065	Include 10% swell factor
3.003	Load and haul to disposal site, 0.5 mile haul	116,600	LCY	\$ 1.18	\$ 1.34	\$ -	\$ -	\$ -	\$ 4.09	\$ 476,417	
3.004	Dam Foundation Excavation - Common	276,000	BCY						\$ 8.59	\$ 2,369,866	
3.005	Excavations - remove top soil layer	303,800	LCY	\$ 1.56	\$ 2.22	\$ -	\$ -	\$ -	\$ 3.78	\$ 1,143,202	Include 10% swell factor
3.006	Load and haul to disposal site, 0.5 mile haul	303,600	LCY	\$ 1.12	\$ 1.31	\$ -	\$ -	\$ -	\$ 4.03	\$ 1,212,349	
3.007	Dam Foundation Rock Exc - Ripplable Rock	842,000	BCY						\$ 11.72	\$ 9,864,146	
3.008	Rock excavations, no blasting	969,300	LCY	\$ 3.51	\$ 3.67	\$ -	\$ -	\$ -	\$ 6.18	\$ 5,964,473	Include 10% swell factor
3.009	Load and haul to stockpile, 0.5 mile haul	969,300	LCY	\$ 1.12	\$ 1.30	\$ -	\$ -	\$ -	\$ 4.01	\$ 3,879,473	
3.010	Dam Foundation Rock Exc - Drill and Shoot	135,000	BCY						\$ 24.08	\$ 3,251,463	
3.011	Blasting operations	162,000	LCY	\$ 4.26	\$ 5.69	\$ 4.85	\$ -	\$ -	\$ 14.90	\$ 2,487,009	Include 10% swell factor
3.012	Load and haul to stockpile, 1 mile haul	152,000	LCY	\$ 1.48	\$ 1.79	\$ -	\$ -	\$ -	\$ 3.29	\$ 494,374	
3.013	Crush and screen material	152,000	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4 Foundation Preparation and Grouting											
Foundation Preparation - Beneath Core											
4.001	Initial Foundation Cleaning - Core	55,000	SY						\$ 20.02	\$ 1,101,318	
4.002	Initial foundation core cleanup	15,000	SY	\$ 11.48	\$ 8.51	\$ -	\$ -	\$ -	\$ 18.97	\$ 913,387	
4.003	Load and haul to disposal area, 0.5 mile haul	15,125	CY	\$ 3.72	\$ 7.58	\$ -	\$ -	\$ -	\$ 11.10	\$ 182,932	Assume removal of top layer, 0.25' thick
4.004	Final Foundation Cleaning - Core	55,000	SY						\$ 16.97	\$ 933,387	
4.005	Final foundation core cleanup	55,000	SY	\$ 11.48	\$ 5.51	\$ -	\$ -	\$ -	\$ 18.97	\$ 913,387	
4.006	Load and haul to disposal area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.007	Dental Excavation	3,200	CY						\$ 120.75	\$ 386,387	
4.008	Dental excavations	3,500	LCY	\$ 60.20	\$ 60.83	\$ -	\$ -	\$ -	\$ 90.00	\$ 348,459	Include 10% swell factor
4.009	Load and haul to site stockpile, 0.5 mile haul	3,500	LCY	\$ 3.81	\$ 6.78	\$ -	\$ -	\$ -	\$ 10.72	\$ 37,727	
4.010	Dental Concrete	3,200	CV	\$ 44.52	\$ 20.23	\$ 183.12	\$ -	\$ -	\$ 247.87	\$ 793,183	
4.011	Groin Cap with Anchors	9,200	CV	\$ 79.02	\$ 22.87	\$ 519.68	\$ 4.38	\$ 625.94	\$ 5,758,641	\$ 3' x 40' cap, includes formwork and reinforcement (50lbs/cy)	
4.012	Curtain Grouting	84,000	LF						\$ 78.69	\$ 6,610,296	
4.013	Drill setup for all holes	1,120	ea.	\$ 191.31	\$ 320.18	\$ -	\$ -	\$ -	\$ 51.44	\$ 572,811	Assume 75' drilling lengths
4.014	Drill curtain grout holes	85,000	ft	\$ 10.34	\$ 11.18	\$ -	\$ -	\$ -	\$ 12.45	\$ 1,024,195	
4.015	Reinforce grout holes	9,400	ft	\$ 10.43	\$ 11.22	\$ -	\$ -	\$ -	\$ 21.58	\$ 192,153	Assume 10% to be drilled
4.016	Reinforce to grout holes and grout nipples	4,200	ea.	\$ 91.43	\$ 10.43	\$ -	\$ -	\$ -	\$ 91.43	\$ 392,121	1 x heading, embed 20'
4.017	Inject Portland cement grout	3,600	hr	\$ 465.34	\$ 160.04	\$ -	\$ -	\$ -	\$ 505.36	\$ 3,376,177	allow 5 hours per hole
4.018	Perform hydraulic conductivity tests	1,120	ea.	\$ -	\$ -	\$ -	\$ 347.39	\$ 347.39	\$ 347.39	\$ 386,976	
4.019	Consolidation Grouting	35,000	LF						\$ 78.81	\$ 2,758,350	
4.020	Drill setup for all holes	457	ea.	\$ 129.49	\$ 317.08	\$ -	\$ -	\$ -	\$ 506.57	\$ 234,398	Assume 75' drilling lengths
4.021	Drill curtain grout holes	35,000	ft	\$ 10.35	\$ 11.18	\$ -	\$ -	\$ -	\$ 12.45	\$ 764,635	
4.022	Reinforce grout holes	1,500	ft	\$ 10.73	\$ 11.57	\$ -	\$ -	\$ -	\$ 21.10	\$ 78,000	Assume 10% to be drilled
4.023	Reinforce to grout holes and grout nipples	1,200	ea.	\$ 91.75	\$ 10.43	\$ -	\$ -	\$ -	\$ 91.75	\$ 195,424	1 x heading, embed 20'
4.024	Inject Portland cement grout	2,500	hr	\$ 465.34	\$ 160.04	\$ -	\$ -	\$ -	\$ 505.36	\$ 1,251,565	allow 5 hours per hole
4.025	Perform hydraulic conductivity tests	457	ea.	\$ -	\$ -	\$ -	\$ 347.39	\$ 347.39	\$ 347.39	\$ 157,073	

Item	Description	Quantity	Unit	Unit Price	Material Price	Transport Price	Placement Price	Subtotal	Rate	Cost	Comments
4.026	Type III Cement	4,200	Tons	\$ 176.82	\$ 73.04	\$ 113.14	\$ -	\$ 362.99	\$	1,524,570	
4.027	Backfill Concrete	-	CY	-	-	-	-	-			Elsewhere
5	Foundation Preparation - Beneath Shell										
5.001	Initial Foundation Cleaning - Shell	130,000	SY					\$ 4.51	\$	586,424	
5.002	Initial clean shell cleanup	130,000	SY	\$ 1.34	\$ 0.43	\$ -	\$ -	\$ 1.78	\$	227,819	
5.003	Load and haul to disposal area, 0.5 mile haul	27,803	LCY	\$ 3.53	\$ 0.52	\$ -	\$ -	\$ 4.05	\$	112,405	Assume removal of top layer, 0.5' thick
6	Foundation Drainage										
6.001	Furnish and Install Foundation Drain Pipe	500	LF	\$ 47.70	\$ 29.60	\$ 35.56	\$ -	\$ 112.86	\$	56,428	
6.002	Furnish and Install Foundation Drain Manholes	3	EA	\$ 1,670.31	\$ 1,017.05	\$ 3,070.88	\$ -	\$ 5,758.23	\$	17,275	
6.003	Seepage Partition Walls	700	CY	\$ 523.27	\$ 116.49	\$ 465.37	\$ -	\$ 1,105.13	\$	773,589	3' x 6' high concrete seepage walls including formwork and reinforcement (100lbs/cy)
7	Embankment										
7.001	Develop Borrow Areas	1	LS								Included below
7.002	Z1 Strip/Overburden/Waste to Stockpile	977,000	BCY					\$ 7.51	\$	7,333,019	Assumed common earth, 3000' haul w/ scraper
7.003	Embankment excavations	1,024,700	LCY	\$ 0.88	\$ 2.69	\$ -	\$ -	\$ 3.57	\$	3,636,672	Include 10% swell factor
7.004	Load and haul to site stockpile, 0.25 mile haul	1,024,700	LCY	\$ 0.85	\$ 2.33	\$ -	\$ -	\$ 3.18	\$	3,258,533	
7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1	424,000	BCY					\$ 9.04	\$	3,834,893	
7.006	Embankment excavations	424,000	LCY	\$ 1.44	\$ 3.12	\$ -	\$ -	\$ 4.57	\$	1,928,823	Include 10% swell factor
7.007	Load and haul to site stockpile, 0.25 mile haul	424,000	LCY	\$ 1.05	\$ 2.71	\$ -	\$ -	\$ 3.76	\$	1,595,070	
7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2	3,270,000	BCY					\$ 9.01	\$	29,454,753	
7.009	Embankment excavations	3,270,000	LCY	\$ 1.43	\$ 3.02	\$ -	\$ -	\$ 4.45	\$	14,551,933	Include 10% swell factor
7.010	Load and haul to site stockpile, 0.25 mile haul	3,270,000	LCY	\$ 1.06	\$ 2.70	\$ -	\$ -	\$ 3.74	\$	12,241,802	
7.011	Z4 Strip/Overburden/Waste to Stockpile	-	BCY					\$ -	\$	-	
7.012	Embankment excavations	-	LCY	-	\$ -	\$ -	\$ -	\$ -	\$	-	
7.013	Load and haul to site stockpile, 0.25 mile haul	-	LCY	-	\$ -	\$ -	\$ -	\$ -	\$	-	
	Restore Borrow Areas										
7.014	Replace Overburden from Stockpile	1,167,750	ECY					\$ 6.73	\$	7,862,478	Backfill borrow area using material from stockpile, allow 25% of stripping material
7.015	Load and haul to site stockpile, 0.25 mile haul	1,264,525	LCY	\$ 1.30	\$ 2.98	\$ -	\$ -	\$ 4.28	\$	5,394,103	
7.016	Spread and compact	1,264,525	LCY	\$ 1.14	\$ 0.92	\$ -	\$ -	\$ 2.06	\$	2,589,376	
7.017	Topsoil Replacement	106,000	ECY					\$ 9.81	\$	1,039,643	Backfill borrow area using material from stockpile
7.018	Excavate, Load and haul excavated backfill material to fill location, 1 mile haul	116,800	LCY	\$ 1.79	\$ 5.04	\$ -	\$ -	\$ 6.79	\$	791,874	
7.019	Spread and compact	116,800	LCY	\$ 1.17	\$ 0.95	\$ -	\$ -	\$ 2.12	\$	249,769	
7.020	Furnish and Install Zone 1 - Core	2,030,000	ECY					\$ 13.57	\$	27,546,777	
7.021	Excavate from borrow areas	2,133,000	LCY	\$ 1.43	\$ 3.02	\$ -	\$ -	\$ 4.45	\$	9,495,462	Include 10% swell factor
7.022	Load and haul to zone 1 fill location, 0.5 mile haul	2,133,000	LCY	\$ 1.28	\$ 2.58	\$ -	\$ -	\$ 3.86	\$	8,268,247	No stockpiling required
7.023	Spread and compact	2,133,000	LCY	\$ 1.10	\$ 2.17	\$ -	\$ -	\$ 3.27	\$	6,955,682	
7.024	Load, Haul and Place - Zone 2A - Filter	616,000	Tons					\$ 3.20	\$	1,968,455	
7.025	Load at stockpile and haul to fill location, 0.5 mile haul	123,012	LCY	\$ 0.83	\$ 2.52	\$ -	\$ -	\$ 3.45	\$	421,272	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.026	Direct hauling from quarry	181,604	LCY								Elsewhere
7.027	Spread and compact	416,708	LCY	\$ 1.46	\$ 2.22	\$ -	\$ -	\$ 3.68	\$	1,537,230	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.028	Spread and compact	416,708	LCY	\$ 1.46	\$ 2.22	\$ -	\$ -	\$ 3.68	\$	1,537,230	Include 15% swell factor
7.029	Load, Haul and Place - Zone 2A - Drain	682,000	Tons					\$ 3.20	\$	2,182,433	
7.030	Load at stockpile and haul to fill location, 0.5 mile haul	132,408	LCY	\$ 0.83	\$ 2.52	\$ -	\$ -	\$ 3.45	\$	457,958	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.031	Direct hauling from quarry	312,047	LCY								Elsewhere
7.032	Spread and compact	481,253	LCY	\$ 1.45	\$ 2.23	\$ -	\$ -	\$ 3.69	\$	1,765,479	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.033	Spread and compact	481,253	LCY	\$ 1.45	\$ 2.23	\$ -	\$ -	\$ 3.69	\$	1,765,479	Include 15% swell factor
7.034	Load, Haul and Place - Zone 2A - Transition	385,000	Tons					\$ 3.23	\$	1,244,898	
7.035	Load at stockpile and haul to fill location, 0.5 mile haul	76,332	LCY	\$ 0.80	\$ 2.61	\$ -	\$ -	\$ 3.57	\$	272,026	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.036	Direct hauling from quarry	182,309	LCY								Elsewhere
7.037	Spread and compact	265,841	LCY	\$ 1.16	\$ 2.23	\$ -	\$ -	\$ 3.71	\$	985,872	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.038	Spread and compact	265,841	LCY	\$ 1.16	\$ 2.23	\$ -	\$ -	\$ 3.71	\$	985,872	Include 15% swell factor
7.039	Load, Haul and Place - Zone 2B - Filter	91,300	Tons					\$ 3.37	\$	307,363	
7.040	Load at stockpile and haul to fill location, 0.5 mile haul	18,329	LCY	\$ 1.10	\$ 3.03	\$ -	\$ -	\$ 4.13	\$	76,008	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.041	Direct hauling from quarry	43,333	LCY								Elsewhere
7.042	Spread and compact	51,762	LCY	\$ 1.46	\$ 2.27	\$ -	\$ -	\$ 3.74	\$	194,265	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.043	Spread and compact	51,762	LCY	\$ 1.46	\$ 2.27	\$ -	\$ -	\$ 3.74	\$	194,265	Include 15% swell factor
7.044	Load, Haul and Place - Zone 2B - Transition	407,000	Tons					\$ 3.22	\$	1,311,996	
7.045	Load at stockpile and haul to fill location, 0.5 mile haul	82,597	LCY	\$ 0.80	\$ 2.50	\$ -	\$ -	\$ 3.53	\$	291,709	Assume 1.7ton/cy, included a 15% swell factor; only 30% of material to be hauled from stockpile to fill location
7.046	Direct hauling from quarry	192,703	LCY								Elsewhere
7.047	Spread and compact	275,324	LCY	\$ 1.16	\$ 2.24	\$ -	\$ -	\$ 3.71	\$	1,023,208	Assume 1.7ton/cy, included a 15% swell factor; 70% of material will be hauled directly
7.048	Spread and compact	275,324	LCY	\$ 1.16	\$ 2.24	\$ -	\$ -	\$ 3.71	\$	1,023,208	Include 15% swell factor
7.049	Furnish and Install Zone 3 - Rockfill	2,170,000	ECY					\$ 27.52	\$	59,725,188	
7.050	Blasting operations	2,604,000	LCY	\$ 4.26	\$ 5.69	\$ 4.85	\$ -	\$ 14.80	\$	38,535,912	Include 20% swell factor
7.051	Load and haul to processing area, 0.5 mile haul	-	LCY	-	\$ -	\$ -	\$ -	\$ -	\$	-	No stockpiling required, material to be hauled to fill location directly
7.052	Crush and screen material	2,604,000	LCY	-	\$ -	\$ -	\$ -	\$ -	\$	-	No crushing and screening required
7.053	Load and haul to zone 3, 1.25 mile haul	2,604,000	LCY	\$ 1.21	\$ 3.23	\$ -	\$ -	\$ 4.46	\$	11,611,130	No stockpiling required, direct haul
7.054	Spread and compact	2,604,000	LCY	\$ 1.45	\$ 2.23	\$ -	\$ -	\$ 3.68	\$	9,572,080	
7.045	Furnish and Install Zone 4 - Random	1,850,000	ECY					\$ 9.80	\$	18,131,990	

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22. Construction Cost Summary: Sites Dam

Total Cost

Total Direct Cost 163,312,242

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 163,312,242

General Conditions

Mobilization	5.0%	8,165,612
Site General Conditions & Requirements	10.0%	17,147,785
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	2,074,882
Bonds	0.6%	1,144,203
GC Home Office Overhead	6.0%	11,510,683
GC Profit	8.0%	16,268,433

Total Contractor Indirect Markups 56,311,598

TOTAL DIRECT COST BEFORE CONTINGENCIES 219,623,840

Contingencies

Design Contingencies	10.0%	21,962,384
Construction Contingencies	15.0%	36,237,934

Total Contingency Allowance 58,200,318

TOTAL DIRECT COST BEFORE ESCALATION 277,824,158

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	2,713,046
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 280,537,204

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Labor (\$)	Equipment (\$)	Subtotal (\$)	Unit Price (\$)	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES															
1.001	Demolition Work	-	LS	\$	-	\$	-	\$	-					Elsewhere	
1.002	Clearing and Grubbing	23	ACRE	\$	3,076.78	\$	5,569.90	\$	-	\$	8,446.68	\$	197,652	Heavy vegetation removal	
1.003	Reservoir Clearing	-	ACRE	\$	-	\$	-	\$	-	\$	-	\$	-	Elsewhere costed	
1.004	Erosion and Sediment Control	23	ACRE	\$	-	\$	-	\$	-	\$	3,760.50	\$	3,760.50	Allowed \$0.25/SF to 30% of the total area	
2 Process and Haul Filter Materials to Project															
2.001	Process and Stockpile on Project - Zone 2A - Filter	220,000	Tons							\$	36.99	\$	8,138,176		
2.002	Purchase processed material from quarry	220,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	4,882,200	Include 10% waste factor / additional material supply	
2.003	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	145,824	LCY	\$	10.43	\$	11.42	\$	-	\$	21.87	\$	3,254,946	1.7ton/ECV and 1.15 swell factor (ECV to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)	
2.004	Process and Stockpile on Project - Zone 2A - Drain	264,000	Tons							\$	37.03	\$	9,776,844		
2.005	Purchase processed material from quarry	264,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	5,859,876	Include 10% waste factor / additional material supply	
2.006	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	178,580	LCY	\$	10.49	\$	11.45	\$	-	\$	21.93	\$	3,915,968	1.7ton/ECV and 1.15 swell factor (ECV to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)	
2.007	Process and Stockpile on Project - Zone 2A - Transition	38,500	Tons							\$	37.00	\$	1,424,640		
2.008	Purchase processed material from quarry	38,500	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	854,500	Include 10% waste factor / additional material supply	
2.009	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	26,044	LCY	\$	10.46	\$	11.43	\$	-	\$	21.89	\$	570,075	1.7ton/ECV and 1.15 swell factor (ECV to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)	
2.010	Process and Stockpile on Project - Zone 2B - Filter	132,000	Tons							\$	37.10	\$	4,897,617		
2.011	Purchase processed material from quarry	132,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	2,929,930	Include 10% waste factor / additional material supply	
2.012	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	95,294	LCY	\$	10.53	\$	11.51	\$	-	\$	22.04	\$	1,667,879	1.7ton/ECV and 1.15 swell factor (ECV to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)	
2.013	Process and Stockpile on Project - Zone 2B - Transition	143,000	Tons							\$	36.99	\$	5,288,895		
2.014	Purchase processed material from quarry	143,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	\$	3,174,100	Include 10% waste factor / additional material supply	
2.015	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	95,225	LCY	\$	10.44	\$	11.42	\$	-	\$	21.86	\$	2,114,795	1.7ton/ECV and 1.15 swell factor (ECV to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)	
Foundation Preparation and Grouting															
3 Foundation Excavation															
3.001	Topsoil Salvage	52,000	BCY							\$	8.49	\$	441,701		
3.002	Excavations - remove top soil layer	57,200	LCY	\$	1.18	\$	2.28	\$	-	\$	3.57	\$	195,706	Include 10% swell factor	
3.003	Load and haul to disposal site, 0.5 mile haul	57,200	LCY	\$	1.18	\$	2.28	\$	-	\$	4.01	\$	232,927		
3.004	Dam Foundation Excavation - Common	109,000	BCY							\$	8.62	\$	939,774		
3.005	Excavations - remove top soil layer	119,900	LCY	\$	1.17	\$	2.23	\$	-	\$	3.79	\$	454,815	Include 10% swell factor	
3.006	Load and haul to disposal site, 0.5 mile haul	119,900	LCY	\$	1.18	\$	2.28	\$	-	\$	4.01	\$	492,050		
3.007	Dam Foundation Rock Exc - Ripplable Rock	310,000	BCY							\$	11.73	\$	3,635,944		
3.008	Rock excavations, no blasting	355,500	LCY	\$	2.51	\$	3.67	\$	-	\$	6.18	\$	2,191,151	Include 10% swell factor	
3.009	Load and haul to stockpile, 0.3 mile haul	310,000	LCY	\$	1.18	\$	2.28	\$	-	\$	4.02	\$	1,243,195		
3.010	Dam Foundation Rock Exc - Drill and Shoot	43,000	BCY							\$	24.51	\$	1,054,136		
3.011	Blasting operations	51,800	LCY	\$	4.31	\$	5.70	\$	4.85	\$	14.91	\$	763,490	Include 10% swell factor	
3.012	Load and haul to stockpile, 0.3 mile haul	51,800	LCY	\$	1.94	\$	3.89	\$	-	\$	3.52	\$	202,650		
3.013	Crush and screen material	51,800	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required	
4 Foundation Preparation and Grouting															
Foundation Preparation - Beneath Core															
4.001	Initial Foundation Cleaning - Core	18,000	SY							\$	20.29	\$	365,197		
4.002	Initial foundation core cleanup	18,000	SY	\$	11.69	\$	5.58	\$	-	\$	17.18	\$	309,120		
4.003	Load and haul to disposal area, 0.5 mile haul	4,950	CY	\$	3.79	\$	7.52	\$	-	\$	11.31	\$	55,927	Assume removal of top layer, 0.25' thick	
4.004	Final Foundation Cleaning - Core	18,000	SY							\$	17.18	\$	309,220		
4.005	Final foundation core cleanup	18,000	SY	\$	11.69	\$	5.58	\$	-	\$	17.18	\$	309,120		
4.006	Load and haul to disposal area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required	
4.007	Dental Excavation	720	CY							\$	123.44	\$	88,874		
4.008	Dental excavations	752	LCY	\$	69.06	\$	51.24	\$	-	\$	162.50	\$	122,420	Include 10% swell factor	
4.009	Load and haul to site stockpile, 0.3 mile haul	752	LCY	\$	3.89	\$	7.52	\$	-	\$	11.41	\$	8,585		
4.010	Dental Concrete	720	CY	\$	43.97	\$	19.98	\$	183.12	\$	-	\$	247.07	177,891	
4.011	Grout Cap with Anchors	3,240	CV	\$	80.60	\$	23.32	\$	519.68	\$	12.42	\$	636.03	2,060,726	
3' x 40' cap, includes formwork and reinforcement (50lbs/cy)															
4.012	Curtain Grouting	27,500	LF							\$	78.86	\$	2,168,658		
4.013	Drill setup for all holes	357	ea.	\$	194.79	\$	325.95	\$	-	\$	510.74	\$	195,927	Assume 75' drilling lengths	
4.014	Drill curtain groin holes	27,500	ft	\$	10.52	\$	11.12	\$	-	\$	21.65	\$	595,812		
4.015	Reinbar groin holes	2,750	ft	\$	19.62	\$	11.46	\$	-	\$	22.08	\$	60,717	Assume 10% to be reinforced	
4.016	Hookup to groin holes and groin nipples	1,375	ea.	\$	91.14	\$	-	\$	-	\$	91.31	\$	125,343	1 x heading, every 20'	
4.017	Inject Portland cement grout	1,653	hr	\$	465.81	\$	162.15	\$	-	\$	525.89	\$	1,674,298	allow 5 hours per hole	
4.018	Perform hydraulic conductivity tests	307	ea.	\$	-	\$	-	\$	-	\$	347.39	\$	127,343		

Item	Sub-item	Description	Quantity	Unit	Unit Price	Material Price	Transport Price	Subtotal Price	Unit Price	Material Price	Transport Price	Subtotal Price	Notes
4.019	Consolidation Grouting		12,300	LF									
4.020	Drill setup for all holes		164	est.	\$	307.38	\$	50,398.52	\$				
4.021	Drill curtain grout holes		12,300	ft	\$	10.22	\$	125.66	\$				
4.022	Re-drill grout holes		1,350	ft	\$	13.57	\$	18,319.50	\$				
4.023	Hookup to grout holes and grout nipples		615	ea.	\$	23.06	\$	14,181.90	\$				
4.024	Inject Portland cement grout		850	hr	\$	487.20	\$	414,120.00	\$				
4.025	Perform hydraulic conductivity tests		164	ea.	\$	-	\$	-	\$				
4.026	Type III Cement		1,400	Tons	\$	176.82	\$	247.55	\$				
4.027	Backfill Concrete		-	CV	\$	-	\$	-	\$				
5	Foundation Preparation - Beneath Shell												
5.001	Initial Foundation Cleaning - Shell		62,000	SY									
5.002	Initial clam shell cleanup		62,000	SY	\$	1.37	\$	84.94	\$				
5.003	Load and haul to disposal area, 0.5 mile haul		11,367	LCY	\$	3.91	\$	44,445.37	\$				
6	Foundation Drainage												
6.001	Furnish and Install Foundation Drain Pipe		500	LF	\$	43.36	\$	21,680.00	\$				
6.002	Furnish and Install Foundation Drain Manholes		1	EA	\$	1,670.31	\$	1,670.31	\$				
6.003	Seepage Partition Walls		-	CV	\$	-	\$	-	\$				
7	Embankment												
7.001	Develop Burrow Areas		1	LS									
7.002	Z1 Strip/Overburden/Waste to Stockpile		305,000	BCY									
7.003	Embankment excavations		135,500	LCY	\$	0.08	\$	10,840.00	\$				
7.004	Load and haul to site stockpile, 0.5 mile haul		305,000	LCY	\$	0.81	\$	247,050.00	\$				
7.005	Z3 Strip/Overburden/Waste to Stockpile-Q1		1,590,000	BCY									
7.006	Embankment excavations		1,749,000	LCY	\$	1.43	\$	2,501,070.00	\$				
7.007	Load and haul to site stockpile, 0.5 mile haul		1,749,000	LCY	\$	1.04	\$	1,818,960.00	\$				
7.008	Z3 Strip/Overburden/Waste to Stockpile-Q2		-	BCY									
7.009	Embankment excavations		-	LCY	\$	-	\$	-	\$				
7.010	Load and haul to site stockpile, 0.5 mile haul		-	LCY	\$	-	\$	-	\$				
7.011	Z4 Strip/Overburden/Waste to Stockpile		-	BCY									
7.012	Embankment excavations		-	LCY	\$	-	\$	-	\$				
7.013	Load and haul to site stockpile, 0.5 mile haul		-	LCY	\$	-	\$	-	\$				
7.014	Replace Overburden from Stockpile		473,750	ECY									
7.015	Load and haul to site stockpile, 0.25 mile haul		571,125	LCY	\$	1.10	\$	628,237.50	\$				
7.016	Spread and compact		521,135	LCY	\$	1.14	\$	594,093.90	\$				
7.017	Topsoil Replacement		52,000	ECY									
7.018	Excavate, load and haul excavated backfill material to fill location, 1 mile		52,000	LCY	\$	1.28	\$	66,560.00	\$				
7.019	Spread and compact		52,000	LCY	\$	1.17	\$	60,840.00	\$				
7.020	Furnish and Install Zone 1 - Core		640,000	ECY									
7.021	Excavate from borrow area		704,000	LCY	\$	1.48	\$	1,041,920.00	\$				
7.022	Load and haul to zone-1 fill location, 1 mile haul		704,000	LCY	\$	1.04	\$	732,416.00	\$				
7.023	Spread and compact		704,000	LCY	\$	1.11	\$	781,440.00	\$				
7.024	Load, Haul and Place - Zone 2A - Filter		220,000	Tons									
7.025	Load at stockpile and haul to fill location, 0.5 mile haul		44,647	LCY	\$	0.85	\$	37,950.00	\$				
7.026	Direct hauling from quarry		194,176	LCY									
7.027	Spread and compact		195,834	LCY	\$	1.48	\$	289,834.32	\$				
7.028	Load, Haul and Place - Zone 2A - Drain		264,000	Tons									
7.029	Load at stockpile and haul to fill location, 0.5 mile haul		53,578	LCY	\$	0.81	\$	43,398.18	\$				
7.030	Direct hauling from quarry		125,052	LCY									
7.031	Spread and compact		176,258	LCY	\$	1.47	\$	258,099.26	\$				
7.032	Load, Haul and Place - Zone 2A - Transition		35,500	Tons									
7.033	Load at stockpile and haul to fill location, 0.5 mile haul		7,813	LCY	\$	1.11	\$	8,672.43	\$				
7.034	Direct hauling from quarry		15,283	LCY									
7.035	Spread and compact		25,044	LCY	\$	1.55	\$	38,818.20	\$				
7.036	Load, Haul and Place - Zone 2B - Filter		132,000	Tons									
7.037	Load at stockpile and haul to fill location, 0.5 mile haul		26,788	LCY	\$	1.12	\$	29,992.56	\$				
7.038	Direct hauling from quarry		62,306	LCY									
7.039	Spread and compact		89,294	LCY	\$	1.39	\$	124,118.66	\$				
7.040	Load, Haul and Place - Zone 2B - Transition		143,000	Tons									
7.041	Load at stockpile and haul to fill location, 0.5 mile haul		29,013	LCY	\$	0.80	\$	23,210.40	\$				
7.042	Direct hauling from quarry		67,715	LCY									
7.043	Spread and compact		95,755	LCY	\$	1.50	\$	143,632.50	\$				

SITES DAM - RESERVOIR EXISTENTIAL (2020) (2020)											
Item	Description	Quantity	Unit	Unit Price	Subtotal Price	Unit Price	Subtotal Price	Unit Price	Subtotal Price	Unit Price	Subtotal Price
7.039	Furnish and Install Zone 3 - Rockfill	950,000	ECY								
7.040	Blasting operations	1,140,000	LCY	\$ 4.28	\$ 4,879.20	\$ 4.28	\$ 4,879.20	\$ 4.28	\$ 4,879.20	\$ 4.28	\$ 4,879.20
7.041	Load and haul to processing area, 0.5 mile haul	-	LCY	-	-	-	-	-	-	-	-
7.042	Crush and screen material	1,140,000	LCY	-	-	-	-	-	-	-	-
7.043	Load and haul to zone 3, 2 mile haul	1,140,000	LCY	\$ 0.82	\$ 938.80	\$ 0.82	\$ 938.80	\$ 0.82	\$ 938.80	\$ 0.82	\$ 938.80
7.044	Spread and compact	1,140,000	LCY	\$ 1.45	\$ 1,653.00	\$ 1.45	\$ 1,653.00	\$ 1.45	\$ 1,653.00	\$ 1.45	\$ 1,653.00
7.045	Furnish and Install Zone 4 - Random	600,000	ECY								
7.046	Excavations in cohesion soil	250,815	LCY	\$ 1.43	\$ 358.67	\$ 1.43	\$ 358.67	\$ 1.43	\$ 358.67	\$ 1.43	\$ 358.67
7.047	Crush and screen material	-	LCY	-	-	-	-	-	-	-	-
7.048	Direct hauling from quarry excavation, 2 mile haul	230,815	LCY	\$ 1.22	\$ 281.60	\$ 1.22	\$ 281.60	\$ 1.22	\$ 281.60	\$ 1.22	\$ 281.60
7.049	Load or stockpile and haul to fill location, 0.5 mile haul	419,185	LCY	\$ 0.79	\$ 331.15	\$ 0.79	\$ 331.15	\$ 0.79	\$ 331.15	\$ 0.79	\$ 331.15
7.050	Spread and compact	419,185	LCY	\$ 1.45	\$ 607.82	\$ 1.45	\$ 607.82	\$ 1.45	\$ 607.82	\$ 1.45	\$ 607.82
7.051	Furnish and Install Riprap	36,000	ECY								
7.052	Blasting operations	43,200	LCY	\$ 4.28	\$ 1,838.56	\$ 4.28	\$ 1,838.56	\$ 4.28	\$ 1,838.56	\$ 4.28	\$ 1,838.56
7.053	Load and haul to processing area, 2 mile haul	-	LCY	-	-	-	-	-	-	-	-
7.054	Crush and screen material	-	LCY	-	-	-	-	-	-	-	-
7.055	Load and haul to fill location, 0.5 mile haul	43,200	LCY	\$ 0.81	\$ 35.00	\$ 0.81	\$ 35.00	\$ 0.81	\$ 35.00	\$ 0.81	\$ 35.00
7.056	Riprap placement	43,200	LCY	\$ 5.89	\$ 254.45	\$ 5.89	\$ 254.45	\$ 5.89	\$ 254.45	\$ 5.89	\$ 254.45
8	Other Work										
8.001	GG Dam - Bypass Pipeline and U/S Cofferdam										
8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	\$ -	\$ -	\$ -	\$ -	\$ 1,993,333.33	\$ 1,993,333.33	\$ 1,993,333.33	\$ 1,993,333.33
8.003	Seeding and Mulching	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.004	Restoration										
8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	800	CY								
8.006	Purchase and Import gravel to fill location and stockpile, 35 mi haul	920	LCY	\$ 14.53	\$ 13,367.60	\$ 14.53	\$ 13,367.60	\$ 14.53	\$ 13,367.60	\$ 14.53	\$ 13,367.60
8.007	Place and compact	920	LCY	\$ 2.85	\$ 2,628.00	\$ 2.85	\$ 2,628.00	\$ 2.85	\$ 2,628.00	\$ 2.85	\$ 2,628.00
8.008	Developing haul routes - Haul routes inside reservoir	22	ACRES								
8.009	Clear and grub	258,320	SF	\$ 0.07	\$ 18.08	\$ 0.07	\$ 18.08	\$ 0.07	\$ 18.08	\$ 0.07	\$ 18.08
8.010	Load and haul earth fill	17,747	CY	\$ 1.09	\$ 19,344.23	\$ 1.09	\$ 19,344.23	\$ 1.09	\$ 19,344.23	\$ 1.09	\$ 19,344.23
8.011	Grade and Compact surface for earthen road	258,320	SF	\$ 0.13	\$ 33.58	\$ 0.13	\$ 33.58	\$ 0.13	\$ 33.58	\$ 0.13	\$ 33.58
8.012	Developing haul routes - Haul routes outside reservoir	15	ACRES								
8.013	Clear and grub	253,400	SF	\$ 0.08	\$ 20.27	\$ 0.08	\$ 20.27	\$ 0.08	\$ 20.27	\$ 0.08	\$ 20.27
8.014	Load and haul earth fill	12,100	CY	\$ 1.79	\$ 21,559.00	\$ 1.79	\$ 21,559.00	\$ 1.79	\$ 21,559.00	\$ 1.79	\$ 21,559.00
8.015	Grade and Compact surface for earthen road	253,400	SF	\$ 0.14	\$ 35.48	\$ 0.14	\$ 35.48	\$ 0.14	\$ 35.48	\$ 0.14	\$ 35.48
8.016	Rock processing areas										
8.017	Mass Concrete / Backfill Concrete	2,400	CY	\$ 95.71	\$ 229,664.00	\$ 95.71	\$ 229,664.00	\$ 95.71	\$ 229,664.00	\$ 95.71	\$ 229,664.00
8.018	Mass Concrete for spillway	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.019	Concrete Gravity Dam	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.020	Clay Backfill	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.021	Clay excavations from borrow area	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.022	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.023	Place clay backfill material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.024	Riprap and Drain	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.025	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.026	Load and haul to processing area, 1 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.027	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.028	Load and haul from stockpile to fill location, 1 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.029	Spread riprap	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.030	Rim Grouting	-	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.031	Bridge	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
8.032	Dewatering allowance	1	LS	\$ -	\$ -	\$ -	\$ -	\$ 498,333.33	\$ 498,333.33	\$ 498,333.33	\$ 498,333.33
9	Golden Gate Dam Bypass Pipeline Facilities										
9.001	Upstream Cofferdam	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.002	Sheet pile cofferdams	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.003	Excavations - remove top soil layer and stockpile	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.004	Load and haul to disposal site, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.005	Purchase processed material from quarry	-	TON	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.006	Haul material from quarry to site stockpile, 40 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.007	Load or stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.008	Spread and compact	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.009	Install 48-Inch Steel Pipe and Encasement	-	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.010	Excavate trench in rock	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.011	Load and haul material to disposal site, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.012	48" steel pipe placement	-	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.013	Concrete backfill for pipe trench (dam footprint)	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.014	Reinforcement for concrete backfill	-	TON	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.015	48" fixed cone valve for controlled release (baffled head, no energy dissipation chamber)	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.016	Concrete manhole intake 10' high (assume precast) reinforcement for concrete manhole (R33 R3)	-	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.017	Install 48"x48" design rock on cone, Manhole	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.018	Grout pipe	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.019	Field Survey	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.020	Riprap Discharge Channel	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.021	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.022	Excavate	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.023	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
9.024	Load and haul to stockpile, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -

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23. Construction Cost Summary: Saddle Dam 3

Total Cost

Total Direct Cost 68,184,786

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 68,184,786

General Conditions

Mobilization 5.0% 3,409,239

Site General Conditions & Requirements 10.0% 7,159,403

Phasing *Not included* 0.0% -

General Contractor Overhead and Fees

Insurance 1.1% 866,288

Bonds 0.6% 477,718

GC Home Office Overhead 6.0% 4,805,846

GC Profit 8.0% 6,792,262

Total Contractor Indirect Markups 23,510,756

TOTAL DIRECT COST BEFORE CONTINGENCIES 91,695,542

Contingencies

Design Contingencies 10.0% 9,169,554

Construction Contingencies 15.0% 15,129,764

Total Contingency Allowance 24,299,318

TOTAL DIRECT COST BEFORE ESCALATION 115,994,860

Escalation to Report Date 3/31/2021 @ 3.00% p.a. 0.977% 1,132,729

Escalation to Mid-point of Construction *Not included* 0% -

ESTIMATED CONSTRUCTION COST 117,127,589

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Transportation (\$)	Processing (\$)	Other (\$)	Total (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES											
1.001	Demolition Work	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
1.002	Cleaning and Grubbing	48	ACRE	\$ 3,115.23	\$ 5,437.02	\$ -	\$ -	\$ -	\$ 8,552.26	\$ 410,508	Heavy vegetation removal
1.003	Reservoir Cleaning	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere costed
1.004	Erosion and Sediment Control	48	ACRE	\$ -	\$ -	\$ -	\$ -	\$ 3,760.50	\$ 3,760.50	\$ 180,504	Allowed 50.25/5F to 30% of the total area
2 Process and Haul Filter Materials to Project											
2.001	Process and Stockpile on Project - Zone 2A - Filter	165,000	Tons						\$ 37.02	\$ 6,108,229	
2.002	Purchase processed material from quarry	165,000	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 3,661,425	Include 10% waste factor / additional material supply
2.003	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	111,618	LCY	\$ 10.47	\$ 1,168.48	\$ -	\$ -	\$ -	\$ 21.91	\$ 2,445,807	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 20% of material to be delivered to stockpile, 20% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004	Process and Stockpile on Project - Zone 2A - Drain	165,000	Tons						\$ 37.02	\$ 6,108,229	
2.005	Purchase processed material from quarry	165,000	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 3,661,425	Include 10% waste factor / additional material supply
2.006	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	111,618	LCY	\$ 10.47	\$ 1,168.48	\$ -	\$ -	\$ -	\$ 21.91	\$ 2,445,807	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 20% of material to be delivered to stockpile, 20% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007	Process and Stockpile on Project - Zone 2A - Transition	48,400	Tons						\$ 37.01	\$ 1,791,502	
2.008	Purchase processed material from quarry	48,400	Tons	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 1,074,311	Include 10% waste factor / additional material supply
2.009	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	32,741	LCY	\$ 10.47	\$ 3,424.88	\$ -	\$ -	\$ -	\$ 21.90	\$ 717,191	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 20% of material to be delivered to stockpile, 20% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons						\$ -	\$ -	Not required
2.011	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.012	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons						\$ -	\$ -	Not required
2.014	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.015	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Foundation Preparation and Grouting											
3 Foundation Excavation											
3.001	Topsoil Salvage	84,000	BCY						\$ 8.23	\$ 691,156	
3.002	Excavations - remove top soil layer	92,400	LCY	\$ 3.45	\$ 3,207.80	\$ -	\$ -	\$ -	\$ 3.71	\$ 343,251	Include 10% swell factor
3.003	Load and haul to disposal site, 0.5 mile haul	92,400	LCY	\$ 3.00	\$ 2,772.00	\$ -	\$ -	\$ -	\$ 3.77	\$ 347,505	
3.004	Dam Foundation Excavation - Common	92,000	BCY						\$ 8.32	\$ 765,138	
3.005	Excavations - remove top soil layer	101,200	LCY	\$ 3.57	\$ 3,612.84	\$ -	\$ -	\$ -	\$ 3.81	\$ 385,606	Include 10% swell factor
3.006	Load and haul to disposal site, 0.5 mile haul	101,200	LCY	\$ 3.04	\$ 3,076.48	\$ -	\$ -	\$ -	\$ 3.75	\$ 379,338	
3.007	Dam Foundation Rock Exc - Ripplable Rock	178,000	BCY						\$ 11.44	\$ 2,036,651	
3.008	Rock excavations, no blasting	204,700	LCY	\$ 3.58	\$ 736,826	\$ -	\$ -	\$ -	\$ 3.84	\$ 787,504	Include 10% swell factor
3.009	Load and haul to stockpile, 0.5 mile haul	204,700	LCY	\$ 3.08	\$ 630,516	\$ -	\$ -	\$ -	\$ 3.71	\$ 769,066	
3.010	Dam Foundation Rock Exc - Drill and Shoot	-	BCY						\$ -	\$ -	
3.011	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
3.012	Explosives, load and haul to stockpile, 3 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Include 20% swell factor
3.013	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4 Foundation Preparation and Grouting											
Foundation Preparation - Beneath Core											
4.001	Initial Foundation Cleaning - Core	24,500	SY						\$ 19.35	\$ 473,997	
4.002	Initial foundation core cleanup	24,500	SY	\$ 11.58	\$ 283.81	\$ -	\$ -	\$ -	\$ 17.09	\$ 418,000	
4.003	Load and haul to disposal area, 0.5 mile haul	6,738	CY	\$ 3.29	\$ 2,216.60	\$ -	\$ -	\$ -	\$ 3.51	\$ 23,977	Assume removal of top layer, 0.25' thick
4.004	Final Foundation Cleaning - Core	25,500	SY						\$ 17.07	\$ 435,199	
4.005	Final foundation core cleanup	25,500	SY	\$ 11.58	\$ 295.49	\$ -	\$ -	\$ -	\$ 17.09	\$ 438,190	
4.006	Load and haul to disposal area, 1 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.007	Dental Excavation	1,800	CY						\$ 120.98	\$ 217,771	
4.008	Dental excavations	1,920	LCY	\$ 67.89	\$ 130,349	\$ -	\$ -	\$ -	\$ 82.07	\$ 157,183	Include 10% swell factor
4.009	Load and haul to site stockpile, 0.5 mile haul	1,920	LCY	\$ 4.88	\$ 9,369.60	\$ -	\$ -	\$ -	\$ 11.91	\$ 23,388	
4.010	Dental Concrete	1,800	CY	\$ 43.97	\$ 79,146	\$ 19.98	\$ 183.12	\$ -	\$ 247.07	\$ 444,726	
4.011	Grout Cap with Anchors	6,040	CY	\$ 79.46	\$ 481,218	\$ 22.99	\$ 519.68	\$ 6.66	\$ 628.80	\$ 3,797,940	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
4.012	Curtain Grouting	24,120	LF						\$ 91.56	\$ 2,208,394	
4.013	Drill setup for all holes	322	ea.	\$ 190.35	\$ 61,312.70	\$ -	\$ -	\$ -	\$ 508.89	\$ 163,660	Assume 75' drilling lengths
4.014	Drill curtain grout holes	24,120	ft	\$ 10.95	\$ 264,114	\$ -	\$ -	\$ -	\$ 13.18	\$ 318,451	
4.015	Reinfit grout holes	2,412	ft	\$ 10.58	\$ 25,425.96	\$ -	\$ -	\$ -	\$ 12.56	\$ 30,245	Assume 10% to be re-drilled
4.016	Mixup to grout holes and grout samples	1,200	hr	\$ 21.81	\$ 26,172	\$ -	\$ -	\$ -	\$ 91.85	\$ 110,225	
4.017	Inject portland cement grout	1,000	hr	\$ 468.01	\$ 468,010	\$ -	\$ -	\$ -	\$ 505.22	\$ 505,220	Allow 5 hours per hole
4.018	Perform hydraulic conductivity tests	1,200	ea.	\$ -	\$ -	\$ -	\$ -	\$ 347.30	\$ 347.30	\$ 416,844	
4.019	Consolidation Grouting	-	LF						\$ -	\$ -	Not required
4.020	Drill setup for all holes	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.021	Drill curtain grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.022	Reinfit grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.023	Mixup to grout holes and grout samples	-	hr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024	Inject portland cement grout	-	hr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.025	Perform hydraulic conductivity tests	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.026	Type III Cement	850	Tons	\$ 177.58	\$ 150,943	\$ 73.35	\$ 113.14	\$ -	\$ 364.07	\$ 309,458	
4.027	Backfill Concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere

