Meeting:	**Sites Reservoir Committee's Environmental Planning and Permitting Workgroup**
Locations:	Maxwell Project Office, 122 Old Highway 99W, Maxwell, CA 95955 See below for alternate meeting locations.

Call in: **1-916-538-7066** Code: **209 737 511#** Click here to join the meeting

Workgroup Chair: Heather Dyer (SBVMWD)

Staff Lead: Ali Forsythe, Environmental Planning and Permitting Manager

AGENDA

Wednesday, May 10, 2023; 10:00 – 11:00 am

NO ACTION or DECISION WILL BE TAKEN

ROLL CALL & CALL TO ORDER:

- Introductions
- Period for Public Comment

Any person may speak about any subject of concern, provided it is within the workgroup's jurisdiction and a public comment card is submitted. The time allotted for receiving such public communication shall be limited to 3 minutes per person.

1. Discussion and Information Items:

1.1 Review and comment on the Final EIR/EIS, Part 3 (continued) status briefing in preparation for approval of the Project.

1.2 Review and comment on the Executive Director entering into a reimbursable agreement with the National Marine Fisheries Service.

2. Environmental Planning and Permitting Manager's Report:

- Key Planning and Permitting Activities Report

3. Upcoming Meetings:

Joint Reservoir Committee and Authority Board
Friday, May 19, 2023 - 9:00 am to noon

Environmental Planning and Permitting Workgroup
Wednesday, June 7, 2023 - 10:00 to 11:00 AM

Virtual Information will be provided before all meetings at 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 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.

Alternate Meeting Locations:

Glenn-Colusa Irrigation District, 344 East Laurel St, Willows, CA 95988

San Bernardino Valley Municipal WD, 380 E. Vanderbilt Way, San Bernardino, CA 92408

Coachella Valley Water District, 51501 Tyler Street, Coachella CA 92236

Reclamation District 108, 975 Wilson Bend Rd., Grimes, CA 95950

Wheeler Ridge-Maricopa Water Storage District, 12109 Hwy 166, Bakersfield, CA 93313

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From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 3/1/2023 8:56:23 AM
To: Spranza, John [John.Spranza@hdrinc.com]; steve.micko@jacobs.com; Angela Bezzone [bezzone@mbkengineers.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Greenwood, Marin [Marin.Greenwood@icf.com]; Hassrick, Jason (Jason.Hassrick@icf.com) [jason.hassrick@icf.com]; Wilder, Rick [Rick.Wilder@icf.com]; Hendrick, Mike [mike.hendrick@icf.com]; Pitts, Adrian [Adrian.Pitts@icf.com]; Clabaugh, Anna [Anna.Clabaugh@hdrinc.com]
CC: Briard, Monique (Monique.Briard@icfi.com) [Monique.Briard@icfi.com]; Leaf, Rob/SAC (Rob.Leaf@jacobs.com) [rob.leaf@jacobs.com]; Lecky, Jim [jim.lecky@icf.com]

Subject: Isolation of Site's Effects for CDFW and New Daily Tool Discussion
Attachments: Sites Project - Operations ITP, Reclamation Investment and Exchange Information
Location: Microsoft Teams Meeting

Start: 3/13/2023 10:00:00 AM
End: 3/13/2023 11:30:00 AM
Show Time As: Busy

Recurrence: (none)

This meeting will have 2 parts. The first is to discuss the sensitivity run that isolates Sites effects from that of Reclamation (see attached). The second half(ish) will be a discussion of the new daily tool Steve rolled out a few weeks back, its applicability to Project operational effects, and if it, or the previous daily model should be the model used going forward.

Microsoft Teams meeting

Join on your computer, mobile app or room device
Click here to join the meeting

Meeting ID: 237 351 540 57
Passcode: ZPZhrM
Download Teams | Join on the web

Or call in (audio only)
+1 213-514-6883,,727343982# United States, Los Angeles
(833) 255-2803,,727343982# United States (Toll-free)
Phone Conference ID: 727 343 982#
Find a local number | Reset PIN

Learn More | Meeting options

From: Alicia Forsythe[aforsythe@sitesproject.org]

Sent: Fri 2/17/2023 9:40:28 AM (UTC-08:00)

To: Davis-Fadtke, Kristal@Wildlife[kristal.davis-fadtke@wildlife.ca.gov]; Uttley, Paige@Wildlife[Paige.Uttley@wildlife.ca.gov]; Williams, Jonathan@Wildlife[jonathan.williams@wildlife.ca.gov]; steve.micko@jacobs.com[steve.micko@jacobs.com]; Angela Bezzone[bezzone@mbkengineers.com]; Spranza, John[john.spranza@hdrinc.com]; Pitts, Adrian[Adrian.Pitts@icf.com]; Greenwood, Marin[Marin.Greenwood@icf.com]; Hassrick, Jason (Jason.Hassrick@icf.com)[jason.hassrick@icf.com]; Wilder, Rick[Rick.Wilder@icf.com]; Lecky, Jim[jim.lecky@icf.com]; Moderan, Julien[Julien.Moderan@icf.com]; Clabaugh, Anna[Anna.Clabaugh@hdrinc.com]; Briard, Monique (Monique.Briard@icfi.com)[Monique.Briard@icfi.com]

Subject: Sites Project - Operations ITP, Reclamation Investment and Exchange Information

Attachment: NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__2035CT_NAA_041222_2035CT_ALT3A_041122_2035CT_ALT3B_041122_2035CT_ALT1A_062222_2035CT_ALT1A_062222_NoShaE.xlsm

Attachment: Sites_ITP_ShastaOrovilleExchangeCriteria_rev02_20230213.docx

Attachment: Sites_OrovilleExchangeVolumeTimeseries_20230208__ALT3A_041122_2035CT_ALT3B_041122_2035CT.xlsx

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 all – I wanted to follow up on a few items around the Sites Project CESA Operations ITP application.

Below and attached are follow up on a few items:

1. Summary of Shasta and Oroville Exchange Modeling Parameters and why they are important – The attached Word document (Sites_ITP_ShastaOrovilleExchangeCriteria_rev02_20230213.docx) is a draft of Oroville exchange criteria descriptions on page 1 and Shasta exchange criteria descriptions on page 2.

2. Oroville Exchange Volumes by month by year – The attached Excel spreadsheet contains Oroville exchange volume timeseries data for Alt 3A (in column B) and Alt 3B (in column C).

3. Following-up on the CalSim II sensitivity (Alt 1A without Shasta exchanges at 2035CT).

A trend report with the following CalSim II results is attached:

- 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
    - Sensitivity analysis
    - 1.5 MAF Sites Reservoir
    - No Reclamation investment
    - Includes Shasta exchanges
- ALT 1A 062222 noShaEXCH 2035CT
    - Sensitivity analysis
    - 1.5 MAF Sites Reservoir
    - No Reclamation investment
    - No Shasta exchanges

I've highlighted two: First - Alt 1A 06222 2035 CT as this in the new run – WITH exchanges but NO Reclamation investment. I think this is the run that we are looking forward to isolate the project, including exchanges but Without Reclamation investment. Second – Alt 1A 062222 noShaEXCH 2035CT as this in the new run – with NO exchanges but NO Reclamation investment. These two runs are new and help us "piece apart" the different components of the Project. The other runs are provided in the sheet for comparative purposes.

I thought I would give folks some time to review all of this material and coordinate internally. Below is a doodle poll to schedule a group call about 2 to 3 weeks out. Please complete the poll ASAP and we will get a meeting scheduled to continue the dialogue.

https://doodle.com/meeting/participate/id/e36xM2Od

Thanks all!

Ali

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

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Oroville Exchange Criteria

	Modeled Criteria	Notes
Exchange Period	June – July	Estimating volume of exchange water before June poses risk of losing Sites water to spill; Per Green Sturgeon requirements, Sites may not decrease Feather River flows in August
Exchange Constraints		
Water year types	Below Normal, Dry and Critically Dry water years	Sites deliveries are minimal in Wet and Above Normal water years. Thus, Oroville exchange not necessary in Wet and Above Normal water years
Exchange Volume		Limited to minimize potential for spills of Sites water from Oroville
Release Period	August – November	Release period considers the remainder of the transfer window (July through November).
Release Constraints		
Delta Export Capacity	Limited based on conveyance capacity at Feather River, conveyance capacity at Sacramento River, Delta regulatory requirements, and Banks Pumping Plant capacity.	Not an explicit constraint; model accounts for mass balance.
Maximum Feather River Flow	Oct: 4,000 cfs Nov: 2,250 cfs	Releases of exchanged water shall not result in an exceedance of the Maximum Feather River Flow. Maximum flows are based on Feather River fall stability flow requirements. October average flow of 4,000 cfs assumes flow requirement of 2,500 cfs for the 16th through 31st. November average of 2,250 cfs to protect fall stability flow requirement for the entire month of November.

Shasta Exchange Criteria

	Modeled Criteria	Notes
Exchange Period	April - June	By April, forecasts for water year type, temperature management tier, and Sites release volumes are fairly certain. Preserve water before the critical months of the cold water pool management season (August and September).
Exchange Constraints		
Water year types	Dry and Critically Dry water years	Selected to focus on challenging years for temperature management. During these years, exchanges are able to reduce early life stage temperature dependent mortality (TDM) of winter run Chinook salmon (WRCS). Sites releases are highest in Dry and Critically Dry years. With an increased release volume, the volume of a Sites-Shasta exchange may increase. Through review of modeled results, reduction in TDM of early life stage WRCS corresponds with larger Shasta exchanges.
Temperature Management Tier	Tier 3 and 4 years	Selected to focus on challenging years for temperature management. During these years, exchanges are able to reduce early life stage TDM of WRCS. In terms of TDM, conditions at Shasta are most adverse during Tier 3 and Tier 4 years. During these years, a Sites-Shasta exchange may preserve cold water pool for targeted use during the critical months of the temperature management period and reduce TDM.
Sacramento Valley Conditions	Only during Balanced conditions	Operational constraint for mass balance accounting.
Release Period	Aug – Nov	Releases are prioritized in August through October. August and September are critical months of the temperature management period. In the months of October and November, some early life stage WRCS remain in the upper Sacramento River. Maintaining temperature conditions through all of these months are critical for reducing TDM of early life stage WRCS.
Release Constraints		
Maximum volume	Limited to Banks Pumping Plant Capacity	Not an explicit constraint; model accounts for mass balance.

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CONSTRUCTION ACCESS AND SITES LODOGA ROADS

DESIGN PROGRESS WORKSHOP

MARCH 1, 2023

Sites

Objectives

- Protect public safety – avoid, minimize, manage commingling of public with construction traffic
- Provide public and landowner access
- Provide efficient access to construction sites to expedite the completion of construction

Sites

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Types of Access Needed

- Provisions for local traffic currently using existing roads during construction
  - Peterson Road
  - Sites Lodoga Road/Maxwell-Sites Road
  - Road 69, D, 68, Delevan, McDermott,
- Access for property owners during construction
- Access for construction equipment
- New/repaired public roads at the conclusion of construction
- New maintenance roads

Sites

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HR Contract Scope of Work

Roads included in this presentation

- Road 68
- Road D
- Road 69 (not North Access Road)
- Delevan Road
- McDermott Road
- Maxwell-Sites Road (west of McDermott)
- Sites Lodoga Road Realignment
- Dirks Road Concept Alignment

Not included in this presentation

- Maxwell Sites Road (east of McDermott)
- Sutton Road
- Wadleigh Road
- Old Highway 99

Sites

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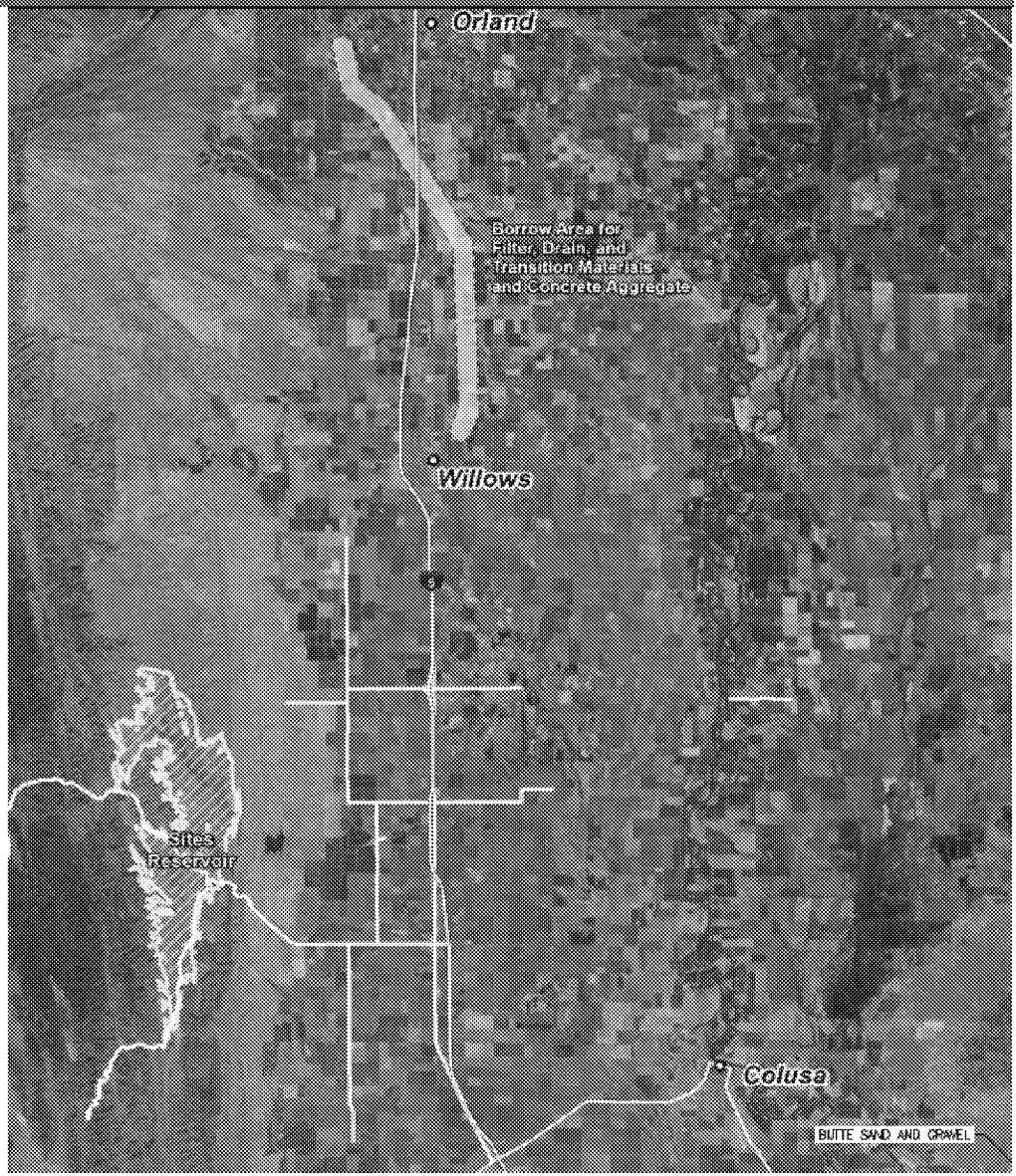
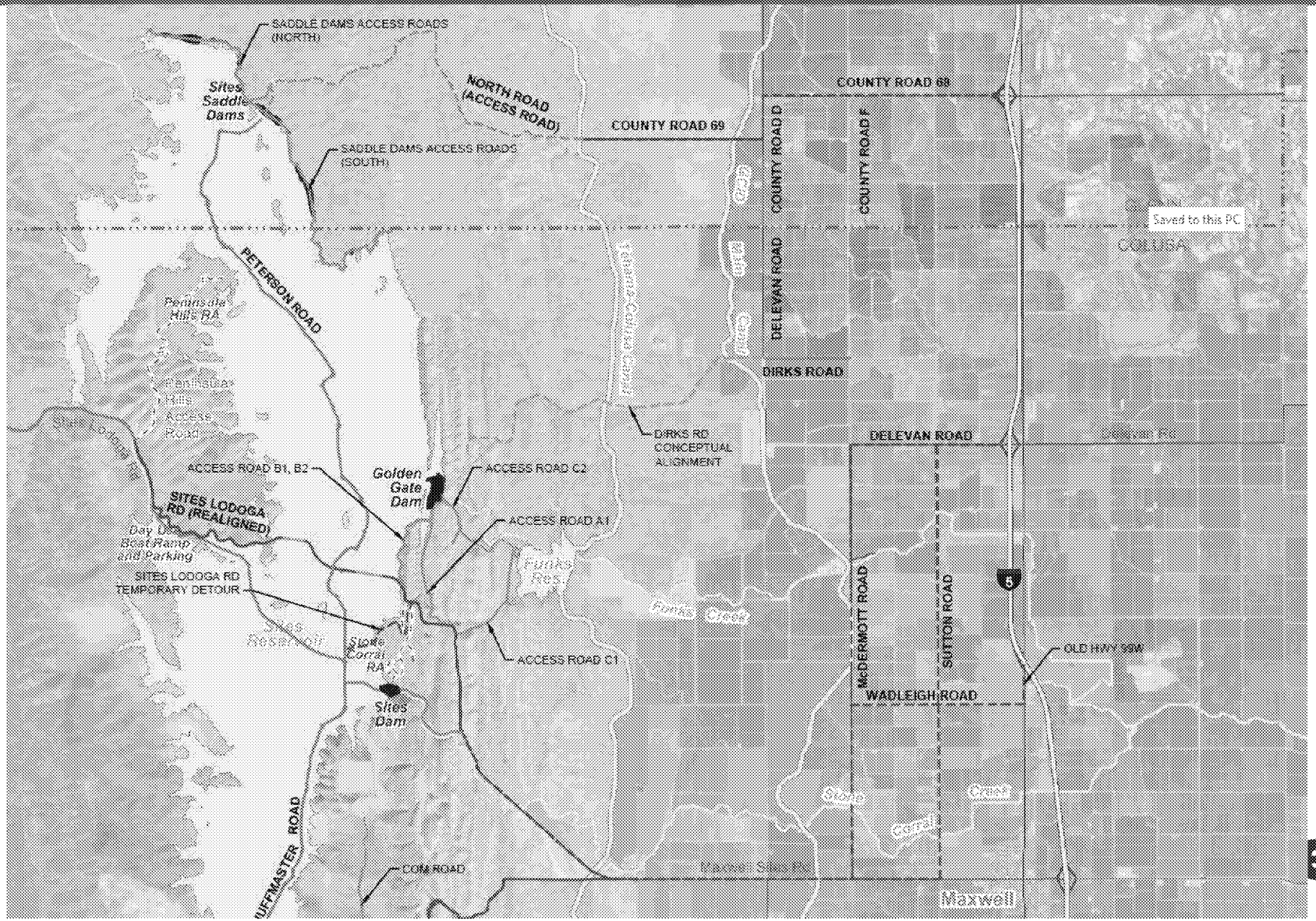
Challenge for HR – Truck Trips

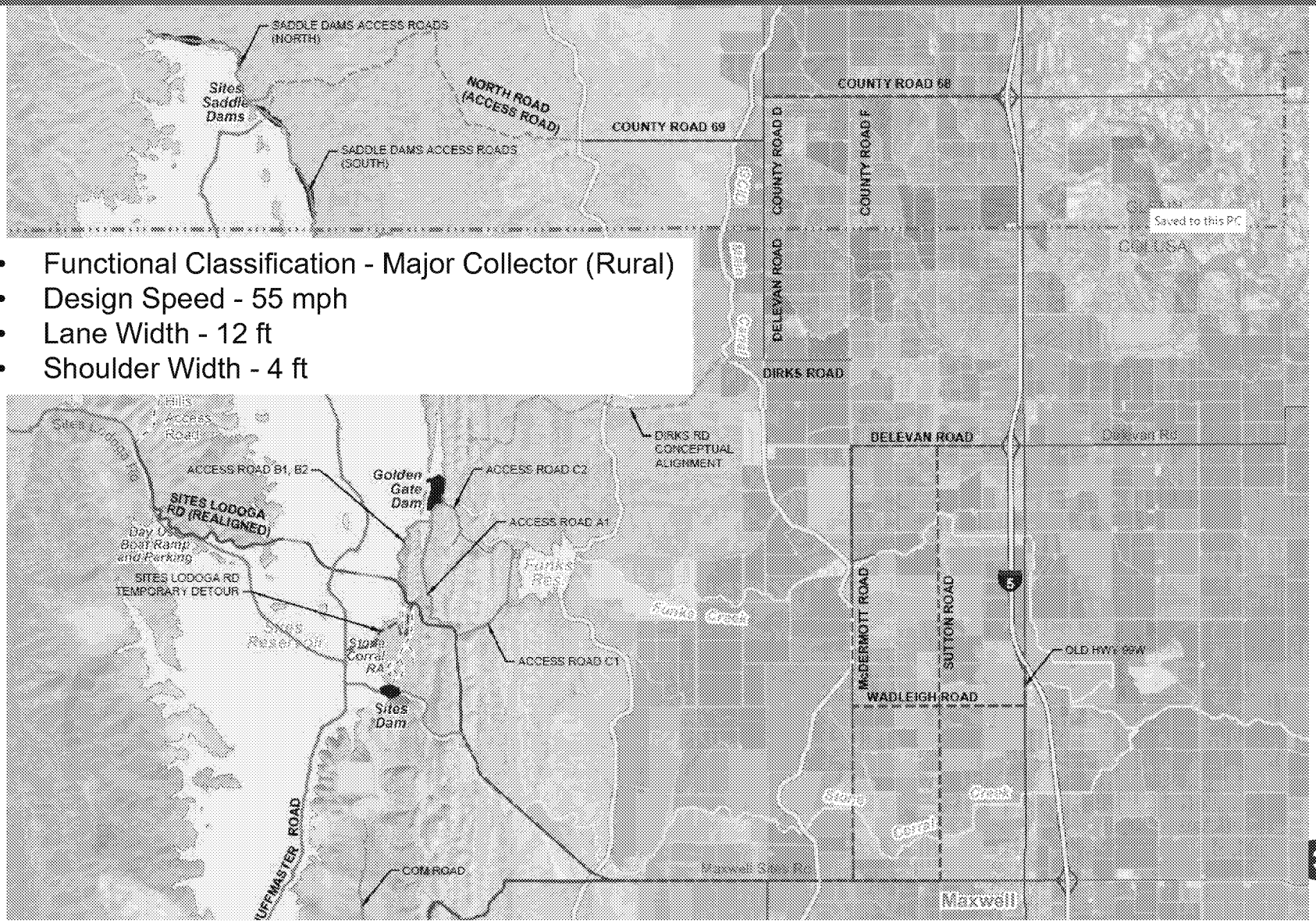
- Minimize trips
- Plan for appropriate routes



Construction Route Overview

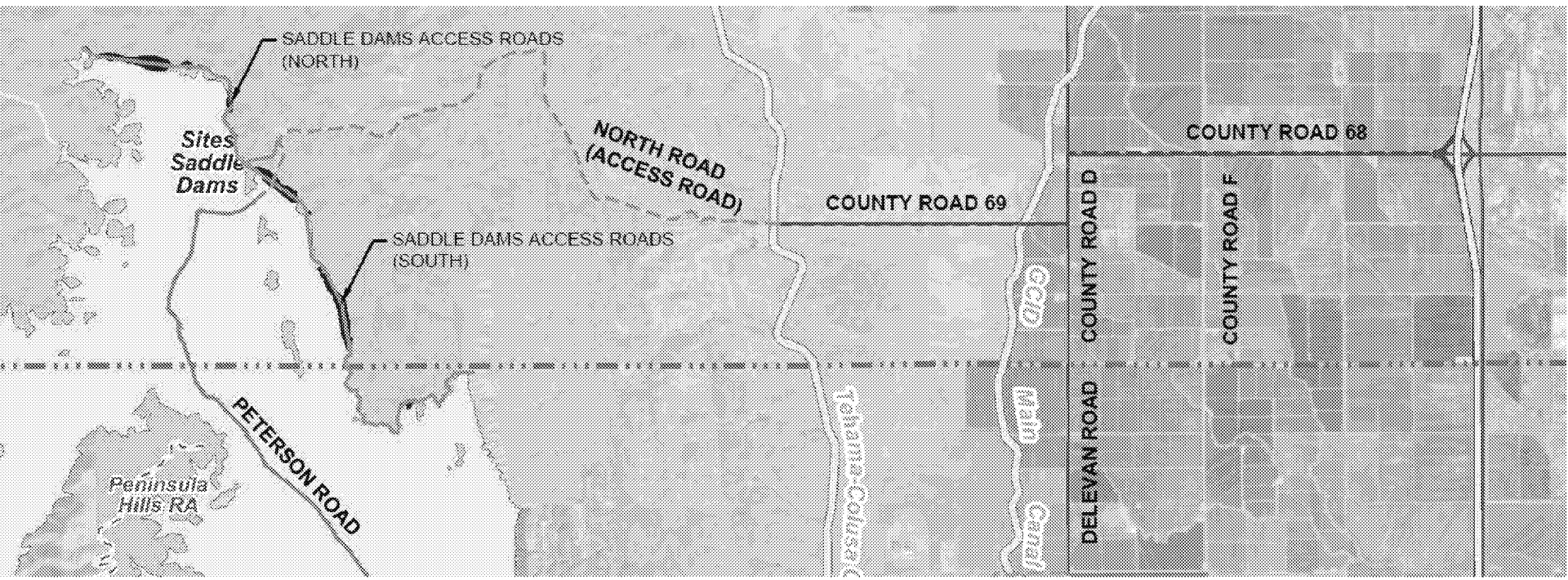


Valley Floor Roads



- Functional Classification - Major Collector (Rural)
- Design Speed - 55 mph
- Lane Width - 12 ft
- Shoulder Width - 4 ft

Northern Route Construction Access



Sites

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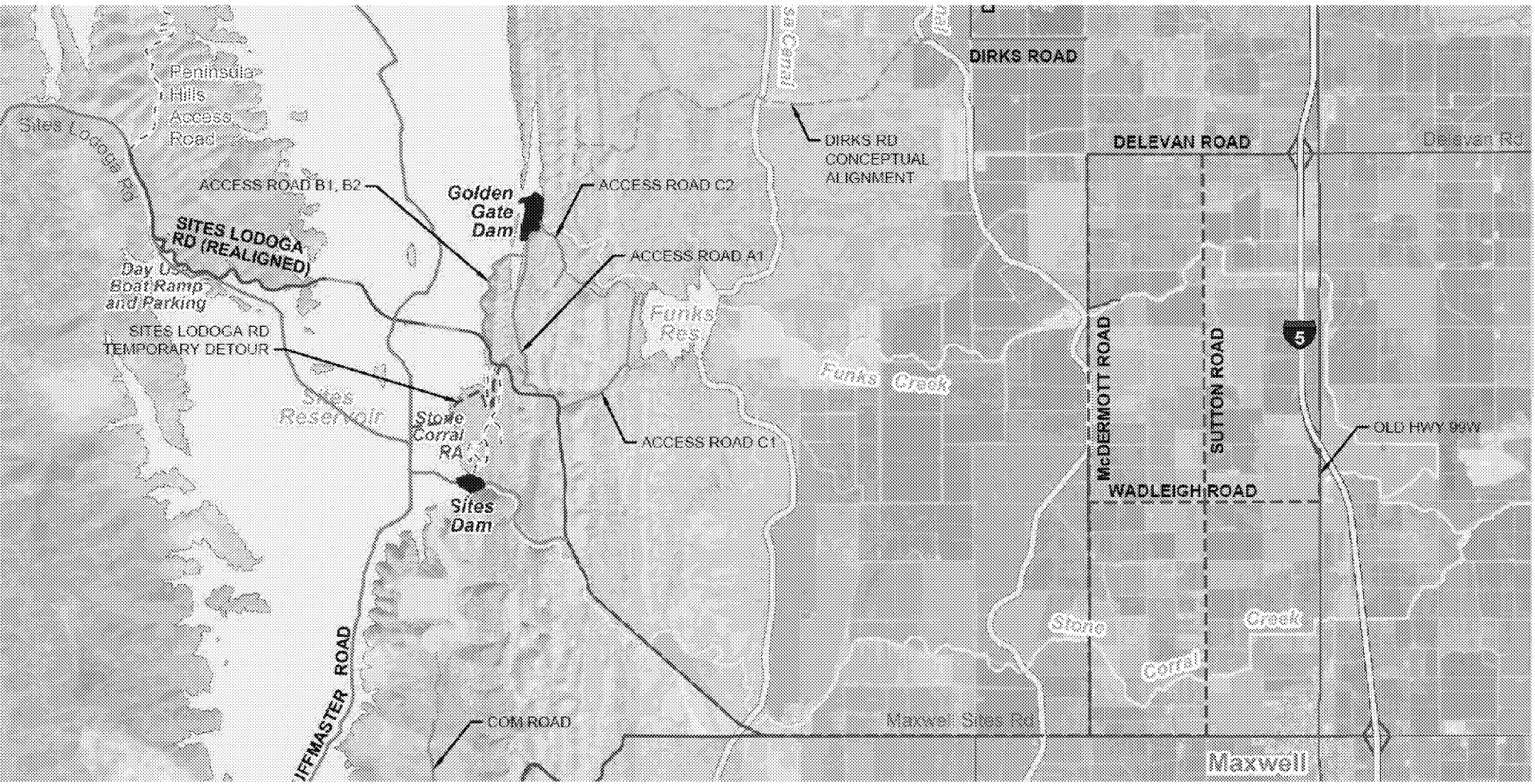
Southern Route Construction Access



Sites

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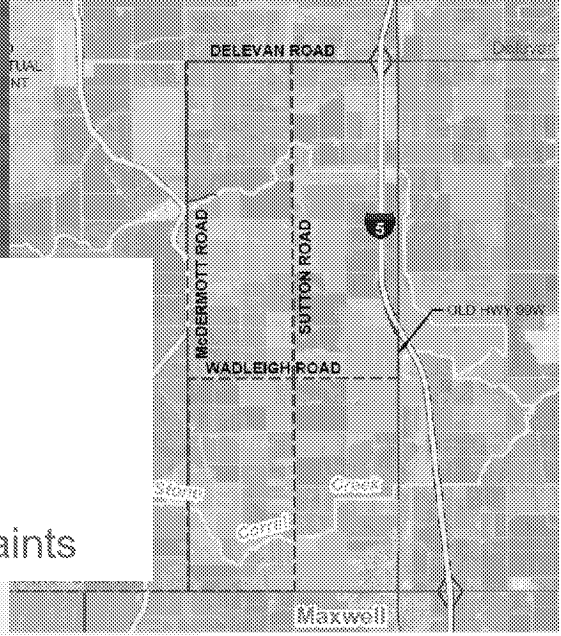
McDermott Road

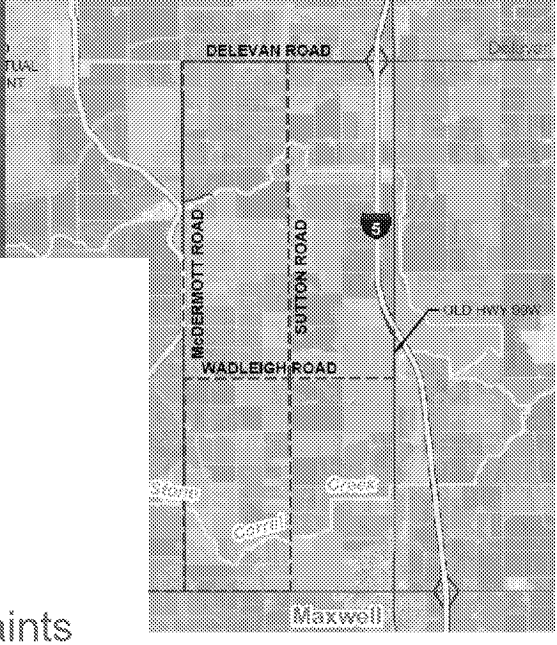
- Existing 30/35 mph curves
- Exist Lane Widths 10+ ft
- Utility pole conflict
- Exist property / Canal constraints



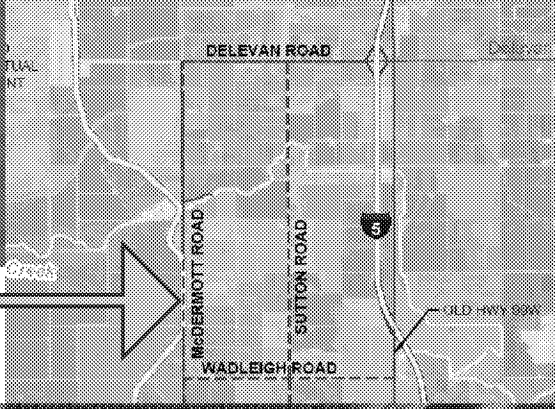
Sites

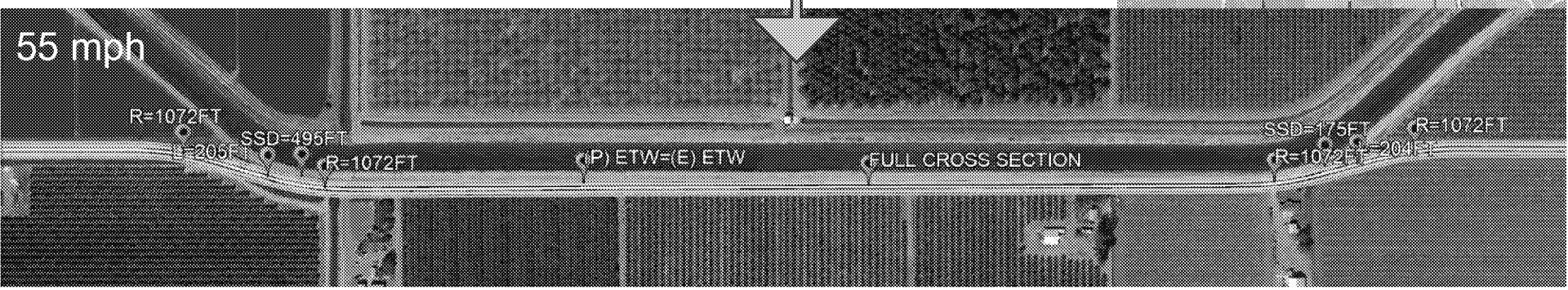
McDermott Road

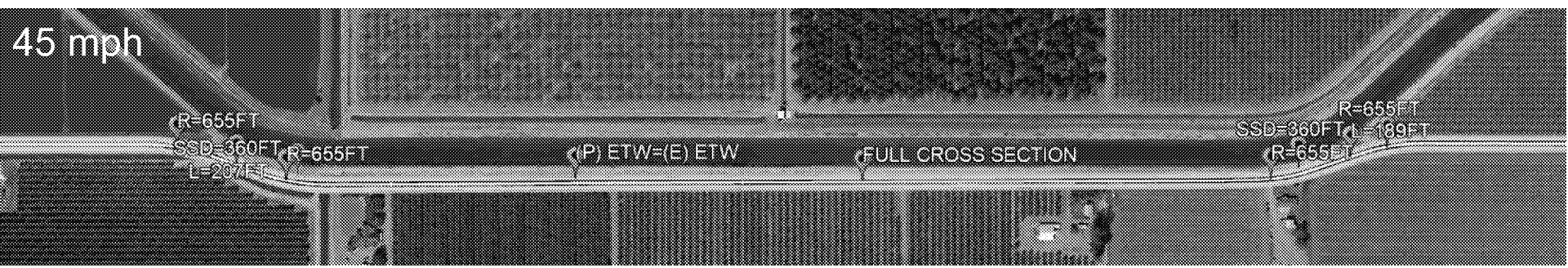
- Existing 30/35 mph curves
- Exist Lane Widths 10+ ft
- Sub-standard sight distance
- Utility pole conflict
- Exist property / Canal constraints

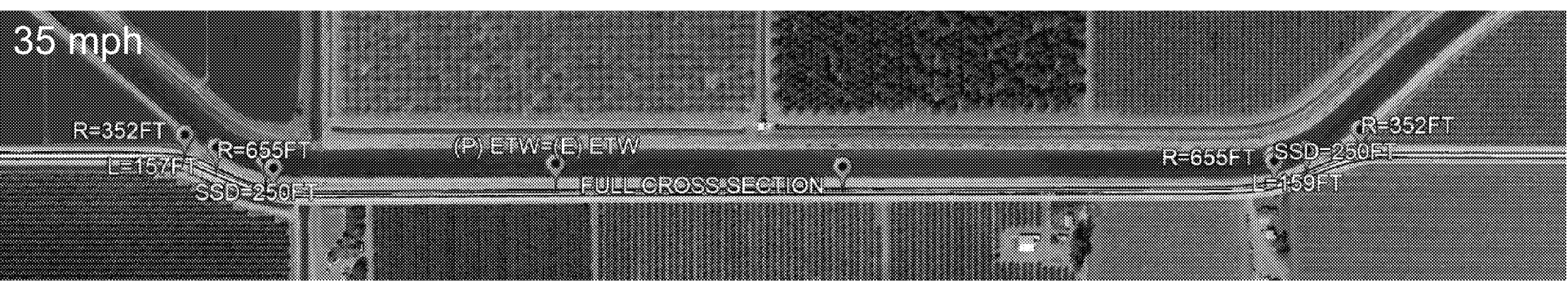


McDermott Road









Summary ROW Impacts

Road Name	Approx. No. of Parcels	Impacts Description
Road 68	10	Property impact and a drainage/ slope easement due to pavement widening
Road D	5	Property impact and a drainage/ slope easement due to pavement widening
Road 69	4	Property impact and a drainage/ slope easement due to pavement widening
Delevan Rd	1	Property impact and a drainage/ slope easement due to pavement widening
McDermott Rd	3	Property impact and a drainage/ slope easement due to pavement widening, utility pole relocation
Maxwell-Sites Rd	3	Property impact and a drainage/ slope easement due to pavement widening
ESTIMATED TOTAL	26	

Sites

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Dirks Road Alternative Construction Access Route

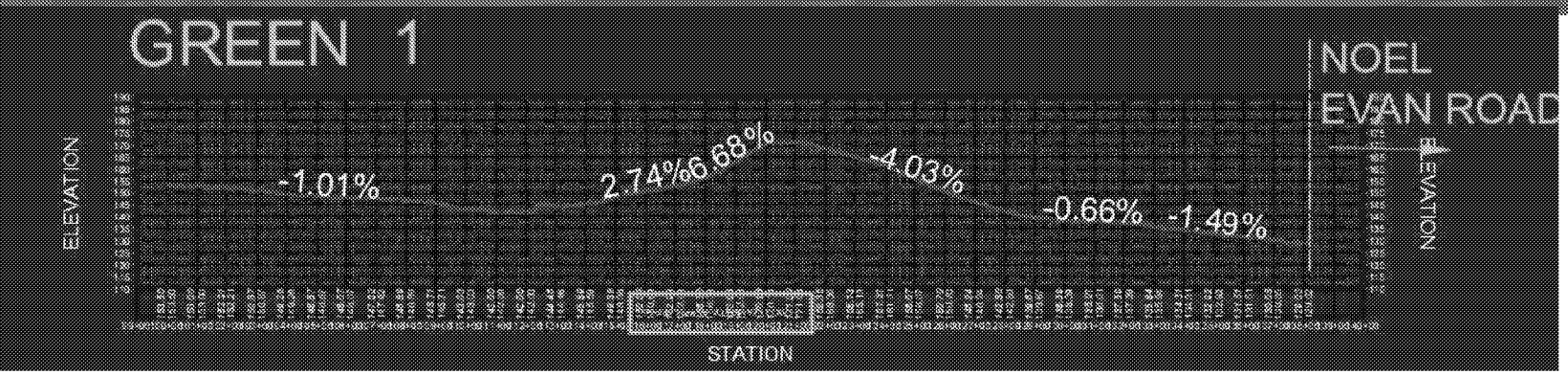
Sites

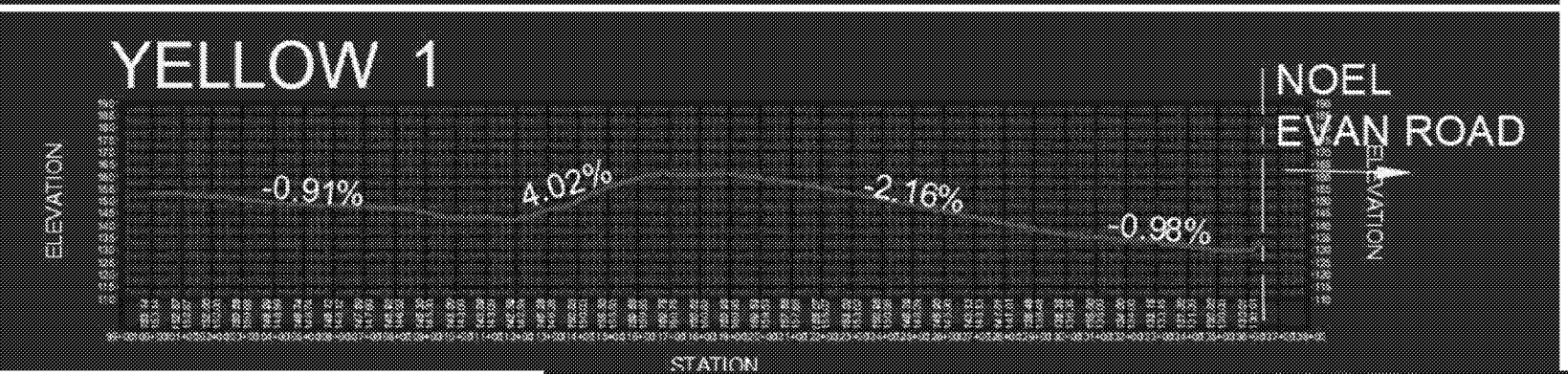
Dirks Road Alternative Construction Access Route

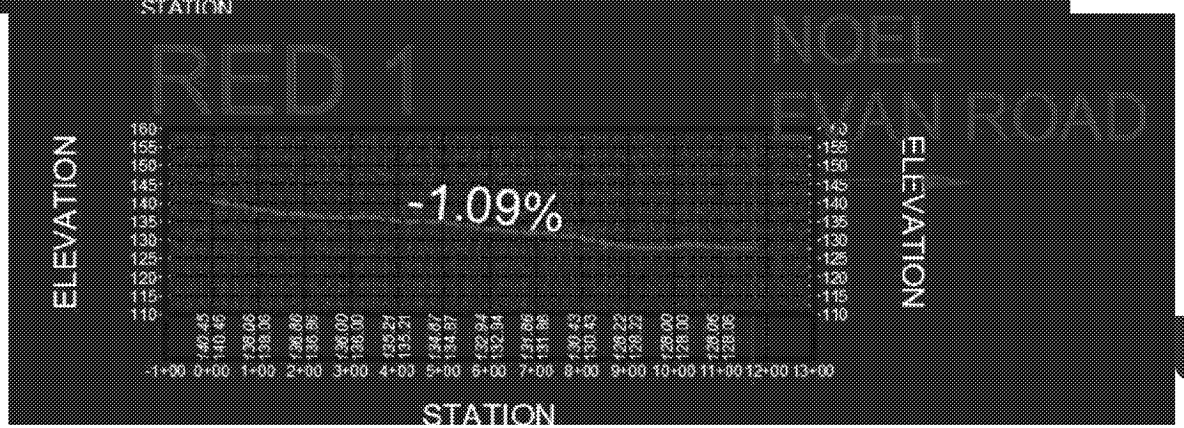
Sites

Dirks Road Alternative Construction Access Route

Dirks Road Alternative Construction Access Route







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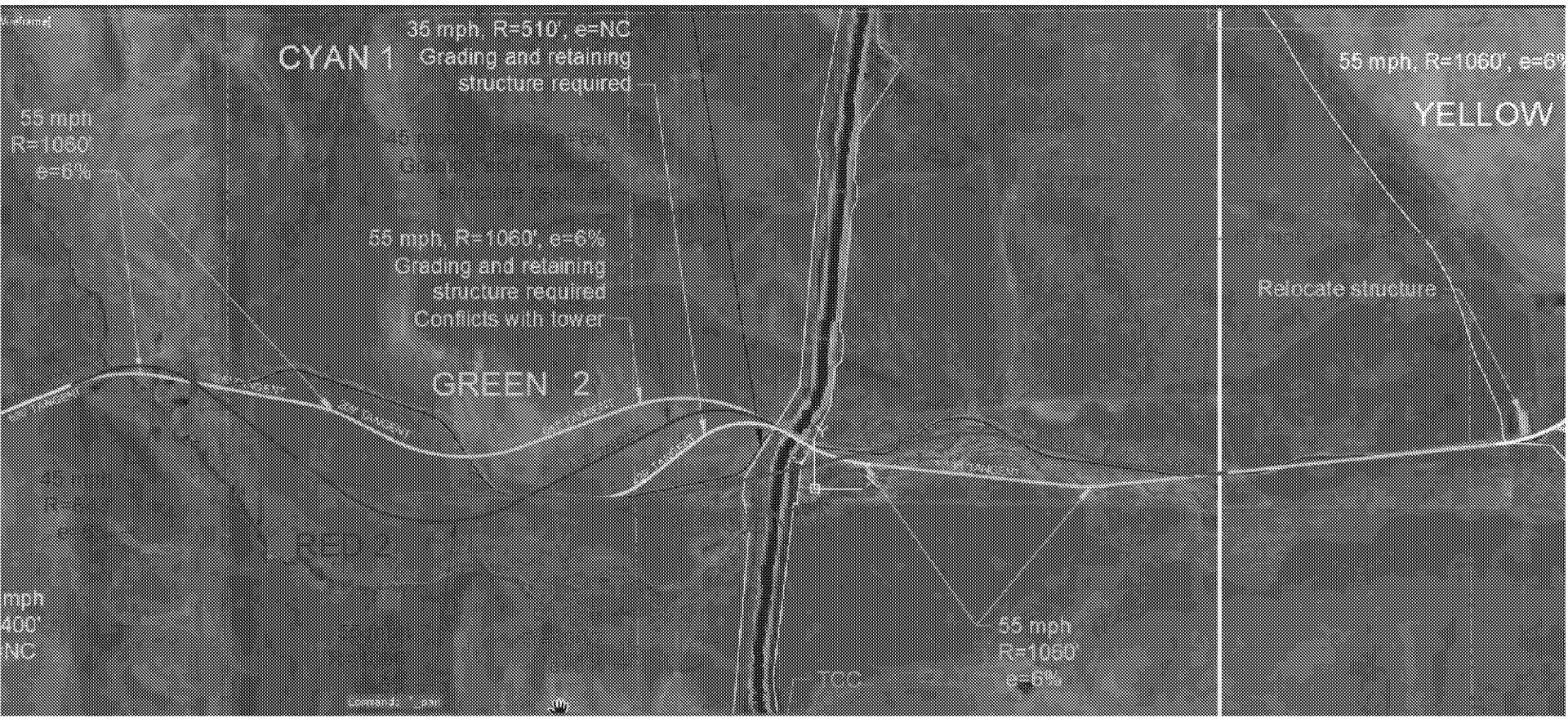
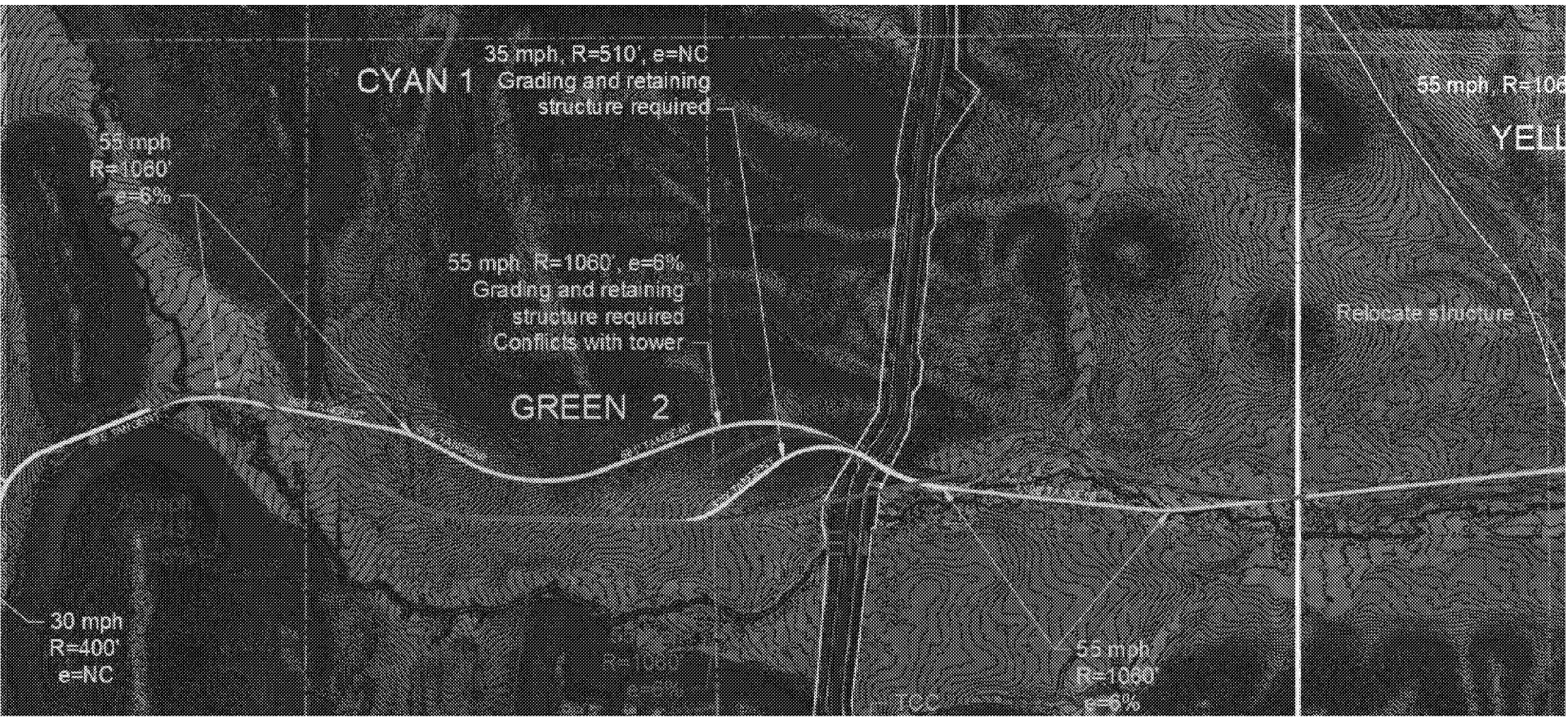
Dirks Road Alternative Construction Access Route

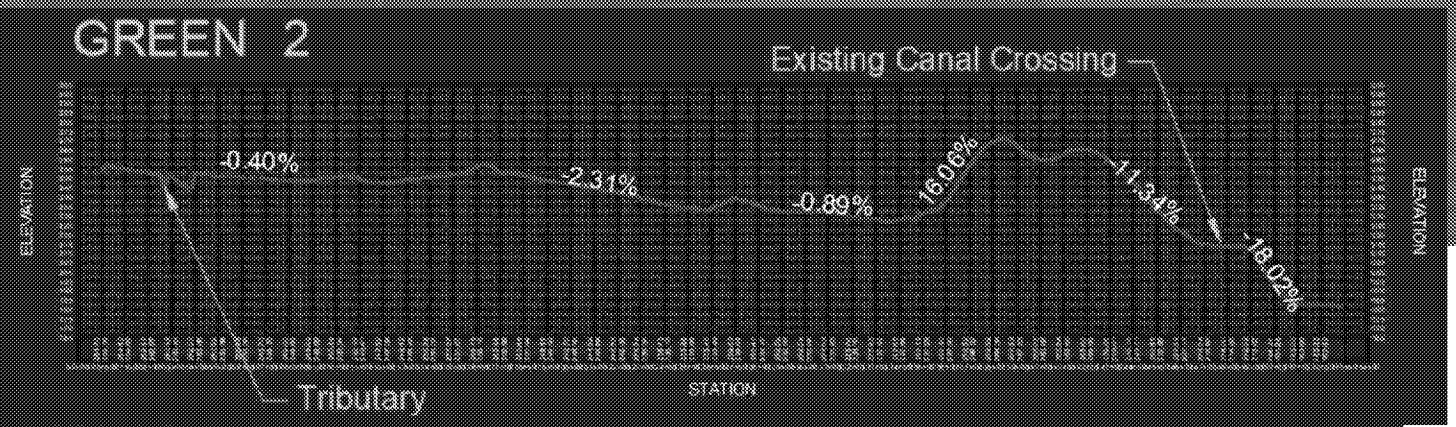


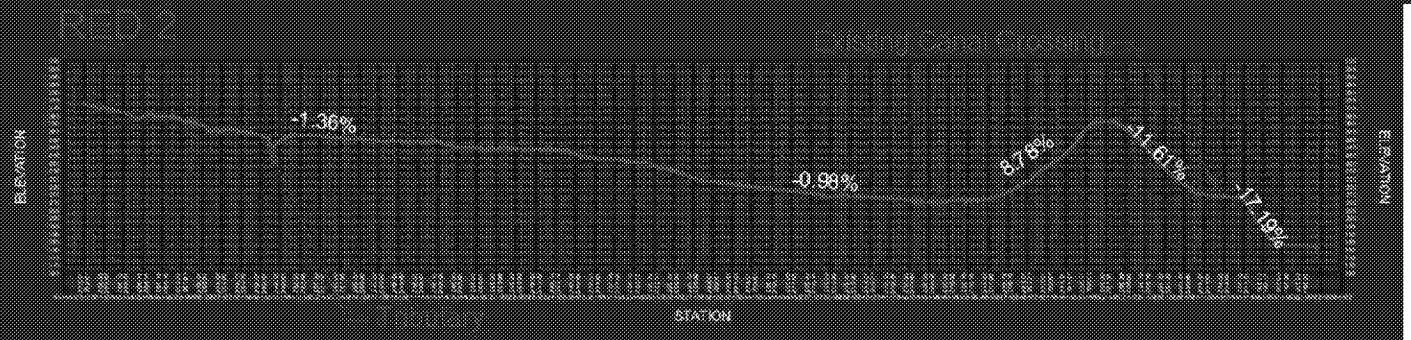
Sites

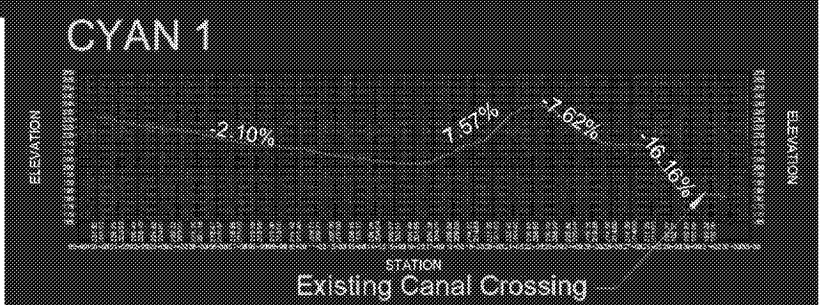
Dirks Road Alternative Construction Access Route

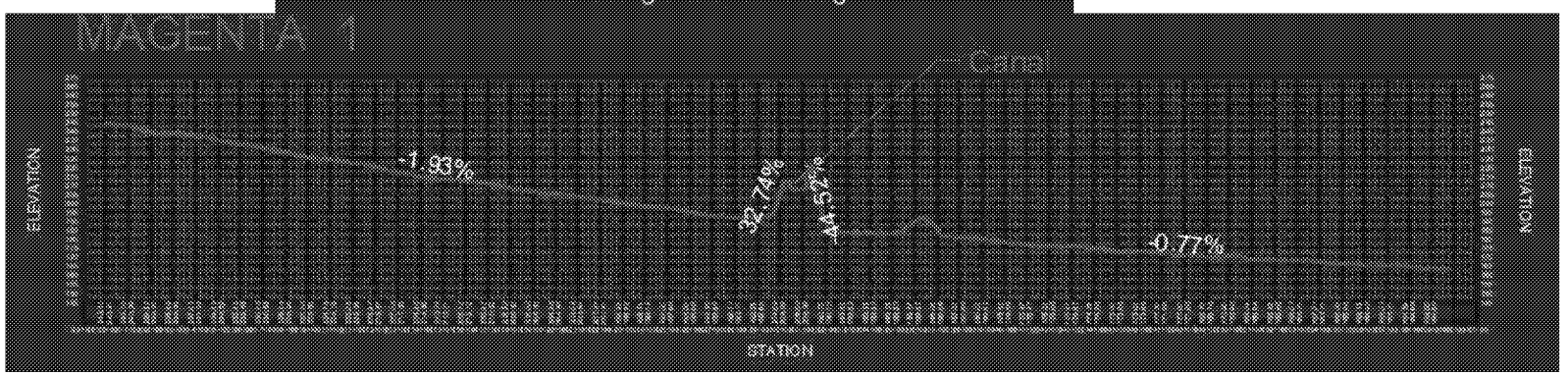


Sites









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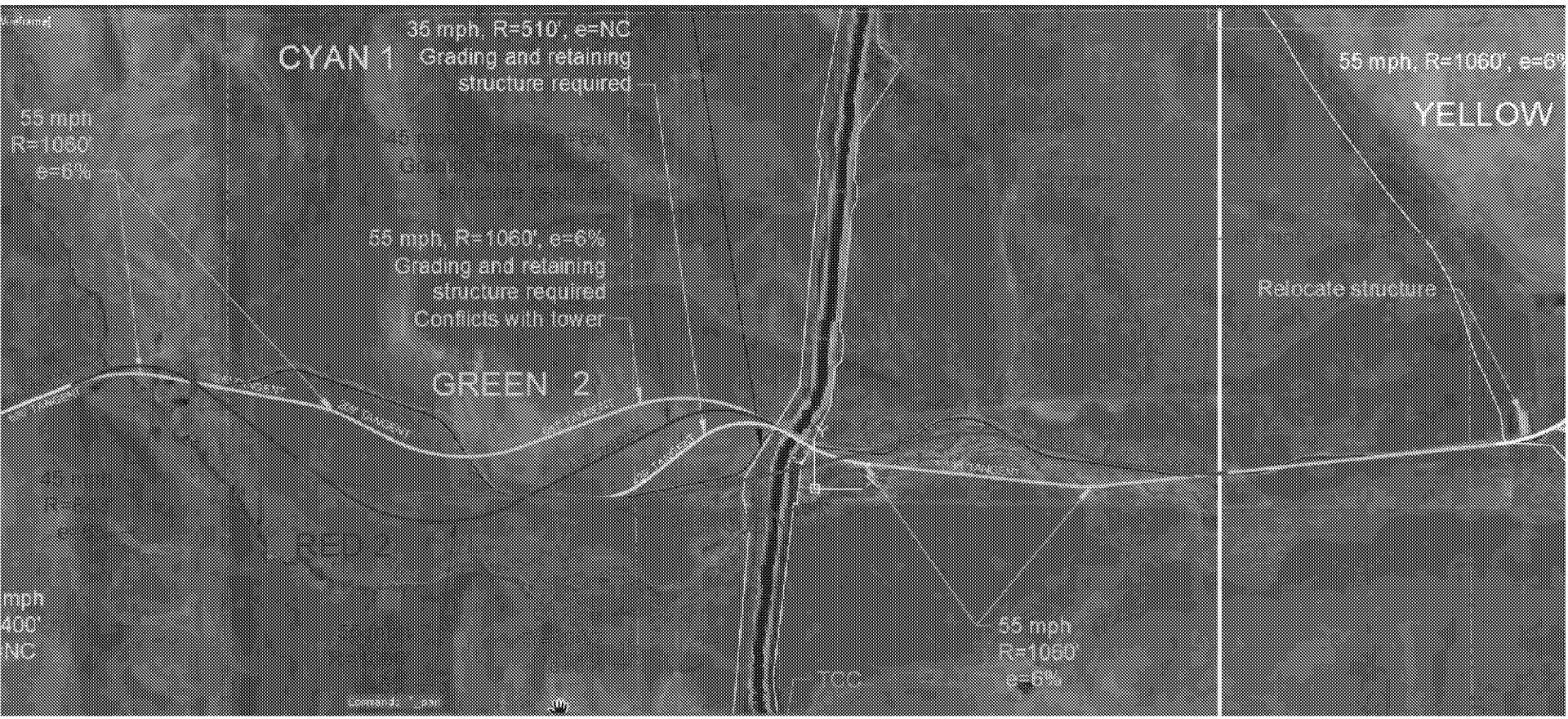
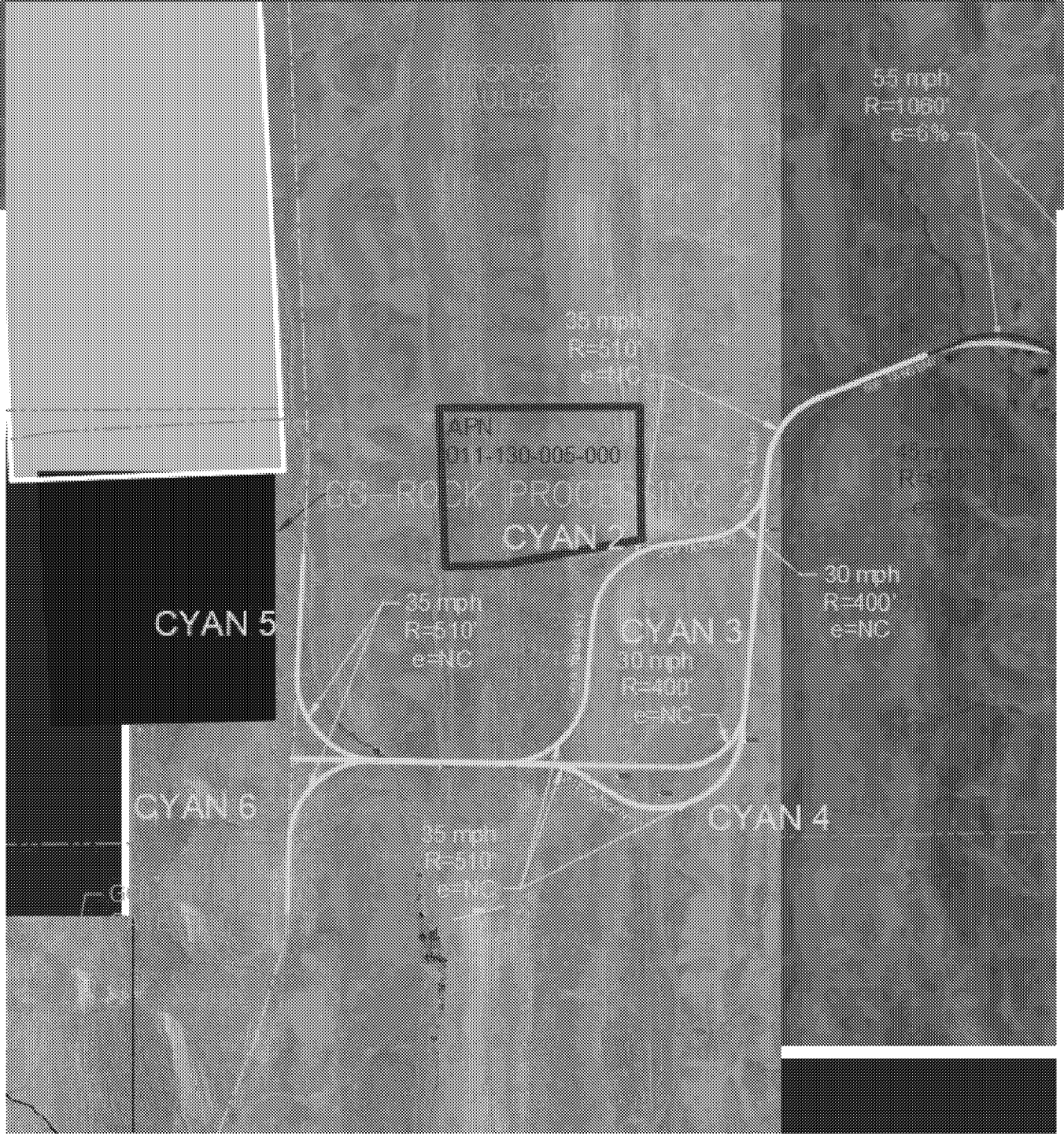
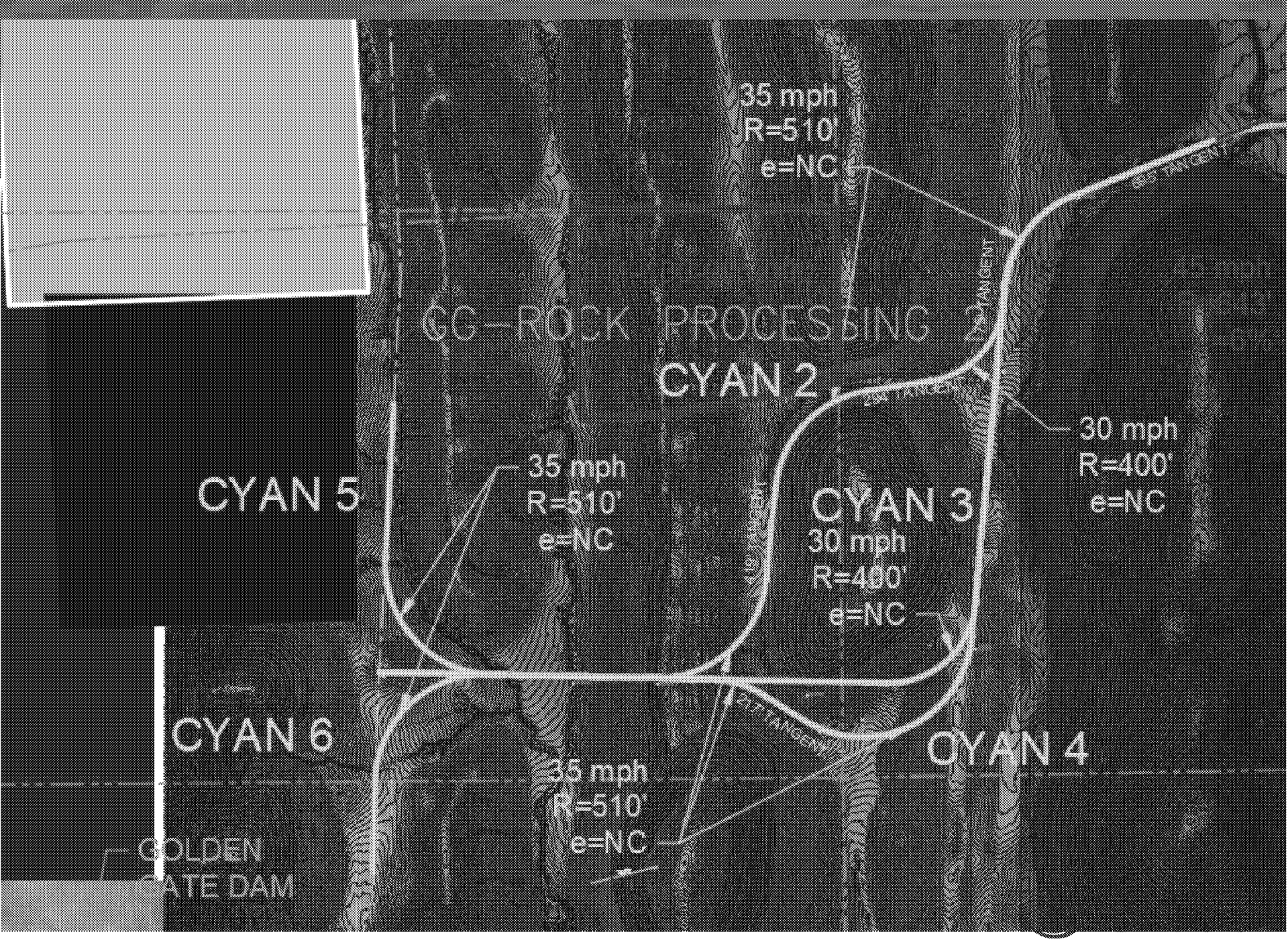
Dirks Road Alternative Construction Access Route



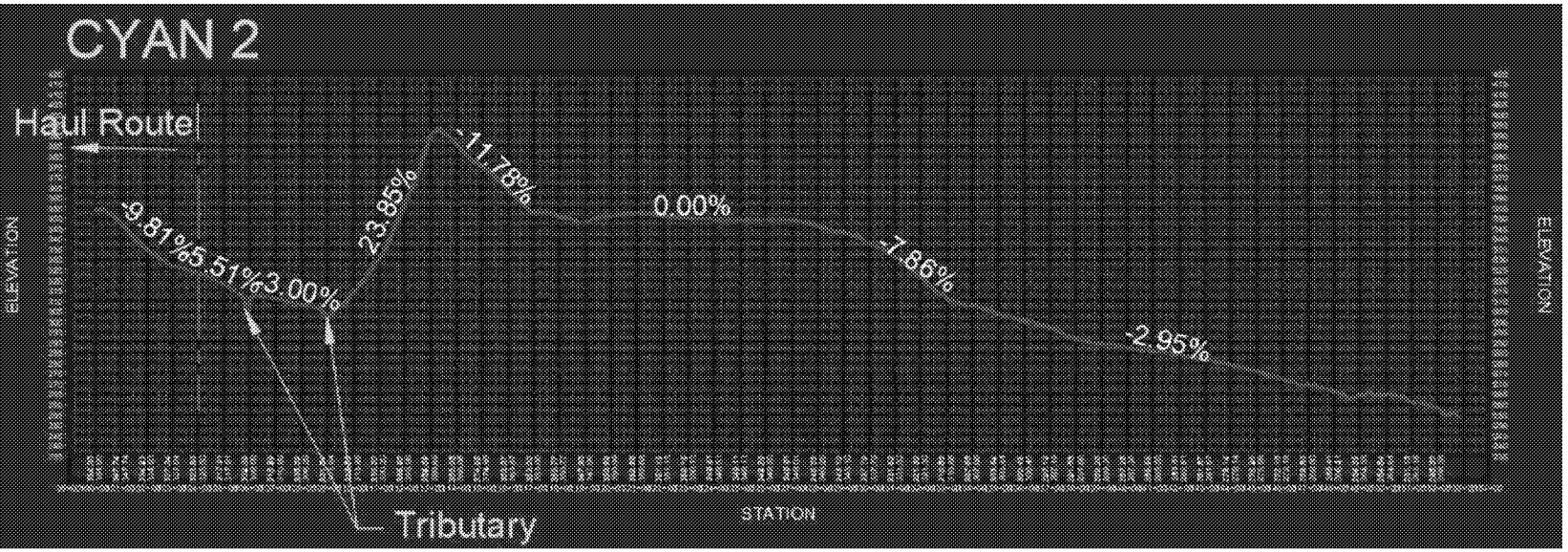
Sites

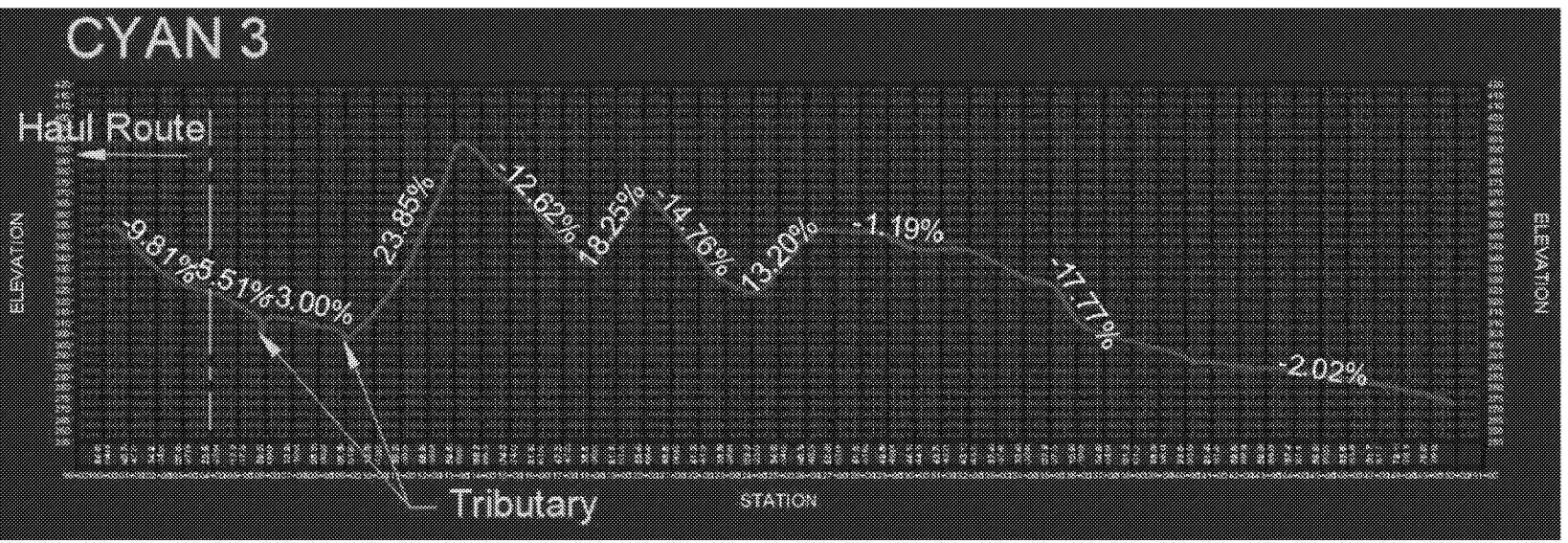

APN
011-130-005-000
CYAN 2
CYAN 3
CYAN 4
CYAN 5
CYAN 6
35 mph
R=510'
e=NC
30 mph
R=400'
e=NC
35 mph
R=1050'
e=3%

Sites


35 mph
R=510'
e=NC
GG–ROCK PROCESSING
CYAN 2
CYAN 5
35 mph
R=510'
e=NC
CYAN 3
30 mph
R=400'
e=NC
30 mph
R=400'
e=NC
CYAN 6
CYAN 4
35 mph
R=510'
e=NC
GOLDEN
ATE DAM

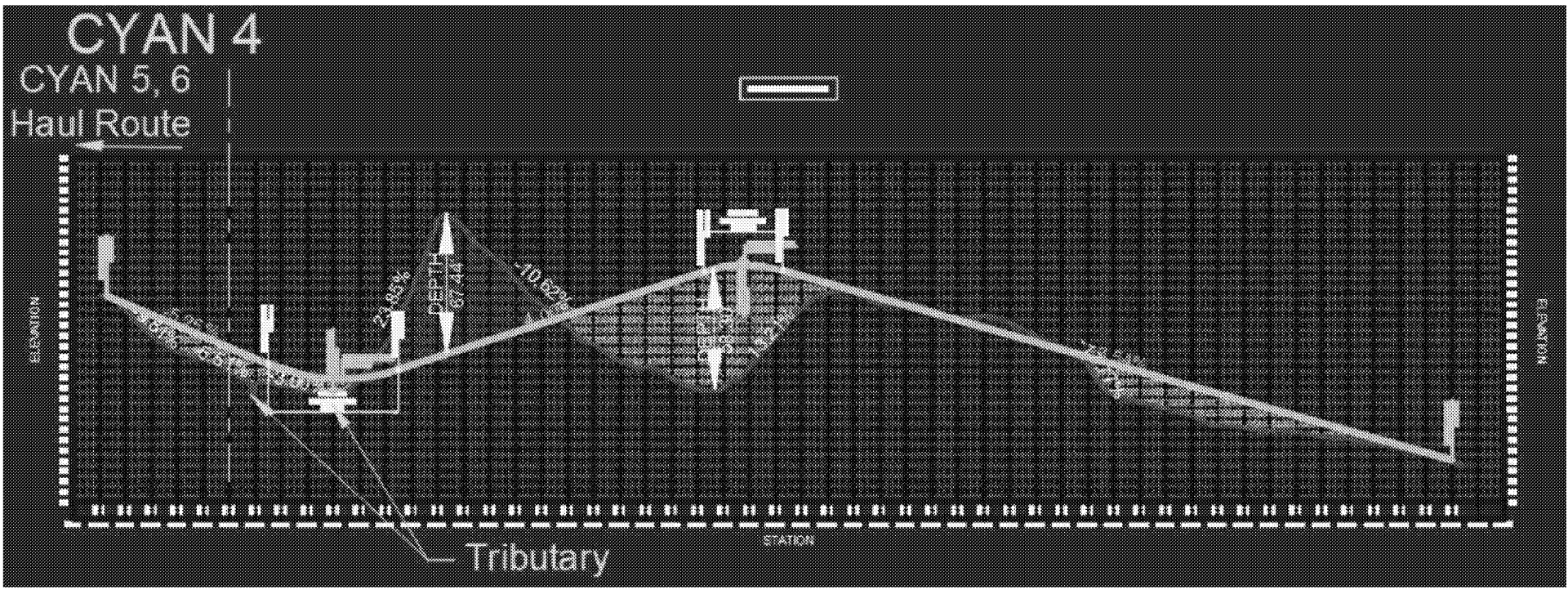
Dirks Road Alternative Construction Access Route





Sites

Dirks Road Alternative Construction Access Route



Sites

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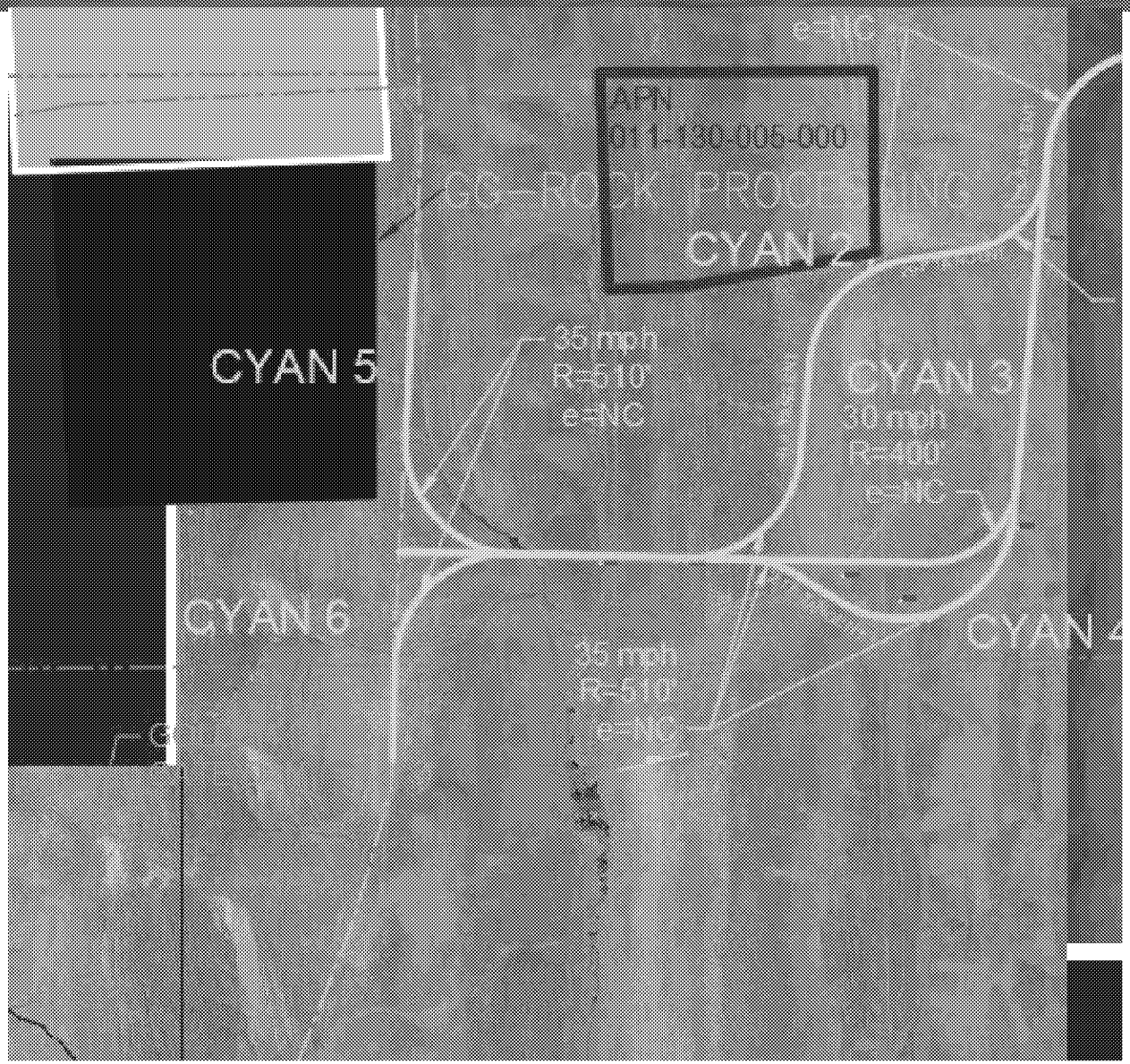
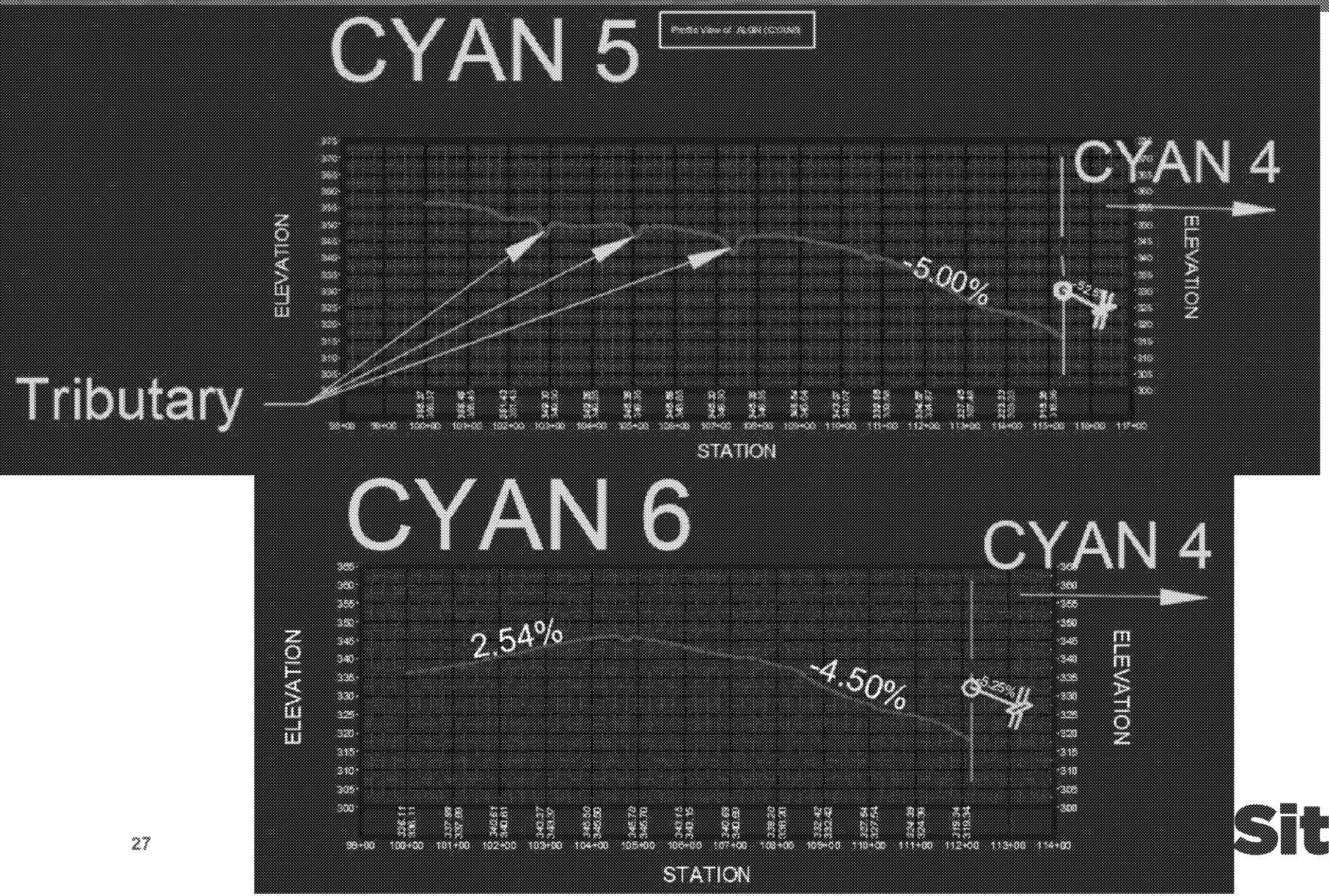


Sites

Dirks Road Alternative Construction Access Route



Sites

Sites Lodoga Road Realignment

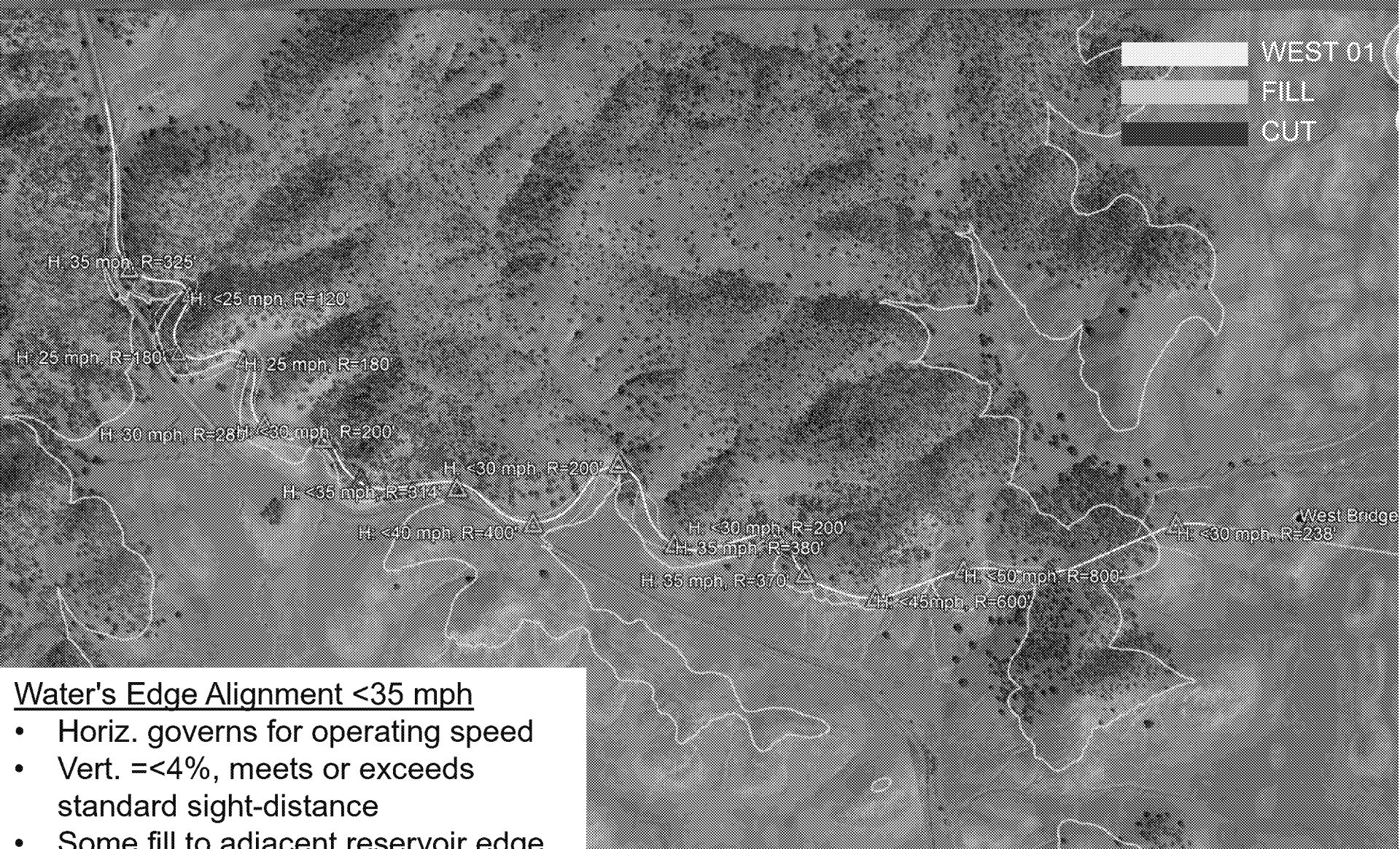
- Functional Classification - Major Collector (Rural)
- Design Speed - 55 mph
- Lane Width - 12 ft
- Shoulder Width - 4 ft
- Side Slopes - 2:1 (non-recoverable, non-traversable)
- Fill Prism slopes (causeway) - 3.25:1
- Max Vert Grades:
  - 45 mph = 8%
  - 55 mph = 7%

Sites Lodoga Road - East

Sites Lodoga Road – West

Draft_0022705

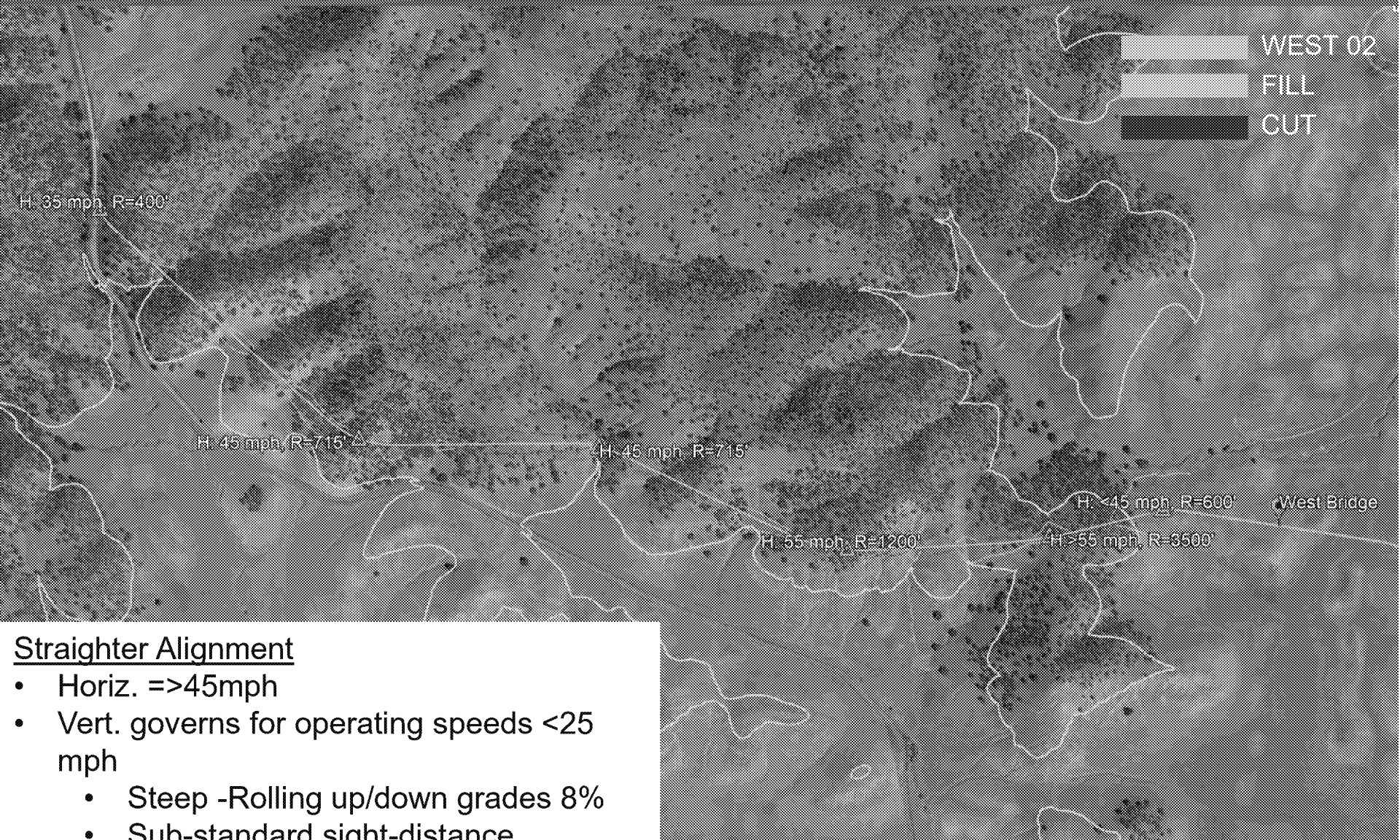
Sites Lodoga Road – West 01



Water's Edge Alignment <35 mph

- Horiz. governs for operating speed
- Vert. =<4%, meets or exceeds standard sight-distance
- Some fill to adjacent reservoir edge

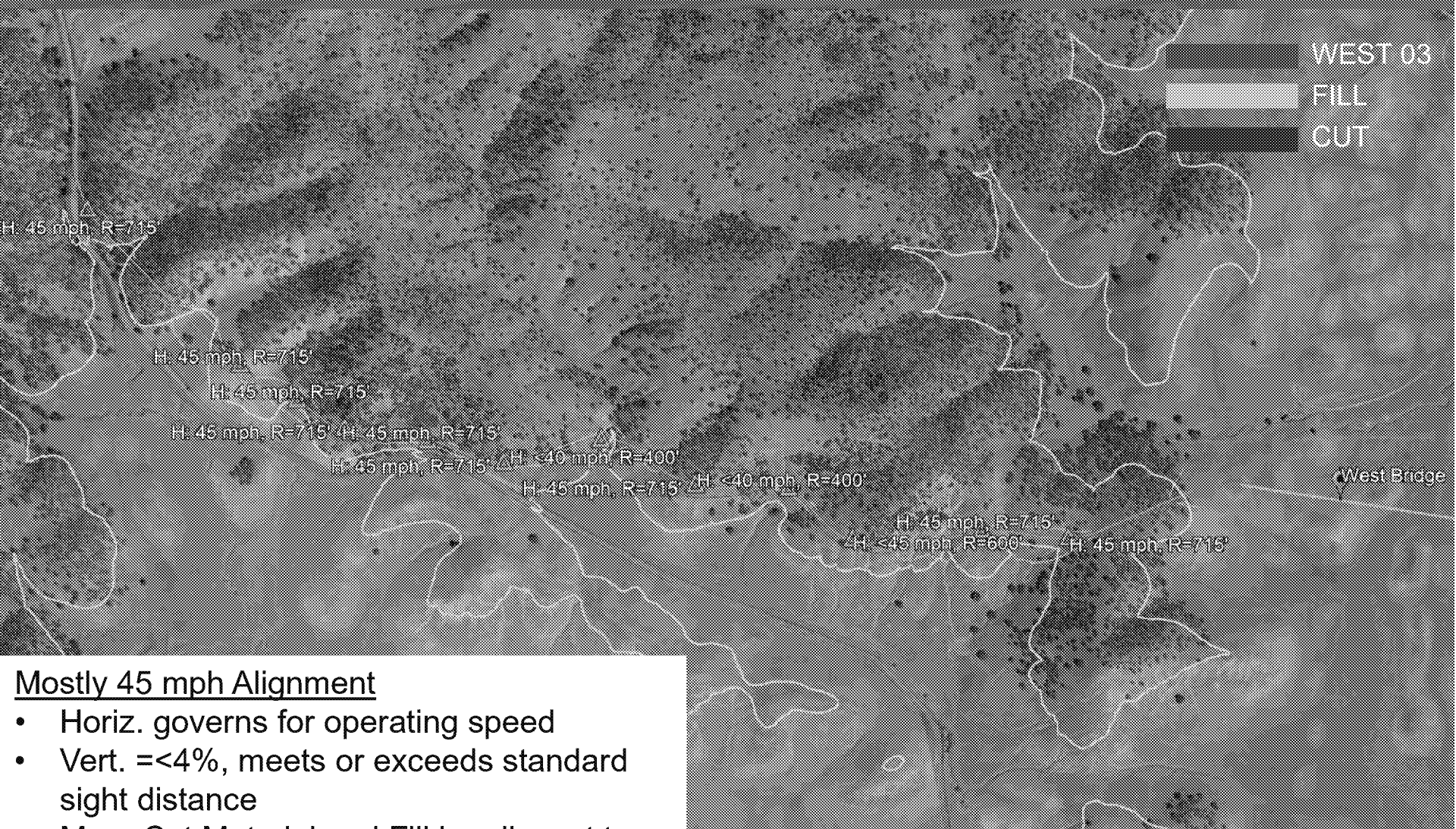
Sites Lodoga Rd – West 02



Straighter Alignment

- Horiz. =>45mph
- Vert. governs for operating speeds <25 mph
  - Steep -Rolling up/down grades 8%
  - Sub-standard sight-distance

Sites Lodoga Road – West 03

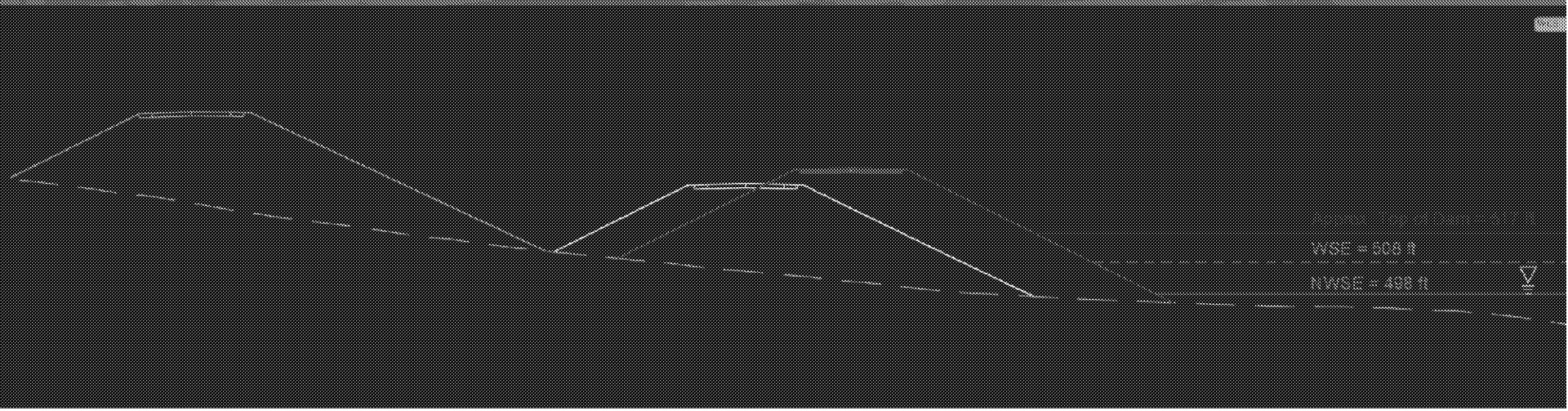


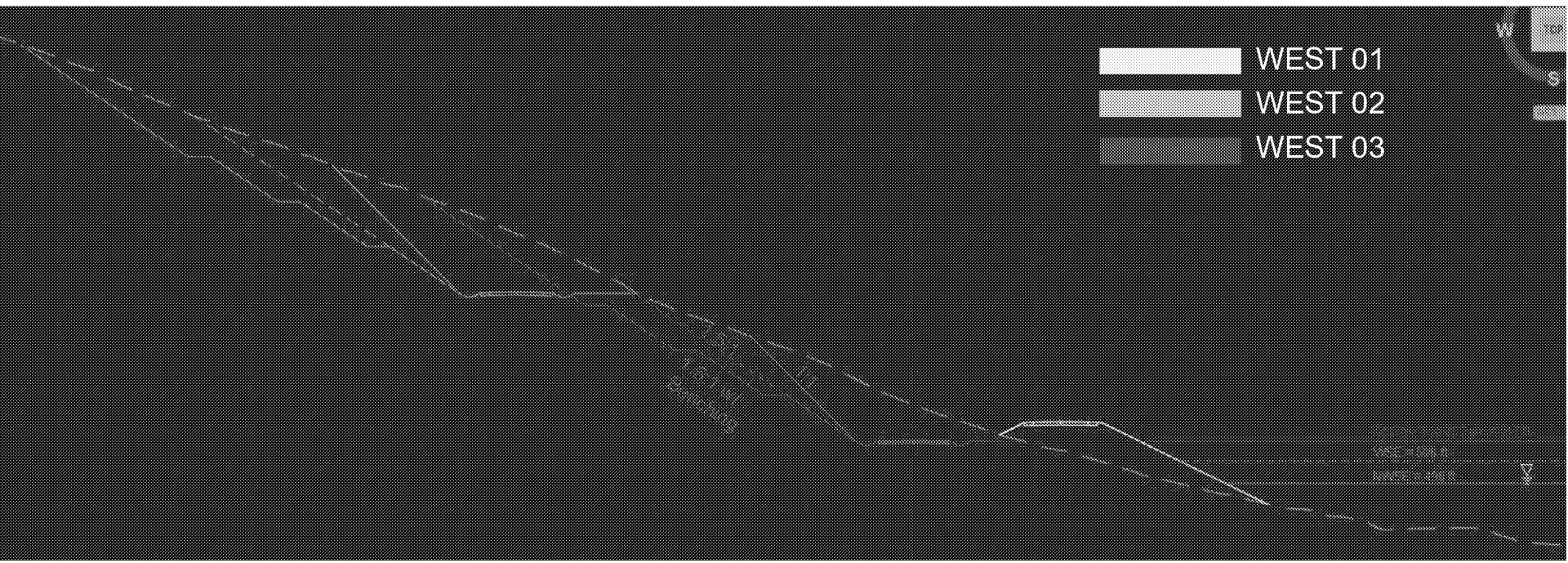
Mostly 45 mph Alignment

- Horiz. governs for operating speed
- Vert. =<4%, meets or exceeds standard sight distance
- More Cut Material and Fill in adjacent to Reservoir edge

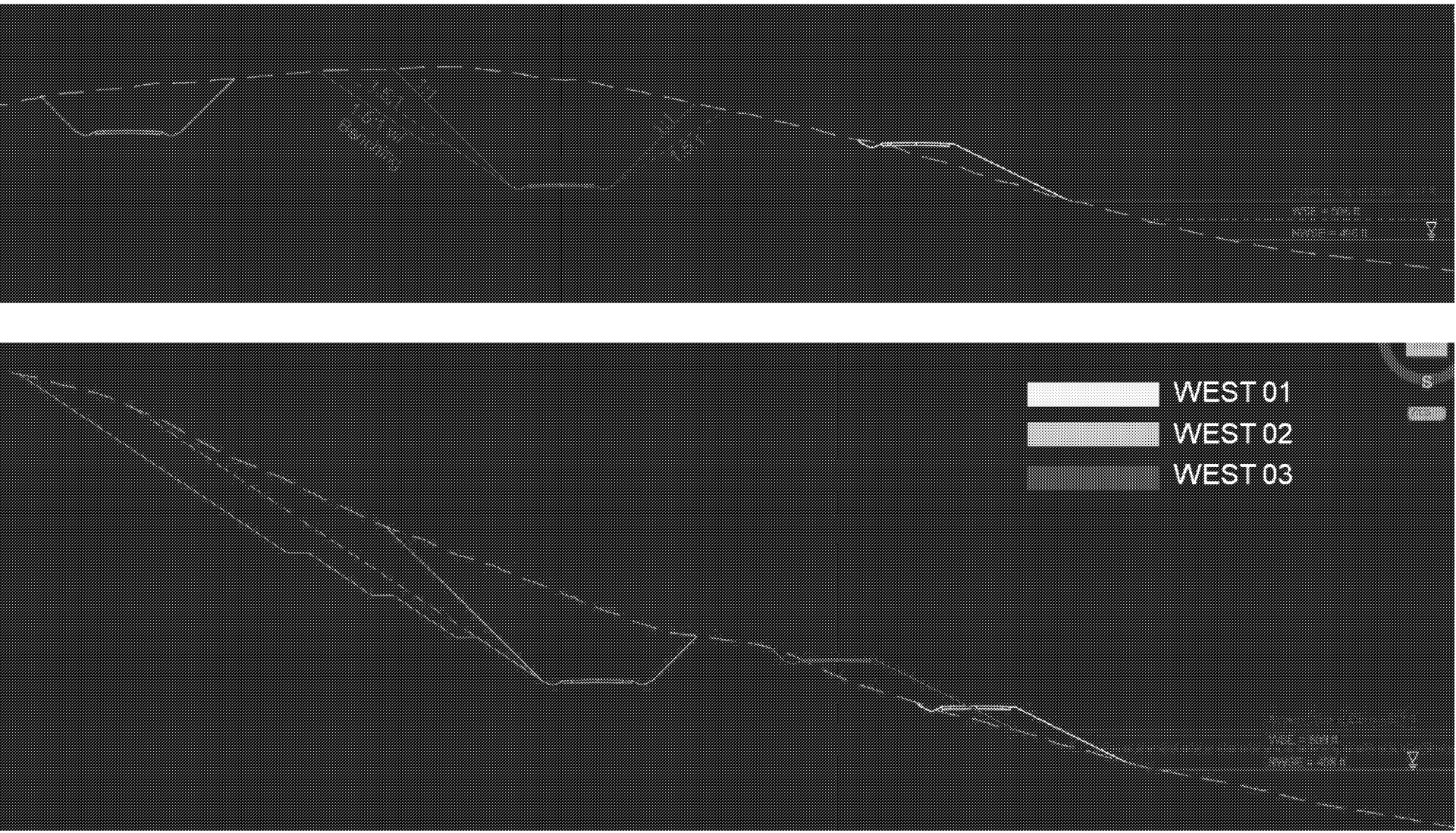
Draft_0022708

Sites Lodoga Road – West





Sites Lodoga Rd – West



EXTRA SLIDES BEYOND THIS SLIDE

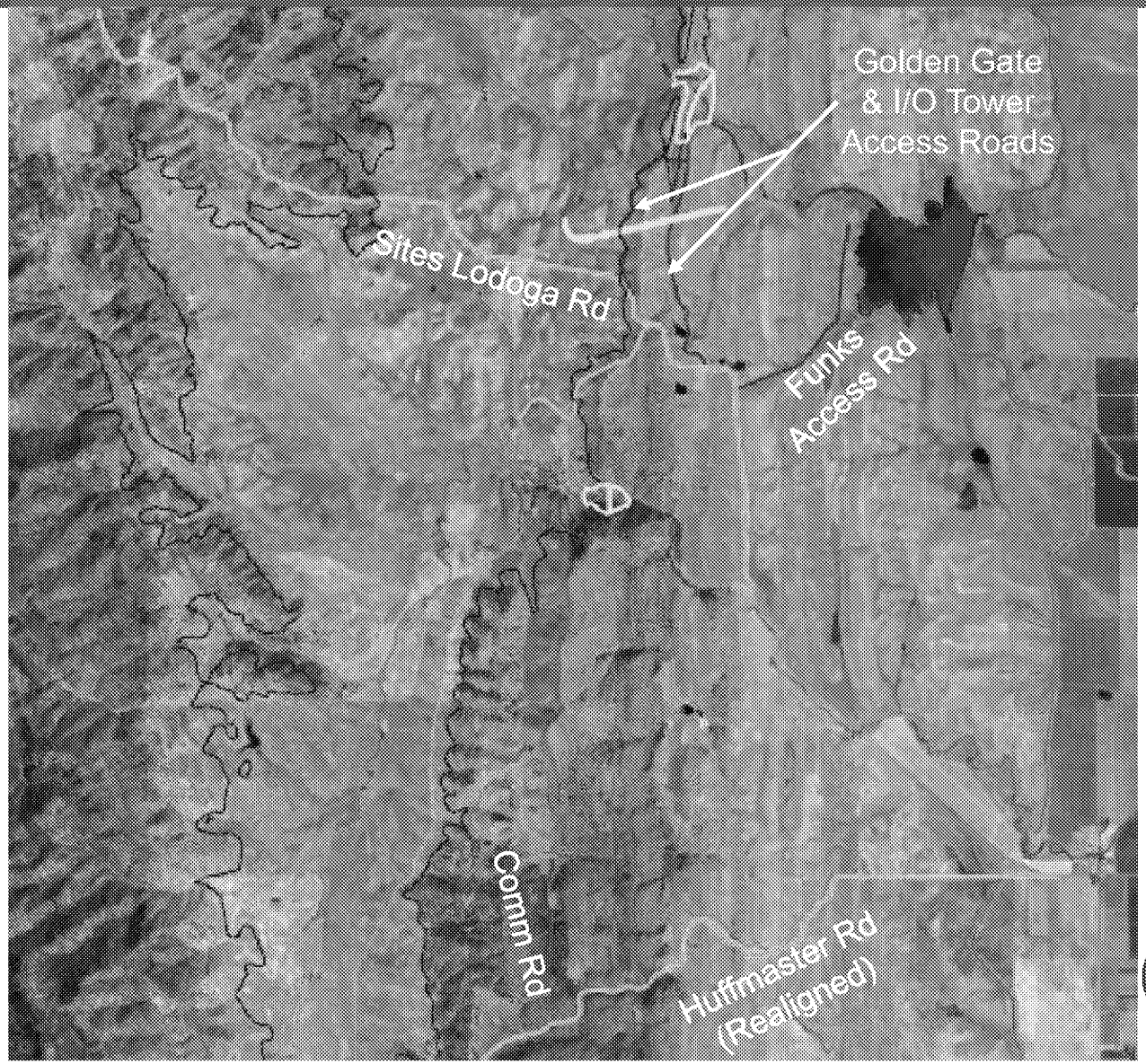
ADDITIONAL SLIDES FROM PREVIOUS PRESENTATIONS

Sites

Sites Lodoga Road Realignment

ites

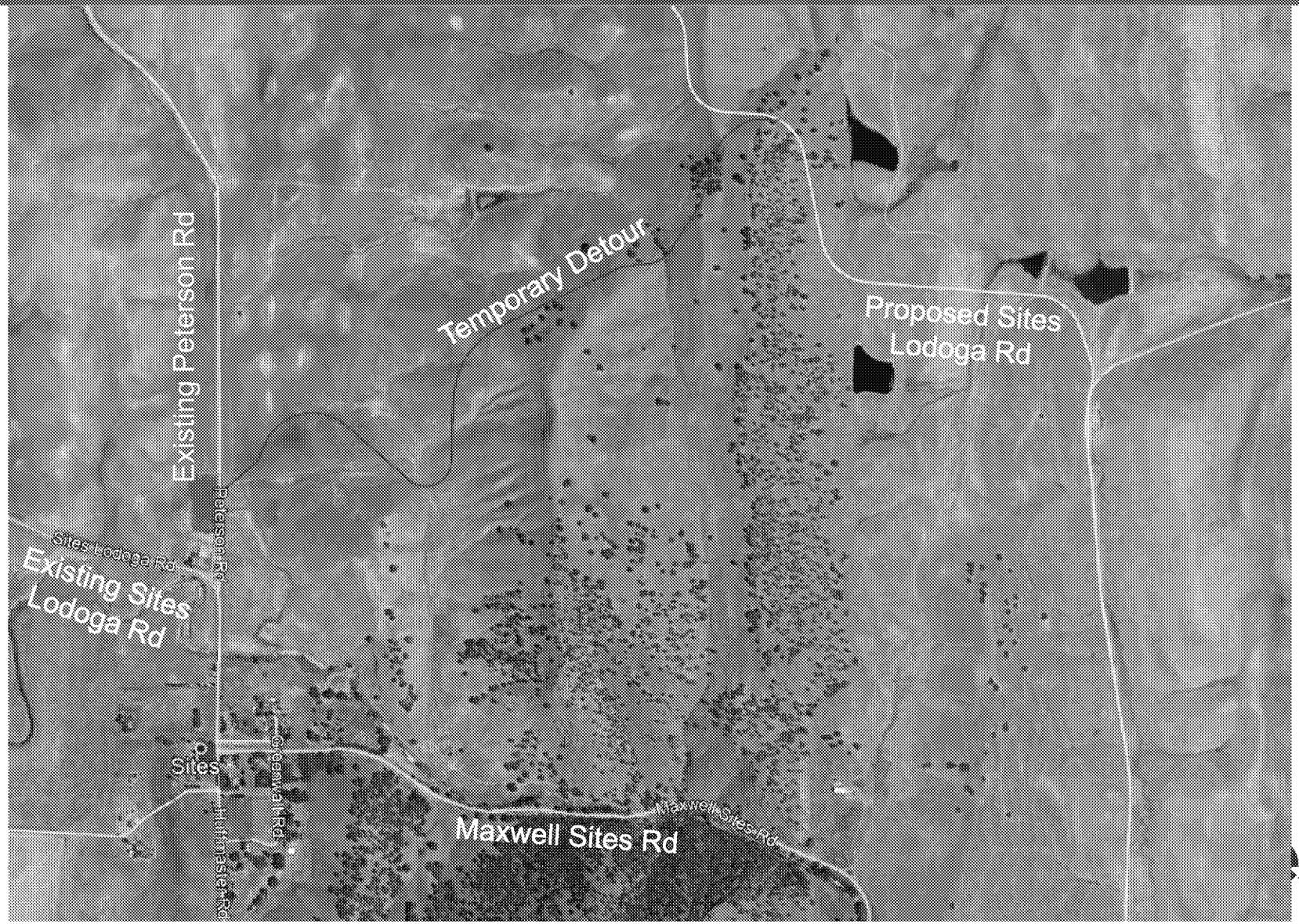
New Maintenance Roads



Sites

Draft_0022713

Sites Lodoga Road Detour for Local Traffic



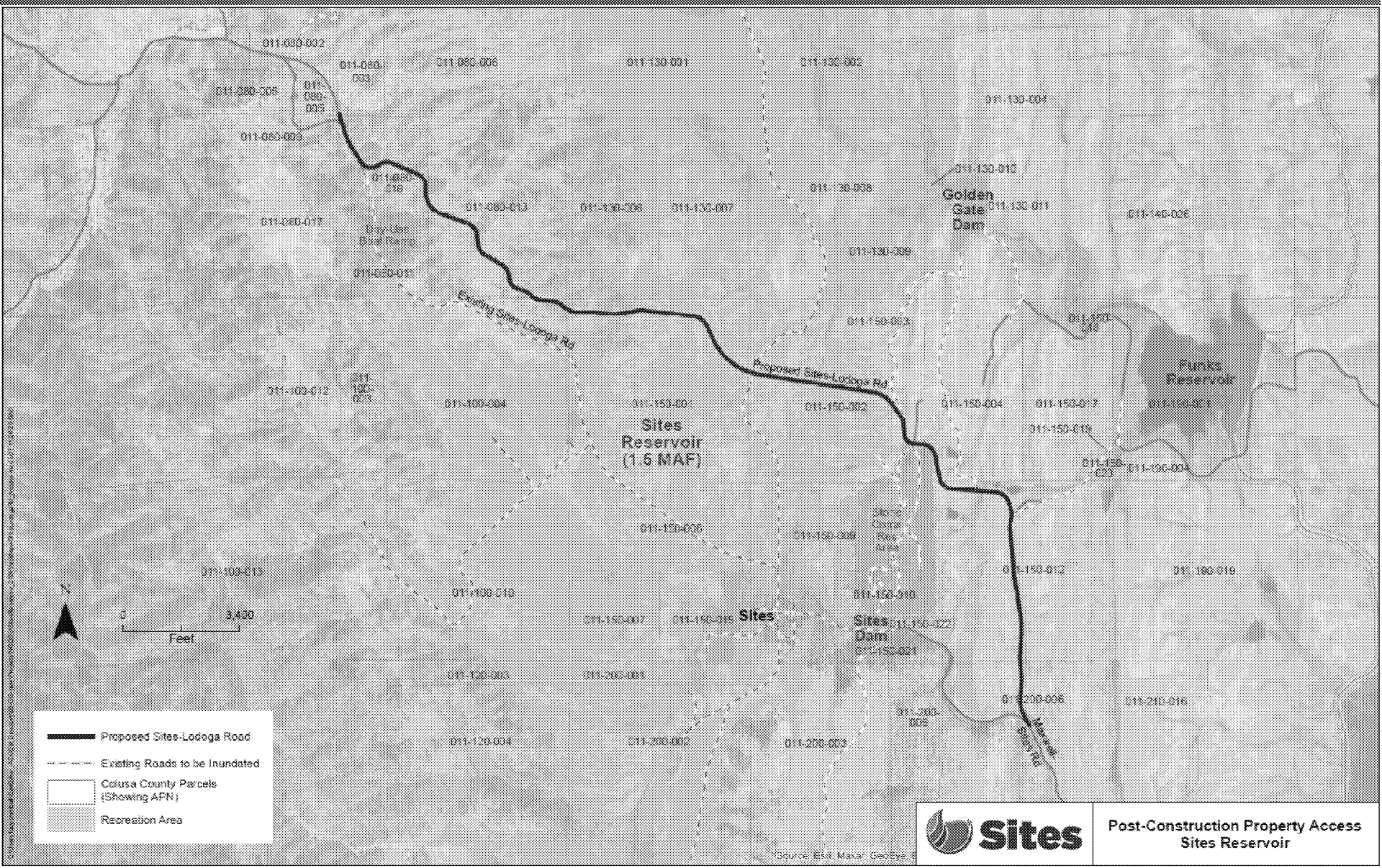
Draft_0022714

Access for Landowners – Sites Lodoga Road

Access for Landowners – Sites Lodoga Road

Draft_0022716

Access for Landowners – Sites Lodoga Road

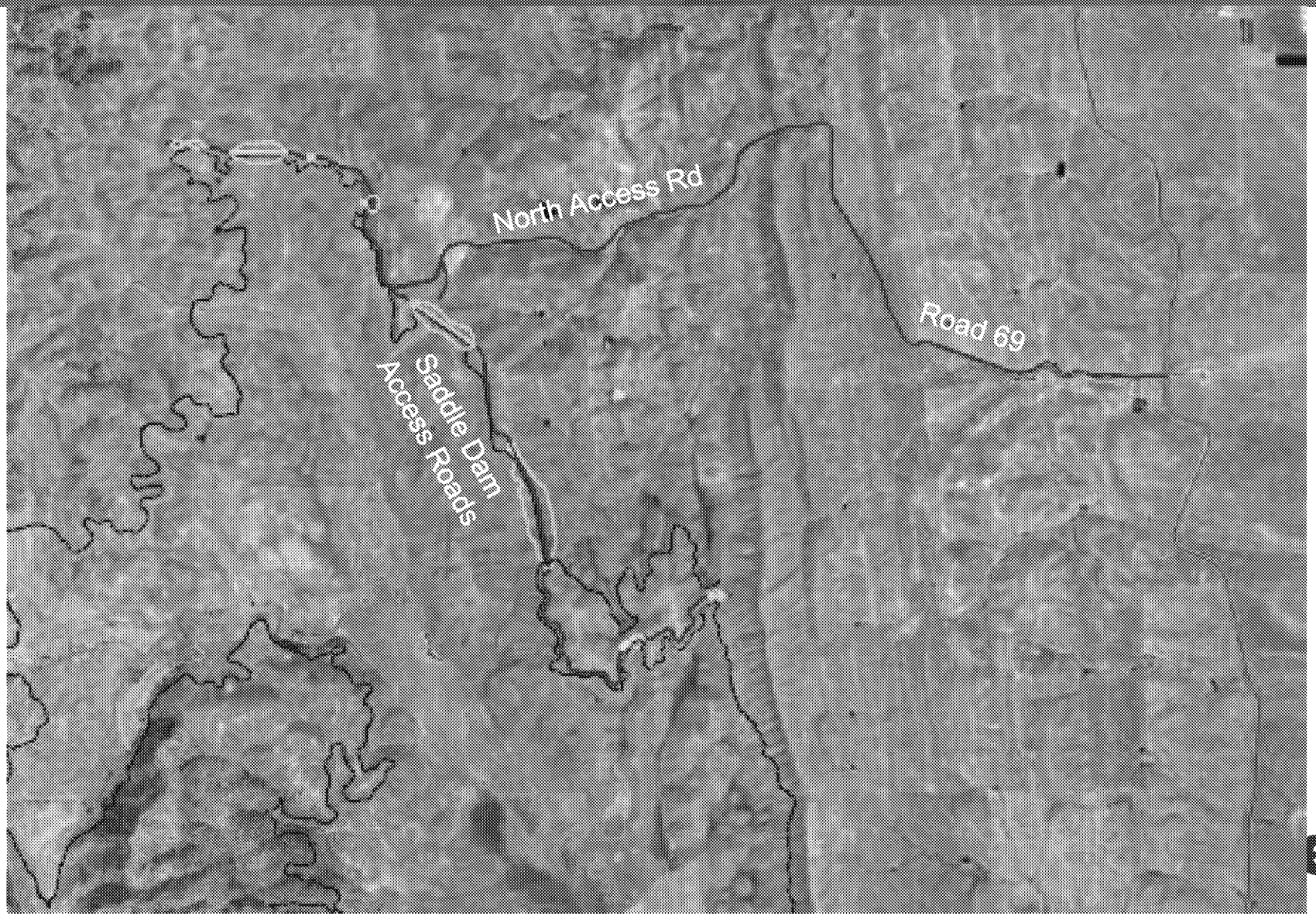


Sites

Post-Construction Property Access
Sites Reservoir

Draft_0022717

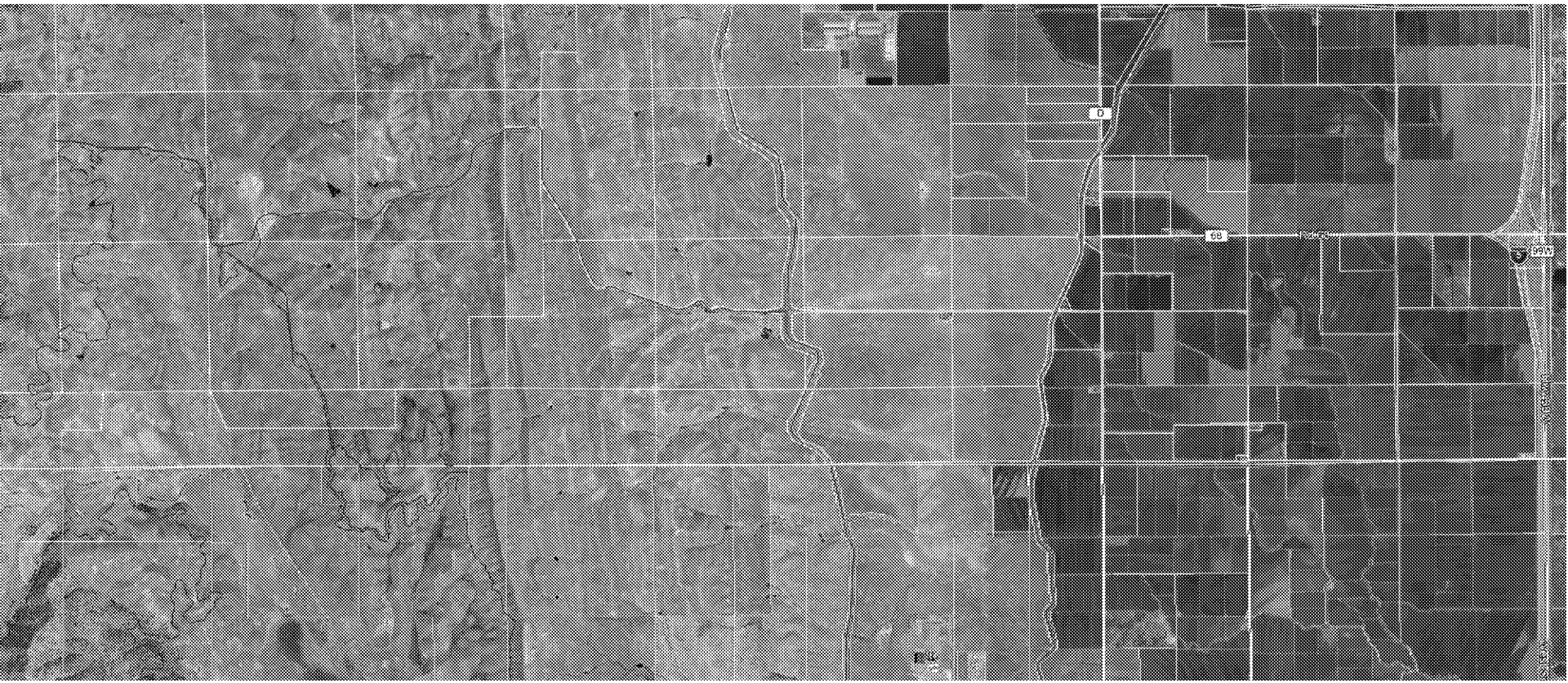
New Maintenance Roads



es

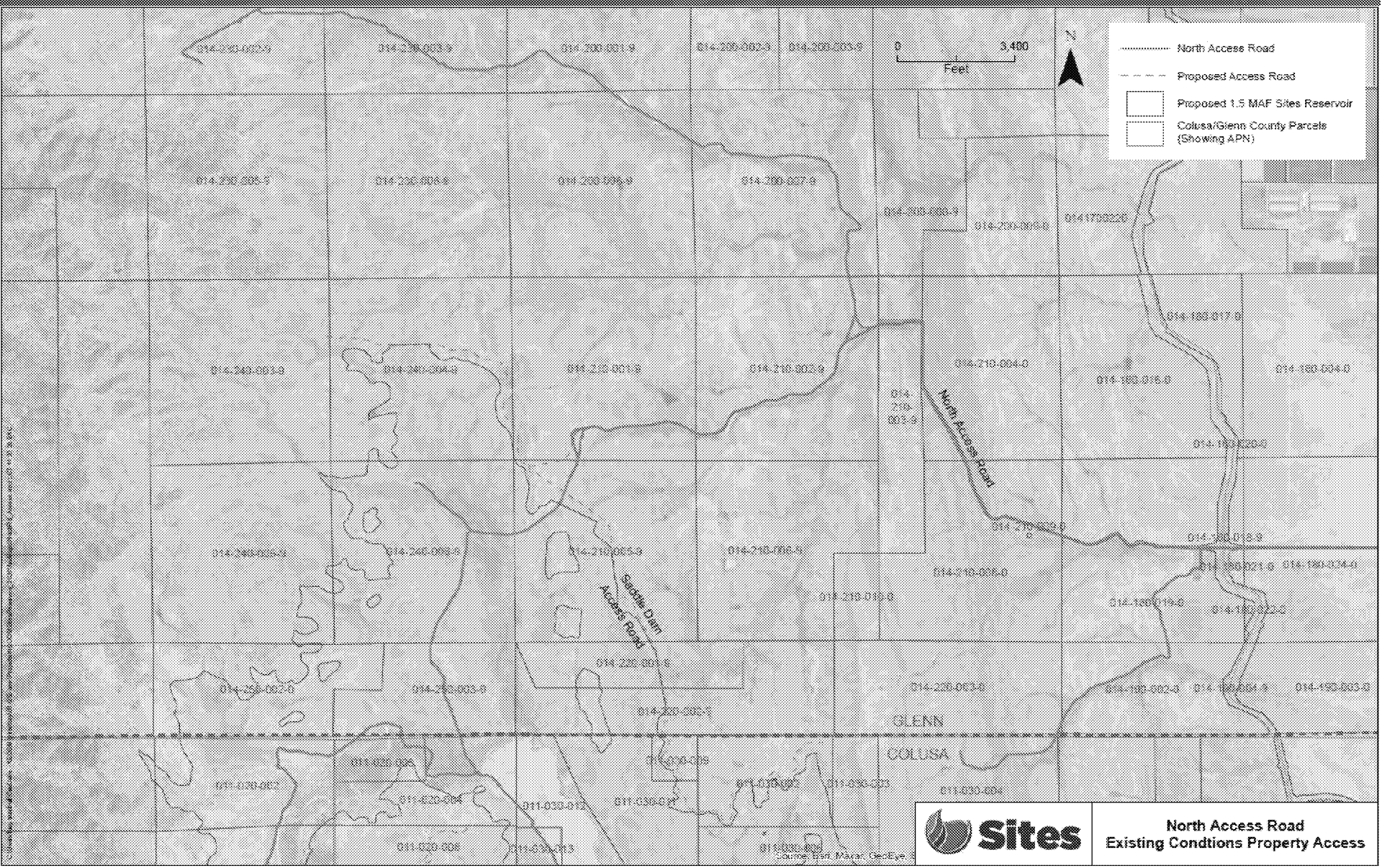
Access for Landowners – North Access Road