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Item	Unit	Description	Quantity	Unit	Unit Price (\$)	Material (\$)	Transport (\$)	Installation (\$)	Subtotal (\$)	Unit Price (\$)	Material (\$)	Transport (\$)	Installation (\$)	Subtotal (\$)	Notes		
7.051	-	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-			
7.054	-	Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required		
7.053	-	Load and haul to fill location, 0.5 mile haul	64,000	LCY	\$	0.79	\$	2.31	\$	-	\$	3.30	\$	277,394	No crushing and screening required		
7.055	-	Riprap placement	54,000	LCY	\$	0.00	\$	0.10	\$	\$	\$	15.10	\$	1,356,205			
8		Other Work															
8.001		GG Dam - Bypass Pipeline and U/S Cofferdam													Elsewhere		
8.002		Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	\$	-	\$	-	\$	-	\$	348,833.33	\$	348,833.33	\$	348,833	Allowance
8.003		Seeding and Mulching	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-			
8.004		Restoration													Elsewhere		
8.005		Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	2,000	CY									\$	87.72	\$	175,447	
8.006		Purchase and import gravel to fill location and stockpile, 35 mi haul	2,300	LCY	\$	11.60	\$	12.48	\$	37.75	\$	61.52	\$	142,123		Include 15% swell factor	
8.007		Place and compact	2,300	LCY	\$	4.73	\$	0.78	\$	\$	\$	14.47	\$	33,272			
8.008		Developing haul routes - Haul routes inside reservoir	51	ACRES									\$	26,932.75	\$	1,373,570	Clear, grade, provide gravel fill layer and compact
8.009		Clear and grub	2,211,560	SF	\$	0.07	\$	0.12	\$	-	\$	0.19	\$	416,509			
8.010		Load and haul earth fill, 0.5 mile haul	41,140	CY	\$	1.72	\$	4.72	\$	-	\$	6.43	\$	264,626		Use existing earth fill material from stockpile	
8.010		Grade and Compact surface for earthen road	2,211,560	SF	\$	0.13	\$	0.18	\$	-	\$	0.31	\$	683,345			
8.011		Developing haul routes - Haul routes outside reservoir	12	ACRES									\$	27,947.01	\$	335,364	Clear, grade, provide gravel fill layer and compact
8.012		Clear and grub	1,122,780	SF	\$	0.06	\$	0.12	\$	-	\$	0.20	\$	104,630			
8.012		Load and haul earth fill, 0.5 mile haul	9,680	CY	\$	1.78	\$	4.72	\$	-	\$	6.49	\$	62,793		Use existing earth fill material from stockpile	
8.013		Grade and Compact surface for earthen road	522,720	SF	\$	0.14	\$	0.18	\$	-	\$	0.32	\$	167,922			
8.014		Rock processing areas													Not required		
8.015		Mass Concrete / Backfill Concrete	3,400	CY	\$	95.71	\$	50.93	\$	233.06	\$	-	\$	379.70	\$	1,290,972	
8.016		Mass Concrete for spillway	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	-	Not required	
8.017		Concrete Gravity Dam	-	CY									\$	-	\$	-	Not required
8.018		Clay Backfill	-	CY									\$	-	\$	-	Not required
8.019		Clay, excavated from borrow area	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.020		Load and haul from stockpile to fill location, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.021		Place clay backfill material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.022		Riprap and Drain	-	CY									\$	-	\$	-	Not required
8.023		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.024		Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.025		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.026		Load and haul from stockpile to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.027		Spread riprap	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	
8.028		Rim Grouting	-	LF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.029		Bridge	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8.030		Dewatering allowance	1	LS	\$	-	\$	-	\$	-	\$	249,166.67	\$	249,166.67	\$	249,167	
9		Misc allowance for small items, allow 1%	1.0%	%								67,509.689	\$	67,509.689	\$	675,097	
Total Direct Cost			53	Acres	\$	317,745.24	\$	480,173.53	\$	245,013.43	\$	30,380.23	\$	1,082,296.10	\$	98,184,786	

24. Construction Cost Summary: Saddle Dam 5

Total Cost

Total Direct Cost 37,668,110

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 37,668,110

General Conditions

Mobilization	5.0%	1,883,406
Site General Conditions & Requirements	10.0%	3,955,152
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	478,573
Bonds	0.6%	263,911
GC Home Office Overhead	6.0%	2,654,949
GC Profit	8.0%	3,752,328

Total Contractor Indirect Markups 12,988,319

TOTAL DIRECT COST BEFORE CONTINGENCIES 50,656,429

Contingencies

Design Contingencies	10.0%	5,065,643
Construction Contingencies	15.0%	8,358,311

Total Contingency Allowance 13,423,954

TOTAL DIRECT COST BEFORE ESCALATION 64,080,383

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	625,766
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 64,706,149

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Transportation (\$)	Installation (\$)	Other (\$)	Total (\$)	Notes
1	PRECONSTRUCTION ACTIVITIES										
1.001	Demolition Work	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
1.002	Cleaning and Grubbing	34	ACRE	\$ 3,094.87	\$ 5,401.49	\$ -	\$ -	\$ -	\$ 8,496.36	\$ 288,876	Heavy vegetation removal
1.003	Reservoir Cleaning	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere costed
1.004	Erosion and Sediment Control	34	ACRE	\$ -	\$ -	\$ -	\$ -	\$ 3,760.50	\$ 3,760.50	\$ 127,857	Allowed 50.25/5% to 30% of the total area
2	Process and Haul Filter Materials to Project										
2.001	Process and Stockpile on Project - Zone 2A - Filter	99,000	Tons						\$ 37.06	\$ 3,668,615	
2.002	Purchase processed material from quarry	99,000	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 2,192,454	Include 10% waste factor / additional material supply
2.003	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	66,971	LCY	\$ 10.50	\$ 11.47	\$ -	\$ -	\$ -	\$ 21.67	\$ 1,471,162	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 20% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004	Process and Stockpile on Project - Zone 2A - Drain	104,500	Tons						\$ 37.15	\$ 3,882,644	
2.005	Purchase processed material from quarry	104,500	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 2,319,534	Include 10% waste factor / additional material supply
2.006	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	70,693	LCY	\$ 10.50	\$ 11.58	\$ -	\$ -	\$ -	\$ 22.11	\$ 1,583,109	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007	Process and Stockpile on Project - Zone 2A - Transition	29,700	Tons						\$ 37.06	\$ 1,100,585	
2.008	Purchase processed material from quarry	29,700	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ 22.20	\$ 658,258	Include 10% waste factor / additional material supply
2.009	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	20,091	LCY	\$ 10.50	\$ 11.47	\$ -	\$ -	\$ -	\$ 21.67	\$ 441,349	1. Plan/ECV and 1.15 swell factor (ECV to LCY) 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons						\$ -	\$ -	Not required
2.011	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.012	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons						\$ -	\$ -	Not required
2.014	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
2.015	Haul material from quarry to site stockpile/fill location, 4.0 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	Foundation Preparation and Grouting										
3	Foundation Excavation										
3.001	Topsoil Salvage	43,200	BCY						\$ 8.83	\$ 381,469	
3.002	Excavations - remove top soil layer	47,520	LCY	\$ 3.49	\$ 2.32	\$ -	\$ -	\$ -	\$ 3.91	\$ 181,180	Include 10% swell factor
3.003	Load and haul to disposal site, 0.5 mile haul	47,520	LCY	\$ 3.17	\$ 3.04	\$ -	\$ -	\$ -	\$ 4.22	\$ 200,360	
3.004	Dam Foundation Excavation - Common	57,700	BCY						\$ 8.85	\$ 510,747	
3.005	Excavations - remove top soil layer	63,420	LCY	\$ 1.61	\$ 2.29	\$ -	\$ -	\$ -	\$ 3.02	\$ 197,162	Include 10% swell factor
3.006	Load and haul to disposal site, 0.5 mile haul	63,420	LCY	\$ 1.18	\$ 3.09	\$ -	\$ -	\$ -	\$ 4.11	\$ 263,343	
3.007	Dam Foundation Rock Exc - Ripplable Rock	112,000	BCY						\$ 11.82	\$ 1,323,482	
3.008	Rock excavations, no blasting	128,800	LCY	\$ 2.54	\$ 3.72	\$ -	\$ -	\$ -	\$ 6.26	\$ 805,805	Include 10% swell factor
3.009	Load and haul to stockpile, 0.5 mile haul	128,800	LCY	\$ 1.18	\$ 2.89	\$ -	\$ -	\$ -	\$ 4.01	\$ 516,387	
3.010	Dam Foundation Rock Exc - Drill and Shoot	-	BCY						\$ -	\$ -	
3.011	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
3.012	Load and haul to stockpile, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Include 10% swell factor
3.013	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4	Foundation Preparation and Grouting										Included below
	Foundation Preparation - Beneath Core										
4.001	Initial Foundation Cleaning - Core	19,000	SY						\$ 19.47	\$ 369,937	
4.002	Initial foundation core cleanup	19,000	SY	\$ 11.80	\$ 5.58	\$ -	\$ -	\$ -	\$ 17.18	\$ 318,990	
4.003	Load and haul to disposal area, 0.5 mile haul	5,225	CY	\$ 3.29	\$ 5.54	\$ -	\$ -	\$ -	\$ 8.83	\$ 45,538	Assume removal of top layer, 0.25' thick
4.004	Final Foundation Cleaning - Core	19,000	SY						\$ 16.98	\$ 321,852	
4.005	Final foundation core cleanup	19,000	SY	\$ 11.47	\$ 5.81	\$ -	\$ -	\$ -	\$ 14.98	\$ 332,652	
4.006	Load and haul to disposal area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.007	Dental Excavation	1,200	CY						\$ 126.06	\$ 151,267	
4.008	Dental excavations	1,320	LCY	\$ 69.06	\$ 81.24	\$ -	\$ -	\$ -	\$ 102.50	\$ 132,990	Include 10% swell factor
4.009	Load and haul to site stockpile, 0.5 mile haul	1,320	LCY	\$ 5.25	\$ 9.04	\$ -	\$ -	\$ -	\$ 14.29	\$ 18,869	
4.010	Dental Concrete	1,200	CY	\$ 44.52	\$ 20.23	\$ 183.12	\$ -	\$ -	\$ 247.87	\$ 297,443	
4.011	Grout Cap with Anchors	3,900	CV	\$ 79.63	\$ 23.04	\$ 519.68	\$ 10.32	\$ 632.67	\$ 2,467,417	\$ 3' x 40' cap, includes formwork and reinforcement (50lbs/cy)	
4.012	Curtain Grouting	10,500	LF						\$ 79.21	\$ 831,664	
4.013	Drill setup for all holes	140	ea.	\$ 194.34	\$ 27,208	\$ -	\$ -	\$ -	\$ 519.56	\$ 72,758	Assume 75' drilling lengths
4.014	Drill curtain grout holes	10,360	ft	\$ 10.34	\$ 107.4	\$ -	\$ -	\$ -	\$ 23.45	\$ 243,500	
4.015	Reinfit grout holes	1,050	ft	\$ 12.53	\$ 13.16	\$ -	\$ -	\$ -	\$ 24.76	\$ 25,922	Assume 10% to be re-drilled
4.016	Mixing to grout holes and grout samples	515	hr	\$ 21.49	\$ 11,077	\$ -	\$ -	\$ -	\$ 91.43	\$ 47,025	1.4 hours per hole
4.017	Inject portland cement grout	700	hr	\$ 468.51	\$ 327,957	\$ -	\$ -	\$ -	\$ 505.80	\$ 354,120	
4.018	Perform hydraulic conductivity tests	140	ea.	\$ -	\$ -	\$ -	\$ -	\$ 347.30	\$ 347.30	\$ 48,612	
4.019	Consolidation Grouting	-	LF						\$ -	\$ -	Not required
4.020	Drill setup for all holes	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.021	Drill curtain grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.022	Reinfit grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.023	Mixing to grout holes and grout samples	-	hr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024	Inject portland cement grout	-	hr	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.025	Perform hydraulic conductivity tests	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.026	Type III Cement	370	Tons	\$ 179.50	\$ 66,415	\$ 74.14	\$ 113.14	\$ 366.78	\$ 135,709	\$ 135,709	
4.027	Backfill Concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere

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Item	Description	Quantity	Unit	Unit Price	Subtotal (\$)	Material (\$)	Transport (\$)	Placement (\$)	Other (\$)	Unit Price	Subtotal (\$)	Notes
7.051	Furnish and Install Riprap	38,000	ECY							\$ 40.35	\$ 1,533,409	
7.052	Blasting operations	45,000	LCY	\$ 4.37	\$ 196,650	\$ 2.28	\$ 102,600	\$ 4.83	\$ 216,900	\$ 15.05	\$ 685,878	Include 25% swell factor
7.053	Load and haul to processing area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
7.054	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
7.055	Load and haul to fill location, 0.5 mile haul	25,000	LCY	\$ 0.83	\$ 20,750	\$ 2.61	\$ 65,250	\$ -	\$ -	\$ 3.44	\$ 136,792	No crushing and screening required
7.056	Riprap placement	45,000	LCY	\$ 8.02	\$ 360,900	\$ 9.11	\$ 409,950	\$ -	\$ -	\$ 15.13	\$ 680,947	
8	Other Work											
8.001	GG Dam - Bypass Pipeline and U/S Cofferdam										Elsewhere	
8.002	Instrumentation/Telemetry: Instrumentation/Telemetry (piezometers, settlement monitors (survey monuments), seismographs, and slope indicators)	1	LS	\$ -	\$ -	\$ -	\$ -	\$ 348,833.33	\$ 348,833.33	\$ 348,833	\$ 348,833	Allowance
8.003	Seeding and Mulching	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.004	Restoration										Elsewhere	
8.005	Gravel Surfacing Roads and Crests / Production and Placement of Dam Crest Gravel (No AC required)	1,700	CY							\$ 87.40	\$ 148,582	
8.006	Purchase and Import gravel to fill location and stockpile, 25 mi haul	1,925	LCY	\$ 10.28	\$ 19,787	\$ 11.01	\$ 21,191	\$ 27.71	\$ 53,138	\$ 50.98	\$ 115,310	Include 15% swell factor
8.007	Place and compact	1,925	LCY	\$ 5.25	\$ 10,106	\$ 11.47	\$ 22,084	\$ -	\$ -	\$ 17.02	\$ 31,272	
8.008	Developing haul routes - Haul routes inside reservoir	32	ACRES							\$ 28,033.64	\$ 897,076	Clear, grade, provide gravel fill layer and compact
8.009	Clear and grub	1,293,920	SF	\$ 0.07	\$ 90,574	\$ 0.11	\$ 142,331	\$ -	\$ -	\$ 0.19	\$ 161,628	
8.010	Load and haul earth fill, 0.5 mile haul	11,940	CY	\$ 2.14	\$ 25,552	\$ 5.83	\$ 69,610	\$ -	\$ -	\$ 7.69	\$ 264,219	Use existing earth fill material from stockpile
8.011	Grade and Compact surface for earthen road	1,303,920	SF	\$ 0.13	\$ 169,509	\$ 0.17	\$ 221,666	\$ -	\$ -	\$ 0.31	\$ 426,123	
8.012	Developing haul routes - Haul routes outside reservoir	21	ACRES							\$ 28,490.25	\$ 598,295	Clear, grade, provide gravel fill layer and compact
8.013	Clear and grub	914,760	SF	\$ 0.07	\$ 64,033	\$ 0.11	\$ 98,623	\$ -	\$ -	\$ 0.19	\$ 175,058	
8.014	Load and haul earth fill, 0.5 mile haul	11,940	CY	\$ 2.20	\$ 26,268	\$ 6.93	\$ 82,441	\$ -	\$ -	\$ 8.21	\$ 115,245	Use existing earth fill material from stockpile
8.015	Grade and Compact surface for earthen road	914,760	SF	\$ 0.13	\$ 118,919	\$ 0.18	\$ 215,052	\$ -	\$ -	\$ 0.32	\$ 298,199	
8.016	Rock processing areas										Not required	
8.015	Mass Concrete / Backfill Concrete	2,500	CY	\$ 96.98	\$ 242,450	\$ 51.61	\$ 129,025	\$ 233.06	\$ 582,640	\$ 381.65	\$ 954,132	
8.016	Mass Concrete for spillway	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
8.017	Concrete Gravity Dam	-	CY							\$ -	\$ -	Not required
8.018	Clay Backfill	-	CY							\$ -	\$ -	Not required
8.019	Clay excavations from borrow area	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.02	Load and haul from stockpile to fill location, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.021	Place clay backfill material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.022	Riprap and Drain	-	CY							\$ -	\$ -	Not required
8.023	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.024	Load and haul to processing area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.025	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.026	Load and haul from stockpile to fill location, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.027	Spread riprap	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
8.028	Rim Grouting	-	LF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
8.029	Bridge	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
8.030	Dewatering allowance	1	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 249,166.67	\$ 249,167	
9	Misc allowance for small items, allow 1%	1.0%	%							\$ 37,295.159	\$ 37,295	
Total Direct Cost		42	Acres	\$ 256,496.41	\$ 381,590.30	\$ 233,494.83	\$ 16,273.11	\$ 935,059.77	\$ 37,688,110			

Sites Reservoir (Alt 2): Other Saddle Dams
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
March 1, 2021

25. Construction Cost Summary: Other Saddle Dams/Dikes				
				Total Cost
Total Direct Cost				39,370,315
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				39,370,315
General Conditions				
Mobilization		5.0%		1,968,516
Site General Conditions & Requirements		10.0%		4,133,883
Phasing	Not included	0.0%		-
General Contractor Overhead and Fees				
Insurance		1.1%		500,200
Bonds		0.6%		275,837
GC Home Office Overhead		6.0%		2,774,925
GC Profit		8.0%		3,921,894
Total Contractor Indirect Markups				13,575,255
TOTAL DIRECT COST BEFORE CONTINGENCIES				52,945,570
Contingencies				
Design Contingencies		10.0%		5,294,557
Construction Contingencies		15.0%		8,736,019
Total Contingency Allowance				14,030,576
TOTAL DIRECT COST BEFORE ESCALATION				66,976,146
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	654,045
Escalation to Mid-point of Construction		Not included	0%	-
ESTIMATED CONSTRUCTION COST				67,630,191

Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Transport (\$)	Processing (\$)	Other (\$)	Total (\$)	Notes
1 PRECONSTRUCTION ACTIVITIES											
1.001	Demolition Work	-	LS	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere
1.002	Cleaning and Grubbing	26	ACRE	\$ 3,195.11	\$ 82,572.86	\$ 5,576.43	\$ -	\$ -	\$ -	\$ 88,149.29	Heavy vegetation removal
1.003	Reservoir Cleaning	-	ACRE	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere costed
1.004	Erosion and Sediment Control	26	ACRE	\$ -	\$ -	\$ -	\$ -	\$ 3,760.50	\$ -	\$ 3,760.50	Allowed 50.25/5% to 30% of the total area
2 Process and Haul Filter Materials to Project											
2.001	Process and Stockpile on Project - Zone 2A - Filter	76,450	Tons							\$ 37.35	\$ 2,855,462
2.002	Purchase processed material from quarry	76,450	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 1,696,922
2.003	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	51,718	LCY	\$ 10.70	\$ 553,292.60	\$ 11.70	\$ -	\$ -	\$ -	\$ 22.40	\$ 1,158,340
2.004	Process and Stockpile on Project - Zone 2A - Drain	80,100	Tons							\$ 37.12	\$ 2,973,259
2.005	Purchase processed material from quarry	80,100	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 1,777,940
2.006	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	54,185	LCY	\$ 10.84	\$ 587,185.40	\$ 11.82	\$ -	\$ -	\$ -	\$ 22.06	\$ 1,195,319
2.007	Process and Stockpile on Project - Zone 2A - Transition	21,560	Tons							\$ 37.55	\$ 809,568
2.008	Purchase processed material from quarry	21,560	Tons	\$ -	\$ -	\$ -	\$ 22.20	\$ -	\$ -	\$ 22.20	\$ 478,527
2.009	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	14,585	LCY	\$ 10.84	\$ 158,000.40	\$ 11.82	\$ -	\$ -	\$ -	\$ 22.70	\$ 331,011
2.010	Process and Stockpile on Project - Zone 2B - Filter	-	Tons							\$ -	\$ -
2.011	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2.012	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2.013	Process and Stockpile on Project - Zone 2B - Transition	-	Tons							\$ -	\$ -
2.014	Purchase processed material from quarry	-	Tons	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
2.015	Haul material from quarry to site stockpile/fill location, 3.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Foundation Preparation and Grouting											
3 Foundation Excavation											
3.001	Topsoil Salvage	52,000	BCY							\$ 8.49	\$ 441,701
3.002	Excavations - remove top soil layer	52,000	LCY	\$ 7.45	\$ 387,400.00	\$ 7.45	\$ -	\$ -	\$ -	\$ 7.45	\$ 387,400.00
3.003	Load and haul to disposal site, 0.5 mile haul	52,000	LCY	\$ 1.18	\$ 61,360.00	\$ 1.18	\$ -	\$ -	\$ -	\$ 1.18	\$ 61,360.00
3.004	Dam Foundation Excavation - Common	43,000	BCY							\$ 8.55	\$ 367,738
3.005	Excavations - remove top soil layer	43,000	LCY	\$ 7.45	\$ 320,350.00	\$ 7.45	\$ -	\$ -	\$ -	\$ 7.45	\$ 320,350.00
3.006	Load and haul to disposal site, 0.5 mile haul	43,000	LCY	\$ 1.18	\$ 50,810.00	\$ 1.18	\$ -	\$ -	\$ -	\$ 1.18	\$ 50,810.00
3.007	Dam Foundation Rock Exc - Ripplable Rock	93,100	BCY							\$ 11.87	\$ 1,104,659
3.008	Rock excavations, no blasting	107,065	LCY	\$ 7.45	\$ 796,836.25	\$ 7.45	\$ -	\$ -	\$ -	\$ 7.45	\$ 796,836.25
3.009	Load and haul to stockpile, 0.5 mile haul	107,065	LCY	\$ 1.18	\$ 126,336.70	\$ 1.18	\$ -	\$ -	\$ -	\$ 1.18	\$ 126,336.70
3.010	Dam Foundation Rock Exc - Drill and Shoot	-	BCY							\$ -	\$ -
3.011	Blasting operations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3.012	Explosives, load and haul to stockpile, 3 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
3.013	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4 Foundation Preparation and Grouting											
Foundation Preparation - Beneath Core											
4.001	Initial Foundation Cleaning - Core	8,700	SY							\$ 12.90	\$ 112,245
4.002	Initial foundation core cleanup	8,700	SY	\$ 7.75	\$ 67,387.50	\$ 7.75	\$ -	\$ -	\$ -	\$ 7.75	\$ 67,387.50
4.003	Load and haul to disposal area, 0.5 mile haul	2,583	CY	\$ 3.46	\$ 8,935.38	\$ 3.46	\$ -	\$ -	\$ -	\$ 3.46	\$ 8,935.38
4.004	Final Foundation Cleaning - Core	8,700	SY							\$ 10.04	\$ 87,366
4.005	Final foundation core cleanup	8,700	SY	\$ 7.75	\$ 67,387.50	\$ 7.75	\$ -	\$ -	\$ -	\$ 7.75	\$ 67,387.50
4.006	Load and haul to disposal area, 0.5 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.007	Dental Excavation	760	CY							\$ 122.75	\$ 93,287
4.008	Dental excavations	836	LCY	\$ 63.06	\$ 52,718.16	\$ 63.06	\$ -	\$ -	\$ -	\$ 63.06	\$ 52,718.16
4.009	Load and haul to site stockpile, 0.5 mile haul	836	LCY	\$ 8.15	\$ 6,814.40	\$ 8.15	\$ -	\$ -	\$ -	\$ 8.15	\$ 6,814.40
4.010	Dental Concrete	760	CY	\$ 44.26	\$ 33,617.60	\$ 20.11	\$ 183.12	\$ -	\$ -	\$ 247.49	\$ 188,093
4.011	Grout Cap with Anchors	2,500	CV	\$ 79.05	\$ 197,625.00	\$ 22.87	\$ 519.68	\$ 16.10	\$ 637.70	\$ 1,594,259	3' x 40' cap, includes formwork and reinforcement (50lbs/cy)
4.012	Curtain Grouting	7,000	LF							\$ 81.07	\$ 567,517
4.013	Drill setup for all holes	90	ea.	\$ 218.64	\$ 19,677.60	\$ -	\$ -	\$ -	\$ -	\$ 564.30	\$ 54,533
4.014	Drill curtain grout holes	7,000	ft	\$ 10.75	\$ 75,250.00	\$ 11.57	\$ -	\$ -	\$ -	\$ 12.30	\$ 156,129
4.015	Reinfit grout holes	700	ft	\$ 11.63	\$ 8,141.00	\$ 12.36	\$ -	\$ -	\$ -	\$ 24.78	\$ 17,346
4.016	Mixing to grout holes and grout samples	330	ent.	\$ 86.90	\$ 28,717.00	\$ -	\$ -	\$ -	\$ -	\$ 94.95	\$ 31,335
4.017	Inject portland cement grout	487	ent.	\$ 468.81	\$ 228,309.47	\$ -	\$ -	\$ -	\$ -	\$ 505.80	\$ 247,190
4.018	Perform hydraulic conductivity tests	98	ea.	\$ -	\$ -	\$ -	\$ -	\$ 347.30	\$ 347.30	\$ -	\$ 34,415
4.019	Consolidation Grouting	-	LF							\$ -	\$ -
4.020	Drill setup for all holes	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.021	Drill curtain grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.022	Reinfit grout holes	-	ft	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.023	Mixing to grout holes and grout samples	-	ent.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.024	Inject portland cement grout	-	ent.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.025	Perform hydraulic conductivity tests	-	ea.	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
4.026	Type III Cement	250	Tons	\$ 181.13	\$ 45,282.50	\$ 74.82	\$ 113.14	\$ -	\$ 369.09	\$ 92,272	
4.027	Backfill Concrete	-	CY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Elsewhere

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Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAACEI Class 4
April 16, 2021

26. Construction Cost Summary: Inlet/Outlet & Diversion Works

Total Cost

Total Direct Cost 167,233,813

TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS 167,233,813

General Conditions

Mobilization	5.0%	8,361,691
Site General Conditions & Requirements	10.0%	17,559,550
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	2,124,706
Bonds	0.6%	1,171,679
GC Home Office Overhead	6.0%	11,787,086
GC Profit	8.0%	16,659,082

Total Contractor Indirect Markups 57,663,794

TOTAL DIRECT COST BEFORE CONTINGENCIES 224,897,607

Contingencies

Design Contingencies	10.0%	22,489,761
Construction Contingencies	15.0%	37,108,105

Total Contingency Allowance 59,597,866

TOTAL DIRECT COST BEFORE ESCALATION 284,495,473

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	2,778,194
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST 287,273,667

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Item	Sub Item	Description	Quantity	Unit	Unit Price (\$)	Est. Material (\$)	Est. Labor (\$)	Est. Equipment (\$)	Est. Subcontract (\$)	Est. Total (\$)	Notes	Comments
11.013		Downstream Portal Excavation and Rock Bolts	-	CY								
11.014		Excavate and haul material	-	LCY	\$	\$	\$	\$	\$	\$		
11.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$		
11.016		Shotcrete portal face	-	CY	\$	\$	\$	\$	\$	\$		
11.017		Steel fiber for shotcrete	-	TON	\$	\$	\$	\$	\$	\$		
11.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$		
11.019		3.5" diam grouted hole with #5 bar	-	CY	\$	\$	\$	\$	\$	\$		
11.020		Downstream Portal Backfill	-	CY								
11.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$		
11.022		Backfill compact and grade	-	LCY	\$	\$	\$	\$	\$	\$		
11.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	\$	\$	\$	\$	\$		
11.024		Tunnel Concrete Lining	-	LF	\$	\$	\$	\$	\$	\$		
11.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	\$	\$	\$	\$	\$		
11.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	\$	\$	\$	\$	\$		
11.027		Riprap Discharge Channel	-	CY								
11.028		Blasting operations	-	LCY	\$	\$	\$	\$	\$	\$		
11.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$		
11.030		Crush and screen material	-	LCY	\$	\$	\$	\$	\$	\$		
11.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$		
11.032		Place at the channel	-	LCY	\$	\$	\$	\$	\$	\$		
12		ERS Facility 2								\$	-	Not required
12.001		Upstream Portal Excavation and Rock Bolts	-	CY								
12.002		Excavate and haul material	-	LCY	\$	\$	\$	\$	\$	\$		
12.003		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$		
12.004		Shotcrete portal face	-	CY	\$	\$	\$	\$	\$	\$		
12.005		Steel fiber for shotcrete	-	TON	\$	\$	\$	\$	\$	\$		
12.006		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$		
12.007		3.5" diam grouted hole with #5 bar	-	CY	\$	\$	\$	\$	\$	\$		
12.008		Upstream Portal Backfill	-	CY								
12.009		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$		
12.010		Backfill compact and grade	-	LCY	\$	\$	\$	\$	\$	\$		
12.011		Inlet and Valve Structures	-	CY								
12.012		Four inlet and valve structures	-	CY	\$	\$	\$	\$	\$	\$		
12.013		Downstream Portal Excavation and Rock Bolts	-	CY								
12.014		Excavate and haul material	-	LCY	\$	\$	\$	\$	\$	\$		
12.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$		
12.016		Shotcrete portal face	-	CY	\$	\$	\$	\$	\$	\$		
12.017		Steel fiber for shotcrete	-	TON	\$	\$	\$	\$	\$	\$		
12.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	\$	\$	\$	\$	\$		
12.019		3.5" diam grouted hole with #5 bar	-	CY	\$	\$	\$	\$	\$	\$		
12.020		Downstream Portal Backfill	-	CY								
12.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	\$	\$	\$	\$	\$		
12.022		Backfill compact and grade	-	LCY	\$	\$	\$	\$	\$	\$		
12.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	\$	\$	\$	\$	\$		
12.024		Tunnel Concrete Lining	-	LF	\$	\$	\$	\$	\$	\$		
12.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	\$	\$	\$	\$	\$		
12.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	\$	\$	\$	\$	\$		
12.027		Riprap Discharge Channel	-	CY								
12.028		Blasting operations	-	LCY	\$	\$	\$	\$	\$	\$		
12.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	\$	\$	\$	\$	\$		
12.030		Crush and screen material	-	LCY	\$	\$	\$	\$	\$	\$		
12.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	\$	\$	\$	\$	\$		
12.032		Place at the channel	-	LCY	\$	\$	\$	\$	\$	\$		
13		IO Facility								\$	165,578,032	
		Clearing Work										
13.001		Demolition Work	-	LS	\$	\$	\$	\$	\$	\$		
13.002		Clearing and Grubbing	9	ACRE	\$	1,230.71	\$	2,147.96	\$	\$	3,379	\$ 30,408 Light vegetation removal
13.003		Erosion and Sediment Control	9	ACRE	\$	\$	\$	\$	\$	3,791	\$ 3,761	\$ 33,845 Allowed 50.25/5F to 30% of the total area
		Access Roads										
13.004		Develop temporary access roads										Elsewhere Included within dam and roadwork estimates
		Foundations										
13.005		Foundation piling	540.00	LF						\$ 450.72	\$ 243,388	4" dia, 60" deep, 9 piles - drilled piers/piles
13.006		Drilling rig mobilization/demobilization allowance	2.00	EA	\$	18,000.00	\$	10,000.00	\$	\$	28,000.00	\$ 60,000
13.007		Foundation piles - drilled piers	540.00	LF	\$	49.50	\$	41.25	\$	\$	108.00	\$ 60,000
13.008		Concrete in piles								\$		Included above
13.009		Pile reinforcement allowance	47	TON	\$	772.50	\$	257.50	\$	\$	2,575.00	\$ 109,288 Allow 150lbs/cy
13.010		Pile testing allowance	15.00	%	\$	\$	\$	\$	\$	243,387.50	\$ 243,387.50	\$ 36,508
13.011		Pile cap / base slab	489	CY						\$ 652.70	\$ 319,186	5" thick base slab
13.012		Cast in place concrete	489	CY	\$	88.97	\$	32.88	\$	\$	316.85	\$ 153,838 18" thick slab
13.013		Formwork	973	SF	\$	13.28	\$	2.54	\$	\$	22.36	\$ 23,700 Formwork to piles
13.014		Concrete reinforcement	97	TON	\$	742.88	\$	371.49	\$	\$	3,714.90	\$ 156,151 Allow 150lbs/cy
		Intake and Outlet Structures										
13.015		Multi-Level Inlet/Outlet Tower Cast In Place Concrete	7,936	CY								246" height tower for Alt 2
13.016		Walls	7,102	CY						\$ 1,133.76	\$ 8,051,876	
13.017		Cast in place concrete	7,102	CY	\$	85.17	\$	32.88	\$	\$	316.85	\$ 2,325,132 Average 4" thick
13.018		Formwork	895,810	SF	\$	13.28	\$	2.54	\$	\$	22.36	\$ 2,192,865 Formwork to walls
13.019		Concrete reinforcement	888	TON	\$	742.88	\$	371.49	\$	\$	3,714.90	\$ 1,509,891 Allow 150lbs/cy
13.020		Slabs - elevated decks	722	CY						\$ 833.82	\$ 602,020	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
13.021		Cast in place concrete	722	CY	\$	65.37	\$	12.68	\$	\$	316.85	\$ 235,973 18" thick slab
13.022		Formwork	5,493	SF	\$	15.25	\$	2.34	\$	\$	25.35	\$ 164,842
13.023		Concrete reinforcement	54	TON	\$	742.88	\$	371.49	\$	\$	3,714.90	\$ 204,162 Allow 150lbs/cy

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Sites Reservoir (Alt 2): South Road
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
March 1, 2021

27.01. Construction Cost Summary: South Road

				Unit Cost Rate (\$/LF)	Total Cost
				LF:	103,512
Total Direct Cost				2,347.89	243,034,541
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				2,347.89	243,034,541
General Conditions					
Mobilization			3.0%	70.44	7,291,036
Site General Conditions & Requirements			10.0%	241.83	25,032,558
Phasing		Not included	0.0%	-	-
General Contractor Overhead and Fees					
Insurance			1.1%	29.26	3,028,939
Bonds			0.6%	16.14	1,670,322
GC Field and Home Office Overhead			5.0%	135.28	14,002,870
GC Profit			5.0%	142.04	14,703,013
Total Contractor Indirect Markups				634.99	65,728,738
TOTAL DIRECT COST BEFORE CONTINGENCIES				2,982.87	308,763,279
Contingencies					
Design Contingencies			25.0%	745.72	77,190,820
Construction Contingencies			15.0%	559.29	57,893,115
Total Contingency Allowance				1,305.01	135,083,935
TOTAL DIRECT COST BEFORE ESCALATION				4,287.88	443,847,214
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	41.87	4,334,317
Escalation to Mid-point of Construction		Not included	0%	-	-
ESTIMATED CONSTRUCTION COST				4,329.75	448,181,531

Item	Sub-item	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comments
South Road										
	Road Length (LF)	103,512	LF							
	Road Length (Miles)	20	MILES							
	Road Area (SF)	3,519,408	SF							
	Road Area (SV)	391,045	SV							
	Road Area (Acres)	81	ACRE							
1 Clearing and Demolition Work										
1.001	Demolition Work	-	SV							Elsewhere
1.002	Asphalt removal work	-	SV	\$	-	\$	-	\$	-	Included elsewhere
1.003	Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	
1.004	Clearing and Grubbing	153	ACRE	\$	1,084.36	\$	-	\$	2,858.92	\$ 438,945 Light vegetation clearing work
Roads and Road Structures										
2 Road Excavations										
2.001	Temporary Silt Fence	86,400	LF						\$ 3.90	\$ 336,066
2.002	Setup temporary silt fence	86,400	LF	\$	3.72	\$	0.22	\$	7.94	\$ 254,014
2.003	Silt fence removal	86,400	LF	\$	0.62	\$	0.22	\$	0.66	\$ 82,532 Include allowances for dump charges
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY						\$ -	\$ - Not required
2.005	Roadway excavations including existing asphalt layer removal	-	LCY	\$	-	\$	-	\$	-	-
2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.007	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	-
2.008	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	-
2.009	Load and haul to stockpile, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	8,891,000	CY						\$ 10.15	\$ 90,247,945 Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material
2.011	Roadway excavations, common earth	10,224,650	LCY	\$	2.09	\$	2.12	\$	4.26	\$ 43,277,108 Cleaned excavations include a 15% swell factor
2.012	Load and haul to stockpile/fill location, 0.25 mile haul	10,224,650	LCY	\$	1.12	\$	2.23	\$	4.58	\$ 46,670,886 Haul to stockpile/fill location, 0.25 mile hauling distance assumed
2.013	Roadway Excavation (Cut to Waste Disposal Area)	1,413,600	CY						\$ 10.72	\$ 15,157,804 Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul
2.014	Roadway excavations	1,625,400	LCY	\$	2.09	\$	2.12	\$	4.26	\$ 6,925,456 Include a 15% swell factor
2.015	Load and haul to disposal site, 0.5 mile haul	1,625,400	LCY	\$	1.48	\$	2.53	\$	5.06	\$ 8,225,305 Haul to disposal area, no provision for processing rubble material or dumping off-site, assumed 0.5 mile hauling distance
2.016	Roadway Excavation (Rock Cut)	1,383,200	CY						\$ 20.02	\$ 27,688,273 Excavated material to be stockpiled for re-use, average 2 mile haul
2.017	Blasting operations	492,852	LCY	\$	4.26	\$	4.07	\$	11.59	\$ 6,586,053 Assume 20% of volume will require blasting, assume rock blasting productivity rate of 100 CY/hr
2.018	Rock breaking operations	1,155,280	LCY	\$	2.80	\$	2.71	\$	6.59	\$ 7,653,154 Assume 70% of volume will be excavated with a loader
2.019	Load and haul to processing area, 2 mile haul	-	LCY	\$	-	\$	-	\$	-	- No crushing and screening required
2.020	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	- No crushing required
2.021	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	- No screening required
2.022	Load and haul to stockpile location, 2 mile haul	1,659,400	LCY	\$	2.23	\$	3.08	\$	8.11	\$ 13,468,016 Haul to stockpile location, 2 mile hauling distance assumed
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	3,831,400	CY						\$ 9.71	\$ 37,200,219 Excavate common earth and direct haul to fill location
2.024	Roadway excavations	4,214,540	LCY	\$	2.08	\$	2.12	\$	4.26	\$ 17,967,462 Include 10% swell factor
2.025	Load and haul to fill location, 0.25 mile haul	4,214,540	LCY	\$	1.12	\$	2.30	\$	4.58	\$ 19,237,727 Assumed 0.25 mile hauling distance
2.026	Crushing operations	-	CY	\$	-	\$	-	\$	-	- Not required
2.027	Screening operations	-	CY	\$	-	\$	-	\$	-	- Not required
3 Road Fill and Layer Work										
3.001	Roadway Embankment (from on-site excavation sources)	3,831,300	CY						\$ 6.49	\$ 24,881,785 From excavated suitable material, assume available on-site excavation
3.002	Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	- No suitable handling and trucking required; all material to be hauled directly to fill location
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	3,831,300	LCY							Included above
3.004	Spread and compact	3,831,300	LCY	\$	3.32	\$	2.12	\$	6.49	\$ 24,881,785 Swell factor of 10% included; Direct hauling work included elsewhere
3.005	Roadway Embankment (imported from other excavation sources)	-	CY							Not required
3.006	Load and haul from transportation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	-
3.007	Spread and compact	-	LCY	\$	-	\$	-	\$	-	-
3.008	Class 4 Aggregate subbase	65,100	CY						\$ 60.80	\$ 3,957,844 Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
3.009	Purchase processed material from quarry	110,670	TON	\$	-	\$	13.53	\$	15.15	\$ 1,676,552 Purchase from commercial quarry, 1.7 ton/cy
3.010	Haul material from quarry to site stockpile/fill location, 35 mile haul	74,165	LCY	\$	10.29	\$	12.07	\$	22.36	\$ 1,673,933 Haul to fill location, no stockpiling needed
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	- No stockpiling needed
3.012	Spread and compact	74,165	LCY	\$	4.12	\$	2.54	\$	8.11	\$ 607,319
3.013	Class 2 Aggregate base	65,100	CY						\$ 60.80	\$ 3,957,844 Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy
3.014	Purchase processed material from quarry	110,670	TON	\$	-	\$	13.53	\$	15.15	\$ 1,676,552 Purchase from commercial quarry, 1.7 ton/cy
3.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	74,165	LCY	\$	10.29	\$	12.07	\$	22.36	\$ 1,673,933 Haul to fill location, no stockpiling needed
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	- No stockpiling needed
3.017	Spread and compact	74,165	LCY	\$	4.12	\$	2.54	\$	8.11	\$ 607,319
3.018	Asphalt concrete	88,000	TON	\$	8.63	\$	4.76	\$	116.27	\$ 10,231,320 Assume HMA (Type A), 150lbs/cy
3.019	Tack Coat	65	TON	\$	915.63	\$	459.29	\$	3,875.84	\$ 252,317 Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton

Item	Description	Quantity	Unit	Local Price	Disposal Price	Material Price	Subcontract Price	Subcontract Price	L&P Price	Price	Comments			
4	Other Roadwork													
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	\$	Not required			
4.002	Midwest Guardrail System	10,351	LF	\$	5.38	\$	2.39	\$	43.53	\$	51.29	530,960 Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'		
4.003	Transition Railing (Type WB-31)	-	EA	\$	-	\$	-	\$	-	\$	-	Not required		
4.004	End Anchor Assembly (Type SFT)	-	EA	\$	-	\$	-	\$	-	\$	-	Not required		
4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	12,180	LF						\$	95.96	\$	1,166,831 Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections		
4.006	Culvert pipe excavations	9,079	LCY	\$	4.23	\$	4.11	\$		\$	8.35	\$	75,705	
4.007	Load and haul material to disposal site, 0.5 mile haul	9,079	LCY	\$	3.63	\$	6.36	\$		\$	10.19	\$	92,490	
4.008	24" Dia pipe, galvanized corrugated metal	12,180	LF	\$	33.65	\$	6.54	\$	22.50	\$	75.09	\$	911,856	
4.009	Load at stockpile and haul to fill location, 0.5 mile haul	9,079	LCY	\$	1.32	\$	2.63	\$		\$	5.29	\$	47,612	
4.010	Sand freebag	709	LCY	\$	-	\$	-	\$	66.45	\$	66.45	\$	47,045	
4.011	Box culvert single cell	-	EA	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
4.012	Paint Traffic Stripe - 6" Yellow	207,024	LF	\$	0.24	\$	0.15	\$	0.70	\$	1.09	\$	225,381	Includes 2 yellow stripes
4.013	Paint Traffic Stripe - 6" White	207,024	LF	\$	0.24	\$	0.15	\$	0.70	\$	1.09	\$	225,381	Assume 2 edges of traveled way stripes
4.014	Roadside Signs	104	EA	\$	247.10	\$	105.52	\$	562.46	\$	915.07	\$	95,167	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions
4.015	Permanent Erosion Control (Hydroseed)	1,143,000	SF	\$	0.05	\$	0.02	\$	0.07	\$	0.14	\$	160,930	Includes seed mix, wood fiber
4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	144.00	CY	\$	-	\$	-	\$	210.81	\$	210.81	\$	30,357	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
4.017	Temporary Inlet/Outlet Protection	432	EA	\$	38.43	\$	14.94	\$	71.96	\$	125.33	\$	54,144	Includes install and removal, sandbag barriers, fiber rolls and stakes
4.018	Rock Anchor Assembly		LF											Not required
4.019	Erosion Control (Blanket) / Fiber roll	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
4.020	Retaining walls (Allowance)	327,000	SF						\$	72.74	\$	23,786,145		
4.021	Setup and removing formwork	694,000	SF	\$	9.34	\$	0.18	\$	2.79	\$	17.01	\$	7,856,463	
4.022	Concrete fill work	24,122	CY	\$	30.42	\$	7.41	\$	204.58	\$	267.92	\$	6,344,225	Assume 24" short, 5,000psi concrete
4.023	Concrete/Gravel/Rubble/Grass	2,412	TON	\$	1,003.92	\$	80.63	\$	3,382.92	\$	3,986.85	\$	9,525,214	Allow 1000psi cy
4.024	Rock Slope Protection using rip rap		CY						\$	-	\$	-		
4.025	Blasting operations		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
4.026	Load and haul to processing area, 2 mile haul		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
4.027	Crush and screen material		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
4.028	Load and haul to stockpile location, 2 mile haul		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	Assume 40% of material to be stockpiled (double handling allowance)
4.029	Load and haul from stockpile to fill location, 0.5 mile haul		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	50% of material to be double handled
4.030	Load and dump haul from excavations to fill location, 2 mile haul		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	Lower haul to fill location, 50% of material to be loaded directly
4.031	Rip rap placement		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
4.032	RSP backing		CY						\$	-	\$	-		
4.033	Load and haul material from stockpile to fill location, 2 mile haul		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
4.034	Sp read and compact		LCY	\$	-	\$	-	\$	-	\$	-	\$	-	
4.035	RSP Fabric backing material		SY	\$	-	\$	-	\$	-	\$	-	\$	-	
4.036	Road piling work													Not required
5	Maintenance Work													
5.001	Public Road Maintenance Work (Roads identified within project boundary)	-	MILE	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
6	Temporary Work													
6.001	General traffic management		MO	\$	-	\$	-	\$	-	\$	-	\$	-	Elsewhere Included within general conditions and requirements
6.002	Temporary road surfaces including removal work													Not required
6.003	Temporary Traffic Handling Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions. Bidirectional sand-filled module Temporary K-railing pinned to pavement Temporary traffic signage	-	DAYS	\$	-	\$	-	\$	-	\$	-	\$	-	Not required
7	Highway and Other Road Connection Work													
7.001	Highway and other road connections			\$	-	\$	-	\$	-	\$	-	\$	-	Not required
8	Misc Allowance													
8.001	Misc allowance for small items, allow 1%	1.0%	%						\$	240,628,258	\$	240,628,258	\$	2,406,283
Total Direct Cost		39,313	LF	\$	983.28	\$	1,150.45	\$	293.47	\$	2,947.63	\$	343,034,941	

Sites Reservoir (Alt 2): North Access Road 69 and Saddle Dam Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAACEI Class 4
March 1, 2021

27.03. Construction Cost Summary: North Access Road 69 and Saddle Dam Roads					
			Unit Cost Rate (\$/LF)	Total Cost	
			LF:	56,623	
Total Direct Cost				271.43	15,369,166
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS				271.43	15,369,166
General Conditions					
Mobilization		5.0%	13.57		768,458
Site General Conditions & Requirements		10.0%	28.50		1,613,762
Phasing	Not included	0.0%	-		-
General Contractor Overhead and Fees					
Insurance		1.1%	3.45		195,265
Bonds		0.6%	1.90		107,680
GC Field and Home Office Overhead		5.0%	15.94		902,717
GC Profit		5.0%	16.74		947,852
Total Contractor Indirect Markups				80.10	4,535,734
TOTAL DIRECT COST BEFORE CONTINGENCIES				351.53	19,904,900
Contingencies					
Design Contingencies		10.0%	35.15		1,990,490
Construction Contingencies		15.0%	58.00		3,284,309
Bidding Contingencies / Alternative Procurement Strategy (APS)		0.0%	-		-
Total Contingency Allowance				93.15	5,274,799
TOTAL DIRECT COST BEFORE ESCALATION				444.69	25,179,699
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	4.34		245,888
Escalation to Mid-point of Construction	Not included	0%	-		-
ESTIMATED CONSTRUCTION COST				449.03	25,425,587

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comments					
	North Access Road 69 and Saddle Dam Roads														
	Road length (LF)	56,623	LF												
	Road length (Miles)	11	MILES												
	Road Area (SF)	1,019,214	SF												
	Road Area (SY)	113,246	SY												
	Road Area (Acre)	24	ACRE												
1	Clearing and Demolition Work														
1.001	Demolition Work	-	SY							Included below					
1.002	Asphalt removal work	-	SY	\$	-	\$	-	\$	-	\$					
1.003	Load and haul to disposal site, 3 mile haul	-	LCY	\$	-	\$	-	\$	-	\$					
1.004	Clearing and Grubbing	76	ACRE	\$	1,091.50	\$	1,796.30	\$	-	\$	2,887.80	\$	219,472	Light vegetation clearing work	
	Roads and Road Structures														
2	Road Excavations														
2.001	Temporary Silt Fence	14,000	LF						\$	4.52	\$	63,288			
2.002	Setup temporary silt fence	14,000	LF	\$	1.83	\$	0.24	\$	0.44	\$	3.01	\$	42,161		
2.003	Silt fence removal	14,000	LF	\$	0.77	\$	0.33	\$	-	\$	1.51	\$	21,126	Include blowwater for dump charges	
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY						\$	-	\$	-	-	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations	
2.005	Roadway excavations including existing asphalt layer removal	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		
2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		
2.007	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		
2.008	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		
2.009	Load and haul to stockpile/fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	383,400	CY						\$	10.18	\$	3,901,747		Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material	
2.011	Roadway excavations, common earth	480,610	LCY	\$	3.30	\$	2.18	\$	-	\$	4.17	\$	1,883,967	Crusher excavations include a 15% swell factor	
2.012	Load and haul to stockpile/fill location, 0.25 mile haul	440,610	LCY	\$	1.37	\$	2.21	\$	-	\$	4.58	\$	2,017,770	Haul to stockpile/fill location, 0.25 mile hauling distance assumed	
2.013	Roadway Excavation (Cut to Waste Disposal Area)	72,200	CY						\$	10.96	\$	790,351		Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul	
2.014	Roadway excavations	83,180	LCY	\$	2.14	\$	2.22	\$	-	\$	4.35	\$	361,234	Include a 15% swell factor	
2.015	Load and haul to disposal site, 0.5 mile haul	83,180	LCY	\$	1.51	\$	2.90	\$	-	\$	5.17	\$	426,037	Haul to disposal area, no permission for processing rubble material in dumping off-site; assumed 0.5 mile hauling distance	
2.016	Roadway Excavation (Rock Cut)	35,400	CY						\$	21.59	\$	764,203		Excavated material to be stockpiled for re-use, average 2 mile haul	
2.017	Blasting operations	12,744	LCY	\$	4.83	\$	4.62	\$	4.80	\$	14.25	\$	181,665	Assume 30% of volume with material blasting, assume rock blasting productivity rate of 100 cy/hr	
2.018	Rock breaking operation	29,736	LCY	\$	2.00	\$	2.23	\$	-	\$	9.03	\$	167,155	Assume 70% of volume will be excavated with crusher	
2.019	Load and haul to processing area, 3 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No crushing and screening required	
2.020	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No crushing required	
2.021	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No screening required	
2.022	Load and haul to stockpile location, 2 mile haul	42,480	LCY	\$	3.90	\$	6.17	\$	-	\$	9.07	\$	385,204	Haul to stockpile location, 2 mile hauling distance assumed	
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	266,000	CY						\$	9.75	\$	2,592,257		Excavate common earth and direct haul to fill location	
2.024	Roadway excavations	292,610	LCY	\$	2.10	\$	2.18	\$	-	\$	4.28	\$	1,251,687	Include 10% swell factor	
2.025	Load and haul to stockpile/fill location, 0.25 mile haul	266,000	LCY	\$	1.97	\$	3.12	\$	-	\$	4.56	\$	1,341,361	Assumed 0.25 mile hauling distance	
2.026	Crushing operations	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required	No crushing work required
2.027	Screening operations	-	CY	\$	-	\$	-	\$	-	\$	-	\$	-	Not required	No crushing work required
3	Road Fill and Layer Work														
3.001	Roadway Embankment (from on-site excavation sources)	266,000	CY						\$	6.91	\$	1,837,417		From excavated suitable material, assume available on-site excavation	
3.002	Load at stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No crushing handling and crushing required; all material to be hauled directly to fill location	
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	266,000	LCY											Included above	
3.004	Spread and compact	266,000	LCY	\$	3.69	\$	3.20	\$	-	\$	5.91	\$	1,627,417	Swell factor of 10% including direct hauling work included elsewhere Swell factor of 10% included	
3.005	Roadway Embankment (imported from other excavation sources)	-	CY											Not required	Backfill material to be sourced from road excavations cut
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		
3.007	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-		
3.008	Class 4 Aggregate subbase	12,100	CY						\$	63.28	\$	766,707		Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton/cy	
3.009	Purchase processed material from quarry	21,320	TON	\$	-	\$	-	\$	15.15	\$	15.15	\$	321,917	Purchase from commercial quarry, 1.7 ton/cy	
3.010	Haul material from quarry to site stockpile/fill location, 30 mile haul	13,815	LCY	\$	13.00	\$	12.98	\$	-	\$	24.06	\$	334,791	Haul to fill location, no stockpiling needed	
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No stockpiling needed	
3.012	Top road and compact	13,815	LCY	\$	4.47	\$	4.19	\$	-	\$	8.52	\$	119,299		
3.013	Class 2 Aggregate base	48,700	CY						\$	60.73	\$	2,957,555		Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton/cy	
3.014	Purchase processed material from quarry	82,790	TON	\$	-	\$	-	\$	15.15	\$	15.15	\$	1,254,195	Purchase from commercial quarry, 1.7 ton/cy	
3.015	Haul material from quarry to site stockpile/fill location, 25 mile haul	38,005	LCY	\$	10.28	\$	12.02	\$	-	\$	22.28	\$	1,247,856	Haul to fill location, no stockpiling needed	
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	\$	-	No stockpiling needed	
3.017	Spread and compact	18,015	LCY	\$	4.18	\$	3.90	\$	-	\$	8.13	\$	425,505		
3.018	Asphalt concrete	-	TON	\$	-	\$	-	\$	-	\$	-	\$	-	Not required	
3.019	Tack Coat	-	TON	\$	-	\$	-	\$	-	\$	-	\$	-	Not required	
4	Other Roadwork														
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	\$	-	\$	-	Not required	
4.002	Midwest Guardrail System	5,662	LF	\$	5.36	\$	2.38	\$	43.53	\$	51.27	\$	290,316		Allow guardrails for 5% of road length on 2 sides, assume wood posts and MGS at edge of shoulder with fill heights <10'

Page 3

Sites Reservoir (Alt 2): County, Delevan & Maxwell Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAE Class 4
March 1, 2021

27.04. Construction Cost Summary: County, Delevan & Maxwell Roads				
			Unit Cost Rate (\$/LF)	Total Cost
LF:			112,356	
Total Direct Cost			155.28	17,447,045
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			155.28	17,447,045
General Conditions				
Mobilization	5.0%		7.76	872,352
Site General Conditions & Requirements	10.0%		16.30	1,831,940
Phasing	<i>Not included</i>	0.0%	-	-
General Contractor Overhead and Fees				
Insurance	1.1%		1.97	221,665
Bonds	0.6%		1.09	122,238
GC Field and Home Office Overhead	5.0%		9.12	1,024,762
GC Profit	5.0%		9.58	1,076,000
Total Contractor Indirect Markups			45.83	5,148,957
TOTAL DIRECT COST BEFORE CONTINGENCIES			201.11	22,596,002
Contingencies				
Design Contingencies	10.0%		20.11	2,259,600
Construction Contingencies	15.0%		33.18	3,728,340
Total Contingency Allowance			53.29	5,987,940
TOTAL DIRECT COST BEFORE ESCALATION			254.41	28,583,942
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	2.48
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-	-
ESTIMATED CONSTRUCTION COST			256.89	28,863,074

Item	Quantity	Unit	Material	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comment
County, Delevan & Maxwell Roads											
			112,356	LF							
			22	MILES							
			3,145,968	SF							
			349,552	SY							
			73	ACRE							
1 Clearing and Demolition Work											
1.001			-	SY							Included below
1.002			-	SY							
1.003			-	LCY							
1.004			38	ACRE	\$	1,155.70	\$	1,001.97	\$	3,057.67	Light vegetation clearing work
Roads and Road Structures											
2 Road Excavations											
2.001			18,310	LF					\$	4.51	\$ 82,525
2.002			10,310	LF	\$	1.02	\$	0.28	\$	3.14	\$ 32,555
2.003			18,310	LF	\$	0.78	\$	0.31	\$	1.36	\$ 24,979
2.004			-	CY					\$	-	-
2.005			-	LCY					\$	-	-
2.006			-	LCY					\$	-	-
2.007			-	LCY					\$	-	-
2.008			-	LCY					\$	-	-
2.009			-	LCY					\$	-	-
2.010			-	CY					\$	-	-
2.011			-	LCY					\$	-	-
2.012			-	LCY					\$	-	-
2.013			1,720	CY					\$	25.15	\$ 43,252
2.014			1,976	LCY	\$	3.20	\$	2.32	\$	6.52	\$ 12,904
2.015			1,976	LCY	\$	4.05	\$	1.76	\$	15.84	\$ 31,341
2.016			-	CY					\$	-	-
2.017			-	LCY					\$	-	-
2.018			-	LCY					\$	-	-
2.019			-	LCY					\$	-	-
2.020			-	LCY					\$	-	-
2.021			-	LCY					\$	-	-
2.022			-	LCY					\$	-	-
2.023			15,690	CY					\$	10.22	\$ 160,346
2.024			17,159	LCY	\$	2.20	\$	2.38	\$	4.69	\$ 77,425
2.025			17,209	LCY	\$	3.48	\$	2.97	\$	4.92	\$ 85,921
2.026			-	CY					\$	-	-
2.027			-	CY					\$	-	-
3 Road Fill and Layer Work											
3.001			15,690	CY					\$	7.10	\$ 111,359
3.002			-	LCY					\$	-	-
3.003			15,690	LCY							
3.004			15,690	LCY	\$	3.78	\$	2.94	\$	7.32	\$ 111,356
3.005			-	CY							
3.006			-	LCY					\$	-	-
3.007			-	LCY					\$	-	-
3.008			-	CY					\$	-	-
3.009			-	TON					\$	-	-
3.010			-	LCY					\$	-	-
3.011			-	LCY					\$	-	-
3.012			-	LCY					\$	-	-
3.013			-	CY					\$	-	-
3.014			-	TON					\$	-	-
3.015			-	LCY					\$	-	-
3.016			-	LCY					\$	-	-
3.017			-	LCY					\$	-	-
3.018			39,330	TON	\$	8.55	\$	4.71	\$	116.15	\$ 4,568,126
3.019			58	TON	\$	921.78	\$	492.37	\$	3,884.73	\$ 226,091
3.020			349,190	SCYD	\$	3.48	\$	2.60	\$	6.08	\$ 2,123,975
3.021			17,470	TON	\$	-	\$	-	\$	169.71	\$ 2,994,849
4 Other Roadwork											

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Sites Reservoir (Alt 2): Access Roads A, B, C & Comm Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
March 1, 2021

27.05. Construction Cost Summary: Access Roads A, B, C & Comm Roads				
			Unit Cost Rate (\$/LF)	Total Cost
			LF:	38,036
Total Direct Cost			526.54	20,027,385
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			526.54	20,027,385
General Conditions				
Mobilization		5.0%	26.33	1,001,369
Site General Conditions & Requirements		10.0%	55.29	2,102,875
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	6.69	254,448
Bonds		0.6%	3.69	140,316
GC Field and Home Office Overhead		5.0%	30.93	1,176,320
GC Profit		5.0%	32.47	1,235,136
Total Contractor Indirect Markups			155.39	5,910,464
TOTAL DIRECT COST BEFORE CONTINGENCIES			681.93	25,937,849
Contingencies				
Design Contingencies		10.0%	68.19	2,593,785
Construction Contingencies		15.0%	112.52	4,279,745
Total Contingency Allowance			180.71	6,873,530
TOTAL DIRECT COST BEFORE ESCALATION			862.64	32,811,379
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	8.42	320,414
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			871.06	33,131,793

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Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comment
4.003	Transition Railing (Type WB-31)	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.004	End Anchor Assembly (Type SFT)	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.005	24" Dia. Pipe culvert, galvanized, corrugated metal	2,253	LF					\$ 102.94	\$ 231,916	Galvanized Corrugated Metal, includes bedding, backfill, and compaction, includes flared end sections.
4.005a	Culvert pipe excavations	3,679	LCY	\$ 4.82	\$ 4.82	\$ -	\$ -	\$ 9.50	\$ 34,950	
4.005b	Load and haul material to disposal site, 3 mile haul	3,679	LCY	\$ 4.82	\$ 4.82	\$ -	\$ -	\$ 13.51	\$ 49,708	
4.005c	24" Dia pipe, galvanized corrugated metal	3,313	LF	\$ 35.87	\$ 35.87	\$ 32.71	\$ -	\$ 75.54	\$ 250,200	
4.005d	Load as stockpile and haul to fill location, 0.5 mile haul	3,679	LCY	\$ 3.08	\$ 3.08	\$ -	\$ -	\$ 7.44	\$ 27,487	
4.005e	Spill bedding	146	LCY	\$ -	\$ -	\$ -	\$ -	\$ 49.43	\$ 7,233	
4.011	Box culvert single cell	-	EA	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.012	Paint Traffic Stripe - 6" Yellow	10,382	LF	\$ 0.36	\$ 0.21	\$ 0.70	\$ -	\$ 1.27	\$ 13,226	Includes 2 yellow stripes for road for CL only
4.013	Paint Traffic Stripe - 6" White	692	LF	\$ 2.69	\$ 1.61	\$ 0.70	\$ -	\$ 5.00	\$ 3,462	Assume 2 edge of traveled way stripes for road for CL only
4.014	Roadside Signs	39	EA	\$ 329.46	\$ 140.69	\$ 562.46	\$ -	\$ 1,032.61	\$ 40,272	Includes steel posts, Includes furnish aluminum sign panels, Assume 1 sign every 2000' in 2 directions.
4.015	Permanent Erosion Control (Hydrosed)	210,800	SF	\$ 0.05	\$ 0.02	\$ 0.07	\$ -	\$ 0.14	\$ 30,169	Includes seed mix, wood fiber
4.016	Rock Slope Protection Pad Energy Dissipator (18" D x 2' W x 6' L)	34.67	CY	\$ -	\$ -	\$ 210.81	\$ -	\$ 210.81	\$ 7,308	Assume 2' W x 6' L x 18" D, Assume Rock Slope Protection, Light, Assume Method B placement, Includes excavation, compaction, RSP fabric
4.017	Temporary Inlet/Outlet Protection	80	EA	\$ 37.74	\$ 14.67	\$ 71.96	\$ -	\$ 124.36	\$ 9,949	Includes install and removal, sandbag barriers, fiber rolls and stakes
4.018	Rock Anchor Assembly		LF							Not required
4.019	Erosion Control (Blanket) / Fiber roll	-	SF	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.020	Retaining walls (Allowance)	21,100	SF					\$ 73.07	\$ 1,541,677	
4.020a	Remove and remove foundation	42,200	SF	\$ 5.63	\$ 4.28	\$ 2.29	\$ -	\$ 12.09	\$ 510,090	
4.020b	Concrete fill work	1,369	CY	\$ 81.89	\$ 7.56	\$ 244.18	\$ -	\$ 293.17	\$ 411,221	
4.020c	Provide/Install Reinforcing	1.96	TON	\$ 1,918.72	\$ 97.58	\$ 9,802.31	\$ -	\$ 3,958.63	\$ 620,256	
4.024	Rock Slope Protection using rip rap	-	CY					\$ -	\$ -	Not required
4.024a	Grading excavations	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024b	Load and haul to processing area, 3 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024c	Crush and screen material	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024d	Load and haul to fill location, 3 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.024e	Rip rap placement	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.030	RSP backing	-	CY					\$ -	\$ -	Not required
4.030a	Load and haul material from stockpile to fill location, 2 mile haul	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.030b	Spread and compact	-	LCY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
4.033	RSP Fabric backing material	-	SY	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	Not required
4.034	Road pile work									Not required
5	Maintenance Work									
5.001	Public Road Maintenance Work (Roads identified within project boundary)	8	MILE	\$ -	\$ -	\$ -	\$ 50,000.00	\$ 50,000.00	\$ 400,000	Include maintenance allowance for road repair during construction, provision for patching work as needed - Allow \$50,000/mile for road patching and repair
6	Temporary Work									
6.001	General traffic management		MO	\$ -	\$ -	\$ -	\$ -			Elsewhere Included within general conditions and requirements
6.002	Temporary road surfaces including removal work									Not required
6.003	Temporary Traffic Handling	-	DAYS	\$ -	\$ -	\$ -	\$ -			Not required
	Includes temporary cones, barricades, and portable delineators. Includes temporary crash cushions. Bidirectional sand-filled module Temporary K-railing pinned to pavement Temporary traffic signage									
7	Highway and Other Road Connection Work									
7.001	Highway and other road connections			\$ -	\$ -	\$ -	\$ -			Not required
8	Misc Allowance									
8.001	Misc allowance for small items, allow 1.5%	1.5%	%				\$ 19,731,414	\$ 19,731,414	\$ 295,971	
Total Direct Cost				18,186	LF	\$ 182.73	\$ 2,482.71	\$ 71.47	\$ 38,344	\$ 20,007.38%

Sites Reservoir (Alt 2): Peninsula Hills Recreation Roads
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
March 1, 2021

27.05. Construction Cost Summary: Peninsula Hills Recreation Roads				
			Unit Cost Rate (\$/LF)	Total Cost
			LF:	10,841
Total Direct Cost			447.65	4,852,962
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			447.65	4,852,962
General Conditions				
Mobilization		5.0%	22.38	242,648
Site General Conditions & Requirements		10.0%	47.00	509,561
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	5.69	61,657
Bonds		0.6%	3.14	34,001
GC Field and Home Office Overhead		5.0%	26.29	285,041
GC Profit		5.0%	27.61	299,294
Total Contractor Indirect Markups			132.11	1,432,202
TOTAL DIRECT COST BEFORE CONTINGENCIES			579.76	6,285,164
Contingencies				
Design Contingencies		10.0%	57.98	628,516
Construction Contingencies		15.0%	95.66	1,037,052
Total Contingency Allowance			153.64	1,665,568
TOTAL DIRECT COST BEFORE ESCALATION			733.39	7,950,732
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	7.16	77,642
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			740.55	8,028,374

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Sites Reservoir (Alt 2): Sites Lodoga Road Temporary Detour
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAACEI Class 4
March 1, 2021

27.08. Construction Cost Summary: Sites Lodoga Road Temporary Detour				
			Unit Cost Rate (\$/LF)	Total Cost
			LF:	16,406
Total Direct Cost			803.38	13,180,295
TOTAL DIRECT COST BEFORE CONTRACTOR INDIRECT MARKUPS			803.38	13,180,295
General Conditions				
Mobilization		5.0%	40.17	659,015
Site General Conditions & Requirements		10.0%	84.36	1,383,931
Phasing	Not included	0.0%	-	-
General Contractor Overhead and Fees				
Insurance		1.1%	10.21	167,456
Bonds		0.6%	5.63	92,344
GC Field and Home Office Overhead		5.0%	47.19	774,152
GC Profit		5.0%	49.55	812,860
Total Contractor Indirect Markups			237.09	3,869,753
TOTAL DIRECT COST BEFORE CONTINGENCIES			1,040.48	17,070,053
Contingencies				
Design Contingencies		10.0%	104.05	1,707,005
Construction Contingencies		15.0%	171.68	2,816,559
Total Contingency Allowance			275.73	4,523,564
TOTAL DIRECT COST BEFORE ESCALATION			1,316.20	21,593,617
Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	12.85	210,869
Escalation to Mid-point of Construction	Not included	0%	-	-
ESTIMATED CONSTRUCTION COST			1,329.06	21,804,486

Item	Description	Quantity	Unit	Local Price	Off-Highway Price	Material Price	Subcontract Price	L&P Price	Price	Comments			
	Sites Lodoga Road Temporary Detour												
	Road Length (LF)	16,406	LF										
	Road Length (Miles)	4	MILES										
	Road Area (SF)	393,744	SF										
	Road Area (SY)	43,749	SY										
	Road Area (Acre)	10	ACRE										
1	Clearing and Demolition Work												
1.001	Demolition Work	-	SY						Included below				
1.002	Asphalt removal work	-	SY	\$	-	\$	-	\$	-	\$			
1.003	Load and haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$			
1.004	Clearing and Grubbing	39	ACRE	\$	1,126.07	\$	1,853.20	\$	2,979.26	\$	116,191	Light vegetation clearing work	
	Roads and Road Structures												
2	Road Excavations												
2.001	Temporary Silt Fence	1,700	LF					\$	8.73	\$	14,842		
2.002	Setup temporary silt fence	1,700	LF	\$	3.80	\$	0.23	\$	3.06	\$	5,218		
2.003	Silt fence removal	1,700	LF	\$	3.19	\$	0.50	\$	5.64	\$	9,594	Include allowance for dump charges	
2.004	Roadway Excavation (Cut for re-use) including AB & AC Material	-	CY					\$	-	\$	-	Not required, assume 0% of total roadway stockpile cut include for AB & AC excavations	
2.005	Roadway excavations including existing asphalt layer removal	-	LCY	\$	-	\$	-	\$	-	\$	-		
2.006	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
2.007	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-		
2.008	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-		
2.009	Load and haul to stockpile, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
2.010	Roadway Excavation (Cut for re-use) including common earth material, no AB & AC Material	499,600	CY					\$	10.16	\$	5,077,616	Includes hauling to stockpile/fill location within 0.25 miles, assume usable fill material, assume 100% of total roadway stockpile cut in common earth excavations, no AB & AC material	
2.011	Roadway excavations, common earth	574,540	LCY	\$	2.08	\$	2.37	\$	4.29	\$	2,431,777	Common excavations include a 10% swell factor	
2.012	Load and haul to stockpile/fill location, 0.25 mile haul	574,540	LCY	\$	3.39	\$	3.20	\$	4.59	\$	2,625,889	Haul to stockpile/fill location, 0.25 mile hauling distance assumed	
2.013	Roadway Excavation (Cut to Waste Disposal Area)	135,100	CY					\$	10.86	\$	1,467,795	Includes organic stripping material, rocks and cobbles removal, haul to waste area in reservoir, average 0.5 mile haul	
2.014	Roadway excavations	155,940	LCY	\$	2.12	\$	2.23	\$	4.32	\$	671,013	Assume 20% of volume will require blasting, include a 10% swell factor	
2.015	Load and haul to disposal site, 0.5 mile haul	155,940	LCY	\$	3.50	\$	3.93	\$	5.13	\$	796,782	Haul to disposal area, no provision for processing rubble material or dumping off site, assumed 0.5 mile hauling distance	
2.016	Roadway Excavation (Rock Cut)	57,000	CY					\$	20.61	\$	1,174,786	Excavated material to be stockpiled for re-use, average 1.5 mile haul	
2.017	Blasting operations	105,300	LCY	\$	4.48	\$	4.20	\$	13.42	\$	279,349	Assume 20% of volume will require blasting, assume rock blasting productivity rate of 100CY/hr	
2.018	Rock breaking operation	47,800	LCY	\$	3.64	\$	2.80	\$	6.24	\$	297,617	Assume 70% of volume will be recovered with charges	
2.019	Load and haul to processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	No crushing and screening required	
2.020	Crushing Operations	-	LCY	\$	-	\$	-	\$	-	\$	-	No crushing required	
2.021	Screening Operations (Post crushing)	-	LCY	\$	-	\$	-	\$	-	\$	-	No screening required	
2.022	Load and haul to stockpile location, 1.5 mile haul	48,400	LCY	\$	3.34	\$	6.04	\$	6.32	\$	572,820	Haul to available location, 1.5 mile hauling distance assumed	
2.023	Stripping Excavation for Embankment fill (Cut and Direct Haul)	-	CY					\$	-	\$	-	Excavate common earth and direct haul to fill location	
2.024	Roadway excavations	-	LCY	\$	-	\$	-	\$	-	\$	-	Include 10% swell factor	
2.025	Load and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Assumes 0.25 mile hauling distance	
2.026	Crushing operations	-	CY	\$	-	\$	-	\$	-	\$	-	Not required	No crushing work required
2.027	Screening operations	-	CY	\$	-	\$	-	\$	-	\$	-	Not required	No crushing work required
3	Road Fill and Layer Work												
3.001	Roadway Embankment (from on-site excavation sources)	-	CY					\$	-	\$	-	Not required	
3.002	Load as stockpile and haul to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
3.003	Load and haul from excavation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Included above	
3.004	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-		
3.005	Roadway Embankment (imported from other excavation sources)	-	CY					\$	-	\$	-	Not required	
3.006	Load and haul from excavation site to fill location, 0.25 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	Backfill material to be sourced from road excavations cut	
3.007	Spread and compact	-	LCY	\$	-	\$	-	\$	-	\$	-		
3.008	Class 4 Aggregate subbase	11,120	CY					\$	62.88	\$	699,187	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy	
3.009	Purchase processed material from quarry	18,904	TON	\$	-	\$	33.15	\$	55.15	\$	286,379	Purchase from commercial quarry, 1.7ton/cy	
3.010	Haul material from quarry to site stockpile/fill location, 25 mile haul	11,708	LCY	\$	10.49	\$	12.84	\$	23.62	\$	304,755	Haul to fill location, no stockpiling needed	
3.011	Load as stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	No stockpiling needed	
3.012	Spread and compact	11,708	LCY	\$	4.39	\$	4.12	\$	8.45	\$	108,473		
3.013	Class 2 Aggregate base	11,120	CY					\$	62.88	\$	699,187	Purchase from commercial quarry, includes placing, compaction, and spreading, Assume 1.7 ton / cy	
3.014	Purchase processed material from quarry	18,904	TON	\$	-	\$	33.15	\$	55.15	\$	286,379	Purchase from commercial quarry, 1.7ton/cy	
3.015	Haul material from quarry to site stockpile/fill location, 25 mile haul	11,708	LCY	\$	10.49	\$	12.84	\$	23.62	\$	304,755	Haul to fill location, no stockpiling needed	
3.016	Load as stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	No stockpiling needed	
3.017	Spread and compact	11,708	LCY	\$	4.39	\$	4.12	\$	8.45	\$	108,473		
3.018	Asphalt concrete	15,010	TON	\$	8.96	\$	4.94	\$	116.79	\$	1,753,037	Assume HMA (Type A), 150lbs/cy	
3.019	Tack Coat	11	TON	\$	613.72	\$	307.85	\$	2,562.55	\$	28,444	Assume 2 application between layers/lifts, Application rate 0.02 gal/sy, Gal of Emulsion for Tack Coat 240 gal/ton	
4	Other Roadwork												
4.001	Bridge Replacement	-	SF	\$	-	\$	-	\$	-	\$	-	Not required	

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VE Alternative 2

1. Construction Cost Summary: Produce embankment materials from on-site materials					Total Cost
Total Direct Cost Effect					(7,978,548)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS					(7,978,548)
General Conditions					
Mobilization		5.0%			(398,927)
Site General Conditions & Requirements		10.0%			(837,747)
Phasing	Not included	0.0%			-
General Contractor Overhead and Fees					
Insurance		1.1%			(101,367)
Bonds		0.6%			(55,900)
GC Home Office Overhead		6.0%			(562,349)
GC Profit		8.0%			(794,787)
Total Contractor Indirect Markups					(2,751,077)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES					(10,729,625)
Contingencies					
Design Contingencies		10.0%			(1,072,962)
Construction Contingencies		15.0%			(1,770,388)
Total Contingency Allowance					(2,843,350)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION					(13,572,975)
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%		(132,545)
Escalation to Mid-point of Construction		Not included	0%		-
ESTIMATED CONSTRUCTION COST SAVING					(13,705,520)

Item	Description	Quantity	Unit	Unit Price (\$)	Estimated Price (\$)	Estimated Price (\$)	Estimated Price (\$)	Estimated Price (\$)	Estimated Price (\$)	Estimated Price (\$)	Estimated Price (\$)
2	Process and Haul Filter Materials to Project										
2.016	Purchase and Stockpile Filter, Drain and Transition Material	(1,296,500)	Tons						\$ 37.16	\$ (48,184,055)	
2.017	Purchase processed material from quarry	(1,296,500)	Tons	\$ -	\$ -	\$ -	\$ 26.76	\$ -	\$ 22.20	\$ (28,727,762)	
2.018	Haul material from quarry to site (Stockpile/Off location, 3.9 mile haul)	(1,296,500)	LCY	\$ 60.89	\$ 79.58	\$ -	\$ -	\$ -	\$ 21.13	\$ (27,496,195)	
2.019	Produce aggregate base materials from on-site materials	1,296,500	Tons						\$ 31.01	\$ 40,205,507	
2.019	Produce material	877,044	Tons	\$ -	\$ -	\$ -	\$ -	\$ 12.00	\$ 12.00	\$ 10,524,528	
2.021	Haul estimated material to processed yard, 3 mile haul	877,044	LCY	\$ -	\$ -	\$ -	\$ -	\$ 4.30	\$ 4.30	\$ 3,765,890	
2.021	Crush material	877,044	LCY	\$ -	\$ -	\$ -	\$ -	\$ 5.50	\$ 5.50	\$ 4,823,742	
2.023	Screen material	877,044	LCY	\$ -	\$ -	\$ -	\$ -	\$ 2.50	\$ 2.50	\$ 2,192,610	
2.024	Washing aggregate	877,044	LCY	\$ -	\$ -	\$ -	\$ -	\$ 13.50	\$ 13.50	\$ 11,843,096	
2.025	Haul to stockpile/off location, 1 mile haul	877,044	LCY	\$ -	\$ -	\$ -	\$ -	\$ 4.30	\$ 4.30	\$ 3,765,890	
2.026	Provision for soil testing	1	LS	\$ -	\$ -	\$ -	\$ 300,000.00	\$ 300,000.00	\$ -	\$ 300,000	
	Total Direct Cost Effect	1,296,500	Tons	\$ -	\$ 79	\$ 65	\$ 221	\$ 31	\$ 46	\$ (27,073,946)	

Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

2. Construction Cost Summary: Use single tunnel				
				Total Cost
Total Direct Cost Effect				(24,378,541)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(24,378,541)
General Conditions				
Mobilization		5.0%		(1,218,927)
Site General Conditions & Requirements		10.0%		(2,559,747)
Phasing	Not included	0.0%		-
General Contractor Overhead and Fees				
Insurance		1.1%		(309,729)
Bonds		0.6%		(170,802)
GC Home Office Overhead		6.0%		(1,718,265)
GC Profit		8.0%		(2,428,481)
Total Contractor Indirect Markups				(8,405,951)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				(32,784,492)
Contingencies				
Design Contingencies		10.0%		(3,278,449)
Construction Contingencies		15.0%		(5,409,441)
Total Contingency Allowance				(8,687,890)
TOTAL DIRECT COST BEFORE ESCALATION				(41,472,382)
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(404,992)
Escalation to Mid-point of Construction		Not included	0%	-
ESTIMATED CONSTRUCTION COST SAVING				(41,877,374)

Item	Sub Item	Description	Quantity	Unit	Unit Price	Subtotal	Material Price	Material Subtotal	Construction Price	Construction Subtotal	Notes	Comments
0		Omit Baseline Cost Estimate										
		Omit baseline estimate	1	LS	\$	\$	\$	\$	\$	167,233,813	\$	167,233,813
1		PRECONSTRUCTION ACTIVITIES										
1.001		Demolition Work		LS	\$	\$	\$	\$				Elsewhere
1.002		Clearing and Grubbing		ACRE	\$	\$	\$	\$	\$	\$		Heavy vegetation removal
1.003		Reservoir Clearing		ACRE	\$	\$	\$	\$	\$	\$		Elsewhere costed
1.004		Erosion and Sediment Control		ACRE	\$	\$	\$	\$	\$	\$		Allowed \$0.25/SF to 30% of the total area
9		Golden Gate Dam Bypass Pipeline Facilities										Included with Golden Gate Dam Estimate
9.001		Upstream Cofferdam		CV					\$	\$		
9.002		Sheet pile cofferdams		SF	\$	\$	\$	\$	\$	\$		
9.003		Excavations - remove top soil layer and stockpile		LCY	\$	\$	\$	\$	\$	\$		
9.004		Load and haul to disposal site, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
9.005		Purchase processed material from quarry		Ton	\$	\$	\$	\$	\$	\$		
9.006		Haul material from quarry to site stockpile, 40 mile haul		LCY	\$	\$	\$	\$	\$	\$		
9.007		Load at stockpile and haul to fill location, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
9.008		Spread and compact		LCY	\$	\$	\$	\$	\$	\$		
9.009		Install 48-Inch Steel Pipe and Encasement		LF					\$	\$		
9.010		Excavate trench in bedrock		LCY	\$	\$	\$	\$	\$	\$		
9.011		Load and haul material to disposal site, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
9.012		48" steel pipe placement		LF	\$	\$	\$	\$	\$	\$		
9.013		Concrete backfill for pipe trench (per instructions)		CU	\$	\$	\$	\$	\$	\$		
9.014		Reinforcement for concrete backfill		TON	\$	\$	\$	\$	\$	\$		
9.015		48" fixed cone valve for controlled release (rafted head, no energy dissipation chamber)		LS	\$	\$	\$	\$	\$	\$		
9.016		Concrete manhole in-situ, 30' high (assume precast reinforcement for concrete manhole (ECS Inc))		LF	\$	\$	\$	\$	\$	\$		
9.017		Install 48" 600' diameter riser on cone manhole		LS	\$	\$	\$	\$	\$	\$		
9.018		Grout pipe		CV	\$	\$	\$	\$	\$	\$		
9.019		Field Survey		LS	\$	\$	\$	\$	\$	\$		
9.020		Riprap Discharge Channel		CV					\$	\$		
9.021		Blasting operations		LCY	\$	\$	\$	\$	\$	\$		
9.022		Excavate		LCY	\$	\$	\$	\$	\$	\$		
9.023		Crush and screen material			\$	\$	\$	\$	\$	\$		Not required
9.024		Load and haul to stockpile, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
9.025		Place at the channel		LCY	\$	\$	\$	\$	\$	\$		
10		Sites Dam Diversion Facilities								\$		Included within Sites Dam Estimate
10.001		Upstream Cofferdam		CV					\$	\$		Included above
10.002		Sheet pile cofferdams		SF	\$	\$	\$	\$	\$	\$		
10.003		Excavations - remove top soil layer and stockpile		LCY	\$	\$	\$	\$	\$	\$		
10.004		Load and haul to disposal site, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.005		Purchase processed material from quarry		Ton	\$	\$	\$	\$	\$	\$		
10.006		Haul material to site stockpile, 40 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.007		Load at stockpile and haul to fill location, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.008		Spread and compact		LCY	\$	\$	\$	\$	\$	\$		
10.009		Upstream Portal Excavation and Rock Bolts		CV					\$	\$		
10.010		Excavate and haul material		LCY	\$	\$	\$	\$	\$	\$		
10.011		Haul to disposal site, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.012		Shotcrete portal face		CV	\$	\$	\$	\$	\$	\$		
10.013		Steel fiber for shotcrete		TON	\$	\$	\$	\$	\$	\$		
10.014		20 ft rock bolts, 5 ft on center - Drilling		EA	\$	\$	\$	\$	\$	\$		
10.015		3.5" diam grouted hole with #10 bar		CV	\$	\$	\$	\$	\$	\$		
10.016		Upstream Portal Backfill		CV					\$	\$		
10.017		Load at stockpile and haul to fill location, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.018		Spread and compact		LCY	\$	\$	\$	\$	\$	\$		
10.019		Inlet and Valve Structures		CV					\$	\$		
10.020		Power inlet and valve structures		CV	\$	\$	\$	\$	\$	\$		
10.021		Downstream Portal Excavation and Rock Bolts		CV					\$	\$		
10.022		Excavate and haul material		LCY	\$	\$	\$	\$	\$	\$		
10.023		Haul to disposal site, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.024		Shotcrete portal face		CV	\$	\$	\$	\$	\$	\$		
10.025		Steel fiber for shotcrete		TON	\$	\$	\$	\$	\$	\$		
10.026		20 ft rock bolts, 5 ft on center - Drilling		EA	\$	\$	\$	\$	\$	\$		
10.027		3.5" diam grouted hole with #10 bar		CV	\$	\$	\$	\$	\$	\$		
10.028		Downstream Portal Backfill		CV					\$	\$		
10.029		Load at stockpile and haul to fill location, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.030		Spread and compact		LCY	\$	\$	\$	\$	\$	\$		
10.031		Tunnel Excavation and Initial Support (Double Shift)		LF	\$	\$	\$	\$	\$	\$		
10.032		Tunnel Concrete Lining		LF	\$	\$	\$	\$	\$	\$		
10.033		10-Ft Steel Pipe Cut and Cover Section		LF	\$	\$	\$	\$	\$	\$		
10.034		Mechanical, Valves, Trash rack, and Metals		LS	\$	\$	\$	\$	\$	\$		
10.035		Riprap Discharge Channel		CV					\$	\$		
10.036		Blasting operations		LCY	\$	\$	\$	\$	\$	\$		
10.037		Excavate, load and haul to stockpile/processing area, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.038		Crush and screen material			\$	\$	\$	\$	\$	\$		
10.039		Load and haul to stockpile, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
10.040		Place at the channel		LCY	\$	\$	\$	\$	\$	\$		
11		ERS Facility 1								\$		Not required
11.001		Upstream Portal Excavation and Rock Bolts		CV					\$	\$		
11.002		Excavate and haul material		LCY	\$	\$	\$	\$	\$	\$		
11.003		Haul to disposal site, 0.5 mile haul		LCY	\$	\$	\$	\$	\$	\$		
11.004		Shotcrete portal face		CV	\$	\$	\$	\$	\$	\$		
11.005		Steel fiber for shotcrete		TON	\$	\$	\$	\$	\$	\$		
11.006		20 ft rock bolts, 5 ft on center - Drilling		EA	\$	\$	\$	\$	\$	\$		
11.007		3.5" diam grouted hole with #10 bar		CV	\$	\$	\$	\$	\$	\$		
11.008		Upstream Portal Backfill		CV					\$	\$		
11.009		Haul excavated material and stockpile, 0.5 mi assumed		LCY	\$	\$	\$	\$	\$	\$		
11.010		Backfill, Compact and grade		LCY	\$	\$	\$	\$	\$	\$		
11.011		Inlet and Valve Structures		CV					\$	\$		