Access for Landowners – North Access Road

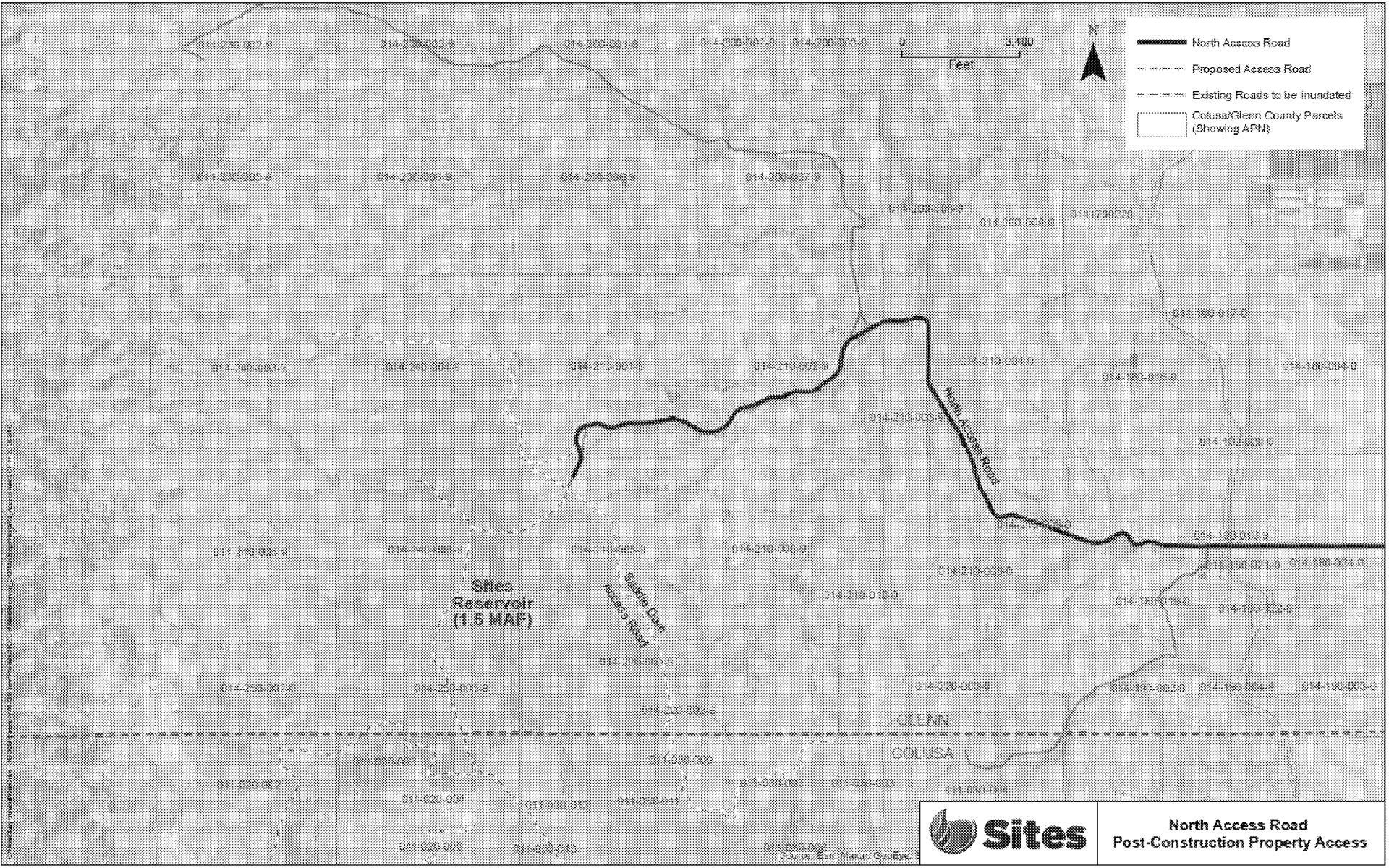


Sites

Access for Landowners – North Access Road

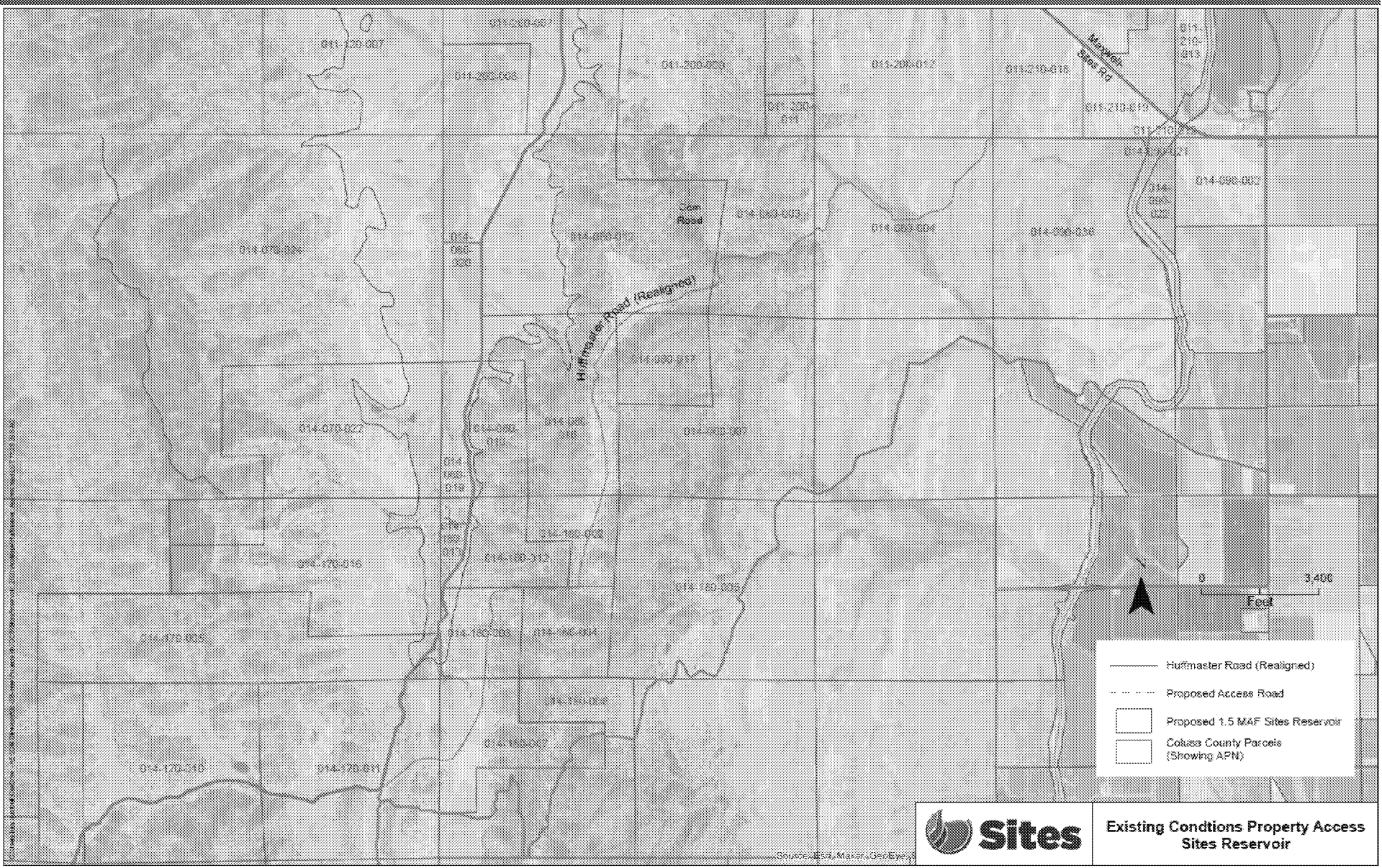


Access for Landowners – North Access Road



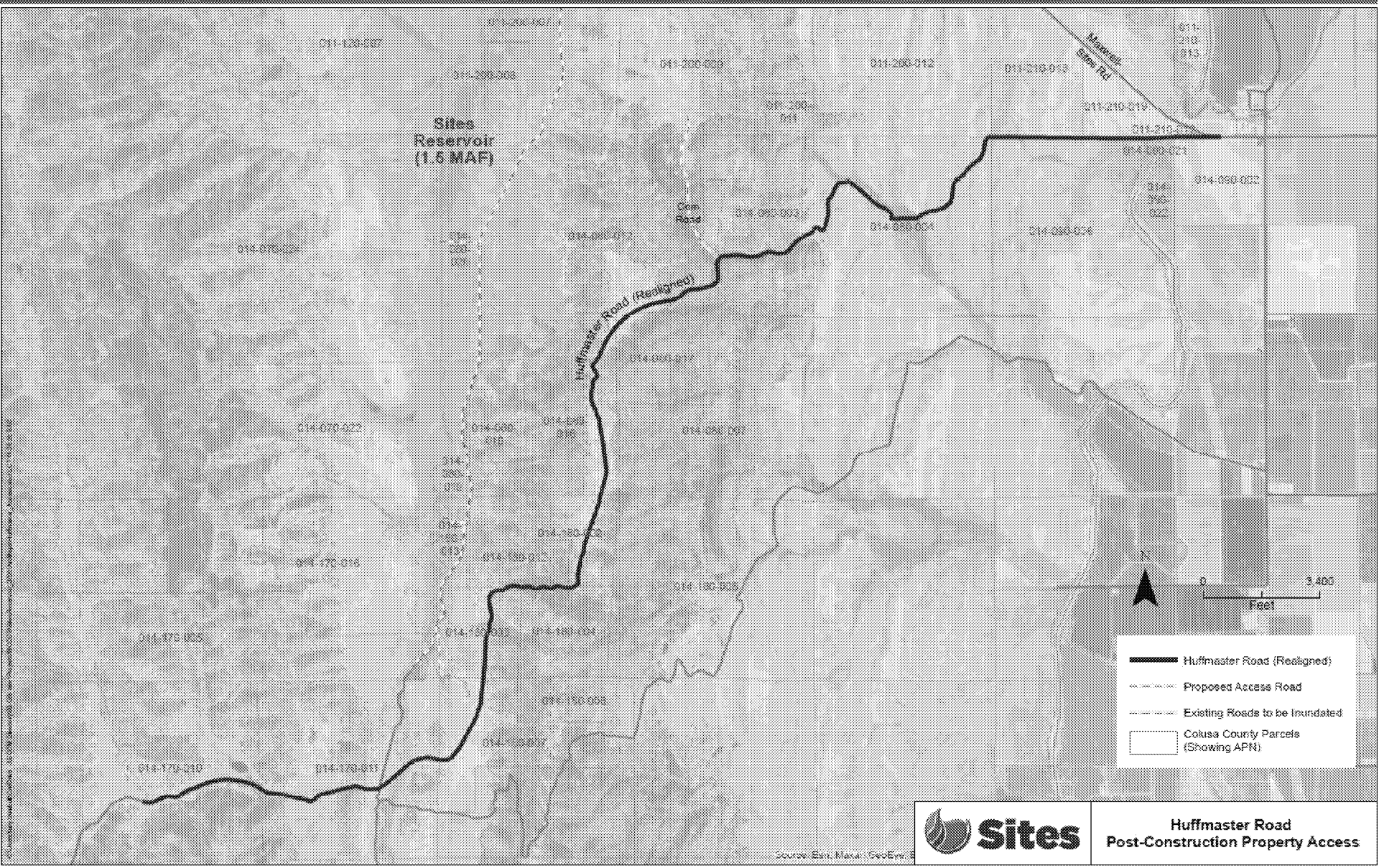
Draft_0022722

Access for Landowners – Huffmaster Road



Draft_0022723

Access for Landowners – Huffmaster Road



Draft_0022724

From: Amparo Flores [AFlores@BrwnCald.com]
Sent: 3/1/2023 12:01:11 PM
To: JP Robinette [jrobinette@sitesproject.org]; Cheyanne Harris [CHarris@BrwnCald.com]
Subject: RE: Cooperative Agreement Workplan
Attachments: Wheeling Rate Review Report 12-30-19 revised.pdf; Pages from ACWD Report - LVE Usage Fees Only.pdf

Following up on the Cooperative Agreement work plan meeting, attached is the Bartle Wells report for LVE from 2019 (I can't believe this was 4 years ago…). I have also attached a presentation from ACWD's Board meeting back in 2020 to give you a sense of issues being discussed at that time.

Amparo

From: JP Robinette <jrobinette@sitesproject.org>
Sent: Thursday, February 23, 2023 10:17 AM
To: Cheyanne Harris <CHarris@BrwnCald.com>; Amparo Flores <AFlores@BrwnCald.com>
Subject: Re: Cooperative Agreement Workplan

My notes, as discussed. Also, most recent term sheets shared with Facility Partners here (as of September 2021):

GCID Term Sheet
TCCA Term Sheet

Notes from today:

- Approach
  - Lori and Joe are thinking about a cover page / task order (for each agency), with common scope attachment.
  - Leverage Bartle Wells LVRE wheeling report example
  - Decision: start with one agreement, work toward a common methodology
- Tasks for Workplan

1. Sites Project permit application and planning document reviews
   - List examples: FERC, EIR, Army Corps
   - Resource: Facility Partner Staff
2. Development of Facilities Use Agreements
   - Process for establishing and updating wheeling rates (true-up), escalation, etc.
   - Wheeling rate development
     - Cost basis
     - Share of costs (modeling)
   - Resource: Facility Partner Staff and a wheeling rate consultant
   - Assumptions
     - Contract drafting led by Authority
3. Development of Design and Construction Agreements

- Allocation of costs and responsibilities for construction of improvements
- Assumptions
- Contract drafting led by Authority

- Schedule and term
  - Through the end of A3, Dec 31, 2024
  - Simple schedule showing three tasks, to be developed with the partners

---

From: Cheyanne Harris
Sent: Wednesday, February 15, 2023 8:35 AM
To: Cheyanne Harris <CHarris@BrwnCald.com>; JP Robinette <jrobinette@sitesproject.org>; Amparo Flores <AFlores@BrwnCald.com>
Subject: Cooperative Agreement Workplan
When: Thursday, February 23, 2023 9:00 AM-10:00 AM.
Where: Microsoft Teams Meeting

Moving due to JP's jury duty.

Holding some time to discuss the TCCA/GCID Cooperative Agreement Workplan development.

Amparo: we'll explain more context (either in our 2/2 call or during this call) – charge your time to 159435.031.002.

This is not time-sensitive so can move in case of a conflict.

Thanks.

Cheyanne Harris, P.E.*
Brown and Caldwell
CHarris@brwncald.com
T 916.853.5349 | **C** 916.628.2352
*Professional Registration in California
Pronouns: she/her/hers

Microsoft Teams meeting

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(888) 404-2493,,325241078# United States (Toll-free)
Phone Conference ID: 325 241 078#
Find a local number | Reset PIN

Brown AND Caldwell

A Brown and Caldwell Teams meeting has been created for this event.

Learn More | Help | Meeting options

From: Amparo Flores [AFlores@BrwnCald.com]
Sent: 3/1/2023 12:02:44 PM
To: JP Robinette [jrobinette@sitesproject.org]; Cheyanne Harris [CHarris@BrwnCald.com]
Subject: RE: Cooperative Agreement Workplan
Attachments: Attachment 2 CCWD Usage Fees Presentation.pdf

And here's a 2020 CCWD presentation to GMs with more details.

From: Amparo Flores
Sent: Wednesday, March 1, 2023 11:51 AM
To: 'JP Robinette' <jrobinette@sitesproject.org>; Cheyanne Harris <CHarris@BrwnCald.com>
Subject: RE: Cooperative Agreement Workplan

Following up on the Cooperative Agreement work plan meeting, attached is the Bartle Wells report for LVE from 2019 (I can't believe this was 4 years ago…). I have also attached a presentation from ACWD's Board meeting back in 2020 to give you a sense of issues being discussed at that time.

Amparo

From: JP Robinette <jrobinette@sitesproject.org>
Sent: Thursday, February 23, 2023 10:17 AM
To: Cheyanne Harris <CHarris@BrwnCald.com>; Amparo Flores <AFlores@BrwnCald.com>
Subject: Re: Cooperative Agreement Workplan

My notes, as discussed. Also, most recent term sheets shared with Facility Partners here (as of September 2021):

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TCCA Term Sheet

Notes from today:

- Approach
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- Resource: Facility Partner Staff and a wheeling rate consultant
- Assumptions
- Contract drafting led by Authority

3. Development of Design and Construction Agreements
- Allocation of costs and responsibilities for construction of improvements
- Assumptions
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- Schedule and term
  - Through the end of A3, Dec 31, 2024
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From: Cheyanne Harris
Sent: Wednesday, February 15, 2023 8:35 AM
To: Cheyanne Harris <CHarris@BrwnCald.com>; JP Robinette <jrobinette@sitesproject.org>; Amparo Flores <AFlores@BrwnCald.com>
Subject: Cooperative Agreement Workplan
When: Thursday, February 23, 2023 9:00 AM-10:00 AM.
Where: Microsoft Teams Meeting

Moving due to JP's jury duty.

Holding some time to discuss the TCCA/GCID Cooperative Agreement Workplan development.

Amparo: we'll explain more context (either in our 2/2 call or during this call) – charge your time to 159435.031.002.

This is not time-sensitive so can move in case of a conflict.

Thanks.

Cheyanne Harris, P.E.*
Brown and Caldwell
CHarris@brwncald.com
T 916.853.5349 | **C** 916.628.2352
*Professional Registration in California
Pronouns: she/her/hers

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A Brown and Caldwell Teams meeting has been created for this event.

Learn More | Help | Meeting options

Sites Reservoir Project

Northern California Water Association

Annual Meeting

March 03, 2023

Sites

Why has the Sites Reservoir in California taken such a long time to get built?

The Sites Reservoir in California has taken a long time to get built for a variety of reasons, including:

1. Funding: One of the biggest hurdles in building the Sites Reservoir has been securing funding. The project has a price tag of over $5 billion, and getting the necessary funds has been a challenge. The project is being funded through a combination of state and federal grants, as well as private investments, but the funding has been slow to come in.

2. Regulatory and environmental hurdles: The Sites reservoir project has faced numerous regulatory and environmental hurdles, including obtaining the necessary permits from various agencies such as the California Department of Water Resources and the U.S. Army Corps of Engineers. The project has had to go through a rigorous environmental review process, which has taken years to complete.

3. Political and stakeholder interests: The Sites Reservoir project has also faced opposition from various stakeholders, including environmental groups, native American tribes and farmers. There have been concerns about the potential impact on wildlife and natural habitats, as well as the potential for the reservoir to divert water away from other areas.

4. Design and engineering challenges: Building a reservoir of this size and complexity involves significant design and engineering challenges. The Sites Reservoir will have a storage capacity of 1.8 million acre-feet, and will require the construction of a dam, pumping stations and other infrastructure. Ensuring that the project is designed and built to withstand earthquakes and other natural disasters has also been a significant challenge.

All of these factors have contributed to the lengthy timeline for the Sites Reservoir project. Despite these challenges, the project is still moving forward, and construction is expected in the next few years.

What should be done to get the Sites Reservoir in California built quicker?

To get the Sites Reservoir in California built quicker, several actions could be taken, including:

1. Streamline the regulatory process: To speed up the project's approval process, there could be efforts to streamline the regulatory and permitting process. This could involve the creation of a single regulatory agency that oversees the entire process or accelerates the timeline for environmental reviews.

2. Increase funding: The project's funding could be increased by allocating more resources from state and federal governments and by attracting private investment. Additionally, funding could be made available for construction as soon as possible to avoid any delays.

3. Address stakeholder concerns: Addressing the concerns of stakeholders, such as environmental groups, Native American tribes, and farmers could help build support for the project and prevent potential legal challenges that could delay construction.

4. Utilize innovative construction techniques: Using innovative construction techniques and technologies, such as modular construction or 3D printing, could speed up the construction process while also reducing costs.

5. Engage in collaborative planning and decision–making: Engaging in collaborative planning and decision-making with all stakeholders involved in the project could help identify and address any potential issues before they become major roadblocks to construction.

By taking these steps, it may be possible to expedite the construction of the Sites Reservoir and deliver much-needed water storage capacity to the state of California.

Questions

Sites

From: Hartman, Jelena@Waterboards [Jelena.Hartman@waterboards.ca.gov]
Sent: 3/2/2023 10:03:01 AM
To: Angela Bezzone [bezzone@mbkengineers.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; WB-Sites WR Application [Sites-WR-Application@Waterboards.ca.gov]
Subject: RE: Sites Application Check-In

Hi Angela-

Just floating this to the top of your inbox.

Are there any updates from Wes regarding the CalSim tables in the WAA Report and in the FEIR? And, should we plan a meeting to address any ministerial cleanup for potential typos/errors in the application material?
Thanks,

Jelena

From: Hartman, Jelena@Waterboards
Sent: Friday, February 10, 2023 8:45 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; WB-Sites WR Application <Sites-WR-Application@Waterboards.ca.gov>
Subject: RE: Sites Application Check-In

Good morning Angela-

Thanks for finding multiple options. Tuesday at 9 works; I'll send the invite shortly.
Sorry about all the typos. I'll use the failing keyboard battery as an excuse.

Jelena

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Friday, February 10, 2023 8:39 AM
To: Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; WB-Sites WR Application <Sites-WR-Application@Waterboards.ca.gov>
Subject: RE: Sites Application Check-In

EXTERNAL:

Good morning,

Unfortunately, I am not available today. But below is my availability for early next week. Please let me know what works for you. If none of these work, we can look later in the week or I can move things around to make time.

Monday: 8-9, 11-1, 3:30-5
Tuesday: 9-10:30
Wednesday: 12-3

In regard to your CalSim question, I will get back to you soon! I have asked Wes to look at the two tables you mentioned below.

Thanks,
Angela

From: Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>
Sent: Thursday, February 9, 2023 3:12 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; WB-Sites WR Application <Sites-WR-Application@Waterboards.ca.gov>
Subject: RE: Sites Application Check-In

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

Hi Angela-

Thank you for reaching out to offer assistance with the noticing material. I will check with staff working on that if this may be of help and will let you know.

There is a short list of admin items to straighten out so that the application material is as easy to navigate as possible. Would you have time for a quick call to go over this? Please let me know if sometime tomorrow 11 am-2 pm would work, or feel free to propose some time slots next week. I anticipate we would need one hour for this.

Finally, can you help me understand the difference in the CalSim results for historical hydrology summarized in Table B-1 of the Sites WAA Report and Table 5B1-3-4c in the February 2023 admin Final EIR? There are minor differences sprinkled across year types and month, however the differences for December are substantial. The CalSim II model in the WAA Report is the one produce in support of the FEIR, so I'm wondering if there is an error in one of the table or if there is another explanation for the discrepancy.

Looking forward to connecting soon.

Best,

Jelena

Jelena Hartman
Environmental Program Manager
Division of Water Rights, Bay-Delta
California State Water Board
jelena.hartman@waterboards.ca.gov

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Thursday, February 9, 2023 2:48 PM
To: Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>
Subject: Sites Application Check-In

EXTERNAL:

Hi Jelena,

Based on recent conversations, it sounds like we can expect the Sites Reservoir water right application to be noticed relatively soon. I wanted to reach out to you to offer our assistance in anyway in drafting noticing materials. We have drafted a summary of the application based on a recent example of an application notice that might be of use to you. Alternatively, if there is anything you have prepared and would like our review, please feel free to send it our way, or we can set up a call to talk through things. Please let me know how we can help!

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 [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/2/2023 3:10:46 PM
To: RWelsh@usbr.gov
Subject: Sites Project - Diversions by Water Year and Month
Attachments: NODOS_SPJPA2020 - 5R1-3b Total Sites Diversion to Fill Diversion Monthly Patterns.pdf

Hi Richard, Attached are graphics showing Sites diversions by water year type and by month, averaged by month.

Let me know if these hit the mark or if you were thinking of something different.

Ali

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

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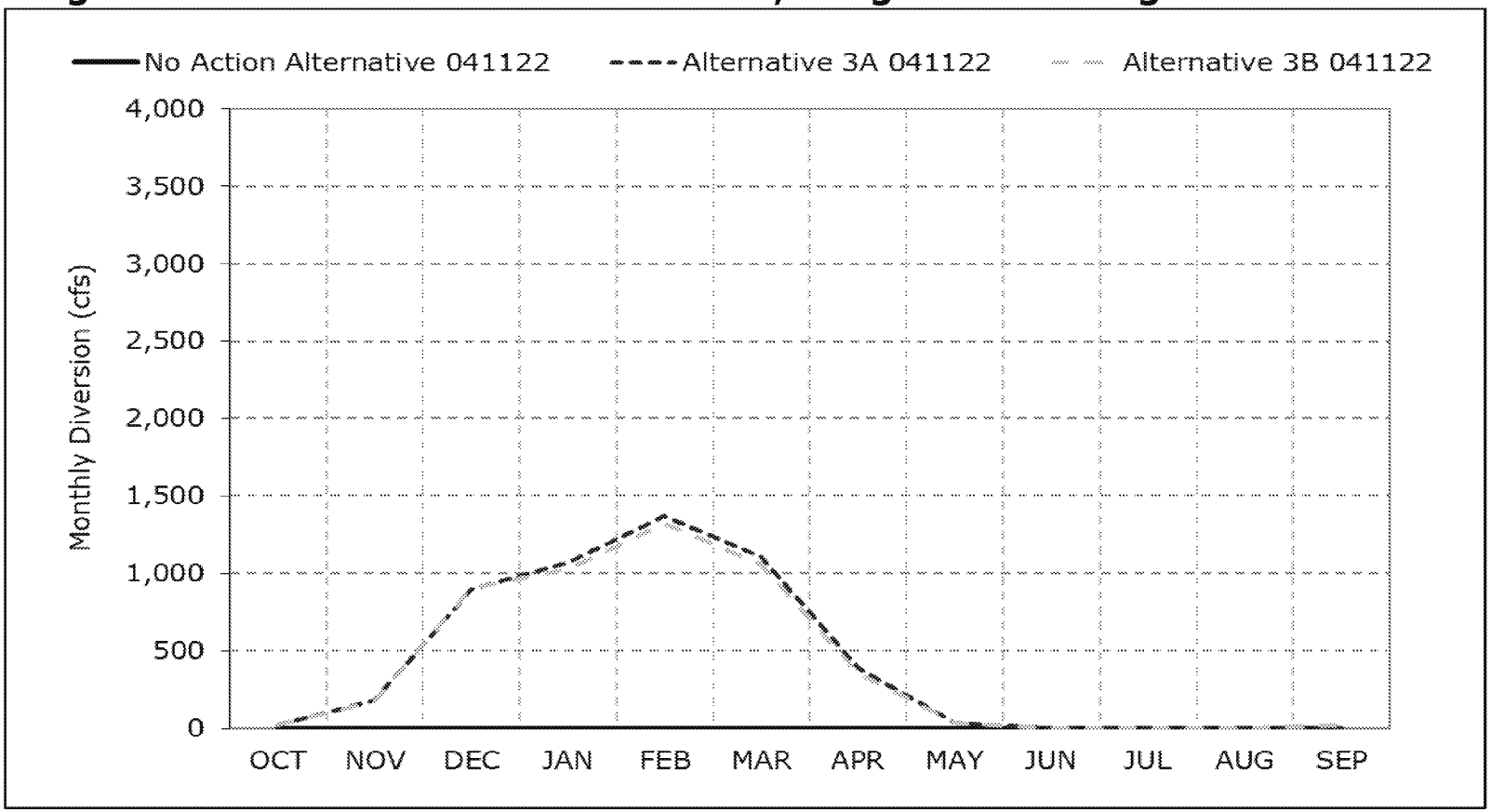
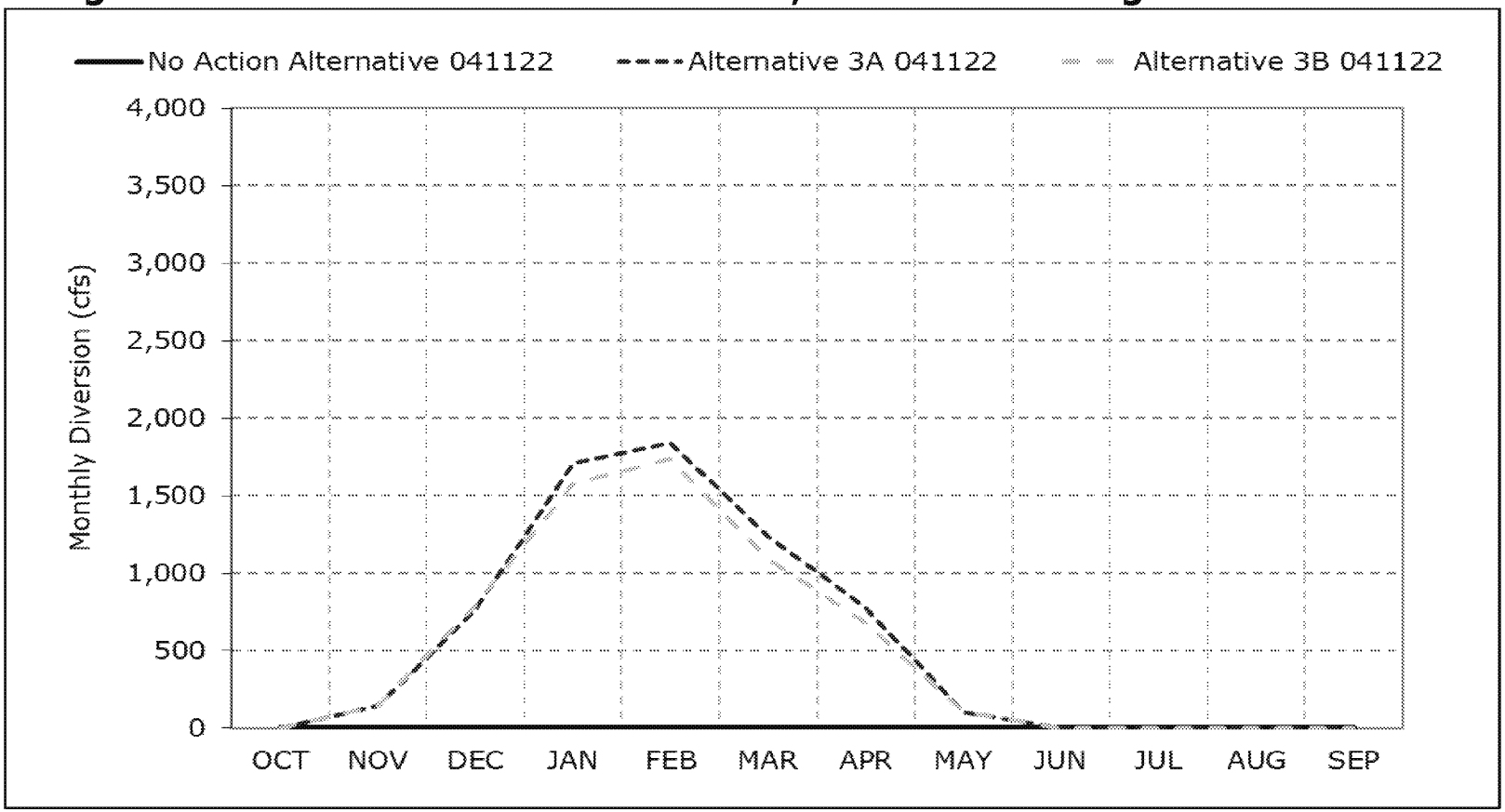
Figure 5R1-3-1. Total Sites Diversions, Long-Term Average Diversion



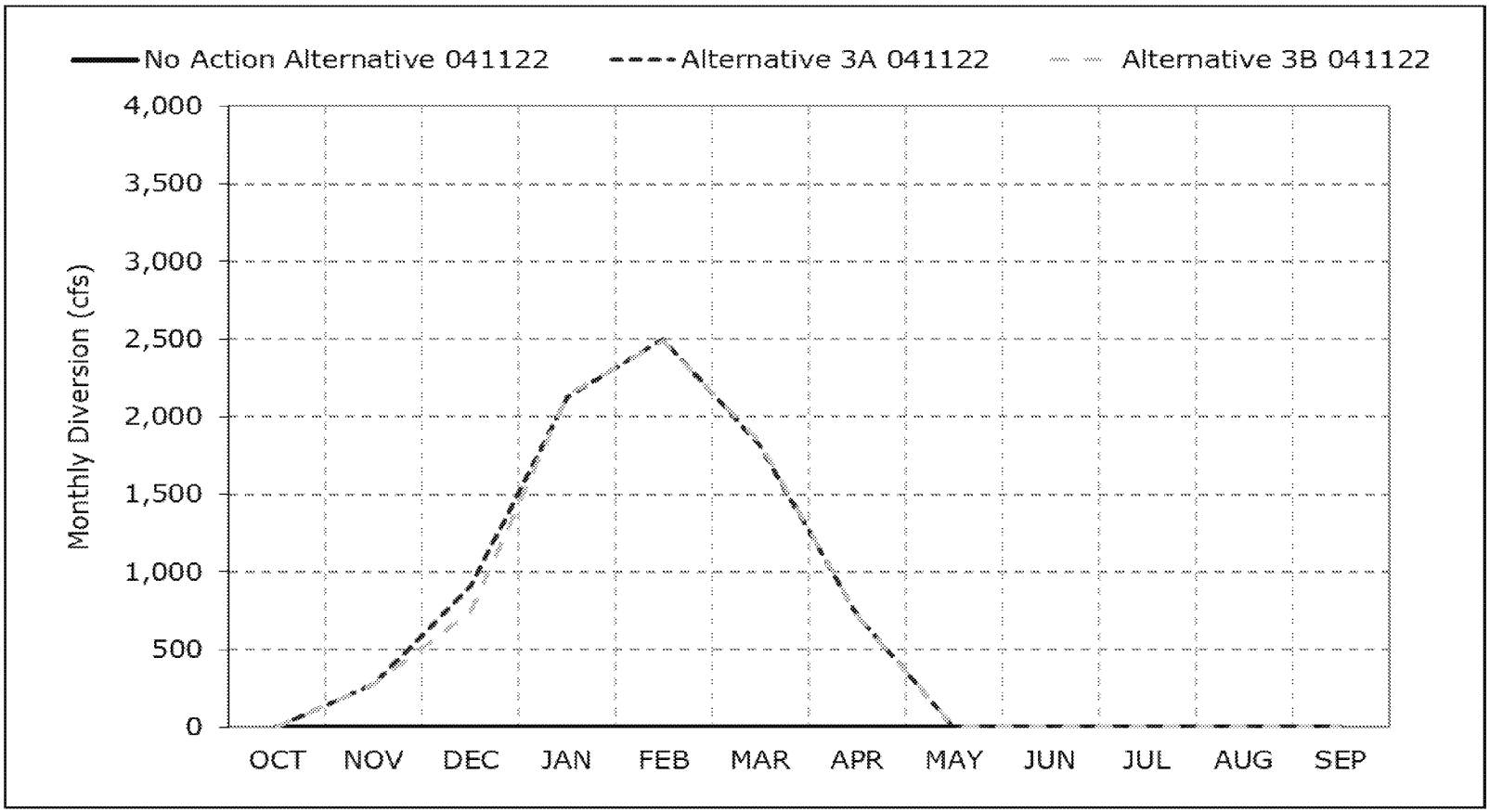
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*Scenarios are simulated with 2035 Central Tendency climate change and 15 cm sea level rise.

Figure 5R1-3-2. Total Sites Diversions, Wet Year Average Diversion



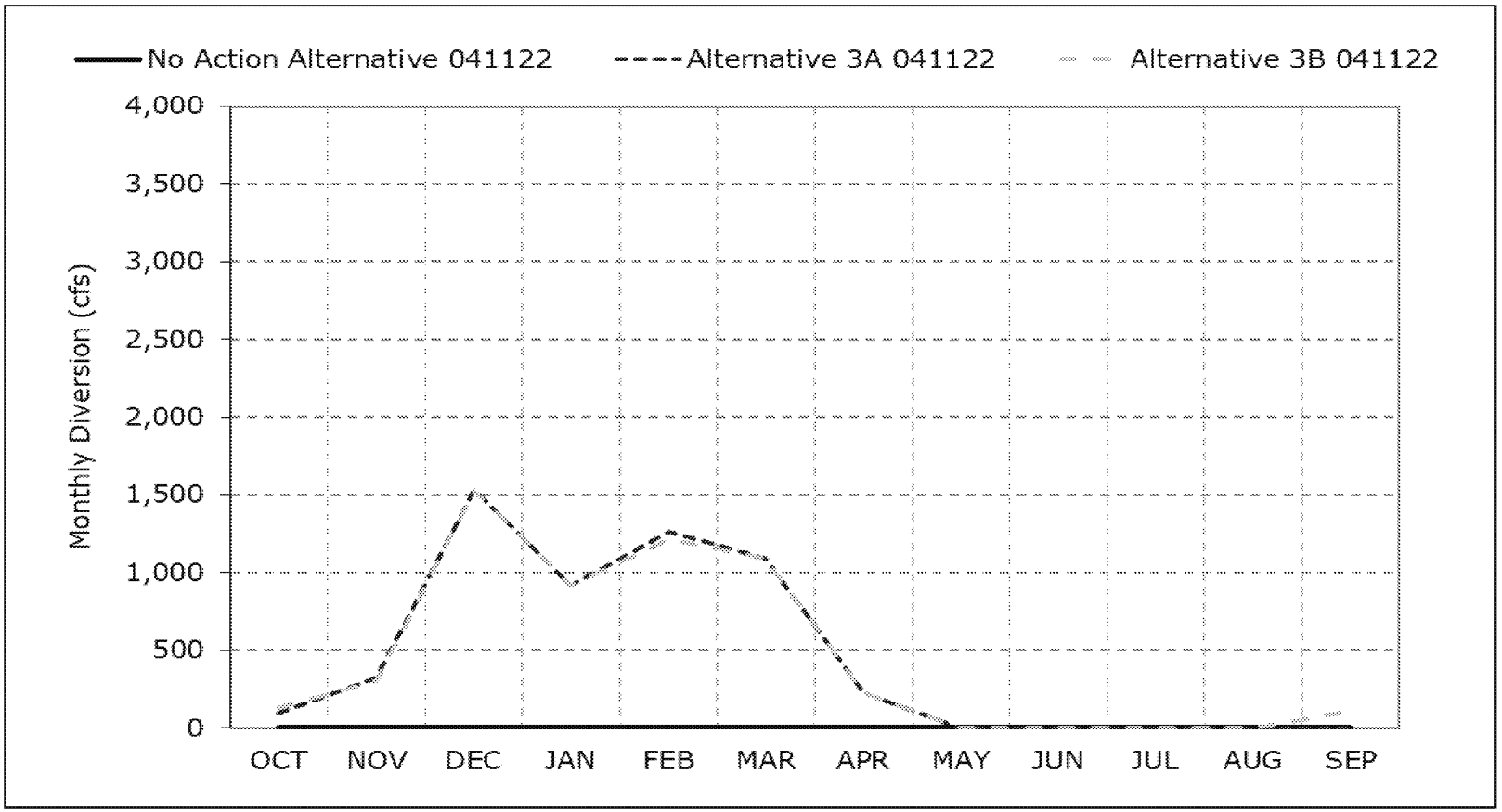
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*Scenarios are simulated with 2035 Central Tendency climate change and 15 cm sea level rise.

Figure 5R1-3-3. Total Sites Diversions, Above Normal Year Average Diversion



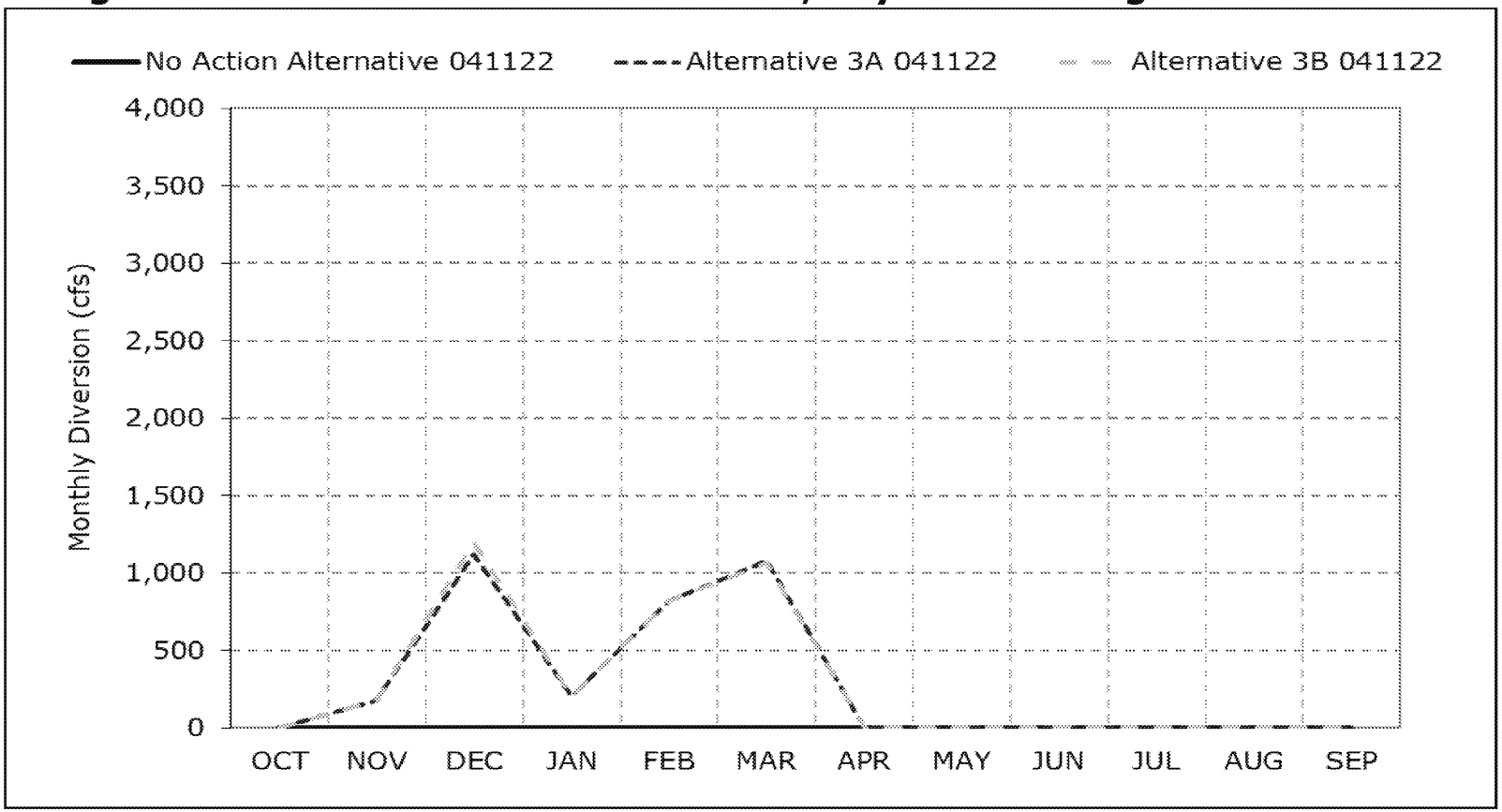
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*Scenarios are simulated with 2035 Central Tendency climate change and 15 cm sea level rise.

Figure 5R1-3-4. Total Sites Diversions, Below Normal Year Average Diversion



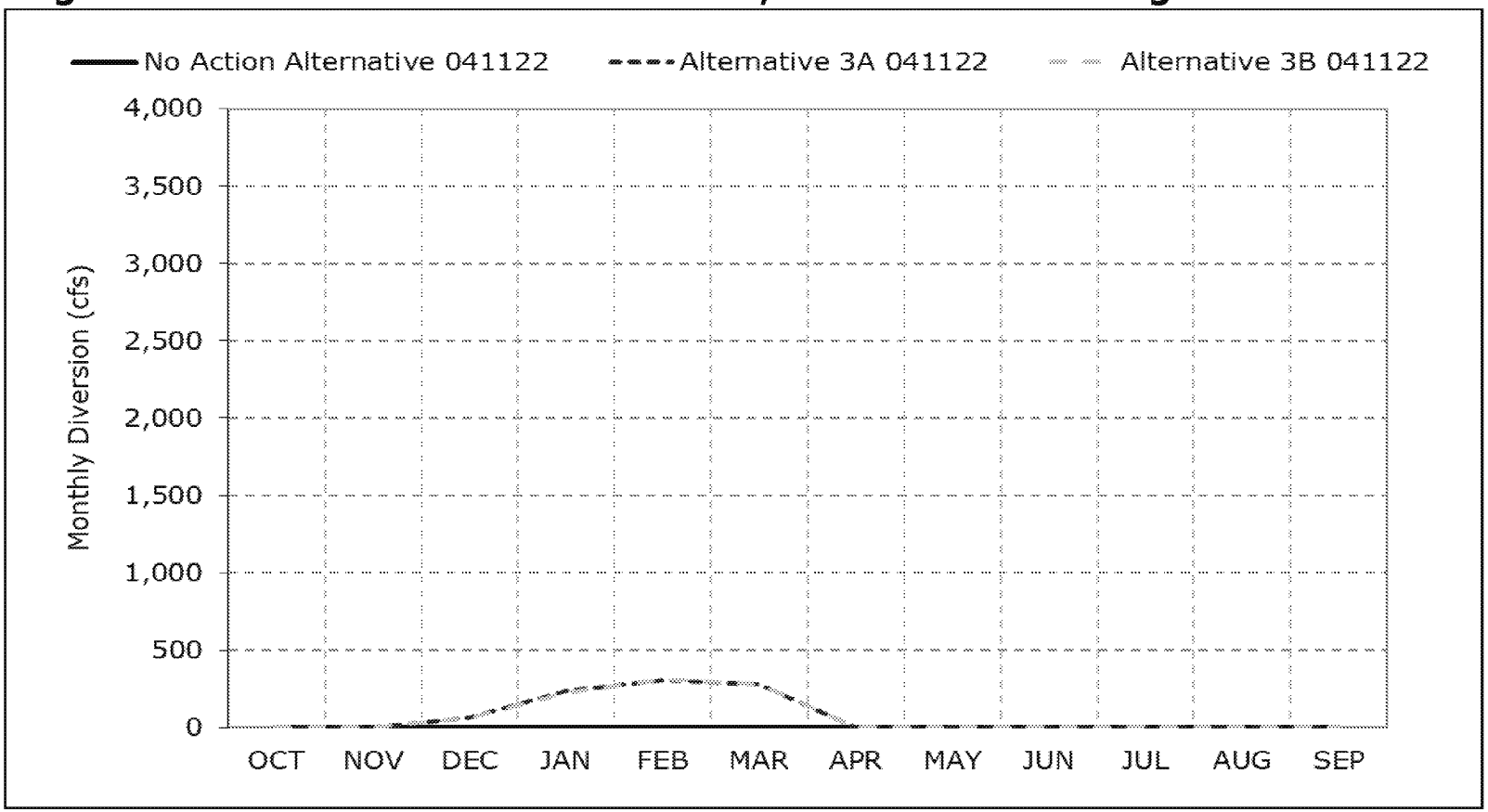
*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*Scenarios are simulated with 2035 Central Tendency climate change and 15 cm sea level rise.

Figure 5R1-3-5. Total Sites Diversions, Dry Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*Scenarios are simulated with 2035 Central Tendency climate change and 15 cm sea level rise.

Figure 5R1-3-6. Total Sites Diversions, Critical Year Average Diversion



*As defined by the Sacramento Valley 40-30-30 Index Water Year Hydrologic Classification (SWRCB D-1641, 1999).
*These results are displayed with calendar year - year type sorting.
*Scenarios are simulated with 2035 Central Tendency climate change and 15 cm sea level rise.