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Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAACEI Class 4
April 16, 2021

3. Construction Cost Summary: Use sloping intake and eliminate bridge				
				Total Cost
Total Direct Cost Effect				(13,938,254)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(13,938,254)
General Conditions				
Mobilization		5.0%		(696,913)
Site General Conditions & Requirements		10.0%		(1,463,517)
Phasing	Not included	0.0%		-
General Contractor Overhead and Fees				
Insurance		1.1%		(177,086)
Bonds		0.6%		(97,655)
GC Home Office Overhead		6.0%		(982,406)
GC Profit		8.0%		(1,388,467)
Total Contractor Indirect Markups				(4,806,044)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				(18,744,298)
Contingencies				
Design Contingencies		10.0%		(1,874,430)
Construction Contingencies		15.0%		(3,092,809)
Total Contingency Allowance				(4,967,239)
TOTAL DIRECT COST BEFORE ESCALATION				(23,711,537)
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(231,551)
Escalation to Mid-point of Construction		Not included	0%	-
ESTIMATED CONSTRUCTION COST SAVING				(23,943,088)

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Item	Sub Item	Description	Quantity	Unit	Unit Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Comments
11.012		Pour inlet and valve structures	-	CY	\$	-	\$	-	\$	-	\$	
11.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	
11.014		Excavate and haul material	-	LCY	\$	-	\$	-	\$	-	\$	
11.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
11.016		Shutter plate aerial face	-	CY	\$	-	\$	-	\$	-	\$	
11.017		Steel fiber for shutter plate	-	TON	\$	-	\$	-	\$	-	\$	
11.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	
11.019		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	
11.020		Downstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	
11.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	
11.022		Backfill: Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	
11.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	-	\$	
11.024		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	-	\$	
11.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	-	\$	
11.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	-	\$	
11.027		Riprap Discharge Channel	-	CY	\$	-	\$	-	\$	-	\$	
11.028		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	
11.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
11.030		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	
11.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
11.032		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	
12		ERS Facility 2									\$	Not required
12.001		Upstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	
12.002		Excavate and haul material	-	LCY	\$	-	\$	-	\$	-	\$	
12.003		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.004		Shutter plate aerial face	-	CY	\$	-	\$	-	\$	-	\$	
12.005		Steel fiber for shutter plate	-	TON	\$	-	\$	-	\$	-	\$	
12.006		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	
12.007		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	
12.008		Upstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	
12.009		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	
12.010		Backfill: Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	
12.011		Inlet and Valve Structures	-	CY	\$	-	\$	-	\$	-	\$	
12.012		Pour inlet and valve structures	-	CY	\$	-	\$	-	\$	-	\$	
12.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	
12.014		Excavate and haul material	-	LCY	\$	-	\$	-	\$	-	\$	
12.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.016		Shutter plate aerial face	-	CY	\$	-	\$	-	\$	-	\$	
12.017		Steel fiber for shutter plate	-	TON	\$	-	\$	-	\$	-	\$	
12.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	
12.019		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	
12.020		Downstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	
12.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	
12.022		Backfill: Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	
12.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	-	\$	
12.024		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	-	\$	
12.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	-	\$	
12.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	-	\$	
12.027		Riprap Discharge Channel	-	CY	\$	-	\$	-	\$	-	\$	
12.028		Blasting operations	-	LCY	\$	-	\$	-	\$	-	\$	
12.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.030		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	
12.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	
12.032		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	
13		IO Facility									\$ 151,777,761	
		Clearing Work										
13.001		Demolition Work	-	LS	\$	-	\$	-	\$	-	\$	
13.002		Clearing and Grubbing	9	ACRE	\$	1,230.71	\$	2,147.96	\$	3,379	\$	30,408 Light vegetation removal
13.003		Erosion and Sediment Control	9	ACRE	\$	-	\$	-	\$	3,761	\$	33,845 Allowed \$0.25/SF to 30% of the total area
		Access Roads										
13.004		Develop temporary access roads										Elsewhere Included within dam and roadwork estimates
		Foundations										
13.005		Foundation piling	-	LF	\$	-	\$	-	\$	-	\$	4' dia, 60" deep, 9 piles - drilled piers/piles
13.006		Drilling rig mobilization/demobilization allowance	-	EA	\$	15,000.00	\$	15,000.00	\$	21,000.00	\$	
13.007		Foundation piles - drilled piers	-	LF	\$	48.50	\$	11.25	\$	76.25	\$	165.00
13.008		Concrete in piles	-	YD	\$	272.50	\$	272.50	\$	1,545.00	\$	Included above
13.009		Pile reinforcement allowance	-	TON	\$	272.50	\$	272.50	\$	1,545.00	\$	Allow 150lbs/cy
13.010		Pile testing allowance	0.0%	%	\$	-	\$	-	\$	-	\$	
13.011		Pile cap / base slab	-	CY	\$	-	\$	-	\$	-	\$	5' thick base slab
13.012		Cast in place concrete	-	CY	\$	65.37	\$	11.68	\$	728.76	\$	36" thick slab
13.013		Formwork	-	SF	\$	15.23	\$	2.34	\$	7.61	\$	Formwork to sides
13.014		Concrete reinforcement	-	TON	\$	242.66	\$	371.49	\$	2,600.43	\$	Allow 150lbs/cy
		Intake and Outlet Structures										
13.015		Multi-Level Inlet/Outlet Tower Cast In Place Concrete	-	CY	\$	-	\$	-	\$	-	\$	246' height tower for Alt 2
13.016		Wells	-	CY	\$	-	\$	-	\$	-	\$	
13.017		Cast in place concrete	-	CY	\$	65.37	\$	11.68	\$	728.76	\$	Average 4' thick
13.018		Formwork	-	SF	\$	15.23	\$	2.34	\$	7.61	\$	Formwork to sides
13.019		Concrete reinforcement	-	TON	\$	242.66	\$	371.49	\$	2,600.43	\$	Allow 150lbs/cy
13.020		Slabs - elevated decks	-	CY	\$	-	\$	-	\$	-	\$	Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.
13.021		Cast in place concrete	-	CY	\$	65.37	\$	11.68	\$	728.76	\$	36" thick slab

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11.1. Construction Cost Summary: Dam Shell Re-design

Total Cost

Total Direct Cost Effect (51,211,638)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (51,211,638)

General Conditions

Mobilization	5.0%	(2,560,582)
Site General Conditions & Requirements	10.0%	(5,377,222)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(650,644)
Bonds	0.6%	(358,801)
GC Home Office Overhead	6.0%	(3,609,533)
GC Profit	8.0%	(5,101,474)

Total Contractor Indirect Markups (17,658,256)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (68,869,894)

Contingencies

Design Contingencies	10.0%	(6,886,989)
Construction Contingencies	15.0%	(11,363,532)

Total Contingency Allowance (18,250,521)

TOTAL DIRECT COST BEFORE ESCALATION (87,120,415)

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	(850,760)
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (87,971,175)

Item	Sub Item	Description	Quantity	Unit	Unit Price (\$)	Subtotal (\$)	Material (\$)	Labor (\$)	Equipment (\$)	Subtotal (\$)	Unit Price (\$)	Subtotal (\$)	Notes
0		Omit Baseline Cost Estimate											
		Omit baseline estimate	1	LS	\$	-	\$	-	\$	-	\$	298,528,075	298,528,075 (\$ 298,528,075)
1		PRECONSTRUCTION ACTIVITIES											
1.001		Demolition Work	-	LS	\$	-	\$	-	\$	-			Elsewhere
1.002		Clearing and Grubbing	51	ACRE	\$	3,121.91	\$	5,446.67	\$	-	\$	8,570.58	440,916 Heavy vegetation removal
1.003		Reservoir Clearing	-	ACRE	\$	-	\$	-	\$	-	\$	-	Elsewhere costed
1.004		Erosion and Sediment Control	51	ACRE	\$	-	\$	-	\$	-	\$	3,760.50	193,460 Allowed \$0.25/SF to 30% of the total area
2		Process and Haul Filter Materials to Project											
2.001		Process and Stockpile on Project - Zone 2A - Filter	616,000	Tons							\$	37.15	22,886,195
2.002		Purchase processed material from quarry	616,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	13,673,044 Include 10% waste factor / additional material supply
2.003		Haul material from quarry to site stockpile/fill location, 3.5 mile haul	416,700	LCY	\$	10.36	\$	11.55	\$	-	\$	22.11	9,213,151 1.75m/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.004		Process and Stockpile on Project - Zone 2A - Drain	682,000	Tons							\$	37.16	25,344,198
2.005		Purchase processed material from quarry	682,000	Tons	\$	-	\$	-	\$	22.20	\$	22.20	15,135,013 Include 10% waste factor / additional material supply
2.006		Haul material from quarry to site stockpile/fill location, 3.5 mile haul	461,333	LCY	\$	10.57	\$	11.52	\$	-	\$	22.12	10,256,180 1.75m/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.007		Process and Stockpile on Project - Zone 2A - Transition	91,300	Tons							\$	37.30	3,405,755
2.008		Purchase processed material from quarry	91,300	Tons	\$	-	\$	-	\$	22.20	\$	22.20	2,024,540 Include 10% waste factor / additional material supply
2.009		Haul material from quarry to site stockpile/fill location, 3.5 mile haul	61,762	LCY	\$	10.67	\$	11.68	\$	-	\$	22.31	1,379,214 1.75m/ECY and 1.15 swell factor (ECY to LCY); 30% of material to be delivered to stockpile, 70% of material to be directly hauled to fill location (Double handling included with fill work below)
2.010		Process and Stockpile on Project - Zone 2B - Filter	-	Tons							\$	-	-
2.011		Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	-	-
2.012		Haul material from quarry to site stockpile/fill location, 3.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-
2.013		Process and Stockpile on Project - Zone 2B - Transition	-	Tons							\$	-	-
2.014		Purchase processed material from quarry	-	Tons	\$	-	\$	-	\$	-	\$	-	-
2.015		Haul material from quarry to site stockpile/fill location, 3.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-
		Foundation Preparation and Grouting											
3		Foundation Excavation											
3.001		Topsoil Salvage	111,300	BCY							\$	8.48	943,634
3.002		Excavations - remove top soil layer	121,430	LCY	\$	1.45	\$	2.24	\$	-	\$	3.69	448,133 Include 10% swell factor
3.003		Load and haul to disposal site, 0.5 mile haul	122,430	LCY	\$	1.13	\$	2.92	\$	-	\$	4.05	499,502
3.004		Dam Foundation Excavation - Common	289,800	BCY							\$	8.53	2,472,016
3.005		Excavations - remove top soil layer	316,780	LCY	\$	1.25	\$	2.20	\$	-	\$	3.75	1,195,362 Include 10% swell factor
3.006		Load and haul to disposal site, 0.5 mile haul	318,780	LCY	\$	1.11	\$	2.89	\$	-	\$	4.00	1,273,633
3.007		Dam Foundation Rock Exc - Ripplable Rock	884,100	BCY							\$	11.71	10,356,498
3.008		Rock and concrete, no blasting	1,016,715	LCY	\$	2.51	\$	3.68	\$	-	\$	6.19	6,249,050 Include 10% swell factor
3.009		Load and haul to stockpile, 0.5 mile haul	1,019,793	LCY	\$	1.11	\$	2.89	\$	-	\$	4.00	4,106,448
3.010		Dam Foundation Rock Exc - Drill and Shoot	141,750	BCY							\$	24.14	3,421,948
3.011		Blasting operations	170,180	LCY	\$	4.28	\$	3.72	\$	4.95	\$	14.85	2,515,898 Include 10% swell factor
3.012		Load and haul to stockpile, 1 mile haul	170,180	LCY	\$	1.45	\$	3.78	\$	-	\$	5.23	896,033
3.013		Crush and screen material	170,180	LCY	\$	-	\$	-	\$	-	\$	-	-
		Foundation Preparation and Grouting											Included below
		Foundation Preparation - Beneath Core											
4.001		Initial Foundation Cleaning - Core	55,000	SY							\$	20.02	1,101,318
4.002		Initial foundation core cleanup	55,000	SY	\$	13.48	\$	0.33	\$	-	\$	16.67	933,367
4.003		Load and haul to disposal area, 0.5 mile haul	15,125	CY	\$	3.72	\$	7.38	\$	-	\$	11.10	167,932 Assume removal of top layer, 0.75' thick
4.004		Final Foundation Cleaning - Core	55,000	SY							\$	16.97	933,387
4.005		Final foundation core cleanup	55,000	SY	\$	13.48	\$	0.33	\$	-	\$	16.67	933,367
4.006		Load and haul to disposal area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-	-
4.007		Dental Excavation	3,200	CY							\$	120.75	386,387
4.008		Dental excavations	3,320	LCY	\$	88.20	\$	39.90	\$	-	\$	99.05	348,630 Include 10% swell factor
4.009		Load and haul to site stockpile, 0.5 mile haul	3,320	LCY	\$	3.66	\$	8.78	\$	-	\$	10.72	37,737
4.010		Dental Concrete	3,200	CY	\$	44.52	\$	20.23	\$	183.12	\$	247.87	793,183
4.011		Grout Cap with Anchors	9,200	CY	\$	79.02	\$	22.87	\$	519.88	\$	625.94	5,758,641 3' x 40" cap, includes formwork and reinforcement (50lbs/cy)
4.012		Curtain Grouting	84,000	LF							\$	78.69	6,610,296
4.013		Drill setup for all holes	1,130	ea.	\$	191.14	\$	126.12	\$	-	\$	317.26	372,811 Assume 75' drilling lengths
4.014		Drill curtain grout holes	84,000	ft	\$	39.34	\$	11.34	\$	-	\$	21.42	1,809,161
4.015		Refill grout holes	8,400	ft	\$	10.43	\$	11.25	\$	-	\$	21.68	182,161 Assume 10% to be re-filled
4.016		Backup to grout holes and grout nipples	4,200	ea.	\$	93.43	\$	-	\$	-	\$	93.43	384,033 1" x 60" every 10'
4.017		Inject Portland cement grout	5,800	hr	\$	482.14	\$	120.04	\$	-	\$	582.19	3,278,177 Allow 5 hours per hole
4.018		Perform hydraulic conductivity tests	1,130	ea.	\$	-	\$	-	\$	-	\$	347.30	398,326
4.019		Consolidation Grouting	35,000	LF							\$	78.81	2,758,350
4.020		Drill setup for all holes	467	ea.	\$	189.48	\$	117.08	\$	-	\$	306.57	143,296 Assume 75' drilling lengths
4.021		Drill curtain grout holes	35,000	ft	\$	39.38	\$	11.39	\$	-	\$	21.55	744,423
4.022		Refill grout holes	3,500	ft	\$	10.71	\$	11.97	\$	-	\$	22.68	76,065 Assume 10% to be re-filled
4.023		Backup to grout holes and grout nipples	1,750	ea.	\$	93.78	\$	-	\$	-	\$	93.79	163,634 1" x 60" every 10'
4.024		Inject Portland cement grout	2,333	hr	\$	482.58	\$	120.09	\$	-	\$	582.67	1,358,552 Allow 5 hours per hole

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11.2. Construction Cost Summary: Dam Shell Re-design

Total Cost

Total Direct Cost Effect (18,489,574)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (18,489,574)

General Conditions

Mobilization	5.0%	(924,479)
Site General Conditions & Requirements	10.0%	(1,941,405)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(234,910)
Bonds	0.6%	(129,542)
GC Home Office Overhead	6.0%	(1,303,195)
GC Profit	8.0%	(1,841,848)

Total Contractor Indirect Markups (6,375,379)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (24,864,953)

Contingencies

Design Contingencies	10.0%	(2,486,495)
Construction Contingencies	15.0%	(4,102,717)

Total Contingency Allowance (6,589,212)

TOTAL DIRECT COST BEFORE ESCALATION (31,454,165)

Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(307,160)
Escalation to Mid-point of Construction		<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (31,761,325)

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Sites Reservoir (Alt 2): Inlet/Outlet & Diversion Works
Feasibility Report Cost Estimate
Sites, CA

Cost Estimate
AAECI Class 4
April 16, 2021

12. Construction Cost Summary: Assume 10% drawdown in 10 days

Total Cost

Total Direct Cost Effect (9,237,393)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (9,237,393)

General Conditions

Mobilization	5.0%	(461,870)
Site General Conditions & Requirements	10.0%	(969,926)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(117,361)
Bonds	0.6%	(64,719)
GC Home Office Overhead	6.0%	(651,076)
GC Profit	8.0%	(920,188)

Total Contractor Indirect Markups (3,185,140)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (12,422,533)

Contingencies

Design Contingencies	10.0%	(1,242,253)
Construction Contingencies	15.0%	(2,049,718)

Total Contingency Allowance (3,291,971)

TOTAL DIRECT COST BEFORE ESCALATION (15,714,504)

Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(153,457)
Escalation to Mid-point of Construction		<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (15,867,961)

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Item	Sub Item	Description	Quantity	Unit	Unit Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Estimated Price	Comments		
11.012		Pour inlet and valve structures	-	CY	\$	-	\$	-	\$	-	\$	-		
11.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	-		
11.014		Excavate and haul material	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.016		Shutter plate panel face	-	CY	\$	-	\$	-	\$	-	\$	-		
11.017		Steel plate for shutter plate	-	TON	\$	-	\$	-	\$	-	\$	-		
11.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	-		
11.019		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	-		
11.020		Downstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	-		
11.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.022		Backfill: Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	-	\$	-		
11.024		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	-	\$	-		
11.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	-	\$	-		
11.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	-	\$	-		
11.027		Riprap Discharge Channel	-	CY	\$	-	\$	-	\$	-	\$	-		
11.028		Blowing operations	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.030		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
11.032		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	-		
12		ERS Facility 2									\$	- Not required		
12.001		Upstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	-		
12.002		Excavate and haul material	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.003		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.004		Shutter plate panel face	-	CY	\$	-	\$	-	\$	-	\$	-		
12.005		Steel plate for shutter plate	-	TON	\$	-	\$	-	\$	-	\$	-		
12.006		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	-		
12.007		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	-		
12.008		Upstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	-		
12.009		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.010		Backfill: Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.011		Inlet and Valve Structures	-	CY	\$	-	\$	-	\$	-	\$	-		
12.012		Pour inlet and valve structures	-	CY	\$	-	\$	-	\$	-	\$	-		
12.013		Downstream Portal Excavation and Rock Bolts	-	CY	\$	-	\$	-	\$	-	\$	-		
12.014		Excavate and haul material	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.015		Haul to disposal site, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.016		Shutter plate panel face	-	CY	\$	-	\$	-	\$	-	\$	-		
12.017		Steel plate for shutter plate	-	TON	\$	-	\$	-	\$	-	\$	-		
12.018		20 ft rock bolts, 8 ft on center - Drilling	-	EA	\$	-	\$	-	\$	-	\$	-		
12.019		3.5" diam grouted hole with #6 bar	-	CY	\$	-	\$	-	\$	-	\$	-		
12.020		Downstream Portal Backfill	-	CY	\$	-	\$	-	\$	-	\$	-		
12.021		Haul excavated material and stockpile, 0.5 mi assumed	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.022		Backfill: Compact and grade	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.023		Tunnel Excavation and Initial Support (Double Shift)	-	LF	\$	-	\$	-	\$	-	\$	-		
12.024		Tunnel Concrete Lining	-	LF	\$	-	\$	-	\$	-	\$	-		
12.025		10-Ft Steel Pipe Cut and Cover Section	-	LF	\$	-	\$	-	\$	-	\$	-		
12.026		Mechanical, Valves, Trash rack, and Metals	-	LS	\$	-	\$	-	\$	-	\$	-		
12.027		Riprap Discharge Channel	-	CY	\$	-	\$	-	\$	-	\$	-		
12.028		Blowing operations	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.029		Excavate, load and haul to stockpile/processing area, 0.5 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.030		Crush and screen material	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.031		Load and haul to stockpile, 1 mile haul	-	LCY	\$	-	\$	-	\$	-	\$	-		
12.032		Place at the channel	-	LCY	\$	-	\$	-	\$	-	\$	-		
13		IO Facility									\$	156,492,099		
		Clearing Work												
13.001		Demolition Work	-	LS	\$	-	\$	-	\$	-	\$	-		
13.002		Clearing and Grubbing	9	ACRE	\$	1,230.71	\$	2,147.96	\$	3,379	\$	30,408 Light vegetation removal		
13.003		Erosion and Sediment Control	9	ACRE	\$	-	\$	-	\$	3,761	\$	33,845 Allowed \$0.25/SF to 30% of the total area		
		Access Roads												
13.004		Develop temporary access roads										Elsewhere Included within dam and roadwork estimates		
		Foundations												
13.005		Foundation piling	351.00	LF						\$	500.58	\$	175,702 4' dia, 60" deep, 9 piles - drilled piers/piles	
13.006		Drilling rig mobilization/demobilization allowance	2.00	EA	\$	15,000.00	\$	30,000.00	\$	3	\$	21,000.00	\$	80,000
13.007		Foundation piles - drilled piers	351.00	LF	\$	48.50	\$	17,025	\$	76.25	\$	1,655.00	\$	57,915
13.008		Concrete in piles												Included above
13.009		Pile reinforcement allowance	26	TON	\$	772.50	\$	20,285	\$	1,345.00	\$	1,575.00	\$	67,767 Allow 150lbs/cy
13.010		Pile testing allowance	15.00	%	\$	-	\$	-	\$	175,701.88	\$	175,701.88	\$	26,355
13.011		Pile cap / base slab	318	CY						\$	678.14	\$	215,558 5' thick base slab	
13.012		Cast in place concrete	318	CY	\$	65.37	\$	20,800	\$	218.79	\$	326.63	\$	1,033,480 36" thick slab
13.013		Formwork	912	SF	\$	15.23	\$	13,891	\$	7.63	\$	25.39	\$	13,106 Formwork to sides
13.014		Concrete reinforcement	24	TON	\$	742.80	\$	17,827	\$	2,600.43	\$	3,714.60	\$	80,563 Allow 150lbs/cy
		Intake and Outlet Structures												
13.015		Multi-Level Inlet/Outlet Tower Cast In Place Concrete	5,158	CY										246' height tower for Alt 2
13.016		Wells	4,616	CY						\$	1,133.76	\$	5,233,719 5' thick base slab	
13.017		Cast in place concrete	4,616	CY	\$	65.37	\$	301,600	\$	218.79	\$	1,013,728	\$	1,528,328 average 4' thick
13.018		Formwork	62,520	SF	\$	15.23	\$	951,345	\$	7.63	\$	1,881,363	\$	1,881,363 Formwork to sides
13.019		Concrete reinforcement	577	TON	\$	742.80	\$	427,596	\$	2,600.43	\$	3,714.60	\$	2,193,028 Allow 150lbs/cy
13.020		Slabs - elevated decks	469	CY						\$	833.82	\$	391,313 Three slabs, assume 3 ft thick each, cross section from CAD, which is in inches.	
13.021		Cast in place concrete	469	CY	\$	65.37	\$	30,700	\$	218.79	\$	102,603	\$	153,393 36" thick slab

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14. Construction Cost Summary: Produce aggregate base materials from on-site materials					
				Unit Cost Rate (\$/LF)	Total Cost
LF:				321,368	
Estimated Cost Effect				(10.83)	(3,479,354)
TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS				(10.83)	(3,479,354)
General Conditions					
Mobilization		5.0%		(0.54)	(173,968)
Site General Conditions & Requirements		10.0%		(1.14)	(365,332)
Phasing	Not included	0.0%		-	-
General Contractor Overhead and Fees					
Insurance		1.1%		(0.14)	(44,205)
Bonds		0.6%		(0.08)	(24,377)
GC Field and Home Office Overhead		5.0%		(0.64)	(204,362)
GC Profit		5.0%		(0.67)	(214,580)
Total Contractor Indirect Markups				(3.20)	(1,026,824)
TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES				(14.02)	(4,506,178)
Contingencies					
Design Contingencies		10.0%		(1.40)	(450,618)
Construction Contingencies		15.0%		(2.31)	(743,519)
Total Contingency Allowance				(3.72)	(1,194,137)
TOTAL DIRECT COST EFFECT BEFORE ESCALATION				(17.74)	(5,700,315)
Escalation to Report Date	3/31/2021	@ 3.00% p.a.	0.977%	(0.17)	(55,665)
Escalation to Mid-point of Construction		Not included	0%	-	-
ESTIMATED CONSTRUCTION COST SAVING				(17.91)	(5,755,980)

Item	Description	Quantity	Unit	Lower Bid	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price	Planned Price
3	Road Fill and Layer Work												
3.008	Class 4 Aggregate subbase	(87,850)	CY							\$ 51.04	\$ (4,484,236)		Purchase from commercial quarry, includes placing, compaction, and spreading. Assume 1.7 ton/cy
3.009	Purchase processed material from quarry	(149,143)	TON	\$		\$	18.53	\$		\$ 18.53	\$ (2,762,443)		Purchase from commercial quarry, 1.7ton/cy
3.010	Haul material from quarry to site stockpile/fill location, 35 mile haul	(321,028)	LCY	\$	12.32	\$	12.32	\$		\$ 21.08	\$ (3,721,283)		Haul to fill location, no stockpiling needed
3.011	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$		\$		\$		\$			No stockpiling needed
3.012	Spread and compact		LCY	\$		\$		\$		\$			Not included as part of review
3.013	Class 2 Aggregate base	(146,650)	CY							\$ 51.07	\$ (7,489,880)		Purchase from commercial quarry, includes placing, compaction, and spreading. Assume 1.7 ton/cy
3.014	Purchase processed material from quarry	(249,892)	TON	\$		\$	13.18	\$		\$ 13.18	\$ (3,296,219)		Purchase from commercial quarry, 1.7ton/cy
3.015	Haul material from quarry to site stockpile/fill location, 35 mile haul	(168,948)	LCY	\$	12.32	\$	12.32	\$		\$ 22.02	\$ (3,713,131)		Haul to fill location, no stockpiling needed
3.016	Load at stockpile and haul to fill location, 0.5 mile haul	-	LCY	\$		\$		\$		\$			No stockpiling needed
3.017	Spread and compact		LCY	\$		\$		\$		\$			Not included as part of review
3.022	Produce aggregate base materials from on-site materials	234,500	CY							\$ 36.23	\$ 8,494,763		
3.023	Excavate material	295,875	LCY	\$		\$		\$	25.00	\$ 7,396,875			
3.024	Haul excavated material to processing yard, 1 mile haul	295,875	LCY	\$		\$		\$	5.00	\$ 1,479,375			
3.025	Crush material	295,875	LCY	\$		\$		\$	1.00	\$ 295,875			
3.026	Screen material	295,875	LCY	\$		\$		\$	1.50	\$ 443,813			
3.027	Haul to stockpile / haul to fill location, 1 mile haul	295,875	LCY	\$		\$		\$	5.00	\$ 1,479,375			
Total Direct Cost Effect		321,386	LF	\$	(8.50)	\$	(2,737)	\$	(18.79)	\$	(37,499)	\$	(12,803)

15. Construction Cost Summary: Use spillway conduit

Total Cost

Total Direct Cost Effect (299,622)

TOTAL DIRECT COST EFFECT BEFORE CONTRACTOR INDIRECT MARKUPS (299,622)

General Conditions

Mobilization	5.0%	(14,981)
Site General Conditions & Requirements	10.0%	(31,460)
Phasing	<i>Not included</i> 0.0%	-

General Contractor Overhead and Fees

Insurance	1.1%	(3,807)
Bonds	0.6%	(2,099)
GC Home Office Overhead	6.0%	(21,118)
GC Profit	8.0%	(29,847)

Total Contractor Indirect Markups (103,312)

TOTAL DIRECT COST EFFECT BEFORE CONTINGENCIES (402,934)

Contingencies

Design Contingencies	10.0%	(40,293)
Construction Contingencies	15.0%	(66,484)

Total Contingency Allowance (106,777)

TOTAL DIRECT COST BEFORE ESCALATION (509,711)

Escalation to Report Date	3/31/2021 @ 3.00% p.a.	0.977%	(4,977)
Escalation to Mid-point of Construction	<i>Not included</i>	0%	-

ESTIMATED CONSTRUCTION COST SAVING (514,688)

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Appendix C

Responses to Comments on the Draft Cost Estimate Technical Memorandum

Responses to Comments on Draft Feasibility-Level Cost Estimate Technical Memorandum



To: Sites Project Authority

CC: Henry Luu, P.E. (HDR)

Date: May 5, 2021

From: Michael Forrest, P.E., G.E.; Jeff Herrin; Mike Smith, P.E., G.E; Howard Michael, P.E.; Abrie Horak (AECOM)

Quality Review: Joe Barnes, P.E. (AECOM)

Authority Agent Review: Henry Luu, P.E. (HDR)

Subject: Responses to Comments on Draft Feasibility-Level Cost Estimate
Task Order No. 2, Task HR56

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Appendix

Appendix A – Sources of Sand and Gravel

Acronyms and Abbreviations

Authority	Sites Project Authority
DSOD	State of California Department of Water Resources, Division of Safety of Dams
DWR	California Department of Water Resources
FDR	Full depth reclamation
ft	feet
lf	liner foot
LMC	Land Management Committee
OSG	Orland Sand and Gravel
sf	square foot
TM	technical memorandum
TRR	Terminal Regulating Reservoir
VE	value engineering

1.0 Introduction

1.1 Purpose and Scope

On March 3, 2021, AECOM presented its in-progress feasibility-level cost estimate on the HR facilities (AECOM, 2021a) to the Land Management Committee (LMC) in Maxwell, CA. This presentation was made because of Authority concerns with the cost growth that occurred between the Value Planning Estimate for recommended alternative VP-7 developed in April 2020 and the in-progress feasibility-level cost estimate developed in February 2021. Due to the cost growth, AECOM developed and presented value engineering (VE) ideas and associated approximate cost reductions for the in-progress estimate intended to reduce the construction costs.

This technical memorandum (TM) responds to the LMC's comments on the in-progress cost estimate pertaining to the HR facilities: main and saddle dams, inlet/outlet works, emergency release structures, roads and bridges.

1.2 Limitations

AECOM represents that our services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client.

This TM is intended for the sole use of the Sites Project Authority. The scope of services performed may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

2.0 Changes from Value Planning Estimate

2.1 Discussion of Cost Estimate Classes

Feasibility level costs have increased significantly from the costs presented in the Value Planning Report (Authority, April, 2020). The Association for the Advancement of Cost Engineering International Recommended Practice 18R-97 (AACEI, 2016) defines five estimating classifications as follows:

- Class 5 – an appraisal estimate that is typically used for concept screening and relying on capacity factors, parametric models, and screening.
- Class 4 – a study of feasibility estimate with equipment factored or parametric models.
- Class 3 – an estimate for budget, authorization, or control based on semi-detailed unit costs with assembly level line items.
- Class 2 – an estimate for control or bid tender with detailed unit costs and forced detailed take-offs.
- Class 1 – a check estimate or bid tender with detailed unit costs and detailed take-offs.

The least detailed estimate is a Class 5 estimate and a Class 1 estimate is the most detailed. The detail of the estimate is limited by the level of detail in the supporting design and documentation of unit rates and equipment costs.

The estimates presented in the Value Planning Report were based on appraisal level engineering designs for conceptual screening and are considered Class 5 estimates. For example, the cost for the 1.5 MAF reservoir was estimated by factoring the cost from estimates developed for 1.3 MAF and 1.8 MAF reservoirs.

The current feasibility estimate is a Class 4 estimate. It is supported by a more detailed design that was not available during development of the Value Planning estimate. The feasibility design is documented in a series of engineering Technical Memoranda, a corresponding package of drawings, a construction schedule, and a Constructability Tech Memo. The current project feasibility-level cost estimate has been prepared by implementing industry standard practices for feasibility level analyses. By the very nature of project development, as this project advances from feasibility to detailed analyses and design, the project definition will obtain higher resolution, promoting greater confidence in project cost estimating for final project budgeting.

2.2 Comparison of VP-7 and Feasibility-Level Cost Estimates

The differences in cost between the value planning and feasibility level estimates are shown in Table 2-1.

Table 2-1. Comparison of Value Planning and Feasibility-Level Estimates for HR Contract Components
(This table does not include VE cost savings)

Facility	VP-7 Estimate (\$M)	Feasibility Estimate (\$M)	Change in Cost	% Increase
1. Site Demolition and Clearing Work	\$11M	\$32M	\$21M	191%
2. Golden Gate Dam	\$306M	\$687M	\$381M	125%
3. Sites Dam	\$144M	\$344M	\$200M	139%
4. Saddle Dams 1, 2, 6, and 8A/B	\$69M	\$139M	\$70M	101%
5. Saddle Dam 3	\$74M	\$243M	\$169M	228%
6. Saddle Dam 5	\$56M	\$92M	\$36M	64%
7. Hunters Creek Release Structures	\$91M	\$96M	\$5M	5%
8. Inlet/Outlet Tower and Tunnels	\$302M	\$332M	\$30M	10%
9. Sites Lodoga Road	\$132M	\$213M	\$81M	61%
10. Sites Lodoga Bridge	\$180M	\$168M	(\$12M)	(7%)
11. Huffmaster Road Realignment (South Residents)	\$41M	\$49M	\$8M	20%
12. North Construction Access Road	\$30M	\$28M	(\$2M)	(7%)
13. Other Roads	\$79M	\$69M	(\$10M)	(13%)
Total	\$1,515M	\$2,492M	\$977M	64%

Table 2-2 summarizes the changes in specific facility designs and costs between the completion of the Value Planning Estimate and the feasibility-level cost estimate prior to the inclusion of VE cost savings.

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities ²	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
1. Clearing, Grubbing, and Demolition						
Clearing, grubbing, and demolition	\$11M	Clearing, grubbing, and demolition	\$32M	\$21M	Added and updated detail for demolition of silos, sheds and garages, water towers, removal of motor homes, removal and cleaning of septic systems, removal of asphalt paving, decommissioning and verification of closure for all gas wells, and plugging of groundwater wells. Unit prices adjusted for current conditions.	VP estimate combined this item with Sites Lodoga Road as part of Reservoir Development. See #9 below for Sites Lodoga Road.
2. Golden Gate Dam						
Preconstruction	\$0M	Preconstruction ³	\$1M	\$1M	New addition at feasibility level; previously included in unit rates.	Not broken out in Value Planning estimate
Process and Haul	\$71M	Process and Haul	\$184M	\$113M	The feasibility estimate is based on purchasing and hauling 2,561,000 tons of aggregate for filters, drains, and transition zone versus 1,945,000 tons for the value planning estimate. Cost increases are associated with unit price increases and quantity increases from design refinements. The value planning estimate relied on older unit rates that were escalated, but escalated rates did not reflect current market conditions.	
Foundation	\$80M	Foundation Excavation	\$37M	(\$6M)	Cost savings. Also reflects a higher level of core foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
Foundation Grouting	\$9M	Foundation Prep and Grouting	\$43M			
	\$0M	Foundation Below Shell Prep	\$1M			
	\$0M	Foundation Drainage	\$2M			
Embankment/Borrow	\$102M	Embankment/Borrow	\$386M	\$284M	The feasibility estimate added \$92M for removing overburden and stockpiling waste, and \$19M for restoring the borrow areas post construction outside of reservoir. The cost for random fill is the single highest component of the embankment construction with a total project cost of \$142M in the feasibility level estimate versus \$98M for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rockfill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated but escalated rates did not reflect current market conditions.	
Other Work	\$0M	Other Work	\$16M	\$16M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area outside the reservoir limits, haul routes specific to Golden Gate Dam, and an allowance for dewatering.	
Bypass Pipeline	\$0M	Bypass Pipeline	\$8M	\$8M	Revised approach to better manage Funks Creek flows during construction by piping under the dam rather than constructing a diversion channel between Funks Creek and Stone Corral Creek as previously proposed. Eliminating the channel cut reduces management of excess waste material.	
Unlisted Items	\$29M	Unlisted Items ⁴	\$7M	(\$22M)	Reduced as a result of added design detail.	
Mob/Demob	\$15M	Mob/Demob	Included above ²	N/A		
Golden Gate Dam Total	\$306M		\$687M	\$381M		
3. Sites Dam						
Preconstruction	\$0M	Preconstruction ³	\$600K	\$600K	New addition at feasibility level; previously assumed to be included in unit rates.	
Process and Haul	\$31M	Process and Haul	\$64M	\$33M	The feasibility estimate is based on purchasing and hauling 881,000 tons of aggregate for filters, drains, and transition zones versus 644,000 tons for the value planning estimate. Cost increases are associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and escalated rates did not reflect current market conditions.	

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities ²	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
Foundation	\$19M	Foundation Excavation	\$13M	\$3M	10% cost growth for foundation-related tasks due to updated pricing information and addition of foundation drainage estimate. Also reflects a higher level of core foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
Foundation Grouting	\$6M	Foundation Prep and Grouting	\$14M			
	\$0M	Foundation Below Shell Prep	\$500K			
	\$0M	Foundation Drainage	\$100K			
Embankment/Borrow	\$54M	Embankment/Borrow	\$139M	\$85M	The feasibility estimate added \$35M for removing overburden and stockpiling waste, and \$8M for restoring the borrow areas post construction outside of reservoir. The cost for rockfill is the single highest component of the embankment construction with a total project cost of \$54M in the feasibility level estimate versus \$31M for the value planning estimate. The cost for random fill similarly increased to \$13M, compared to \$7M for the value planning effort. Higher unit rates for placing embankment materials for the core zone, rockfill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated but did not reflect current market conditions.	
Other Work	\$0M	Other Work	\$10M	\$10M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to Sites Dam, and an allowance for dewatering.	
Diversion Tunnel	\$17M	Diversion Tunnel	\$97M	\$80M	For value planning, the Sites diversion was only sized for ecosystem-related creek releases of 10-20 cfs. For the feasibility level design, the Sites diversion is sized for ecosystem-related creek releases of up to 400 cfs (per the request of the permitting team) as well as a larger portion of emergency drawdown flows (1,000 cfs for Value Planning versus 2,000 cfs for feasibility). These are different design criteria that result in much higher costs.	
Unlisted Items	\$10M	Unlisted Items ⁴	\$2M	(\$8M)	Reduced as a result of added design detail.	
Mob/Demob	\$7M	Mob/Demob	Included above ²	N/A		
Sites Dam Total	\$144M		\$344M	\$200M		
4. Saddle Dams 1, 2, 6, and 8A/B						
Preconstruction	\$0M	Preconstruction ³	\$1M	\$1M	New addition at feasibility level; previously assumed to be included in unit rates.	
Process and Haul	\$12M	Process and Haul	\$29M	\$17M	The \$17M increase in cost is associated with the purchasing and hauling of aggregate for filters, drains, and transition material. The feasibility level estimate is based on 399,000 tons versus 250,000 tons for the value planning estimate. Cost increases are associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Foundation	\$15M	Foundation Excavation	\$8M	\$4M	27% cost growth for foundation related tasks due to updated pricing information and addition of foundation drainage estimate. Also reflects a higher level of foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
		Foundation Prep and Grouting	\$10M			
		Foundation Below Shell Prep	\$300K			
		Foundation Drainage	\$300K			
Embankment/Borrow	\$38M	Embankment/Borrow	\$53M	\$15M	The feasibility estimate added \$6M for removing overburden and stockpiling waste, and \$3M for restoring the borrow areas post construction outside of reservoir. The cost for rockfill and random fill are roughly equal with a combined total project cost of \$25M in the feasibility level estimate versus \$21M for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rock fill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project	

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities ²	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
					cost). The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Other Work	\$0M	Other Work	\$34M	\$34M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to the Saddle Dams, and an allowance for dewatering.	
Unlisted Items	\$0M	Unlisted Items ⁴	\$1M	\$1M	Unlisted items were not included in the Value Planning estimates for saddle dams.	
Slurry Wall	\$900K	See Notes	Included in Foundation item above.		Costs for the slurry wall were absorbed into the foundation work for the feasibility level estimate	Replaced with grout curtains in feasibility level estimate under the Foundation activity.
Mob/Demob	\$3M	Mob/Demob	Included above ²	N/A		
Saddle Dams 1, 2, 6, and 8A/B Total	\$69M		\$139M	\$70M		
5. Saddle Dam 3						
Preconstruction	\$0M	Preconstruction ³	\$1M	\$1M	New addition at feasibility level.	
Process and Haul	\$12M	Process and Haul	\$53M	\$41M	The \$41M increase in cost is associated with the purchasing and hauling of aggregate for transition zones, filters and drains. The feasibility design included 730,000 tons versus 265,000 tons for the Value Planning estimate. Cost increases are also associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Foundation	\$19M	Foundation Excavation	\$15M	\$21M	121% cost growth for foundation related due to more extensive excavation, preparation, and grouting. Costs were also affected by updated pricing information and addition of foundation drainage estimate. Also reflects a higher level of foundation cleanup prior to and after foundation grouting to obtain foundation acceptance from DSOD.	
		Foundation Prep and Grouting	\$22M			
		Foundation Below Shell Prep	\$1M			
		Foundation Drainage	\$1M			
Embankment/Borrow	\$37M	Embankment/Borrow	\$135M	\$98M	The feasibility estimate added \$15M for removing overburden and stockpiling waste, and \$5M for restoring the borrow areas post construction outside of reservoir . The cost for rockfill was \$33M and the cost of random fill was \$40M in the feasibility level estimate versus \$7M and \$18M, respectively, for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rock fill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Other Work	\$0M	Other Work	\$10M	\$10M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to the Saddle Dams, and an allowance for dewatering.	
Unlisted Items	\$0M	Unlisted Items ⁴	\$2M	\$2M	An allowance for unlisted items was not included in the Value Planning estimate.	
Slurry Wall	\$1M	See Notes	Included in foundation item above.		Costs for the slurry wall were absorbed into the foundation work for the feasibility level estimate.	Replaced with grout curtains in feasibility level estimate under the Foundation activity
Mob/Demob	\$2M	Mob/Demob	Included above ²	N/A		
Saddle Dam 3 Subtotal	\$74M		\$243M	\$169M		
6. Saddle Dam 5						
Preconstruction	\$0M	Preconstruction ³	\$1M	\$1M	New addition at feasibility level.	
Process and Haul	\$8M	Process and Haul	\$20M	\$12M	The \$12M increase in cost is associated with the purchasing and hauling of aggregate for transition zones, filters and drains. The feasibility design included 283,000 tons versus 167,000 tons for the Value Planning estimate. Cost	

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities ²	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
					increases are also associated with unit price increases and some double handling of materials. The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Foundation	\$12M	Foundation Excavation	\$7M	\$6M	50% cost growth for foundation related due to more extensive excavation, preparation, and grouting. Costs were also affected by updated pricing information and addition of foundation drainage estimate.	
		Foundation Prep and Grouting	\$10M			
		Foundation Below Shell Prep	\$700K			
		Foundation Drainage	\$90K			
Embankment/Borrow	\$31M	Embankment/Borrow	\$43M	\$12M	The feasibility estimate added \$5M for removing overburden and stockpiling waste, and \$2M for restoring the borrow areas post construction outside of reservoir. The total project cost for rockfill and random fill was about \$20M in the feasibility level estimate versus \$17M for the value planning estimate. Higher unit rates for placing embankment materials for the core zone, rock fill, and random fill increased by 18% to 23% based on updated pricing backup (resulting in a 35% to 46% to the fully loaded project cost). The value planning estimate relied on older pricing data that was escalated and did not reflect current market conditions.	
Other Work	\$0M	Other Work	\$7M	\$7M	Other work items include telemetry for long-term monitoring of the dam, re-seeding the disturbed area, haul routes specific to the Saddle Dams, and an allowance for dewatering.	
Unlisted Items	\$0M	Unlisted Items ⁴	\$900K	\$900K	An allowance for unlisted items was not included in the Value Planning estimate.	
Slurry Wall	\$1M	See Notes	Included in Foundation item above.		Costs for the slurry wall were absorbed into the foundation work for the feasibility level estimate.	Replaced with grout curtains in feasibility level estimate under the Foundation activity
Mob/Demob	\$3M	Mob/Demob	Included above ²	N/A		
Saddle Dam 5 Subtotal	\$56M		\$92M	\$36M		
7. Emergency Release Structures						
Release structures to Hunters Creek	\$91M	Release structures to Hunters Creek	\$96M	\$5M	The value planning report had no supporting drawings for pricing the release structures. Take-off quantities were developed from feasibility level drawings to support the current estimate.	
8. Inlet/Outlet Facilities						
Construct Multi-Level Inlet/Outlet Tower	\$103M	Construct Multi-Level Inlet/Outlet Tower	\$113M	\$10M	Feasibility estimate uses drawing take-offs to produce quantities for tower.	
Construct Dual Inlet/Outlet Tunnels	\$199M	Construct Dual Inlet/Outlet Tunnels	\$214M	\$15M	Raising the I/O tunnel reduced the length, resulting in \$37M savings. Net is \$15M additional cost for feasibility estimate. Increase in tunnel cost is due to unit price increase for tunnel construction.	
Unlisted Items	\$0	Unlisted Items ⁴	\$5M	\$5M		
I/O Facilities Subtotal	\$302M		\$332M	\$30M		
9. Sites Lodoga Road						
Sites Lodoga East and West Roadways (outside inundation area)	\$39M	Sites Lodoga East and West Roadways (outside inundation area)	\$71M	\$32M	Road length increased from 21,700 ft to 29,000 ft. Cost per linear foot increased from \$1,802 per lf to \$2,208 per lf. Unit prices were revised to match recent pricing data.	
Embankment for Sites Lodoga Road Bridges	\$93M	Embankment for Sites Lodoga Road Bridges	\$142M	\$49M	Approximately \$70M for embankments and \$72M for rock slope protection. The rock slope protection is a new feature. Embankment cost increased by \$36M from flattening the slopes from a 2:1 to a 3:1 for the embankment to accommodate rapid reservoir drawdown that could jeopardize the stability of the embankments.	
	\$132M		\$213M	\$81M		

Table 2-2. Comparison of Value Planning and Feasibility-Level Cost Estimates

(This table does not include VE cost savings)

Feature	VP-7 Costs	Feasibility Activities ²	Feasibility Costs	Change in Costs	Design Changes and Other Factors Influencing Costs	Notes
10. Sites Lodoga Bridge						
VP7 – One Bridge (L = 1106 feet) Feasibility – Two Bridges (L1 = 1400 feet; L2 = 1633 feet)	\$180M	Two Bridges	\$168M	(\$12M)	Value planning estimate included embankment for bridge (see under Sites Lodoga Road above). The feasibility cost is now only bridge cost and this increased due to a second bridge being added, which increased the total bridge length nearly 3 times. The unit price for the bridge increased from \$600 per sf to \$1,355 per sf due to design of foundation (piers and pier caps) and bridge deck columns. Considered seismic loading.	
11. Huffmaster Road Realignment						
Huffmaster Rd Realignment	\$41M	Huffmaster Road Realignment	\$49M	\$8M	The roadway width was reduced from 24 feet to 15 feet. The roadbed depth was reduced from 18 inches to 12 inches. Cut and fill volumes were adjusted based on comparative earthwork modeling of Sites Lodoga Road. Unit prices were revised to match recent pricing data.	
12. North Construction Access Road						
North Construction Access Road	\$30M	North Construction Access Road	\$28M	(\$2M)	Unit prices were revised to match recent pricing data.	
Other Roads						
Other Roads	\$79M	Other Roads	\$69M	(\$10M)	Additional access roads were previously undetermined. Also added canal bridge replacements and revised the roadway construction technique from conventional replacement to full depth reclamation for the existing County Roads that was not addressed in the Value Planning estimate.	
Total Estimated Cost	\$1,515M		\$2,492M	\$977M		
VE Savings (Alt 1) – See Rev. Cost Estimate TM, Table 14-1			(\$212M)	(\$212M)		
	\$1,515M		\$2,280M	\$765M		

¹ Totaling individual costs may not add up to the subtotal or total costs due to rounding.

² In the feasibility estimate, contractor indirect mark-ups (including mobilization) and non-contract costs have been distributed into each of the respective line items.

³ Preconstruction includes clearing and grubbing in facility footprints, demolition, and erosion controls.

⁴ Unlisted items is an allowance for what we do not know or have not designed yet.

3.0 Comments on Dams

3.1 Summary of Borrow Areas and Aggregate Sources

Comment: Provide a summary of borrow areas and aggregate sources and how material will be handled (e.g., which quarries will the Authority purchase and develop versus which areas would be owned and operated by others).

Response: (see also Section 3.2)

A typical dam section for the Sites and Golden Gate dams is shown on Figure 3-1. The location of onsite haul routes, borrow, disposal, stockpile, staging, and rock processing areas are shown on Figure 3-2. The location of offsite quarries is shown on Figure 3-3. A material balance diagram for Golden Gate dam that illustrates the quantities and sources of the zone materials is shown on Figure 3-4. The following discusses the zones and sources:

- Zone 1 – Impervious Core – The central core of the dam will consist of clayey alluvium from within the reservoir. The borrow areas for Zone 1 are shown on Figure 3-2 with Z1 designation. For example, the core material for Golden Gate dam would come from GG-Z1 Borrow. The volume of Zone 1 material for Golden Gate is shown on the Material Balance Diagram on Figure 3-4.
- Zone 2 – Filter, Drain and Transition Zones – These zones flank the core and cover the downstream foundation. The materials will be sands and gravels that meet the durability requirements for concrete aggregate. The source of this material is assumed to be from offsite commercial sand and gravel quarries located between Willows and Orland as shown on Figure 3-3. It is assumed that the Contractor would enter into an agreement with these commercial quarries to supply the Zone 2 materials. The ability of the existing quarries to expand to meet the requirements of the project is a risk factor that should be further evaluated as design progresses.
- Zone 3 – Rockfill Shell – This zone is the upstream shell of the dam. The materials are high quality sandstone rock quarried from the reservoir east rim. The borrow locations are shown on Figure 3-2 with the designation Z3. For example, the rockfill shell for Golden Gate dam will come from GG-Z3 Quarry 1 and 2. The larger quarry is located outside of the reservoir on the eastern side of the east rim because this is where the majority of the high-quality sandstone can be obtained. The western side of the east rim appears to contain more mudstone than sandstone. It is assumed that the Authority will acquire the land for these quarries and make them available to the dam Contractor to develop and use them for the dam construction. The volume of Zone 3 from the borrow areas and required for Golden Gate dam construction are shown on the Material Balance Diagram on Figure 3-4. Visual and other potential impacts will need to be mitigated for major rock quarries located on the east side of the reservoir ridge.
- Zone 4 Random – This zone is the downstream shell and upstream cofferdam of the dams. The materials are the more weathered rock and mudstones. The material will break down to a mixture of soil and rock particles when excavated and compacted in the dam. A portion of Zone 4 will be generated from the dam foundation excavations and that material would be used for the cofferdams. The borrow locations are shown on Figure 3-2 with the designation Z3; Zone 4 materials would also be obtained from the same quarries as Zone 3. .

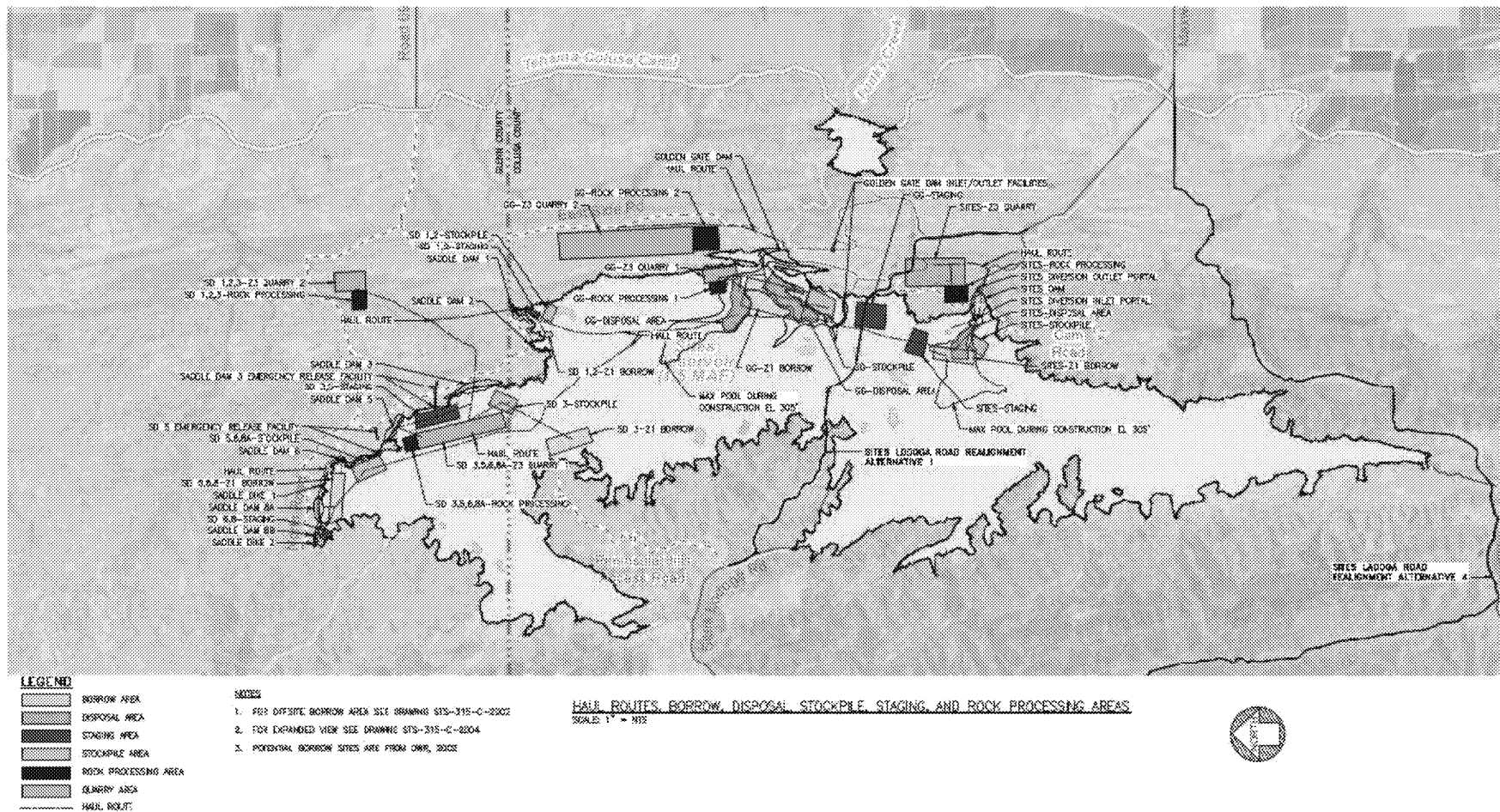


Figure 3-2. Haul Routes, Borrow, Disposal, Stockpile, Staging and Rock Processing Areas

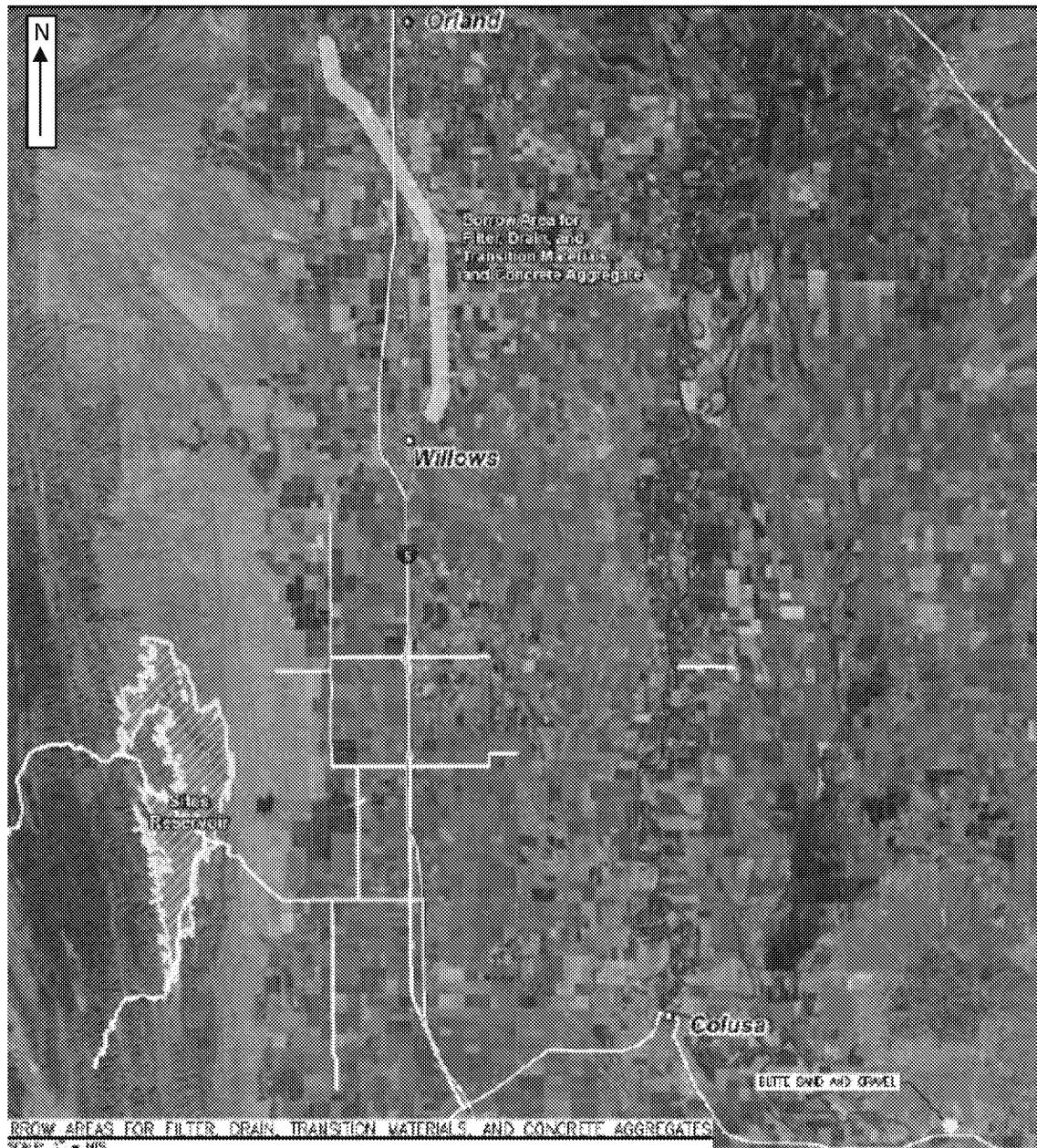
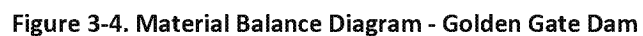


Figure 3-3. Offsite Quarries Location

Calculated by: KAC
 Reviewed by: MZ
 Date: January, 2010



The Zone 3 quarries have a significant quantity of weathered rock at the surface and the less weathered sandstones that supply Zone 3 are interbedded with layers of mudstone that can be used for Zone 4 but not for Zone 3. As stated above, visual and other potential impacts will need to be mitigated for major rock quarries located on the east side of the reservoir ridge.

- The volume of Zone 4 needed for Golden Gate dam and the volume of material from the quarries are shown on the Material Balance Diagram on Figure 3-4. A significant volume of weathered rock and mudstone would be developed in the quarry that is in excess of the volume of Zone 4 required in the dam. This excess material is designated for disposal and quarry restoration on Figure 3-4; quarry restoration would consist of backfilling the lower portions of the quarry. As discussed above, it is assumed that the Authority will acquire the land for these quarries and make them available to the dam Contractor to develop and use them for the dam construction. It is also noted that one of the current VE alternatives is to modify the zonation of the upstream shell to include both Zone 3 and Zone 4. This would help reduce the excess material that would have to be disposed and decrease the size of the quarries

3.2 Quarry Assumptions and Approach

Comment: Follow up on quarry assumptions and approach.

Response:

3.2.1 Private Development of On-site Quarries

Private development of on-site quarries to produce Zone 3 rockfill was evaluated to confirm the issues facing this approach. We have consulted with our construction team member, Dan Hertel of Engineering Solutions, for this evaluation. The approach of taking the quarries out of the direct control of the Authority and the dam Contractors presents the following potential issues:

- Gearing up for the exploration, permitting, etc. that needs to happen in a timely manner will be challenging for some type of local ownership.
- Under private ownership, exploration and permitting by a third party could create liability issues associated with potential geotechnical observations and conclusions, as well as permit stipulations that may be beyond the bounds or intent of the Sites Project.
- Ramping up for construction activities would be a substantial task and investment in planning, labor and equipment. Early investment would include acquisition of, or commitment to equipment, including for mining, processing, loading and hauling, and for disposal and shop facilities. The cost of early investment would likely be more than several million dollars per quarry and could exceed \$20-\$30 million per quarry.
- This work would be on the critical path for most of the construction duration. As such, the quarries should be in direct control of the contractors. Any delays caused by the quarry operation that is not under the dam Contractor's direct control would result in claims to the Authority and incur significant cost penalties. Furthermore, any materials produced by private quarries that fail to meet specified requirements would delay approvals by DSOD and create liability for the Authority as these materials would be "owner-furnished". It appears that any

third-party quarry operator would need to provide some type of performance bond to help insure that adequate production and quality were met.

Due to the above potential issues, our feasibility-level cost estimate assumes the rock quarries will be under the control of the Construction Contractor. Besides rock quarries, this assumption also pertains to concrete aggregate and sand and gravel quarries to produce filter and drain materials for the dams. The development of aggregate road base materials by a third party supplier poses less risk and is a smaller magnitude endeavor. This will be further evaluated as the design proceeds. Further work is needed as design progresses to verify the approach to obtaining quarried materials.

3.2.2 Sources of Sand and Gravel

Stony Creek

We were requested to consider Stony Creek as a source of potential sand and gravel for production of dam filter and drain materials, concrete aggregate, and aggregate road base materials. We have not identified a currently active gravel mining operation on Stony Creek closer than Orland. There are significant gravel deposits along Stony Creek, which could potentially be mined for use in the filter, drain, and as concrete aggregate materials. The gravel bed appears to be approximately 100 to 300 feet wide. Since no currently active quarry appears to exist, mining materials from Stony Creek would require purchasing rights to mine the gravel, developing the site, and obtaining the necessary environmental permits.

The Stonyford location is closer to the Sites Project, so there may be opportunities for cost savings. The materials might be purchased at a lower price and hauled directly to the site and processed there, as opposed to hauling 35 miles from Orland. Pros and cons of this approach are:

- Pros: Shorter material haul and less reliance on commercial quarries to produce materials.
- Cons: Would need to haul more materials to account for more waste than from the commercial quarries, and construction water demand would increase due to the need to wash the materials. In addition, the mining rights may need to be purchased and the site developed prior to producing suitable materials for construction. There are also potentially significant environmental review and permitting requirements.

Other Sources of Sand and Gravel

Further to Stony Creek discussed above for a source of sand and gravel, we undertook a very preliminary look at the potential quarry sand and gravel materials in the Project region. Due to the large quantities of required materials, we considered materials within a distance of some 50 miles from the site. Figure 3-5 from the California Department of Conservation, Division of Mine Reclamation, shows the locations of active mines in the project vicinity. The active mines shown on the figure are summarized in Table 3-1.

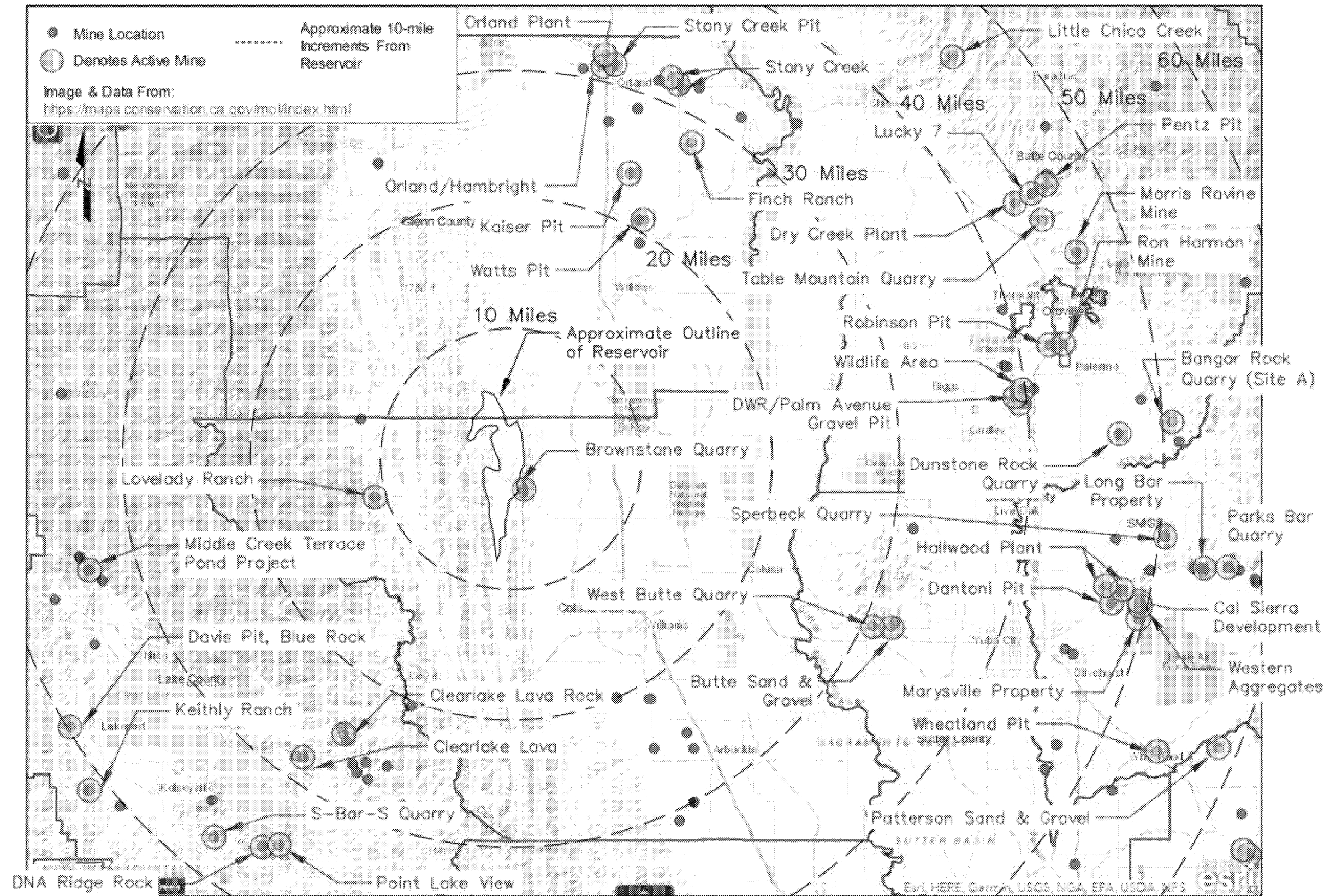


Figure 3-5. Active and Inactive Mines In Project Vicinity

Table 3-1. Summary of Active Mines

Mine Name	Primary Product	Owner	Area Disturbed (acres)	Area Permitted (acres)
Almond Avenue Mine	Sand and Gravel	Franklin Construction Company, Inc.	12	44
Bangor Rock Quarry-Site A	Stone	Bangor Rock LLC	41	28
Brownstone Quarry	Dimension Stone	Brownstone Quarry	5	Unknown
Butte Sand & Gravel	Sand and Gravel	Butte Sand And Gravel	268	481
Cal Sierra Development, Inc.	Gold (Placer)	Cal Sierra Development, Inc.	7	704
Clearlake Lava	Cinders	Clearlake Lava, Inc.	44	50
Clearlake Lava Rock	Sand and Gravel	Clearlake Lava, Inc.	7	11
Dantoni Pit	Sand and Gravel	Noble (Bud) Plant And Eleanor Plant	0	200
Davis Pit, Blue Rock	Sand and Gravel	Thorn	0	10
DNA Ridge Rock	Sand and Gravel	Epidendio	20	20
Dry Creek Plant	Sand and Gravel	Franklin Construction Company, Inc.	2	11
Dunstone Rock Quarry	Sand and Gravel	Hammett	40	120
DWR/Palm Avenue Gravel Pit	Sand and Gravel	DWR Flood Management	10	Unknown
Finch Ranch	Sand and Gravel	Graham	14	313
Hallwood Plant	Sand and Gravel	Baldwin Contracting Company, Inc.	393	688
Kaiser Pit	Sand and Gravel	Glenn County, Department Of Public Works	21	31
Keithly Ranch	Stone	Granite Construction Company	52	200
Little Chico Creek	Sand and Gravel	Franklin Construction Company, Inc.	8	5
Long Bar Property	Sand and Gravel	Silica Resources, Inc.	62	120
Lovelady Ranch, LLC	Sand and Gravel	Lovelady Ranch, LLC & Little Stony, LLC	2	8
Lucky 7	Sand and Gravel	Duke Sherwood Contracting, Inc.	0	10
Marysville Property	Sand and Gravel	Teichert Aggregates	283	590
Middle Creek Terrace Pond Project	Sand and Gravel	Clearlake Redi-Mix, Inc.	2	31
Morris Ravine Mine	Silica	Mineral Resources, LLC	76	520
Orland Plant	Sand and Gravel	Baldwin Contracting Company, Inc.	60	85
Orland/Hambright	Sand and Gravel	Baldwin Contracting Company, Inc.	18	150
Parks Bar Quarry	Rock	Nordic Industries, Inc.	44	234
Patterson Sand And Gravel	Sand and Gravel	Cemex	375	326
Pentz Pit	Sand and Gravel	Baldwin Contracting Company, Inc.	0	362
Point Lake View	Cinders	Clearlake Lava, Inc.	43	150
Robinson Pit	Sand and Gravel	Granite Construction Company	75	130
Ron Harmon Mine	Fill Dirt	Harmon	0	27
Sperbeck Quarry	Rock	Nordic Industries, Inc.	28	28
S-Bar-S Quarry	Not Reported	Rich-Ted Trucking, Inc.	14	Unknown
Stony Creek	Sand and Gravel	North Valley Rock, LLC	4	80
Stony Creek	Sand and Gravel	Baldwin Contracting Company, Inc.	37	192
Stony Creek Pit	Sand and Gravel	Bogart Construction	1	117
Table Mountain Quarry	Sand and Gravel	Florida Rock Industries, Inc	105	320
Watts Pit	Sand and Gravel	Glenn County, Department Of Public Works	21	58
West Butte Quarry	Sand and Gravel	Butte Sand And Gravel	18	36
Western Aggregates	Sand and Gravel	Western Aggregates, Inc.	407	0
Wheatland Pit	Clay	Gladding Mc Bean	2	114
Wildlife Area	Sand and Gravel	Granite Construction Company	72	115

Information in table is based on information from the California Department of Conservation, Division of Mine Reclamation in 2019 (downloaded April 14, 2021)

The primary source of material for these quarries are alluvial deposits or rock outcrops of various quality. Most of the larger quarries for sand and aggregate are located east and north of the project site. We selected six quarries or material providers in the project area to obtain additional information on sand and gravel products, concrete aggregate, and road base and subbase materials as follows:

- Available technical specification sheets/lab certifications
- At-plant costs
- Productivity rates
- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)
- Processing facility location
- Available material remaining/duration of permitted operation

The companies selected and information obtained are shown in Table 3-2 and response sheets are contained in Appendix A. Included in the response sheets are contact names, contact information, and dates of conversations. After researching Stony Creek Quarry, it appears Knife River Construction is doing business as Baldwin Contracting Company in that area so a separate response is not provided in Appendix A.

It is noted that this activity was cursory, and not comprehensive. As the design process progresses, a comprehensive assessment of available quarry materials in the region would be necessary that would include visits to the quarries and sampling and testing of their materials. Testing would include the following:

- Specific gravity and absorption
- Abrasion resistance
- Sodium sulfate soundness
- Flat and elongated particles
- Potential for alkali-silica reaction

Table 3-2. Results of Preliminary Quarry Contact

Material Provider	Mine Name	Material & Technical Specifications or Lab Certification Provided?	At-Plant Costs?	Productivity Rates?	Quarry and/or Processing Facility Location?	Source Material Type?	Available Material and/or Duration of Permitted Operation?
Butte Sand & Gravel	Butte Sand & Gravel	Yes. Provided gradation, R Value, durability and compaction. Meets Caltrans aggregate base requirements. Does not meet quality requirements for concrete.	\$9 to \$11/ton (depending on product)	Up to 10,000 tons per day	10373 S Butte Road Sutter, CA	Volcanic Rock	Quarry has 100 year permit
Finch Ranch Sand and Gravel	Finch Ranch	Not provided, but material meets Caltrans and concrete aggregate requirements.	\$11.5/ton plus tax	Answer not provided	7266 Highway 32, Orland, CA	Answer not provided	Answer not provided
Knife River Corporation	Orland Plant	Not provided, but material meets concrete aggregate standards	\$10-\$20/ton (depending on product)	Answer not provided	6415 Co Rd 7, Orland, CA (Orland Plant)	Alluvium	Answer not provided
Lovelady Ranch, LLC	Lovelady Ranch, LLC	Multiple attempts made at contact were made. No information was provided.					
Baldwin Contracting Company, Inc.	Stony Creek	See Knife River Corporation (Chico Location, 1764 Skyway Drive, Chico CA)					
Orland Sand & Gravel	Stony Creek Pit	Multiple attempts made at contact were made. No information was provided.					

3.3 Potential Benefits of Using Excess Materials from Construction of the TRR in HR Facilities

Comment: Provide an evaluation of the potential benefits of using waste from the Terminal Regulating Reservoir (TRR) West excavation to construct Golden Gate Dam (we should evaluate other options also, including use for roads).

Response:

Jacobs Engineering/Geosyntec indicated that excess materials from the TRR West excavation could amount to about 9 million cubic yards of total material (e-mail from Peter Rude, Jacobs Engineering, March 18, 2021). These excess excavated materials are being considered for use in the HR facilities. The geotechnical characteristics and volume of the excavated materials require further exploration. Geosyntec has estimated that 30-70% of that material may include the Cretaceous siltstone and 30-70% may include the Quaternary unit, with proportions between the two units dependent upon the ultimate reservoir's location, size, layout, depth, etc. (e-mail from Brian Martinez, PhD, March 19, 2021). As a result, it is not known at this time how much of the material would need to be wasted. Besides material balance (excavation at TRR and use in HR), hauling costs would need to be considered because the TRR is about 4 miles east of Golden Gate Dam. In the Jacobs Engineering cost estimate for the TRR, 4 to 6 miles of hauling costs were included depending on the material and where it will be placed (8 to 12 miles round trip). Reuse of this material could save or add cost to the overall project depending on the quality of the material and amount to be wasted.

The location, size, depth, and layout of the TRR will be further defined through the upcoming geotechnical investigation. The results of this investigation will inform an engineering and cost evaluation of reuse options during preliminary engineering. The weathered rock materials from the TRR excavation are being considered for use in the Golden Gate Dam (Zone 4 earthfill) or in the roadway fills. Reuse of rock from the TRR in Golden Gate Dam would require DSOD approval of earthfill for the upstream shell. There are several areas where roadway fills are anticipated, including Sites Lodoga Road Realignment and Huffmaster Road Realignment. Specific road areas requiring fills will be better defined once design level topography has been obtained.

The VE idea discussed during the March 3, 2021, LMC meeting, *"Replace upstream shell zone and eliminate upstream filter/transition zones¹"*, minimizes excess earthfill by using it as a part of the upstream shell zone (see Section 3.1 above). Utilizing the full amount of TRR excess excavation materials would convert the entire upstream shell into earthfill. Seismic stability for a dam with earthfill upstream shell may be a concern to DSOD due to the adequacy of compaction of the earthfill to preclude excessive seismic deformations. To evaluate the viability of using the TRR material in the Zone 4 upstream shell of the dams, seismic stability would need to be evaluated; this would likely include test fills using weathered rock during the geotechnical investigation phase.

Other limitations on using the TRR excavation materials in Golden Gate Dam include the following:

- If used on the upstream side of the dam, the haul route would need to cross the embankment core and chimney filter and drains, creating potential contamination issues, potentially

¹ This VE option was presented at the 3/3/21 LMC meeting. It replaces a portion of the upstream shell rockfill (Zone 3) with earthfill (Zone 4).

interfering with dam construction, and disturbing the compacted materials. The TRR excavated materials could be used on the downstream side of the dam to avoid hauling across the top of the dam.

- If used on the upstream side of the dam, the haul route lengths would be increased, possibly by 10 miles or more, to avoid crossing the dam.
- The availability of the TRR materials would need to be compatible with the construction schedule.

Instead of using the excess excavated materials in the dam, the materials may be used in the less stringent road fills (not DSOD jurisdictional) on the east side of the reservoir. The demand for the fill material versus the amount available from TRR would need to be evaluated, and locating disposal sites would be required for excess materials. Alternatively, excess material could be disposed of in the deadpool of the reservoir or along the roads.

3.4 Cost Comparison for 40% Increase in Foundation Preparation and 50% Increase in Processing and Hauling

Comment: Provide breakdown/cost comparison for 40% increase in foundation preparation and 50% increase in processing and hauling.

Response:

Refer to Table 2-2 for response to this comments. This comment was expanded to include reviewing all cost increases, not only the cost for foundation preparation and processing and hauling.

3.5 Double Handling of Commercially-Obtained Material

Comment: Justify/support assumption for double-handling of commercially obtained material – reason for transporting to stockpile area instead of directly to placement.

Response:

This is a question on material availability and timing of the demand. For the feasibility-level cost estimate, AECOM assumed 70 percent direct haul and 30 percent stockpile onsite prior to placement in the dams. The reason is the demand for the materials will vary significantly with time, the quantities are large, and the Contractor will need to have the material available for placement without delaying construction. For example, a significant quantity of blanket drain material will be quickly needed to cover large areas of the downstream shell foundation upon receipt of DSOD approval of the foundation.

Due to the volumes of material required, particularly for the large dams, placing the materials by direct delivery may not be achievable and a surge pile may be needed for blanket placement to keep pace with the schedule. The construction schedule shows the first use of filter/drain material starting in the Saddle Dams in late 2026 (AECOM, 2021b). Golden Gate Dam filter/drain construction would start in early 2027 and Sites Dam filter/drain would start in early 2028. The final use of filter/drain would be in 2028 for the Saddle dams and in 2029 for Golden Gate and Sites dams.

As stated above, the demand for the materials would vary significantly and our opinion is that would require a surge pile of material on site to help meet the peak demands. In addition, to even out the

demand on the offsite quarries, it was assumed that filter/drain delivery to the site would need to begin in 2025. Therefore, double handling of a portion of the filter/drain materials would be needed. As such, our estimate for feasibility is 70 percent direct haul and 30 percent stockpile/double handling of the filter/drain materials.

4.0 Comments on Roads and Bridges

4.1 Reevaluation of Bridge Length and Fill Prism

Comment: Re-evaluate the bridge length and fill prism (we know from an engineering perspective how to proceed but are unsure if this would result in any environmental impacts other than handling the additional fill prism – suggest coordination with ICF, maybe including their limnologist). Evaluate option for one bridge (only eastern span).

Response

The Environmental Team has been consulted regarding the potential for additional environmental impacts and mitigation needs. A response is forthcoming.

The additional fill required to replace the 1,400-foot-long westerly bridge has been evaluated and results in approximately \$14M savings. The 1,400-foot-long bridge would be replaced with approximately 3.6M cubic yards of local fill material, 260,000 cubic yards of rock slope protection, 1,760 cubic yards of aggregate base, and 1,200 tons of hot-mix asphalt, for the fill prism and roadway elements. The engineering issue is the absence of geotechnical data and analysis of the alluvium to evaluate its use to support a large fill prism on the valley floor. This cost savings will need to be verified once the subsurface materials investigations are complete.

4.2 Realignment of Sites-Lodoga Road

Comment: Sites Lodoga Road – an alternative alignment closer to the water's edge may provide some savings.

Response:

A comparative analysis has been performed of the current alignment relative to the reservoir water's edge alignment and the cost savings would be roughly \$10M. The water's edge alignment traverses approximately 900 feet of less difficult mountainous terrain, but is approximately 1,800 feet longer overall. However, the net is still expected to be a savings based on approximately 1,300 additional tons of hot-mix asphalt, 2,000 additional cubic yards of aggregate base, 21,000 less square feet of retaining walls, 550,000 less cubic yards of roadway excavation, and approximately 3,000 linear feet of full-depth reclamation of roadway. Figure 4-1 shows the comparison of the two alignments.

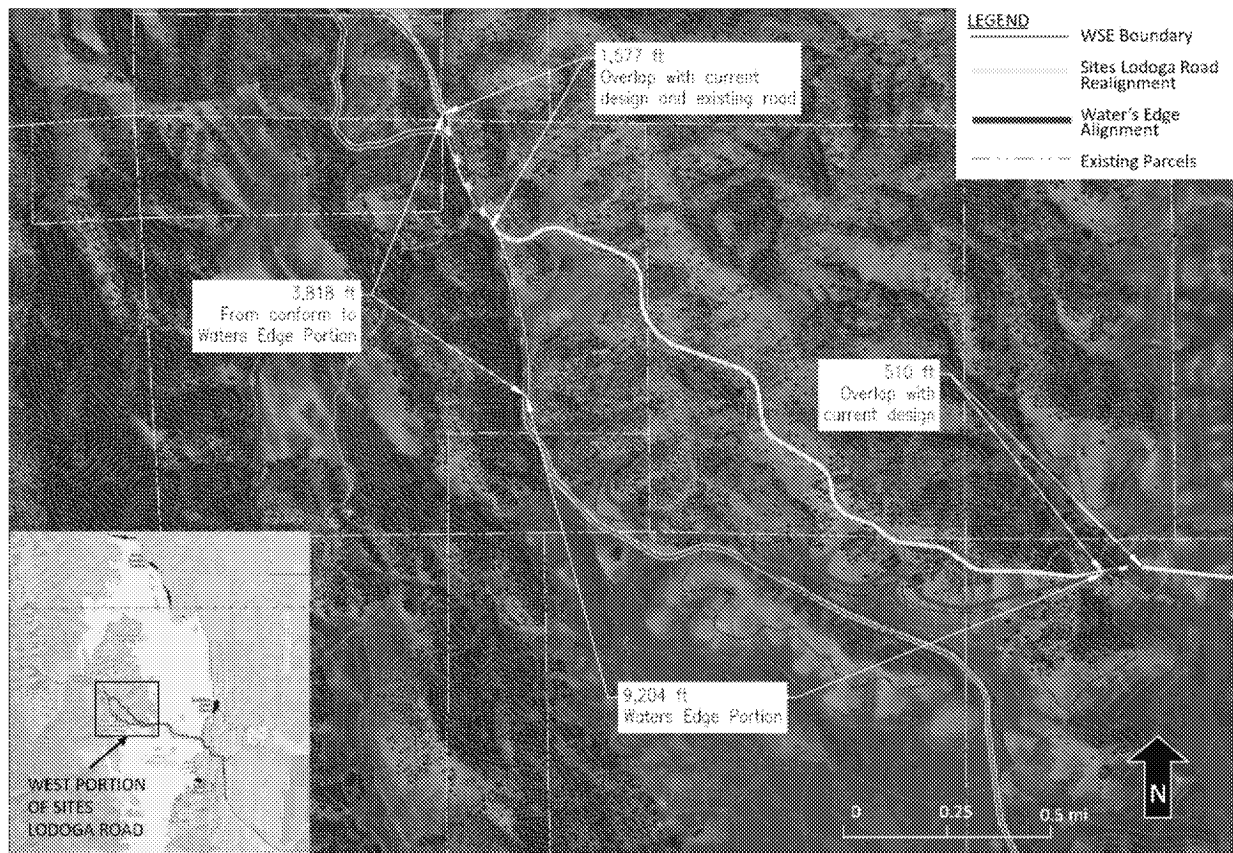


Figure 4-1. West Sites-Ladoga Road Alternative Alignment Options

4.3 Reduction of Length of Huffmaster Road Realignment

Comment: It appears possible to reduce the road length of Huffmaster Road realignment by tying in to the existing Huffmaster Road north of "Ladybug's" residence (this alignment change would need to be coordinated with the environmental team).

Response:

The reduced length of Huffmaster Road realignment is approximately 4,000 feet and would result in approximately \$4M in savings. The reduction in length reduces the roadway excavation by approximately 150,000 cubic yards, reduces the aggregate base by approximately 2,200 cubic yards, and reduces the retaining walls by approximately 6,000 square feet. Figure 4-2 shows the reduced roadway length.