File Provided Natively

Sites Project Fishery Workshop

June 1, 2022

Sites

Draft - Predecisional Working Document - For Discussion Purposes Only

Agenda

- Review of Previous Action Items
- Diversion Criteria Update
- Exchanges Update
- Modeling Update
- Schedule
- Open Topics
- Adjourn

Draft_0022749

Diversion Criteria

John Spranza

Sites

Alternatives Considered in the Revised Draft EIR/Supplemental Draft EIS

Facilities / Operations	Alternative 1	Alternative 2	Alternative 3
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 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

Draft_0022751

Sites Diversion Criteria Evolution

	2017 Draft EIR/EIS	2021 RDEIR/SDEIS	2022 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 is detected, diversions would cease for 7 days	Same as 2017 DEIR/EIS	Similar except the following: (1) a qualified precipitation-generated pulse event is determined based on forecasted flows and (2) pulse protection may cease earlier than 7 days if flows at Bend Bridge exceed 29,000 cfs and Project diversions subtracted from Bend Bridge flows continue to be at least 25,000 cfs.
Minimum Bypass Flows at Wilkins Slough	Diversions allowed when flows below Wilkins Slough are above 5,000 cfs	10,700 cfs in March through May; 5,000 cfs all other times	10,700 cfs October through June; 5,000 cfs September (not diverting from June 15 to end of August)
Minimum Bypass Flows in the Sacramento River	3,250 at RBDD and 4,000 cfs at Hamilton City; rate of diversion controlled by fish screen designs	No change	No change

Draft_0022752

Sites Diversion Criteria Evolution

	2017 Draft EIR/EIS	2021 RDEIR/SDEIS	2022 Final EIR/SEIR
Fremont Weir Notch Protections	No specific criteria	No more than 1% reduction in flow over weir when spill over the weir are less than 600 cfs. No more than a 10% reduction in flow over weir when spills over the weir are between 600 cfs and 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
Sacramento River Fully Appropriated Stream and Delta Conditions	No specific criteria	Diversions allowed only when the Sacramento River is not fully appropriated (September 1 through June 14) and when Delta is in excess conditions as determined by DWR & Reclmation	No change
Freeport, Net Delta Outflow Index, X2, and Delta Water Quality	Diversions only be allowed when a Sacramento River flow of 15,000 cfs is present at Freeport in January; 13,000 cfs in December and February through June; and 11,000 cfs in other months.	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

Draft_0022753

Diversion Criteria - Analyses Status

- Currently using these diversion criteria in analyses for BA and ITP
- Final EIR/EIS analyses are also beginning
- Further updates will be given when we have enough results
  - Salmonid-focused meeting
  - Non-salmonid meeting

Draft_0022754

Exchanges

Steve Micko

Sites

Operations Overview

- Diversions
  - Red Bluff Pumping Plant
  - Hamilton City Pump Station
- Releases
  - TC Canal
  - GCID Canal
  - North Delta (Yolo Bypass)
  - South of Delta
- **Exchanges**
  - **Reclamation**
  - **DWR**
- Exports through the Delta

Shasta Exchanges

- Previous Modeling Focus:
  - Sites-Shasta exchanges focused on improving Shasta cold water pool management and incidentally improved Fall Flow Stability
- Revised Modeling Focus:
  - Shasta exchanges support Shasta cold water pool management, Fall Flow Stability and Spring Pulse Flow actions

Draft_0022757

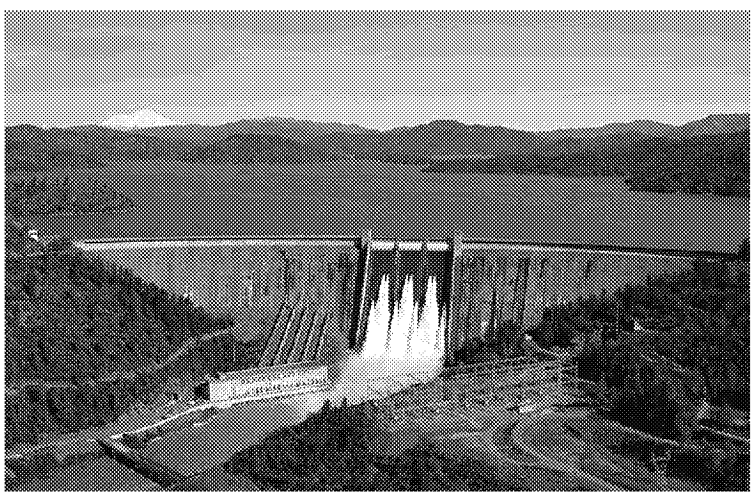
Shasta Exchanges – Cold Water Pool Modeling Criteria

Criteria	RDEIR/SDEIS	Final EIR/EIS
Period	Dry: Apr – Jun Critical: Apr – May	Dry: Apr – Jun Critical: Apr – May
Water year types	Dry and Critical water years	Dry and Critical water years
Temperature Management Tier	Tier 2, 3 and 4 years	Tier 3 and 4 years
Min. flow at Sacramento River at Keswick	Apr – May: 6,000 cfs Jun: 10,000 cfs	No criteria
Temperature Criteria	Apr – Jun: Tiers 2 and 3: 53.5 deg F Tier 4: 56 deg F	No criteria
Sacramento Valley Conditions	Only occurs during Balanced conditions	Only occurs during Balanced conditions

Draft_0022758

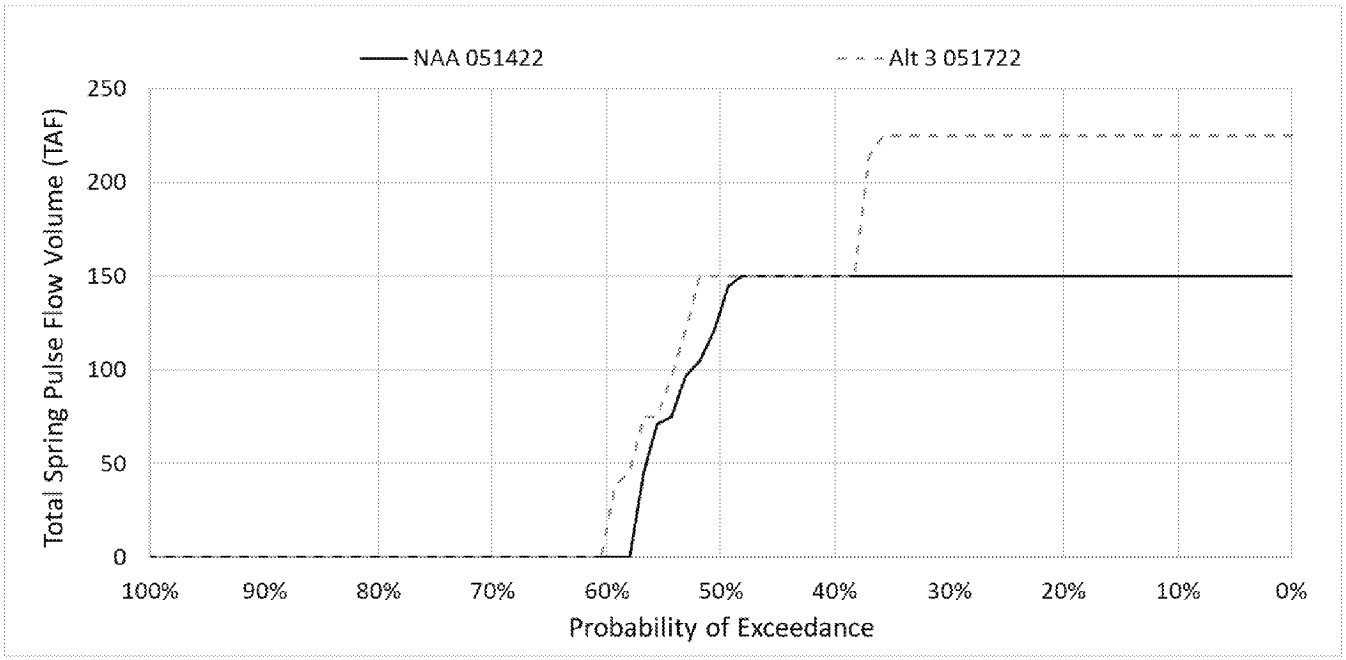
Shasta Exchanges – Fall Flow Stability Modeling Criteria

- Additional Fall Flow Stability may occur:
  - Between October through February
  - Sites storage is greater than 80% at the end of May
  - Previous month Shasta storage is greater than 3.2 MAF
  - Fall stability flows are already active



Shasta Exchanges – Spring Pulse Modeling Criteria

- Additional Spring Pulse may occur in May:
  - Sites storage is greater than 80% at the end of April
  - End of April Shasta storage is greater than 4.1 MAF



Draft_0022760

Open Topics and Agenda for Next Meeting

Sites

Thank you!

Sites

From: Nishikawa,George M [GNishikawa@mwdh2o.com]
Sent: 3/6/2023 9:22:49 AM
To: Spranza, John [john.spranza@hdrinc.com]
CC: Bradshaw,Dee [VBradshaw@mwdh2o.com]; Angela Bezzone [bezzone@mbkengineers.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Project Operations Overview

Hi John,

Thank you so much for this slide deck, very helpful to wrap my head around the operations. It was great meeting you as well, always nice to get together in person!

If I wanted to review SOD deliveries broken down by year type, are the Surface Water Chapters/Appendix in the current Nov 2021 EIR still the current best available resource?

Thank You,

George Nishikawa
Resource Specialist, Bay Delta Initiatives
Metropolitan Water District of Southern California
812-606-3315 (c)
gnishikawa@mwdh2o.com

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Monday, March 6, 2023 8:24 AM
To: Nishikawa,George M <GNishikawa@mwdh2o.com>
Cc: Bradshaw,Dee <VBradshaw@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Sites Project Operations Overview

Hi George,

It was good to meet you at NCWA. To help you get a general overview of how the project works, I have attached a PowerPoint overview of the Project's operations taken from a June 2022 agency workshop. It is very high level, but it's what I think you were looking for. I'd be happy to schedule some time to go over this if you would like. Please feel free to call if you have any questions.
Regards,
John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist
He/Him

HDR
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916.679.8858 M 818.640.2487
john.spranza@hdrinc.com

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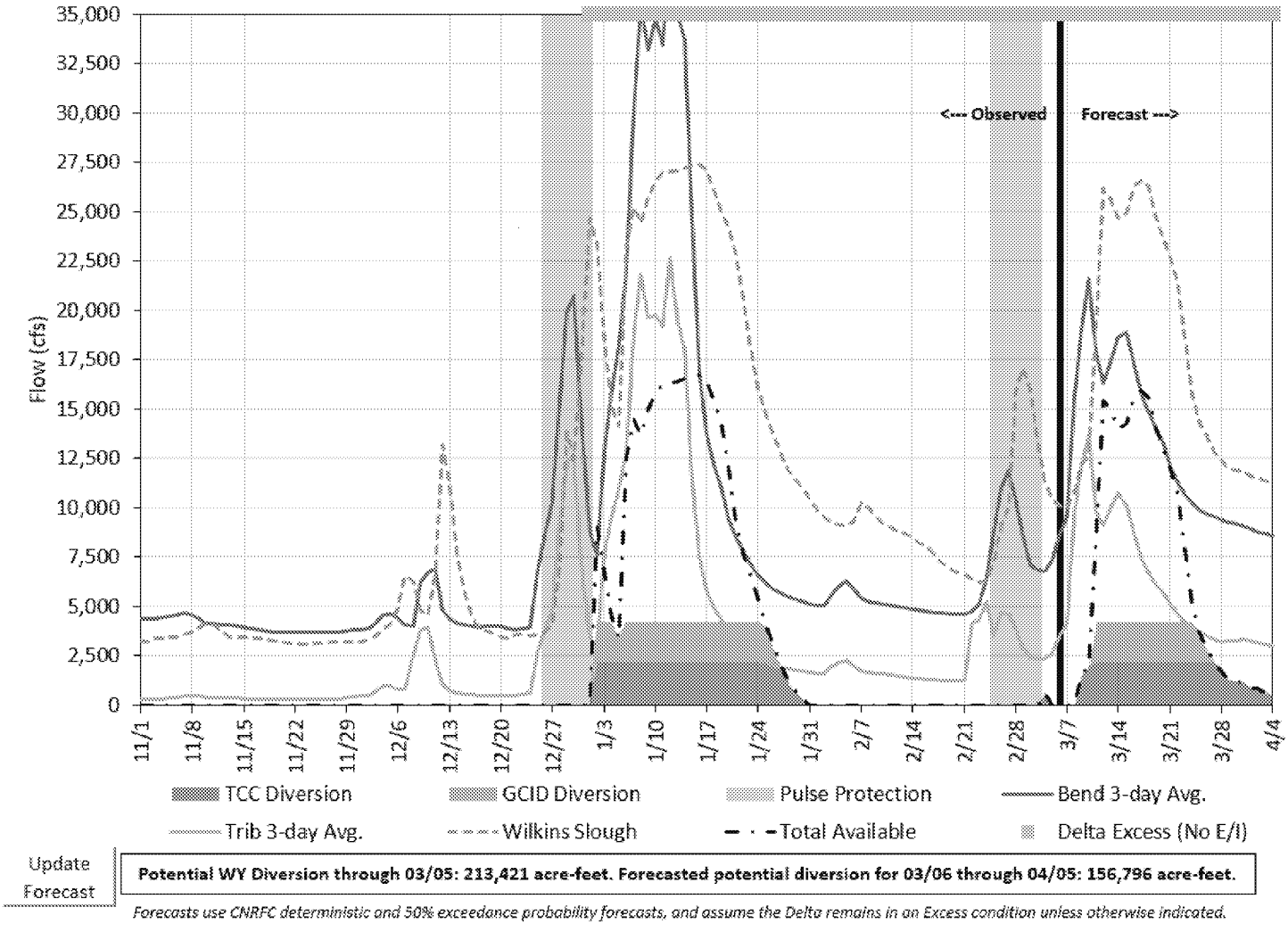
From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 3/6/2023 9:54:45 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Sites
Attachments: 2023-02-16 Sites Diversion Forecast Tool.xlsm

The tool is working. I just had to go back to a previous version that had not attempted to pull the corrupt data. Clean version is attached for your use.

Getting to the request from Dan Keppen, the tool indicates a total of 213 TAF so far this water year, with the potential for up to 156 TAF over the next 30 days!



From: Wesley Walker <walker@mbkengineers.com>
Sent: Thursday, February 16, 2023 10:21 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites

From: Wesley Walker
Sent: Thursday, February 16, 2023 10:15 AM

To: Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites

From: Wesley Walker
Sent: Thursday, February 16, 2023 10:12 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Subject: Sites

Wesley Walker, P.E.
MBK Engineers
455 University Avenue, Suite 100
Sacramento, CA 95825
Phone: (916) 456-4400
Cell: (714) 350-6184
Fax: (916) 456-0253

File Provided Natively

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/6/2023 3:43:18 PM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: Sites Project - Admin Final EIR/EIS Comments

No comments from Colusa County or TCCA. Haven't heard back from GCID, but I think you can assume no comments.

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: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/6/2023 3:51:27 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Sara M. Katz [skatz@katzandassociates.com]; Emily Fan Michaelson [emichaelson@katzandassociates.com]; Ann Newton [anewton@katzandassociates.com]
Subject: Sites EIR Video Outlines for Review
Attachments: EIR Videos Outline.docx

Hi Ali and Kevin,
We put together a broad outline for the Sites EIR videos we've discussed and would love your input before we move forward with scripting. Pulling from the updated 2023 messaging, we thought the two videos could center on the themes of collaboration and innovative environmental benefits.

If these outlines look good, we will move forward with building out a more robust script and storyboard for each. Please let us know if you have any questions or feedback!

Thank you,
Quin

K&A
KATZ & ASSOCIATES

Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

Sites Reservoir EIR Video Outlines

Video #1 – A Collaborative Effort

Theme: Collaboration between local, state, and federal agencies

- Sites has support across all levels of government and the project would not be possible without this collaboration
- Participation in Sites Reservoir is as broad and diverse as the communities they serve: more than 24 million Californians and more than 500,000 acres of farmland
- The project is possible thanks to continued support from state and federal partners: Prop 1 funding is possible due to the dedicated source of water for the environment and federal investment enhances these environmental benefits
- The Authority has spent over a decade engaging the public, stakeholders, and landowners to achieve a project that can increase California's water supply resiliency while protecting and enhancing California's environment

Visuals: Overview of project site, California farmland, Sacramento River/Valley, group shots of interviewees

Speakers: Jerry Brown, Rob Cooke- California Department of Water Resources, Don Bader- U.S. Bureau of Reclamation

Length: 60 seconds

Video #2 – A First of Its Kind

Theme: 21st century system designed with core value of environmental stewardship

- The environment is the single largest beneficiary of water out of Sites Reservoir
- Sites is designed with environmental values in mind: does not dam a major river system and does not threaten fish migration or spawning
- Sites is a flexible storage solution designed to adapt to future climate conditions and will improve water supply resiliency for California's environment, communities, and farms when it's most needed; Modeling shows that Sites performs better under challenging climate change conditions
- Sites creates a first-of-its-kind environmental water asset for California that will help aquatic species and habitats withstand dry year conditions

Visuals: Overview of project site, shots of salmon and other animals in the Delta ecosystem, flowing river water, natural basin filling up with water, dry/cracked earth

Speakers: Ali Forsythe, Fritz Durst- Chair/Reclamation District No. 108

Length: 90 seconds

DRAFT

From: Davis-Fadtke, Kristal@Wildlife [Kristal.Davis-Fadtke@wildlife.ca.gov]
Sent: 3/7/2023 8:15:35 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Jacobson, Allison M [ajacobson@usbr.gov]
Subject: FW: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review
Attachments: V1-015-Ch10_Wildlife_AdminFinal.docx; V2-008-App02D_BMPs_Plans_Studies_AdminFinal (1).docx; V1-004-Ch00_Exec_Summ_AdminFinal.docx

Good morning,

I just realized this email did not go through because the file sizes are too large. My apologies for the delay. I will send the last file in a separate email.

Kristal

From: Davis-Fadtke, Kristal@Wildlife
Sent: Friday, March 3, 2023 1:22 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; john.spranza@hdrinc.com; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hello,

Please find attached CDFW's comments on Group 1.

Have a great weekend.

Kristal

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Friday, February 24, 2023 2:11 PM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Cohen, Ariel <Ariel.Cohen@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>; Brick, David A <dbrick@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hello CEQA Responsible Agencies – We've had some feedback that folks could use additional time in their review. We also have a really tight schedule to finish the document, so are trying to balance these requests with the Project schedule. We've come up with the following approach:

Group 1 – Chapters, Appendices, and Responses generally NOT reliant on the new modeling will now be due on March 3. This gives a few extra days for your review and allows us to get moving on changes to these chapters relatively on schedule.

Group 2 – Chapters, Appendices and Responses generally WITH the new modeling will now be due on March 14. This gives an additional 2 weeks for your review of these heftier sections.

The attached document outlines this in more detail. Please let me know if you have any questions or concerns.

We look forward to your comments.

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: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Wednesday, February 22, 2023 5:17 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hi Laurie,

We have been able to access all the files and are in the middle of our review. Given that the last of the files were received on February 11, we will not be able to provide comments until March 8.

Best,

Kristal

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, February 22, 2023 12:45 PM
To: Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

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Good afternoon all -

We are checking in on the status of your review and comments on the Sites Reservoir Administrative Final EIR/EIS. Please let me know if there are any ongoing issues with access and your ability to add comments (in comment bubbles) to the files. We also would like to know if there are any problems in meeting the schedule to submit your comments by February 28th, which is next Tuesday.

Thank you for providing your review and comments, we very much value your input.

Laurie

From: Laurie Warner Herson
Sent: Saturday, February 11, 2023 8:00 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR

<David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning,

ICF delivered the last of the Sites Reservoir Administrative Final EIR/EIS yesterday evening. These files include responses to individual comments in table format. The tables are organized by topic and an index of table numbers and topics has been provided. All files have been upload to the Volume 3 folder on SharePoint: Vol3 RTC

This concludes the daily emails but I'm still available should there be any questions or issues in accessing files. We look forward to receiving your comments at the end of the month.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 10, 2023 8:55 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning everyone,

The following master responses to comments on the Sites Reservoir RDEIR/SDEIS have been uploaded for your review:

- Master Responses 1, CEQA and NEPA Process, Regulatory Requirements, and General Comments
- Master Response 2, Alternatives Description and Baseline
- Master Response 3, Hydrology and Hydrologic Modeling
- Master Response 4, Water Quality
- Master Response 5, Aquatic Biological Resources

- Master Response 6, Vegetation, Wetland, and Wildlife Resources
- Master Response 7, Tribal Coordination, Consultation, and Engagement
- Master Response 8, Trinity River
- Master Response 9, Alternatives Development

Individual responses to comments, organized by topic in table format, will be uploaded later today. I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Thursday, February 9, 2023 10:45 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all –

The following additional files have been uploaded for your review:

Chapters
ES. Executive Summary
ES. Table ES2
28. Climate Change

Appendices
4A, Regulatory Requirements
30B, Comparison of Regional Hydrologic Model Results to Inform Economic Analyses

These are the last of the chapter and appendix files that have been updated (see attached revised index). Volume 3, Responses to Comments will start being uploaded later today and I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 8, 2023 8:25 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all,

The following additional files have been uploaded for your review:

Chapters
6. Surface Water Quality
7. Fluvial Geomorphology
29. Indian Trust Assets
31. Cumulative Impacts
32. Other Required Analyses
33. Consultation and Coordination and List of Preparers

Appendices
21A, Reservoir GHG Calculations (NEW)

A revised index has also been uploaded and a copy is attached to this email. We are almost done with Volumes 1 and 2 and ICF has informed me that they will start uploading Volume 3 files soon. As always, please contact us if you have any issues accessing these files.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Monday, February 6, 2023 5:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR

<David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good evening,

The following files have been uploaded today:

Chapter:
30. Environmental Justice and Socioeconomics

Appendices:
10A, Wildlife Database Results
20A, Methodology for Air Quality and GHG Emissions Calculations
20C, Ambient Air Quality and Health Risk Analysis Technical Report
20C1, AERMOD Equivalency Model Demonstration (NEW)*
20C2, Model Construction Figures (NEW)*
20C3, Modeled Emissions (NEW)*
20D, Photochemical Modeling Study to Support a Health Impact Analysis

A revised index has also been uploaded and a copy is attached to this email. Please let me know if you have any issues with access or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Sunday, February 5, 2023 4:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Hello all,

The EIR/EIS Team has submitted Chapter 11, *Aquatic Biological Resources* and all remaining Chapter 11 appendices. They have also submitted the following additional appendices:

6B3, Sacramento–-San Joaquin Delta Modeling, X2 Results (DSM2-QUAL)*
6B4, Sacramento–San Joaquin Delta Modeling, Export Loading*
6B5, Water Quality Compliance*

We have added those files to the State and Federal Agency SharePoint site for your review. We also added an updated index of chapters and appendices (attached) to SharePoint. Please let us know if you have any questions or issues with access. If there are others that need access to review the files, please forward their name and email address.

Thank you for your time and input,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 3, 2023 7:57 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Good morning,

We have uploaded additional chapters for your review. These include:

Chapters
1. Introduction
21. Greenhouse Gases

Appendices
1A Introduction to Appendices and Models
2B, Additional Alternatives Screening and Evaluation
5A, Surface Water Resources Modeling of Alternatives
5A1, Model Assumptions
5A2, CALSIM II Model Assumptions Callouts
5A3, DSM2 Model Assumptions Callouts
5A4, HEC5Q and Reclamation Temperature Model Assumptions Callouts
5A5, CALSIM II Model Delivery Specifications
5A6, Model Limitations and Improvements
5A7, Daily Pattern Development for the Estimation of Daily Flows and Weir Spills in CALSIM II
5B, Water Resources System Modeling
5B1, Project Operations
5B2, River Operations

5B3, Delta Operations
5B4, Regional Deliveries
5B5, Water Supply
5C, Upper Sacramento River Daily River Flow and Operations Model (2 parts)
6B1, Sacramento–-San Joaquin Delta Modeling, Salinity Results (DSM2-QUAL)
6B2, Sacramento–-San Joaquin Delta Modeling, Chloride Results (DSM2-QUAL)
6C, River Temperature Modeling
6D, Sites Reservoir Discharge Temperature Modeling*
6D1, Sites Reservoir Discharge Temperature Modeling, Attachment 1 Reservoir Surface Water and Release Temperature
6D2, Sites Reservoir Discharge Temperature Modeling, Attachment 2 Water Temperature at Downstream Locations
6E, Water Quality Data
6F, Mercury and Methylmercury
11D, Fisheries Water Temperature Assessment Summary Table
11N, Other Flow-Related Upstream Analyses
15A, Natural Resources Conservation Service Land Evaluation and Site Assessment Explanations and Calculations for the Sites Reservoir Project (NEW
17A, CVP/SWP Power Modeling
28A, Climate Change

Please let me know if there is any problem in accessing files or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 1, 2023 4:31 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Dear Responsible Agencies,

We have uploaded initial chapters and appendices of the Sites Administrative Final EIR/EIS for your review. The files have been copied to folders at the following location on the Sites Project State and Federal Agencies SharePoint site: https://sitesreservoirproject.sharepoint.com/sites/SitesProjectStateandFederalAgencies.

We have included an index of chapters and appendices with the files on SharePoint. The index identifies which chapters and appendices will be revised as well as the date they are uploaded. We will update the index as we receive additional chapters and appendices to SharePoint. The files uploaded to-date include:

Chapters

2. Project Description and Alternatives
3. Environmental Analysis
4. Regulatory and Environmental Compliance
5. Surface Water Resources
8. Groundwater Resources
9. Vegetation and Wetland Resources
10. Wildlife Resources
12. Geology and Soil
14. Land Use
15. Agriculture and Forestry Resources
16. Recreation Resources
17. Energy
18. Navigation, Transportation, and Traffic
20. Air Quality
23. Tribal Cultural Resources
26. Public Services and Utilities
27. Public Health and Environmental Health
34. Final EIR/EIS Document Distribution

Appendices
2D, Environmental Commitments and BMPs
2D1, Assessment of Mystery Snail Technical Memorandum (NEW)
6A, California State Water Resources Control Board Constituents of Concern
7A, Fluvial Geomorphic Setting Information
7B, Hydrodynamic Geomorphic Modeling Results
8A, Groundwater Resources Basin Setting

All documents were uploaded in a protected state, allowing comment bubbles but not changes to the document text. The ICF team is still doing editing in parallel so no changes should be made to the documents to avoid version control issues. Also:

- Please provide comments in comment bubbles where the change is needed.
- Please be specific and detailed in every comment bubble and avoid referencing another comment bubble (i.e.: "See previous comment") as all comments are compiled and individual reviewer names may not be retained.
- If referencing a previous comment made on a document in Volume 3, please add the comment to the Volume 3 document and reference the associated Comment Report number (i.e.: "Table 5, Comment 1.")
- Focus on substantial issues not editorial changes.
- Changes to the project description are described in detail in Chapter 2 and updated throughout the EIR/EIS chapters.

Please let us know if there are issues with access to filles or any other questions. We will notify you when additional files are available for review; we ask that you complete your review by February 28, 2023.

Thank you,

Laurie

Laurie Warner Herson
Principal/Owner
Phenix
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/

Chapter 10 Wildlife Resources

10.1 Introduction

This chapter describes the environmental setting, methods of analysis, and impact analysis for wildlife resources that would potentially be affected by the construction and operation of the Project. Wildlife resources addressed in this chapter are defined as special-status wildlife species (excluding fish) and the habitats on which they depend, nesting migratory birds, colonies of non-special-status roosting bats, and wildlife corridors.

The study area for wildlife resources consists of all areas where ground disturbance is planned under all Project alternatives plus a 300-foot-wide buffer area (Figure 9B-1 in Appendix 9B, *Vegetation and Wetland Methods and Information*). The 300-foot buffer was assessed for potential temporary direct impacts on wildlife resources. For some special-status and migratory birds, direct and indirect effects may exceed the 300-foot buffer. In these instances, survey areas and no-disturbance ~~disturbance~~ buffers identified in mitigation measures are extended to address a larger potential impact area based on the species biology or established guidance from wildlife agencies (i.e., California Department of Fish and Wildlife [CDFW] and U.S. Fish and Wildlife Service [USFWS]). For operational impacts only, the study area for wildlife resources also includes the Sacramento River between the RBPP and the Delta, Sutter Bypass, and Yolo Bypass. This area is referred to as the operations study area.

Tables 10-1a and 10-1b summarize the CEQA determinations and NEPA conclusions for construction and operation impacts, respectively, between alternatives that are described in the impact analysis.

Table 10-1a. Summary of Construction Impacts and Mitigation Measures for Wildlife Resources

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact WILD-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	**Mitigation Measure WILD-1.1**: Assess Habitat Suitability and Survey Suitable Habitat for Vernal Pool Branchiopods **Mitigation Measure WILD-1.2**: Avoid and Minimize Potential Effects on Vernal	SU/SA (golden eagle) LTSM/NE (other species)

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Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Pool Branchiopods and Western Spadefoot **Mitigation Measure WILD-1.3**: Compensate for Impacts on Occupied Vernal Pool Branchiopod Habitat **Mitigation Measure WILD-1.6**: Conduct Surveys for Suitable Valley Elderberry Longhorn Beetle Habitat **Mitigation Measure WILD-1.7**: Fence Elderberry Shrubs to be Protected **Mitigation Measure WILD-1.8**: Transplant Permanently Affected Elderberry Shrubs and Compensate for Loss of Valley Elderberry Longhorn Beetle and its Habitat **Mitigation Measure WILD-1.10**: Assess Habitat Suitability and Survey for Presence of Monarch Butterfly Nectar and Larval Host Plants **Mitigation Measure WILD-1.11**: Compensate for Loss of Monarch Butterfly Nectar and Larval Host Plants **Mitigation Measure WILD-1.12**: Assess Habitat Suitability and Survey for Presence of Crotch Bumble Bee and Western Bumble Bee Food Plants **Mitigation Measure WILD-1.13**: Compensate for Loss of Crotch Bumble Bee and Western Bumble Bee Habitat **Mitigation Measure WILD-1.14**: Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle **Mitigation Measure VEG-2.2**: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities **Mitigation Measure VEG-3.2**: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands **Mitigation Measure WILD-1.17**: Implement California Red-legged Frog Protective Measures	

ADMINISTRATIVE DRAFT

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Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Mitigation Measure WILD-1.18: Compensate for Permanent and Temporary Losses of Occupied California Red-legged Frog Aquatic and Upland Habitats **Mitigation Measure WILD-1.19**: Conduct Preconstruction Surveys for Western Pond Turtle and Monitor Initial In-Water Work **Mitigation Measure VEG-3.1**: Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities **Mitigation Measure VEG-3.3**: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters **Mitigation Measure WILD-1.20**: Implement Protective Measures for Giant Gartersnake **Mitigation Measure WILD-1.21**: Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats **Mitigation Measure WILD-1.22**: Conduct Vegetation Removal During the Non-Breeding Season of Nesting Migratory Birds **Mitigation Measure WILD-1.23**: Conduct Preconstruction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found **Mitigation Measure WILD-1.24**: Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement Avoidance and Minimization Measures if Found **Mitigation Measure WILD-1.25**: Restore Temporarily Disturbed Habitat and Compensate for the Permanent Loss of Occupied Burrowing Owl Habitat **Mitigation Measure WILD-1.28**: Conduct Focused Surveys for Golden Eagle and Bald Eagle and Implement Protective Measures if Found	

ADMIN DRAFT

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Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
		Mitigation Measure WILD-1.29: Compensate for the Loss of Eagle Nest Trees **Mitigation Measure VEG-4.1**: Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction **Mitigation Measure VEG-4.2**: Compensate for Adverse Effects on Oak Woodlands **Mitigation Measure WILD-1.30**: Conduct Focused Surveys for Nesting Swainson's Hawk, White-tailed Kite, and Other Raptors Prior to Construction and Implement Protective Measures During Construction **Mitigation Measure WILD-1.31**: Compensate for the Permanent Loss of Foraging Habitat for Swainson's Hawk **Mitigation Measure AG-1.1**: Purchase Agricultural Conservation Easements to Preserve Regional Important Farmland **Mitigation Measure WILD-1.32**: Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Building/Structure Demolition **Mitigation Measure WILD-1.33**: Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Tree Trimming and Removal **Mitigation Measure WILD-1.34**: Compensate for Permanent Impacts on Occupied Roosting Habitat **Mitigation Measure WILD-1.35**: Implement Protective Measures to Avoid and Minimize Potential Impacts on American Badger	

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Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Alternative 2	S/SA	Same as Alternative 1, plus: **Mitigation Measure WILD-1.4**: Evaluate and Survey Potential Habitat for Antioch Dunes Anthicid and Sacramento Anthicid Beetles and Implement Protective Measures **Mitigation Measure WILD-1.5**: Compensate for the Loss of Occupied Antioch Dunes Anthicid and Sacramento Anthicid Beetle Habitat	SU/SA (golden eagle), LTSM/NE (other species)
Alternative 3	S/SA	Same as Alternative 1	SU/SA (golden eagle), LTSM/NE (other species)
Impact WILD-2: Substantial interference with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impediment of the use of native wildlife nursery sites			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	Same as for Impact WILD-1	SU/SA
Alternative 2	S/SA	Same as for Impact WILD-1	SU/SA
Alternative 3	S/SA	Same as Alternative 1	SU/SA
Impact WILD-3: Conflict with any local policies or ordinances protecting wildlife resources			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	Same as for Impacts WILD-1 and WILD-2	LTSM/NE
Alternative 2	S/SA	Same as for Impacts WILD-1 and WILD-2	LTSM/NE
Alternative 3	S/SA	Same as Alternative 1	LTSM/NE
Impact WILD-4: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	Same as for Impact WILD-1	LTSM/NE
Alternative 2	S/SA	Same as for Impact WILD-1	LTSM/NE
Alternative 3	S/SA	Same as Alternative 1	LTSM/NE

Notes:
NI = CEQA no impact
LTSM = CEQA less than significant with mitigation
S= CEQA significant impact
SU = CEQA significant and unavoidable
NE = NEPA no effect or no adverse effect
SA = NEPA substantial adverse effect

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Table 10-1b. Summary of Operation Impacts and Mitigation Measures for Wildlife Resources

Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Impact WILD-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	**Mitigation Measure WILD-1.9**: Protect Special-Status Invertebrates and Their Host and Food Plants from Herbicide and Pesticide Use **Mitigation Measure WILD-1.15**: Design and Construct Wildlife Crossings for New Roadways at Suitable Locations **Mitigation Measure WILD-1.16**: Monitor and Maintain Wildlife Crossings **Mitigation Measure WILD-1.26**: Protect Special-Status Wildlife from Rodenticide Use **Mitigation Measure WILD-1.27**: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines	LTSM/NE
Alternative 2	S/SA	Same as Alternative 1	LTSM/NE
Alternative 3	S/SA	Same as Alternative 1	LTSM/NE
Impact WILD-2: Substantial interference with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impediment of the use of native wildlife nursery sites			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	Same as for Impact WILD-1	SU/SA
Alternative 2	S/SA	Same as Alternative 1	SU/SA
Alternative 3	S/SA	Same as Alternative 1	SU/SA
Impact WILD-3: Conflict with any local policies or ordinances protecting wildlife resources			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	Same as for Impacts WILD-1 and WILD-2	LTSM/NE
Alternative 2	S/SA	Same as Alternative 1	LTSM/NE
Alternative 3	S/SA	Same as Alternative 1	LTSM/NE
Impact WILD-4: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan			
No Project	NI/NE	-	NI/NE
Alternative 1	S/SA	Same as for Impact WILD-1	LTSM/NE
Alternative 2	S/SA	Same as Alternative 1	LTSM/NE

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Alternative	Level of Significance Before Mitigation	Mitigation Measures	Level of Significance After Mitigation
Alternative 3	S/SA	Same as Alternative 1	LTSM/NE

Notes:
NI = CEQA no impact
LTSM = CEQA less than significant with mitigation
S= CEQA significant impact
SU = CEQA significant and unavoidable
NE = NEPA no effect or no adverse effect
SA = NEPA substantial adverse effect

10.2 Environmental Setting

This section presents the methods for assessing wildlife resources in the study area, describes the habitats and wildlife commonly associated with each land cover type in the study area, and discusses the federally and state listed special-status wildlife species identified as potentially present in the study area. Table 10A-1 in Appendix 10A, *Special-status Wildlife Database ResultsSpecies Lists, Special-Status Wildlife Table, and Non-Listed Wildlife Species AccountsTable and Non-listed Wildlife Species Accounts*, includes the status, habitat requirements description, and likelihood of occurrence for the special-status species. Appendix 10A also provides species accounts for non-special-status wildlife species with moderate to high potential to occur in the study area. Appendix 10B, *Wildlife Habitat Models and Methods*, contains special-status species model descriptions.

10.2.1. Methods for Assessing Wildlife Resources in the Study Area

Potential wildlife resources in the study area were evaluated by reviewing existing information and identifying potentially suitable habitat with geographic information system (GIS) modeling. Limited access was obtained for geotechnical boring investigations for the Project, and focused bird surveys prior to geotechnical work were conducted in these specific locations in 2020 and 2021. Information from the January 2021 focused bird surveys conducted prior to geotechnical boring is reported in Appendix 10A. Property access restrictions precluded field surveys of wildlife resources in the remainder of the study area since the preparation of the 2017 Draft EIR/EIS (Chapter 3, *Environmental Analysis*). Previous surveys to characterize habitat and wildlife communities and for focused surveys for groups of wildlife species (i.e., amphibians and reptiles, birds, and mammals) were conducted from 1998 to 2004 and in 2010 to 2011 within study areas that vary from the Project study area. Because these survey data are 10 to 23 years old, other sources of data and habitat modeling were used to determine the potential presence of wildlife resources in the study area. The following information was reviewed.

- California Natural Diversity Database (CNDDB) search results for occurrences of special-status wildlife species (defined in Section 10.2.3, *Special-Status Wildlife Species*) within 5 miles of the study area (Appendix 9A, *Special-Status Plant Species*) (California Department of Fish and Wildlife 2021a), which encompasses a distance that reasonably includes special-status wildlife that may occur in the Project area.

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- An unofficial endangered and threatened species list for the study area, obtained from the Information, Planning, and Consultation (IpaC) website (Appendix 9A) (U.S. Fish and Wildlife Service 2021).
- Historical and recent (i.e., 2020) aerial imagery of the study area in Google Earth Pro.
- Species distribution, habitat association, and habitat requirement information from numerous sources cited in this chapter and Appendices 10A and 10B.
- California Essential Habitat Connectivity Project (Spencer et al. 2010) and ~~geographic information system~~ (GIS) habitat connectivity layers from 2019 in the online map viewer.
- Locations of special-status birds in eBird (Cornell Lab of Ornithology 2021).

Potentially suitable habitat for special-status wildlife species in the study area was determined based on scientific literature and GIS modeling. Available literature was reviewed to identify known habitat associations and habitat requirements for each species. Habitat requirements were then compared with the existing land cover types mapped in the study area, and a series of assumptions were made regarding which land cover types could provide potentially suitable habitat for each species based on its habitat requirements. The land cover types associations, model assumptions, and rationales are in the species model descriptions (Appendix 10B). Using the assumptions and rationales from the model descriptions, a list of potentially suitable land cover types was created for each species. The potentially suitable land cover types were then modeled using GIS software to identify areas of potential habitat for most species in the study area. Modeling using GIS software was not used to identify habitat for Antioch Dunes anthicid beetle (*Anthicus antiochensis*) and Sacramento anthicid beetle (*Anthicus sacramento*) because suitable habitat for these species is limited to areas along the Sacramento River and was assumed to be present in the limited Project footprint along the river. Because the models were limited in part by the accuracy of aerial imagery interpretation and the inability to field verify the land cover mapping, they generally overestimate the amount of potential habitat in the study area for one or more species (see species models description in Appendix 10B for more information). Special-status wildlife species with moderate to high potential to occur in the study area are assumed to be present in the Project area and may be affected by the Project.

10.2.2. Land Cover Types and Associated Common Wildlife Species

The study area and vicinity are predominantly vegetated by natural and agricultural vegetation. Aerial imagery interpretation was primarily used to map the land cover types in the study area. The land cover types identified in the study area are shown in Figure 9B-1 in Appendix 9B, *Vegetation and Wetland Methods and Information*, and are listed in Table 9B-1, which also provides acreage estimates for each type. All land cover type acreages are preliminary and subject to revision based on pedestrian surveys once access has been granted to the study area. The habitats and common wildlife associated with each land cover type are described below. Land cover types that special-status wildlife are associated with are discussed in Section 10.2.3, *Special-Status Wildlife Species*, and in Appendix 10A.

10.2.2.1. Annual Grassland

Annual grassland is the dominant land cover type in the study area. Annual grasslands are used by many wildlife species for foraging. Some of these species also inhabit annual grassland if

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special features such as cliffs, caves, ponds, or woody plants are available for breeding or resting habitat, or as escape cover. Reptiles that occur in annual grassland habitats include western fence lizard (*Sceloporus occidentalis*), common gartersnake (*Thamnophis sirtalis*), and Northern Pacific rattlesnake (*Crotalus oreganus oreganus*). Grasslands provide foraging habitat for wide-ranging species such as red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), and American kestrel (*Falco sparverius*). Mammals typically found in this habitat include California vole (*Microtus californicus*), western harvest mouse (*Reithrodontomys megalotis*), California ground squirrel (*Otospermophilus beecheyi*), black-tailed hare (*Lepus californicus*), and coyote (*Canis latrans*), (California Department of Fish and Wildlife 2021b). In addition, many species that nest or roost in open woodlands may forage in associated grasslands, including western bluebird (*Sialia ~~mexicana~~mexicana*), western kingbird (*Tyrannus verticalis*), and some species of bats (Zeiner et al. 1990a:428, 510; 1990b).

10.2.2.2. Barren

The barren land cover type is characterized by areas where vegetation cannot grow. Barren was mapped in one location in the study area in a landslide on a hillslope where vegetation was not present. Because of the lack of vegetation, barren ground has a limited use by wildlife. However, some species, such as California horned lark (*Eremophila alpestris actia*), prefer areas with limited or very low-growing vegetation.

10.2.2.3. Blue Oak Woodland

The blue oak woodland vegetation community, dominated by blue oak (*Quercus douglasii*), is the most common land cover type in the low foothills of the western portion of the study area. Oak woodlands are important habitats because of their high value to wildlife in the form of nesting sites, cover, and food (California Department of Fish and Wildlife 2021b). Birds associated with oak woodlands include acorn woodpecker (*Melanerpes formicivorus*), California scrub jay (*Aphelocoma californica*), yellow-billed magpie (*Pica nuttalli*), and many warblers and flycatchers (Zeiner et al. 1990a:376, 452, 460). Cavities in oak trees are important nesting sites for acorn woodpecker, oak titmouse (*Baeolophus inornatus*), Bewick's wren (*Thryomanes bewickii*), and western bluebird (California Partners in Flight 2002:24). Oak woodlands provide nesting sites and/or foraging habitat for raptors, such as red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), and great-horned owl (*Bubo virginianus*) (Zeiner et al. 1990a:132, 136, 326; California Partners in Flight 2002:24). Mammals associated with oak woodlands include western gray squirrel (*Sciurus griseus*), bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), and gray fox (*Urocyon cinereoargenteus*) (Zeiner et al. 1990b:70, 146, 324, 352). Acorns are an important food source for species such as California quail (*Callipepla californica*), wild turkey (*Meleagris gallopavo*), western gray squirrel, and mule deer (California Department of Fish and Wildlife 2021b).

10.2.2.4. Canal

Canals occur throughout the lower elevation portions of the study area in agricultural areas. Canals, including the TC Canal, GCID Main Canal, and CBD, were defined as constructed channels used for irrigation that may be earth- or concrete-lined. Most canals are subject to ongoing maintenance, including vegetation removal. Wildlife use of canals depends on several factors, including the extent of vegetation in and along the canal, whether the canal is concrete lined, the period of time that water remains in the canal, and the velocity of flow. Concrete-lined

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canals, or those with high flow velocities, typically have low value for wildlife, although large canals with slower flows can be used by waterfowl.

10.2.2.5. Chamise Chaparral

The chamise chaparral community is uncommon in the study area and is concentrated along South Road in the western portion where it is the dominant vegetation. Chaparral provides habitat for a variety of birds and mammals. Numerous rodents, deer, and other herbivores are common in chaparral communities. Rabbits and hares will eat twigs, evergreen leaves, and bark from chaparral in fall and winter when there is not an abundance of grasses. Shrubby vegetation provides mammals with cover and shade during hot weather and protection from wind in the winter. Chaparral provides seeds, fruits, insects, protection from predators and the weather, in addition to singing, roosting, and nesting sites for many species of birds (California Department of Fish and Wildlife 2021b). California quail, Bewick's wren, wrentit (*Chamaea fasciata*), California thrasher (*Toxostoma redivivum*), black-tailed hare, brush mouse (*Peromyscus boylii*), dusky-footed woodrat (*Neotoma fuscipes*), and black-tailed deer (*Odocoileus hemionus columbianus*) are common in chaparral habitats (Zeiner et al. 1990a:168, 492, 524, 532; 1990b:94, 230, 246, 352).

10.2.2.6. Developed

Developed areas are generally paved or covered with an impermeable substrate (i.e., asphalt, concrete). Structures in developed areas such as buildings, bridges, and culverts may provide suitable roosting habitat for bats or nesting habitat for birds. Roadways and other paved surfaces do not provide habitat for wildlife.

10.2.2.7. Disturbed

Disturbed areas are regularly compacted but still have a permeable surface (e.g., graveled roads). Because these areas are typically subject to disturbance from human activity on a regular basis, they provide low-quality habitat for wildlife. Wildlife species commonly found in urban areas are also found in disturbed areas. Such species may include Brewer's blackbird (*Euphagus cyanocephalus*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), yellow-billed magpie, mourning dove (*Zenaida macroura*), Virginia opossum (*Didelphus virginiana*), and striped skunk (*Mephitis mephitis*) (Zeiner et al. 1990a:310, 460, 646, 668, 682; Zeiner et al. 1990b:2, 316). American kestrel and red-tailed hawk frequently forage in this habitat (Zeiner et al. 1990a:136, 144). Killdeer (*Charadrius vociferus*) and lesser nighthawk (*Chordeiles acutipennis*) may nest in graveled areas (Zeiner et al. 1990a:192, 344).

10.2.2.8. Ditch

Ditches are defined as earth-lined, constructed channels used for irrigation or drainage, including roadside drainages, and are present throughout the study area in the lower elevation agricultural areas. Most ditches are subject to ongoing maintenance, including vegetation removal. Wildlife use of ditches is dependent on several factors including the extent of vegetation in and along the ditch, the period of time that water remains in the ditch, and the velocity of flow. Ditches with high flow velocities typically have low value for wildlife. Ditches with vegetation in the channel and along the banks and an adequate inundation period can provide food, water, cover, and dispersal corridors for various wildlife species such as Sierran treefrog (*Pseudacris sierra*), California newt (*Taricha torosa*), great egret (*Ardea alba*), raccoon (*Procyon lotor*), and striped

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skunk. The banks of ditches could be used by California ground squirrel and western fence lizard.

10.2.2.9. Ephemeral Stream

Ephemeral streams occur throughout the Antelope Valley and surrounding hills. These unnamed features convey flows only during and immediately after rainfall events. Ephemeral streams provide temporary sources of water for several common wildlife species but do not provide breeding habitat for amphibians. The banks of the channels may be used by California ground squirrel, western fence lizard, and gopher snake (*Pituophis catenifer*).

10.2.2.10. Foothill Pine

Foothill pine occurs only in the western part of the study area along the South Road alignment. A large variety of wildlife species breed in foothill pine habitat, although no species is completely dependent on it for breeding, feeding, or cover. Most species utilizing this habitat breed during late winter and early spring (California Department of Fish and Wildlife 2021b). Blue oak-foothill pine woodland habitat provides forage opportunities for a variety of bird species that feed on acorns, bark, and foliage insects. Primary cavity-nesting birds (e.g., woodpeckers) excavate nest holes in living and dead trees, which are subsequently used by other cavity-nesting species such as American kestrel, white-breasted nuthatch (*Sitta carolinensis*), and western bluebird. Other species that may occur in this habitat include wild turkey, oak titmouse, and western gray squirrel (Zeiner et al. 1990a:144, 164, 472, 510; 1990b:146).

10.2.2.11. Forested Wetland

Forested wetlands (i.e., riparian forest) occur in one segment of Willow Creek (northeast of the city of Willows) and in segments of Antelope Creek, Stone Corral Creek, Grapevine Creek, Funks Creek, and unnamed intermittent streams that are tributary to these creeks, as well as at the edge of a pond southwest of Funks Reservoir. When the vegetation is diverse and well developed, riparian forest provides high value habitat for wildlife, including several special-status species. Riparian forest habitat provides food, water, and migration and dispersal corridors, as well as escape, nesting, and thermal cover for many wildlife species (California Department of Fish and Wildlife 2021b). Invertebrates, amphibians, and aquatic reptiles live in aquatic and adjacent upland habitats. Raptors, herons, egrets, and other birds nest in the upper canopy. A variety of songbirds use the shrub canopy, and cavity-nesting birds, such as Nuttall's woodpecker (*Picoides nuttallii*) and oak titmouse, occupy dying trees and snags (Zeiner et al. 1990a:388, 472). Several mammals including raccoon, Virginia opossum, and striped skunk are common in riparian forest habitats (Zeiner et al. 1990b:2, 298, 316).

10.2.2.12. Freshwater Marsh

Freshwater marsh occurs at the saturated edges of riparian vegetation, ponds (including Salt Lake), seasonal wetlands, Funks Reservoir, Stone Corral Creek, GCID Main Canal near the Sacramento River at the GCID head gate, and unnamed intermittent streams. Most irrigation ditches and agricultural field edges are regularly maintained, and freshwater marsh is infrequently in ditches. Freshwater marsh provides food, cover, and water for a variety of amphibians, reptiles, birds, and mammals (California Department of Fish and Wildlife 2021b). Wildlife species that use freshwater marsh habitat include Sierran treefrog (Zeiner et al. 1988:78), valley gartersnake (*Thamnophis sirtalis fitchi*) (Stebbins 2003:375), great blue heron

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(*Ardea ~~herodias~~herodias*), great egret, Virginia rail (*Rallus limicola*), and red-winged blackbird (*Agelaius phoeniceus*) (Zeiner et al. 1990a:32, 34, 176, 638).

10.2.2.13. Hayfield

The largest areas of hayfields in the study area are located on the Antelope Valley floor. Alfalfa fields are included with this land cover type. Hayfield provides high-quality seasonal habitat for reptiles (e.g., gopher snake, California kingsnake [*Lampropeltis californiae*]), birds (e.g., blackbirds, doves, egrets, hawks, owls, waterfowl), and mammals (gophers, voles, deer, elk [*Cervus canadensis*], fox [*Vulpia* spp.]). However, when hayfields are harvested repeatedly, reproduction values for ground-nesting birds are reduced to zero. If rotational cropland is adjacent to hayfields, the hayfields can provide cover during seasonal disking and planting of the rotated fields (California Department of Fish and Wildlife 2021b). Alfalfa is also high-quality wildlife habitat because it provides nesting cover, abundant insects, and feeding opportunities throughout the year due to its perennial growth pattern. Many types of insects and vertebrate herbivores, such as gophers and rabbits, feed in alfalfa fields. The insect and vertebrate herbivores are then prey for songbirds, raptors, foxes, snakes, and lizards. Deer, pronghorn, and elk commonly feed in alfalfa fields, especially in times of drought, and raptors can be found hunting in alfalfa fields (Agronomy Research and Information Center 2021).

10.2.2.14. Intermittent Stream

There are numerous intermittent streams in the study area, including Willow Creek, Stone Corral Creek, Lurline Creek, Grapevine Creek, Wilson Creek, tributaries to these creeks, and many unnamed streams. Segments of Hunters Creek, Funks Creek, and Antelope Creek also have intermittent flows. Intermittent streams have the most water flow during the wet season and may contain pools that remain inundated into late summer. Intermittent streams have a more limited use by wildlife species than perennial streams because of their restricted flows. When flowing or when pools are present, these streams may provide sources of drinking water for birds and mammals and may provide movement corridors for some species of amphibians.

10.2.2.15. Managed Wetland

Managed wetlands in the study area include human-made wetlands in a mitigation area on the west side of the CBD. Wildlife species and habitat use for managed wetland are similar to those described for freshwater marsh.

10.2.2.16. Mixed Chaparral

Mixed chaparral is generally found in the western and southern portions of the study area at elevations ranging from 800–1,800 feet. Wildlife species and habitat use for mixed chaparral are similar to those described for chamise chaparral.

10.2.2.17. Oak Savanna

Oak savanna in the study area can be found on gently sloping hills and occasionally on terraces and valley floors. Wildlife species and habitat use for oak savanna are similar to those described for annual grassland and blue oak woodland.

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10.2.2.18. Orchard

Orchards in the study area are located east of Funks Reservoir on the Central Valley floor. Orchards are typically planted on deep fertile soils that supported diverse and productive natural habitats in the past. Orchards can provide shade or water, if irrigated, for wildlife. Deer may browse on orchard trees. Orchards may provide cover and nesting sites for various species of birds including mourning dove and California quail. California ground squirrels may also feed on nuts in orchards. Birds that commonly feed on almonds and walnuts are northern flicker (*Colaptes auratus*), California scrub jay, American crow, oak titmouse, Brewer's blackbird, and house finch. Birds that frequently feed on orchard fruit include yellow-billed magpie, western bluebird, American robin (*Turdus migratorius*), northern mockingbird (*Mimus polyglottos*), cedar waxwing (*Bombycilla cedrorum*), and Bullock's oriole (*Icterus bullockii*) (California Department of Fish and Wildlife 2021b).

10.2.2.19. Ornamental Woodland

Ornamental woodlands in the study area are stands of nonnative trees that have been planted around buildings or agricultural lands. Ornamental woodland provides a location where animals can escape, nest, and obtain thermal cover. Common and special-status birds may perch or nest in stands of nonnative woodland. Common mammals such as raccoon, Virginia opossum, and striped skunk may take cover in nonnative woodland. Foliage-roosting bat species may roost in the foliage of nonnative woodland trees.

10.2.2.20. Perennial Stream

The Sacramento River is a perennial stream. Portions of several streams in the study area carry water year-round in some years, including a realigned segment Hunters Creek and Stone Corral Creek downstream of the confluence with Antelope Creek. Perennial streams with adjacent riparian or emergent wetland vegetation provide food, water, and migration and dispersal corridors, as well as escape, nesting, and thermal cover for a variety of wildlife and fish species. The open water areas of large rivers and creeks provide resting and escape cover for many species of waterfowl and other waterbirds. Insectivorous birds, such as swallows, swifts, and flycatchers catch insects over open water areas. The river shore and shallow water areas provide foraging opportunities for waterfowl, herons, and shorebirds (California Department of Fish and Wildlife 2021b). Other wildlife species that may use the riverine habitat and/or associated riparian habitat include western pond turtle (*Actinemys marmorata*) (Zeiner et al. 1988:100), river otter (*Lontra canadensis*), raccoon, and striped skunk (Zeiner et al. 1990b:298, 316, 318).

10.2.2.21. Pond

There are numerous ponds in the Antelope Valley and surrounding hills, as well as one detention basin in the Dunnigan Pipeline alignment. Ponds provide habitat for several species of amphibians including Sierran treefrog, California newt, and California toad (*Anaxyrus boreas halophilus*), as well as aquatic reptiles such as valley gartersnake. Freshwater marsh vegetation is commonly associated with ponds and provides cover habitat for these species, and may provide cover, resting, or breeding habitat for various bird species. Bats and insectivorous birds may drink from and forage over ponds, and other mammal species may use ponds as a source of water.

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10.2.2.22. Reservoir

Funks Reservoir is the only reservoir in the study area. Reservoirs provide habitat for a variety of amphibians, reptiles, birds, and mammals for reproduction, food, water, or cover (California Department of Fish and Wildlife 2021b). Various species of ducks and geese inhabit reservoirs, and other birds such as herons and belted kingfishers (*Megaceryle alcyon*) forage along the water's edge. Many species of insectivorous birds, including barn swallow (*Hirundo rustica*), cliff swallow (*Petrochelidon pyrrhonota*), and black phoebe (*Sayornis nigricans*), catch their prey over open water (Zeiner et al. 1990a:416, 442, 444).

10.2.2.23. Rice

Rice is the most dominant agricultural type in the easternmost portion of the study area. Flooded rice fields provide freshwater wetlands for a variety of wetland-associated wildlife, including shorebirds, wading birds, and gulls (California Department of Fish and Wildlife 2021b). Wildlife species associated with flooded rice fields include great egret, white-faced ibis (*Plegadis chihi*), snow goose (*Chen caerulescens*), northern pintail (*Anas acuta*), black-necked stilt (*Himantopus mexicanus*), and greater yellowlegs (*Tringa melanoleuca*) (Zeiner et al. 1990a:34, 44, 52, 66, 198, 203).

10.2.2.24. Row Crops

Row crops are mostly scattered in the eastern portion of the study area on the valley floor. Agricultural lands (including row crops) are established on fertile soils that historically supported abundant wildlife. The quality of habitat for wildlife is greatly diminished when the land is converted to agricultural uses and is intensively managed. Many species of rodents and birds have adapted to agricultural lands, but they are often controlled by fencing, trapping, and poisoning to prevent excessive crop losses (California Department of Fish and Wildlife 2021b). Wildlife species that may be associated with row crops include mourning dove, American crow (*Corvus brachyrhynchos*), Brewer's blackbird, raptors, egrets, and rodents.

10.2.2.25. Ruderal

Ruderal areas are mostly scattered in the eastern portion of the study area on the valley floor. Ruderal refers to weedy or disturbed conditions including areas surrounding residences, out-buildings, and stockyards. Depending on the size and location of ruderal areas, wildlife use of ruderal areas is similar to those described above for annual grassland (larger ruderal areas or near other natural land cover types) or disturbed (smaller ruderal areas or near developed areas).

10.2.2.26. Scrub-Shrub Wetland

Scrub-shrub wetland is present along Willow Creek and Grapevine Creek (intermittent streams); perennial streams, including Sacramento River and portions of Stone Corral Creek and Funks Creek; Funks Reservoir; edges of ponds; and irrigation and drainage ditches with enough water supply to support woody vegetation. Scrub-shrub wetland provides cover, a place to escape, and nesting substrate for a variety of animals. Songbirds perch and nest in the woody vegetation and other birds such as red-winged blackbird and Virginia rail may use the emergent vegetation for cover and nesting (Zeiner et al. 1990a:176, 638). Because the vegetation in scrub-shrub wetlands is dependent on long-term sources of water, open water associated with scrub-shrub wetland provides habitat for amphibians and aquatic reptiles.

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10.2.2.27. Seasonal Wetland

Seasonal wetlands occur throughout the study area in isolated depressions in annual grassland, as well as in association with other wetlands and non-wetland waters, such as freshwater marsh, ponds, and streams. Some of the seasonal wetlands in the study area would be considered vernal pools, because they have higher species diversity and support native or obligate-wetland species (California Department of Water Resources 2000). Several seasonal wetlands northwest of Funks Reservoir are alkali wetlands. Seasonal wetlands and vernal pools provide unique habitat for a variety of aquatic invertebrates that are food for other wildlife species, including great blue heron, killdeer, American avocet (*Recurvirostra americana*), black-necked stilt, and greater yellowlegs (Zeiner et al. 1990a:32, 192, 198, 200, 202). In addition, amphibians such as Sierran treefrog, and California toad use vernal pools and seasonal swales for breeding and feeding (Zeiner et al. 1988:56, 78).

10.2.2.28. Upland Riparian

Riparian vegetation in the study area is associated with intermittent and perennial stream corridors and floodplain terraces, although most of the riparian areas are narrow and degraded by cattle use. Well-developed, native riparian vegetation occurs in small remnant patches along foothill portions of the larger creeks in the study area. The largest concentration of riparian habitat is in the southern portion of the inundation area along Antelope Creek. One large stand of upland riparian also occurs along the Sacramento River at the end of the Dunnigan Pipeline alignment. Wildlife species and habitat use for upland riparian are similar to those described for forested wetland.

10.2.2.29. Vineyard

Small portions of two individual vineyards are located in the northern portion of the study area on the outer edges of the city of Willows and in the southern portion of the study area along the Dunnigan Pipeline alignment. Wildlife species and habitat use for vineyard are similar to those described for orchard and row crops.

10.2.3. Special-Status Wildlife Species

For the purpose of this chapter, special-status wildlife are animals that are legally protected under the Endangered Species Act (ESA), the California Endangered Species Act (CESA), or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing.

Special-status wildlife are those animals in any of the following categories:

- Species listed or proposed for listing as threatened or endangered under ESA (50 Code of Federal Regulations [CFR] 17.11 [listed animals] and various notices in the Federal Register [FR] [proposed species]).
- Species that are candidates for possible future listing as threatened or endangered under ESA (85 FR 73164 [November 16, 2020]).
- Species listed or proposed for listing by the State of California as threatened or endangered under CESA (14 California Code of Regulations 670.5).

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- Animal species of special concern identified on the Special Animals List by ~~California Department of Fish and Wildlife (~~CDFW~~)~~ (California Department of Fish and Wildlife 2021c).
- Animals fully protected in California (California Fish and Game Code Section 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish]).
- Animals that are considered biologically rare, very restricted in distribution, or declining throughout their range, as determined by the scientific community (such as the Western Bat Working Group) and/or identified on the CDFW Special Animals List (California Department of Fish and Wildlife 2021c).

While migratory birds are not considered special status, their occupied nests and eggs are protected by the California Fish and Game Code Sections 3503 and 3503.5 and the Migratory Bird Treaty Act. Migratory birds have the potential to nest throughout the study area and potential impacts on nesting migratory birds are addressed in Section 10.4, *Impact Analysis and Mitigation Measures*.

As described in Appendix 10A, wildlife biologists used the CNDDB to search for records in the Project area and the area within 5 miles of the Project (California Department of Fish and Wildlife 2021a) and the IpaC species list (U.S. Fish and Wildlife Service 2021) to determine which special-status wildlife species should be considered for analysis. The species evaluated included those that would be considered rare under CEQA based on being biologically rare, very restricted in distribution, or declining throughout their range, as determined by the scientific community (such as the Western Bat Working Group) and/or identified on the CDFW Special Animals List (California Department of Fish and Wildlife 2021c). Special-status wildlife recommended for consideration by CDFW staff were also considered. A total of 42 special-status wildlife species were evaluated for their potential to occur in the study area (Table 10A-1 in Appendix 10A).

Based on a review of species distribution, habitat requirements, and land cover types in the study area (Figure 9B-1 in Appendix 9B), nine of the 42 species are not expected to occur in the study area because it lacks suitable habitat for the species or is outside the species' known range. Table 10A-1 provides an explanation for the absence of each of these species from the study area. These nine species are not addressed further. Federally listed, state-listed ~~listed~~, and fully protected species (13 species) that have potential to occur in the study area are discussed below. Non-listed and non-fully-protected species (20 species) are discussed in Appendix 10A.