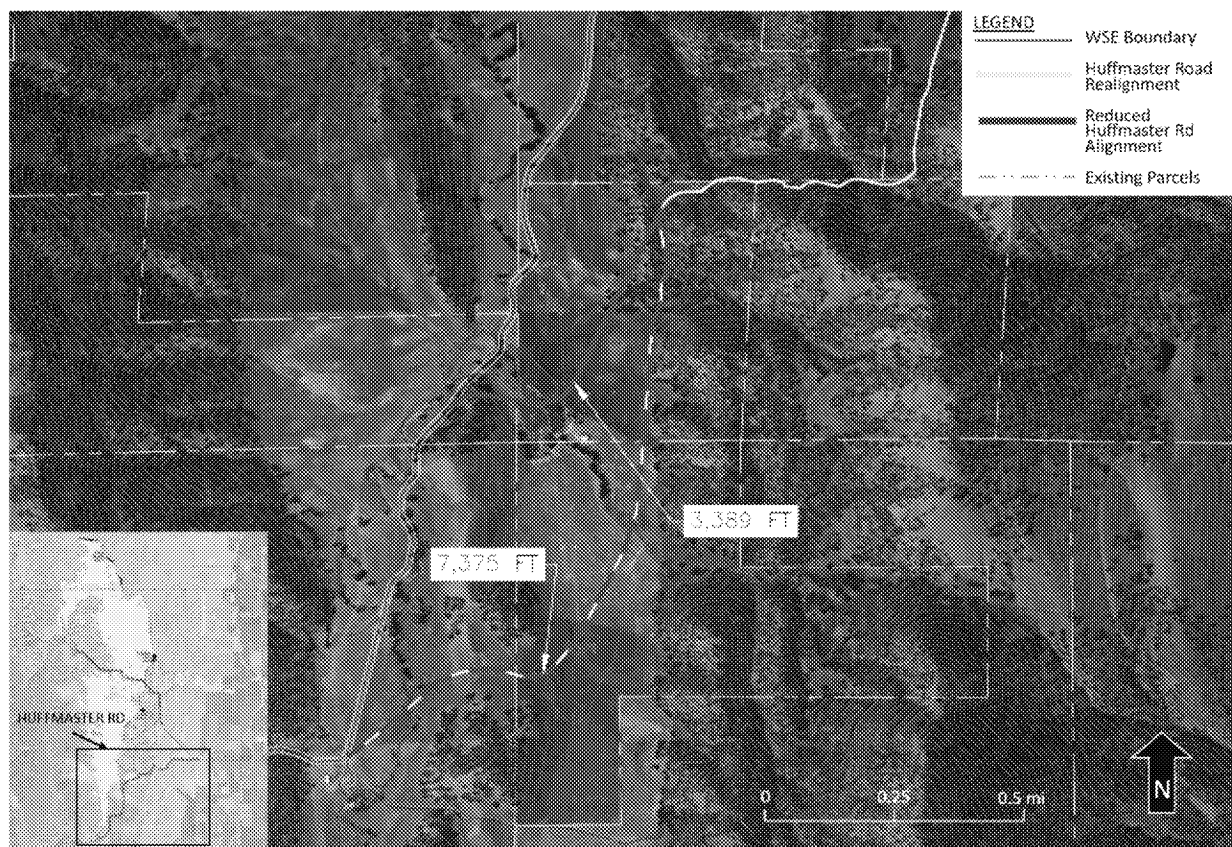


Figure 4-2. South Huffmaster Road Realignment Options

4.4 Colusa County Cost Data

Comment: Coordinate with Mike Azevedo to obtain recent Colusa County data on costs/linear foot and review for application to the road cost estimate.

Response:

Colusa County provided the Lodoga-Stonyford Road Project construction documents and bid results dated September 24, 2020, for evaluation. This project involves partial depth reconstruction of the roadway structural section. The cost evaluation of this Lodoga-Stonyford Road Project compares well with the Site Reservoir Project as demonstrated below and affirms the feasibility-level cost estimate established for the reconstruction of County roads that would provide construction access from Interstate 5 to the Sites Reservoir site. Table 4-1 summarizes the evaluation.

Table 4-1. Comparison of Road Project Features

Sites Reservoir - County Roads Full Depth Reclamation (FDR)	Colusa County – Lodoga Stonyford Road Rehabilitation Project (County Rehab)
\$233 per lf of roadway based on engineers estimate	\$91.10 per lf of roadway based on bid results
14 inch deep pulverizing with 2 inch AC overlay (16 inch total structural section)	5 inch deep pulverization with 4 inch AC overlay (9 inch total structural section)
Additional items not included in the Lodoga-Stonyford Road Project: Metal pipe culvert and concrete box culvert replacements, and intersection upgrades	No additional items
28 ft wide road	22 ft wide road
Additional items not included in the Lodoga-Stonyford Road Project: 2 feet of shoulder widening on each side of the road which involves an additional bid item for roadway excavation	No shoulder widening or roadway excavation
Project Comparison Summary – Equivalent Basis	
\$189 per lf without the additional items *	\$206 per lf with factored width and depth *
21.28 miles combined length	2.07 miles long
Total cost = \$26.25M (high economy of scale)	Total cost = \$1M (low economy of scale)

* Equating Project Cost:

- FDR 16-inch deep structural section : County Rehab 9-inch deep section (1.78:1 ratio)
- FDR 28-foot road width : County Rehab 22-foot road width (1.27:1 ratio)
- County Road factored cost: \$91.10 per lf x 1.78 x 1.27 = \$206 per lf
- FDR equivalent cost: \$189 per lf (high economy of scale)

As would be expected based on the relative economy of scale, the FDR equivalent cost per linear foot is less but reasonably close to the County Rehabilitation project cost (\$189 per lf vs \$206 per lf).

5.0 References

AECOM (2021a). Draft Feasibility-Level Cost Estimate Technical Memorandum, Task Order No. 2, Task HR56. February 3.

AECOM (2021b). Constructability Analysis – Draft, Task Order No. 2, Task HR53. February 22.

AACEI (2016). Association for the Advancement of Cost Engineering International. Recommended Practice No. 12R-97, Cost Estimate Classification System. March 1.

Authority (2020). Value Planning Report. April.

Appendix A

Sources of Sand and Gravel

MATERIAL PROVIDER: BUTTE SAND & GRAVEL
NAME OF CONTACT: MEGAN AND JOE
CONTACT PHONE/EMAIL: 530-696-2486
DATE OF CONVERSATION/CONTACT: APRIL 5, 2021

Responses below were transcribed from phone conversation

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

Response: Provided gradation, R Value, durability and compaction data for ¾ AB material showing material meets Caltrans aggregate base specifications. Material does not meet concrete aggregate requirements.

- At-plant costs (not a bid)

Response: \$9-\$11/ton (depending on the product)

- Productivity rates

Response: Up to 10,000 tons per day

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

Response: 10373 S Butte Road Sutter, CA. The source is volcanic rock.

- Processing facility location

Response: 10373 S Butte Road Sutter, CA

- Available material remaining/duration of permitted operation

Response: The quarry has a 100-year permit to operate.

MATERIAL PROVIDER: FINCH RANCH SAND AND GRAVEL
NAME OF CONTACT: NORTH VALLEY ROCK PRODUCTS - BILL GRAHAM
CONTACT PHONE/EMAIL: 530-865-9668, 530-624-6399
DATE OF CONVERSATION/CONTACT: APRIL 21, 2021

Responses below were transcribed from phone conversation

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

Response: They produce sand and gravel products that meet Caltrans aggregate base specifications and meet concrete aggregate requirements.

- At-plant costs (not a bid)

Response: \$11.5/ton plus tax.

- Productivity rates

Response: Would not provide

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

Response: Would not say

- Processing facility location

Response: 7266 Highway 32 Orland

- Available material remaining/duration of permitted operation

Response: Would not discuss.

MINE NAME: KNIFE RIVER CORPORATION
NAME OF CONTACT: MARC INGOLDSEN
CONTACT PHONE/EMAIL: MARC.INGOLDSEN@KNIFERIVER.COM
DATE OF CONVERSATION/CONTACT: APRIL 5 AND APRIL 8, 2020

Responses below were transcribed from phone and email conversation

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?

Response: Not willing to provide without project name

- At-plant costs (not a bid)

Response: \$10-\$20/ton (depending on the product)

- Productivity rates

Response: Not willing to provide without project name

- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)

Response: 6415 Co Rd 7, Orland, CA; Material is alluvium

- Processing facility location

Response: 6415 Co Rd 7, Orland, CA

- Available material remaining/duration of permitted operation

Response: Not willing to provide without project name

MINE NAME: LOVELDAY RANCH, LLC

NAME OF CONTACT: WILLY WYCOFF CONSTRUCTION

CONTACT PHONE/EMAIL: 530-218-1687 AND 530-963-3093

DATE OF CONVERSATION/CONTACT: APRIL 1 AND APRIL 2, 2021

No responses received

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?
- At-plant costs (not a bid)
- Productivity rates
- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)
- Processing facility location
- Available material remaining/duration of permitted operation

MINE NAME: ORLAND SAND & GRAVEL

NAME OF CONTACT: DALE ROY BOGART

CONTACT PHONE/EMAIL: (530)865-2478; DRDOCBOGART@GMAIL.COM

DATE OF CONVERSATION/CONTACT: APRIL 5 AND APRIL 8, 2021

No responses received

- Available technical specification sheets/lab certifications (durability, gradation, petrographic analysis, LA rattler, R value, etc.). Can we get copies?
- At-plant costs (not a bid)
- Productivity rates
- Quarry location, source material type (alluvium, hard rock, soft rock, etc.)
- Processing facility location
- Available material remaining/duration of permitted operation

Appendix D

Responses to Metropolitan Water District's Comments on Draft Cost Estimate

Metropolitan Water District's Comments on the 2/3/21 Draft Cost Estimate Technical Memorandum
Received 3/2/21

Soft costs and Contingencies

1. Assumptions seem reasonable.

Pipeline Conveyance

2. Costs per linear foot for the pipeline appears a bit high based on Metropolitan past experience. The pipeline internal pressures are unknown so it's difficult to determine appropriate pipe thickness and costs. Could be cost savings here.

Response: *To be addressed by the HC Contractor.*

Filter, Drain, Transition Zones:

3. Quarry Development - I don't know that characteristics of local rock in the area; however, I strongly consider developing a Sites Quarry for filter, drain, and transition materials. An onsite Sites Quarry could produce filter, drain, and transition materials for the dams and saddle dams, aggregate base for roads and concrete aggregate for concrete batch plant for appurtenant facilities. If a site closer than 40 miles is available, cost savings could be realized rather purchasing and transporting materials from a quarry located 40 miles away. It would minimize the amount of waste and degradation of materials being delivered to the site.

Response: *Onsite quarries will be a focus of future geotechnical investigations and testing. At this time, there is limited testing data on samples of sandstone from a quarry immediately downstream of the Sites dam right abutment. That testing showed that the sandstone did not meet the quality requirements for the filter and drain zone material. The sandstone is also interlayered with mudstones, which would be challenging to selectively excavate the fresh sandstone and to not incorporate the mudstone with the sandstone. Based on these considerations, it was decided to check for offsite quarries that can supply the required high quality materials. Quarries that have this quality material appear to be between Willows and Orland, about 35 miles from the Sites reservoir. These offsite quarries will need to be investigated further. The transition zones are less critical than the filter and drain zones and, therefore, a lower quality rock could be used for the transition zones. On-site sandstone may be quarried for use in the transition zones to reduce costs.*

4. With 10% of the purchased quarry being allocated for waste, the assumption that 70% of the transported materials can go directly into the fill after a 40-mile trip (roughly 1 hour on the road each way) may be optimistic. The most important zones for Quality Control are the filter, drain, and transitions and QC may be difficult to maintain due to material degradation from handling, trucking, etc. There is a risk significant out-of-spec or rejected materials.

Response: *We agree that the most important zones for QC are the filter, drain, and transitions. The specification requirements would state that the Contractor would need to determine the gradation that the materials must have before transportation to the embankments to ensure that the specified gradations are obtained in place in the embankment after hauling, placing, spreading, moisture conditioning and compacting. The 70 percent assumption is based on the expected demand for materials and the need to have surge piles onsite to handle peak demands. The 10 percent is based on the tendency to slightly "overbuild" the filter/drain zones ("Christmas*

tree effect"). As noted above, it is now currently assumed that the onsite sandstone can be used for transition materials. A proven source of quality filter and drain materials onsite has not been established; this will be confirmed during the next phase of geotechnical investigations. Offsite quarries that are closer and that can provide high quality material will also be evaluated in the next phase of geotechnical investigations.

5. Constructability TM shows the construction durations of Diamond Valley Lake (DVL) and Seven Oaks Dam (SOD) compared with Sites Reservoir. This may be a little misleading because DVL and SOD borrow and quarry materials were located on site or nearby. Those projects didn't depend on transporting materials by truck from 40 miles away.

Response: *Acknowledged. These projects have significant differences that make them difficult to compare. For example, the volumes of embankment material for DVL are over five times greater than Sites. The discussion of duration is meant to be a rough order of magnitude comparison only. The project schedule considered that the filter and drain materials would be imported from off site.*

Dam Zonation & Cross-Section:

6. For taller dams such as Sites and Golden Gate Dams (267 ft and 287 ft high, respectively), the 30-foot wide crest seems narrow, especially since the smaller saddle dams also have 30-foot crest widths.

Response: *The crest width for Sites and Golden Gate will be revisited in preliminary design to check if the crest should be widened for these two dams.*

7. Flattening the upstream slope of the two larger dams and replacing some Zone 3 Rockfill with more Zone 4 Random materials should be considered and the section optimized. While more materials would be needed, less Zone 3 rock is required.

Response: *Modifying the upstream shell to accommodate random fill will be considered during preliminary design. The upstream slope would need to be flattened, but the benefit of using more random materials (and less waste) and reduced rockfill would likely result in savings. The concern will be the saturated random material (expected to be a rocky earthfill) in the upstream shell that would be subject to high seismic loading. The characteristics of the random fill will need to be carefully evaluated during next phases of geotechnical investigation. Test fills using the random materials to evaluate their compaction characteristics are being considered.*

Construction Water

8. While construction water is discussed in the Constructability TM, I don't see a line item for water purchase or the development of temporary construction water sources. With all the embankments being constructed simultaneously (or at least some), a temporary pipeline system and perhaps a pumping system may be required.

Response: *There is not a line item for development of construction water sources in the cost estimate. There are water wells within the valley and it was assumed that the water for dam construction would come from existing water supply wells within the inundation area that will be acquired as part of the project. Water may also be available during the wet season at the cofferdam location to be constructed on Funks Creek to enable the construction of Golden Gate Dam. Water used for construction purposes would also be transferred from the GCID Main*

Canal, by trucks and/or temporary pipelines. The cost for construction water was assumed to be part of the miscellaneous allowance for small items included in the feasibility-level cost estimate.

From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 4/27/2023 10:51:15 AM
To: 'Ali Elhassan' [aelhassan@scvwa.org]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Modeling documentation
Attachments: 03-03 Allocations of Storage Space_04.21.2023.pdf;
Sites_CalSimDemandAssumptions_rev01_20230411_DRAFT.docx; Transfer Window Slide.pptx

Hi Ali –

Attached are additional Sites documents, including:

1. Staff report dated April 21, 2023 which include an attached table summarizing the current assumptions for Percent Available Storage (or Capacity Interest) which is proportionate to the share of water diverted that would be made available to each Storage Partner.
2. A summary of demand assumptions for the different Storage Partner groups used in Project CalSim II modeling.
3. Slides providing information regarding through-Delta movement of Sites water. The second slide shows estimates of Sites exports and remaining available transfer capacity.

Please let me know if you have any questions or would like additional information.

Thanks,
Angela

From: Angela Bezzone
Sent: Thursday, April 6, 2023 2:10 PM
To: Ali Elhassan <aelhassan@scvwa.org>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; Micko, Steve/SAC <Steve.Micko@jacobs.com>
Subject: FW: Modeling documentation

Hi Ali,

Apologies for the delay in getting back to you. We are still compiling information to send your way, particularly regarding demand assumptions used in the CalSim model. However, the Jacobs modeling team has posted the CalSim models and assumptions matrix to the link below for the No Action Alternative and Alternative 3 (the preferred alternative which assumes a Bureau of Reclamation investment of up to 25%).

We should have more information to send to you next week. Please let Ali and me know if you and your team have any questions about the model assumptions.

Thanks,

Angela Bezzone, P.E.

MBK Engineers
455 University Ave Suite 100
Sacramento, CA 95825

(916) 456-4400 – Phone
(775) 450-6408 – Cell
(916) 456-0253 – Fax

From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Thursday, April 6, 2023 2:01 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: RE: Modeling documentation

CAUTION - EXTERNAL SENDER: This email originated from outside of the organization. Only open links from **TRUSTED** sources.

Hi Angela,

At this  link, I posted:

- NODOS_FEIRS2022_CALSIM_MMv5_NOACTION_051422.7z
- CalSim II model for the No Action Alternative
- NODOS_FEIRS2022_CALSIM_MMv5_ALT3_051722.7z
- CalSim II model for Alternative 3
- Sites_CalSim_AssumptionMatrix_20230210__ALT3_051722.xlsx
- CalSim II assumptions matrix

Ali Elhassan should be able to access this link.

Thanks,
Steve

From: Ali Elhassan <aelhassan@scvwa.org>
Sent: Wednesday, April 5, 2023 3:25 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Subject: FW: Modeling documentation

CAUTION - EXTERNAL SENDER: This email originated from outside of the organization. Only open links from **TRUSTED** sources.

Hi Angela, I sent this email to Ali but she is out of the office. Could you respond to my request.
Thanks
Ali

From: Ali Elhassan
Sent: Wednesday, April 5, 2023 3:22 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Modeling documentation

Hi Ali,
I am following up after our meeting a couple of weeks ago. I would like to know if you would be able to send me the available modeling documentation that we talked about to help us understand the model structure and assumptions made.

Please let me know if you have any questions.

Thanks

Ali

Ali Elhassan, Ph.D, PE

Director of Water Resources

Santa Clarita Valley Water Agency

26501 Summit Circle

Santa Clarita, Ca 91350

Direct (661) 705-3941 ext. 1248

Cell (661) -714-6286

E-Mail: aelhassan@scvwa.org



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Meeting: Joint Reservoir Committee & Authority Board
Agenda Item 3.3

April 21, 2023

Subject: Converting to Storage Allocation Based Participation

Requested Action:

Review allocations of Storage space and proportionate shares of diverted water for Participants based on conditional state and Federal Participation.

Detailed Description/Background:

In April and July of 2021, the Board's considered materials focused on transitioning from a 'yield' based participation in the project to 'storage' based participation. The transition to Storage-based participation is necessary for the contracting for benefits and obligations in the Sites Reservoir as cost allocation needs to be based on physical capacity attributes of the facilities. Recall that prior planning costs have been allocated using a value for "yield" considerations. Capacity Interest assignment and cost allocation starting in Phase 3 will be Storage-based. This report is intended to refresh the Board's understanding of this prior work and provide updated calculations based on current information. The attached Table 1 represents the updated calculations.

The following key updates are considered in arriving at the Storage Allocation for each Storage Partner:

- Over the past few months, discussions around Federal participation have led to an assumed storage allocation of 128 TAF (~9%) for Reclamation. This is short of their requested 16% but greater than the previous assumption of 7% and reflects the net adjustment resulting from dead pool and survey data information.
- The State's participation continues to be assumed to be 244 TAF which reflects the information in the feasibility report accepted by the CWC in December 2021.

The updated calculation of allocation of storage is consistent with the methodology approved in April 2021, which continues to be a sound approach. This methodology considered equitable treatment between local participants, confirming that neither the State nor Reclamation receive disproportionate benefits compared to local participants, and considerations for the Credit Reimbursement Policy. The preliminary outcome using the approved methodology was the following conversion based on a 1.5 million-acre-foot reservoir:

Existing participation x 6.234 = Storage Allocation

Example: 1,000 acre-feet per year participation = 6,234 acre-feet Storage Allocation

This preliminary result was applied to the Amendment 3 Participation which established the local Partner combined allocation of 1.038 MAF above. Table 1 summarizes the current allocation of Available Storage based on the assumptions above.

Staff intends to seek Board approval of these Preliminary Final Storage Allocations in May 2023. These figures are intended to establish the basis for the pro-forma cost tables that are being prepared to provide updated cost information for the 'soft call'. Participant responses to the soft call process this summer are expected to be reported in the form of storage space.

There is likely to be a further update of the figures at the time of 'investor commitment' which will be the final call to Participants for their desired storage capacity in the project.

Prior Action:

April 2021: Approved methodology for allocating storage space in Sites Reservoir to local Storage Partners using the approach of 1 acre-foot participation to 6.234 acre-feet of storage space.

July 2021: Review of value creation from ownership in Sites Reservoir storage allocation.

Fiscal Impact/Funding Source:

None.

Staff Contact:

Angela Bezzone

Attachments:

Attachment A: Table 1 – Updated “Preliminary Final” Storage Amounts by Participant

Table 1. Proposed Allocation of Sites Reservoir Available Storage

Participant Name	Amendment 3 Participation Level	Amendment 3 Storage Allocation	% Available Storage ^{1, 2, 3}
Antelope Valley-East Kern WA	500	3,117	0.2%
City of American Canyon	4,000	24,936	1.8%
Coachella Valley WD	10,000	62,340	4.4%
Colusa County	10,000	62,340	4.4%
Colusa County WD	9,256	57,702	4.1%
Cortina WD	450	2,805	0.2%
Davis WD	2,000	12,468	0.9%
Desert WA	6,500	40,521	2.9%
Dunnigan WD	2,972	18,527	1.3%
Glenn-Colusa ID	5,000	31,170	2.2%
Irvine Ranch WD	1,000	6,234	0.4%
LaGrande WD	1,000	6,234	0.4%
Metropolitan Water District of SC	50,000	311,700	22.1%
Reclamation District 108	4,000	24,936	1.8%
Rosedale-Rio Bravo WD	500	3,117	0.2%
San Bernardino Valley Municipal WD	21,400	133,408	9.5%
San Geronio Pass WA	14,000	87,276	6.2%
Santa Clara Valley WD	500	3,117	0.2%
Santa Clarita Valley WA	5,000	31,170	2.2%
Westside WD	5,375	33,508	2.4%
Wheeler Ridge - Maricopa WSD	3,050	19,014	1.3%
Zone 7 WA	10,000	62,340	4.4%
State of California - Total	n/a	244,000	17.3%
Reclamation	n/a	128,020	9.1%
Available Storage Total	166,503	1,410,000	100.0%
Note: 1. Percent Available Storage equals Capacity Interest in Base Facilities for Participants, a term to be defined in the Benefits and Obligation Contracts (Contract) to represent the granting of capacity in Sites Owned Base Facilities to Participants by the Authority. Base Facilities will be defined in the Contract. 2. Capacity Interest in Sites Owned Downstream Facilities, including the Dunnigan Pipeline, will be allocated amongst Participants using Downstream Facilities to convey water to their Secondary Point of Delivery based on their Storage Allocation. Downstream Facilities will be defined in the Contract. 3. This is the proportionate share of water diverted that would be made available to the Participant.			

Sites Storage Partner Demand Assumptions

- **North of Delta – Settlement Contractors**
 - Demand assumption:
 - Assume NoD Settlement Contractor storage partners want water to make-up for settlement contractor shortages (in Shasta critical years)
 - Constraint assumptions:
 - Subject to water available in storage partner account
 - Subject to conveyance capacity at Sites facilities
- **North of Delta – Service Contractors**
 - Demand assumption:
 - Assume NoD Service Contractor storage partners want water to make-up for shortages
 - Constraint assumptions:
 - Subject to water available in storage partner account
 - Subject to conveyance capacity at Sites facilities
- **North of Delta – Colusa County Groundwater**
 - Demand assumption:
 - Supplement groundwater recharge with up to 2.5 TAF/month in Jun – Sep of all years
 - Constraint assumptions:
 - Subject to water available in storage partner account
 - Subject to conveyance capacity at Sites facilities
- **South of Delta**
 - Demand assumption:
 - Assume SoD storage partners want Sites water every year
 - Constraint assumptions:
 - Subject to water available in storage partner account
 - Water may only be delivered during the transfer window (July – November)
 - Subject to available conveyance capacity at Sites facilities and Banks Pumping Plant
- **State Prop 1**
 - Yolo Bypass
 - Demand assumption
 - Release up to 20 TAF/month in Aug – Oct of all years
 - Constraint assumptions:
 - Subject to water available in storage partner account
 - Subject to conveyance capacity at Sites facilities
 - Incremental Level 4 Refuges
 - Demand assumption
 - Release available storage to supplement Incremental Level 4 refuge deliveries in Jan – Dec (mostly Jul – Dec)
 - Constraint assumptions:
 - Subject to water available in storage partner account

- Subject to conveyance capacity at Sites facilities and Banks/Jones Pumping Plants (if destined to South of Delta refuges)
- **Federal – CVP Operational Flexibility**
 - Demand assumptions
 - Release water from Sites to improve:
 - anadromous fish populations (by relieving CVP withdrawals from Shasta to increase cold water pool storage, support fall flow stability, and spring pulse flows)
 - CVP contractor water supply
 - Delta water quality
 - Constraint assumptions:
 - Subject to water available in storage partner account
 - Subject to conveyance capacity at Sites facilities and, if delivering South of Delta, Jones Pumping Plant

From: Marcia Kivett [MKivett@sitesproject.org]
Sent: 4/27/2023 11:21:26 AM
To: Jerry Brown [jbrown@sitesproject.org]
Subject: Fwd: EIR/EIS Comparison Chart
Attachments: 202301_Admin Final EIR_EIS Review Prep_Final_V3.pdf

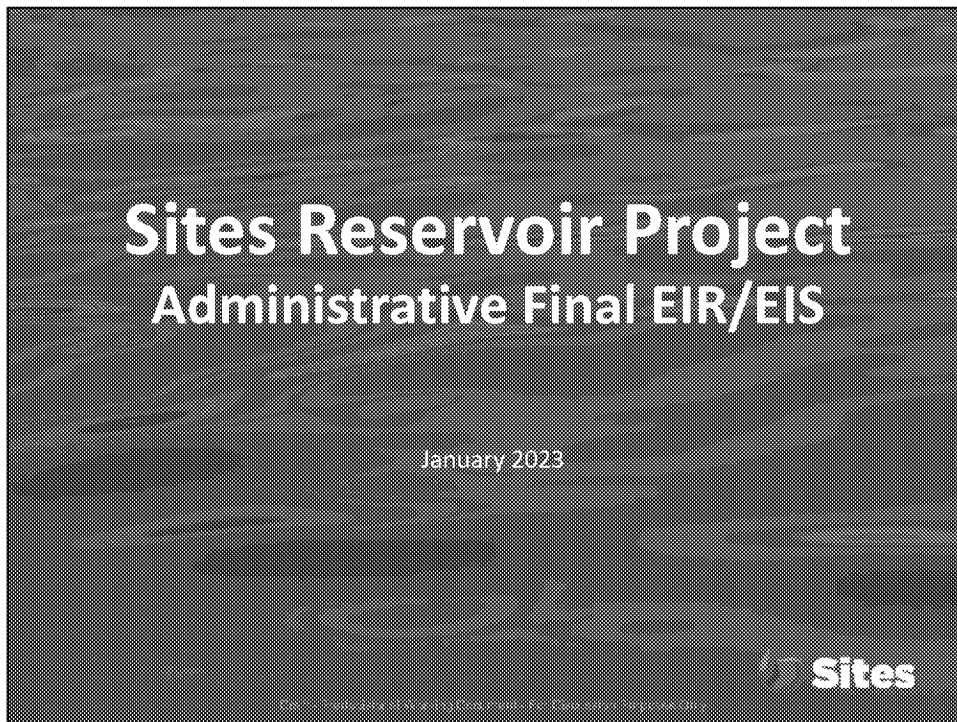
This is the presentation I sent them.

Sent from my iPhone

Begin forwarded message:

From: Marcia Kivett <MKivett@sitesproject.org>
Date: April 27, 2023 at 11:59:20 AM EDT
To: Alicia Forsythe <aforsythe@sitesproject.org>, Laurie Warner Herson
<laurie.warner.herson@phenixenv.com>
Subject: EIR/EIS Comparison Chart

Ali/Laurie - Jerry asked me for the 2017 to present-day EIR/EIS comparison chart. This is slide 12 (page 6), correct?



1

Agenda

- Purpose of Meeting
 - Provide overview of the Administrative Final EIR/EIS and the review process and schedule
- Approach to the Final EIR/EIS:
 - Final EIR/EIS Development
 - Content and Format
 - Approach to Responses to Comments
- Project Refinements:
 - Preferred Alternative
 - Comparison of RDEIR/SDEIS and Final EIR/EIS Operational Criteria
 - Mitigation Measure Fish-2.1
 - Updated Modeling
 - Facility Refinements
- Review Process and Schedule

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Approach to Final EIR/EIS



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Final EIR/EIS Development

- RDEIR/SDEIS released November 12, 2021
- Close of public review January 28, 2022
 - 101 comment letters
 - Some comments submitted in form letters and in a petition
 - Approximately 1,000 individual comments
- Efforts since RDEIR/SDEIS:
 - Identification of refinements to the Project, both facilities and operations
 - Revisions to diversion criteria and associated modeling
 - Developed master and individual responses to comments
 - Revisions to EIR/EIS text based on comment/responses and/or based on project modifications (e.g., facility changes, operation modifications)

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Final EIR/EIS Format

- Volume 1 – Chapters
 - Include all chapters from RDEIR/SDEIS *with changes*
- Volume 2 – Appendices
 - Include all appendices from RDEIR/SDEIS *with changes*
- Chapters and appendices without changes are not included
- Changes shown as
 - Admin Final – Changes shown in track changes
 - Final EIR/EIS – Changes shown as margin line only

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Final EIR/EIS Format (continued)

- Volume 3 – Response to Comments
 - Chapter 1 – Introduction and Approach
 - Chapter 2 – Commenter Indices and Form Letter Introduction
 - Chapter 3 – Master Responses Introduction and Master Responses
 - Chapter 4 – Responses to Comments Tables
 - Appendix – Response to 2017 Comments required by NEPA

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General Approach To Responding to Comments

- Master Responses
 - Identified common themes and comments in order to draft Master Responses
- Individual Responses
 - Prepared responses to all individual comments
 - Currently organized by topics in comment response tables
 - Individual comments and responses will be reorganized by **letter** prior to publication of the Final EIR/EIS

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Master Response Topics

- MR1, CEQA and NEPA Process, Regulatory Requirements, and General Comments
- MR2, Alternatives Description and Baseline
- MR3, Hydrology and Hydrologic Modeling
- MR4, Water Quality
- MR5, Aquatic Biological Resources
- MR6, Vegetation, Wetland, and Wildlife Resources
- MR7, Tribal Coordination, Consultation, and Engagement
- MR8, Trinity River
- MR9, Alternatives Development

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Chapters/Appendices with No Changes – Revised on 2/1/2023

- Chapters
 - 13, Minerals
 - 19, Noise
 - 22, Cultural Resources
 - 24, Visual Resources
 - 25, Population and Housing
- Appendix 2A, 2C, 8B, 9A, 9B, 10B, 12A, 12B, 19A, 20A, 20C, 20D, 22A, 24A, 24B, 27A, 33A, 33B, 33C

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Project Refinements

 **Sites**

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Key Differences

- Changes between RDEIR/SDEIS and Final EIR/EIS:
 - Preferred Alternative is now Alternative 3
 - Revisions to diversion criteria
 - Incorporation of Mitigation Measure Fish-2.1 into Project
 - Revised modeling
 - Minor changes in facilities due to design refinements
 - Corrections or clarifications needed in response to comments
- No new or substantial greater impacts identified that would require recirculation

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Changed to Alt 3 as Preferred Alternative

Facilities / Operations	Alternative 1 – Authority's Preferred Project in RDEIR/SDEIS	Alternative 2	Alternative 3 – Preferred Alt in the Final EIR/EIS
Reservoir Size	1.5 MAF	1.3 MAF	1.5 MAF
Hydropower	Incidental upon release	Same as Alt 1	Same as Alt 1
Diversion Locations	Red Bluff Pumping Plant and Hamilton City	Same as Alt 1	Same as Alt 1
Conveyance Release / Dunnigan Release	1,000 cubic feet per second (cfs) into new Dunnigan Pipeline to Colusa Basin Drain	1,000 cfs into new Dunnigan Pipeline to Sacramento River. Partial release into the Colusa Basin Drain	Same as Alt 1
Reclamation Involvement	1. Funding Partner, up to 7% 2. Operational Exchanges a. Within Year Exchanges b. Real-time Exchanges	Operational Exchanges a. Within Year Exchanges b. Real-time Exchanges	Same as Alt 1, but up to 25% investment
DWR Involvement	Operational Exchanges with Oroville and storage in SWP facilities South-of-Delta	Same as Alt 1	Same as Alt 1
Route to West Side of Reservoir	Bridge across reservoir	Paved road around southern end of reservoir	Same as Alt 1

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Revised Diversion Criteria

Location (Listed from North to South)	RDEIR/SDEIS with Mitigation Included	Final EIR/EIS
Bend Bridge Pulse Protection	Protection of all qualified precipitation-generated pulse events (i.e., peaks in river flow rather than scheduled operational events) from October to May based on the detection of fish presence and migration during the beginning of the flow event. For each event where fish presence and migration are detected, diversions from the Sacramento River would cease for 7 days.	Similar except the following: (1) a qualified precipitation-generated pulse event is determined based on forecasted flows, (2) hourly gage monitoring at Bend Bridge gage detects the predicted flow of 8,000 cfs, and migrating anadromous fish are detected at RBDD, and (3) pulse protection may cease earlier than 7 days if flows at Bend Bridge exceed 25,000 cfs and Project diversions subtracted from Bend Bridge flows continue to be at least 25,000 cfs.
Minimum Bypass Flows in the Sacramento River at the RBPP	3,250 cfs minimum bypass flow at all times; rate of diversion controlled by fish screen design.	No change
Minimum Bypass Flows in the Sacramento River at the Hamilton City Pump Station	4,000 cfs minimum bypass flow at all times; rate of diversion controlled by fish screen design.	No change

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Revised Diversion Criteria (Continued)

Location (Listed from North to South)	RDEIR/SDEIS with Mitigation Included	Final EIR/EIS
Minimum Bypass Flows in the Sacramento River at Wilkins Slough	Chapter 21 in addition to the minimum bypass flows in the Sacramento River at RBPP and the Hamilton City Pump Station, a minimum bypass flow of 8,000 cfs in the Sacramento River at Wilkins Slough would be in place in April and May and 5,000 cfs during the rest of the year. Mitigation Measure FISH-2.1: 10,700 cfs in March through May; 5,000 cfs all other times.	10,700 cfs October 1 through June 14; 5,000 cfs September (not diverting from June 15 to end of August)
Fremont Weir Notch Protections	No more than 1% reduction in flow over weir when spill over the weir is less than 600 cfs. No more than a 10% reduction in flow over weir when spills over the weir are between 600 cfs and 5,000 cfs. No restriction when flows over the weir are greater than 6,000 cfs.	No longer included. Revised minimum bypass flows in the Sacramento River at Wilkins Slough and Bend Bridge pulse protection provide protections for Fremont Weir Notch.

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Revised Diversion Criteria (Continued)

Location (Listed from North to South)	RDEIR/SDEIS with Mitigation Included	Final EIR/EIS
Sacramento River Fully Appropriated Stream	Diversions allowed only when the Sacramento River is not fully appropriated (September 1 through June 14)	No change
Excess conditions, as determined by DWR and Reclamation and defined in 2018 COA Addendum	Delta must be in excess for Sites Reservoir diversions	No change
Freeport, Net Delta Outflow Index, X2, and Delta Water Quality	Operations consistent with all applicable laws, regulations, biological opinions and incidental take permits, and court orders in place at the time that diversion occurs	No change

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Incorporation of Mitigation Measure Fish-2.1 into Project

- RDEIR/SDEIS
 - Included Mitigation Measure FISH-2.1 to reduce potential life stage effects on salmonids by increasing the bypass flow requirement at Wilkins Slough
 - Minimum bypass flow requirement of 10,700 cfs at Wilkins Slough in March-May
- Final EIR/EIS
 - Project description now incorporates the requirements of Mitigation Measure FISH-2.1, which have been refined and made more restrictive (the revised diversion criteria on the previous slide)
 - The bypass flow requirement at Wilkins Slough has been developed as an integral component of how the Project is proposed to operate in terms of its water diversion criteria
 - The modeling performed for the Final EIR/EIS includes the revised diversion criteria
 - This eliminates the need for Mitigation Measure FISH-2.1 in the Final EIR/EIS

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Revised Modeling

- Adjustments made in the CALSIM II modeling between the RDEIR/SDEIS and the Final EIR/EIS to better represent the most up-to-date modeling procedures and actual operations, including:
 - Shasta Lake Operations – expanded exchanges to include more opportunities for fall flow stability and spring pulse enhancement
 - Deadpool Volume – reduced from generally 120 TAF to 60 TAF
 - Delta Salinity Accounting – slightly refined based on revisions to Calsim II coding
 - Period of Diversion to Sites Storage – revised to only include Sept 1 to June 14 to match water right application
 - South of Delta Water Delivery – revised to allow in any year that capacity is available (previously limited to below normal, dry and critically dry years)
 - Updates to Diversion Criteria – revised diversion criteria incorporated

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Facility Refinements

- The RDEIR/SDEIS noted that:
 - “Preliminary design for facilities described herein will continue to be refined and modifications may occur as needed as the Project proceeds to final design and as part of the ongoing value engineering process undertaken by the Authority.”
- Admin Final EIR/EIS includes:
 - Sloped rather than vertical Inlet/Outlet (I/O) Tower
 - Single 32' diameter I/O tunnel replaces two 23' tunnels
 - Removal of two emergency release structures, eliminating emergency drawdown releases to Hunters Creek

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Review Process and Schedule



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Review Process and Schedule

- Starting February 1 files will be available for online review
 - Email will be sent with link to everyone invited to these meetings
- Additional files added as they are ready with all files posted by February 10
 - Additional emails sent as new files are uploaded
- Final editing and formatting not finished – its good but still working on great!
 - Focus comments on substantive issues
 - We appreciate pointing out number inconsistencies
 - Don't bother to comment on edits and format
- All comments due by February 28

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Format for Comments

- Please provide comments in comment bubbles
- Prefer no track change edits but recommended text changes can be added in bubbles
- Prefer comments all on SharePoint so everyone can see each others comments
- If you copy/download a file for your internal agency review, please upload back onto SharePoint with your agency name on the end
 - 01_ExecutiveSummary_Sites
- Each person accessing SharePoint needs “individual” access

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Where To Go With Questions

- File access issues/challenges
 - Laurie Warner Herson at laurie.warner.herson@phenixenv.com
- CEQA Responsible Agencies
 - Ali Forsythe at aforsythe@sitesproject.org
 - Laurie Warner Herson
- Reclamation staff and NEPA Cooperating Agencies
 - David Brick at dbrick@usbr.gov
 - Allison Jacobson at ajacobson@usbr.gov

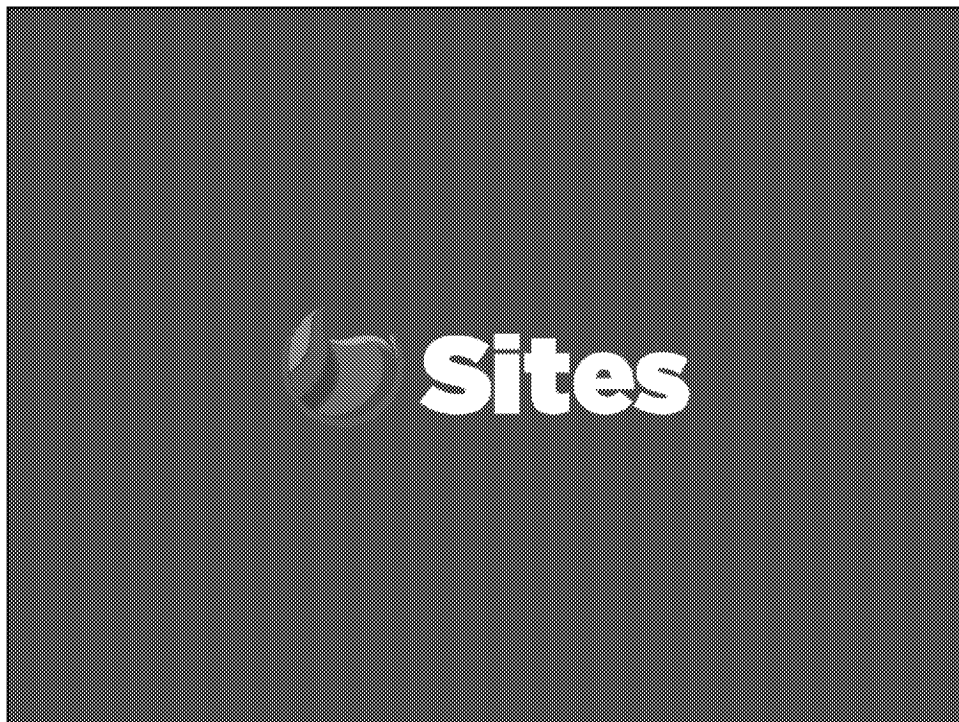
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Sites Imported Aggregate Briefing

April 27, 2023

Agenda

- Project Description
- Dam Filter, Drain and Transition Zones
- Road Base
- Concrete Aggregate
- Summary of Quantities
- Questions