10.2.3.1. Conservancy Fairy Shrimp

Status and Distribution

Conservancy fairy shrimp (*Branchinecta ~~conservatio~~conservatio*) is federally listed as endangered (59 FR 48136–48153). Historically, Conservancy fairy shrimp was probably found in suitable vernal pool habitats throughout much of the Central Valley and southern coastal regions of California (U.S. Fish and Wildlife Service 2005a:II-181). Except for one population along the Central Coast in Ventura County, all current locations of Conservancy fairy shrimp are in the Central Valley (U.S. Fish and Wildlife Service 2012:3).

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Habitat Requirements and Biology

Conservancy fairy shrimp primarily occurs in large turbid vernal pools (playa pools) that stay inundated for much longer than typical vernal pools, often into summer (Eriksen and Belk 1999:88, U.S. Fish and Wildlife Service 2012:3). Conservancy fairy shrimp has been found in vernal pools on a variety of landforms, geologic formations, and soil types (U.S. Fish and Wildlife Service 2005a:II-183) and within a wide elevation range (16 to 5,577 feet) (Eriksen and Belk 1999:88).

Similar to other vernal pool branchiopods, Conservancy fairy shrimp is adapted to the environmental conditions of its ephemeral vernal pool habitats. These adaptations include the ability of fairy shrimp cysts (eggs) to remain dormant in the soil when vernal pool habitats are dry. Fairy shrimp are also able to complete their lifecycle (from cyst hatching to reproducing) within the relatively short time period when vernal pools are inundated with water (U.S. Fish and Wildlife Service 2005a:II-195). Differences in the rate of maturation and reproduction of vernal pool branchiopods are thought to be the result of variations in water temperature (Helm 1998:134).

Occurrence in and Near the Study Area

There are no recorded occurrences of Conservancy fairy shrimp in the study area (California Department of Fish and Wildlife 2021a). There is one known occurrence of Conservancy fairy shrimp at the Sacramento National Wildlife Refuge, approximately 1.5 miles from the study area (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of the seasonal wetland and ditch land cover types when adjacent to or surrounded by annual grassland.

10.2.3.2. Vernal Pool Fairy Shrimp

Status and Distribution

Vernal pool fairy shrimp (*Branchinecta lynchi*) is federally listed as threatened (59 FR 48136–48153). Vernal pool fairy shrimp is known to occur in a wide range of vernal pool habitats in the southern and Central Valley areas of California (U.S. Fish and Wildlife Service 2005a:II-192). The species is currently found in fragmented habitats across the Central Valley of California from Shasta County to Tulare and Kings Counties, in the central and southern Coast Ranges from Napa County to Los Angeles County, and inland in western Riverside County, California (U.S. Fish and Wildlife Service 2005a:II-193; 2007a:17).

Habitat Requirements and Biology

Vernal pool fairy shrimp commonly inhabit vernal pools or vernal pool-like habitats, typically in grassland landscapes. Most frequently, vernal pool fairy shrimp are found in vernal pools or vernal swales, in unplowed grasslands (Eng et al. 1990:257). Vernal pool fairy shrimp sometimes occur in other wetlands that provide habitat characteristics similar to those of vernal pools; these other wetlands include alkaline rain pools, rock outcrop pools, and some disturbed and constructed sites, including tire ruts, ditches, and puddles (59 FR 48136–48153; Eriksen and Belk 1999:93; Helm 1998:129–130; U.S. Fish and Wildlife Service 2007a:24, 58). Occupied habitats range in size from 6-square-foot puddles to pools exceeding 24 acres (Eriksen and Belk 1999:93). Vernal pool fairy shrimp is not found in riverine, marine, or other permanent waters

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(U.S. Fish and Wildlife Service 2007a:4). Suitable pools must stay inundated long enough for the shrimp to complete their life cycle.

Vernal pool fairy shrimp mature very quickly and can have multiple clutches of eggs per lifespan (Eriksen and Belk 1999:93). In a study using large plastic pools to simulate natural vernal pools, Helm (1998:133) found that vernal pool fairy shrimp reached maturity in an average of 18 days following hatching and reproduced an average of 40 days after hatching. Differences in the rate of maturation and reproduction of vernal pool branchiopods are thought to be the result of variations in water temperature (Helm 1998:134).

Occurrence in and Near the Study Area

There are no recorded occurrences of vernal pool fairy shrimp in the study area (California Department of Fish and Wildlife 2021a). There are several records for vernal pool fairy shrimp occurrences at the Sacramento National Wildlife Refuge, approximately 2.75–3.75 miles from the study area. There are also records for occurrences near the RBPP, the closest being approximately 1.2 miles northwest of the pumping plant (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of the seasonal wetland and ditch land cover types when adjacent to or surrounded by annual grassland.

10.2.3.3. Vernal Pool Tadpole Shrimp

Status and Distribution

Vernal pool tadpole shrimp (*Lepidurus packardi*) is federally listed as endangered (59 FR 48136–48153). The historical range of vernal pool tadpole shrimp likely consisted of the Central Valley and Central Coast regions of California (U.S. Fish and Wildlife Service 2005a:II-204). Vernal pool tadpole shrimp presently occurs sporadically in the Central Valley from Shasta County to northwestern Tulare County and the San Francisco Bay area (U.S. Fish and Wildlife Service 2005a:II-204-205; 2007b:4).

Habitat Requirements and Biology

Vernal pool tadpole shrimp occurs in a variety of seasonal habitats, including vernal pools and other seasonal pools, ponded clay flats, roadside ditches, and stock ponds (Helm 1998:132; Rogers 2001:1002). Habitats where vernal pool tadpole shrimp have been observed range in size from small (less than 25 square feet), clear, vegetated vernal pools to large (more than 80 acres) winter lakes (Helm 1998:133). Vernal pool tadpole shrimp produce cysts (eggs) that lie in the soil until the next winter rains trigger the eggs to hatch (U.S. Fish and Wildlife Service 2007b:3).

In the laboratory, vernal pool tadpole shrimp eggs collected from dry pond sediments at the end of summer hatched in 17 days (Ahl 1991:137). In a study using large plastic pools to simulate natural vernal pools, Helm (1998:133) found that vernal pool tadpole shrimp reached maturity in an average of 38 days following hatching and reproduced an average of 54 days after hatching (Helm 1998:133). Differences in water temperature, which strongly effects the growth rates of aquatic invertebrates, may cause variation in rates of growth and maturation (U.S. Fish and Wildlife Service 2005a:II-206). Vernal pool tadpole shrimp can produce additional eggs during the wet season that hatch without going through a dormant period (Ahl 1991:137).

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While vernal pool tadpole shrimp is adapted to seasonal habitats, it has a relatively long lifespan compared to other large branchiopods (U.S. Fish and Wildlife Service 2005a:II-206). In Helm's study (1998:133), vernal pool tadpole shrimp lived an average of 143 days. The long lifespan of vernal pool tadpole shrimp is attributed to its ability to tolerate drying pool conditions and warm water (Helm 1998:135).

Occurrence in and Near the Study Area

There are no recorded occurrences of vernal pool tadpole shrimp in the study area (California Department of Fish and Wildlife 2021a). There are several known occurrences of vernal pool tadpole shrimp at the Sacramento National Wildlife Refuge, approximately 1.25–3 miles from the study area (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of the seasonal wetland and ditch land cover types when adjacent to or surrounded by annual grassland.

10.2.3.4. Valley Elderberry Longhorn Beetle

Status and Distribution

Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*) is federally listed as threatened. The current range of valley elderberry longhorn beetle consists of the Central Valley from approximately Shasta County south to to Fresno County. It includes the valley floor and lower foothills, with most beetle observations recorded at elevations below 500 feet (U.S. Fish and Wildlife Service 2017a).

Habitat Requirements and Biology

Valley elderberry longhorn beetle is found only in association with its host plant, elderberry (*Sambucus* spp.), which is commonly present in riparian forests and adjacent grasslands in the Central Valley (Barr 1991:4–5). Elderberry shrubs can also be present in non-riparian valley oak (*Quercus lobata*) and blue oak woodland habitats (U.S. Fish and Wildlife Service 2017a:5). Adult valley elderberry longhorn beetles feed on elderberry foliage and are present from March through early June, during which time the adults mate and lay eggs (U.S. Fish and Wildlife Service 2006a:5). Females lay their eggs in bark crevices or at the junction of stem and trunk or leaf petiole and stem (Barr 1991:4). After hatching, the larva burrows into the stem where it develops for 1–2 years and feeds on the pith in the center of the stem (Talley et al. 2007:1480). Before pupation, the larva creates an exit hole, plugs the hole with wood shavings, and returns to the pith to pupate.

After transforming into an adult, valley elderberry longhorn beetle emerges through the previously created exit hole (U.S. Fish and Wildlife Service 2017a:4). Exit holes are 0.3–0.4 inch wide (Barr 1991:5). Adult emergence, mating, and egg laying takes place in the spring and summer (March to July) (U.S. Fish and Wildlife Service 2017a:4). Adults feed on elderberry leaves and flowers (Talley et al. 2007:1480). Valley elderberry longhorn beetle abundance is associated with higher levels of nitrogen available in the pith of stressed elderberries (Talley et al. 2007:1480).

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Occurrence in and Near the Study Area

There are numerous records for occurrences of valley elderberry longhorn beetle along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021a). Potentially suitable habitat for this species in the study area consists of upland riparian, scrub-shrub wetland, forested wetland, blue oak woodland, oak savanna, annual grassland, and ruderal land cover types.

10.2.3.5. California Red-legged Frog

Status and Distribution

California red-legged frog (*Rana draytonii*) is federally listed as threatened. The historical range of California red-legged frog extended along the coast from the vicinity of Mendocino in Mendocino County, California, and inland from the vicinity of Redding, California, southward to northwestern Baja California, Mexico (Storer 1925:235–236; Jennings and Hayes 1985:95). The species is known from isolated locations in the Sierra Nevada and the North Coast and northern Transverse Ranges. It is locally abundant in portions of the San Francisco Bay area and along the Central Coast and is still present in Baja California, Mexico (69 FR 19622). California red-legged frog is believed to be extirpated from the floor of the Central Valley (U.S. Fish and Wildlife Service 2002:5). California red-legged frogs have been found at elevations that range from sea level to about 5,000 feet. Nearly all sightings have occurred below 3,500 feet (U.S. Fish and Wildlife Service 2002:1).

Habitat Requirements and Biology

California red-legged frog uses a variety of habitat types that include various aquatic systems, as well as riparian and upland habitats (U.S. Fish and Wildlife Service 2002:12). However, the frogs may complete their entire life cycle in a pond or other aquatic site that is suitable for all life stages (66 FR 14626). California red-legged frogs inhabit marshes, streams, lakes, ponds, and other, usually permanent, sources of water that have dense riparian vegetation (Stebbins 2003:225). Habitat generally consists of still or slow-moving water that is at least 2.5 feet deep and adjacent to shrubby riparian vegetation (willows [*Salix* spp.]) or tules [*Scirpus* sp.] and cattails [*Typha* sp.]) (Jennings and Hayes 1994:64). Although California red-legged frog can inhabit either intermittent or permanent streams or ponds, populations probably cannot be maintained in streams in which all surface water disappears (Jennings and Hayes 1994:64–65).

California red-legged frogs are highly aquatic and spend most of their lives in the riparian zone (Brode and Bury 1984:32). Adults may take refuge during dry periods in rodent holes or leaf litter in riparian habitats (U.S. Fish and Wildlife Service 2002:14). Adult California red-legged frogs have been observed using large cracks in the bottoms of dried ponds as refugia (Alvarez 2004:162). Although California red-legged frogs typically remain near streams or ponds, marked and radio-tagged frogs have been observed to move more than 2 miles through upland habitat. These movements are frequently made during wet weather and at night (U.S. Fish and Wildlife Service 2002:12–13.)

Aestivation habitat consists of riparian vegetation and landscape features within 300 feet of riparian vegetation that provide cover and moisture during the dry season including boulders,

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rocks, organic debris (e.g., downed trees or logs), industrial debris, and agricultural features (e.g., drains, watering troughs, spring boxes, abandoned sheds, haystacks) (61 FR 25814).

California red-legged frogs breed from November through April and typically lay their eggs in clusters around aquatic vegetation (U.S. Fish and Wildlife Service 2002:16). Larvae typically undergo metamorphosis from July to September, 3.5 to 7 months after hatching (66 FR 14626), but larvae have been observed to take more than a year to complete metamorphosis in four counties on the Central Coast of California (Fellers et al. 2001:156).

Occurrence in and Near the Study Area

There are no recorded California red-legged frog occurrences within 5 miles of the study area (California Department of Fish and Wildlife 2021a). The closest reported occurrence is approximately 34 miles from the study area in Butte County (California Department of Fish and Wildlife 2021d). California red-legged frog was not found in the Sites Reservoir portion of the survey area during focused surveys for the species in 1997–1998 (Brown and Yip 2000:20). California red-legged frog is considered extirpated from the floor of the Central Valley (U.S. Fish and Wildlife Service 2002:5), which constitutes the portion of the study area generally east of Funks Reservoir (excluding the reservoir). Potentially suitable aquatic habitat for this species in the study area consists of freshwater marsh, perennial stream, intermittent stream, pond, and reservoir land cover types. Potentially suitable upland habitat in the study area consists of annual grassland, blue oak woodland, foothill pine, oak savanna, ruderal, forested wetland, ephemeral stream, scrub-shrub wetland, seasonal wetland, and upland riparian land cover types within 300 feet of aquatic habitat. Potentially suitable upland habitat land cover types within 1 mile of potentially suitable aquatic habitat land cover types in the study area are considered dispersal habitat for California red-legged frog.

10.2.3.6. Giant Gartersnake

Status and Distribution

Giant gartersnake (*Thamnophis gigas*) is federally listed as threatened and state listed as threatened. Giant gartersnake is endemic to the Sacramento and San Joaquin Valleys, where it is found in lowland areas (U.S. Fish and Wildlife Service 2015a:I-8). Historically, this species was found throughout the Central Valley from Butte County in the north to Kern County in the south. Giant gartersnake is presently known to occur only in nine discrete populations in Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Kings, Madera, Merced, Placer, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Tulare, Yolo, and Yuba Counties (U.S. Fish and Wildlife Service 2015a:9, 11–12).

Habitat Requirements and Biology

Giant gartersnake inhabits marshes, ponds, sloughs, small lakes, low-gradient streams and other waterways, and agricultural wetlands, including irrigation and drainage canals, rice fields, and the adjacent uplands (U.S. Fish and Wildlife Service 2006b:3).

Suitable giant gartersnake aquatic habitat consists of slow-moving or static water that is present from March through November with a mud substrate and the presence of prey (amphibians or fish) (U.S. Fish and Wildlife Service 2017b:I-3). Emergent and bankside vegetation that provides cover from predators and for thermoregulation are also required. Other components of suitable

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aquatic habitat are basking sites with supportive vegetation (such as folded tule [*Schoenoplectus* spp.] clumps) adjacent to escape cover, upland refugia in locations that are not subject to recurrent flooding, and the absence of a continuous riparian canopy and large predatory fish (U.S. Fish and Wildlife Service 2017b:I-3).

Characteristics of suitable upland habitat are available bankside vegetation, such as cattail or tule; shelter that is more permanent in nature, such as bankside cracks and crevices, holes, or small mammal burrows; and banksides that are not subjected to overgrazing (U.S. Fish and Wildlife Service 2017b:I-3). Riparian woodland is generally considered unsuitable habitat because of the lack of basking sites, presence of excessive shade, and lack of prey (U.S. Fish and Wildlife Service 1999:22).

Small mammal burrows and other areas of cover above the flooding zone, such as riprap, are used for overwintering (generally October 1 through April 1). Overwintering snakes have been documented in burrows as far as 656 to 820 feet from the edge of summer aquatic habitat (U.S. Fish and Wildlife Service 2017b:I-3, I-5, I-6). Results of a U.S. Geological Survey (USGS) study indicate that giant gartersnakes utilize burrows in upland areas during their active period more than previously assumed (Halstead et al. 2015). The USGS study found that at least one-half of giant gartersnake activity during the active season occurs in terrestrial environments, although primarily within 33 feet of wetlands (Halstead et al. 2015). Nearly all (i.e., 90%) of the snakes were females that were in burrows within 66 feet of water during the active season (Halstead et al. 2015).

The breeding season extends from March through May. Females give birth to live young from summer to early fall. Giant gartersnake feeds primarily on small fish and amphibians (U.S. Fish and Wildlife Service 2017b:I-5, I-6).

Occurrence in and Near the Study Area

There are four records for occurrences of giant gartersnake in the study area and numerous occurrences of giant gartersnake recorded within 5 miles of the study area, including at the Sacramento National Wildlife Refuge, in other areas east of the inundation area, and at the east end of the Dunnigan Pipeline (California Department of Fish and Wildlife 2021a). Potentially suitable aquatic habitat for giant gartersnake in the study area consists of canal, ditch, freshwater marsh, managed wetland, pond, and rice land cover types. Suitable giant gartersnake upland habitat in the study area consists of annual grassland, disturbed, and ruderal land cover types within 200 feet of suitable aquatic habitat. Aquatic and upland habitats for giant gartersnake in the study area are east of the GCID Main Canal except for upland habitat within 200 feet west of GCID Main Canal; and east and west of the GCID Main Canal south of Stone Corral Creek.

10.2.3.7. Golden Eagle

Status and Distribution

Golden eagle (*Aquila chrysaetos*) is fully protected under the California Fish and Game Code and protected by the Bald and Golden Eagle Protection Act (BGEPA). Golden eagle is a year-round resident throughout much of California. The species does not breed in the center of the Central Valley but breeds in much of the rest of the state (Zeiner et al. 1990a:142, 143).

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Habitat Requirements and Biology

Golden eagle inhabits nearly all terrestrial habitats of the western United States, except densely forested, densely populated, and agricultural areas (Katzner et al. 2020). Secluded, protected cliffs with overhanging ledges are usually preferred for nesting but large trees are also used for nesting and cover (Driscoll 2010:1, Hunt et al. 1999:4). Preferred territory sites include those that have a favorable nest site, a dependable food supply (medium to large mammals and birds), and broad expanses of open country for foraging. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990:262). In the interior central Coast Ranges of California, golden eagles favor open grasslands and oak savanna, with lesser numbers in oak woodland and open shrublands. In the Diablo Range of California, all except a few pairs nest in trees in oak woodland and oak savanna habitats due to a lack of suitable rock outcrops or cliffs. Nest trees include several oak species (*Quercus* spp.), foothill pine (*Pinus sabiniana*), Coulter pine (*Pinus coulteri*), California bay laurel (*Umbellularia californica*), eucalyptus (*Eucalyptus* spp.), and western sycamore (*Platanus racemosa racemose*). Eagles will also nest on electrical transmission towers traversing grasslands (Hunt et al. 1999:13).

Grasslands, deserts, savannas, and early successional stages of forest and shrub habitats provide open foraging terrain for golden eagles (Zeiner et al. 1990a:142). Golden eagle preys on a variety of animal species, with mammals making up 80%–90% of its diet (Driscoll 2010:2). The golden eagle nesting season is generally late March through the end of August. In the Diablo Range of California, courtship behaviors have been observed in December and January (Katzner et al. 2020).

Occurrence in and Near the Study Area

Although there are no recorded occurrences of golden eagle in the study area or within 5 miles of the study area (California Department of Fish and Wildlife 2021a), there are numerous observations of individuals in the study area that are recorded in eBird (Cornell Lab of Ornithology 2021). Potentially suitable golden eagle nesting habitat in the study area consists of blue oak woodland, foothill pine, and oak savanna land cover types. Potentially suitable foraging habitat for golden eagle in the study area consists of annual grassland, oak savanna, mixed chaparral, ornamental woodland, and ruderal land cover types.

10.2.3.8. Bald Eagle

Status and Distribution

Bald eagle (*Haliaeetus leucocephalus*) is state listed as endangered, is fully protected under the California Fish and Game Code, and is protected under the BGEPA. Bald eagle is a permanent resident and uncommon winter migrant in California (California Department of Fish and Game 1999a).

Habitat Requirements and Biology

Bald eagle breeds at coastal areas, rivers, lakes, and reservoirs with forested shorelines or cliffs in northern California. Wintering bald eagles are associated with aquatic areas containing some open water for foraging. Bald eagle nests in trees in mature and old growth forests that have some habitat edge and are somewhat close (within 1.25 miles) to water with suitable foraging

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opportunities. The average distance of bald eagle nests to human developments is 0.3 mile for most populations, which indicates a preference for nesting away from those areas. (Buehler 2020). Bald eagle will occasionally nest in riparian habitats, where nests are often in black cottonwoods (*Populus trichocarpa*) (Anthony et al. 1982:333). In California, ponderosa pine (*Pinus ponderosa*) and sugar pine (*Pinus lambertiana*) are the most frequently used tree species for nesting (Lehman 1979:13, Anthony et al. 1982:333). Where no large conifers are present, bald eagle will nest in deciduous trees such as oaks and cottonwoods (*Populus* spp.). Bald eagles build their nests in the upper canopy, generally selecting the largest trees in the area (Buehler 2020). The breeding season is February through July (Zeiner et al. 1990a:122).

Roost sites, like nest sites, are associated with aquatic foraging areas, but roost sites are farther from water than nest sites (Buehler 2020). Bald eagle is an opportunistic forager that takes live prey and scavenges carrion. Bald eagles hunt for live fish in shallow water but more frequently scavenge dead or dying fish. Bald eagle also eats other aquatic and terrestrial animals including waterfowl, muskrats (*Ondatra zibethicus*), raccoons, and small mammals (Buehler 2020; Jackman et al. 1999:87, 90–92; California Department of Fish and Game 1999a).

Occurrence in and Near the Study Area

Although there are no recorded occurrences of bald eagle in the study area (California Department of Fish and Wildlife 2021a), there is one known bald eagle occurrence at Sacramento National Wildlife Refuge, approximately 1.5 miles from the study area (California Department of Fish and Wildlife 2021a). Several bald eagles were observed by an ICF biologist at Funks Reservoir in January 2021 during focused bird surveys for geotechnical boring investigation locations. Potentially suitable habitat for this species in the study area consists of blue oak woodland, foothill pine, forested wetland, perennial stream, reservoir, and upland riparian land cover types.

10.2.3.9. Swainson's Hawk

Status and Distribution

Swainson's hawk (*Buteo swainsoni*) is state listed as threatened. The breeding range for Swainson's hawk in California consists of the extreme northeast portion of the state, the Sacramento and San Joaquin Valleys, valleys of the Sierra Nevada Range in Inyo and Mono Counties, and occasionally elsewhere in the state (Bechard et al. 2020). Swainson's hawks primarily winter in South America but some individuals winter in the Delta (Bechard et al. 2020).

Habitat Requirements and Biology

Swainson's hawks arrive in the Central Valley in March or April to establish nesting territories and breed (California Department of Fish and Wildlife 2016:5). They usually nest in large, mature trees. Most nest sites (87%) in the Central Valley are found in riparian habitats (Estep 1989:35), primarily because trees are more available there. Swainson's hawk also nests in mature roadside trees and in isolated trees in agricultural fields or pastures. The breeding season is from March through August (Estep 1989:12, 35). Nest sites are generally adjacent to, or within flying distance of, suitable foraging habitat and near large tracts of agricultural lands (California Department of Fish and Wildlife 2016:8).

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Swainson's hawk forages in grasslands, grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. Vineyards, orchards, rice, and cotton crops are generally unsuitable for foraging because of the density of the vegetation (California Department of Fish and Game 1992:41). Important land cover types for foraging are alfalfa and other irrigated hay crops, grain and row crops, fallow fields, dryland pasture, grassy ruderal lots, and annual grasslands (Swolgaard et al. 2008:192, 194; California Department of Fish and Wildlife 2016:7). In California, voles make up a large portion of Swainson's hawk's diet, but it will also eat ground squirrels, pocket gophers, and deer mice (*Peromyscus* spp.) (Bechard et al. 2020).

Occurrence in and Near the Study Area

There are numerous records for Swainson's hawk nest sites along the Sacramento River and other locations in the study area. Potentially suitable nesting habitat in the study area consists of blue oak woodland, forested wetland, oak savanna, ornamental woodland, and upland riparian land cover types. Isolated tree stands and solitary trees in agricultural fields or field borders or semi-developed areas were mapped as oak savanna or ornamental woodland and were included as potential nesting habitat in the habitat model, to the extent that they were mapped. Foraging habitat for Swainson's hawk in the study area consists of annual grassland, hayfield, managed wetland, oak savanna, row crops, ruderal, and seasonal wetland land cover types.

10.2.3.10. White-tailed Kite

Status and Distribution

White-tailed kite (*Elanus leucurus*) is fully protected under the California Fish and Game Code. In California, white-tailed kite occurs in coastal and valley lowlands (California Department of Fish and Game 2005).

Habitat Requirements and Biology

White-tailed kite nests in trees or shrubs in open grassland, agricultural, wetland, oak woodland, and savanna habitats (Dunk 2020). Habitat elements that influence nest site selection and nesting distribution include habitat structure (usually trees with a dense canopy) and prey abundance and availability (primarily the association with California vole), while the association with specific vegetation types (e.g., riparian, oak woodland, etc.) appears less important (Erichsen et al. 1996:165, 173; Dunk 2020). White-tailed kite nests have been documented in a variety of tree species, including oak, Fremont's cottonwood (*Populus fremontii*), willow, eucalyptus, box elder (*Acer negundo*), coast redwood (*Sequoia sempervirens*), ornamental trees including olive (*Olea* sp.) and pine (*Pinus* sp.), and in shrubs less than 10 feet tall (e.g., *Atriplex* sp. and *Baccharis* sp.) (Dixon et al. 1957:159; Erichsen et al. 1996:172; Dunk 2020). Nest trees appear to be selected based on structure and security, and thus typically have a dense canopy or are in a dense group of trees or large stands (more than 250 acres). White-tailed kites also nest in single isolated trees and, in the non-breeding season, communally roost in small stands of trees (Dunk 2020). The breeding season lasts from February through October and peaks between May and August (California Department of Fish and Game 2005).

White-tailed kites prefer grasslands, low shrubs, open woodlands, and cultivated areas for foraging (Dunk 2020). The foraging success of white-tailed kite is directly proportional to the abundance and composition of prey species (Erichsen et al. 1996:173), with rodents being the

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main prey type (Dunk 2020; Mendelsohn and Jaksic 1989:8). Preferred foraging habitats are ungrazed grasslands, open woodlands, low shrubs, wetlands dominated by grasses, and fence rows and irrigation ditches with residual vegetation adjacent to grazed lands (Mendelsohn and Jaksic 1989:2, 8; Dunk 2020). In cultivated areas, alfalfa and sugar beet fields are preferred, as well as rice stubble fields in the spring (Erichsen et al. 1994:46; Erichsen et al. 1996:170).

Occurrence in and Near the Study Area

There are no recorded occurrences of white-tailed kite in the study area (California Department of Fish and Wildlife 2021a). There is one record for a white-tailed kite nest site approximately 2.5 miles south of the RBPP and one record for a nest site approximately 3 miles east of the southern portion of the inundation area (California Department of Fish and Wildlife 2021a). Potentially suitable nesting habitat in the study area consists of blue oak woodland, forested wetland, oak savanna, ornamental woodland, and upland riparian land cover types. Foraging habitat for white-tailed kite in the study area consists of annual grassland, hayfield, managed wetland, oak savanna, row crops, ruderal, and seasonal wetland land cover types.

10.2.3.11. Western Yellow-billed Cuckoo

Status and Distribution

The western distinct population segment of the yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is federally listed as threatened (79 FR 59992) and state listed as endangered (California Department of Fish and Wildlife 2021b). The breeding range of western yellow-billed cuckoo in California consists of isolated locations along the South Fork Kern River, lower Colorado River, and Sacramento River (Hughes 2015).

Habitat Requirements and Biology

Breeding western yellow-billed cuckoos are riparian obligates and nest almost exclusively in riparian woodland with native broadleaf trees and shrubs (Halterman et al. 2015:3). Suitable habitat has a tree or large-shrub component with a variable overstory canopy and an understory component (U.S. Fish and Wildlife Service 2019a:5, 6). The overstory of the riparian habitat typically includes cottonwood and willow trees (U.S. Fish and Wildlife Service 2019a:6). Nest sites are often in dense foliage, and nests are primarily in willow, Fremont's cottonwood, and mesquite (*Prosopis* sp.). Along the Sacramento River, nests have rarely been found in prune (*Prunus* sp.), English walnut (*Juglans regia*), and almond (*Prunus dulcis*) orchards (Laymon 1998:4). Cottonwoods are used extensively for foraging and are an important component of foraging habitat (78 FR 61634).

Western yellow-billed cuckoo requires large blocks of riparian habitat for breeding (78 FR 61633). Patch size was found to be the most important habitat variable to predict presence of western yellow-billed cuckoo on the Sacramento River (Girvetz and Greco 2009). Large patch sizes (50 to 100 acres, with a minimum width of 328 feet) are typically required for cuckoo occupancy (Riparian Habitat Joint Venture 2004).

Western populations of yellow-billed cuckoos form pairs in mid-June or later and breed from June to August, with a peak in mid-July to early August (Hughes 2015). Breeding is restricted to the middle of summer, presumably because of a seasonal peak in large insect abundance (Rosenberg et al. 1982). To accommodate this, development of young is very rapid with a

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breeding cycle of 17 days from egg-laying to fledging of young (Hughes 2015). Western populations continue nesting through August, and up to three broods can be raised in a season if the prey base is sufficient. The birds begin their southbound migration in mid-August, and most have left the breeding grounds by mid-September (78 FR 61632).

Little is known about western yellow-billed cuckoo migratory habitat. Yellow-billed cuckoos may be found in a variety of vegetation types during migration, which suggests that the habitat needs of the cuckoo during migration are not as restricted as their habitat needs during the breeding season. Yellow-billed cuckoo may also be found in smaller riparian patches during migration than those in which it typically nests (78 FR 61634).

Occurrence in and Near the Study Area

There are numerous records for occurrences of western yellow-billed cuckoo along the Sacramento River in the operations study area (California Department of Fish and Wildlife 2021a). Potentially suitable western yellow-billed cuckoo habitat in the operations study area consists of forested wetland, scrub-shrub wetland, and upland riparian land cover types that are a minimum of 37 acres in size and have a minimum patch width of 328 feet and a maximum canopy gap width of 328 feet.

10.2.3.12. Bank Swallow

Status and Distribution

Bank swallow (*Riparia riparia*) is state listed as a threatened (California Department of Fish and Wildlife 2021b). The geographic range for bank swallow in California includes breeding in portions of the northern and central regions of the state where appropriate habitat exists. There are scattered colonies throughout northern California, but an estimated 70% ~~to~~ 90% of the breeding population is along the Sacramento River and its tributaries. This species spends winters in Central and South America (Bank Swallow Technical Advisory Committee 2013:9–10) and breeds in California between approximately March and September (California Department of Fish and Game 1999b).

Habitat Requirements and Biology

Riparian, lake, and coastal areas with vertical banks, bluffs, and cliffs with fine-textured or sandy soils provide suitable habitat for bank swallow (California Department of Fish and Game 1999b). Bank swallows typically establish colonies along eroded, vertical banks in river systems with friable alluvial soils. Nesting colonies are infrequently found in artificial sites, including sand quarries and road cuts (Bank Swallow Technical Advisory Committee 2013:12–13). Nesting sites are almost always near water (California Department of Fish and Game 1999b). In addition, riparian overbank vegetation appears to be an important habitat feature for bank swallow nesting, foraging, or both on the Sacramento River; a 10-year survey indicated that colonies were more strongly associated with native herbaceous/scrub and riparian forest habitat types, than with orchards (Garcia 2009:53, 55; Bank Swallow Technical Advisory Committee 2013:13). Nesting site selection is also based on attributes such as soil moisture, soil texture, orientation of the bank face, verticality of the bank face, and proximity to foraging areas (California Department of Fish and Game 1995:11).

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Foraging habitat for bank swallow includes wetlands, open water, grasslands, riparian woodland, orchards, agricultural fields, shrub lands, and upland woodlands (Bank Swallow Technical Advisory Committee 2013:14, California Department of Fish and Game 1999b). This species typically forages within approximately 650 feet of nest sites but may forage up to 6 miles away (Garrison 1998:4). Bank swallows typically forage in flight on a wide variety of aerial and terrestrial soft-bodied insects including flies, bees, and beetles (Bank Swallow Technical Advisory Committee 2013:14, California Department of Fish and Game 1999b).

Bank swallow nests in colonies ranging in size from three to over 3,000. Females typically lay three to five eggs, and are thought to have one brood per season, but may have two. Peak egg-laying is between mid-April and mid-May, and most juveniles fledge by mid-July (Bank Swallow Technical Advisory Committee 2013:11–12).

Occurrence in and Near the Study Area

There are numerous CNDDB records for occurrences of bank swallow along the Sacramento River in the operations study area. The occurrences that are closest to construction areas are 0.2 mile from the RBPP and 0.4 mile from the GCID head gate structure, both along the Sacramento River (California Department of Fish and Wildlife 2021a). Potentially suitable bank swallow nesting habitat in the study area consists of portions of the Sacramento River with eroded, vertical banks. Potentially suitable bank swallow foraging habitat in the study area consists of annual grassland, blue oak woodland, barren, chamise chaparral, ephemeral stream, forested wetland, foothill pine, freshwater marsh, intermittent stream, mixed chaparral, oak savanna, perennial stream, pond, reservoir, scrub-shrub wetland, seasonal wetland, upland riparian, canal, disturbed, ditch, hayfield, managed wetland, orchard, ornamental woodland, reservoir, rice, row crops, ruderal, and vineyard land cover types.

10.2.3.13. Tricolored Blackbird

Status and Distribution

Tricolored blackbird (*Agelaius tricolor*) is state listed as threatened. Tricolored blackbird is a highly colonial species that is largely endemic to California. The historical tricolored blackbird breeding range in California included the Sacramento and San Joaquin Valleys, the foothills of the Sierra Nevada south to Kern County, the coastal slope from Sonoma County south to the Mexican border, and, sporadically, the Modoc Plateau. However, historical surveys did not include large areas of the species' currently known breeding range (Shuford and Gardali 2008:438). The species' overall range has not changed much since the mid-1930s (Beedy et al. 2020), though more recent surveys have documented additional local populations at the periphery of the range (e.g., as far north along the Pacific Coast as Humboldt County, and in the western Mojave desert), and new colony sites within the overall historical range (Shuford and Gardali 2008:439).

Habitat Requirements and Biology

Suitable tricolored blackbird breeding colony sites have open, accessible water; a protected nesting substrate, including either flooded, thorny, or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony. Tricolored blackbird breeding colonies occur in freshwater marshes dominated by tules and cattails, in

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Himalayan blackberry (*Rubus armeniacus*), and in silage and grain fields (Beedy and Hamilton 1997:3–4). The breeding season is from early March to early August (Beedy et al. 2020).

Tricolored blackbird foraging habitats in all seasons include annual grasslands, dry seasonal pools, agricultural fields (such as large tracts of alfalfa with continuous mowing schedules, and recently tilled fields), cattle feedlots, and dairies. Tricolored blackbirds also forage occasionally in riparian scrub habitats and along marsh borders. Weed-free row crops and intensively managed vineyards and orchards do not serve as regular foraging sites. Most tricolored blackbirds forage within 3 miles of their colony sites but commute distances of up to 8 miles have been reported (Beedy and Hamilton 1997:5).

Occurrence in and Near the Study Area

There are two records for presumably extant tricolored blackbird colonies that overlap the study area; one is east of the inundation area and the other is east of the GCID system improvements area. There are more than 20 records for occurrences of tricolored blackbird colonies within 5 miles of the study area (California Department of Fish and Wildlife 2021a). Potentially suitable tricolored blackbird nesting habitat in the study area consists of freshwater marsh and managed wetland land cover types. Potentially suitable foraging habitat for tricolored blackbird in the study area consists of annual grassland, rice, row crops, and seasonal wetland land cover types within 3 miles of suitable nesting habitat. Ruderal areas are also considered suitable foraging habitat when adjacent to other suitable foraging habitat land cover types.

10.2.4. Wildlife Corridors

Suitable habitat is required for wildlife species to provide food, water, cover, and other elements for survival. Depending on the species, a variety of habitats may be used throughout the life cycle, including reproduction and dispersal. Local movement, migration, and dispersal patterns vary for different species, and may be an important part of individual and species survival. In California, development, including agriculture, urbanization, and transportation, has resulted in substantial habitat reduction and fragmentation that presents barriers to local movements and migration for many wildlife species. Development has also resulted in additional risk to wildlife when moving through these areas, including risk of vehicle strikes on roadways.

CDFW and the California Department of Transportation have identified existing habitat blocks and linkages within the state, as well as missing linkages, and developed strategies for preserving and enhancing wildlife linkages through the California Essential Habitat Connectivity Project (Spencer et al. 2010). Mapped natural landscape blocks are large areas of mostly intact and well-conserved natural areas, and essential connectivity areas are connections between these blocks that have been identified as high priority for maintaining and enhancing ecological connectivity. In the Central Valley region, the essential connectivity areas often connect existing reserves across lands with more roads, agriculture, and urbanization, which can constrain wildlife movements. According to California Essential Habitat Connectivity Project mapping, there are multiple natural landscape blocks, small natural areas, low priority linkages, and essential connectivity areas in and near the study area (Figure 10-1). In addition, CDFW's Areas of Conservation Emphasis viewer shows that portions of the study area are identified as "irreplaceable and essential corridors", "conservation planning linkages", and "connections with implementation flexibility" (Figure 10-2) (California Department of Fish and Wildlife 2018).

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Figure 10-1. Wildlife Movement Corridors [FIGURE UNDER REVIEW – TO BE INCLUDED IN THE FINAL EIR/EIS]

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Figure 10-2. Areas of Conservation Emphasis: Terrestrial Connectivity [FIGURE UNDER REVIEW – TO BE INCLUDED IN THE FINAL EIR/EIS]

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Much of the study area is comprised of natural and agricultural land covers, and there is very little existing urban development to impede wildlife movement except for roadways and irrigation infrastructure (i.e., the TC Canal and GCID Canal). As described above and in Appendix 10A, *Wildlife Species Lists, Special-Status Wildlife Table, and Non-Listed Wildlife Species Accounts*, there is potential habitat for multiple special-status species in the study area that could be used for migration and dispersal. Non-listed wildlife such as deer, tule elk, bobcats, foxes, raccoons, skunks, squirrels, and various species of amphibians and reptiles could also use the study area for dispersal and migration.

10.3 Methods of Impact Analysis

The methods for analysis of impacts on wildlife resources are based on professional standards and information cited throughout this section. The key impacts were identified and evaluated based on the environmental characteristics of the study area and the expected magnitude, intensity, and duration of activities related to the construction and operation of the Project.

Direct impacts are those effects that would be caused by the Project and would occur at the same time and place. Filling of the reservoir is considered a direct impact, even though it would take time for the reservoir to be filled completely. Indirect impacts are those effects that are caused by the Project but would occur later in time (e.g., impacts from operations) or be farther from the Project but are reasonably foreseeable (e.g., impacts downstream of the Project). Direct and indirect impacts may be either permanent or temporary. Short-term temporary impacts on wildlife resources would occur when temporarily affected areas would be restored to preconstruction conditions within 1 year. Long-term temporary impacts would occur when impacts on wildlife resources would be temporary but would last between 1 and 5 years. Short-term temporary impacts are calculated as temporary impacts and long-term temporary impacts were calculated as permanent impacts in the impact analysis. The study area for wildlife resources includes a 300-foot-wide area beyond the permanent and temporary impact areas. For vernal pool branchiopods, the amount of modeled habitat within 250 feet of impact boundaries was estimated for potential impacts such as changes in hydrology that would indirectly but permanently affect modeled habitat. The additional 300-foot area was assessed for potential temporary direct impacts on wildlife resources. For some special-status birds and migratory birds, direct and indirect effects may exceed the 300-foot assessment buffer. In these instances, survey areas and no-disturbance buffers identified in mitigation measures are extended to address a larger potential impact area based on the species' biology or established guidance from wildlife agencies (i.e., CDFW and USFWS). For operational impacts only, the study area for wildlife resources also includes the Sacramento River between the RBPP and the Delta, the Sutter Bypass, and the Yolo Bypass (i.e., operations study area).

In general, permanent and temporary impacts on potential habitat for special-status species are overestimated because surveys to assess habitat suitability of land cover types could not be conducted in the study area due to access limitations. Consequently, the entirety of the land cover is considered affected even when specific habitat requirements may be absent (e.g., elderberry shrubs, which are host plants for valley elderberry longhorn beetle, in riparian land cover types).

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Climate change is likely to alter temperature and hydrologic patterns in the Sacramento Valley. Heat waves are expected to become longer and affect larger areas, with higher daytime and nighttime temperatures and fewer cooling days. The Sacramento Valley will likely see increased precipitation during winter storms, more extreme floods, and greater floodplain vulnerability. On the dry extreme, the region will experience increased dryness and more extreme droughts. Changes in temperature and precipitation patterns and extremes could modify habitats and wildlife species compositions as some wildlife species become unable to survive in the new climate conditions. Climate change considerations and wildlife are discussed in Chapter 28, *Climate Change.*

10.3.1. Construction

As a result of the inability to access most of the study area because it is privately owned, direct permanent impacts on special-status wildlife and their habitats were assessed using the estimated amounts of modeled habitat (as described in Section 10.2.1, *Methods for Assessing Wildlife Resources in the Study Area*) that would be converted by Project construction. Construction impacts include both construction of facilities and filling of Sites Reservoir. Short-term (less than 1 year of disturbance) and long-term temporary (1 to 5 years of disturbance) impacts on habitat for wildlife species were calculated using the estimated acreages of land cover types that would be temporarily disturbed during Project construction based on the amount of time the land cover would be disturbed. One of the assumptions of the impact analysis was that the conditions on parcels of land surrounding the reservoir would be maintained similar to baseline~~existing~~ conditions (e.g., as grazing lands).

Impacts on special-status wildlife habitats were calculated using GIS software. GIS data of the Project footprint and associated temporary impact areas were overlaid on the modeled species habitat (and in a few cases, land cover mapping data) to quantify the permanent and temporary impacts associated with the construction of the Project facilities. Impacts on individuals of special-status wildlife species were assumed if modeled habitat was affected. This approach is conservative and overestimates the potential effects. Once property access is obtained, surveys would be conducted to determine if suitable habitat and/or special-status wildlife are present in the study area. Special-status wildlife species identified as having moderate to high potential to occur in the study area (Table 10A-2 in Appendix 10A) were included in the impact analysis. The special-status wildlife species with low or no potential to occur in the study area were not included in the impact analysis because they are not expected to occur in the study area or be affected by the Project.

The following assumptions and alternative details regarding specific Project components were applied to the impact analysis for Alternatives 1, 2, and 3 unless otherwise stated:

- Installation of the two additional TC Canal diversion pumps at the RBPP would not affect any modeled habitat for special-status wildlife because construction would occur in the existing facility footprint. In addition, work would be short term. These activities would likely be conducted during winter because dewatering would be required and because it would be outside of the nesting bird season. No impacts are anticipated and this area is not considered further in this analysis.

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- Staging areas for all Project components would be temporarily affected, unless a part of the Project footprint overlaps the staging area, where impacts would be considered permanent.
- Impacts from the north-south transmission line and the east-west transmission line would be primarily long-term temporary for installation of new high-voltage electrical transmission lines to power the regulating reservoirs. Only one of the two alignments described in Chapter 2, *Project Description and Alternatives*, would be constructed and the specific locations of the transmission lines are unknowns. Permanent impacts would result from new transmission line towers and an access road, which are assumed to be within annual grassland. Construction would include installation of up to 16 towers that are assumed to each have vegetation clearing within a 10-foot radius of the base, and an unpaved 15-foot-wide access road. Based on these specifications, approximately 5 acres of annual grassland would be permanently removed. The impact on the remaining area within the transmission line alignments would be considered long-term temporary and is overestimated because only one transmission line would be constructed.
- Quarries located outside the inundation area would be regraded and allowed to revegetate at the bottoms but would not return to pre-Project conditions and would be considered permanently affected.
- Offsite borrow areas or aggregate areas would be in existing active commercial facilities and are not part of the impact analysis for wildlife resources due to the ongoing activities at these locations.
- The reservoir would replace existing land cover types with open water and Alternative 1 or 3 would permanently flood a larger area (1.5 MAF) than Alternative 2 (1.3 MAF).
- The footprints for the Peninsula Hills, Stone Corral Creek, and day-use boat ramp/parking recreation areas represent the total area that could be used for recreation activities, but only a portion of each footprint would be permanently affected as a result of construction of campsites, parking areas, picnic areas, hiking trails, potable water sources, utility connections, kiosks (at Peninsula Hills and Stone Corral Creek Recreation Areas), and toilets. Therefore, permanent impacts from these facilities are overestimated in the impact analysis for wildlife resources.
- New road construction would result in the permanent loss of existing land cover types in the entire construction disturbance area, and improvements to existing roads would affect only the area to the edges of the rights-of-way. The exact locations of the realigned Huffmaster Road, new Comm Road South, and new South Road are not yet finalized. Corridors were used to identify the areas in which potential direct and indirect impacts would occur. For example, for South Road, a 400-foot-wide conceptual road alignment plus a 300-foot-wide buffer was identified to allow for design flexibility. Because the final realigned South Road location is unknown, the entire 700-foot-wide corridor was assumed to be permanently affected for the purpose of the impact analysis. Within the corridors, the actual permanent impact area would be only the footprint of roads and shoulders with additional temporarily affected areas for construction staging and equipment movement. Therefore, permanent impacts from these facilities are overestimated.

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The Authority will implement the following BMPs, which are described in Appendix 2D, *Best Management Practices, Management Plans, and Technical Studies*, for all alternatives unless otherwise noted, and as such are incorporated into the analysis of potential construction impacts on wildlife resources.

- BMP-12, Development and Implementation of Stormwater Pollution Prevention Plan(s) (SWPPP) and Obtainment of Coverage under Stormwater Construction General Permit (Stormwater and Non-stormwater) (Water Quality Order No. 2022-0057-DWQ/NPDES No. CAS000002 and any amendments thereto), requires development and use of erosion control measures, sediment control measures, construction materials management measures, waste management measures, non-stormwater control measures, and postconstruction ~~construction~~ stormwater management measures to prevent the movement of sediment and contaminants into aquatic habitats.
- BMP-17, Implementation of Visual/Aesthetic Design, Construction, and Operation Practices, requires all construction lighting to be directional to minimize glare impacts to wildlife; requires permanent outdoor lighting to be limited to safety and security requirements, to be shielded to minimize offsite light spill and glare, and to be screened and directed away from adjacent uses to the highest degree possible to minimize lighting impacts on wildlife, such as exposure to predation and altering movement to avoid the light.
- BMP-13, Development and Implementation of Spill Prevention and Hazardous Materials Management/Accidental Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) and Response Measures, requires site-specific plans with measures to minimize effects from spills of hazardous or petroleum substances during construction and operation/maintenance to prevent contamination of aquatic habitats.
- BMP-15, Performance of Site-Specific Drainage Evaluations, Design, and Implementation, requires professional hydrologists and civil engineers to evaluate and design water conveyance systems (e.g., ditches, curb and gutters, culverts) that are within 250 feet of seasonal wetlands to maintain the existing hydrology of the seasonal wetlands and ensure that contaminants from impervious surfaces are not channeled into seasonal wetlands.
- BMP-33, Implementation of a Worker Environmental Awareness Program (WEAP), requires training of all construction crews and contractors on protection and avoidance of biological, cultural, archaeological, paleontological, and other sensitive resources to make personnel aware of these resources and avoid impacts on sensitive biological resources.
- BMP-35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities, requires a construction monitoring plan for sensitive biological resources and in-water construction activities, construction monitoring by qualified biologists, use of exclusion fencing around sensitive biological resources to protect them from disturbance, limiting vehicle speeds to 15–20 miles per hour on unpaved roads to reduce the potential for vehicle strikes, and the following measures for construction personnel to protect wildlife.

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- Requiring trash to be removed from work sites daily to avoid attracting wildlife to the construction area.
- Prohibiting firearms and pets in construction areas to prevent injury or mortality of wildlife.
- Covering all trenches and holes at the end of each day and inspecting them prior to the start of work each day to prevent wildlife entrapment.
- Prohibiting the use of netting for erosion control to prevent special-status wildlife from being entangled in the netting.

- BMP-37, Shading of Work Lighting for Nighttime Work (Alternative 2 Discharge Location on Sacramento River), requires work lights to be shaded to minimize illumination of water in order to minimize disturbance of wildlife species.

These BMPs would be implemented for Alternatives 1, 2, and 3 and would reduce direct and indirect impacts on special-status wildlife.

10.3.2. Operation

Operation of the Project would not involve additional earth-moving or substantial disturbance of new areas beyond those that would be disturbed during construction. Therefore, impact acreages from operation were not calculated for purpose of analysis of impacts on wildlife resources. The operation phase would include primarily changes in water diversions to Sites Reservoir, routine tasks to maintain the facilities after construction according to operations and maintenance plans that would be developed, scientific studies such as fish monitoring in the Sacramento River, and energy generation and use. Energy generation and use is not anticipated to affect wildlife resources.

Based on hydrologic modeling results and practical application of the North Delta Flow action, only minimal effects from operational water diversions would occur in most parts of the study area with respect to wildlife. ~~In the Yolo Bypass, model results show changes in flow and inundation for late summer and early fall (August through October).~~ Impacts in the Yolo Bypass were assessed qualitatively, based on the best available information. Details of hydrologic modeling results are described in Chapter 5 (*Surface Water Resources*), Chapter 7 (*Fluvial Geomorphology*), Chapter 11 (*Aquatic Biological Resources*), and Appendix 11M (~~*Inundated Floodplain and Side Channel Habitat Analysis, including*~~ *Yolo and Sutter Bypass Flow and Weir Spill Analysises*~~)~~.

Maintenance would include vegetation control and grazing around all facilities, recreation areas, and a 100-foot buffer around the facilities. These activities would affect undeveloped land where special-status wildlife or their habitats could occur. Because public use of recreation areas could affect areas that support special-status wildlife or their habitats, impacts that could result during operation of recreation areas were considered.

The completion and implementation of a Land Management Plan (LMP), which is described in Section 2D.7, *Land Management Plan*, are incorporated into the analysis of potential operation impacts on wildlife resources. This plan would address management and maintenance activities on all non-recreation land resources held in fee or easement (including the Project buffer) by the

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Authority, including vegetation maintenance, invasive aquatic and plant control, and rodent control. The LMP would include general measures and practices when working in or near habitat for special-status wildlife and specify when pre-activity surveys or monitoring would be required prior to or during maintenance activities.

Impacts that could result during operation of recreation areas were also considered because public use of recreation areas could affect special-status wildlife or their habitats. The development and implementation of a Recreation Management Plan, which is described in Section 2D.8, *Recreation Management Plan*, are incorporated into the impact analyses for wildlife resources. This plan would address management activities and specify where signs, fencing areas, or other deterrents to avoid or minimize human intrusion into habitat would be required on all Project recreation lands and areas.

10.3.3. Thresholds of Significance

An impact on wildlife resources would be considered significant if the Project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any wildlife species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS.
- Interfere substantially with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites.
- Conflict with any local policies or ordinances protecting wildlife resources.
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

10.4 Impact Analysis and Mitigation Measures

Impact WILD-1: Substantial adverse effect (i.e., loss or removal), either directly or through habitat modifications, on wildlife species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service (*the following impact analysis is subdivided into lettered components, and special-status species are grouped together when they utilize the same land cover types or impacts are similar*)

Summary tables showing permanent and temporary impacts on modeled habitat for special-status species by alternative are included for each group of special-status wildlife discussed below. Appendix 10C, *Special-Status Wildlife Impacts Tables,* has detailed tables showing permanent and temporary impacts on modeled habitat for special-status species by Project component.

No Project

Under the No Project Alternative, no new Project facilities would be constructed or operated. As described in Section 10.2, *Environmental Setting*, special-status wildlife species and their

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habitats are known or have the potential to occur in the Project area. Because there would be no construction or operation of new Project facilities under the No Project Alternative, there would be no temporary or permanent impacts on special-status wildlife or their habitats. In addition, under the No Project Alternative, the operation of existing facilities, such as TC Canal, RBPP, and GCID Main Canal, would continue. The owner/operators of these facilities would operate within the conditions and requirements of existing permits and agreements meant to protect special-status wildlife species. Finally, activities that currently occur within the study area such as grazing or other rural agricultural activities would continue and may result in effects on special-status wildlife species but would do so in the context of existing regulations, requirements, and activities.

Significance Determination

The No Project Alternative would not result in a substantial adverse effect, either directly or through habitat modifications, on special-status wildlife species. There would be no impact/no effect.

Alternatives 1, 2, and 3

The analyses of Project construction and operation impacts for special-status wildlife species are presented for individual species or groups of species if they utilize the same land cover types or impacts are similar. The analyses incorporate the BMPs in Section 10.3, *Methods of Impact Analysis*, the LMP, and the Recreation Management Plan that the Authority will implement to avoid and/or reduce potential impacts on special-status wildlife species. For example, construction workers would be trained on the importance of avoiding special-status wildlife and plant species (BMP-33), and fencing would be required around sensitive habitats that feasibly can be avoided during construction (BMP-35). BMP-35 would also restrict off-road driving in construction areas to prevent disturbance in, and damage to, habitats that would be avoided during construction (e.g., those adjacent to work areas or in activity exclusion zones). While these BMPs would avoid and/or reduce impacts during construction, they would not prevent the permanent loss of habitat or degradation of habitat, described further below by species, as a result of the construction of Alternative 1, 2, or 3. All land cover type acreages are preliminary and subject to revision based on pedestrian surveys once access has been granted to the study area.

Aquatic Invertebrates

Impact WILD-1a: Vernal Pool Branchiopods

The largest continuing threats to vernal pool branchiopods are habitat loss and modification of habitat from urban development and agricultural conversion (U.S. Fish and Wildlife Service 2007a:16, U.S. Fish and Wildlife Service 2007b:27).

Direct permanent and temporary impacts and indirect impacts on modeled habitat for Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp (i.e., vernal pool branchiopods) from Alternatives 1, 2, and 3 are shown in Table 10-2a.

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Table 10-2a. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Vernal Pool Branchiopod Habitat in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternatives 1 and 3 Indirect Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts	Alternative 2 Indirect Impacts
Conservancy Shrimp, Vernal Pool Fairy Shrimp, and Vernal Pool Tadpole Shrimp	366	0	120	358	0	123

Alternatives 1 and 3

Modeled habitat for vernal pool branchiopods is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

Construction

Construction of Alternative 1 or 3 would result in permanent loss of modeled habitat for vernal pool branchiopods (Table 10-2a). Modeled habitat would also be lost when the reservoir is inundated. Clearing and grubbing, excavation, and other construction activities could result in individuals or cysts being crushed or buried by equipment. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable habitat and cause illness or mortality of individuals.

Operation

Indirect effects on vernal pool branchiopods could occur during operation as a result of changes in topography, compaction of soils, and increases in surface runoff from the additional impervious surfaces associated with the new facilities. These changed conditions could modify the existing hydrologic regime of modeled vernal pool branchiopod habitat in or within 250 feet of affected areas (Table 10-2a). Changes in topography could result in additional water entering habitat or could interfere with existing hydrology of or water flow into occupied habitats, thereby increasing or reducing the amount of water entering habitat. Alterations in the length of the inundation period of habitat could affect vernal pool branchiopod reproduction. Changes in topography could also result in new or increased contaminants such as gasoline, oil, and herbicides entering vernal pool branchiopod habitat from adjacent new or widened roads, or new facilities, which could cause illness or mortality of individuals. The Authority would implement BMP-15, which will require professional hydrologists and civil engineers to evaluate and design water conveyance systems (e.g., ditches, curb and gutters, culverts) that are within 250 feet of seasonal wetlands to maintain the existing hydrology of the seasonal wetlands and ensure that contaminants from impervious surfaces are not channeled into seasonal wetlands.

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Implementation of this BMP would avoid potential indirect effects on vernal pool branchiopod habitat from changes in hydrology and new or increased amounts of contaminants.

Impacts on vernal pool branchiopods from maintenance activities are not expected to occur because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways. Any occupied vernal pools in or near maintenance areas would be protected from disturbance through implementation of measures and practices in the LMP.

Based on the habitat modeling, there is suitable vernal pool branchiopod habitat at the recreation areas, which would be used by visitors on a regular basis. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). If vernal pool branchiopods were present in the modeled habitat, they could be crushed by visitors. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into vernal pool branchiopod habitat.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on vernal pool branchiopods from removal of suitable habitat and loss of individuals. Operational effects on vernal pool branchiopods would be avoided or minimized through implementation of BMP-15, the LMP, and the Recreation Management Plan, and would be less than significant. Construction impacts would be significant because implementation of Alternative 1 or 3 could reduce the local populations of federally listed vernal pool branchiopods through direct mortality and habitat loss.

Implementation of Mitigation Measures WILD-1.1, WILD-1.2, and WILD-1.3 would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to determine occupancy, habitat disturbance would be avoided during the rainy season, the topsoil of vernal pools in permanent impact areas would be removed for use in habitat creation or restoration (if requested by USFWS), and compensation would be provided for impacts on occupied habitat. All modeled habitat would be evaluated, and suitable habitat would be surveyed for the presence of vernal pool branchiopods prior to construction. Direct and indirect impacts on occupied habitat would be mitigated through acquiring and protecting habitat in perpetuity or purchasing mitigation credits in accordance with mitigation ratios and requirements developed during ESA Section 7 consultation with USFWS.

Mitigation Measure WILD-1.1: Assess Habitat Suitability and Survey Suitable Habitat for Vernal Pool Branchiopods

Once property access is granted and prior to the start of construction, the Authority will retain qualified biologists to assess habitat suitability and conduct surveys for vernal pool branchiopods in the Project area and where modeled habitat is within 250 feet of the Project area and indirect effects may occur. Qualified biologists are defined as those who have a recovery permit from USFWS to conduct surveys for listed vernal pool branchiopods. The surveys will be conducted in accordance with the *Survey Guidelines for the Listed Large Branchiopods*, which recommend surveys at 14-day intervals after initial inundation of habitat until the habitat dries or it has been inundated for a minimum

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of 90 consecutive days (U.S. Fish and Wildlife Service 2015b). Surveys in accordance with the guidelines take a minimum of 1 year to complete and will be initiated early enough to allow completion before the start of construction. The biologists will submit the results of the surveys in a report to USFWS, per the requirements of the biologists' recovery permits.

Mitigation Measure WILD-1.2: Avoid and Minimize Potential Effects on Vernal Pool Branchiopods and Western Spadefoot

The following steps will be taken to avoid or minimize potential effects on vernal pool branchiopods and western spadefoot.

- Ground disturbance within 250 feet of occupied habitat or suitable habitat that hasn't been surveyed that would not be directly affected will be avoided during the rainy season (approximately October 15 through May 15). Compensation will be provided for habitat occupied by listed vernal pool branchiopods that cannot be avoided during the rainy season (Mitigation Measure WILD-1.3).
- If a portion of occupied vernal pool branchiopod or western spadefoot habitat will be filled (i.e., permanent impacts), the filling will be conducted when the habitat is completely dry.
- If requested by USFWS, the top 3 to 4 inches of soil of pools occupied by listed or unlisted vernal pool branchiopods that would be destroyed or completely filled will be removed and stored in the Project area until ready for placement in created or restored habitat outside of the Project footprint. The topsoil will be covered with tarps or other appropriate material and orange construction barrier fencing or stakes and flagging will be installed around the covered topsoil. A qualified biologist will be on site to monitor the removal and covering of the topsoil during periodic monitoring visits to the Project area. The stored topsoil will be spread over the bottom of created or restored pools prior to the start of the winter rainy season.

Mitigation Measure WILD-1.3: Compensate for Impacts on Occupied Vernal Pool Branchiopod Habitat

The Authority will compensate for direct and indirect effects on occupied vernal pool branchiopod habitat through the purchase of mitigation credits at a USFWS-approved mitigation or conservation bank or through acquiring, creating, restoring and/or protecting habitat in perpetuity at a location approved by USFWS. Direct and indirect effects on occupied habitat will be mitigated by preserving occupied habitat at a 2:1 ratio (habitat preserved : habitat directly or indirectly affected) or by an equivalent or greater amount as determined during ESA Section 7 consultation with USFWS. In addition, direct effects on occupied habitat will be mitigated by creating or preserving occupied habitat at a 1:1 ratio (habitat created : habitat directly affected) or by an equivalent or greater amount as determined during ESA Section 7 consultation with USFWS. The purchase of mitigation credits or the establishment of onsite or offsite mitigation areas (or a combination of these options) would be completed as agreed upon by the Authority, Reclamation, and USFWS.

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USFWS-approved conservation banks have long-term adaptive management plans with performance standards. Therefore, if mitigation is through a USFWS-approved conservation bank, the bank's performance standards and success criteria will be applied.

If credits are not purchased at a USFWS-approved conservation bank, the Authority will implement standards for long-term management and protection of conservation areas. The Authority will work closely with USFWS during the planning and development of conservation areas. Once established, conservation areas will be surveyed by a USFWS-approved biologist a minimum of two times per year during the wet season (generally November through April). The biologist will survey for the presence of listed vernal pool branchiopods, evaluate the adequacy of site protection (e.g., fencing, signage) and weed control, assess potential threats to vernal pool branchiopods, and take photographs of the site. The biologist will also survey a set of reference pools to compare to the preserved and created/restored pools. The reference pools should be located in proximity to the conservation area and exhibit characteristics similar to the preserved and created/restored pools.

For non-mitigation bank compensation, the performance standard for occupancy of the created/restored pools by listed vernal pool branchiopods is a minimum of 5% of the total number of created/restored pools supporting listed vernal pool branchiopods over a 10-year monitoring period. A pool must be occupied at least once during the 10-year monitoring period to be considered occupied. If the performance standard cannot be achieved, the Authority and Reclamation will consult with USFWS to determine if the standard is not realistic based on data from other vernal pool surveys in the Project region and/or implement an alternative compensatory mitigation approach.

Working closely with USFWS during planning and development of the conservation area, monitoring the conservation area to ensure performance standards are achieved, and applying adaptive management actions when the performance standard is not achieved will ensure that the compensatory mitigation is effective and compensates for the loss of occupied habitat resulting from the Project.

NEPA Conclusion

Construction and operation effects on vernal pool branchiopods would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on vernal pool branchiopods as compared to the No Project Alternative as a result of removal of suitable habitat and loss of individuals. Operational effects on vernal pool branchiopods would be avoided or minimized through implementation of BMP-15, the LMP, and the Recreation Management Plan. With implementation of Mitigation Measures WILD-1.1, WILD-1.2, and WILD-1.3, the construction and operation effects would be reduced to no adverse effect on vernal pool branchiopods.

Alternative 2

Modeled habitat for vernal pool branchiopods may be present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

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Construction

Construction of Alternative 2 would result in the permanent loss of modeled habitat for vernal pool branchiopods (Table 10-2a). Clearing and grubbing, excavation, and other construction activities could result in the destruction of vernal pools or other suitable habitats, and individuals or cysts could be crushed or buried by equipment. Impacts would be the same as described for Alternatives 1 and 3 except that construction of South Road and TRR West would result in additional loss of modeled habitat and the smaller inundation area would result in reduced loss of modeled habitat. Overall, permanent impacts on modeled vernal pool branchiopod habitat would be less under Alternative 2 because of the smaller inundation area and reduced permanent impacts from construction of dams and dikes (Appendix 10C, Table 10C-1).

Operation

Potential changes in the hydrologic regime of vernal pool branchiopod habitat that could result from changes in topography, soil compaction, and increased amounts of impervious surfaces and potential illness or mortality of vernal pool branchiopods from new or increased contaminants would be similar under Alternative 2 as described for Alternatives 1 and 3. Impacts would be the same as described for Alternatives 1 and 3 except that the larger amount of impervious surface from South Road under operation of Alternative 2 would result in potential indirect effects on additional modeled vernal pool branchiopod habitat. Impacts from maintenance activities and disturbance at recreation areas would be the same under Alternative 2 as described for Alternatives 1 and 3. Effects from operation would be avoided or minimized through implementation of BMP-15, the LMP, and the Recreation Management Plan.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that permanent loss of modeled habitat would be less under Alternative 2 because of the smaller inundation area and fewer permanent impacts on habitat from dams and dikes (Appendix 10C, Table 10C-1). Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that the additional impermeable surface from South Road could result in potential indirect effects on additional modeled vernal pool branchiopod habitat. Operational effects on vernal pool branchiopods would be avoided or minimized through implementation of BMP-15, the LMP, and the Recreation Management Plan, and would be less than significant. Construction impacts would be significant because the implementation of Alternative 2 could reduce the local populations of federally listed vernal pool branchiopods through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.1, WILD-1.2, and WILD-1.3 would reduce the level of impact to less than significant for reasons discussed above.

NEPA Conclusion

Construction and operation effects on vernal pool branchiopods would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on vernal pool branchiopods as compared to the No Project Alternative. Construction of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that permanent loss of modeled habitat would be less under Alternative 2 because of the smaller inundation area and fewer permanent impacts on habitat from dams and dikes (Appendix 10C, Table 10C-1). Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3

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except that the additional impermeable surface from South Road could result in potential indirect effects on additional modeled vernal pool branchiopod habitat. Operational effects on vernal pool branchiopods would be avoided or minimized through implementation of BMP-15, the LMP, and the Recreation Management Plan With implementation of Mitigation Measures WILD-1.1, WILD-1.2, and WILD-1.3, the construction and operation effects would be reduced to no adverse effect.

Terrestrial Invertebrates

Permanent and temporary impacts on modeled habitat for other special-status invertebrates from Alternatives 1, 2, and 3 are shown in Table 10-2b.

Table 10-2b. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Terrestrial Invertebrate Habitat in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts
Antioch Dunes Anthicid Beetle and Sacramento Anthicid Beetle	0	0	<1	<1
Valley Elderberry Longhorn Beetle	13,548	973	12,709	947
Monarch Butterfly	15,542	1,305	15,158	1,281
Crotch Bumble Bee and Western Bumble Bee	14,117	979	13,649	927

Impact WILD-1b: Antioch Dunes Anthicid Beetle and Sacramento Anthicid Beetle

Antioch Dunes anthicid beetle has been extirpated from Antioch Dunes and both anthicid beetle species have limited distributions (California Department of Fish and Wildlife 2021e, 2021f). However, the current distributions of these beetles are limited to adjacent to the Sacramento River (California Department of Fish and Wildlife 2021e, 2021f).

Alternatives 1 and 3

Potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle is present along the Sacramento River in the operations study area.

Construction

Construction of Alternatives 1 and 3 would not result in direct impacts on Antioch Dunes anthicid beetle or Sacramento anthicid beetle because construction activities would not be conducted in or near potentially suitable habitat.

Operation

Operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Diversions from the Sacramento River to

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the reservoir would occur only under higher Sacramento River flow regimes. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~12~~% increase to a less than 2.5~~2.53~~% decrease under Alternative 1 or 3 when compared to the No Project~~Action~~ Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or, June ~~or July~~) between the No Project~~Action~~ Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, T~~t~~hese values show an increase of ~~less than~~ 1% to a decrease of less than 6~~5~~% when compared to No Project~~Action~~ Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water available in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under ~~existing~~baseline conditions. Minimal changes to the natural river geomorphic processes and existing geomorphic characteristics of the Sacramento River would not affect potentially suitable habitat for Antioch Dunes anthicid beetle or Sacramento anthicid beetle (i.e., sandy banks and sand bars).

Impacts on Antioch Dunes anthicid beetle and Sacramento anthicid beetle from maintenance activities are not expected to occur because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would not result in direct impacts on Antioch Dunes anthicid beetle or Sacramento anthicid beetle because there would be no work in potentially suitable habitat for these species. Operation of Alternative 1 or 3 would not result in indirect impacts on these anthicid beetles because changes in natural river geomorphic processes and existing geomorphic characteristics would be minor and would not affect existing potential habitat. There would be no impact.

NEPA Conclusion

Construction and operation effects on Antioch Dunes anthicid beetle or Sacramento anthicid beetle would be the same as described above for CEQA. Construction of Alternative 1 or 3 would not result in direct effects on Antioch Dunes anthicid beetle or Sacramento anthicid beetle as compared to the No Project Alternative because there would be no work in potentially suitable habitat for these species. Operation of Alternative 1 or 3 would not result in indirect effects on these anthicid beetles as compared to the No Project Alternative because changes in natural river geomorphic processes and existing geomorphic characteristics would be minor and would not affect existing potential habitat. Construction and operation of Alternative 1 or 3 would result in no effect on Antioch Dunes anthicid beetle and Sacramento anthicid beetle.

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Alternative 2

Potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle is present along the Sacramento River in the operations study area and at the location of the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent loss and temporary disturbance of potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle (Table 10-2b). There is potentially suitable habitat for these species at the Sacramento River discharge location.

Installation of rock slope protection would result in the permanent and temporary losses of potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle. Individuals could also be crushed or buried by equipment or rock.

Operation

Operation effects on Antioch Dunes anthicid beetle and Sacramento anthicid beetle under Alternative 2 would be the same as for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in the permanent loss and temporary disturbance of potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle and could cause mortality of individuals. These impacts would be significant because the construction of Alternative 2 could reduce the local populations of these rare beetles through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.4 and WILD-1.5 would reduce the level of impact from construction to less than significant because potentially suitable habitat would be assessed and surveyed by a qualified entomologist prior to removal or disturbance and suitable habitat that would not be affected would be fenced and avoided during construction. If occupied habitat is removed, an equivalent amount of habitat would be restored or preserved in the vicinity of the affected area. There would be no impact on Antioch Dunes anthicid beetle and Sacramento anthicid beetle from operations under Alternative 2.

Mitigation Measure WILD-1.4: Evaluate and Survey Potential Habitat for Antioch Dunes Anthicid and Sacramento Anthicid Beetles and Implement Protective Measures

The Authority will retain a qualified entomologist (experienced with anthicid beetle identification and habitat suitability) to assess and survey the area of potentially suitable habitat for Antioch Dunes anthicid and Sacramento anthicid beetles prior to the start of construction of the Sacramento River discharge. If suitable habitat is not present or no Antioch Dunes anthicid and Sacramento anthicid beetles are observed and the entomologist concurs that no further surveys are needed, no further actions are required. If either beetle species is observed, the entomologist will relocate the beetles to suitable habitat outside of the impact area. The entomologist will report observations of either

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beetle species to CDFW and submit occurrence data to the CNDDB. The Authority will protect any suitable habitat in the vicinity of the work area that will not be affected with fencing or stakes and flagging. No construction related foot or vehicle traffic will be allowed in the fenced or flagged area. The Authority will remove fencing when construction of the Sacramento River discharge is complete.

Mitigation Measure WILD-1.5: Compensate for the Loss of Occupied Antioch Dunes Anthicid and Sacramento Anthicid Beetle Habitat

The Authority will compensate for the permanent loss of occupied Antioch Dunes anthicid beetle and/or Sacramento anthicid beetle habitat by restoring disturbed habitat or preserving occupied habitat along the Sacramento River, preferably in the vicinity of the affected area, at a 1:1 ratio (acres restored or preserved : acres of permanent impact). The Authority will retain a qualified entomologist to assess habitat to be restored or preserved and provide guidance on habitat restoration. The Authority will retain a qualified entomologist to monitor the restored or preserved habitat annually for a minimum of 5 years. Monitoring will be conducted at the preserved area to ensure that habitat conditions are maintained at baseline conditions or better, that the habitat has not been degraded, and that it continues to be occupied by the beetle(s). If habitat is restored, the entomologist will conduct monitoring to ensure the restored habitat conditions are maintained, survey for beetle occupancy, and make adaptive management recommendations for habitat improvements. The Authority will submit monitoring reports that include habitat conditions, beetle occupancy information, and photographs to the CDFW annually. If either beetle is observed during habitat monitoring, the entomologist will submit occurrence information to the CNDDB.

NEPA Conclusion

Construction and operation effects on Antioch Dunes anthicid beetle or Sacramento anthicid beetle would be the same as described above for CEQA. Construction of Alternative 2 would result in the permanent loss and temporary disturbance of potentially suitable habitat for Antioch Dunes anthicid beetle and Sacramento anthicid beetle and could cause mortality of individuals as compared to the No Project Alternative if occupied habitat is removed or beetles are killed. With implementation of Mitigation Measures WILD-1.4 and WILD-1.5, effects would be reduced to no adverse effect. There would be no effect on Antioch Dunes anthicid beetle and Sacramento anthicid beetle from operations under Alternative 2.

Impact WILD-1c: Valley Elderberry Longhorn Beetle

The greatest historical threat to valley elderberry longhorn beetle has been the elimination, loss, or modification of its habitat by urban, agricultural, or industrial development, and other activities that reduce or eliminate its host plants (Talley et al. 2006:21, 22).

Alternatives 1 and 3

Modeled habitat for valley elderberry longhorn beetle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal

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intake, and Dunnigan Pipeline. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for valley elderberry longhorn beetle (Table ~~10-2b4-10b~~). Removal of elderberry shrubs would result in the permanent and temporary losses of suitable valley elderberry longhorn beetle habitat. Elderberry shrubs could also die after filling of the Sites Reservoir if they are present in the inundation area. Removal or trimming of elderberry shrubs could result in injury or mortality of valley elderberry longhorn beetle if the species is present. Ground disturbance within 20 feet of an elderberry shrub's dripline could damage its roots and result in stress or reduced vigor of the shrub (U.S. Fish and Wildlife Service 2017a:11).

Operation

Potential indirect effects on valley elderberry longhorn beetle that were considered were altered hydrology for elderberry shrubs, loss of connectivity to adjacent habitat, and disturbance from maintenance activities. Reduction of water to elderberry shrubs as a result of altered hydrology from changes in topography or compaction of soils could result in reduced shrub vigor/vitality and an associated decrease in shoot, leaf, and flower production that could ultimately reduce the suitability of the shrubs to provide habitat for valley elderberry longhorn beetle. Loss of connectivity between elderberry shrubs may result when elderberry or associated vegetation is removed. Removal of such vegetation could result in gaps in vegetation that are too wide for valley elderberry longhorn beetle to travel across due to their fairly limited movement distances (Talley et al. 2006), resulting in separation of individuals or a reduction in the possibility of colonization of adjacent areas.

Maintenance activities required for operation of Project facilities could result in impacts on valley elderberry longhorn beetle. Impacts are generally expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas that likely have few elderberry shrubs present. Maintenance activities involving herbicide and pesticide use could cause mortality of elderberry shrubs or illness or mortality of valley elderberry longhorn beetle, respectively. Elderberry shrubs could also be inadvertently removed or trimmed during maintenance activities. The LMP will include specifications on herbicide and pesticide use in operations and maintenance areas to minimize or prevent potential effects on elderberry shrubs and valley elderberry longhorn beetle. The LMP will also specify measures to protect valley elderberry longhorn beetle habitat from accidental trimming and other maintenance activities that could harm elderberry shrubs.

Stone Corral and Funks Creeks would receive bypass flows from the reservoir from outlets on Sites Dam and Golden Gate Dam, respectively. Bypass flows would range from 0 to 100 cubic feet per second (cfs), with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). The increase of flow in each drainage would support the existing geomorphic functions and characteristics of each channel. A Flow Characterization and Geomorphic Study (Section 2D.4, *Stone Corral Creek and Funks Creek Aquatic Study Plan and Adaptive Management*) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. While increased flows from bypass

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releases may result in minor erosion and changes in sediment deposition, the changes are expected to be minimal when compared to the existing flashy hydrology of both creeks and no impacts on elderberry shrubs or valley elderberry longhorn beetle are anticipated.

Potential impacts associated with flow releases at RBPP and GCID Main Canal at Hamilton City on the Sacramento River, Yolo Bypass, and Delta as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. Operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. The banks of the Sacramento River provide suitable habitat for elderberry shrubs. Diversions from the Sacramento River to the reservoir would occur only under higher Sacramento River flow regimes. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.41% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No ProjectAction Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or June, ~~or July~~) between the No ProjectAction Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, These values show an increase of ~~less than~~ 1% to a decrease of less than 65% when compared to No ProjectAction Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under ~~existing~~baseline conditions. Minimal changes to the natural river geomorphic processes and existing geomorphic characteristics for the Sacramento River would not affect elderberry shrubs and valley elderberry longhorn beetle.

Based on observations during North Delta Flow Actions (Davis pers. comm.), the comparable August–October habitat flows from Sites Reservoir through the Yolo Bypass may cause limited inundation of low-elevation parcels in the upper Yolo Bypass (north of the Interstate 80 [I-80] causeway). The intent of the releases from Sites Reservoir to the Yolo Bypass during this period is to temporally and spatially distribute food resources for fish species. If the water inundates floodplain areas (i.e., areas outside existing channels) the food would be deposited and would fail to move into the Delta. As such, Sites Reservoir would be operated to maintain flows within the existing Toe Drain, Tule Canal, and other channels, and adjustments in operations would be coordinated between the Authority and parcel owners using the existing Yolo Bypass monitoring network. As a result, impacts on potential valley elderberry longhorn beetle habitat in the Yolo Bypass are not anticipated.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 could result in significant impacts on valley elderberry longhorn beetle from removal of suitable habitat and loss of individuals, when compared to ~~existing~~baseline conditions. Operation could result in significant impacts on valley elderberry longhorn beetle from altered hydrology, loss of connectivity to adjacent habitat, and disturbance

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from maintenance activities. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local population of this federally listed species through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9 would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to determine presence, elderberry shrubs to be protected would be fenced, compensation would be provided for permanent loss of habitat, and a measure would be implemented to avoid and minimize potential effects of herbicide and pesticide use on valley elderberry longhorn beetle and its habitat.

Mitigation Measure WILD-1.6: Conduct Surveys for Suitable Valley Elderberry Longhorn Beetle Habitat

The Authority will retain qualified biologists or botanists (i.e., with elderberry/valley elderberry longhorn beetle experience) to conduct surveys to identify and map locations of elderberry shrubs in work areas and within 165 feet of the work areas. For shrubs located in non-riparian areas, elderberry stems will be examined for the presence of valley elderberry beetle exit holes. This information will be used to determine the amount of compensation required for the loss of elderberry shrubs in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (U.S. Fish and Wildlife Service 2017a). The biologist will mark elderberry shrubs in or within 165 feet of work areas with flagging for future removal or protection.

Mitigation Measure WILD-1.7: Fence Elderberry Shrubs to be Protected

Elderberry shrubs in or within 165 feet of work areas that will not be removed will be protected during construction. If not already marked, a qualified biologist will flag the elderberry shrubs that will be protected during construction. The Authority's contractor will install orange construction barrier fencing or stakes and flagging at the edge of the buffer areas established for each shrub and signs indicating the potential for beetle presence and excluding any Project activity within the buffer areas will be posted prior to the start of work. The buffer area distances will be proposed by the biologist and approved by USFWS. No construction activities will be permitted in the buffer area other than those activities necessary to erect the fencing or stakes and flagging without written permission from USFWS.

If orange construction barrier fencing is used, it will be placed such that there is at least a 1-foot gap between the ground and the bottom of the orange construction fencing to minimize the potential for snakes and other ground-dwelling animals to become caught in the fencing. Buffer areas around elderberry shrubs will be inspected periodically by a qualified biologist until Project construction is complete or until the fences or staking/flagging are removed, as approved by the biological monitor and the resident engineer. The Authority's contractor will be responsible for maintaining the buffer area fences around elderberry shrubs throughout construction and removing the fencing or staking and flagging when construction is complete. The biologist's fencing inspection reports will be provided to the Authority.

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Mitigation Measure WILD-1.8: Transplant Permanently Affected Elderberry Shrubs and Compensate for Loss of Valley Elderberry Longhorn Beetle and its Habitat

Before construction begins, the Authority will retain a qualified contractor to transplant elderberry shrubs that cannot be avoided to a USFWS-approved mitigation or conservation bank or other approved area in accordance with the *Framework for Assessing Impacts to the Valley Elderberry Longhorn Beetle (Desmocerus californicus dimorphus)* (U.S. Fish and Wildlife Service 2017a). Elderberry shrubs that cannot be avoided will be transplanted during the plant's dormant phase (November through the first 2 weeks of February). A qualified biological monitor will remain on site while the shrubs are being transplanted. Additionally, the Authority will compensate for permanent impacts on occupied riparian habitat by creating or preserving habitat at a 3:1 (acres of created or preserved habitat : acres of permanent impact) or by an equivalent or greater amount as determined in consultation with USFWS. The Authority will compensate for permanent impacts on occupied non-riparian habitat by creating or preserving habitat at a ratio of 1:1 for all acres that are permanently affected, or by transplanting affected elderberry shrubs containing valley elderberry longhorn beetle exit holes and providing compensation at a 1:1 ratio for the area of the affected shrubs. The purchase of mitigation credits or the establishment of onsite or offsite mitigation areas (or a combination of these options) would be completed as agreed upon by the Authority, Reclamation, and USFWS.

USFWS-approved conservation banks have long-term adaptive management plans with performance standards. If credits are not purchased at a USFWS-approved conservation bank, the Authority will implement standards for long-term management and protection of conservation areas. The Authority will work closely with USFWS during the planning and development of preservation areas. Once established, preservation areas will be surveyed by a USFWS-approved biologist a minimum of two times per year between February 14 and June 30. The biologist will search for valley elderberry longhorn beetle exit holes, evaluate the adequacy of site protection (e.g., fencing, signage) and weed control, assess potential threats to the beetle, take photographs of the site, and evaluate the performance standards below.

1. A minimum of 60% of the initial elderberry and native associate plantings must survive over the first 5 years after the site is established. As much as feasible, elderberry shrubs should be well distributed throughout the site; however, in some instances underlying geologic or hydrologic issues might preclude elderberry establishment over some portion of the site. If significant die-back occurs within the first 3 years, replanting may be used to achieve the 60% performance standard. However, replanting efforts should be concentrated in areas containing surviving elderberry plants. In some instances, overplanting may be used to offset the selection of a less suitable site.

2. After 5 years, the site must show signs of recruitment. A successful site should have evidence of new growth on existing plantings, as well as natural recruitment of elderberry. New growth is characterized as stems 1.2 inches in diameter. If no signs of

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recruitment are observed, the Authority and Reclamation will discuss possible remedies with the USFWS.

Following USFWS's interim standards for the long-term management and protection of mitigation sites, working closely with USFWS during planning and development of the preservation area, monitoring the preservation area to ensure performance standards are achieved, and replanting elderberries when the performance standards are not achieved will ensure that the compensatory mitigation is effective and compensates for the losses resulting from the Project.

Mitigation Measure WILD-1.9: Protect Special-Status Invertebrates and Their Host and Food Plants from Herbicide and Pesticide Use

To minimize impacts on valley elderberry longhorn beetle, monarch butterfly, Crotch bumble bee, and western bumble bee from herbicide drift, herbicide application will be limited to areas immediately adjacent to Project facilities and will be conducted using handheld equipment. Herbicides and pesticides will be applied only by applicators with current licenses and/or certifications from the California Department of Pesticide Regulation. The applicator will follow the herbicide label directions. Spray nozzles will be kept within 24 inches of target vegetation during spraying. The most current information on herbicide toxicity on wildlife will be used to inform future decisions about herbicide and pesticide use during operations.

NEPA Conclusion

Construction and operation effects on valley elderberry longhorn beetle would be the same as described above for CEQA. Construction of Alternative 1 or 3 could result in effects on valley elderberry longhorn beetle as compared to the No Project Alternative from removal of suitable habitat and loss of individuals. Operation of Alternative 1 or 3 could result in effects on valley elderberry longhorn beetle as compared to the No Project Alternative from altered hydrology, loss of connectivity to adjacent habitat, and disturbance from maintenance activities. With implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for valley elderberry longhorn beetle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline, and the Sacramento River discharge. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 could result in permanent and temporary losses of modeled habitat for valley elderberry longhorn beetle (Table 10-2b4~~-10b~~). Removal of elderberry shrubs would result in the permanent and temporary losses of valley elderberry longhorn beetle habitat, and potential injury or mortality of individuals. Ground disturbance within 20 feet of an elderberry

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shrub's dripline could result in disturbance of roots, which could cause stress or reduced vigor of elderberry shrubs. Impacts would be the same as described for Alternatives 1 and 3 except that construction of TRR West and the Sacramento River discharge would result in additional loss of modeled habitat and the smaller inundation area would result in reduced loss of modeled habitat under Alternative 2. Construction of the new South Road would not result in impacts on valley elderberry longhorn beetle habitat because the roadway would be located above 500 feet elevation (the level above which suitable habitat is present). Overall, the amount of permanent habitat loss would be less under Alternative 2 because of the smaller inundation area and reduced impacts from construction of dams and dikes, and roads (Table 10C-3). Overall, the amount of temporary habitat loss would be less under Alternative 2 because of less modeled habitat being affected by the regulating reservoirs and conveyance complex, inlet/outlet works, and dams and dikes (Table 10C-3).

Operation

Potential indirect effects on valley elderberry longhorn beetle from altered hydrology, loss of connectivity to adjacent habitat, and disturbance from maintenance activities would be the same under Alternative 2 as described for Alternatives 1 and 3. Impacts on valley elderberry beetle from operation would be the same as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that permanent habitat loss would be less under Alternative 2 because of the smaller inundation area and reduced impacts from construction of dams and dikes and roads. Temporary habitat loss would be less for construction of Alternative 2 because of less modeled habitat being affected by the regulating reservoirs and conveyance complex, I/O Works, dams, and dikes. Operation of Alternative 2 would result in the same impacts as Alternatives 1 and 3. These impacts would be significant because the implementation of Alternative 2 could reduce the local valley elderberry longhorn beetle population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on valley elderberry longhorn beetle would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on valley elderberry longhorn beetle as compared to the No Project Alternative. Construction of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that permanent habitat loss would be less under Alternative 2 because of the smaller inundation area and reduced effects from construction of dams and dikes, and roads. Temporary habitat loss would be less for construction of Alternative 2 than for Alternative 1 or 3 because of less modeled habitat being affected by the regulating reservoirs and conveyance complex, I/O Works, dams, and dikes. Operation of Alternative 2 would result in the same impacts as Alternatives 1 and 3 as compared to the No Project Alternative from effects on valley elderberry longhorn beetle from altered hydrology, loss of connectivity to adjacent habitat, and disturbance from maintenance activities. With implementation of Mitigation Measures WILD-1.6, WILD-1.7, WILD-1.8, and WILD-1.9, effects would be reduced to no adverse effect.

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Impact WILD-1d: Monarch Butterfly

The western population of monarch butterfly, located in California, has experienced precipitous decline from about 1.2 million in 1997 to fewer than 30,000 in 2019 (U.S. Fish and Wildlife Service 2020a) as a result of habitat loss at breeding and overwintering sites, disease, pesticides, and climate change (U.S. Fish and Wildlife Service 2019b).

Alternatives 1 and 3

Modeled habitat for monarch butterfly is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for monarch butterfly (Table 10-24b). Construction of Alternatives 1 and 3 facilities could result in the permanent and temporary losses of suitable roosting, foraging, and breeding habitats for monarch butterfly. Potentially suitable habitat would be lost when the Sites Reservoir was inundated. Clearing and grubbing, excavation, and other construction activities could result in mortality of adults or larvae from being crushed or buried by equipment. Adult monarch butterflies could be struck by vehicles and construction equipment traveling along access roads during construction if foraging or flying through the area. Construction could also disrupt roosting or foraging activities.

Operation

Maintenance activities required for operation of Alternative 1 or 3 could result in impacts on monarch butterfly. Impacts are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. However, maintenance activities involving herbicide and pesticide use have the potential to affect monarch butterfly and its larval host plants (native milkweeds) and nectar plants and cause the loss of habitat or individuals. Monarch butterflies could also be struck by vehicles and equipment traveling along access roads during operation. The LMP will include specifications on herbicide and pesticide use in operations and maintenance areas to minimize or prevent potential effects on monarch butterfly larval host plants and nectar plants.

The recreation areas and reservoir would be used on a regular basis, which would result in an increased human presence in these areas. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, remove nectar plants). Larval butterflies could be crushed by visitors walking through habitat and suitable nectar plants could be removed or stepped on by visitors. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into natural areas that may contain larval host plants or nectar plants.

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New roadways, once completed, could increase the potential mortality of monarch butterfly from being struck by vehicles of workers traveling to operations facilities or those of visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on monarch butterfly from removal of suitable habitat and loss of individuals. Operation of Alternative 1 or 3 could result in mortality of adult butterflies from vehicle strikes, illness or injury of adults or larvae from pesticide use, or death of nectar plants from herbicide use. Construction and operation impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local monarch butterfly population. Implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11 would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to identify patches of native milkweeds and nectar plants, temporarily disturbed habitat would be restored, permanent loss of habitat containing native milkweeds and/or nectar plants would be compensated for through either onsite or offsite habitat restoration or preservation, and a measure would be implemented to avoid and minimize potential effects of herbicide and pesticide use on monarch butterfly and its larval host plants and nectar plants.

Mitigation Measure WILD-1.9: Protect Special-Status Invertebrates and Their Host and Food Plants from Herbicide and Pesticide Use

This measure is the same as that described above for valley elderberry longhorn beetle.

Mitigation Measure WILD-1.10: Assess Habitat Suitability and Survey for Presence of Monarch Butterfly Nectar and Larval Host Plants

No more than 3 years prior to the start of ground-disturbing activities botanists will identify and map locations and species of milkweed and/or nectar plants (using information from https://xerces.org/sites/default/files/publications/19-046_01_MonarchNectarPlants_California_web-3pg.pdf or the most updated information) during special-status plant surveys (Mitigation Measure VEG-1.1) in areas that would be permanently or temporarily affected by construction.

Mitigation Measure WILD-1.11: Compensate for Loss of Monarch Butterfly Nectar and Larval Host Plants

The Authority will compensate for permanent loss of suitable monarch butterfly habitat (as identified through implementation of Mitigation Measure WILD-1.10) by including native milkweed and nectar plants for monarch butterfly in onsite and/or offsite mitigation plans for sensitive natural communities (Mitigation Measure VEG-2.2). The Authority will compensate for permanent loss of suitable monarch butterfly habitat by planting native milkweed and nectar plants at suitable onsite and/or offsite restoration or preservation areas at a ratio of 1:1 (acres lost : acres planted. The offsite restoration areas would provide suitable habitat constituents for monarch butterfly (e.g., roosting habitat, nectar plants, native milkweed) and will be preserved through a conservation easement.

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The establishment of restoration areas would be completed as agreed upon by the Authority, USFWS, and CDFW.

The Authority will compensate for temporary loss of suitable monarch butterfly habitat by including native milkweed and nectar plants in planting palettes for onsite restoration of sensitive natural communities (Mitigation Measure VEG-2.2) or temporarily disturbed grassland, and/or at offsite mitigation areas.

The Authority will utilize monarch butterfly information[1] from The Xerces Society to ensure that mitigation areas provide the suitable habitat constituents described above for monarch butterfly. The Authority will conduct baseline surveys of each onsite and offsite mitigation area to determine the baseline habitat conditions for monarch butterfly prior to implementing habitat improvements (i.e., planting), if applicable. Each area will be surveyed by qualified botanists to determine the extent of naturally occurring milkweed and nectar plants. After onsite restoration is completed at each mitigation area, qualified botanists will conduct surveys during 3 of the next 5 years and evaluate each site to determine if the area and condition of milkweed and nectar plants achieve the performance standards of being at or above baseline conditions.

Methods and results of surveys, and recommendations for adaptive management actions as needed, will be included in annual monitoring reports for each mitigation area (if there is more than one) and will be submitted to USFWS and CDFW.

Using the latest information from The Xerces Society during planning and development of the mitigation areas, monitoring the mitigation areas to ensure performance standards are achieved and implementing adaptive management options when the performance standards are not achieved will ensure that the compensatory mitigation is effective and compensates for the losses resulting from the Project.

NEPA Conclusion

Construction and operation effects on the monarch butterfly would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on monarch butterfly as compared to the No Project Alternative due to removal of suitable habitat and loss of individuals, including potential mortality of adult butterflies or illness or injury of adults or larvae. With implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for monarch butterfly is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, Sacramento River discharge, and Sacramento River in the operations study area.

[1] https://xerces.org/monarchs/western-monarch-conservation/habitat

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Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for monarch butterfly (Table 10-2b4~~10b~~). Impacts would be the same as described for Alternatives 1 and 3 except that construction of South Road and TRR West under Alternative 2 would result in additional loss of modeled habitat, permanent impacts on modeled habitat would be less because the inundation area would be smaller, and construction of the Sacramento River discharge would result in permanent loss of additional modeled habitat. Overall, permanent and temporary impacts on modeled monarch butterfly habitat would be less under Alternative 2 than under Alternatives 1 and 3 because of the smaller inundation area and reduced impacts from construction of dams, and dikes (Appendix 10C, Table 10C-4).

Operation

Potential effects on monarch butterfly as a result of operation of Alternative 1 or 3 would be similar to those for Alternative 2. There could be a greater potential for monarch butterflies to be struck by vehicles of workers traveling to operations facilities or those of visitors traveling to recreation areas on the new South Road.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that permanent and temporary impacts on modeled monarch butterfly habitat would be less under Alternative 2 because of the smaller inundation area and reduced impacts from construction of dams and dikes. Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that the increased amount of roadway could result in greater potential for monarch butterflies to be struck by vehicles. These impacts would be significant because the implementation of Alternative 2 could reduce the local population of monarch butterfly through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on monarch butterfly would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on monarch butterfly as compared to the No Project Alternative. Construction of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that permanent and temporary effects on modeled monarch butterfly habitat would be less under Alternative 2 because of the smaller inundation area and reduced effects from construction of dams and dikes. Operation of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that the increased amount of roadway could result in greater potential for monarch butterflies to be struck by vehicles. With implementation of Mitigation Measures WILD-1.9, WILD-1.10, and WILD-1.11, effects would be reduced to no adverse effect.

Impact WILD-1e: Crotch Bumble Bee and Western Bumble Bee

Although not federally or state listed, The Xerces Society considers Crotch bumble bee and western bumble bee endangered with extinction throughout their ranges. Recent studies have

Commented [A1]: Impact WILD-1e describes impacts to Crotch Bumble Bee and Western Bumble Bee. This impact describes the classification for these species as neither "federally or state listed." Since the draft Environmental Impact Report was released, the status for these two species has since been update. Candidacy under the California Endangered Species Act (CESA) was reinstated for all both bumble bee species on September 30, 2022. As candidate species, they receive the same legal protection afforded to endangered or threatened species (Fish & G. Code, §§ 2074.2 & 2085. As a result, CDFW recommends the lead agency revise the classification to "candidate under CESA" to properly reflect the most updated status for both species.

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shown that these species have experienced significant reductions in both their range and relative abundance and are far less common than they were historically in areas where the species persist (The Xerces Society for Invertebrate Conservation 2018:5).

Alternatives 1 and 3

Modeled habitat for Crotch bumble bee and western bumble bee is present at the GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled Crotch bumble bee and western bumble bee habitat (Table 10-24b). Potentially suitable habitat would also be lost when the reservoir was inundated. Clearing and grubbing, excavation, and other activities could result in the destruction of nests or mortality of bees from being crushed or buried by equipment. Crotch and western bumble bees could also be struck by vehicles and equipment traveling along access roads during construction.

Operation

Maintenance activities required for operation of Alternatives 1 and 3 facilities could result in impacts on Crotch bumble bee and western bumble bee. Impacts are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways. However, maintenance activities involving herbicide and pesticide use have the potential to affect Crotch and western bumble bees and their food plants and cause the loss of habitat or illness or mortality of individuals. Crotch and western bumble bees could also be struck by vehicles and equipment traveling along access roads during operation. The LMP will include specifications on herbicide and pesticide use in operations and maintenance areas to minimize or prevent potential effects on Crotch bumble bee and western bumble bee food plants.

The recreation areas and reservoir would be used on a regular basis, which would result in an increased human presence in these areas, as well as additional roadway traffic, which could result in increased vehicle strikes. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, removal of nectar plants). Individual bees could be stepped on or their nests could be buried or collapsed. Suitable food plants could also be removed or stepped on by visitors walking through habitat. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into natural areas that may contain bumble bee food plants.

New roadways, once completed, could increase the potential mortality of Crotch and western bumble bees from being struck by workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 1 or 3 would result in significant impacts on Crotch bumble bee and western bumble bee from removal of potential habitat and loss of individuals.

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These impacts would be significant because Alternative 1 or 3 could reduce the local populations of these rare bumble bees through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.9, WILD-1.12, and WILD-1.13 would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to identify patches of native food plants, temporarily disturbed habitat would be restored, permanent loss of habitat containing suitable native food plants would be compensated for through offsite habitat restoration or preservation, and a measure would be implemented to avoid and minimize potential effects of herbicide and pesticide use on Crotch bumble bee, western bumble bee, and their food plants.

Mitigation Measure WILD-1.9: Protect Special-Status Invertebrates and Their Host and Food Plants from Herbicide and Pesticide Use

This measure is described above for valley elderberry longhorn beetle.

Mitigation Measure WILD-1.12: Assess Habitat Suitability and Survey for Presence of Crotch Bumble Bee and Western Bumble Bee Food Plants

No more than 3 years prior to the start of ground-disturbing activities, botanists will identify and map locations of patches of native plants in the taxa most commonly associated with Crotch bumble bee and western bumble bee that would be permanently or temporarily affected by construction during special-status plant surveys (Mitigation Measure VEG-1.1). Native plants of the following genera are appropriate for Crotch bumble bee: *Antirrhinum*, *Asclepias*, *Phacelia*, *Chaenactis*, *Clarkia*, *Dendromecon*, *Eriogonum*, *Eschscholzia*, *Lupinus*, *Medicago*, and *Salvia*. Native plants of the following taxa are appropriate for western bumble bee: *Asteraceae*, *Ceanothus*, *Centaurea*, *Chrysothamnus*, *Cirsium*, *Eriogonum*, *Geranium*, *Grindelia*, *Lupinus*, *Melilotus*, *Monardella*, *Rubus*, *Penstemon*, *Solidago*, and *Trifolium*.

Mitigation Measure WILD-1.13: Compensate for Loss of Crotch Bumble Bee and Western Bumble Bee Habitat

The Authority will compensate for permanent loss of suitable bumble bee foraging habitat (as identified through implementation of Mitigation Measure WILD-1.12) by including suitable native nectar- and pollen-producing plants commonly used as food sources by Crotch and western bumble bees in onsite and/or offsite mitigation plans for sensitive natural communities (Mitigation Measure VEG-2.2). The Authority will compensate for permanent loss of suitable Crotch and western bumble bee habitat by planting native suitable native nectar- and pollen-producing plants at suitable onsite and/or offsite restoration or preservation areas at a ratio of 1:1 (acres lost : acres planted The Authority will compensate for temporary loss of suitable Crotch and western bumble bee habitat by including native bumble bee food plants in planting palettes for onsite restoration of sensitive natural communities (Mitigation Measure VEG-2.2) or temporarily disturbed grassland and/or at offsite mitigation areas.

Native plants of the following genera are appropriate for Crotch bumble bee: *Antirrhinum*, *Asclepias*, *Phacelia*, *Chaenactis*, *Clarkia*, *Dendromecon*, *Eriogonum*,

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Eschscholzia, *Lupinus*, *Medicago*, and *Salvia*. Native plants of the following taxa are appropriate for western bumble bee: *Asteraceae*, *Ceanothus*, *Centaurea*, *Chrysothamnus*, *Cirsium*, *Eriogonum*, *Geranium*, *Grindelia*, *Lupinus*, *Melilotus*, *Monardella*, *Rubus*, *Penstemon*, *Solidago*, and *Trifolium*. In mitigation areas where these plant genera are present, habitat will be preserved. In mitigation areas where these plant genera are absent, these plant genera will be seeded or planted, as appropriate based on site conditions. Mitigation areas will be placed under a conservation easement.

The Authority will utilize bumble bee conservation information[2] from The Xerces Society to ensure that mitigation areas provide the suitable native nectar- and pollen-producing plants described above for Crotch bumble bee and western bumble bee. The Authority will conduct baseline surveys of each onsite and offsite mitigation area to determine the baseline habitat conditions for Crotch bumble bee and western bumble bee prior to implementing habitat improvements (i.e., planting), if applicable. Each area will be surveyed by qualified botanists to determine the extent of naturally occurring native nectar- and pollen-producing plants. After onsite restoration is completed at each mitigation area, qualified botanists will conduct surveys during 3 of the next 5 years and evaluate each site to determine if the area and condition of native nectar- and pollen-producing plants achieve the performance standards of being at or above baseline conditions.

Methods and results of surveys and recommendations for adaptive management actions as needed will be included in annual monitoring reports for each mitigation area (if there is more than one) and will be submitted to USFWS and CDFW.

Using the latest information from The Xerces Society during planning and development of the mitigation area, monitoring the mitigation area to ensure performance standards are achieved, and implementing adaptive management options when the performance standards are not achieved will ensure that the compensatory mitigation is effective and compensates for the losses resulting from the Project.

NEPA Conclusion

Construction and operation effects on Crotch bumble bee and western bumble bee would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on Crotch bumble bee and western bumble bee as compared to the No Project Alternative from removal of potential habitat and loss of individuals. With implementation of Mitigation Measures WILD-1.9, WILD-1.12, and WILD-1.13, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for Crotch bumble bee and western bumble bee is present at the GCID Main Canal improvements, Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works,

[2] https://www.xerces.org/sites/default/files/publications/12-020_01_BumbleBeeConservation_web.pdf

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dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for Crotch bumble bee and western bumble bee (Table ~~10-2b~~4 ~~10b~~). Impacts would be the same as described for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of modeled habitat and permanent impacts on modeled habitat would be less under Alternative 2 because the inundation area would be smaller. Overall, permanent and temporary impacts on modeled Crotch bumble bee and western bumble bee habitat would be less under Alternative 2 than under Alternatives 1 and 3 because of the smaller inundation area and reduced impacts from construction of dams and dikes (Appendix 10C, Table 10C-5).

Operation

Potential effects on Crotch bumble bee and western bumble bee as a result of operation of Alternative 1 or 3 would be similar to Alternative 2. There could be greater potential for Crotch bumble bee and western bumble bee to be struck by vehicles of workers traveling to operations facilities or those of visitors traveling to recreation areas on the new South Road.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that permanent and temporary impacts on modeled Crotch bumble bee and western bumble bee habitat would be less under Alternative 2 than under Alternatives 1 and 3 because of the smaller inundation area and reduced impacts from construction of dams and dikes. Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that the increased amount of roadway could result in greater potential for Crotch bumble bee and western bumble bee to be struck by vehicles. These impacts would be significant because the implementation of Alternative 2 could reduce the local populations of Crotch bumble bee and western bumble bee through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.9, WILD-1.12, and WILD-1.13 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on Crotch bumble bee and western bumble bee would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on Crotch bumble bee and western bumble bee as compared to the No Project Alternative. Construction of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that permanent and temporary effects on modeled Crotch bumble bee and western bumble bee habitat would be less under Alternative 2 than under Alternatives 1 and 3 due to less area disturbed. Operation of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that the increased amount of roadway could result in greater potential for Crotch bumble bee and western bumble bee to be struck by vehicles. With implementation of Mitigation Measures WILD-1.9, WILD-1.12, and WILD-1.13, effects would be reduced to no adverse effect.

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Amphibians and Reptiles

Permanent and temporary impacts on modeled habitat for special-status amphibians and reptiles from Alternatives 1, 2, and 3 are shown in Table 10-2c.

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Table 10-2c. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Amphibian and Reptile Habitats in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternatives 1 and 3 Temporary Impacts	Alternative 2 Permanent Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts	Alternative 2 Temporary Impacts
	Aquatic Habitat	Upland Habitat	Aquatic Habitat	Upland Habitat	Aquatic Habitat	Upland Habitat	Aquatic Habitat	Upland Habitat
Western Spadefoot	532	13,739	50	838	532	13,331	48	813
California Red-legged Frog	287	6,765	17	365	280	6,383	16	366
Western Pond Turtle	636	14,213	330	1,005	642	13,827	429	985
Giant Gartersnake	2	26	28	17	2	20	137	49

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Impact WILD-1f: Western Spadefoot

Western spadefoot has been eliminated from a portion of its range as a result of urban and agricultural development and additional habitat losses are expected (Morey 2005:516, 517).

Alternatives 1 and 3

Modeled habitat for western spadefoot is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled western spadefoot habitat (Table 10-2c). Modeled habitat would also be lost when the reservoir was inundated. Clearing and grubbing, excavation, and other construction activities could result in destruction of burrows and mortality or injury of individuals from being crushed or buried by equipment. Western spadefoot could also be struck by vehicles and equipment traveling along access roads during construction. In addition, work in or adjacent to suitable aquatic habitats during the breeding season could destroy developing eggs and/or larvae. Construction activities and lighting could result in the disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable habitat and cause illness or mortality of individuals. Construction of the reservoir could cause fragmentation or isolation of western spadefoot populations and create a barrier for movement between areas of suitable habitat.

Operation

Western spadefoot aquatic habitat could be indirectly affected as a result of changes in topography, compaction of soils, and increases in surface runoff from the additional impervious surfaces associated with the new facilities. These changed conditions could modify the existing hydrologic regime of modeled potential habitat in or near the affected areas. Changes in topography could result in additional water entering habitat or could interfere with existing water flow into habitats, thereby increasing or reducing the amount of water entering habitat. Changes to the length of the inundation period of habitat could affect western spadefoot reproduction. Changes in topography could also result in new or increased amounts of contaminants such as gasoline, oil, and herbicides entering suitable western spadefoot aquatic habitat from adjacent new or widened roads, or new facilities, could cause illness or mortality of individuals. The Authority would implement BMP-15, which will require professional hydrologists and civil engineers to evaluate and design water conveyance systems (e.g., ditches, curb and gutters, culverts) that are within 250 feet of seasonal wetlands to maintain the existing hydrology of the seasonal wetlands and ensure that contaminants from impervious surfaces are not channeled into seasonal wetlands. Implementation of this BMP would avoid potential indirect effects on western spadefoot aquatic habitat from changes in hydrology and new or increased amounts of contaminants.

Impacts from maintenance activities required for operation under Alternatives 1 and 3 are expected to be minimal because maintenance activities would be conducted mostly in previously

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disturbed areas during daytime hours and using existing roadways. Western spadefoot could be struck by vehicles and equipment traveling along access roads during operation, but this is unlikely to occur because western spadefoot movement primarily occurs at night. The LMP will include measures and practices to avoid or minimize operations and maintenance impacts on western spadefoot, where suitable or occupied habitat is present.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). If western spadefoot was present, individuals could be crushed by visitors walking through habitat. In addition, increased human activity at the recreation areas and near the reservoir could cause western spadefoot to avoid habitat in these areas. There is also potential for the introduction of exotic invasive species (e.g., bullfrogs [*Lithobates catesbeianus*], red-eared sliders [*Trachemys scripta elegans*]) from visitors releasing these animals at recreation areas or into the reservoir, which could compete with or prey on western spadefoot. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into western spadefoot aquatic habitat.

New roadways, once completed, could impede movement and increase the potential mortality of western spadefoot from being struck by the vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. The presence of the reservoir could cause fragmentation or isolation of western spadefoot populations and create a barrier for movement between areas of suitable habitat.

Safety lighting would be installed at the dams, bridge, and recreation areas. Lighting could cause western spadefoot to avoid using areas illuminated by these new sources of light or modify its movement pathways to avoid the lighted areas. Lighting could also make western spadefoot more vulnerable to predation. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on western spadefoot.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on western spadefoot from removal of potential habitat and loss of individuals. Operation of Alternative 1 or 3 would result in significant impacts on western spadefoot because exotic invasive species that prey on or compete with western spadefoot could be introduced at recreation areas and individuals could be killed by being struck by the vehicles of personnel or recreationists. These impacts would be significant because implementation of Alternatives 1 and 3 could reduce the local western spadefoot population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, WILD-1.15, WILD-1.16, VEG-2.2, and VEG-3.2 would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to determine presence, disturbance of seasonal wetlands would be avoided during the rainy season, compensation would be provided for the permanent and temporary losses of occupied vernal pool branchiopod habitat (which would also benefit western

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spadefoot), and if found to be necessary through a wildlife corridor study, suitable crossings would be installed at appropriate locations to facilitate safe crossings.

Mitigation Measure WILD-1.2: Avoid and Minimize Potential Effects on Vernal Pool Branchiopods and Western Spadefoot

This measure is described above for vernal pool branchiopods.

Mitigation Measure WILD-1.3: Compensate for Impacts on Vernal Pool Branchiopod Habitat

This measure is described above for vernal pool branchiopods.

Mitigation Measure WILD-1.14: Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle

Once property access is granted and prior to the start of construction, the Authority will retain qualified biologists to assess habitat suitability and conduct surveys for western spadefoot, California red-legged frog, and western pond turtle in the Project area and where potentially suitable habitat is within 300 feet of the Project area where impacts from operation may occur. Qualified biologists are defined as those who have experience evaluating habitat and conducting focused surveys for western spadefoot, California red-legged frog, and western pond turtle. The surveys will be conducted in accordance with the following conditions.

- Western spadefoot habitat assessments and surveys of seasonal wetland habitat will be conducted during vernal pool branchiopod habitat assessments and surveys (Mitigation Measure WILD-1.1).
- Habitat assessment and surveys for California red-legged frog will be conducted in accordance with the *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog*, which provides direction for site assessments and recommend up to eight surveys that are conducted over a period of 9–12 months (U.S. Fish and Wildlife Service 2005b). Habitat assessment and surveys for western pond turtle and western spadefoot (intermittent streams) will be conducted concurrently with the California red-legged frog surveys.

The qualified biologists will prepare and submit reports describing the methods and results of the habitat assessments and surveys to the Authority, CDFW, and USFWS.

Mitigation Measure WILD-1.15: Design and Construct Wildlife Crossings for New Roadways at Suitable Locations

The Authority will retain a qualified wildlife biologist with expertise in wildlife crossing use and design to conduct a wildlife connectivity and crossing assessment and to determine where suitable wildlife crossing structures would be most effective along North Road, Sites Lodoga Road, South Road, and other roads as determined by the

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Authority and the wildlife biologist, in coordination with CDFW. Wildlife crossing structures will be designed and constructed at suitable locations to provide habitat connectivity and safe movement for an array of wildlife likely to use the Project area. To ensure that the assessment is inclusive of a variety of species, a wildlife crossing species guild (WCG) approach will be used as detailed in Kintsch et al. (2015). This WCG approach will include ecological and behavioral needs of a variety of species inhabiting the Project area/region. The Authority will also use information from other documents (e.g., Clevenger and Huijser 2011; Langton and Clevenger 2020; Ontario Ministry of Natural Resources and Forestry 2016) when planning and designing corridors for amphibians and reptiles. Wildlife crossing locations and design will be determined based on WCG species inhabiting the Project area/region, habitat features, topography, existing land ownership and use, and the future state of the ~~Project~~study area (as shown or described in planning documents) through a wildlife connectivity and crossing assessment. Where possible, wildlife crossings will be located where there is compatible land ownership and use and opportunities for habitat preservation on either side of the wildlife crossing.

Prior to final roadway design for the Project, a wildlife connectivity assessment will be conducted to assess existing and expected wildlife movement and habitat connectivity conditions, evaluate Project-related impacts on connectivity and species movement, and identify appropriate wildlife crossing locations and designs. Other connectivity enhancement strategies such as land acquisition, retrofit of existing structures, habitat enhancement, and traffic control will be considered as part of the connectivity assessment to maintain and enhance connectivity in the area surrounding the reservoir. The assessment will include a landscape-scale and local (Project)-scale assessments. The assessment may use database research, field surveys, photo monitoring, GIS modeling, or a combination thereof to identify existing wildlife species in the Project area, determine how connectivity and species movement may be affected by the Project, and determine the appropriate locations and designs of wildlife crossings.

Wildlife crossings will be located at appropriate frequencies within contiguous suitable habitat and in other locations where crossing structures are warranted (e.g., riparian/riverine crossings) to accommodate a range of species expected to move through the area. For example, for small-bodied animals like amphibians, reptiles, and small mammals, where species habitat and movement needs are present, wildlife crossings may be located no more than 1,000 feet apart or as determined appropriate for specific target species. For medium- and large-bodied animals, such as bobcats, coyotes, tule elk, and deer, wildlife crossings may be located no more than 1 mile apart.

Wildlife crossings will be located where there is suitable habitat on both sides of the roadway. If feasible and depending on the size and ecological and behavioral needs of target species, vegetative cover will be provided near entrances to give animals security and reduce negative effects such as lights and noise associated with the road. Suitable habitat and/or cover will also be provided in the crossing structure wherever feasible. This may be achieved by designing culverts or culvert-like structures to be high enough to allow light for plants to grow, installing rubble piles, stumps, or branches to provide

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cover for smaller animals in the crossings, and leaving earthen bottoms in crossing structures.

When possible, wildlife crossings will be located away from areas used or dominated by humans, including recreation areas, trails, and lighted areas to avoid reduced wildlife crossing movement function and to prevent human-wildlife conflict.

Wildlife crossings will be designed to optimally facilitate movement for multiple WCG species. When possible, proposed culverts will be constructed to function as multi-use culverts, which are designed to ensure that they facilitate wildlife movement. Multi-use culvert crossings will be designed to be optimally accessible to wildlife movement and will also be designed to require minimal maintenance.

Wildlife fencing will be installed to direct wildlife toward crossings and prevent species' access to roadways and other areas they must be excluded from. Escape opportunities such as jump-out ramps may be provided as appropriate in conjunction with fencing to allow animals to escape from the roadway.

Mitigation Measure WILD-1.16: Monitor and Maintain Wildlife Crossings

Because many wildlife species will avoid or be obstructed by structures with a substantial amount of debris or blockages, the Authority will require a qualified wildlife biologist to regularly monitor crossings and culverts and clear them or oversee the clearing of debris and other blockages. Cameras, roadkill surveys, or other methods will be used to monitor wildlife crossing use. Vegetative cover will be maintained near crossing entrances to provide cover and reduce negative effects such as artificial lighting and noise associated with the road. A monitoring and maintenance plan for wildlife crossings will be developed during design of wildlife crossings (Mitigation Measure WILD-1.15) that will specify the methods for documenting postconstruction conditions, the approach for and frequency of monitoring and maintenance, performance standards, reporting requirements, and adaptive management actions to ensure long-term success of crossing structure function.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, *Vegetation and Wetland Resources*, Section 9.5, *Impact Analysis and Mitigation Measures*4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

NEPA Conclusion

Construction and operation effects on western spadefoot would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse

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effect on western spadefoot as compared to the No Project Alternative. Construction of Alternative 1 or 3 would result in effects on western spadefoot from removal of potential habitat and loss of individuals. Operation of Alternative 1 or 3 would result in effects on western spadefoot because exotic invasive species that prey on or compete with western spadefoot could be introduced at recreation areas and individuals could be killed by being struck by the vehicles of personnel or recreationists. With implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, WILD-1.15, WILD-1.16, VEG-2.2, and VEG-3.2, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for western spadefoot is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, TRR/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for western spadefoot (Table 10-2c). Impacts would be similar to those under Alternatives 1 and 3 except that construction of South Road and TRR West result in additional loss of modeled habitat and the smaller inundation area would result in reduced loss of modeled habitat. Overall, permanent impacts on modeled western spadefoot aquatic habitat would be slightly more under Alternative 2, and permanent impacts on western spadefoot upland habitat would be less under Alternative 2 than under Alternatives 1 and 3 because of the smaller inundation area and reduced permanent impacts from construction of dams and dikes (Appendix 10C, Table 10C-6). Overall, temporary impacts on modeled aquatic and upland habitat would be less under Alternative 2 because of reduced temporary impacts from dams and dikes and Sites Reservoir related facilities (Appendix 10C, Table 10C-6).

Operation

Potential effects on western spadefoot from operation would be similar under Alternative 2 to Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway could impede western spadefoot movement over a larger area and increase the potential for individual spadefoot toads to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that construction of South Road and TRR West would result in additional permanent loss of potential habitat and the smaller reservoir footprint would reduce the amount of permanent habitat loss under Alternative 2. Overall, permanent and temporary impacts on modeled western spadefoot habitat would be less under Alternative 2 than under Alternatives 1 and 3, except for permanent impacts on modeled aquatic habitat, because of the smaller inundation area and reduced impacts from construction of dams and dikes (Appendix 10C, Table 10C-6). Operation of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that the increased amount of

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roadway could impede movement over a larger area and result in additional mortality from vehicle strikes. These impacts would be significant because the implementation of Alternative 2 could reduce the local western spadefoot population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, WILD-1.15, WILD-1.16, VEG-2.2, and VEG-3.2 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on western spadefoot would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on western spadefoot as compared to the No Project Alternative. Overall, permanent and temporary impacts on modeled western spadefoot habitat would be less under Alternative 2 than under Alternatives 1 and 3, except for permanent impacts on modeled aquatic habitat, because of the smaller inundation area and reduced impacts from construction of dams and dikes (Appendix 10C, Table 10C-6). Operation of Alternative 2 would result in similar effects to Alternatives 1 and 3, except that the increased amount of roadway could impede movement over a larger area and result in additional mortality from vehicle strikes. With implementation of Mitigation Measures WILD-1.2, WILD-1.3, WILD-1.14, WILD-1.15, WILD-1.16, and VEG-2.2, effects would be reduced to no adverse effect.

Impact WILD-1g: California Red-legged Frog

California red-legged frog has been extirpated from approximately 70% of its historical range, with severe declines occurring primarily in the Central Valley and southern California (U.S. Fish and Wildlife Service 2002:1, 4, 5).

Alternatives 1 and 3

Modeled habitat for California red-legged frog is present west of Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for California red-legged frog (Table 10-2c). Clearing and grubbing, excavation, and other construction activities could result in destruction of burrows, and mortality or injury of individuals from being crushed or buried by equipment. California red-legged frog could be struck by vehicles and equipment traveling along access roads during construction. In addition, work in or adjacent to suitable aquatic habitats during the breeding season could destroy developing eggs and/or larvae. Construction activities and lighting could also result in disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable habitat and cause illness or mortality of individuals.

Operation

New or increased amounts of contaminants such as gasoline, oil, and herbicides could enter suitable California red-legged frog aquatic habitat from adjacent new or widened roads, or new facilities, which could cause illness or mortality of eggs or individuals.

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Impacts from maintenance activities required for operation under Alternatives 1 and 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. If present, California red-legged frog could be struck by vehicles and equipment traveling along access roads during operation, but this is unlikely to occur because California red-legged frog movement mostly occurs at night. The LMP will include measures and practices to avoid or minimize operations and maintenance impacts on California red-legged frog, where suitable or occupied habitat is present.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). If California red-legged frog was present, individuals could be crushed by visitors walking through habitat. In addition, increased human activity at the recreation areas and near the reservoir could cause California red-legged frog to avoid habitat in these areas. There is also potential for the introduction of exotic invasive species (e.g., bullfrogs, red-eared sliders) from visitors releasing these animals at recreation areas or into the reservoir, which could compete with or prey on California red-legged frog. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into California red-legged frog aquatic habitat.