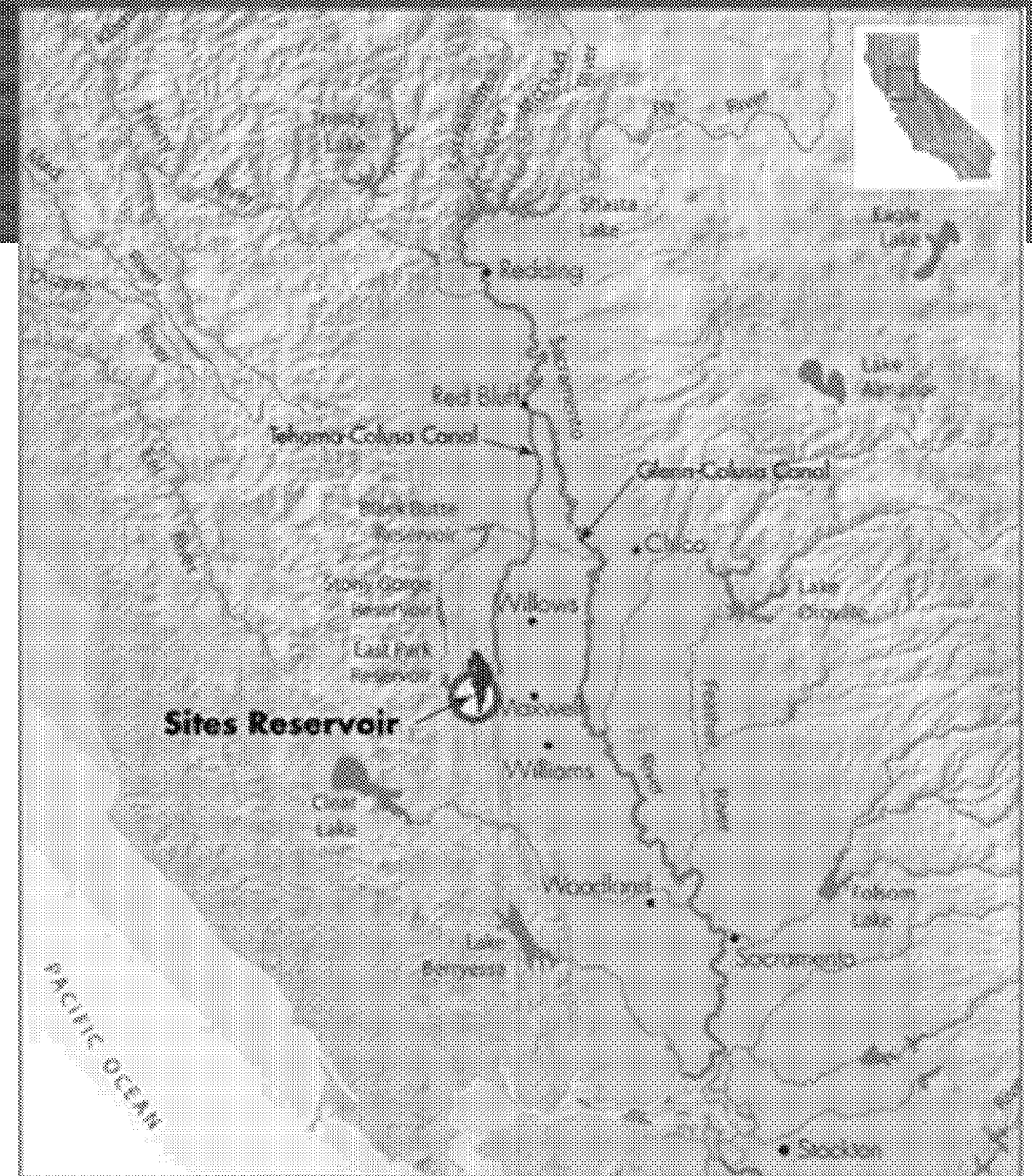
Project Description

Project Location

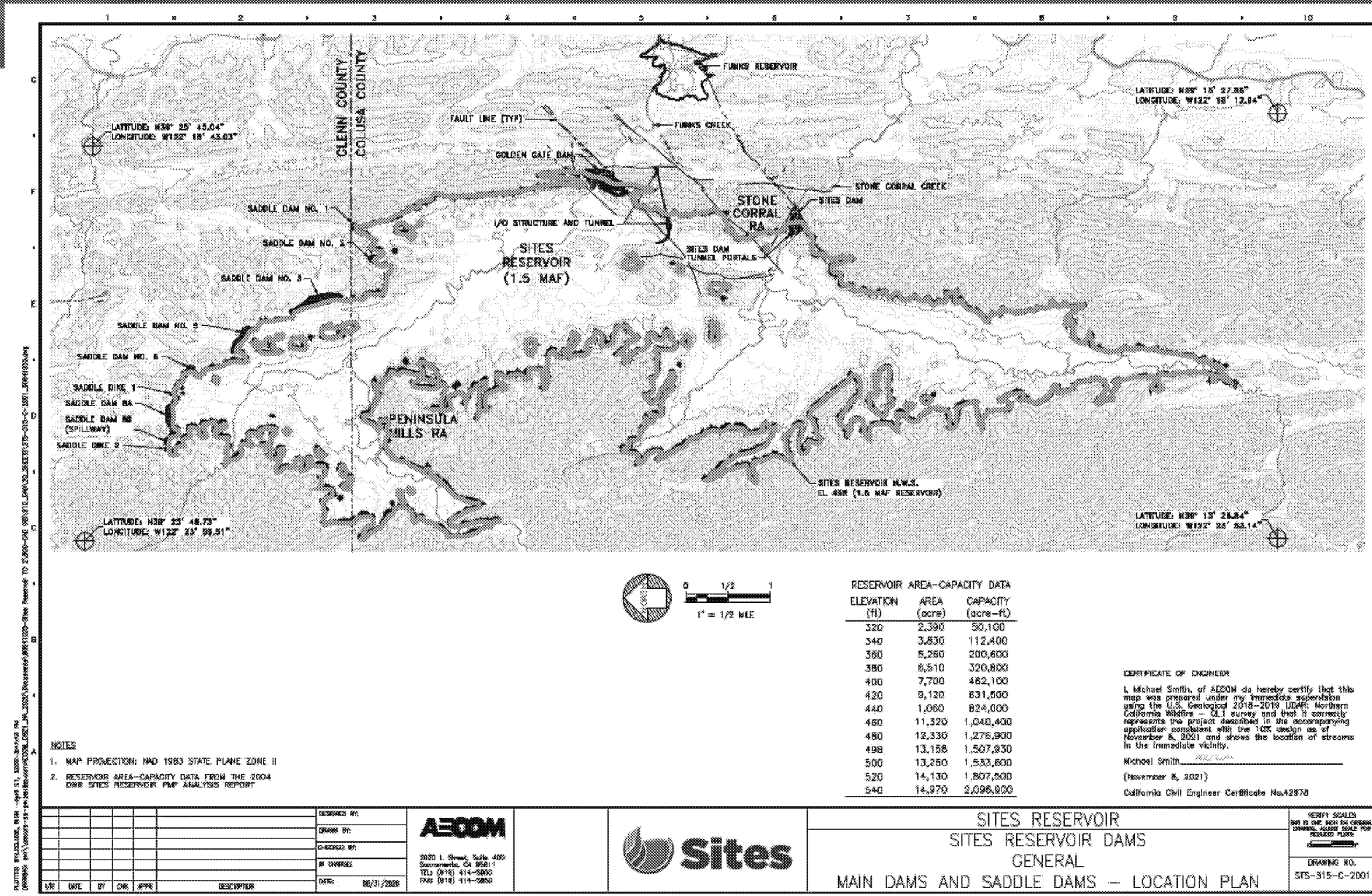
80 miles north of Sacramento

10 miles west of Maxwell

45 miles south of Orland



Sites Reservoir Features

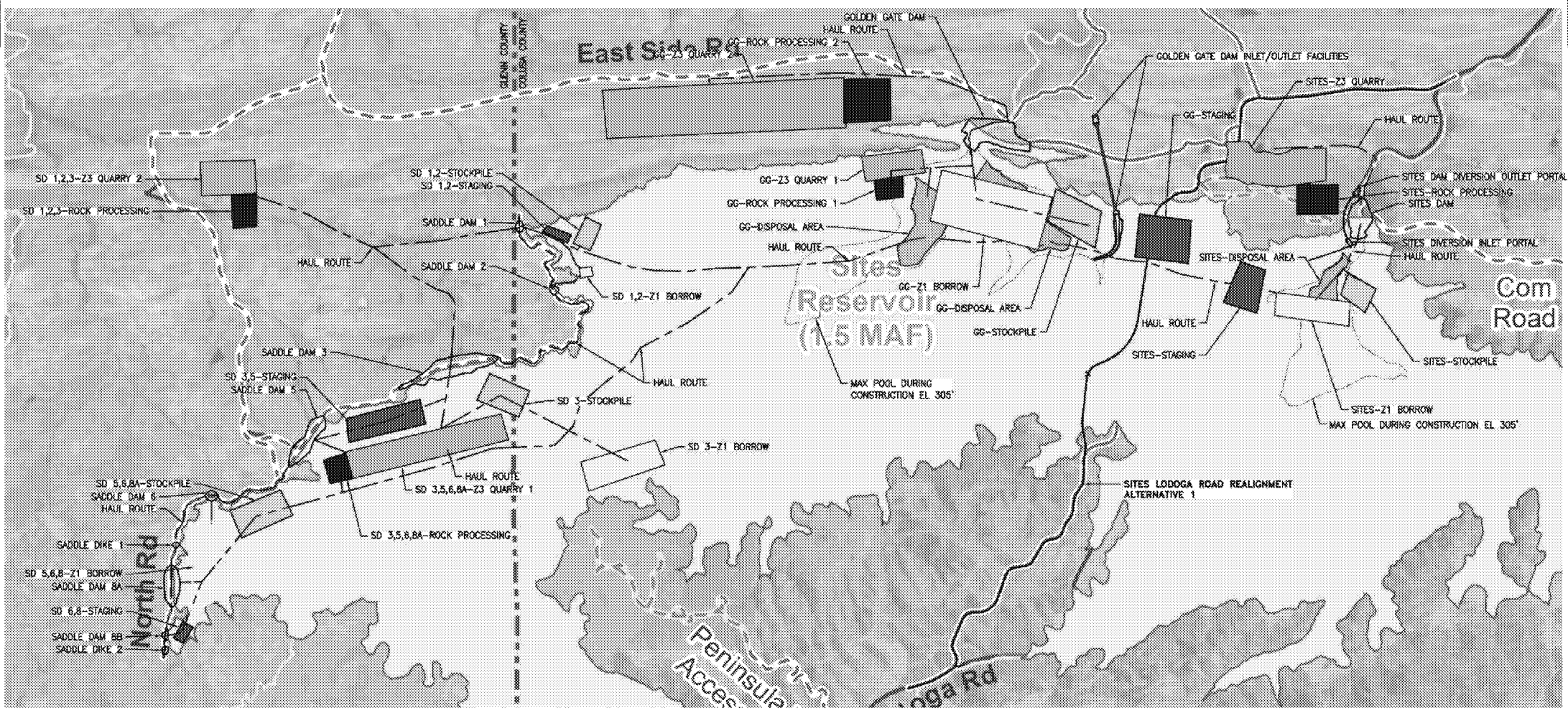


Sites Reservoir Features

Total Storage Capacity	1.5 MAF
Active Storage Capacity	1.4 MAF
Approximate Inundation Area	13,200 acres
Approximate Watershed Area	54,150 acres (84.6 mi ²)
Dam/Saddle Dam/Dike Crest Elevation (Without Camber)	517 feet
Dam Heights (approx. - max. ht. above streambed): Golden Gate Dam Sites Dam 7 Saddle Dams*/2 Saddle Dikes (for freeboard)	287 feet 267 feet 12 – 107 feet
Maximum Operating Water Elevation	498 feet
Minimum Operating Water Elevation	340 feet
Top of Dead Pool	300 feet
Inlet/Outlet Facilities:	
I/O Tunnel (single), with sloping intake (south of GG Dam)	32 feet ID
Sites Diversion Tunnel (north abutment of Sites Dam)	12 feet ID

* Saddle Dam 8B is the spillway location.

Sites Reservoir Features – Construction



LEGEND

- BORROW AREA
- DISPOSAL AREA
- STAGING AREA
- STOCKPILE AREA
- ROCK PROCESSING AREA
- QUARRY AREA
- HAUL ROUTE

NOTES

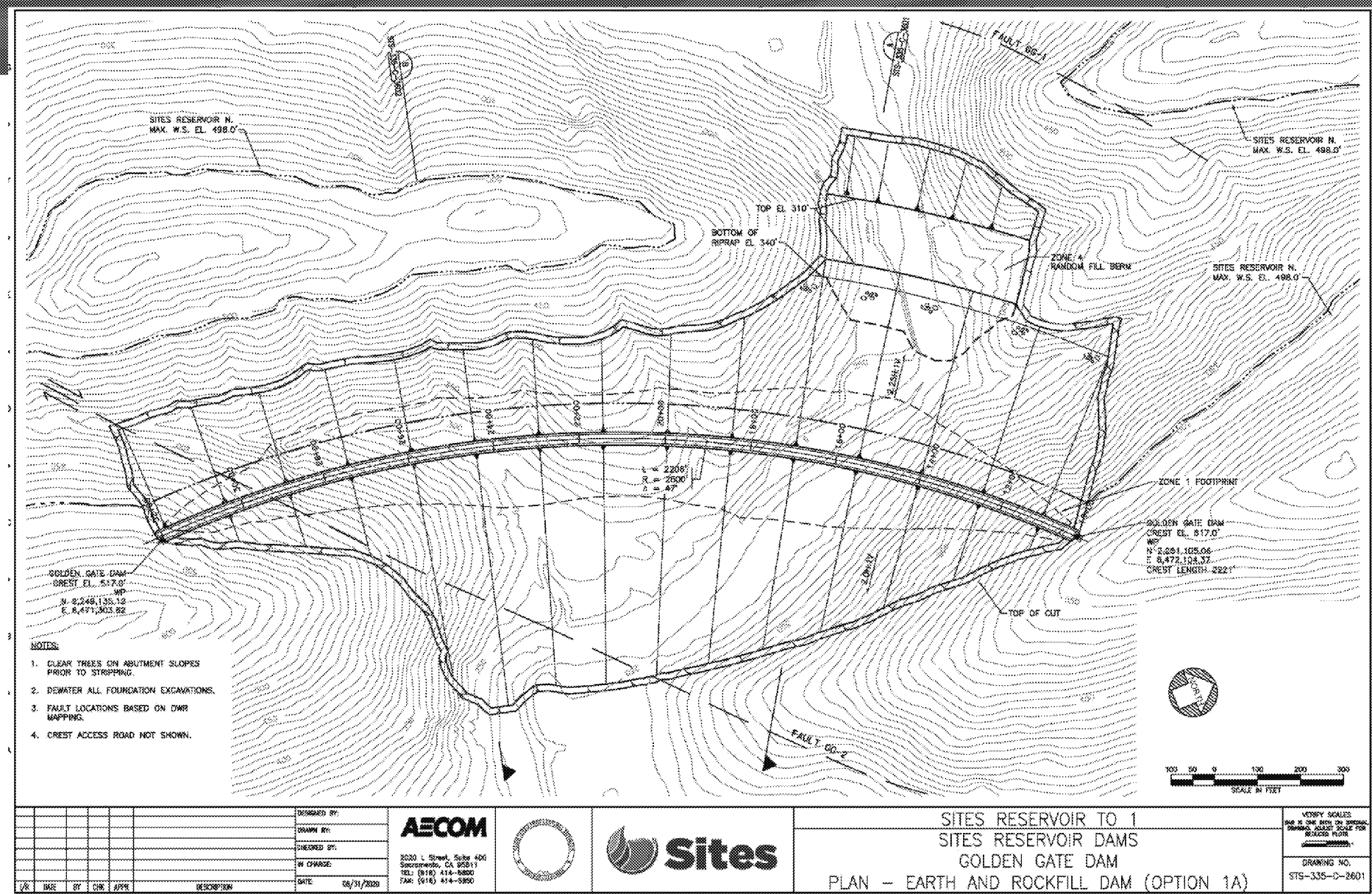
1. FOR OFFSITE BORROW AREA SEE DRAWING STS-315-C-2002
2. FOR LARGER VIEW SEE DRAWING STS-315-C-2003
3. POTENTIAL BORROW SITES ARE FROM DWR, 2002

HAUL ROUTES, BORROW, DISPOSAL, STOCKPILE, STAGING, AND ROCK PROCESSING AREAS (EXPANDED VIEW)
SCALE: 1" = NTS

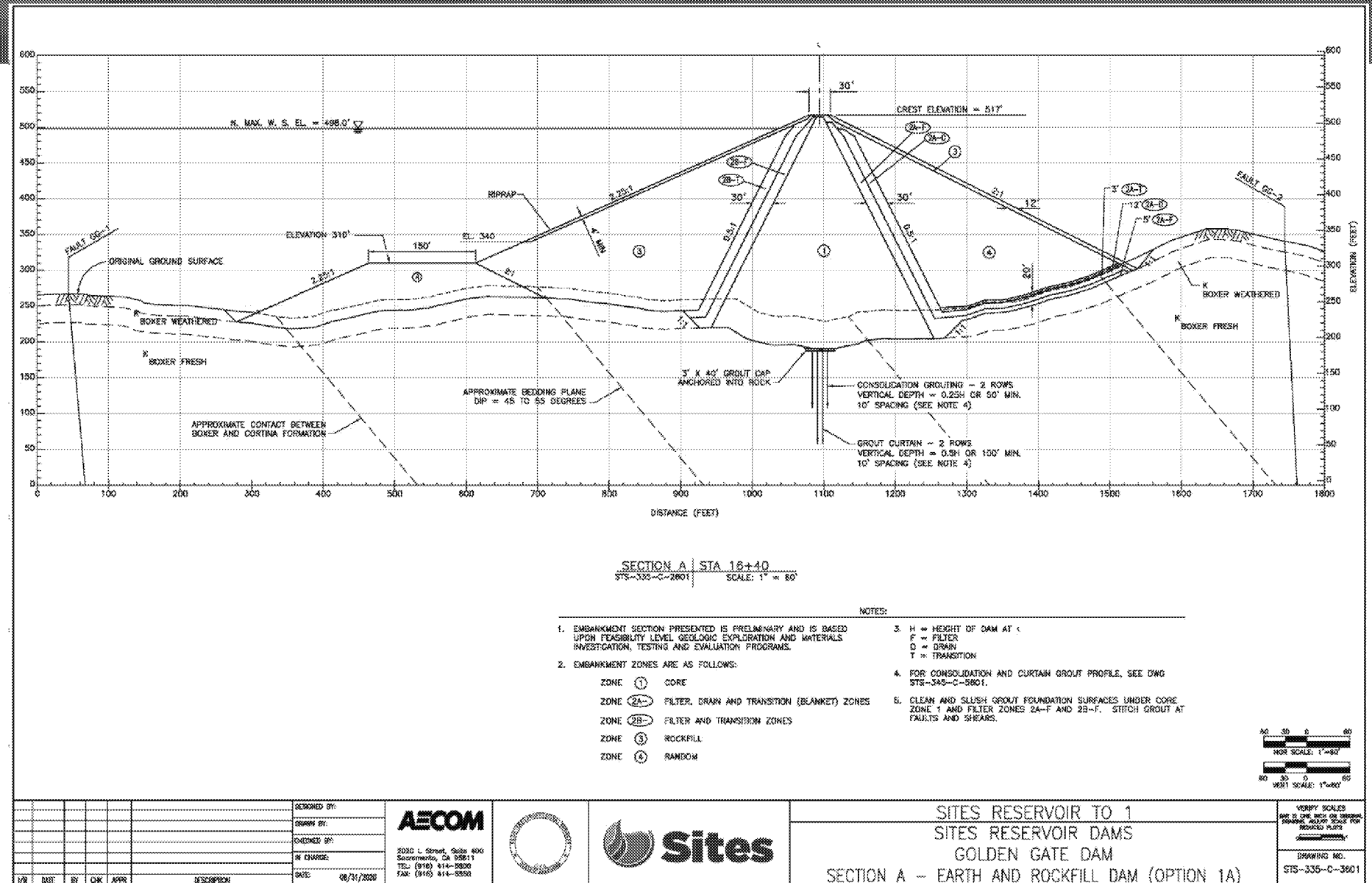


Dam Filter, Drain and Transition Zones

Golden Gate Dam



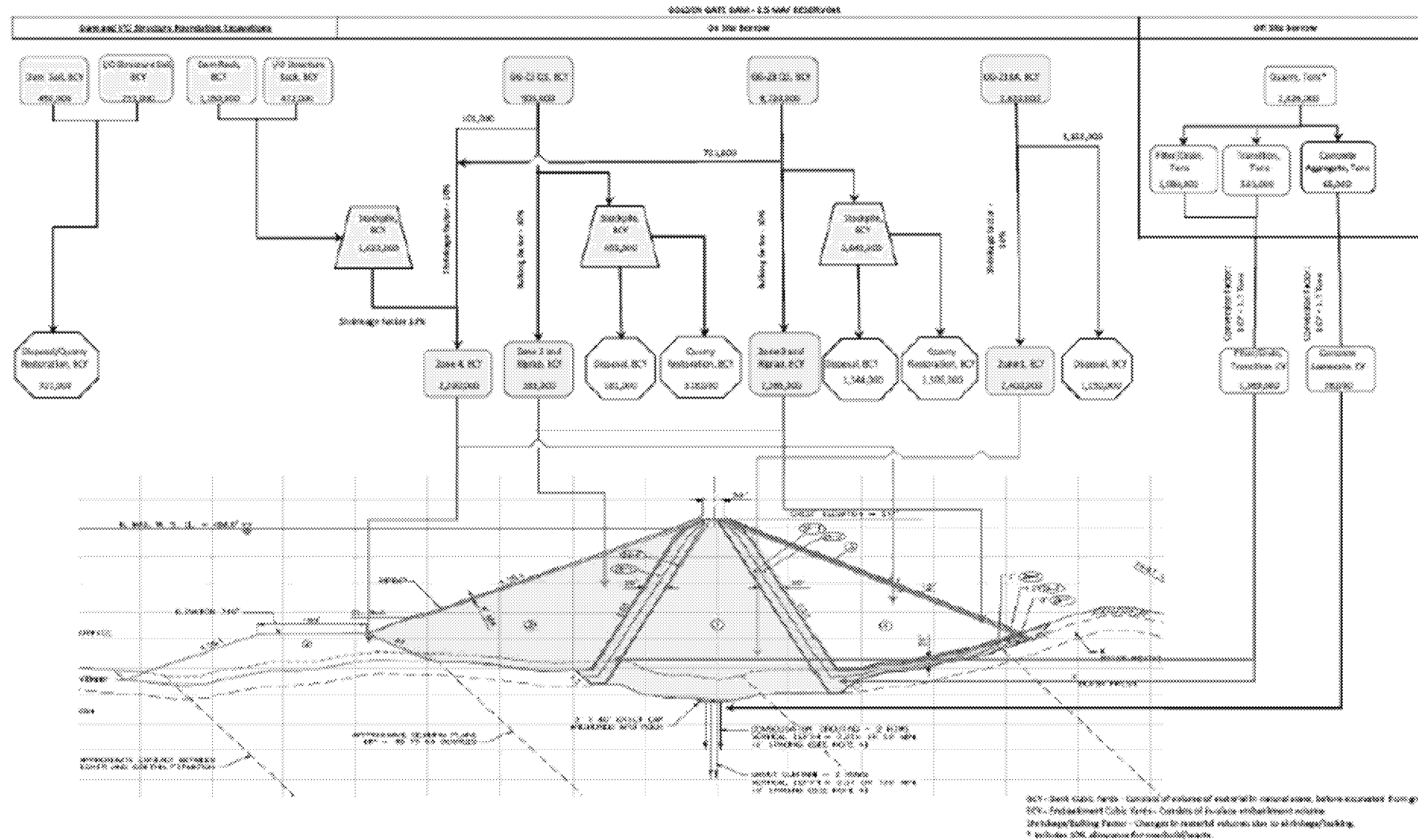
Typical Golden Gate and Sites Dam Section



Material Balance Golden Gate Dam

MATERIALS BALANCE
GOLDEN GATE DAM - 1.5 MAF RESERVOIR

Submitted by: **SSS**
 Reviewed by: **SSS**
 Date: January, 2023



Examples of Dam Construction



Examples of Dam Construction



Examples of Dam Construction



Examples of Dam Construction

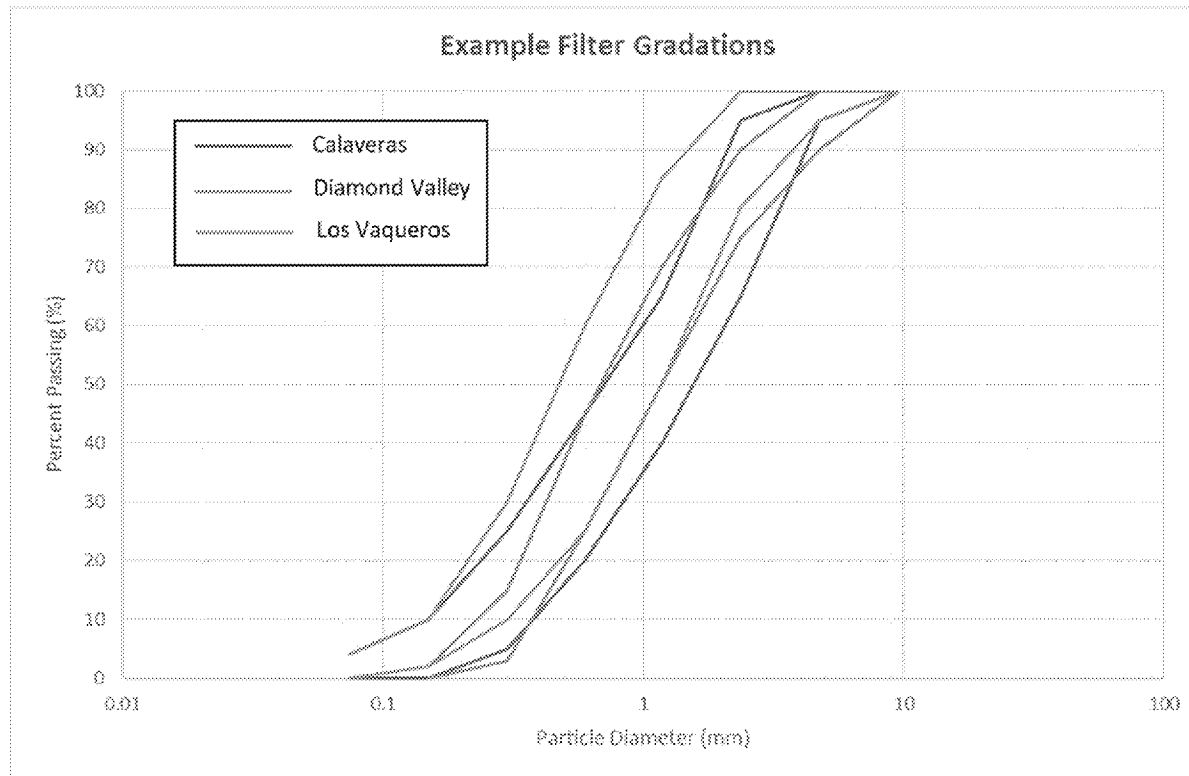


Examples of Filter Gradations and Requirements

Generally meet the soundness requirements of ASTM C33 for fine aggregate plus requirements below

Test Type	Acceptability Standard	Criteria
Specific Gravity	ASTM C127	Greater than 2.6
Abrasion Resistance	ASTM C131	10 percent maximum loss by weight at 100 revolutions, and 40 percent loss of weight at 500 revolutions
	ASTM C535	40 percent maximum loss of weight at 1000 revolutions
Sodium Sulfate Soundness	ASTM C88	10 percent maximum weighted average loss by weight, after five cycles
Shape		Particles shall be generally equidimensional
Elongated Particles	CRD-C-119 and CRD-C-120	Not greater than 15 percent by weight
Other		Material shall be free of clay balls, organics, soft particles, and other impurities

Examples of Filter Gradations and Requirements



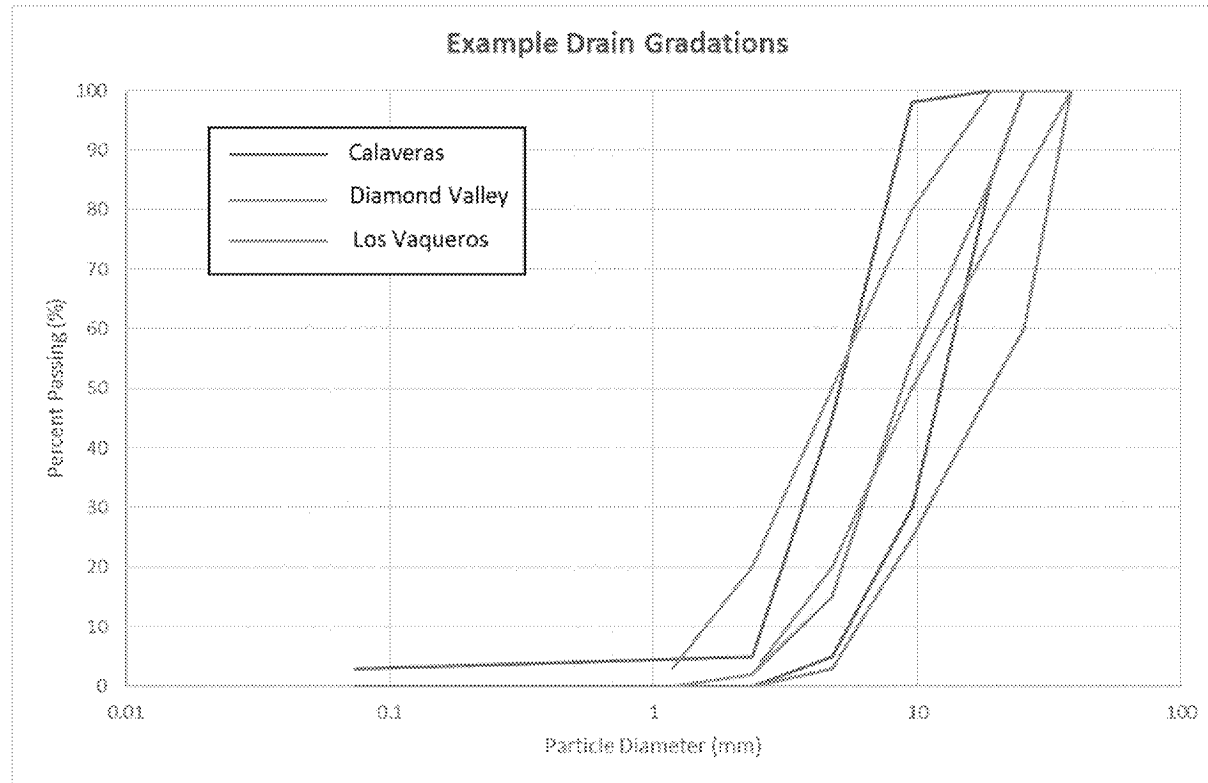
Note: No gap or skip grading between any two consecutive sieves

Sieve Size	Calaveras	Diamond Valley	Los Vaqueros
3/8-inch	100	100	100
No. 4	95 – 100	90 – 100	95 – 100
No. 8	65 – 95	75 – 90	80 – 100
No. 16	40 – 65	50 – 70	50 – 85
No. 30	20 – 45	25 – 45	25 – 60
No. 50	5 – 25	3 – 15	10 – 30
No. 100	0 – 10	0 – 2	2 – 10
No. 200	0 – 4	-	0 – 4

Examples of Drain Gradations and Requirements

Test Type	Acceptability Standard	Criteria
Adsorption	ASTM C127	Greater than 2.6
Specific Gravity	ASTM C127 and C128	Greater than 2.6
Abrasion Resistance	ASTM C131	10 percent maximum loss by weight at 100 revolutions, and 40 percent loss of weight at 500 revolutions
Sodium Sulfate Soundness	ASTM C88	10 percent maximum weighted average loss by weight, after five cycles
Shape		Particles shall be generally equidimensional
Elongated Particles	CRD-C-119 and CRD-C-120	Not greater than 15 percent by weight
Other		Material shall be free of clay balls, organics, soft particles, and other impurities

Examples of Drain Gradations and Requirements



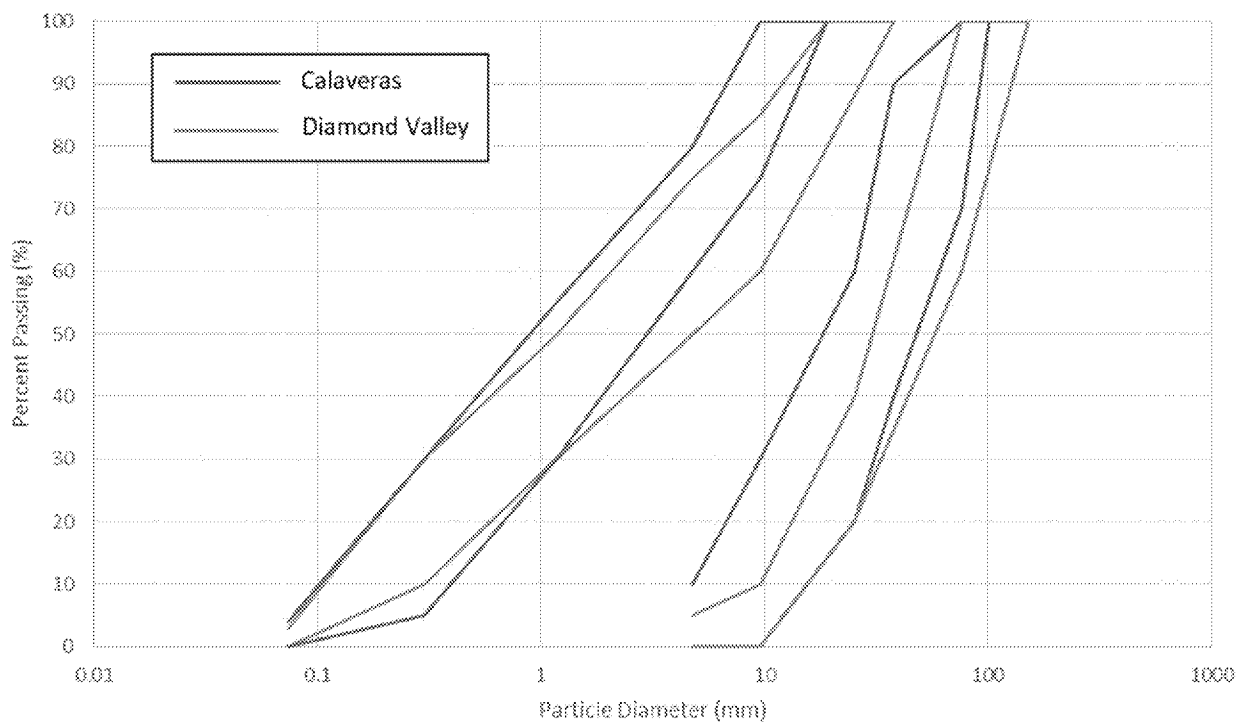
Note: No gap or skip grading between any two consecutive sieves

Sieve Size	Calaveras	Diamond Valley	Los Vaqueros
1.5-inch	-	100	100
1-inch	100	60 – 100	-
3/4-inch	85 – 100	50 – 85	75 – 100
3/8-inch	30 – 98	25 – 55	50 – 80
No. 4	5 – 45	3 – 15	20 – 50
No. 8	0 – 5	0 – 2	2 – 20
No. 16	-	-	0 – 3
No. 200	0 – 3	-	-

Examples of Transition Gradations and Requirements

- Similar soundness requirements to filter and drain

Example Transition Gradations



Sieve Size	Calaveras (Upstream)	Calaveras (Downstream)	Diamond Valley (Upstream)	Diamond Valley (Downstream)
6-inch	-	-	-	100
4-inch	-	100	-	-
3-inch	-	70 – 100	-	60 – 100
1.5-inch	-	40 – 90	100	-
1-inch	-	20 – 60	-	20 – 40
¾-inch	100	-	80 – 100	-
3/8-inch	75 – 100	0 – 30	60 – 85	0 – 10
No. 4	60 – 80	0 – 10	50 – 75	0 – 5
No. 16	30 – 55	-	30 – 50	-
No. 50	5 – 30	-	10 – 30	-
No. 200	0 – 4	-	0 – 3	-

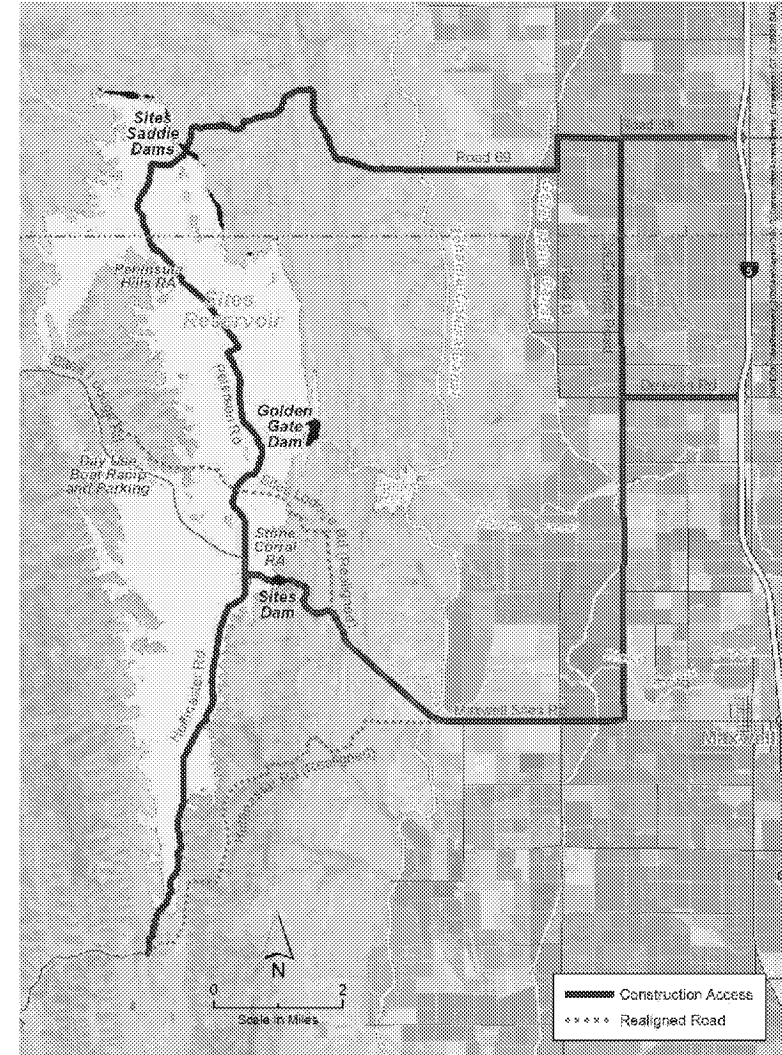
Road Base

Road Base

- Caltrans Class 2 Aggregate Base (standard specifications 26-1.02)
 - Consists of clean broken stone, crushed gravel, natural rough-surfaces gravel, sand, and/or processed reclaimed AC, PCC, LCB, or CTB

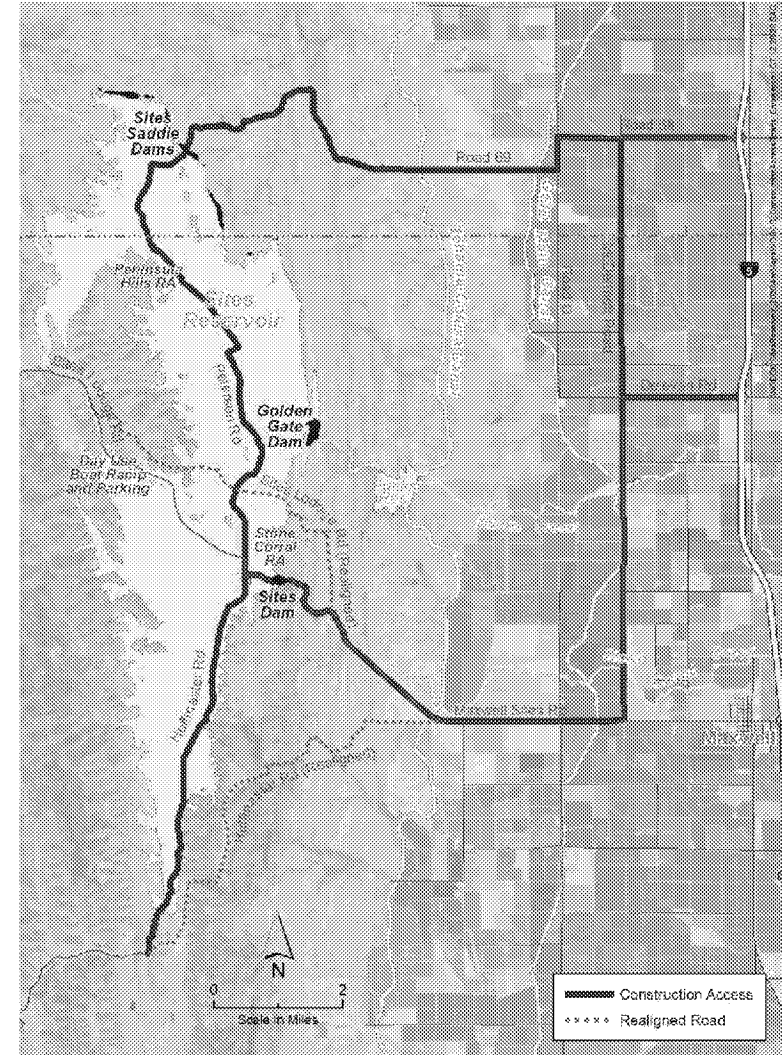
Sieve size	Percentage passing			
	1-1/2 inch maximum		3/4 inch maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	--	--
1-1/2"	90-100	87-100	--	--
1"	--	--	100	100
3/4"	50-85	45-90	90-100	87-100
No. 4	25-45	20-50	35-60	30-65
No. 30	10-25	6-29	10-30	5-35
No. 200	2-9	0-12	2-9	0-12

Quality characteristic	Requirement	
	Operating range	Contract compliance
Resistance (R-value, min)	--	78
Sand equivalent (min)	25	22
Durability index (min)	--	35



Road Base

- Caltrans Class 4 Aggregate Subbase (standard specifications 25-1.02)
 - Consists of clean broken stone, crushed gravel, natural rough-surfaces gravel, sand, and/or processed reclaimed AC, PCC, LCB, or CTB
 - Gradation and quality requirements to be decided based on project needs, but likely to have a minimum sand equivalent of about 20 and R-value of about 40



Concrete Aggregate

Concrete Aggregate

- Need to meet quality requirements of ASTM C33, Concrete Aggregates

Location	Approximate Quantities (tons)
Spillway (Saddle Dam 8B)	19,500
Inlet/Outlet Structure	115,900
Sites Diversion Tunnel	10,400
Golden Gate Dam Bypass	35,000
Sites Lodoga Bridge	45,585

Summary of Quantities

Summary of Quantities

Location	Approximate Quantities (Million Tons)
Zone 2A – Downstream Filter	1.5
Zone 2A – Downstream Drain	1.6
Zone 2A – Downstream Transition	0.3
Zone 2B – Upstream Filter	0.6
Zone 2B – Upstream Transition	0.6
Class 4 Aggregate Subbase	0.3
Class 2 Aggregate Base	0.5
Concrete Aggregate	0.6
Total	6.0 million tons

Crude Average Delivery Schedule

- **Overall Project Schedule = 800 to 1200 days**
- **Overall Quantity of Material = 6 million tons**
- **Average Delivery = 6,000 to 7,500 tons per day**

Questions

Questions

- Do you have the quality of materials needed and their location(s)?
- Do you have the plants to create the materials in spec and their location(s)?
- Do you have the capacity to deliver the quality and quantities of materials in the time needed?

Questions – cont'd.

- Do you have technical specifications/lab certifications such as durability, gradation, petrographic analysis, LA rattler, R-value, available?
- What is the location of quarry and type of material; alluvium, hard rock, soft rock?
- What are the available material remaining/duration of permitted operations?

Questions – cont'd.

- What are the productivity rates for different materials?
- What is the maximum amount of material you can deliver per day?
- What are the approximate at plant costs for different materials?
- Will you be using prevailing labor rates for trucking?

From: Berryman, Ellen [Ellen.Berryman@icf.com]
Sent: 4/27/2023 12:04:47 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]; Turner, Debbie [Debbie.Turner@icf.com]; Poopatanapong, Amy [Amy.Poopatanapong@icf.com]
Subject: RE: Sites - ITP revisions

Hi Ali,

It looks like ICF can incorporate impact revisions by Friday, but I won't be back to work until next Wednesday, so if it goes out this Friday I won't be able to review it first. Since I have history with the document, I would recommend holding off for my QA/QC to ensure consistency, if the timeline allows. Your call.

Thank you,
Ellen

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, April 27, 2023 11:11 AM
To: Spranza, John <john.spranza@hdrinc.com>; Berryman, Ellen <Ellen.Berryman@icf.com>; Turner, Debbie <Debbie.Turner@icf.com>
Subject: RE: Sites - ITP revisions

Hi all – We would like a quality deliverable that can be submitted to CDFW without more changes. If ICF needs more time to prepare that, we can be flexible. But I really don't want to get a document that we do final review on and find inconsistencies in and have to revise again. Does ICF feel like you all need more time to prepare the document?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Thursday, April 27, 2023 11:06 AM
To: Berryman, Ellen <Ellen.Berryman@icf.com>; Turner, Debbie <Debbie.Turner@icf.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites - ITP revisions

The Authority

John Spranza

D 916.679.8858 M 818.640.2487

From: Berryman, Ellen <Ellen.Berryman@icf.com>
Sent: Thursday, April 27, 2023 10:53 AM

To: Spranza, John <John.Spranza@hdrinc.com>; Turner, Debbie <Debbie.Turner@icf.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>
Subject: RE: Sites - ITP revisions

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What's driving this timeline?

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Tuesday, April 25, 2023 12:08 PM
To: Berryman, Ellen <Ellen.Berryman@icf.com>; Turner, Debbie <Debbie.Turner@icf.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>
Subject: RE: Sites - ITP revisions

This Friday 😊

John Spranza

D 916.679.8858 M 818.640.2487

From: Berryman, Ellen <Ellen.Berryman@icf.com>
Sent: Tuesday, April 25, 2023 11:14 AM
To: Spranza, John <John.Spranza@hdrinc.com>; Turner, Debbie <Debbie.Turner@icf.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>
Subject: RE: Sites - ITP revisions

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Guys. I'm checking emails to get ready for returning next week. Do we have a due date for completing the ITP application revisions?

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Monday, April 24, 2023 9:33 AM
To: Turner, Debbie <Debbie.Turner@icf.com>
Cc: Berryman, Ellen <Ellen.Berryman@icf.com>; aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>
Subject: RE: Sites - ITP revisions

Hi Debbie,
The changes below are consistent with what we discussed.
Thanks.
John

John Spranza

D 916.679.8858 M 818.640.2487

From: Turner, Debbie <Debbie.Turner@icf.com>
Sent: Friday, April 21, 2023 8:42 AM
To: Spranza, John <John.Spranza@hdrinc.com>

Cc: Berryman, Ellen <Ellen.Berryman@icf.com>

Subject: Sites - ITP revisions

CAUTION: [EXTERNAL] This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi John,

Below are the decisions made today regarding the ITP (and the BA) so that the ITP is consistent with the permits.

- Remove Figure 3-21 Road Site Map. We'll also be removing this figure from the BA (I'll notify Mike Hendricks).
- Use Alt 1 v3 impact footprint for acreage calcs (this version has Sites Lodoga Road hugging the inundation area).

Have a good weekend, 😊

Debbie

Debbie Turner | Conservation GIS Analyst | 858.444.3927 (primary phone) | 619.417.4277 (mobile)

Work Schedule: Monday through Thursday 7 am to 3 pm PST

| debbie.turner@icf.com

ICF50  | 525 B Street, Suite 1700, San Diego, CA 92101 USA | icf.com

From: Jerry Brown [jbrown@sitesproject.org]
Sent: 4/27/2023 12:59:50 PM
To: Marcia Kivett [MKivett@sitesproject.org]
Subject: Re: EIR/EIS Comparison Chart
Attachments: 20230217_Comparison of Diversion Criteria[1][2].docx

Here's what I was looking for.

From: Jerry Brown <jbrown@sitesproject.org>
Date: Thursday, April 27, 2023 at 11:18 AM
To: Marcia Kivett <MKivett@sitesproject.org>
Subject: Re: EIR/EIS Comparison Chart

This is not what I was thinking. I've landed and will find when I get to my office. Thanks for checking.

Sent from my iPhone

On Apr 27, 2023, at 10:26 AM, Marcia Kivett <MKivett@sitesproject.org> wrote:

Let me know if this is what you envisioned. I know you do not want to create documents, but Laurie did note the highlighted below. I asked her not too until we heard back from you.

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, April 27, 2023 10:01 AM
To: Marcia Kivett <MKivett@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: EIR/EIS Comparison Chart

No this is a comparison of the 2021 Revised Draft EIR/Supplemental Draft EIS to the 2023 Admin Final EIR/EIS analysis. The project as analyzed in the 2017 Draft EIR/EIS is compared to the current project In Appendix 2B, specifically in Table 2B-1. I don't think we have a comparison of the environmental impacts of the two (and I'm not sure we should go there). If Ali want me to, I could pull that together.

From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Thursday, April 27, 2023 8:59 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: EIR/EIS Comparison Chart

Ali/Laurie - Jerry asked me for the 2017 to present-day EIR/EIS comparison chart. This is slide 12 (page 6), correct?

<V2-006-App02B_Addtl_Alts_Screen_AdminFinal.docx>

From: Joe Trapasso [jtrapasso@sitesproject.org]
Sent: 4/27/2023 1:21:36 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Lori Jones [LJones@BrwnCald.com]
Subject: RE: Sites Project - Services Contract Template for Paskenta Tribe

Joe likes: Its not a rush! 😊

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, April 27, 2023 1:19 PM
To: Joe Trapasso <jtrapasso@sitesproject.org>; Lori Jones <LJones@BrwnCald.com>
Subject: RE: Sites Project - Services Contract Template for Paskenta Tribe

Thanks Joe. Agreement in place this summer – I'd say target is end of June or July. Its not a rush, but I wanted to get moving on it.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Joe Trapasso <jtrapasso@sitesproject.org>
Sent: Thursday, April 27, 2023 1:06 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Lori Jones <LJones@BrwnCald.com>
Subject: RE: Sites Project - Services Contract Template for Paskenta Tribe

Ali, The Authority standard long and short forms will likely not work for them based on my experience with the CICC and Yocha Dehe Tribes. The Yocha Dehe Tribe used the CICC Tribes agreement for their agreement. Alan had reviewed both agreements. Good to provide them the short form along with the Yocha Dehe contract. What is the schedule for having an executed agreement in place?

Lori, please email Ali the current short form.

Thanks,

Joe

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, April 27, 2023 11:54 AM
To: Joe Trapasso <jtrapasso@sitesproject.org>; Lori Jones <LJones@BrwnCald.com>
Subject: Sites Project - Services Contract Template for Paskenta Tribe

Hi Joe and Lori – The Paskenta Tribe has expressed an interest in being our Tribal monitor for activities in Glenn County. They would like to contract with the Authority for this effort.

Can you send me our standard services contract template? I am going to send this to them along with the Yocha Dehe contract as an example. Which I realize the Yocha Dehe contract does not follow our template, but I am also nervous that the Tribe may find our template way too onerous and not culturally sensitive. So I want to provide an alternative.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 4/27/2023 1:35:44 PM
To: Marcia Kivett [MKivett@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: EIR/EIS Comparison Chart

Ok, that makes sense. I forgot we had developed the comparison of all three versions of operational criteria.

From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Thursday, April 27, 2023 1:08 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Fw: EIR/EIS Comparison Chart

Jerry found what he was looking for. See attached.

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Thursday, April 27, 2023 12:59 PM
To: Marcia Kivett <MKivett@sitesproject.org>
Subject: Re: EIR/EIS Comparison Chart

Here's what I was looking for.

From: Jerry Brown <jbrown@sitesproject.org>
Date: Thursday, April 27, 2023 at 11:18 AM
To: Marcia Kivett <MKivett@sitesproject.org>
Subject: Re: EIR/EIS Comparison Chart

This is not what I was thinking. I've landed and will find when I get to my office. Thanks for checking.

Sent from my iPhone

On Apr 27, 2023, at 10:26 AM, Marcia Kivett <MKivett@sitesproject.org> wrote:

Let me know if this is what you envisioned. I know you do not want to create documents, but Laurie did note the highlighted below. I asked her not to until we heard back from you.

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, April 27, 2023 10:01 AM
To: Marcia Kivett <MKivett@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: EIR/EIS Comparison Chart

No this is a comparison of the 2021 Revised Draft EIR/Supplemental Draft EIS to the 2023 Admin Final EIR/EIS analysis. The project as analyzed in the 2017 Draft EIR/EIS is compared to the current project in Appendix 2B, specifically in Table 2B-1. I don't think we have a comparison of the environmental impacts of the two (and I'm not sure we should go there). If Ali want me to, I could pull that together.

From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Thursday, April 27, 2023 8:59 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>

Subject: EIR/EIS Comparison Chart

Ali/Laurie - Jerry asked me for the 2017 to present-day EIR/EIS comparison chart. This is slide 12 (page 6), correct?

<V2-006-App02B_Addtl_Alts_Screen_AdminFinal.docx>

From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 4/27/2023 2:50:53 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Spranza, John [john.spranza@hdrinc.com]
Subject: RE: WR App Errata

FYI – Jelena suggested this not be included as errata (which I’m totally fine with!) and just be prepared to address it if/when we are asked. She appreciated that we put thought to addressing her question, but thought this provided little benefit and wasn’t worth the attention it would receive by being errata.

From: Angela Bezzone
Sent: Thursday, April 27, 2023 8:33 AM
To: 'Alicia Forsythe' <aforsythe@sitesproject.org>
Cc: Spranza, John <john.spranza@hdrinc.com>
Subject: RE: WR App Errata

That is a good point. I think it’s ok as long as we can explain it if the question comes up through protest/hearing. My explanation would be something along the lines of the below. If this line of thinking seems reasonable, then I think we’re good to go. Let’s say someone asks “Why don’t the diversion numbers in the WAA Report line up exactly with the Final EIS/R or Operations ITP?”

My response would be: There were slight coding differences between Alternative 3 used in the EIS/R and Alternative 3A used in the Operations ITP; however, both models use the same Project assumptions. Although the Alternative 3A historical hydrology presented in the WAA was not presented in the Operations ITP, it was used in support of the ITP as it was the first step in developing the climate change scenarios.

Further, we provided the entire CalSim model run with the application, so people can dive into the details. They just aren’t going to find an exact 1:1 in another document. Writing this out helped me! Hopefully, it makes sense to you.

Angela

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 26, 2023 10:17 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: Spranza, John <john.spranza@hdrinc.com>
Subject: RE: WR App Errata

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Yes. I think this is good. BUT – the Operations ITP modeling uses the 2035 CT, NOT historical hydrology. Does that change anything?

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Angela Bezzone <bezzone@mbkengineers.com>

Sent: Wednesday, April 26, 2023 8:59 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>

Cc: Spranza, John <john.spranza@hdrinc.com>

Subject: WR App Errata

Ali – We talked about this a while ago, but I want to confirm that I have the right language to describe how Alternative 3A is now proposed to be used. The screenshot below is from the WAA Report and comes from a question from Jelena asking why the Admin Final EIS/EIR diversions weren't exactly in line with the WAA. The answer is that there were minor code differences between Alt 3 and 3A, even though they use the same assumptions.

I'm trying to make as minor of a change as possible, so the only change is adding the underlined text. Is "Incidental Take Permit for Project Operations" the correct language to use?

The CalSim II model used for this analysis is the Alternative 3A model produced by the Authority in support of the Final Environmental Impact Report/ Environmental Impact Statement²² and the Incidental Take Permit for Project Operations, both of which are currently in preparation. The relevant supply and demand inputs used in this copy of the CalSim II model include²³:

Thanks!

Angela Bezzone, P.E.

MBK Engineers

455 University Ave Suite 100
Sacramento, CA 95825

(916) 456-4400 – Phone

(775) 450-6408 – Cell

(916) 456-0253 – Fax

From: Alicia Forsythe [aforsythe@sitesproject.org]
Sent: 4/27/2023 5:25:31 PM
To: Katherine Maher [KMaher@valleywater.org]
Subject: Re: Sites Modeling Follow-Up

That looks good to me.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Reservoir Project | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

From: Katherine Maher <KMaher@valleywater.org>
Sent: Thursday, April 27, 2023 4:12:19 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Modeling Follow-Up

Do you see any issue with these statements? I don't want to overstate the environmental benefits, but I'm trying to call out the different types of environmental benefits provided by the project.

The operational flexibility provided by the Project will help preserve the cold-water pool in Lake Shasta later into the summer months to support spawning and rearing of endangered Winter-Run Chinook Salmon in the Sacramento River. The Project will also provide a reliable supply of refuge water to improve Pacific Flyway habitat for migratory birds and other native species as well as provide water dedicated to help improve conditions for Delta Smelt.

Thanks,

Katherine

From: Katherine Maher
Sent: Thursday, April 27, 2023 3:19 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Modeling Follow-Up

Hi Ali,

Do you have a few minutes for a quick call this afternoon? I just want to run a few things in our presentation by you.

Katherine

From: Katherine Maher
Sent: Thursday, April 27, 2023 3:03 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Modeling Follow-Up

Thanks, Ali! I'll keep these results in the memo.

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 26, 2023 1:23 PM
To: Katherine Maher <KMaher@valleywater.org>
Subject: RE: Sites Modeling Follow-Up

*** This email originated from outside of Valley Water. Do not click links or open attachments unless you recognize the sender and know the content is safe. ***

Yes. It does. This was hot off the press when Erin sent this to you and this does reflect the current diversion criteria.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Katherine Maher <KMaher@valleywater.org>
Sent: Wednesday, April 26, 2023 1:10 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Modeling Follow-Up

Hi Ali,

Thanks, we'll keep this in the memo. Does this modeling reflect the current diversion criteria?

Katherine

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, April 26, 2023 12:46 PM
To: Katherine Maher <KMaher@valleywater.org>
Subject: FW: Sites Modeling Follow-Up

*** This email originated from outside of Valley Water. Do not click links or open attachments unless you recognize the sender and know the content is safe. ***

Hi Katherine – I took a look at this and in reading the footnotes in detail, I think this is still relevant. These values were based on the BA modeling and assuming Alternative 3B, which has Reclamation at 16% investment. These numbers are our current values and are good to continue to use. Apologies for taking so long to get to this.

Ali

Annualized participation (TAF/yr)	Storage in reservoir (1:6.234 conversion factor)	Percent diversions received*	Approximate releases (TAF/yr, long-term average) ***	Approximate releases (TAF/yr, dry and critical years)
500	3,117	0.2%	510	1,030
6,000	37,404	2.6%	6,115	12,330
8,000	49,872	3.5%	8,150	16,440
10,000	62,340	4.4%	10,190	20,550
*Percent diversions received is calculated based on percent active storage allocated to the participant. The active storage in the reservoir is estimated to be 1.44 MAF based on a 60 TAF deadpool. The percent diversions is the storage allocated to the participant divided by the total active storage. **Estimated releases are based on modeled operational assumptions. ***Based on Alternative 3B results (16% federal storage allocation) for the Biological Assessment using 2035 CT climate hydrology				

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Heydinger, Erin <Erin.Heydinger@hdrinc.com>
Sent: Friday, May 27, 2022 9:25 AM
To: Katherine Maher <KMaher@valleywater.org>; Cindy Kao <CKao@valleywater.org>
Cc: Patel, Trishna <Trishna.Patel@hdrinc.com>
Subject: RE: Sites Modeling Follow-Up

Hi Katherine and Cindy,

I just wanted to follow-up with a note I should have included in my email. All numbers are provided in releases from the reservoir, and therefore don't include any losses through the Delta.

Thanks,
Erin

Erin Heydinger PE, PMP
D 916.679.8863 M 651.307.9758

hdrinc.com/follow-us

From: Heydinger, Erin
Sent: Thursday, May 26, 2022 10:57 AM
To: kmaher@valleywater.org; Cindy Kao <CKao@valleywater.org>
Cc: Patel, Trishna <Trishna.Patel@hdrinc.com>
Subject: Sites Modeling Follow-Up

Hi Cindy and Katherine-

Below are answers to your questions from our call on Monday. I asked the Jacobs team about the CalSim 2/3 expected difference and hope to hear back from them before the end of the week. I will forward their response when I get it.

- **Regulatory assumptions and level of development:** All models that have been run for the Sites project over the past year (including the WSIP Feasibility Study, draft EIR/EIS) include both ROC on LTO and the SWP ITP in the baseline. All models used a 2030 planning level of development (comparable to assumptions for system-wide demands). This is consistent with other documents that have been recently produced, such as the SWP ITP and ROC on LTO.
- **Releases from Reservoir with climate change:** you requested numbers showing releases under the 2070 climate scenario. The table below shows estimate releases for Alternative 1B under historic, 2030, and 2070 climate conditions.

	Historic hydrology	2030 climate change (WSIP hydrology)	2070 climate change (WSIP hydrology)
Reservoir releases (TAF, long-term average)	234	253	259

- The diversion criteria table is attached
- Estimated storage and releases for Valley Water at various participations levels based on latest modeling. Please see below. Note that this is a back-of-the envelope estimate and should be considered approximate.

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*Percent diversions received is calculated based on percent active storage allocated to the participant. The active storage in the reservoir is estimated to be 1.44 MAF based on a 60 TAF deadpool .The percent diversions is the storage allocated to the participant divided by the total active storage. **Estimated releases are based on modeled operational assumptions. ***Based on Alternative 3B results (16% federal storage allocation) for the Biological Assessment using 2035 CT climate hydrology				

Please let me know if you have questions on this or if anything else comes up.

Thanks and have a great Memorial Day!

Erin

Erin Heydinger, PE, PMP
Project Manager - Water

HDR
2379 Gateway Oaks Dr, #200
Sacramento, CA 95833
D 916.679.8863 M 651.307.9758

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From: Lori Jones [LJones@BrwnCald.com]
Sent: 4/27/2023 5:57:18 PM
To: Joe Trapasso [jtrapasso@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Project - Services Contract Template for Paskenta Tribe
Attachments: Yocha Dehe Monitoring Agreement fully executed.pdf; SF Agreement_Template Form_Revised_Final.pdf

Ali and Joe:

A copy of the executed Yocha Dehe Tribe Agreement and the Authority Short Form Agreement template are attached.

Thank you,
Lori

Lori Jones, P.E., PMP
Brown and Caldwell | Walnut Creek, CA
LJones@brwncald.com
T 925.210.2272 | C 707.761.4242

From: Joe Trapasso <jtrapasso@sitesproject.org>
Sent: Thursday, April 27, 2023 1:06 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Lori Jones <LJones@BrwnCald.com>
Subject: RE: Sites Project - Services Contract Template for Paskenta Tribe

Ali, The Authority standard long and short forms will likely not work for them based on my experience with the CICC and Yocha Dehe Tribes. The Yocha Dehe Tribe used the CICC Tribes agreement for their agreement. Alan had reviewed both agreements. Good to provide them the short form along with the Yocha Dehe contract. What is the schedule for having an executed agreement in place?

Lori, please email Ali the current short form.

Thanks,

Joe

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, April 27, 2023 11:54 AM
To: Joe Trapasso <jtrapasso@sitesproject.org>; Lori Jones <LJones@BrwnCald.com>
Subject: Sites Project - Services Contract Template for Paskenta Tribe

Hi Joe and Lori – The Paskenta Tribe has expressed an interest in being our Tribal monitor for activities in Glenn County. They would like to contract with the Authority for this effort.

Can you send me our standard services contract template? I am going to send this to them along with the Yocha Dehe contract as an example. Which I realize the Yocha Dehe contract does not follow our template, but I am also nervous that the Tribe may find our template way too onerous and not culturally sensitive. So I want to provide an alternative.

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 |
aforsythe@sitesproject.org | www.SitesProject.org

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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 4/28/2023 8:00:28 AM
To: lbill@paskenta.org
CC: Janis Offermann (Janis@Horizonh2o.com) [janis@horizonh2o.com]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Cohen, Ariel [Ariel.Cohen@hdrinc.com]
Subject: FW: Sites Project - Services Contract Template for Paskenta Tribe
Attachments: Yocha Dehe Monitoring Agreement fully executed.pdf; SF Agreement_Template Form_Revised_Final.pdf

Hi Laverne – It was great to chat last week. I committed to send over the Yocha Dehe monitoring contract along with the Authority's Standard Contract Template for your review and thoughts on how to best contract with Paskenta for monitoring activities in Glenn County. Attached are both of these items. We are flexible and will work with you on whatever template/format is best for the Tribe.

Hope you have a fantastic weekend!

Ali

Alicia Forsythe | Environmental Planning and Permitting Manager | Sites Project Authority | 916.880.0676 | aforsythe@sitesproject.org | www.SitesProject.org

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From: Laverne D. Bill [lbill@paskenta.org]
Sent: 4/28/2023 9:43:53 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Janis Offermann (Janis@Horizonh2o.com) [janis@horizonh2o.com]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Cohen, Ariel [Ariel.Cohen@hdrinc.com]
Subject: RE: Sites Project - Services Contract Template for Paskenta Tribe

Good afternoon, Ali. It was great to talk to everyone about the project and I appreciate you sending over the templates for us to use. I will begin working on this and get back to you next week. Thanks again and have a great weekend.



Laverne Bill, B.S., M.B.A.
Tribal Historic Preservation Officer (THPO)
Paskenta Band of Nomlaki Indians
22580 Olivewood Avenue
Corning, CA 96021
C: (530) 781-6699
P: (530) 670-1746
www.paskenta-nsn.gov

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Friday, April 28, 2023 8:00 AM
To: Laverne D. Bill <lbill@paskenta.org>
Cc: Janis Offermann (Janis@Horizonh2o.com) <janis@horizonh2o.com>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: FW: Sites Project - Services Contract Template for Paskenta Tribe

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Hi Laverne – It was great to chat last week. I committed to send over the Yocha Dehe monitoring contract along with the Authority's Standard Contract Template for your review and thoughts on how to best contract with Paskenta for monitoring activities in Glenn County. Attached are both of these items. We are flexible and will work with you on whatever template/format is best for the Tribe.

Hope you have a fantastic weekend!

Ali

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From: Jerry Brown [jbrown@sitesproject.org]
Sent: 4/28/2023 9:49:58 AM
To: Roger Gwinn [rgwinn@tfgnet.com]; Garrett Durst [garrett@naturalresourcesresults.com]; Kevin Spesert [kspesert@sitesproject.org]
Subject: Sites Leg Visit Follow-ups
Attachments: 5K_Att-3_WRLCM_results_2035_04_10_23[4].pdf; 20230217_Comparison of Diversion Criteria[1][3].docx

Here's the two items requested during our Leg visits:

1. Winter Run Life Cycle Model Report – I confirmed that the tool takes into account all Sites diversion and all Sites releases.
2. Table showing changes in operating criteria from 2017 EIR/EIS to current plans.

Please handle distribution as you see fit.

Jerry

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 4/28/2023 10:05:34 AM
To: Amparo Flores [aflores@brwnclad.com]; Newens, Richard [Richard.Newens@hdrinc.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; Arsenijevic, Jelica [jelica.arsenijevic@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: Colusa Basin Drain Information
Attachments: V1-010-Ch05_Surface_H2O_AdminFinal.docx

Hi Amparo and Richard,

I spoke to Ali and Angel and they were okay with sharing that presentation, I have uploaded it to SharePoint here:

<https://sitesreservoirproject.sharepoint.com/envpermitting/Data%20and%20Background%20Information/Forms/AllItems.aspx?newTargetListUrl=%2Fenvpermitting%2FData%20and%20Background%20Information&viewpath=%2Fenvpermitting%2FData%20and%20Background%20Information%2FForms%2FAllItems%2Easpx&id=%2Fenvpermitting%2FData%20and%20Background%20Information%2FColusa%20BD&viewid=6952b73f%2D7cb0%2D4789%2Dacaf%2Dfa3da2b9440e>

The key planning documents and permits relative to the CBD are:

In Prep

EIR/EIS

Clean Water Act 404 and 401

State Endangered Species Act, Construction and Operations

Federal Endangered Species Act, Construction and Operations

California Lake and Streambed Alteration Agreement (e.g., Section 1600 streambed permit)

Programmatic NHPA Section 106 agreement

Post 60% Design

CVFPB encroachment permit for levee work on non-federal levees (west side of CBD)

If needed, Section 408 permission for work on federal levees (east side of CBD)

I also checked the EIR/S and there was no discussion of flooding along the CBD that would result from the project. Chapter 5 does have some information and I have attached an administrative draft of that section. Please let me know if you have any additional questions.

John

John Spranza, MS, CCN

*Senior Aquatic Ecologist / Regulatory Specialist
Fisheries Section Lead – Northern California
He/Him*

HDR

2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916.679.8858 M 818.640.2487
john.spranza@hdrinc.com

hdrinc.com/follow-us
hdrinc.com/follow-us

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 4/28/2023 10:22:58 AM
To: Spranza, John [john.spranza@hdrinc.com]; Amparo Flores [aflores@brwncald.com]; Newens, Richard [Richard.Newens@hdrinc.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; Arsenijevic, Jelica [jelica.arsenijevic@hdrinc.com]
Subject: RE: Colusa Basin Drain Information

Just for clarification, as presented in the EIR/EIS, it is our understanding that releases to the CBD would be operated to avoid flood:

Using the simulated proposed conditions stage results, Jacobs (2020) identified the periods when WSEs would exceed the critical elevation of 25.3 feet, NAVD 88 at RM 8.9 and computed the quantity and timing of when Sites Reservoir volumes could be conveyed to Sacramento River with a constant flow rate of 1,000 cfs. In brief, the 1,000-cfs Sites Reservoir release could be conveyed without causing WSE effects primarily during April through July and in October. In August and September, the CBD carries high flows resulting from rice field agricultural drainage and often does not have capacity to convey reservoir releases of 1,000 cfs.

CBD Flood Impacts

Sites releases to the CBD would be controlled by operations and would not inundate, as a result of overtopping, seepage, or reverse flows, the existing agricultural fields adjacent to the CBD. No flooding in the CBD area is anticipated as a result of operation of Alternative 1, 2, or 3. Sites releases potentially could be directed to the Yolo Bypass instead of the Sacramento River from August through October.

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Friday, April 28, 2023 10:06 AM
To: Amparo Flores <aflores@brwncald.com>; Newens, Richard <Richard.Newens@hdrinc.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Arsenijevic, Jelica <jelica.arsenijevic@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
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I also checked the EIR/S and there was no discussion of flooding along the CBD that would result from the project.

Chapter 5 does have some information and I have attached an administrative draft of that section.

Please let me know if you have any additional questions.

John

John Spranza, MS, CCN

Senior Aquatic Ecologist / Regulatory Specialist

Fisheries Section Lead — Northern California

He/Him

HDR

2379 Gateway Oaks Drive, Suite 200

Sacramento, CA 95833

D 916.679.8858 M 818.640.2487

john.spranza@hdrinc.com

hdrinc.com/follow-us

hdrinc.com/follow-us

From: Newens, Richard [Richard.Newens@hdrinc.com]
Sent: 4/28/2023 10:49:24 AM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Spranza, John [john.spranza@hdrinc.com]; Amparo Flores [aflores@brwnald.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; Arsenijevic, Jelica [jelica.arsenijevic@hdrinc.com]
Subject: RE: Colusa Basin Drain Information

Thanks John and Laurie. We'll incorporate these information into the assessment accordingly and reach out with any follow up questions.

Richard Newens
D 916.679.8883 M 916.719.7800

hdrinc.com/follow-us

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Friday, April 28, 2023 10:23 AM
To: Spranza, John <John.Spranza@hdrinc.com>; Amparo Flores <aflores@brwnald.com>; Newens, Richard <Richard.Newens@hdrinc.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Arsenijevic, Jelica <jelica.arsenijevic@hdrinc.com>
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John

John Spranza, MS, CCN

Senior Aquatic Ecologist / Regulatory Specialist

Fisheries Section Lead – Northern California

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2379 Gateway Oaks Drive, Suite 200

Sacramento, CA 95833

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john.spranza@hdrinc.com

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Sites Project Community Working Group Meeting Highlights



*Our Core Values – Safety, Trust and Integrity, Respect for Local Communities, Environmental Stewardship, Shared Responsibility and Shared Benefits, Accountability and Transparency, Proactive Innovation, Diversity, and Inclusivity
Our Commitment – To live up to these values in everything we do*

Meeting Information:

Date:	March 23, 2023	Location:	122 Old Hwy 99W, Maxwell
Start Time:	2:30 p.m.	Finish Time:	4:30 p.m.
Purpose:	Community Working Group		

Meeting Participants:

Jennifer Diaz – Colusa County Chamber of Commerce	Gary Evans – Supervisor, Colusa County
Maria Gomez de Ramirez – Colusa County Chamber of Commerce	Jim Yoder – Glenn County Board of Supervisors
Summer Shadley – Maxwell Unified School District8	Juleah Cordi –Assemblymember Gallagher
Mike Bradwell – Colusa County Sheriff’s Department	Rita Durgan – Assemblymember Aguiar-Curry
Joyce Bond – Stonyford Museum	Evan Cragin – Assemblymember Aguiar-Curry
Carline Stanton – Stonyford Museum	Mike Azevedo – Colusa County Public Works
Kenny Cohen – Maxwell Fire Department	Jerry Brown – Sites Project Authority
Randal Toews – Kanawha Glenn Fire District	Ali Forsythe – Sites Project Authority
Anastacia Allen – Colusa County Agriculture	JP Robinette – Sites Project Authority
Wendy Tyler – Colusa County	Kevin Spesert – Sites Project Authority
Nadine Bailey – Family Water Alliance	Sandra Yarbrough – Sites Project Authority
Justin Gibbs – Glenn County Sheriff’s Department	Conner McDonald – CMD West
Chuck Dudley – Yolo County Farm Bureau	Henry Luu – HDR
Barry Corbin – Glenn County Sheriff’s Department	Jelica Arsenjijevic – HDR
Rob Timm – Sour Robs	Jeriann Alexander – Fugro
Tish Nerli – Maxwell Parks & Recreation District	Sara Katz – Katz & Associates
Michael West – Colusa County Office of Education	Sarah Rossetto – Katz & Associates
Kurt Chambers – Maxwell Public Utility District	

Welcome & Introductions

Sara Katz (meeting facilitator) welcomed attendees to the third meeting of the Sites Project Authority's Community Working Group. Meeting attendees introduced themselves and the organizations they represent. It was noted that new members will be provided with binders of all meeting materials to date at the next meeting on May 18, 2023.

Sites Reservoir Project Update

Sites Project Authority Executive Director Jerry Brown provided an update on the Sites Reservoir Project with an emphasis on project progress since the group last met.

- Based upon a recent analysis, Mr. Brown reported that 250,000 acre-feet of water could have been captured from the January 2023 storms and another 250,000 acre-feet of water could have been captured from the February 2023 storms. From a water management perspective, this is meaningful information to support the purpose of Sites Reservoir. While the status of the snowpack in the Sierra Nevada mountains does not affect Sites the same way as rain conditions, the 2023 storms have been record-setting.
- The Water Infrastructure Financing and Innovation Act (WIFIA) application will be submitted by the end of March 2023 to the Environmental Protection Agency. If approved, the \$2.2 billion loan will cover roughly 75% of the project cost. Credit agencies have determined that the Sites Project Authority's credit rating is sufficient for the application and the Authority is well-qualified. The application process is expected to take approximately one year.
- It's expected that the final environmental document will be available in June 2023 with the Board reviewing the document this summer. Revisions to the draft document are incorporated to address concerns raised and respond to comments received. The conclusion of the CEQA process will allow for the continuance of the project permitting.
- The Authority provided supplemental information to the State Water Quality Control Board for the water right application. While the notice for public review will likely occur in April 2023, it is unknown whether the permitting process will be completed in 2024.
- The Authority is talking to the County of Colusa about the Comprehensive Economic Development Strategy (CEDS) analysis and the possibility of a bolt-on analysis of Sites effects as part of the ongoing CEDS efforts and funding streams. There will be two components of funding: 1) Permanent area like an in-lieu property tax, and 2) Construction related sales tax. This is a suggested topic for a future meeting.

Comment: There is a survey on the County of Colusa website for the CEDS process related to infrastructure, housing, jobs, etc. ([[HYPERLINK "http://www.colusacountyceds.com"](http://www.colusacountyceds.com)]). There are also similar processes ongoing for Glenn County and Yolo County.

Part II: Current Engineering Design/Construction Considerations (What does 'good' look like?)

JP Robinette, the Authority Engineering and Construction Manager, led the continued discussion for engineering design and construction. The design of the project is at approximately 10 percent, with some aspects having more certainty than others at this point. Contractor involvement will start in 2025 and will revolve around how material will be moved around the valley (including truck traffic, housing, etc.). From 2023 to 2026, material sources, such as aggregates, will be determined. The geotechnical work underway now is supporting the planning for and evaluation of material sources. The Sites Project Authority wants to understand how the project may affect what it's like to live and work in the valley, and what opportunities may exist to improve the project.

Some ideas will have trade-offs, but strategies discussed during the second meeting included:

- Implement contract incentives for desired behavior
- Install facilities for safe foot traffic
- Restore and/or improve roads used for construction and operations
- Minimize commute times for local community, school and buses during construction
- Create sustainable interest in recreational facilities
- Prohibit heavy truck traffic along Oak Street
- Encourage construction workers to patronize local businesses
- Identify synergies between recreation facilities and housing
- Consider issues related to no availability of local housing for additional workers
- Leverage Sites investment for local benefits
- Establish agreements to allow flexibility and changes for future operations to ensure benefits keep flowing through to the community
- Expand broadband throughout community when installing it for project construction/operations
- Coordinate with agriculture traffic during harvest
- Talk to other communities about lessons learned from disaster cleanup camps (local examples will be necessary)
- Consider commuter impacts at origin

Mr. Robinette encouraged the group to focus on answering the following questions:

1. What does “good” look like as it relates to mitigating impacts from construction and operations?
2. How can local businesses and residents benefit from the project during construction? How about during operations?
3. How will Sites impact your organization’s responsibilities during construction? How about during operations?
4. What are some mutually beneficial projects or “shared purposes” between Sites and your organization or group?

Questions (“Q&A”) and comments (“C”) included:

C: Internet is critical to keeping people in Maxwell. Maxwell also needs larger buildings to hold community events and meetings. Perhaps the community facilities can be upgraded as part of the project.

Q: Where will these people be housed? The Sheriff’s office is short-staffed, and the project could result in more traffic to bars and restaurants depending u[on where they will be staying. The Sheriff’s office and police department will need to adjust once they know where workers will stay.

A: It has been a combination of temporary and permanent housing. Based on early contractor outreach, there is interest in commutes of up to 1.5 hours. Surprisingly, Sites Reservoir will not even be one of the most remote projects for the types of contractors pursuing these projects. This is close enough to Sacramento and Woodland, Marysville and Yuba City, and even further north.

Q: What is the peak number of workers?

A: It’s estimated that the workforce will peak for two to three years at about 600-800 workers. This is largely made up of operators, engineers and laborers. It doesn’t seem like there is infrastructure, such as water and sewer, to support that workforce in Maxwell. There is a real opportunity around Maxwell for workforce development.

- C:** There is a stagnant population hovering around 22,000 for the last 30 to 40 years. The opportunities for apprenticeships and internships would be great for the community to help train young people.
- C:** For the PG&E plant project previously, the school district did not receive additional funding. The state contribution to local schools is offset by the funds provided by a project owner, so the school district did not see the benefit. If the funding does not run through the County, then it could be directly given to the school district. The primary way the state would provide more funding is based on community growth.
- C:** Infrastructure or local enhancements at the school district (like a gym) would benefit the community as well if it's owned by the community instead of the school district.
- Q:** Would the construction workforce contribute to the numbers for the school district and for how long? Can you approach the contractors to discuss community investment early?
- A:** We want to proceed with an affordable and permittable project, with an acknowledgement of the sacrifice by the local community. With Proposition 1 funding, a Project Labor Agreement will include requirements of the contractors.
- Q:** Will the main contractor also be responsible for the sidewalks and crosswalks?
- A:** Yes. Construction traffic will not be allowed on Oak Street and on side streets in Maxwell. We are looking into ways this can be enforced with contractors, with the emphasis of safety for children near the schools. At the last meeting, an idea was suggested for an alternative route to keep the heavy truck traffic away from Oak Street. The Authority is looking into alternative truck routes with the County and the local landowner that would potentially be affected.

Brainstorming Session: Recreation

Ali Forsythe, the Authority Environmental and Permitting Manager, gave an update on the recreational aspects proposed as part of the Proposition 1 application:

- The Proposition 1 application includes a combination of water-based and land-based recreation, with three recreation areas made up of two campgrounds, picnic sites, hiking trails and a boat launch.
- The recreational components, including the two campgrounds, could be built in a phased approach to meet interest levels.
- The application included an estimate of 187,000 user days per year. The Authority is seeking input on the recreational facilities.
- As per the environmental document, there will be methylmercury considerations with the first 10 years of reservoir filling, so there will not be fish stocking in that period.
- Long term, there are possible mercury concentrations in fish over the state human consumption advisory limit, which would require signage advising against eating fish caught especially for sensitive individuals. These are similar concerns at many of the reservoirs in the state.
- Harmful algal blooms are possible in areas around the reservoir and tend to occur in warm, nutrient rich water. If this occurs, the area would be closed and water-based recreation would be limited.
- In addition, invasive species, including invasive mussels, are problematic for water operations, so boat inspections will be mandatory at Sites Reservoir.
- The Authority is looking for input to be used in a plan to be submitted to the Department of Water Resources once the water right is issued. The Authority knows there is more evaluation needed for the numbers and components included in the Proposition 1 application.

Questions (“Q&A”) and comments (“C”) included:

- Q:** Is the 10-year period of no fish stocking a strict timeframe if monitoring shows that there are no methylmercury concerns?
- A:** There will be a low probability of catch because fish will be so limited when the reservoir is first filled, so regular testing will be difficult in the first 10 years.
- C:** There is a big difference in how much the Proposition 1 funding would have supported when the application was put in versus what it will build today.
- Q:** How do you plan to enforce boat inspections?
- A:** The Authority still needs to evaluate and determine the enforcement of boat inspections. The user days will need to be counted for Proposition 1 funding purposes, which will require a staffed station that could also be used for boat inspections.
- C:** The number of users who visit Stonyford has become more manageable since it became a paid use area.
- C:** There is a recreation area at the East Park Reservoir Dam, but the road needs repair due to recreation traffic. Please consider the road condition after construction but with use by recreators. East Park Reservoir Dam was built 1908 to 1910. The Stonyford Dam was built in the 1920s. There are photos and more history available at the museum.
- C:** Local law enforcement has vehicles, boats, and WaveRunners stored in Willows, and it would improve response times if a storage area was available at Sites Reservoir.
- Q:** How will law enforcement respond when the reservoir includes multiple counties?
- A:** If law enforcement sees a violation on the water, they will have the ability to enforce it. It is a shared responsibility, and the Department of Boating and Water Ways also has enforcement capability.
- C:** There is a need for a cell tower out at the reservoir for safety, security and recreation purposes.
- Q:** When do decisions need to be made around recreation?
- A:** Decisions about recreation will need to be made before the Proposition 1 funding is issued, and a plan will be due to the state around the time that the water right is issued.

Overview of Geotechnical Field Activities

Jelica Arsenijevic with HDR (engineering consultants) provided an overview of the status of geotechnical activities.

- The program includes surface geologic investigations and subsurface geotechnical investigations necessary to support the engineering, design development and project cost estimate. While activities have been slowed by bad weather, they’re on track and will be ongoing through 2024. These include:
 - o Geologic mapping, which is conducted via pedestrian (on foot) surveys with handheld tools to get an increased understanding of topographic features of the ground surface
 - o Soil borings implemented with drill rigs and sometimes multiple passes with various probes and sensors
 - o Test pits to help in identifying the trenching capacity
 - o Fault studies to identify location and stratigraphy of suspected and known faults
 - o Well installation to monitor water level fluctuations and groundwater conditions
- Compliance is critical for the geotechnical studies, including the mitigation measures in CEQA and NEPA, permit compliance and community considerations (such as school buses, cattle transport and agricultural operations). The team has responded to landowner and traffic circumstances and is committed to being a good neighbor.

- The Authority welcomes opportunities to speak to local students about the geotechnical studies. There could also be opportunities for youth to see the work occurring in the field.

Sara Katz announced that the next meeting will be held from 2:30-4:30 p.m., on May 18, at the Sites Project Authority Office. She adjourned the meeting at 4:30 p.m.

Other Discussion/Public Comment

Financing including Local Component

Road Connections

Workforce Development – Apprenticeship Program

Housing

Recreation

Construction Scheduling – Ag Impacts

Future Meetings

- May 18, 2023
- July 20, 2023
- September 21, 2023
- November 16, 2023

From: Marcus Maltby [mmaltby@BrwnCald.com]
Sent: 4/30/2023 1:39:02 PM
To: jelica.arsenijevic [jelica.arsenijevic@hdrinc.com]; David Hubbard [Dhubbard@BrwnCald.com]
CC: Luu, Henry [henry.luu@hdrinc.com]; Spranza, John [john.spranza@hdrinc.com]; laurie.warner.herson [laurie.warner.herson@phenixenv.com]; conner [conner@cmdwest.com]; Risse, Danielle [danielle.risse@hdrinc.com]; JP Robinette [jrobinette@sitesproject.org]
Subject: RE: Sites: Early Work Schedule Assumptions Memo

Hi Jelica –

Sorry for the delay in response. Just getting caught up on some emails from last week. Dave has compiled the assumptions that he has received and what was provided to AECOM in the early stages of the schedule. A link to those assumptions is provided below. Dave had mentioned he may have a few other assumptions stored elsewhere that he plans to add to the folder over the next day or two. As far as a memo or a more formalized documentation of our assumptions, we will likely hold off on that until we've settled in on what our baseline will look like.

Schedule Basis Data

Regarding the plan for the schedule, this remains mostly the same as the last update. We are still in the process of fine tuning the schedule with the Agents. The last discussion focused in on breaking out the roads packages and solidifying our reservoir footprint which Henry can speak to in detail if you're interested. I plan to have another follow up with the Agents relatively soon to share our progress and test the comfort level with our latest iteration being put up for adoption as our project baseline along with the level of detail in the summary schedule.

Once the baseline schedule is adopted by the Board, Dave will coordinate monthly updates similar to what he is doing for our Amendment 3 schedule now. Both the A3 schedule and construction schedule are actually built in the same file so really we'll just be expanding the window that we update.

@David Hubbard – Could you please respond to this email with a link to the full construction schedule with predecessors and successors shown? I also encourage everyone on this email to pick up the phone and discuss any specific schedule related questions with Dave. He would be happy to walk anyone through our existing logic and is always looking for input to help improve our schedule.

Also including JP on this email.

Thanks,

Marcus Maltby, PE*

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From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Wednesday, April 26, 2023 9:49 AM
To: Marcus Maltby <mmaltby@BrwnCald.com>
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Subject: Sites: Early Work Schedule Assumptions Memo

Importance: High

Marcus

As part of the large effort involved in providing input to the early works schedule, lots of assumptions went into . Those assumptions were shared via email, and as notes in the various reiterations in excel schedules. We were given direction by agents that an assumptions memo be prepared to document all the “assumptions” that went into this effort.

What is status of that memo? We have not seen it and we need the memo soon as new information is coming out as design progresses forward. Hoping the integration team can review the memo, as I’m assuming the reviewed memo will accompany the early works schedule being rolled out in June.

Also, what is the plan to revisit the really works schedule before it gets rolled out to the board in June?

Thanks in advance.

Jelica Arsenijevic
Environmental Project Manager



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