New roadways could impede movement and increase the potential for mortality of California red-legged frog from being struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. The presence of Sites Reservoir under Alternatives 1 and 3 would be an ongoing impediment to movement of California red-legged frog. If California red-legged frogs are present in the aquatic features directly east of the reservoir, presence of the reservoir could cause fragmentation of the California red-legged frog population and create a barrier for California red-legged frog movement between these aquatic features and suitable habitat directly west of the reservoir.

Safety nighttime lighting would be installed at the dams, Funks Reservoir, bridge, and recreation areas, where modeled habitat is present. Lighting could cause California red-legged frog to avoid using areas illuminated by these new sources of light or modify its movement pathways to avoid the lighted areas. Lighting could also make California red-legged frog vulnerable to predation. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on California red-legged frog.

Stone Corral and Funks Creeks would receive bypass flows from the reservoir through outlets on Sites Dam and Golden Gate Dam, respectively. Bypass flows would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). The increase of flow in each drainage would support the existing geomorphic functions (i.e., flow regime, sediment transport, and bank erosion) and characteristics (i.e., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian

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vegetation) of each channel. A Flow Characterization and Geomorphic Study (Appendix 2D) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. Because the bypass flows would emulate natural conditions and would not exceed 100 cfs, they would not substantially change the length of time that there is flow in the creeks or the length of ponding in the creeks. The addition of impervious surfaces would not substantially alter the existing drainage patterns of a site or area because of the limited area of impervious surfaces and the ability of the surrounding open area to allow infiltration of precipitation. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and no impacts on California red-legged frog are expected.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 could result in significant impacts on California red-legged frog from removal of modeled habitat and potential loss of individuals. Operation of Alternative 1 or 3 could result in significant impacts on California red-legged frog as a result of new or increased contaminants entering habitat, vehicle strikes, introduction of exotic invasive species that prey on or compete with California red-legged frog, and impeded movement from new roadways. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local California red-legged frog population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.17, and WILD-1.18 would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to determine presence, protective measures would be implemented during construction, compensation would be provided for the permanent and temporary losses of suitable habitat, and if found to be necessary through a wildlife corridor study, suitable crossings would be installed at appropriate locations to facilitate safe crossings.

Mitigation Measure WILD-1.14: Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.15: Design and Construct Wildlife Crossings for New Roadways at Suitable Locations

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.16: Monitor and Maintain Wildlife Crossings

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.17: Implement California Red-legged Frog Protective Measures

If California red-legged frog is found in the Project area either incidentally or during surveys conducted in accordance with Mitigation Measure WILD-1.14, the Authority will implement the following protective measures. These measures will apply to upland

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habitat (within 300 feet) and dispersal habitat (within 1 mile) of aquatic habitats that are found to be occupied during surveys.

- Occupied aquatic habitat will not be removed or filled until California red-legged frogs have been relocated to suitable habitat outside of disturbance areas or other actions that will avoid mortality of individuals or effects on the population as determined during ESA Section 7 consultation with USFWS.
- Occupied aquatic habitat that will not be removed or disturbed will be protected with exclusion fencing along the edge of the work area a minimum of 200 feet from the aquatic habitat. The fencing will be installed to prevent individuals from entering the work area but will not completely enclose the pond or exclude dispersal to and from the pond. The USFWS-approved biologist will assist with preparing the fence plans and will be present during installation. The fencing will be installed to a depth of 6 inches and extended at least 30 inches above grade. The contractor will avoid placing fencing on top of ground squirrel burrows. The fence will be pulled taut at each support to prevent folds or sagging. A USFWS-approved biologist will also walk all fence lines daily to look for individual frogs stranded along fence lines. Fencing will be inspected and maintained in good condition throughout work and will be removed after work is complete and all construction equipment is removed from the work area.
- A USFWS-approved biologist will be present during all ground-disturbing work in California red-legged frog upland and dispersal habitats during the rainy season (generally October 15 to May 1) when frogs are dispersing. The biologist will survey work areas for frogs and for rodent burrows in potential upland habitat immediately prior to the start of any ground-disturbing work (including moving equipment into the area). If a California red-legged frog is found, it will be moved out of the work area in accordance with the USFWS biological opinion for the Project. Disturbance of suitable habitat will be minimized to the maximum extent feasible.
- In the event a California red-legged frog is trapped, construction within 300 feet of the location will cease until the individual has been removed from the location per a USFWS-approved relocation plan. The plan will include trapping and relocation methods, relocation sites, and post-relocation monitoring. Only USFWS-approved biologists will be allowed to relocate listed species to outside of the construction area.
- If ground disturbance or vegetation removal will occur in suitable upland or dispersal habitats during or 24 hours following a rain event between October 15 and May 1, a USFWS-approved biologist will be onsite to monitor the work and ensure that the exclusion fencing is intact. Following a rain event, no work will proceed until a USFWS-approved biologist has inspected the work areas and verified that there are no California red-legged frogs present. A rain event is to be considered precipitation of at least 0.25 inch within a 24-hour period.
- Activities within suitable upland/dispersal habitat will cease no less than 30 minutes before sunset and will not begin again prior to no less than 30 minutes after sunrise. Except when necessary for driver or pedestrian safety artificial lighting at a worksite will be prohibited during the hours of darkness when working in suitable California red-legged frog upland/dispersal habitat.

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- For any night work, the driving path and work area will be surveyed for California red-legged frog immediately prior to work and nighttime work will be monitored by a USFWS-approved biologist.

- If work must be conducted at night, all lighting will be directed away and shielded from California red-legged frog habitat outside the work area to minimize light spillover to the greatest extent possible.

Mitigation Measure WILD-1.18: Compensate for Permanent and Temporary Losses of Occupied California Red-legged Frog Aquatic and Upland Habitats

The Authority will compensate for the permanent and temporary losses of occupied California red-legged frog aquatic habitat and associated upland habitat through the purchase of mitigation credits at a USFWS-approved mitigation or conservation bank or through acquiring or preserving and protecting habitat in perpetuity at a location approved by USFWS. Permanent impacts on habitat will be mitigated by restoring or preserving habitat at a 2:1 ratio (habitat restored or preserved : habitat affected) or by an equivalent or greater amount as determined during Section 7 ESA consultation with USFWS. Temporary impacts on habitat will be mitigated by restoring or preserving habitat at a 1:1 ratio (habitat restored or preserved : habitat affected), or by an equivalent or greater amount as determined during Section 7 ESA consultation with USFWS for the Project. The purchase of mitigation credits or the establishment of onsite or offsite mitigation areas (or a combination of these options) would be completed as agreed upon by the Authority, Reclamation, and USFWS.

USFWS-approved conservation banks have long-term adaptive management plans with performance standards. Therefore, if mitigation occurs through a USFWS-approved conservation bank, the bank's performance standards and success criteria will be applied.

If credits are not purchased at a USFWS-approved conservation bank, the Authority will implement standards for long-term management and protection of conservation areas. The Authority will work closely with USFWS during the planning and development of conservation areas. Conservation areas will have suitable aquatic and upland habitat. Once established, conservation areas will be surveyed by a USFWS-approved biologist a minimum of two times between January 1 and June 30. The biologist will survey aquatic habitat for California red-legged frog, evaluate the adequacy of site protection (e.g., fencing, signage), assess potential threats to the frog, and take photographs of the site. The biologist will also survey a set of reference ponds or other aquatic habitat known to be occupied by California red-legged frog to compare to the preserved and created/restored aquatic habitat. The reference ponds/habitat should be located within proximity to the conservation area and exhibit characteristics similar to the preserved and created/restored habitat.

Performance standards for management of non-mitigation bank ponds are as follows: (1) > 10% of the shoreline is vegetated; (2) 30%–60% of the pond has emergent vegetation; and (3) 40%–70% of the pond is open water. Performance standards are not included for California red-legged frog occupancy since the objective of the Project mitigation is to

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establish compensatory suitable habitat rather than to ensure occupancy. Therefore, the successful establishment of aquatic and upland habitats based on the floristic, physical, and hydrologic components of the habitats will be used to evaluate the success of offsite California red-legged frog habitat compensatory mitigation. If the performance standards cannot be achieved, the Authority and Reclamation will consult with USFWS to implement an alternative compensatory mitigation approach.

Working closely with USFWS during planning and development of the conservation area and monitoring the conservation area to ensure performance standards are achieved and adaptive management actions are applied when the performance standards are not achieved will ensure that the compensatory mitigation is effective and compensates for the losses resulting from the Project.

NEPA Conclusion

Construction and operation effects on California red-legged frog would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on California red-legged frog as compared to the No Project Alternative from removal of modeled habitat and potential loss of individuals. With implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.17, and WILD-1.18, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for California red-legged frog is present at the TRR West, west of Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas.

Construction

Construction of Alternative 2 would result in permanent and temporary losses of modeled aquatic and upland habitat for California red-legged frog (Table 10-2c). Impacts would be similar to those for Alternatives 1 and 3 except that construction of South Road and TRR West would result in additional loss of modeled habitat and the smaller inundation area would result in reduced loss of modeled habitat. Overall, permanent impacts on modeled California red-legged frog habitat would be less under Alternative 2 than under Alternatives 1 and 3 because of the smaller inundation area and reduced impacts from construction of dams, and dikes (Appendix 10C, Table 10C-7). Temporary impacts on California red-legged frog modeled habitat would be similar to Alternatives 1 and 3 (Appendix 10C, Table 10C-7). A reduction in the removal of potential habitat would also result in a decreased potential for injury or mortality of California red-legged frog. A smaller area could be affected by construction lighting and potential contamination from spills or leaks of gasoline, oil, or other contaminants during construction.

Operation

Potential operation effects on California red-legged frog under Alternative 2 would be similar to those under Alternatives 1 and 3. The length of new roadway would be substantially longer (more than 10 miles) for Alternative 2 than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway would impede

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movement over a larger area and increase the potential for California red-legged frog to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that permanent impacts on modeled California red-legged frog habitat would be less under Alternative 2 than under Alternatives 1 and 3 because of the smaller inundation area and reduced impacts from construction of dams and dikes (Appendix 10C, Table 10C-7). A net decrease in the amount of habitat removed would also decrease the potential for individuals to be crushed or buried by equipment or struck by vehicles and equipment traveling along access roads. The operation impacts of Alternative 2 would be similar to those for Alternatives 1 and 3 except that the increased amount of roadway could impede movement over a larger area and result in additional mortality from vehicle strikes. These impacts would be significant because the implementation of Alternative 2 could reduce the local California red-legged frog population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.17, and WILD-1.18 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on California red-legged frog would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on California red-legged frog as compared to the No Project Alternative from removal of modeled habitat and potential loss of individuals. Construction of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that permanent effects on modeled California red-legged frog habitat would be less under Alternative 2 than under Alternatives 1 and 3 because of the smaller inundation area and reduced effects from construction of dams and dikes (Appendix 10C, Table 10C-7). A net decrease in the amount of habitat removed would also decrease the potential for individuals to be crushed or buried by equipment or struck by vehicles and equipment traveling along access roads. The operation effects of Alternative 2 would be similar to those for Alternatives 1 and 3 except that the increased amount of roadway could impede movement over a larger area and result in additional mortality from vehicle strikes. With implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.17, and WILD-1.18, effects would be reduced to no adverse effect.

Impact WILD-1h: Western Pond Turtle

Western pond turtle populations have declined substantially, although they are still found within most of their historical range in California (Yarnal 2019:10–13).

Alternatives 1 and 3

Modeled habitat for western pond turtle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, Sites Reservoir, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline. Potential habitat is also present along the Sacramento River in the operations study area.

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Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for western pond turtle (Table 10-2c). Clearing and grubbing, excavation, and other construction activities could result in the destruction of nest sites and mortality or injury of eggs or individuals from being crushed or buried by equipment. Western pond turtle could be struck by vehicles and equipment traveling along access roads during construction. Construction activities could also result in disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable aquatic habitat and cause illness or mortality of individuals.

Operation

Under Alternative 1 or 3, new or increased amounts of contaminants such as gasoline, oil, and herbicides could enter suitable western pond turtle aquatic habitat from adjacent new or widened roads, or new facilities, which could cause illness or mortality of individuals.

Impacts on western pond turtle from routine maintenance activities are not expected because maintenance activities would be conducted mostly in previously disturbed areas during daylight hours and using existing roadways. If present, western pond turtle could be struck by vehicles and equipment traveling along access roads during operation. The LMP will include measures and practices to avoid or minimize operations and maintenance impacts on western pond turtle where suitable or occupied habitat is present.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. There is potential for visitors to access undeveloped areas and disturb existing habitat (e.g., walk through habitat, increase trash). In addition, increased human activity at the recreation areas and near the reservoir could cause western pond turtle to avoid habitat in these areas. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into western pond turtle aquatic habitat.

New roadways, once completed, could create barriers to movement and increase the potential for western pond turtle to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

Stone Corral and Funks Creeks would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). A Flow Characterization and Geomorphic Study (Appendix 2D) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. These flow increases would support the existing geomorphic functions and characteristics of each channel. Because the bypass flows would emulate natural conditions and would not exceed 100 cfs, they would not substantially change the length of time that there is flow in the creeks or the length of ponding in the creeks. The addition of impervious surfaces would not substantially alter the existing drainage patterns of a site or area because of the limited area of impervious surfaces and the ability of the surrounding open area to allow infiltration of precipitation. While increased flows from bypass releases may result in minor increases in

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erosion and changes in sediment deposition, the changes are expected to be minimal and no impacts on western pond turtle are expected.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle, operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~1~~% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No ProjectAction Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or June~~, or July~~) between the No ProjectAction Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, T~~t~~hese values show an increase of ~~less than~~ 1% to a decrease of less than 6~~5~~% when compared to No ActionProject Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under ~~existing~~baseline conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect western pond turtle or its aquatic or upland habitat.

Based on observations during North Delta Flow Actions (Davis pers. comm.), the comparable August–October habitat flows from Sites Reservoir through the Yolo Bypass may cause limited inundation of low-elevation parcels in the upper Yolo Bypass (north of the I-80 causeway). The intent of the releases from Sites Reservoir to the Yolo Bypass during this period is to temporally and spatially distribute food resources for fish species. If the water inundates floodplain areas (i.e., areas outside existing channels) the food would be deposited and would fail to move into the Delta. As such, Sites Reservoir would be operated to maintain flows within the existing Toe Drain, Tule Canal, and other channels, and adjustments in operations would be coordinated between the Authority and parcel owners using the existing Yolo Bypass monitoring network. As a result, impacts on potential western pond turtle habitat in the Yolo Bypass are not anticipated.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on western pond turtle from removal of potential habitat and potential loss of individuals. Operation of Alternative 1 or 3 could result in significant impacts on western pond turtle as a result of new or increased contaminants entering habitat, vehicle strikes, and new roads creating impediments to movement. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local western pond turtle population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.19, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3 would reduce the level of impact from construction

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and operation to less than significant because surveys would be conducted to identify suitable habitat, qualified biologists would conduct preconstruction surveys and monitor initial work in suitable aquatic habitat, compensation would be provided for the permanent and temporary losses of suitable habitat, and if found to be necessary through a wildlife corridor study, suitable crossings would be installed at appropriate locations to facilitate safe crossings.

Mitigation Measure WILD-1.14: Assess Habitat Suitability and Survey Suitable Habitat for Western Spadefoot, California Red-legged Frog, and Western Pond Turtle

This measure is described above for western spadefoot.

Mitigation Measure WILD-1.15: Design and Construct Wildlife Crossings for New Roadways at Suitable Locations

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.16: Monitor and Maintain Wildlife Crossings

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.19: Conduct Preconstruction Surveys for Western Pond Turtle and Monitor Initial In-Water Work

The Authority will retain qualified biologists (i.e., experienced in the identification of and knowledge of the life history and habitats of western pond turtle) to conduct preconstruction surveys within 24 hours of the start of activities that disturb occupied or suitable western pond turtle aquatic habitat. The biologist will survey the aquatic habitat and adjacent marsh, riparian, and grassland habitat in the construction area. If in-water work does not start immediately, the biologist will return to the construction site immediately prior to the start of in-water work to conduct another preconstruction survey. The biologist will remain onsite until initial in-water work is complete. If a turtle becomes trapped during initial in-water work, a biologist who is CDFW-approved to capture and relocate turtles during construction of the Project will relocate the individual to suitable aquatic habitat upstream or downstream of the construction area. The construction crew will be instructed to notify the crew foreman who will contact the biologist if a turtle is found trapped in the construction area. Work in the area where the turtle is trapped will stop until the biologist arrives and removes and relocates the turtle. The biologist will report their activities to CDFW within 24 hours of relocating any turtle.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.5.4.

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Mitigation Measure VEG-3.1: Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.54.

NEPA Conclusion

Construction and operation effects on western pond turtle would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on western pond turtle as compared to the No Project Alternative from removal of potential habitat and potential loss of individuals. With implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.19, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect.

Alternative 2

Suitable habitat for western pond turtle is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, Sites Reservoir, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in permanent and temporary losses of modeled aquatic and upland habitat for western pond turtle (Table 10-2c). Impacts would be similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional loss of modeled habitat and the smaller inundation area would result in smaller impacts on modeled habitat. Overall, permanent and temporary impacts on modeled western pond turtle aquatic habitat would be greater under Alternative 2 because of the construction of South Road and TRR West. Overall, permanent and temporary impacts on modeled western pond turtle upland habitat would be less under Alternative 2 than under Alternative 1 or 3 because of the smaller inundation area and reduced impacts from construction of dams, and dikes (Appendix 10C, Table 10C-8). Additional removal of modeled aquatic habitat would also result in an increased potential for injury or mortality of western pond turtle. There would be a larger area that could be affected by potential contamination from spills or leaks of gasoline, oil, or other contaminants during construction.

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Operation

Potential effects on western pond turtle from operation would be similar under Alternative 2 as described for Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway would impede movement over a larger area and increase the potential for western pond turtle to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3 except that permanent and temporary impacts on modeled western pond turtle aquatic habitat would be greater under Alternative 2 because of the construction of South Road and TRR West and permanent and temporary impacts on modeled western pond turtle upland habitat would be less under Alternative 2 because of the smaller inundation area and reduced impacts from construction of dams, and dikes. A net increase in the amount of modeled aquatic habitat removed would also increase the potential for individuals to be crushed or buried by equipment. Operation of Alternative 2 would be the same as Alternatives 1 and 3 except that the increased amount of roadway would impede movement over a larger area and result in additional mortality from vehicle strikes. These impacts would be significant because the implementation of Alternative 2 could reduce the local western pond turtle population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.19, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on western pond turtle would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on western pond turtle as compared to the No Project Alternative from removal of potential habitat and potential loss of individuals. Construction of Alternative 2 would result in similar effects to Alternatives 1 and 3 except that permanent and temporary effects on modeled western pond turtle aquatic habitat would be greater under Alternative 2 because of the construction of South Road and TRR West and permanent and temporary effects on modeled western pond turtle upland habitat would be less under Alternative 2 because of the smaller inundation area and reduced effects from construction of dams and dikes. A net increase in the amount of modeled aquatic habitat removed would also increase the potential for individuals to be crushed or buried by equipment. Operation of Alternative 2 would be the same as Alternatives 1 and 3 except that the increased amount of roadway would impede movement over a larger area and result in additional mortality from vehicle strikes. With implementation of Mitigation Measures WILD-1.14, WILD-1.15, WILD-1.16, WILD-1.19, VEG-2.2, VEG-3.1, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect.

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Impact WILD-1i: Giant Gartersnake

Giant gartersnake distribution and abundance has declined in the San Joaquin Valley and giant gartersnake abundance has declined in the Sacramento Valley (U.S. Fish and Wildlife Service 2017b:I-9).

Alternatives 1 and 3

Modeled habitat for giant gartersnake is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, road improvements, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of potential giant gartersnake habitat (Table 10-2c). Clearing and grubbing, excavation, structure improvements associated with road improvements, and other construction activities could result in the destruction of burrows and mortality or injury of individuals from being crushed or buried by equipment. Giant gartersnake could be struck by vehicles and equipment traveling along access roads during construction. Construction activities could also result in disruption of foraging activities or dispersal. Spills or leaks of gasoline, oil, or other contaminants during construction could contaminate suitable aquatic habitat and cause illness or mortality of individuals.

Operation

Under Alternative 1 or 3, new or increased amounts of contaminants such as gasoline, oil, and herbicides could enter suitable giant gartersnake aquatic habitat from adjacent new or widened roads, or new facilities, which could cause illness or mortality of individuals.

Maintenance activities required for operation of Alternative 1 or 3 facilities could result in impacts on giant gartersnake. For most areas of operation, impacts are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas using existing roadways. Maintenance of ditches or waterway crossings that provide suitable giant gartersnake habitat could result in injury or mortality of individuals. If present, giant gartersnake could be struck by vehicles and equipment traveling along access roads during operation. The LMP will include measures and practices to avoid or minimize operations and maintenance impacts on giant gartersnake, where suitable or occupied habitat is present.

Based on observations during North Delta Flow Actions (Davis pers. comm.), the comparable August–October habitat flows from Sites Reservoir through the Yolo Bypass may cause limited inundation of low-elevation parcels in the upper Yolo Bypass (north of the I-80 causeway). The intent of the releases from Sites Reservoir to the Yolo Bypass during this period is to temporally and spatially distribute food resources for fish species. If the water inundates floodplain areas (i.e., areas outside existing channels) the food would be deposited and would fail to move into the Delta. As such, Sites Reservoir would be operated to maintain flows within the existing Toe Drain, Tule Canal, and other channels, and adjustments in operations would be coordinated between the Authority and parcel owners using the existing Yolo Bypass monitoring network. As a result, impacts on potential giant gartersnake habitat in the Yolo Bypass are not anticipated.

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CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on giant gartersnake from removal of suitable habitat and potential loss of individuals. Operation of Alternative 1 or 3 could result in significant impacts on giant gartersnakes if individuals are injured or killed during maintenance of waterway structures or are struck by vehicles during maintenance activities. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local giant gartersnake population through direct mortality and habitat loss. Implementation of Mitigation Measure WILD-1.20 would reduce the level of impact from construction and operation to less than significant because construction in suitable habitat would be conducted during this species' active period to the extent feasible, surveys would be conducted to determine presence of giant gartersnake, construction would be suspended if giant gartersnakes are observed in work areas, exclusion fencing would be installed along the edge of the construction area where suitable habitat is present, and additional measures would be implemented to avoid causing giant gartersnake injury and mortality. Furthermore, implementation of Mitigation Measures VEG-2.2, VEG-3.2, VEG-3.3, and WILD-1.21 would reduce the level of impact to less than significant because temporarily disturbed aquatic and upland habitats would be restored and compensation would be provided for the permanent and temporary losses of suitable aquatic and upland habitat. The Authority will also implement measures specified in the biological opinion from USFWS and the incidental take permit from CDFW for the Project.

Mitigation Measure WILD-1.20: Implement Protective Measures for Giant Gartersnake

The Authority will implement the following protective measures when working in or near giant gartersnake habitat.

- When possible, all construction activity in suitable giant gartersnake aquatic habitat, and upland habitat within 200 feet of suitable aquatic habitat, will be conducted during the snake's active period (between May 1 and October 1). For work that cannot be conducted between May 1 and October 1, additional protective measures, such as installing exclusion fencing or additional biological monitoring, or other measures determined during consultation with USFWS and CDFW, will be implemented.
- Any dewatered habitat will remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
- The movement of heavy equipment within 200 feet of the banks of potential giant gartersnake aquatic habitat will be confined to designated haul routes to minimize habitat disturbance.
- Vegetation clearing within 200 feet of the banks of suitable giant gartersnake aquatic habitat will be limited to the minimum area necessary. Avoided giant gartersnake habitat in or adjacent to the Project area will be flagged and designated as an activity exclusion zone, to be avoided by all construction personnel.

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- To reduce the likelihood of snakes entering the construction area, exclusion fencing will be installed along the edge of the construction area that is within 200 feet of suitable aquatic habitat. The exclusion fencing will be installed during the active period for giant gartersnakes (May 1 to October 1) to reduce the potential for injury and mortality during this activity. The exclusion fencing will consist of 3-foot-tall silt fencing buried 4 to 6 inches below ground level.
- A USFWS- and CDFW-approved biologist will conduct a preconstruction survey of work areas within 200 feet of suitable giant gartersnake habitat no more than 24 hours before the start of work in that area.
- Prior to construction activities each morning, construction personnel will inspect exclusion and orange barrier fencing to ensure they are both in good working order. If any snakes are observed in the construction area during this inspection or at any other time during construction, the USFWS- and CDFW-approved biologist will be contacted to survey the site for snakes. The work area will be re-inspected and surveyed whenever a lapse in construction activity of 2 weeks or more has occurred. If a snake (believed to be a giant gartersnake) is encountered during construction, activities will cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed.
- The Authority will prepare a giant gartersnake relocation plan for review and approval by USFWS and CDFW prior to Project implementation. The plan will include trapping and relocation methods, relocation sites, and post-relocation monitoring. If a giant gartersnake becomes trapped, construction will cease until the individual has been relocated to an appropriate location as described in the approved relocation plan. Only USFWS and CDFW-approved biologists will conduct surveys and move listed species in accordance with the approved relocation plan.

Mitigation Measure WILD-1.21: Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats

The Authority will compensate for the permanent and temporary losses of suitable giant gartersnake aquatic habitat and associated upland habitat through the purchase of mitigation credits at a USFWS- and CDFW-approved mitigation or conservation bank or through acquiring and protecting habitat in perpetuity at a location approved by USFWS and CDFW. Permanent impacts on habitat will be mitigated by restoring or preserving habitat at a 3:1 ratio (habitat restored or preserved: habitat affected) or by an equivalent or greater amount as determined through consultation with USFWS or CDFW. Temporary impacts on habitat will be mitigated by restoring or preserving habitat at a 1:1 ratio (habitat restored or preserved : habitat affected), or by an equivalent or greater amount as determined during consultation with USFWS or CDFW. The purchase of mitigation credits or the establishment of onsite or offsite mitigation areas (or a combination of these options) would be completed as agreed upon by the Authority, Reclamation, USFWS, and CDFW.

USFWS and CDFW-approved conservation/mitigation banks have long-term adaptive management plans with performance standards. If mitigation occurs through a USFWS

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and CDFW-approved conservation/ mitigation bank, the bank's performance standards and success criteria will be applied.

If credits are not purchased at a USFWS and CDFW-approved conservation bank, the Authority will implement standards for long-term management and protection of conservation areas. The Authority will work closely with USFWS and CDFW during the planning and development of conservation areas. Conservation areas will have suitable aquatic and upland habitat. Once established, conservation areas will be surveyed annually by a USFWS- and CDFW- approved biologist. The biologist will assess the aquatic and upland habitat conditions, evaluate the adequacy of site protection (e.g., fencing, signage), assess potential threats to giant gartersnake, and take photographs of the site. The biologist will prepare monitoring reports that will include methods and results of monitoring and recommendations for adaptive management actions as needed.

Performance standards for non-mitigation bank aquatic and upland habitat compensation will provide the basis for monitoring parameters and will help determine the need for possible remedial actions after Project implementation. General performance standards for management of non-mitigation bank giant gartersnake habitat are as follows: (1) protected habitat is supplied with a reliable source of clean water from March through November or at a minimum, through the critical active summer months; (2) a sufficient amount of upland habitat is adjacent to aquatic habitat and is not inundated during the active season (May 1 through October 1); (3) the site provides available and abundant bankside vegetative cover (i.e., tule, cattail) for cover; and (4) permanent shelter, such as bankside cracks or crevices, holes, or small mammal burrows and upland winter refugia (areas that do not flood) must be present and maintained. During planning and development of the mitigation area, additional or more refined performance standards may be developed in coordination with USFWS and CDFW. Performance standards are not included for giant gartersnake occupancy since the objective of the Project mitigation is to establish compensatory suitable habitat rather than to ensure occupancy. Therefore, the successful establishment of aquatic and upland habitats based on the floristic, physical, and hydrologic components of the habitats will be used to evaluate the success of offsite giant gartersnake habitat compensatory mitigation.

Working closely with USFWS and CDFW during planning and development of the conservation area, monitoring the conservation area to ensure performance standards are achieved, and applying adaptive management actions when the performance standards are not achieved will ensure that the compensatory mitigation is effective and compensates for the losses resulting from the Project.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.5.4.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

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This measure is described in Chapter 9, Section 9.5.4.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.5.4.

NEPA Conclusion

Construction and operation effects on giant gartersnake would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on giant gartersnake as compared to the No Project Alternative from removal of suitable habitat and potential loss of individuals. With implementation of Mitigation Measures WILD-1.20, WILD-1.21, VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for giant gartersnake is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West, new and widened roadways, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for giant gartersnake (Table 10-2c). Impacts would be similar to those under Alternatives 1 and 3 except that permanent impacts on modeled upland habitat would be less under Alternative 2 because of reduced impacts from construction of the TRR West and temporary impacts on modeled aquatic and upland habitat would be greater under Alternative 2 because of the extended Dunnigan Pipeline and construction of the Sacramento River discharge under Alternative 2 (Appendix 10C, Table 10C-9).

Operation

Potential effects on giant gartersnake from operation would be similar under Alternative 2 to those described for Alternatives 1 and 3 except that additional maintenance activities at the Sacramento River discharge could result in additional potential for injury or mortality of giant gartersnakes.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in similar impacts to those under Alternatives 1 and 3 except that permanent impacts on modeled upland habitat would be less under Alternative 2 because of reduced impacts from construction of TRR West and temporary impacts on modeled aquatic and upland habitat would be greater under Alternative 2 because of the extended Dunnigan Pipeline and construction of the Sacramento River discharge. Operation of Alternative 2 could also result in additional potential for injury or mortality of giant gartersnakes from maintenance activities at the Sacramento River discharge. These impacts would be significant because the implementation of Alternative 2 could reduce the local giant gartersnake population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.20,

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WILD-1.21, VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on giant gartersnakes would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on giant gartersnake as compared to the No Project Alternative removal of suitable habitat and potential loss of individuals. Construction of Alternative 2 would result in similar effects to those under Alternatives 1 and 3 except that permanent effects on modeled upland habitat would be less under Alternative 2 because of reduced effects from construction of TRR West and temporary effects on modeled aquatic and upland habitat would be greater under Alternative 2 because of the extended Dunnigan Pipeline and construction of the Sacramento River discharge. Operation of Alternative 2 could also result in additional potential for injury or mortality of giant gartersnakes from maintenance activities at the Sacramento River discharge. With implementation of Mitigation Measures WILD-1.20, WILD-1.21, VEG-2.2, VEG-3.2, and VEG-3.3, effects would be reduced to no adverse effect.

Birds

Permanent and temporary impacts on modeled habitat for special-status birds from Alternatives 1, 2, and 3 are shown in Table 10-2d.

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Table 10-2d. Acreages of Permanent and Temporary Impacts on Modeled Special-Status Bird Habitats in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternatives 1 and 3 Temporary Impacts	Alternative 2 Permanent Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts	Alternative 2 Temporary Impacts
	Nesting Habitat	**Foraging Habitat**	**Nesting Habitat**	**Foraging Habitat**	**Nesting Habitat**	**Foraging Habitat**	**Nesting Habitat**	**Foraging Habitat**
Golden Eagle	1,006	13,109	43	916	947	12,752	41	868
Swainson's Hawk and White-tailed Kite	1,083	14,184	50	1,023	970	13,637	48	998
Mountain Plover	N/A	14,166	N/A	980	N/A	13,621	N/A	929
Bank Swallow	0	15,664	0	1,413	0	15,111	0	1,472
Tricolored Blackbird	42	13,501	19	1,037	43	12,955	16	1,115
	Nesting and Foraging		**Nesting and Foraging**		**Nesting and Foraging**		**Nesting and Foraging**	
Northern Harrier	14,286		1,078		13,733		1,156	
Burrowing Owl	14,00		977		13,491		947	
Bald Eagle	407		253		482		253	
Western Yellow-billed Cuckoo	0		0		0		0	
Yellow-breasted Chat and Yellow Warbler	71		10		104		8	
Song Sparrow ("Modesto" Population)	112		28		147		25	

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Impact WILD-1j: Northern Harrier and Burrowing Owl

Conversion of wetlands and pasturelands in the Central Valley has resulted in a decline of northern harrier and local extirpations. Ground nests are particularly vulnerable to disturbance or destruction by human activity, and to predation by wild and domestic animals (Shuford and Gardali 2008:152, 153). Burrowing owl populations have declined in central and southern coastal breeding areas, and the species has experienced modest breeding range reductions statewide. Burrowing owl population declines are attributed to the loss, degradation, and modification of suitable habitat, and the eradication of ground squirrels that provide the owls with burrows for nesting, protection from predators, and shelter (California Department of Fish and Game 2012:1).

Alternatives 1 and 3

Modeled habitat for northern harrier (*Circus hudsonius*) and burrowing owl (*Athene cunicularia*) is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled northern harrier and burrowing owl habitats (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests and burrows or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active northern harrier and burrowing owl nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation of Alternative 1 or 3 facilities are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Suitable northern harrier nesting habitat is not anticipated to be located near facilities that would be maintained, and noise and other disturbances from maintenance are not expected to affect nesting northern harriers. If burrowing owls were nesting near the facilities, they could be disturbed by noise, vibrations, or presence of maintenance workers. Use of rodenticides at the facilities could cause illness or mortality of northern harrier or burrowing owl because they could feed on rodents that have ingested rodenticide. The LMP will include specifications on rodenticide use in operations and maintenance areas to minimize or prevent potential secondary poisoning of northern harrier or

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burrowing owl. The LMP will also include an Integrated Pest Management Plan that focuses on long-term prevention of pest damage through habitat modification (Van Vuren et al. 2014), incorporating biological control methods such as raptor perches and owl boxes to increase natural raptor predators, and limited and targeted rodenticide use when necessary.

The new transmission lines ~~i~~installed~~Installed~~ for the reservoirs could cause mortality of northern harrier and burrowing owl through collision or electrocution.

New or widened roadways and additional vehicles traveling on roadways could increase the potential for injury or mortality of northern harrier and burrowing owl from being struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the human activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and disturb nesting activities. In addition, increased noise and activity in developed and undeveloped areas could cause northern harrier and burrowing owl to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir. The Authority would implement the Recreation Management Plan (Section 2D.8), which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into habitat.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. Artificial lighting could deter northern harrier or burrowing owl from nesting in illuminated areas. The Authority will implement BMP-17 that requires permanent safety lighting be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on northern harrier and burrowing owl nesting.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on northern harrier and burrowing owl from removal of modeled habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 could result in disturbance of northern harrier and burrowing owl from human-generated noise and disturbance at recreation areas and near the reservoir, or illness or mortality of northern harrier or burrowing owl from ingestion of rodents that have consumed rodenticide. Collision with new transmission lines could cause injury or death of individuals from the collision impact or electrocution. New or widened roadways and additional vehicles traveling on roadways could increase the potential for injury or mortality of northern harrier and burrowing owl from vehicle strikes. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local northern harrier and burrowing owl populations through direct mortality and habitat loss.

Implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.24, WILD-1.25, WILD-1.26, WILD-1.27, VEG-2.2, and VEG-3.2 would reduce the level of impact from construction and operation to less than significant because vegetation would be removed during

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the non-breedingbreeding season, surveys would be conducted to determine if northern harrier and burrowing owl are nesting (or for burrowing owl, wintering) in or near work areas, no-disturbance buffers would be established around active nest (or wintering) sites, rodenticides would be used minimally and appropriately, transmission lines would be fitted with protective devices, and impacts on sensitive natural communities in which northern harriers or burrowing owls may nest or forage would be compensated for through habitat restoration or protection.

Mitigation Measure WILD-1.22: Conduct Vegetation Removal During the Non-Breeding Season of Nesting Migratory Birds

The Authority will, to the maximum extent feasible, remove trees, shrubs, and herbaceous vegetation during the non-breeding season for most migratory birds (generally between September 1 and January 31) to remove nesting substrate and avoid potential delays in construction caused by the presence of nesting birds. If vegetation cannot be removed between September 1 and January 31, or if ground cover re-establishes in areas where vegetation has been removed, the affected area will be surveyed for nesting birds, as discussed in Mitigation Measure WILD-1.23.

Mitigation Measure WILD-1.23: Conduct Preconstruction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found

For special-status species where survey protocols have been established by CDFW, USFWS, or technical advisory committees, those survey protocols will supersede this measure (i.e., Mitigation Measures WILD-1.24, WILD-1.28, and WILD-1.29 for burrowing owl, golden eagle/bald eagle, and Swainson's hawk/white-tailed kite). The Authority will retain qualified wildlife biologists with knowledge of the relevant species to conduct non-raptor nesting bird surveys no more than 14 days prior to the start of construction. Where suitable habitat is present to support bank swallow, yellow-breasted chat, tricolored blackbird, yellow warbler, and song sparrow (Modesto population), wildlife biologists will thoroughly survey habitat and listen for calls and songs of these species. Surveys for non-raptor nesting migratory birds will include examining all potential nesting habitat in and within 50 feet of work areas on foot and/or using binoculars. Surveys for nesting raptors will conducted during Swainson's hawk/white-tailed kite surveys. If no active nests are detected during these surveys, no additional measures are required. During all nesting bird surveys, the biologist will document any state-listed bird species detected in the survey area.

If an active nest is found in the survey area, a no-disturbance buffer will be established around the nest site to avoid disturbance or destruction of the site until the end of the breeding season (August 31) or until after a qualified wildlife biologist determines that the young have fledged and moved out of the Project area (this date varies by species). The extent of these buffers will be determined by the biologist in coordination with USFWS and CDFW and will depend on the species, level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. If it is determined that the no-disturbance buffer cannot be maintained, the Authority and the qualified biologist will consult with USFWS and CDFW about implementing a reduced buffer but

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requiring full-time nest monitoring by a qualified biologist to watch for signs of stress. If behaviors indicating stress or potential nest abandonment (e.g., visible or audible agitation, leaving the nest at an unusual time or for an unusual length of time), the biologist will have the authority to stop work until the bird has returned to the nest or otherwise shows signs of recovery from the stress.

For state-listed species, the above protective measures will be implemented, and the Authority will contact CDFW to discuss the need for CESA take authorization, if the Authority does not already have such authorization.

Mitigation Measure WILD-1.24: Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement Avoidance and Minimization Measures if Found

The Authority will retain qualified biologists (experienced at identification of burrowing owls and their habitat) to conduct burrowing owl surveys in accordance with CDFW's *2012 Staff Report on Burrowing Owl Mitigation* (2012 Staff Report) (California Department of Fish and Game 2012). Biologists will conduct four surveys during the breeding season as follows: (1) one survey between February 15 and April 15, and (2) a minimum of three surveys at least 3 weeks apart between April 15 and July 15, with at least one survey after June 15. Biologists will also conduct four surveys spread evenly throughout the non-breeding season (September 1 to January 31). A report describing the methods and results of the survey will be submitted to CDFW within 30 days of completing the surveys.

The Authority will retain qualified biologists to conduct preconstruction take avoidance surveys for active burrows according to methodology in the 2012 Staff Report. If burrowing owls are found during any of the surveys, the Authority will implement Mitigation Measure WILD-1.25, which requires habitat to be replaced at a conservation area before permanent impacts occur. Because ample lead time is necessary to acquire and protect replacement habitat, these efforts should begin as soon as possible after presence of burrowing owls is determined.

Regardless of results from the surveys described above, if suitable habitat is present in the Project area, take avoidance (preconstruction) surveys will be conducted in the Project area (i.e., the area of ground disturbance and surrounding 500 feet) no less than 14 days prior to and 24 hours before initiating ground-disturbing activities (i.e., two surveys). If suitable habitat within 500 feet of ground disturbance is not accessible because of landowner restrictions, then the survey will extend to the edge of where access is allowed. Because burrowing owls may re-colonize a site after a few days, subsequent surveys will be conducted if more than 48 hours pass between Project activities. If no burrowing owls are found, no further mitigation is required. If burrowing owls are found, the Authority will implement the following measures summarized from the 2012 Staff Report.

- Occupied burrows will not be disturbed during the breeding season (February 1–August 31).

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- Depending on the time of year and level of disturbance, a 164-foot to 1,640-foot-wide buffer area will be established around occupied burrows. No construction will be authorized within the buffer unless a qualified biologist determines through non-invasive methods that egg laying and incubation have not begun or that juveniles are foraging independently and are capable of independent survival.
- To the maximum extent possible, burrows occupied during the non-breeding season by migratory or non-migratory resident burrowing owls will be avoided.
- To the maximum extent possible, destruction of unoccupied burrows in temporary impact areas will be avoided, and visible markers will be placed near burrows to ensure they are not collapsed.
- Occupied burrows that cannot be avoided will have exclusion devices installed and be collapsed. Burrow exclusion will be conducted only by qualified biologists during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty by site surveillance and/or scoping.
- Qualified biologists will conduct additional take avoidance surveys, as described above.
- Qualified biologists will monitor the Project site for burrowing owls during Project construction activities.
- Impacts on burrowing owls and their habitat will be minimized by using buffer areas, visual screens, and other measures during Project construction activities. Recommended buffer distances in the 2012 Staff Report will be used or site-specific buffers and visual screens will be determined through information collected during site-specific monitoring and consultation with CDFW.

Mitigation Measure WILD-1.25: Restore Temporarily Disturbed Habitat and Compensate for the Permanent Loss of Occupied Burrowing Owl Habitat

If burrowing owls have been documented to occupy burrows at the Project site in the last 3 years, CDFW considers the site occupied and mitigation is required (California Department of Fish and Game 2012:6).

The Authority will restore temporarily disturbed areas to pre-Project conditions. The Authority will mitigate for permanent impacts on occupied burrowing owl habitat in accordance with the 2012 Staff Report Permanent impacts will be mitigated by creating or preserving habitat at a 1:1 ratio (habitat created or preserved : habitat permanently affected) or by an equivalent or greater amount as determined in coordination with CDFW. Replacement habitat will be established through onsite mitigation, offsite mitigation, and/or credits purchased at a CDFW-approved mitigation or conservation bank. The purchase of mitigation credits or the establishment of onsite or offsite mitigation areas (or a combination of these options) would be completed as agreed upon by the Authority and CDFW.

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CDFW-approved mitigation banks have long-term adaptive management plans with performance standards. If mitigation occurs through a CDFW-approved conservation/ mitigation bank, the bank's performance standards and success criteria will be applied.

If credits are not purchased at a CDFW-approved conservation bank, the Authority will implement standards for long-term management and protection of mitigation areas. A conservation easement would be placed on offsite mitigation land. A mitigation monitoring plan will be prepared for onsite and offsite mitigation to ensure the long-term success of the habitat. The mitigation monitoring plan will describe the requirements for monitoring and maintaining the site, performance standards, adaptive management techniques, and reporting requirements.

The Authority will work closely with CDFW during the planning and development of onsite and offsite mitigation areas. Mitigation areas will provide suitable nesting and foraging habitat. Once established, mitigation areas will be periodically monitored by a CDFW-approved biologist. The biologist will survey the site for presence of western burrowing owl, assess the suitability of the site in providing nesting and foraging habitat (including the abundance of prey), evaluate the adequacy of site protection (e.g., fencing, signage), assess potential threats to burrowing owls, and take photographs of the site. The biologist should determine the number of adult burrowing owls and pairs, and if the numbers are maintained between monitoring years. The frequency of monitoring will be determined based on site-specific conditions in coordination with CDFW and will be included in the mitigation monitoring plan.

Performance standards for management of burrowing owl habitat will be based on site-specific conditions and included in the mitigation monitoring plan. Performance standards may include managing vegetation height to between 4.7 and 13 centimeters through grazing or mowing (California Department of Fish and Game 2012) and maintaining conditions that promote or support natural prey distribution and abundance, especially in proximity to occupied burrows. The successful establishment or maintenance of suitable breeding and foraging habitat based on the vegetation height and prey abundance will be used to evaluate the success of the burrowing owl habitat compensatory mitigation.

Working closely with CDFW during planning and development of the conservation area, monitoring the conservation area to ensure performance standards are achieved, and applying adaptive management when performance standards are not achieved will ensure that the compensatory mitigation is effective and compensates for the permanent habitat loss resulting from the Project.

Mitigation Measure WILD-1.26: Protect Special-Status Wildlife from Rodenticide Use

To minimize the potential for wildlife to be poisoned by ingesting rodenticide, use of rodenticides will be minimized to the maximum extent feasible and limited to areas immediately surrounding Project facilities. Facilities will be maintained in a manner to reduce the potential for nuisance rodents, including sealing openings in structures,

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securely storing trash bins, and installing signage at recreation areas discouraging feeding of wildlife and encouraging disposal of food and other trash in designated containers. Signage will include text from the California Code of Regulations that states it is illegal to feed big game mammals and that feeding of wildlife is considered harassment and should not be done under any circumstances.

Wherever feasible, alternatives to rodenticide will be used for rodent eradication, such as traps, if they can be used safely around other wildlife. Additionally, to minimize the risk to non-target species from directly ingesting rodenticides, anticoagulant and non-anticoagulant rodenticides will not be broadcast. The Authority will consult with California Department of Pesticide Regulation's PRESCRIBE database (https://www.cdpr.ca.gov/docs/endspec/prescint.htm) prior to any vertebrate pest control activity. The database incorporates section by section coordination with CDFW's Biogeographic Information and Observation System and the CNDDB to provide species-specific use restrictions that are not on pesticide labels, including use of modified bait stations and what those modifications must be.

Mitigation Measure WILD-1.27: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines

The Authority will ensure that new transmission lines and associated equipment will be properly fitted with wildlife protective devices to isolate and insulate structures to prevent injury or mortality of birds. Protective measures shall follow the guidelines provided in *Reducing Avian Collisions with Power Lines: The State of the Art* (Avian Power Line Interaction Committee 2012), or the current Avian Power Line Interaction Committee guidelines in place at the time the transmission lines are installed, and will include insulating hardware or conductors against simultaneous contact, using poles that minimize impacts to birds, and increasing the visibility of conductors or wires to prevent or minimize bird collisions.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

NEPA Conclusion

Construction and operation effects on northern harrier and burrowing owl would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on northern harrier and burrowing owl as compared to the No Project Alternative. Construction of Alternative 1 or 3 would result in effects on northern harrier and burrowing owl from removal of modeled habitat and potential loss or disturbance of active nests.

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Operation of Alternative 1 or 3 could result in disturbance of northern harrier and burrowing owl from human-generated noise and disturbance at recreation areas and near the reservoir, or illness or mortality of northern harrier or burrowing owl from ingestion of rodents that have consumed rodenticide. Collision with new transmission lines could cause injury or death of individuals from the collision effect or electrocution. New or widened roadways and additional vehicles traveling on roadways could increase the potential for injury or mortality of northern harrier and burrowing owl from vehicle strikes. With implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.24, WILD-1.25, WILD-1.26, WILD-1.27, VEG-2.2, and VEG-3.2, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for northern harrier and burrowing owl is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of nesting and foraging habitats for northern harrier and burrowing owl (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Potential impacts on northern harrier and burrowing owl under Alternative 2 would be similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of modeled habitat and the smaller inundation area would result in reduced loss of modeled habitat. Overall, permanent and temporary impacts on burrowing owl habitat and permanent impacts on northern harrier habitat would be less under Alternative 2 because of the smaller inundation area and reduced impacts from dams and dikes (Appendix 10C, Tables 10C-10 and 10C-11). Temporary impacts on northern harrier habitat would be greater under Alternative 2 because of construction associated with conveyance to the Sacramento River and new and widened roads (Appendix 10C, Table 10C-10).

Operation

Potential effects on northern harrier and burrowing owl from operation of Alternative 2 would be similar to Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway could increase the potential for northern harrier and burrowing owl to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those under Alternatives 1 and 3 except that permanent and temporary impacts on burrowing owl habitat and permanent impacts on northern harrier habitat would be less under Alternative 2 and temporary impacts on northern harrier habitat would be greater under Alternative 2. Operation of Alternative 2 would

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result in similar impacts as those described above for Alternatives 1 and 3 except that the greater amount of roadway could increase the potential for northern harrier and burrowing owl to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. These impacts would be significant because the implementation of Alternative 2 could reduce the local northern harrier and burrowing owl populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.24, WILD-1.25, WILD-1.26, WILD-1.27, VEG-2.2, and VEG-3.2 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on northern harrier and burrowing owl would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on northern harrier and burrowing owl as compared to the No Project Alternative. Construction of Alternative 2 would result in effects similar to those under Alternatives 1 and 3 except that permanent and temporary effects on burrowing owl habitat and permanent effects on northern harrier habitat would be less under Alternative 2 and temporary effects on northern harrier habitat would be greater under Alternative 2. Operation of Alternative 2 would result in similar effects as those described above for Alternatives 1 and 3 except that the greater amount of roadway could increase the potential for northern harrier and burrowing owl to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. With implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.24, WILD-1.25, WILD-1.26, WILD-1.27, VEG-2.2, and VEG-3.2, effects would be reduced to no adverse effect.

Impact WILD-1k: Golden Eagle and Bald Eagle

The population trend of golden eagle in California is largely unknown, but the species is threatened by loss of foraging areas, loss of nesting habitat, pesticide poisoning, lead poisoning and collision with human-made structures such as wind turbines (California Department of Fish and Wildlife 2021g). Bald eagle population decline has been attributed to habitat modification from urban developments; agriculture; timber harvest; pesticides and contaminants, including lead poisoning; off-road vehicles and other human disturbances; electrocution and collision with power lines; and shooting (California Department of Fish and Wildlife 2021h).

Alternatives 1 and 3

Modeled habitat for golden eagle and bald eagle is present at the GCID Main Canal improvements, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas. Additional modeled habitat for golden eagle is present at the TC Canal intake. Modeled bald eagle habitat is also present at the GCID Main Canal diversion, TRR East, and Dunnigan Pipeline. Potential bald eagle nesting habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled nesting and foraging habitats for golden eagle and bald eagle (Table 10-2d). Habitat

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loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Destruction of nests and nest abandonment would have to be avoided because both species are fully protected under the California Fish and Game Code.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active golden eagle and bald eagle nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Operation impacts that could result in mortality of golden eagle and bald eagle would have to be avoided because both species are fully protected under the California Fish and Game Code. Maintenance activities required for operation under Alternative 1 or 3 could result in impacts on golden eagle and bald eagle. While small mammals are not their preferred prey, bald eagles could become ill or die from eating rodents that have ingested rodenticides used at the facilities. Use of rodenticides at the facilities could also cause illness or mortality of golden eagle from eating rodents that have ingested rodenticide. The LMP will include specifications on rodenticide use in operations and maintenance areas to minimize or prevent potential secondary poisoning of golden eagle and bald eagle.

Noise and vibration from vehicles and equipment, and presence of maintenance crews could disturb golden eagles or bald eagles if maintenance activities are near active nests. Although maintenance activities would be temporary and short term, they could result in disturbance of active nests if conducted during a sensitive period in the nesting process (e.g., when eaglets are learning to fly). The Authority will implement the LMP to avoid maintenance impacts on golden eagle and bald eagle.

The new transmission lines installed for the reservoirs could cause mortality of golden eagle and bald eagle through electrocution or collision.

Modeled habitat for golden eagle and bald eagle is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and disturb nesting activities. In addition, increased noise and activity in developed and undeveloped areas could cause golden eagle and bald eagle to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into habitat.

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Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, and CBD outlet where suitable nesting habitat may be present. Lighting could deter golden eagles or bald eagles from nesting in areas that are illuminated by these new sources of light. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on golden eagle and bald eagle nesting.

Stone Corral and Funks Creeks, which may have suitable nest trees associated with them, would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). A Flow Characterization and Geomorphic Study (Section 2D.4.3) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on suitable golden eagle or bald eagle nesting habitat associated with the creeks.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle, operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~1~~% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No Project~~Action~~ Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or, June, ~~or July~~) between the No Project~~Action~~ Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, ~~T~~these values show an increase of ~~less than~~ 1% to a decrease of less than 6~~5~~% when compared to No Project~~Action~~ Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under ~~existing~~baseline conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect suitable bald eagle nesting habitat along the river.

The completed reservoir would provide new bald eagle foraging habitat (fish in the reservoir) and result in new nesting sites or wintering habitat because of the proximity to new foraging habitat. Although ~~T~~these would be beneficial effects, they would not occur for the first 12 to 20 years of operation (2 to 10 years for reservoir filling and 10 years after filling before fish are introduced [see *Construction* in Chapter 6, *Surface Water Quality*]).

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Consumption of fish that have bioaccumulated methylmercury could result in illness or mortality of bald eagle. Potential bioaccumulation of methylmercury in reservoir fish during the first 10 years of operation is discussed in Chapter 6.

CEQA Significance Determination and Mitigation Measures

Implementation of Alternative 1 or 3 would have the beneficial effects of providing new bald eagle foraging habitat (Sites Reservoir) and new nesting sites or wintering habitat because of the proximity to the new foraging habitat (12 to 20 years after reservoir filling begins). Construction of Alternative 1 or 3 would result in significant impacts on golden eagle and bald eagle from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 may result in disturbance of bald eagle and golden eagle if nesting or foraging at or near recreation areas and the use of rodenticides could cause illness, injury, or mortality of bald eagle or golden eagle if rodenticides are ingested. Collision with new transmission lines could cause injury or death of individuals from the collision impact or electrocution. Consumption of fish that have bioaccumulated methylmercury could cause illness or mortality of bald eagle. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local golden eagle and bald eagle populations through direct mortality and habitat loss.

Implementation of Mitigation Measures WILD-1.22, WILD-1.26, WILD-1.27, WILD-1.28, WILD-1.29, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, ~~and~~ VEG-4.2, and WQ-1.1 would reduce the level of impact on bald eagle from construction and operation to less than significant because vegetation would be removed during the non-breeding season, surveys would be conducted to determine if bald eagle are nesting in or near work areas, no-disturbance buffers would be established around active nest sites, rodenticides would be used minimally and appropriately, transmission lines would be fitted with protective devices;, steps would be taken to reduce, monitor, and manage mercury in the reservoir;, and impacts on sensitive natural communities in which bald eagles may nest or forage would be compensated for through habitat restoration and preservation. Implementation of Mitigation Measures WILD-1.22, WILD-1.26, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2 would reduce the level of construction impacts on golden eagle; however, the removal of mature trees within blue oak woodland, foothill pine, and oak savanna communities would be a long-term impact on golden eagle because of the length of time that would be required for newly planted trees to reach mature size and fully replace the habitat function and habitat value of the removed trees. This impact on golden eagle would remain significant and unavoidable even with mitigation because of the long-term loss of blue oak woodland, foothill pine, and oak savanna habitat. Implementation of Mitigation Measures WILD-1.27 and WILD-1.28 would reduce the level of impact on golden eagle from operation to less than significant because rodenticides would be used minimally and appropriately, and transmission lines would be fitted with protective devices. The Authority will also implement measures specified in an Eagle Conservation Plan, which will be prepared in coordination with USFWS and CDFW to address Project impacts on bald eagle and golden eagle.

Mitigation Measure WILD-1.22: Conduct Vegetation Removal During the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

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Mitigation Measure WILD-1.26: Protect Special-Status Wildlife from Rodenticide Use

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.27: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.28: Conduct Focused Surveys for Golden Eagle and Bald Eagle and Implement Protective Measures if Found

Prior to the start of construction, the Authority will retain qualified wildlife biologists (experienced with raptor identification and behaviors) to conduct focused surveys for golden eagle and bald eagle nests in suitable habitat in the Project area and within a 2-mile radius of the Project area.

The surveys will be conducted in accordance with the *Interim Golden Eagle Inventory and Monitoring Protocols; and other Recommendations* (Pagel et al. 2010), *Protocol for Evaluating Bald Eagle Habitat and Populations in California* (Jackman and Jenkins 2004), *Bald Eagle Breeding Survey Instructions* (California Department of Fish and Wildlife 2017) and *Updated Eagle Nest Survey Protocol* (U.S. Fish and Wildlife Service 2020b).

Prior to conducting surveys, any known breeding area records will be reviewed, and a map of potential nest sites will be created using GIS mapping of suitable nesting habitat. If feasible, an initial survey will be conducted during the fall or winter, prior to the initial occupancy survey, to identify existing nest sites. Nest locations will be mapped using GPS software and will be used during the occupancy surveys.

For golden eagle, based on the results of the initial survey, aerial (helicopter) or ground surveys will be conducted to assess nest occupancy. A minimum of two aerial surveys or ground observation periods lasting at least 4 hours each will be conducted in a single breeding season (January 1 through August 31) to confirm presence/absence of golden eagle. Each survey will be conducted at least 30 days apart. Surveys will be conducted in the morning during favorable weather conditions.

For a bald eagle, based on the results of the initial survey, a minimum of three surveys will be conducted during the bald eagle nesting season (January 1 to July 31) in the year that construction will begin, and each year during the construction period, to look for new nests. The first survey will be conducted in the early breeding period in early March, and additional surveys will be conducted in mid-nesting season (late April or early May) and late in the season (mid-June). Surveys will be conducted in the morning, if feasible, during favorable weather conditions.

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For both species, the final survey methods and survey area boundaries will be determined based on coordination with USFWS and CDFW, and all survey results will be submitted to these agencies.

No active bald eagle or golden eagle nest trees will be removed during the nesting season. If an occupied golden eagle or bald eagle nest is identified in the survey area, a no-disturbance buffer will be established around the nest site to avoid disturbance or destruction of the site, consistent with the USFWS's *Recommended Buffer Zones for Human Activities around Nesting Sites of Bald Eagles in California and Nevada* and the USFWS *Recommended Buffer Zones for Ground-based Human Activities around Nesting Sites of Golden Eagles in California and Nevada* (U.S. Fish and Wildlife Service 2017c ~~and U.S. Fish and Wildlife Service~~, 2020~~c~~). If it is determined that the no-disturbance buffer cannot be maintained, the Authority and the qualified biologist will consult with USFWS and CDFW about implementing a reduced buffer but requiring full-time nest monitoring by a qualified biologist to watch for signs of stress. If behaviors indicating stress or potential nest abandonment (e.g., visible or audible agitation, leaving the nest at an unusual time or for an unusual length of time), the biologist will have the authority to stop work until the bird has returned to the nest or otherwise shows signs of recovery from the stress. Work will be delayed as long as necessary to ensure that nest abandonment does not occur.

Mitigation Measure WILD-1.29: Compensate for the Loss of Eagle Nest Trees

Prior to the start of construction, the Authority will purchase compensatory mitigation credits from the Bald Eagle and Golden Eagle Electrocution Prevention In-lieu Fee Program for the loss of eagle nest trees. The number of credits to be purchased will depend on the results of eagle nest surveys (Mitigation Measure WILD-1.28) and consultation with USFWS and CDFW during preparation of the Eagle Conservation Plan and will be specified in the Eagle Take Permit from USFWS.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.5~~4~~.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.5~~4~~.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.5~~4~~.

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Mitigation Measure VEG-4.1: Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-4.2: Compensate for Adverse Effects on Oak Woodlands

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure WQ-1.1: Methylmercury Management

This measure is described in Chapter 6, Section 6.4, *Impact Analysis and Mitigation Measures*.

NEPA Conclusion

Construction and operation effects on golden eagle and bald eagle would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on golden eagle and bald eagle as compared to the No Project Alternative. Implementation of Alternative 1 or 3 would have the beneficial effects of providing new bald eagle foraging habitat (Sites Reservoir) and new nesting sites or wintering habitat because of the proximity to the new foraging habitat. Construction of Alternative 1 or 3 would result in effects on golden eagle and bald eagle from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 may result in disturbance of bald eagle and golden eagle if nesting or foraging at or near recreation areas and the use of rodenticides could cause illness, injury, or mortality of bald eagle or golden eagle if rodenticides are ingested. Collision with new transmission lines could cause injury or death of individuals from the collision effect or electrocution. With implementation of Mitigation Measures WILD-1.22, WILD-1.28, WILD-1.29, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2, effects on bald eagle from construction would be reduced to no adverse effect. With implementation of Mitigation Measures WILD-1.22, WILD-1.28, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2, construction effects on golden eagle would be reduced, however, the removal of mature trees within blue oak woodland, foothill pine, and oak savanna communities would be a long-term adverse effect on golden eagle and would remain a substantial adverse effect even with mitigation. Operation of Alternative 1 or 3 would result in the same effects as those described above for CEQA, and with implementation of Mitigation Measures WILD-1.26 and WILD-1.27, there would be no adverse effect on golden eagle and bald eagle.

Alternative 2

Modeled habitat for golden eagle and bald eagle is present at the GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, and recreation areas. Additional modeled habitat for golden eagle is present at the TC Canal intake. Modeled bald eagle habitat is also present at the GCID Main Canal diversion, Dunnigan Pipeline, and the Sacramento River discharge.

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Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for golden eagle and bald eagle (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Destruction of nests and nest abandonment would have to be avoided because both species are fully protected under the California Fish and Game Code.

Impacts would be similar to those for Alternatives 1 and 3 except that construction of South Road and TRR West under Alternative 2 would result in additional loss of suitable golden eagle habitat and the smaller inundation area would reduce the amount of permanent habitat loss. Overall, permanent and temporary impacts on golden eagle nesting and foraging habitat would be less under Alternative 2 because of the reduced inundation area and fewer construction impacts from dams and dikes (Appendix 10C, Table 10C-12).

For bald eagle, impacts would be similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional habitat loss but would be offset by reduction in habitat loss from the smaller reservoir footprint. Overall, permanent impacts on bald eagle nesting and foraging habitat would be greater under Alternative 2 because of additional roadway. Overall, temporary impacts on nesting and foraging bald eagle habitat would be the same under Alternative 2 as for Alternatives 1 and 3 (Appendix 10C, Table 10C-13). Additional removal of potential bald eagle nesting habitat would also result in an increased potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Operation

Potential effects on golden eagle and bald eagle from operation of Alternative 2 would be similar to Alternatives 1 and 3. The completed reservoir under Alternative 2 would provide new but smaller bald eagle foraging habitat than Alternatives 1 and 3 and could result in new nesting sites or wintering habitat because of the proximity to new foraging habitat.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except permanent and temporary impacts on golden eagle nesting and foraging habitats would be less under Alternative 2 and permanent impacts on bald eagle nesting and foraging habitat would be greater under Alternative 2. A net increase in the amount of suitable bald eagle nesting habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in similar impacts as those described above for Alternatives 1 and 3 except that the completed reservoir under Alternative 2 would provide new but smaller bald eagle foraging habitat than Alternatives 1 and 3 and could result in new nesting sites or wintering habitat because of the proximity to new foraging habitat. These impacts would be significant because the implementation of Alternative 2 could reduce the local golden eagle and bald eagle populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.22, WILD-1.26, WILD-1.27, WILD-1.28, WILD-1.29, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and

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VEG-4.2 would reduce the level of construction and operation impacts on bald eagle to less than significant.

Implementation of Mitigation Measures WILD-1.22, WILD-1.26, WILD-1.27, WILD-1.28, WILD-1.29, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2 would reduce the level of construction and operations impacts on golden eagle; however, the removal of mature trees within blue oak woodland, foothill pine, and oak savanna communities would be a long-term impact on golden eagle because of the length of time that would be required for newly planted trees to reach mature size and fully replace the habitat function and habitat value of the removed trees. This impact on golden eagle would remain significant and unavoidable even with mitigation because of the long-term loss of blue oak woodland, foothill pine, and oak savanna habitat. The Authority will also implement measures specified in an Eagle Conservation Plan, which will be prepared in coordination with USFWS to address Project impacts on bald eagle and golden eagle.

NEPA Conclusion

Construction and operation effects on golden eagle and bald eagle would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on bald eagle and golden eagle as compared to the No Project Alternative. Construction of Alternative 2 would result in effects similar to those for Alternatives 1 and 3 except permanent and temporary effects on golden eagle nesting and foraging habitats would be less under Alternative 2 and permanent effects on bald eagle nesting and foraging habitat would be greater under Alternative 2. A net increase in the amount of suitable bald eagle nesting habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in similar effects as those described above for Alternatives 1 and 3 except that the completed reservoir under Alternative 2 would provide new but smaller bald eagle foraging habitat than Alternatives 1 and 3 and could result in new nesting sites or wintering habitat because of the proximity to new foraging habitat. With implementation of Mitigation Measures WILD-1.22, WILD-1.28, WILD-1.29, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2, construction effects on bald eagle would be reduced to no adverse effect. With implementation of Mitigation Measures WILD-1.22, WILD-1.28, VEG-2.2, VEG-3.2, VEG-3.3, VEG-4.1, and VEG-4.2, construction effects on golden eagle would be reduced, however, the removal of mature trees within blue oak woodland, foothill pine, and oak savanna communities, would be a long-term adverse effect on golden eagle and would remain a substantial adverse effect even with mitigation. Operation of Alternative 2 would result in the same effects as those described above for CEQA, and with implementation of Mitigation Measures WILD-1.26 and WILD-1.27, there would be no adverse effect on bald eagle and golden eagle.

Impact WILD-1l: Swainson's Hawk and White-tailed Kite

Swainson's hawk populations declined as much as 90% between the early 1900s and 1970; recent populations are still below historical numbers and this species has not reoccupied much of its previous range (California Department of Fish and Wildlife 2016:17, 21). Historically, white-tailed kite populations were substantially reduced by habitat loss, shooting, and egg collection, and the long-term trend suggests a continued decline (Cornell Lab of Ornithology 2019).

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Alternatives 1 and 3

Modeled habitat for Swainson's hawk and white-tailed kite is present at the GCID Main Canal intake, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and Sacramento River in the operations study area.

Construction

Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for Swainson's hawk and white-tailed kite (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Destruction of white-tailed kite nests and nest abandonment would have to be avoided because white-tailed kite is fully protected under the California Fish and Game Code.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active Swainson's hawk and white-tailed kite nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Operation impacts that could result in mortality of white-tailed kite would have to be avoided because this species is fully protected under the California Fish and Game Code. Maintenance activities required for operation Alternative 1 or 3 could result in impacts on Swainson's hawk and white-tailed kite. Noise and vibration from vehicles and equipment, and presence of maintenance crews could disturb individuals if maintenance activities are near active nests. Although maintenance activities would be temporary and short term, they could result in disturbance of active nests if conducted during a sensitive period in the nesting process (e.g., when fledglings are beginning to fly). Use of rodenticides at the facilities could cause illness or mortality of individuals because they could feed on rodents that have ingested rodenticide. The Authority will implement the LMP to avoid maintenance impacts on Swainson's hawk and white-tailed kite, including specifications on rodenticide use in operations and maintenance areas to minimize or prevent potential secondary poisoning of Swainson's hawk and white-tailed kite.

The new transmission lines installed for the reservoirs could cause mortality of Swainson's hawk and white-tailed kite through electrocution or collision.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas, as well as additional roadway traffic. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and disturb nesting activities. In addition, increased noise and activity in

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developed and undeveloped areas could cause Swainson's hawk and white-tailed kite to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into habitat.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, and CBD outlet where suitable nesting habitat may be present. Lighting could deter individuals from nesting in areas that are illuminated by these new sources of light. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on Swainson's hawk and white-tailed kite nesting.

Stone Corral and Funks Creeks, which may have suitable nest trees associated with them, would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). A Flow Characterization and Geomorphic Study (Section 2D.4.3) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on suitable Swainson's hawk and white-tailed kite nesting habitat associated with the creeks.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle, operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.41% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No ProjectAction Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or, June, ~~or July~~) between the No ProjectAction Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, Tthese values show an increase of ~~less than~~ 1% to a decrease of less than 65% when compared to No ProjectAction Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under baseline~~existing~~ conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect suitable Swainson's hawk and white-tailed kite nesting habitat along the river.

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Based on observations during North Delta Flow Actions (Davis pers. comm.), the comparable August–October habitat flows from Sites Reservoir through the Yolo Bypass may cause limited inundation of low-elevation parcels in the upper Yolo Bypass (north of the I-80 causeway). The intent of the releases from Sites Reservoir to the Yolo Bypass during this period is to temporally and spatially distribute food resources for fish species. If the water inundates floodplain areas (i.e., areas outside existing channels) the food would be deposited and would fail to move into the Delta. As such, Sites Reservoir would be operated to maintain flows within the existing Toe Drain, Tule Canal, and other channels, and adjustments in operations would be coordinated between the Authority and parcel owners using the existing Yolo Bypass monitoring network. As a result, impacts on potential Swainson's hawk and white-tailed kite habitat in the Yolo Bypass are not anticipated.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on Swainson's hawk and white-tailed kite from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 may result in disturbance of Swainson's hawk and white-tailed kite if nesting or foraging at or near recreation areas, and the use of rodenticides could cause illness, injury, or mortality of Swainson's hawk and white-tailed kite if rodenticides are ingested. Collision with new transmission lines could cause injury or death of individuals from the collision impact or electrocution. These impacts would be significant because the implementation of Alternative 1 or 3 could reduce the local Swainson's hawk and white-tailed kite populations through direct mortality and habitat loss.

Implementation of Mitigation Measures WILD-1.22, WILD-1.26, WILD-1.27, WILD-30, WILD-1.31, VEG-2.2, VEG-4.1, and VEG-4.2 would reduce the level of impact from construction and operation to less than significant because vegetation would be removed during the non-breedingbreeding season, surveys would be conducted to determine if Swainson's hawk or white-tailed kite is nesting in or near work areas, no-disturbance buffers would be established around active nest sites, rodenticides would be used minimally and appropriately, transmission lines would be fitted with protective devices, and impacts on foraging habitat and other sensitive natural communities in which Swainson's hawk or white-tailed kite may nest or forage would be mitigated through habitat restoration and preservation. Mitigation Measure WILD-1.29 would ensure that mitigation lands fulfill both the foraging and nesting requirements for Swainson's hawk, and that they support nesting Swainson's hawks at equal or greater densities than the habitat lost. Mitigation Measures VEG-2.2 and VEG-4.2 would further mitigate the loss of nesting habitat through restoration or creation of riparian and oak woodland at a ratio of at least 1:1. Mitigation of riparian and oak woodland at a 1:1 ratio in conjunction with Swainson's hawk foraging habitat mitigation (Mitigation Measure WILD-1.31) is more than sufficient to reduce impacts on Swainson's hawk and white-tailed kite habitat to less than significant.

Mitigation Measure WILD-1.22: Conduct Vegetation Removal During the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

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Mitigation Measure WILD-1.26: Protect Special-Status Wildlife from Rodenticide Use

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.27: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.30: Conduct Focused Surveys for Nesting Swainson's Hawk, White-tailed Kite, and Other Raptors Prior to Construction and Implement Protective Measures During Construction

The Authority will retain qualified wildlife biologists (experienced with raptor identification and behaviors) to conduct focused surveys for Swainson's hawk, white-tailed kite, and other raptor nesting areas before construction begins. Survey methodology will follow the Swainson's Hawk Technical Advisory Committee's methodology (Swainson's Hawk Technical Advisory Committee 2000). A minimum of six surveys will be conducted during the appropriate timeframes discussed in the methodology. If needed, the qualified biologists will coordinate with CDFW regarding the extent and number of surveys. Surveys will generally be conducted from February to July. Survey methods and results will be reported to CDFW within 30 days of the completion of the surveys.

Because the area surrounding the Project area is largely undeveloped, focused surveys for Swainson's hawk and white-tailed kite will be conducted in the Project area and in a buffer area up to 0.5 mile around the Project area. The survey area for other nesting raptors will encompass potential habitat within 500 feet of work areas. The portions of the Swainson's hawk/white-tailed kite buffer area containing unsuitable nesting habitat and/or with an obstructed line of sight to the Project area will not be surveyed.

No active Swainson's hawk or white-tailed kite nest trees will be removed during the nesting season. If the biologists find an active Swainson's hawk or white-tailed kite nest, the contractor will maintain a 0.25-mile no-work buffer between construction activities and the active nest(s) until it has been determined that the young have fledged. The biologists will mark the no-work buffer with stakes and signs and will check the location at least weekly to ensure that the signs are in place and the buffer is being maintained. No work will be authorized within the buffer except for vehicle travel. If a 0.25-mile buffer around the nest cannot be maintained, the Authority and a qualified biologist will consult with CDFW about implementing alternative protective measures that are sufficient to minimize the risk of disturbance, such as a reduced buffer with full-time~~time~~ nest monitoring by a qualified biologist. If nesting raptors exhibit agitated behavior indicating stress, the biological monitor will have the authority to stop construction in that area until they determine that the young have fledged.

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For active nests of other raptors, no-disturbance buffers will be established around the nest sites to avoid disturbance or destruction of the sites until the end of the breeding season (August 31) or until after a qualified wildlife biologist determines that the young have fledged and moved out of the Project area (this date varies by species). The extent of these buffers will be determined by the biologist in coordination with USFWS and CDFW and will depend on the species, level of noise or construction disturbance, line-of-sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers.

Mitigation Measure WILD-1.31: Compensate for the Permanent Loss of Foraging Habitat for Swainson's Hawk and White-tailed Kite

The Authority will compensate for permanent loss of suitable Swainson's hawk and white-tailed kite foraging habitat by restoring or preserving habitat onsite or offsite. The Authority will consider all suitable foraging habitat within 10 miles of an active Swainson's hawk nest (i.e., determined active during current surveys or within the last 5 years based on available data from prior surveys, if any) to be occupied by the species. Mitigation ratios (occupied habitat restored or preserved: habitat affected) will be as follows, or by an equivalent or greater amount as determined through consultation (for Swainson's hawk) with CDFW.

- 1:1 for foraging habitat within 1 mile of an active Swainson's hawk nest.
- 0.75:1 for foraging habitat within 5 miles but greater than 1 mile from an active Swainson's hawk nest.
- 0.5:1 for foraging habitat within 10 miles but greater than 5 miles from an active Swainson's hawk nest.

Onsite or offsite mitigation lands will provide suitable foraging habitat and sufficient potential nesting trees to support Swainson's hawk (including protected trees or planted trees, or both), as determined by a qualified biologist, in an area with Swainson's hawk nesting densities equal to or greater than nesting densities in the Project area. The Authority may purchase mitigation credits for Swainson's hawk habitat from a CDFW-approved mitigation or conservation bank in lieu of or in addition to onsite or offsite habitat preservation. The purchase of mitigation credits or the establishment of onsite or offsite mitigation areas (or a combination of these options) would be completed as agreed upon by the Authority and CDFW.

Commented [A2]: Mitigation Measure WILD-1.31 describes compensation for the permanent loss of Swainson's hawk and white-tailed kite foraging habitat. As a result of ongoing discussions with the lead agency, CDFW recommends Mitigation Measure WILD-1.31 be revised to be consistent with the more simplified approach to Swainson's hawk foraging mitigation. CDFW recommends the following language be added (marked in **bold underline)** while removing the language in ~~strikethrough~~
- **1:1** for foraging habitat within **10** mile**s** of an active Swainson's hawk nest.
- ~~0.75:1 for foraging habitat within 5 miles but greater than 1 mile from an active Swainson's hawk nest.~~
- ~~0.5:1 for foraging habitat within 10 miles but greater than 5 miles from an active Swainson's hawk nest.~~

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-4.1: Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction

This measure is described in Chapter 9, Section 9.54.

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Mitigation Measure VEG-4.2: Compensate for Adverse Effects on Oak Woodlands

This measure is described in Chapter 9, Section 9.54.

NEPA Conclusion

Construction and operation effects on Swainson's hawk and white-tailed kite would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on Swainson's hawk and white-tailed kite as compared to the No Project Alternative. Construction of Alternative 1 or 3 would result in effects on Swainson's hawk and white-tailed kite from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 may result in disturbance of Swainson's hawk and white-tailed kite if nesting or foraging at or near recreation areas, and the use of rodenticides could cause illness, injury, or mortality of Swainson's hawk and white-tailed kite if rodenticides are ingested. Collision with new transmission lines could cause injury or death of individuals from the collision effect or electrocution. With implementation of Mitigation Measures WILD-1.22, WILD-1.26, WILD-1.27, WILD-1.30, WILD-1.31, VEG-2.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for Swainson's hawk and white-tailed kite is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of potential habitat for Swainson's hawk and white-tailed kite (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Destruction of white-tailed kite nests and nest abandonment would have to be avoided because this species is fully protected under the California Fish and Game Code.

Impacts would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional loss of modeled nesting and foraging habitat and permanent impacts on potential nesting and foraging habitat would be less under Alternative 2 because the inundation area would be smaller. Overall, permanent and temporary impacts on Swainson's hawk and white-tailed kite nesting and foraging habitats would be less under Alternative 2 because of the reduced inundation area and fewer construction impacts from dams and dikes (Appendix 10C, Table 10C-14).

Operation

Potential effects on Swainson's hawk and white-tailed kite from operation of Alternative 2 would be similar to Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway could

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increase the potential for Swainson's hawk and white-tailed kite to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that permanent and temporary impacts on Swainson's hawk and white-tailed kite nesting and foraging habitats would be less under Alternative 2. Operation of Alternative 2 would result in similar impacts to those described above for Alternatives 1 and 3 except that the greater amount of roadway could increase the potential for Swainson's hawk and white-tailed kite to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. These impacts would be significant because the implementation of Alternative 2 could reduce the local Swainson's hawk and white-tailed kite populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.22, WILD-1.26, WILD-1.27, WILD-1.30, WILD-1.31, VEG-2.2, VEG-4.1, and VEG-4.2 would reduce the level of construction and operation impacts to less than significant.

NEPA Conclusion

Construction and operation effects on Swainson's hawk and white-tailed kite would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on these species as compared to the No Project Alternative. Construction of Alternative 2 would result in effects similar to those for Alternatives 1 and 3 except that permanent and temporary effects on Swainson's hawk and white-tailed kite nesting and foraging habitats would be less under Alternative 2. Operation of Alternative 2 would result in similar effects to those described above for Alternatives 1 and 3 except that the greater amount of roadway could increase the potential for Swainson's hawk and white-tailed kite to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. With implementation of Mitigation Measures WILD-1.21, WILD-1.26, WILD-1.27, WILD-1.30, WILD-1.31, VEG-2.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect.

Impact WILD-1m: Mountain Plover

About half of the mountain plover wintering population occurs in California and there has been a decrease in the wintering population in the Central Valley; the loss of and inadequate management of wintering areas in California is a conservation concern for this species (Andres and Stone 2009:1, 19).

Alternatives 1 and 3

Modeled wintering habitat for mountain plover is present at the GCID Main Canal intake, GCID Main Canal improvements, TRR East/Funks pipelines, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of modeled mountain plover wintering habitat (Table 10-2d). Habitat loss would result from conversion to unsuitable land cover types and reservoir inundation. Potential injury or mortality

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of eggs or nestlings from nest destruction or nest abandonment would not occur because the area of disturbance under Alternatives 1 and 3 is outside mountain plover's nesting range.

Operation

Maintenance would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Suitable mountain plover wintering habitat would not be in maintenance areas and operation would not result in impacts on mountain plover.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Increased noise and activity in developed and undeveloped areas could cause mountain plover to avoid foraging in the recreation areas or in suitable habitat near the reservoir.

The new transmission lines installed for the reservoirs could cause injury to or mortality of mountain plover through collision or electrocution.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 would result in significant impacts on mountain plover from removal of suitable wintering habitat. Operation of Alternative 1 or 3 could result in significant impacts if mountain plovers are injured or die from electrocution from colliding with new transmission lines or electrocution. These impacts would be significant because Alternative 1 or 3 could affect the local wintering mountain plover population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.27, VEG-2.2, VEG-3.2, and AG-1.1 would reduce the level of impact from construction and operation to less than significant because permanent loss of sensitive natural communities in which mountain plover may forage would be compensated for through habitat restoration or preservation and purchasing conservation easements on Important Farmland (defined in Chapter 15, *Agriculture and Forestry Resources*).

Mitigation Measure WILD-1.27: Construct Overhead Power Lines and Associated Equipment Following Suggested Practices to Reduce Bird Collisions with Power Lines

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

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Mitigation Measure AG-1.1: Purchase Agricultural Conservation Easements to Preserve Regional Important Farmland

This measure is described in Chapter 15, Section 15.4, *Impact Analysis and Mitigation Measures*.

NEPA Conclusion

Construction and operation effects on mountain plover would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on mountain plover as compared to the No Project Alternative due to the removal of suitable wintering habitat or potential direct mortality during construction or injury or mortality during operation. With implementation of Mitigation Measures WILD-1.27, VEG-2.2, VEG-3.2, and AG-1.1, effects would be reduced to no adverse effect.

Alternative 2

Modeled habitat for mountain plover is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, inundation area, I/O Works, dams, new and widened roadways, recreation areas, and Dunnigan Pipeline.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled mountain plover wintering habitat (Table 10-2d). Impacts would be similar to those described for Alternatives 1 and 3 except that permanent impacts on modeled wintering habitat would be less under Alternative 2 because the inundation area would be smaller and temporary impacts on wintering habitat would be less under Alternative 2 because of fewer construction impacts from the regulating reservoirs and conveyance complex, I/O Works, and dams and dikes (Appendix 10C, Table 10C-15).

Operation

Potential effects on mountain plover from operation of Alternative 2 would be similar to Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway could increase the potential for mountain plover to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that permanent and temporary impacts on modeled wintering habitat would be less under Alternative 2. Operation of Alternative 2 would result in similar impacts to those described above for Alternatives 1 and 3 except that the greater amount of roadway could increase the potential for mountain plover to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. These impacts would be significant because Alternative 2 could affect the local wintering mountain plover population through direct mortality and habitat

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loss. Implementation of Mitigation Measures WILD-1.27, VEG-2.2, VEG-3.2, and AG-1.1 would reduce the level of construction and operation impacts to less than significant.

NEPA Conclusion

Construction and operation effects on mountain plover would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on mountain plover as compared to the No Project Alternative. Construction of Alternative 2 would result in effects similar to those for Alternatives 1 and 3 except that permanent and temporary effects on modeled wintering habitat would be less under Alternative 2. Operation of Alternative 2 would result in similar effects to those described above for Alternatives 1 and 3 except that the greater amount of roadway could increase the potential for mountain plover to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. With implementation of Mitigation Measures WILD-1.27, VEG-2.2, VEG-3.2, and AG-1.1, effects would be reduced to no adverse effect.

Impact WILD-1n: Western Yellow-billed Cuckoo, Yellow-breasted Chat, Yellow Warbler, and Song Sparrow (Modesto Population)

Yellow-breasted chat populations have declined in the Sacramento Valley as a result of riparian habitat loss and nest parasitism (Shuford and Gardali 2008:353–355). Yellow warblers are nearly extirpated in the Central Valley, primarily from loss of riparian habitat and from predation (Shuford and Gardali 2008:333). The substantial loss of wetlands and riparian forests in the Central Valley is thought to have greatly reduced the overall numbers of song sparrow and resulted in local extirpation within its range (Shuford and Gardali 2008:401).

Alternatives 1 and 3

Modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow (Modesto population; herein song sparrow) is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East/Funks pipelines, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline. Modeled habit for song sparrow is also present at Funks Reservoir. Potential habitat is also present for all four bird species along the Sacramento River in the operations study area; this is the only area in which potential habitat for western yellow-billed cuckoo is present.

Construction

Alternative 1 or 3 would not result in any construction impacts on western yellow-billed cuckoo or modeled western yellow-billed cuckoo habitat. Construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Vegetation removal and other construction activities could result in destruction of nests, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of

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construction crews could result in temporary disturbance of yellow-breasted chat, yellow warbler, and song sparrow nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Alternative 1 or 3 would not result in any operation impacts on potential western yellow-billed cuckoo habitat. Maintenance would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Noise and vibration from vehicles and equipment, and presence of maintenance crews could disturb nesting yellow-breasted chat, yellow warbler, and song sparrow if maintenance activities are near active nests. Although maintenance activities would be temporary and short term, they could result in disturbance of active nests if conducted during a sensitive period in the nesting process. The LMP will include measures and practices to avoid or minimize operations and maintenance impacts on nesting yellow-breasted chat, yellow warbler, and song sparrow.

Modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to nests and disturb nesting activities. In addition, increased noise and activity in developed and undeveloped areas could cause individuals to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir. The Authority would implement the Recreation Management Plan, which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into habitat.

New or widened roadways and additional vehicles traveling on roadways could increase the potential for injury or mortality of yellow-breasted chat, yellow warbler, and song sparrow from being struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. Increased or new roadway noise could also interfere with communication between individuals and result in altered behaviors (i.e., discontinuing use of habitat near roads, nesting further from roads). Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. Lighting could deter individuals from nesting in areas that are illuminated by these new sources of light. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on yellow-breasted chat, yellow warbler and song sparrow nesting.

Stone Corral and Funks Creeks, which may have suitable nesting habitat for yellow-breasted chat, yellow warbler, and song sparrow associated with them, would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and

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lower flows in the drier months (e.g., summer). A Flow Characterization and Geomorphic Study (Section 2D.4.3) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on suitable yellow-breasted chat, yellow warbler, and song sparrow nesting habitat associated with the creeks. No potential western yellow-billed cuckoo habitat is associated with Stone Corral or Funks Creeks.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle, operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~1~~% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No Project~~Action~~ Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or, June, ~~or July~~) between the No Project~~Action~~ Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, ~~T~~these values show an increase of ~~less than~~ 1% to a decrease of less than 6~~5~~% when compared to No Project~~Action~~ Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under baseline~~existing~~ conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect suitable western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, and song sparrow nesting habitat along the river.

Based on observations during North Delta Flow Actions (Davis pers. comm.), the comparable August–October habitat flows from Sites Reservoir through the Yolo Bypass may cause limited inundation of low-elevation parcels in the upper Yolo Bypass (north of the I-80 causeway). The intent of the releases from Sites Reservoir to the Yolo Bypass during this period is to temporally and spatially distribute food resources for fish species. If the water inundates floodplain areas (i.e., areas outside existing channels) the food would be deposited and would fail to move into the Delta. As such, Sites Reservoir would be operated to maintain flows within the existing Toe Drain, Tule Canal, and other channels, and adjustments in operations would be coordinated between the Authority and parcel owners using the existing Yolo Bypass monitoring network. As a result, impacts on potential yellow-breasted chat, yellow warbler, and song sparrow habitat in the Yolo Bypass are not anticipated.

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The completed reservoir would provide an additional food source (insects associated with the reservoir) for yellow-breasted chat, yellow warbler, and song sparrow. This would be a beneficial effect of the Project.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 1 or 3 would have no impact on western yellow-billed cuckoo. Construction of Alternative 1 or 3 would result in significant impacts on yellow-breasted chat, yellow warbler, and song sparrow from removal of modeled habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 could result in impacts on yellow-breasted chat, yellow warbler, and song sparrow from disturbance during the nesting season if nesting or foraging at or near recreation areas, injury or mortality from vehicle strikes, and changes in communication or behavior from new or increased roadway noise. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present. Construction impacts would be significant because Alternative 1 or 3 could reduce the local yellow-breasted chat, yellow warbler, and song sparrow populations through direct mortality and habitat loss.

Implementation of Mitigation Measures WILD-1.22, WILD-1.23, VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact from construction to less than significant for yellow-breasted chat, yellow warbler, and song sparrow because vegetation would be removed during the non-breedingbreeding season, preconstruction surveys for nesting birds would be conducted, no-disturbance buffers would be established around active nest sites, and impacts on sensitive natural communities in which yellow-breasted chat, yellow warbler, and song sparrow may nest or forage would be compensated for through habitat restoration. The completed reservoir would also benefit yellow-breasted chat, yellow warbler, and song sparrow by providing additional insect prey.

Mitigation Measure WILD-1.22: Conduct Vegetation Removal During the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.23: Conduct Preconstruction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

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Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.5.4.

NEPA Conclusion

Construction and operation effects on western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, and song sparrow would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would have no adverse effect on western yellow-billed cuckoo as compared to the No Project Alternative. Construction of Alternative 1 or 3 but would result in a substantial adverse effect on yellow-breasted chat, yellow warbler, and song sparrow as compared to the No Project Alternative. Construction of Alternative 1 or 3 would result in adverse effects on yellow-breasted chat, yellow warbler, and song sparrow from removal of modeled habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 could result in adverse effects on yellow-breasted chat, yellow warbler, and song sparrow from disturbance during the nesting season if nesting or foraging at or near recreation areas, injury or mortality from vehicle strikes, and changes in communication or behavior from new or increased roadway noise. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present. With implementation of Mitigation Measures WILD-1.22, WILD-1.23, VEG-2.2, VEG-3.2, and VEG-3.3, construction effects would be reduced to no adverse effect for yellow-breasted chat, yellow warbler, and song sparrow. Operation of Alternative 1 or 3 would result in no adverse effect on western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, or song sparrow.

Alternative 2

Modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West/Funks pipelines, TRR West, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and Sacramento River discharge. Modeled habit for song sparrow is present at Funks Reservoir. Potential habitat is also present for all four bird species along the Sacramento River in the operations study area; this is the only area in which potential habitat for western yellow-billed cuckoo is present.

Construction

Alternative 2 would not result in any construction impacts on western yellow-billed cuckoo or potential western yellow-billed cuckoo habitat. Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for yellow-breasted chat, yellow warbler, and song sparrow (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Impacts would be similar to those for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of modeled yellow-breasted chat, yellow warbler, and song sparrow habitat, and permanent impacts on modeled habitat would be less under Alternative 2 because the inundation area would be smaller. Overall, permanent impacts on modeled yellow-breasted chat, yellow warbler, and song sparrow habitat would be greater under Alternative 2 because of the greater permanent impacts associated with

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of new and widened roads (Appendix 10C, Tables 10C-17 and 10C-18). Temporary impacts on modeled habitat would be less than for Alternatives 1 and 3 because of reduced impacts associated with regulating reservoirs and conveyance complex. Additional removal of permanently affected habitat would also result in an increased potential for injury or mortality of eggs or individuals.

Operation

Operation under Alternative 2 would have no impact on western yellow-billed cuckoo. Potential impacts on yellow-breasted chat, yellow warbler, and song sparrow nesting and foraging activities from operation under Alternative 2 would be similar to Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway could increase the potential for yellow-breasted chat, yellow warbler, and song sparrow to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas, and new or increased roadway noise could affect yellow-breasted chat, yellow warbler, and song sparrow communication and behaviors over a larger area.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 2 would have no adverse effect on western yellow-billed cuckoo. Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that permanent impacts on modeled yellow-breasted chat, yellow warbler, and song sparrow habitat would be greater under Alternative 2 as a result of greater permanent impacts associated with new and widened roads. A net increase in the amount of modeled habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result similar impacts to those described for Alternatives 1 and 3 except that the greater amount of roadway could increase the potential for yellow-breasted chat, yellow warbler, and song sparrow to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas and new or increased roadway noise could affect yellow-breasted chat, yellow warbler, and song sparrow communication and behaviors over a larger area. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present. Construction impacts would be significant for yellow-breasted chat, yellow warbler, and song sparrow because Alternative 2 could reduce the local populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.22, WILD-1.23, VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact from construction to less than significant.

NEPA Conclusion

Construction and operation effects on western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, and song sparrow would be the same as described above for CEQA. Construction and operation of Alternative 2 would have no adverse effect on western yellow-billed cuckoo as compared to the No Project Alternative. Construction of Alternative 2 would have a substantial adverse effect on yellow-breasted chat, yellow warbler, and song sparrow as compared to the No Project Alternative. Construction of Alternative 2 would result in effects

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similar to those for Alternatives 1 and 3 except that permanent effects on modeled yellow-breasted chat, yellow warbler, and song sparrow habitat would be greater under Alternative 2 as a result of greater permanent effects associated with new and widened roads. A net increase in the amount of modeled habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result similar effects to those described for Alternatives 1 and 3 as compared to the No Project Alternative except that the greater amount of roadway could increase the potential for yellow-breasted chat, yellow warbler, and song sparrow to be struck by vehicles of workers or visitors and new or increased roadway noise could affect yellow-breasted chat, yellow warbler, and song sparrow communication and behaviors over a larger area. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present. With implementation of Mitigation Measures WILD-1.22, WILD-1.23, VEG-2.2, VEG-3.2, and VEG-3.3, effects would not be adverse. Operation of Alternative 2 would result in no adverse effect on western yellow-billed cuckoo, yellow-breasted chat, yellow warbler, or song sparrow.

Impact WILD-1o: Bank Swallow

Monitoring of the bank swallow population along the Sacramento River showed a 39% reduction in the number of burrows (nests) between 1986 and 2012 (Bank Swallow Technical Advisory Committee 2013:1).

Alternatives 1 and 3

Modeled foraging habitat for bank swallow is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake and Dunnigan Pipeline. Potential bank swallow nesting habitat is present along the Sacramento River in the operations study area.

Construction

Construction of facilities under Alternatives 1 and 3 would result in the permanent and temporary losses of foraging habitat for bank swallow (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation.

Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of bank swallow foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Noise and other disturbances from maintenance are not anticipated to affect foraging bank swallows.

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Modeled foraging habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Increased noise and activity in developed and undeveloped areas could cause bank swallow to avoid foraging in recreation areas or in suitable habitat near the reservoir.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle, operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~1~~% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No Project~~Action~~ Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or, June~~, or July~~) between the No Project~~Action~~ Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, ~~T~~these values show an increase of ~~less than~~ 1% to a decrease of less than 6~~5~~% when compared to No Project~~Action~~ Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under baseline~~existing~~ conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect suitable bank swallow nesting habitat along the river.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 could result in significant impacts on bank swallow from removal of suitable foraging habitat. Operation of Alternative 1 or 3 could result in disturbance of bank swallow foraging activities from human-generated noise and disturbance at recreation areas and near the reservoir, but these impacts would not be significant. Construction impacts would be significant because Alternatives 1 and 3 could affect the local bank swallow population through loss of foraging habitat. Implementation of Mitigation Measures WILD-1.23, VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact for construction to less than significant because surveys for nesting bank swallows would be conducted and impacts on sensitive natural communities in which bank swallow may forage would be compensated for through habitat restoration and preservation.

Mitigation Measure WILD-1.23: Conduct Preconstruction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found

This measure is described above for northern harrier and burrowing owl.

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Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.54.

NEPA Conclusion

Construction effects on bank swallow would be the same as described above for CEQA. Construction of Alternatives 1 and 3 would result in a substantial adverse effect on bank swallow as compared to the No Project Alternative due to removal of suitable foraging habitat. Operation effects on bank swallow of Alternative 1 or 3 would be the same as described above for CEQA and could result in disturbance of bank swallow foraging activities as compared to the No Project Alternative, but would not be adverse. With implementation of Mitigation Measures WILD-1.23, VEG-2.2, VEG-3.2, and VEG-3.3, construction effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in no adverse effect on bank swallow.

Alternative 2

Modeled foraging habitat for bank swallow is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, Dunnigan Pipeline, and the Sacramento River discharge. Potential bank swallow nesting habitat is present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled foraging habitat for bank swallow (Table 10-2d). Impacts would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge under Alternative 2 would result in additional loss of modeled habitat and permanent impacts on potential habitat would be less under Alternative 2 because the inundation area would be smaller. Overall, permanent impacts on modeled bank swallow foraging habitat would be less under Alternative 2 because of the reduced inundation area and fewer construction impacts from dams and dikes and the regulating reservoirs and conveyance complex (Appendix 10C, Table 10C-19). Temporary impacts on modeled foraging habitat would greater under Alternative 2 because of greater impacts from conveyance to the Sacramento River and new and widened roads.

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Operation

Potential effects on bank swallow from operation would be the same under Alternative 2 as described for Alternatives 1 and 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that permanent impacts on modeled bank swallow foraging habitat would be less under Alternative 2 because of the reduced inundation area and fewer construction impacts from dams and dikes and the regulating reservoirs and conveyance complex. Temporary impacts on modeled foraging habitat would be greater under Alternative 2 because of greater impacts from conveyance to the Sacramento River and new and widened roads. Operation of Alternative 2 would result in the same impacts as those described above for Alternatives 1 and 3 and there would be no adverse effect on bank swallow. Construction impacts would be significant because Alternative 2 could affect the local bank swallow population through loss of foraging habitat. Implementation of Mitigation Measures WILD-1.23, VEG-2.2, VEG 3.2, and VEG-3.3 would reduce the level of impact from construction to less than significant.

NEPA Conclusion

Construction and operation effects on bank swallow would be the same as described above for CEQA. Construction of Alternative 2 would result in a substantial adverse effect on bank swallow as compared to the No Project Alternative. Construction of Alternative 2 would result in effects similar to those for Alternatives 1 and 3 except that permanent effects on modeled bank swallow foraging habitat would be less under Alternative 2 because of the reduced inundation area and fewer construction effects from dams and dikes and the regulating reservoirs and conveyance complex. Temporary effects on modeled foraging habitat would be greater under Alternative 2 because of greater effects from conveyance to the Sacramento River and new and widened roads. With implementation of Mitigation Measures WILD-1.23, VEG-2.2, VEG-3.2, and VEG-3.3, construction effects would be reduced to no adverse effect. Operation of Alternative 2 would result in no adverse effect on bank swallow.

Impact WILD-1p: Tricolored Blackbird

Urban development, agricultural conversion, and harvesting of silage fields have caused a dramatic decline in the tricolored blackbird population from loss of suitable breeding and foraging habitats and loss of reproductive breeding efforts (U.S. Fish and Wildlife Service 2019c:14, 28, 36, 37).

Alternatives 1 and 3

Modeled habitat for tricolored blackbird is present at the GCID Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

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Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of nesting and foraging habitats for tricolored blackbird (Table 10-2d). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings.

Nighttime construction lighting could temporarily disturb active nest sites if they are in the illuminated area. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of active tricolored blackbird nests and foraging activities. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Suitable tricolored blackbird nesting habitat is not anticipated to be located near facilities that would be maintained, and noise and other disturbances from maintenance are not anticipated to affect tricolored blackbird nesting or foraging activities.

There is no modeled breeding habitat at the recreation areas. There are a few areas of modeled breeding habitat (freshwater marsh) along the perimeter of the reservoir footprint. These areas could be occasionally disturbed by people visiting the reservoir, but potential disturbance is expected to be minimal and would not result in impacts on tricolored blackbirds nesting in the immediate vicinity. Increased noise and activity in developed and undeveloped areas would cause tricolored blackbird to avoid foraging or nesting in the recreation areas or in suitable habitat near the reservoir.

New or widened roadways and additional vehicles traveling on roadways could increase the potential for injury or mortality of tricolored blackbird from being struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. Increased or new roadway noise could also interfere with communication between individuals and result in altered behaviors (i.e., discontinuing use of habitat near roads, nesting further from roads). Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present.

Safety nighttime lighting that would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, and CBD outlet have the potential to deter tricolored blackbirds from nesting in areas that are illuminated by these new sources of light. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on tricolored blackbird nesting.

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Based on observations during North Delta Flow Actions (Davis pers. comm.), the comparable August–October habitat flows from Sites Reservoir through the Yolo Bypass may cause limited inundation of low-elevation parcels in the upper Yolo Bypass (north of the I-80 causeway). The intent of the releases from Sites Reservoir to the Yolo Bypass during this time period is to temporally and spatially distribute food resources for fish species. If the water inundates floodplain areas (i.e., areas outside existing channels) the food would be deposited and would fail to move into the Delta. As such, Sites Reservoir would be operated to maintain flows within the existing Toe Drain, Tule Canal, and other channels, and adjustments in operations would be coordinated between the Authority and parcel owners using the existing Yolo Bypass monitoring network. As a result, impacts on potential tricolored blackbird habitat in the Yolo Bypass are not anticipated.

The completed reservoir would provide an additional food source (insects associated with the reservoir) for tricolored blackbird. This would be a beneficial effect of the Project.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 could result in significant impacts on tricolored blackbird from removal of suitable habitat and potential loss or disturbance of active nests. Operation of Alternative 1 or 3 could result in impacts on tricolored blackbird from injury or mortality from vehicle strikes and changes in communication or behavior from new or increased roadway noise. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present. Construction impacts would be significant because they could reduce the local tricolored blackbird population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.31, VEG-2.2, VEG-3.2, and VEG-3.3 would reduce the level of impact from construction to less than significant because vegetation would be removed during the non-breeding~~breeding~~ season, surveys would be conducted to determine if tricolored blackbird is nesting in or near work areas, no-disturbance buffers would be established around active nest sites, and impacts on sensitive natural communities in which tricolored blackbird may nest or forage would be compensated for through habitat restoration and preservation. Implementation of Mitigation Measures VEG-2.2, VEG-3.2, and VEG-3.3 would avoid and compensate for permanent loss of potential tricolored blackbird nesting habitat. Annual grassland foraging habitat would be preserved at a minimum 1:1 ratio though implementation of Mitigation Measures WILD-1.31 and VEG-2.2. Implementation of Mitigation Measure AG-1.1 would compensate for the loss of agricultural foraging habitat through preservation and purchasing conservation easements on Regional Important Farmland (defined in Chapter 15). The completed reservoir would also benefit tricolored blackbird by providing additional insect prey.

Mitigation Measure WILD-1.22: Conduct Vegetation Removal During the Non-Breeding Season of Nesting Migratory Birds

This measure is described above for northern harrier and burrowing owl.

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Mitigation Measure WILD-1.23: Conduct Preconstruction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.31: Compensate for the Permanent Loss of Foraging Habitat for Swainson's Hawk and White-tailed Kite

This measure is described above for Swainson's hawk and white-tailed kite.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.3: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Non-Wetland Waters

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure AG-1.1: Purchase Agricultural Conservation Easements to Preserve Regional Important Farmland

This measure is described in Chapter 15, Section 15.4.

NEPA Conclusion

Construction and operation effects on tricolored blackbird would be the same as described above for CEQA. Construction of Alternatives 1 and 3 would result in a substantial adverse effect on tricolored blackbird as compared to the No Project Alternative due to the removal of suitable habitat and potential loss or disturbance of active nests resulting in direct mortality and habitat loss. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present, as compared to the No Project Alternative, under operation of Alternative 1 or 3. With implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.31, VEG-2.2, VEG-3.2, VEG-3.3, and AG-1.1, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 is not anticipated to result in adverse effects on tricolored blackbird.

Alternative 2

Modeled habitat for tricolored blackbird is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR West/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, Dunnigan Pipeline, TC Canal intake, and Sacramento River discharge.

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Construction

Construction of Alternative 2 would result in the permanent and temporary losses of potential habitat for tricolored blackbird (Table 10-2d) and potential destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Impacts under Alternative 2 would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and the Sacramento River discharge would result in additional loss of modeled habitat and the smaller inundation area would result in reduced loss of modeled habitat. Overall, permanent impacts on nesting habitat and temporary impacts on foraging habitat would be greater under Alternative 2 because of greater impacts associated with the regulating reservoirs and conveyance complex and conveyance to the Sacramento River, respectively. Overall, permanent impacts on tricolored blackbird foraging habitat and temporary impacts on nesting habitat would be less under Alternative 2 because of the smaller inundation area and fewer temporary impacts on nesting habitat from the regulating reservoirs and conveyance complex, respectively (Appendix 10C, Table 10C-20). Additional removal of potential nesting habitat would result in an increased potential for injury or mortality of eggs or individuals.

Operation

Potential effects on tricolored blackbird from operation under Alternative 2 would be similar to Alternatives 1 and 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway could increase the potential for tricolored blackbird to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas, and new or increased roadway noise could affect tricolored blackbird communication and behaviors over a larger area.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that permanent impacts on nesting habitat and temporary impacts on foraging habitat would be greater under Alternative 2 and permanent impacts on tricolored blackbird foraging habitat and temporary impacts on nesting habitat would be less under Alternative 2. A net increase in the amount of nesting habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in similar impacts to those described above for Alternative 1 or 3 except that the greater amount of roadway could increase the potential for tricolored blackbird to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas and new or increased roadway noise could affect tricolored blackbird communication and behaviors over a larger area. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present. Impacts from construction would be significant because they could reduce the local tricolored blackbird population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.31, VEG-2.2, VEG-3.2, VEG-3.3, and AG-1.1 would reduce the level of impact from construction to less than significant.

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NEPA Conclusion

Construction and operation effects on tricolored blackbird would be the same as described above for CEQA. Construction of Alternative 2 would result in a substantial adverse effect on tricolored blackbird as compared to the No Project Alternative. Construction of Alternative 2 would result in effects similar to those for Alternatives 1 and 3 except that permanent effects on nesting habitat and temporary effects on foraging habitat would be greater under Alternative 2 and permanent effects on tricolored blackbird foraging habitat and temporary effects on nesting habitat would be less under Alternative 2. A net increase in the amount of nesting habitat removed would also increase the potential for destruction of nests or nest abandonment, which could cause injury or mortality of eggs or nestlings. Operation of Alternative 2 would result in similar effects to those described above for Alternative 1 or 3 except that the greater amount of roadway under Alternative 2 could increase the potential for tricolored blackbird to be struck by vehicles and new or increased roadway noise could affect tricolored blackbird communication and behaviors over a larger area. Vehicle strikes are anticipated to be infrequent and road noise is not anticipated to substantially affect populations, if present. With implementation of Mitigation Measures WILD-1.22, WILD-1.23, WILD-1.31, VEG-2.2, VEG-3.2, VEG-3.3, AG-1.1, effects would be reduced to no adverse effect. Operation of Alternative 2 would result in no adverse effect on tricolored blackbird.

Mammals

Permanent and temporary impacts on modeled habitat for special-status mammals from Alternatives 1, 2, and 3 are shown in Table 10-2e.

Table 10-2e. Acreages of Permanent and Temporary Impacts on Modeled Habitat for Special-Status Mammals in the Study Area

	Alternatives 1 and 3 Permanent Impacts	Alternatives 1 and 3 Temporary Impacts	Alternative 2 Permanent Impacts	Alternative 2 Temporary Impacts
Pallid Bat and Long-eared Myotis	15,893	1,435	15,380	1,495
Townsend's Big-eared Bat and Silver-haired Bat	15,893	1,435	15,380	1,495
Western Red Bat and Hoary Bat	15,893	1,437	15,380	1,495
American Badger	14,184	972	13,756	918

Impact WILD-1q: Pallid Bat, Townsend's Big-eared Bat, Silver-haired Bat, Western Red Bat, Hoary Bat, Long-eared Myotis and Colonies of Non-special-status Roosting Bats

Many bat species are rare, declining, or have unknown population sizes. Historical and ongoing challenges affecting bats include habitat loss, alteration, and disturbance; and new challenges include wind energy, climate change, and emerging diseases such as white-nose syndrome (U.S. Geological Survey n.d.).

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Alternatives 1 and 3

Modeled habitat for pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), silver-haired bat (*Lasionycteris noctivagans*), western red bat (*Lasiurus blossevillii*), hoary bat (*Lasiurus cinereus*), long-eared myotis (*Myotis evotis*), and colonies of non-special-status roosting bats (referred to as special-status bats herein) is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of modeled habitat for special-status bats (Table 10-2e). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in destruction of roost or roost abandonment, which could cause injury or mortality of individuals, including non-volant (i.e., non-flying) pups.

Removal of existing human-made structures and trees during construction could result in the permanent loss of roosting habitat for bats, including maternity, seasonal migration, and/or winter roosting habitats. Tree and structure removal during construction could also result in injury or mortality of bats, including non-volant pups, or eviction from roosts during the daytime when they would be disoriented and vulnerable to predation. Bats displaced from roost sites would have to compete with other bats for new roost locations.

Nighttime construction lighting could temporarily disturb bat foraging activities. Noise and vibration from operation of vehicles and equipment, and presence of construction crews could result in temporary disturbance of bats roosting near work areas. Rock quarries and batch plants in the inundation area and dam and dike footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance of roosting bats from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. Noise and vibration from vehicles and equipment, and presence of maintenance crews could disturb individuals if maintenance activities are near active roosts. These types of disturbances would be temporary and short term and are not anticipated to adversely affect special-status bats.

Modeled habitat is present at the recreation areas and near the reservoir, which would be used by visitors on a regular basis and would result in an increased human presence in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to roosting bats and disturb existing habitat. In addition, increased noise and activity in developed and undeveloped areas

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may cause bats to avoid foraging or roosting in the recreation areas or in suitable habitat near the reservoir. While these activities may disturb bats, they would not result in injury or mortality of individuals.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. New lighting could deter bats from using areas that are illuminated by these new sources of light, but lighting may also attract insects and increase foraging opportunities around the lights. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on special-status bats.

The completed reservoir would provide a new drinking water source and foraging habitat (insects associated with the reservoir) for bats. This would be a beneficial effect of the Project.

Bats could be affected by methylmercury or harmful algal blooms (HABs). As described in Chapter 6, *Surface Water Quality*, methylmercury concentrations in organisms increase from simpler to more complex organisms in a process called biomagnification. Methylmercury uptake into algae occurs passively through diffusion and concentrations can be 100,000 times higher in algae than in surface water. Concentrations again increase by two to five times in the invertebrates that consume algae. Aquatic insects contaminated with methylmercury that emerge from aquatic ecosystems as adults can transfer methylmercury to terrestrial predators, such as bats, when consumed (Korstian et al. 2018). Mercury impacts various systems in the body, resulting in altered behavior, reduced productivity, and increased infections in wild mammals (Scheuhammer et al. 2007). If bats were to consume a substantial number of insects contaminated with methylmercury from Sites Reservoir, they could become ill or die.

Limited information is available on the potential impacts of HABs on bats. In one study, little brown bats (*Myotis lucifugus*) were found to be not highly affected by the ingestion of microcystin, a hepatotoxin (Jones 2016). Dead bats have also been found near HABs (Pybus et al. 1986). If HABs were to occur in Sites Reservoir (see Chapter 6), cyanobacteria and cyanotoxins could be ingested by bats either through drinking water or eating insects contaminated with the toxins, which could have little effect, or could cause sickness or death.

Stone Corral and Funks Creeks, which have potentially suitable roost trees associated with them, would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). A Flow Characterization and Geomorphic Study (Section 2D.4.3) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on roosting habitat for special-status bats associated with the creeks.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle,

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operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~1~~% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No Project~~Action~~ Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or June~~, or July~~) between the No Project~~Action~~ Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, ~~T~~these values show an increase of ~~less than~~ 1% to a decrease of less than ~~5~~6% when compared to No Project~~Action~~ Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under baseline~~existing~~ conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect trees that may provide roosting habitat for special-status bats along the river.

CEQA Significance Determination and Mitigation Measures

Construction of Alternatives 1 and 3 would result in significant impacts on special-status bats from removal of suitable habitat and potential loss or disturbance of active roosts and displacement of bats from roost sites. Impacts from construction would be significant because they could reduce the local populations of these special-status bats through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.32, WILD-1.33, WILD-1.34, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2 would reduce the level of impact from construction to less than significant because surveys for special-status bats would be conducted, protective measures would be implemented, roosting habitat that is permanently lost would be replaced and protected onsite or at an offsite preservation area, impacts on oak woodland would be minimized, and impacts on sensitive natural communities in which special-status bats may roost or forage would be compensated for through habitat restoration and preservation. Operation of Alternative 1 or 3 may result in disturbance of roosting or foraging bats but is not anticipated to result in injury or mortality or destruction of habitat. Consumption of insects contaminated with methylmercury could cause illness or mortality of bats. Implementation of Mitigation Measure WQ-1.1 would reduce the impact from operation to~~This impact would be~~ less than significant because steps would be taken to reduce, monitor, and manage mercury in the reservoir. Ingestion of HABs by bats either through drinking water or eating insects contaminated with the toxins could cause illness or death of bats. The water quality monitoring program and a HABs action plan described under *Harmful Algal Blooms* in the Reservoir Management Plan in Appendix 2D, *Best Management Practices, Management Plans, and Technical Studies*, would minimize the potential for HABs to be present and ingested by bats. The completed reservoir would also benefit special-status bats by providing a new drinking water source~~s~~ and additional insect prey.

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Mitigation Measure WILD-1.32: Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Building/Structure Demolition

Prior to building/structure demolition, the Authority will retain a qualified biologist (defined below) to conduct preconstruction surveys and implement protective measures for pallid bat, Townsend's big-eared bat, silver-haired bat, long-eared myotis, and other bats that roost in or on buildings and structures. At least 30 days prior to the demolition of the existing buildings and structures, qualified biologists will conduct an initial daytime survey to assess the buildings/structures for potential bat roosting habitat, and to look for bats and indications of bat use. The qualified biologists will have knowledge of the natural history of the species that may be present, have sufficient experience determining bat occupancy, and be familiar with bat survey techniques. The qualified biologist will examine both the inside and outside of the buildings/structures for potential roosting habitat, as well as routes of entry to the building and structures. Locations of any roosting bats, signs of bat use, and entry and exit points will be noted and mapped on a drawing of the buildings and structures. Roost sites will also be photographed as feasible. Depending on the results of the habitat assessment, the Authority will ensure the following steps are taken:

- If the building and structures can be ~~adequately~~ assessed (i.e., sufficient areas of the buildings and structures can be examined) and no habitat or limited potential habitat for roosting bats is present and no signs of bat use are present, the building may be demolished within 24 hours. If the building is not demolished within 24 hours, another survey of the interior and exterior of the buildings/structure by a qualified biologist will be conducted within 24 hours of the scheduled demolition.
- If moderate or high potential habitat for roosting bats is present and habitat can be thoroughly surveyed, the structure may be demolished within 24 hours. If there are no signs of bat use but the habitat cannot be thoroughly surveyed, measures will be implemented under the guidance of the qualified biologists to exclude bats from using the buildings and structures as a roost site to the extent feasible given the conditions of the structures, such as sealing off entry points. Prior to installing exclusion measures, the qualified biologists will re-survey the buildings and structures to ensure that no bats are present. In addition, a preconstruction survey of the interior and exterior of the buildings and structures will be conducted within 24 hours of demolition to confirm that no bats are present.

If moderate or high potential habitat is present and bats or bat sign are observed, exclusion measures are not installed as described above, or the buildings or structures provide suitable habitat but cannot be ~~adequately~~ fully assessed, the Authority will implement the following protective measures:

- Prior to initiating demolition activities, follow-up surveys will be conducted to determine if bats are present and the species of bats present. The qualified biologists will develop a survey plan (number, timing, and type of surveys) and conduct surveys using night vision goggles and/or active acoustic monitoring using full spectrum bat detectors will be conducted.

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- The qualified biologist will develop a plan to discourage or exclude bat use of buildings/structures prior to demolition based on the timing of demolition, extent of evidence of bat use or occupied habitat, and species present. The plan may include modifying the structure to be less appealing for roosting without causing harm to bats, installing exclusion measures, or using light or other means to deter bats from using the buildings and structures to roost. The plan will be submitted to CDFW for review and comment.
- A preconstruction survey of the interior and exterior of the building and structures will be conducted within 24 hours of demolition to confirm that no bats are present.

Depending on the species of bats present, size of the bat roost, and timing of the demolition, the Authority will implement the following additional protective measures as applicable:

- To avoid impacts on maternity colonies and/or hibernating bats, buildings/structures where bats are confirmed to be present will not be demolished during the maternity season (generally assumed to be between April 15 and August 15 for this Project) or the hibernation season (generally from November 1 to March 1). Removal of occupied roosting habitat will be conducted only following the maternity season and prior to hibernation, generally between August 16 and October 31, unless exclusionary devices are first installed. Other measures, such as using lights to deter bat roosting, may be used as developed by the qualified biologist and as approved by CDFW, if applicable.
- Installation of exclusion devices will be conducted only before maternity colonies establish (generally after March 1) or after they disperse (generally August 15 to October 31) to prevent bats from occupying a roost site during demolition to the extent feasible. Exclusionary devices will be installed by or under the supervision of a qualified biologist.

Mitigation Measure WILD-1.33: Conduct Surveys and Implement Protection Measures for Special-Status Bat Species Prior to Tree Trimming and Removal

Prior to tree trimming or removal, the Authority will retain a qualified biologist to conduct preconstruction ~~construction~~ surveys and implement protective measures for pallid bat, Townsend's big-eared bat, silver-haired bat, western red bat, hoary bat, long-eared myotis, and other tree-roosting bats. Prior to initiating tree trimming or removal, a qualified biologist will examine the trees to be removed or trimmed to identify suitable bat roosting habitat. Because of the limited timeframe for tree removal (September 15 to October 31), the tree habitat assessment should be conducted early enough to provide information to inform tree removal planning. The biologists will identify high-quality habitat features (e.g., large tree cavities, basal hollows, loose or peeling bark, larger snags), and the area around these features will be searched for bats and indications of bat use. If the tree can be ~~adequately~~ assessed and no habitat for roosting bats is present, no further actions are necessary and tree removal or trimming may commence. Because signs of bat use are not easily found, and trees cannot be completely surveyed for bat

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roosts, the Authority will implement the following protective measures listed below for trees containing potential roosting habitat.

- Trimming or removal of trees with potentially suitable bat roosting habitat will be avoided during the maternity season (generally between April 1 and July 31) and the hibernation season (generally from November 1 to March 1).
- Removal of trees providing bat roosting habitat will be conducted only before maternity colonies establish (generally after March 1) or after they disperse (generally August 1 to October 31).
- If a maternity roost is found, the roost will be protected until July 31or until the qualified biologist has determined the maternity roost is no longer active. Appropriate no-work buffers around the roost will be established under direction of the qualified biologist. Buffer distances may vary depending on the species and activities being conducted.
- Trimming and removal of trees (between July 31 and October 31) with suitable roosting habitat will be monitored by a qualified biologist. Tree trimming and removal will be conducted using a two-phase removal process conducted over two consecutive days. In the afternoon on the first day, limbs and branches will be removed using chainsaws only. Only branches or limbs without cavities, crevices, or deep bark fissures will be removed; branches and limbs with these features will be avoided. On the second day, the entire tree will be removed. The qualified biologist will search through downed vegetation for injured or dead bats. Observation of injured or dead special-status bats will be reported to CDFW.

Mitigation Measure WILD-1.34: Compensate for Permanent Impacts on Occupied Roosting Habitat

The Authority will compensate for the permanent loss of occupied roosting habitat by constructing and/or installing suitable replacement habitat onsite or at an offsite preservation area. The roosting habitat type and design will be developed in coordination with CDFW. A monitoring plan will be prepared to ensure the replacement habitat is maintained and functions as intended. Annual reports will be submitted to CDFW to document compliance with monitoring requirements.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-3.2: Compensate for Temporary and Permanent Impacts on State- or Federally Protected Wetlands

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-4.1: Avoid and Minimize Potential Adverse Effects on Oak Woodlands During Construction

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This measure is described in Chapter 9, Section 9.54.

Mitigation Measure VEG-4.2: Compensate for Adverse Effects on Oak Woodlands

This measure is described in Chapter 9, Section 9.54.

Mitigation Measure WQ-1.1: Methylmercury Management

This measure is described in Chapter 6, Section 6.4.

NEPA Conclusion

Construction and operation effects on special-status bats would be the same as described above for CEQA. Construction of Alternative 1 or 3 would result in a substantial adverse effect on special-status bats as compared to the No Project Alternative due to the removal of suitable habitat and potential loss or disturbance of active roosts and displacement of bats from roost sites. Operation of Alternative 1 or 3 may result in disturbance of roosting or foraging bats as compared to the No Project Alternative but is not anticipated to result in injury or mortality of individuals or destruction of habitat. Furthermore, implementation of Alternative 1 or 3 would have the beneficial effects of providing a new drinking water source and foraging habitat for bats. With implementation of Mitigation Measures WILD-1.32, WILD-1.33, WILD-1.34, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operation of Alternative 1 or 3 would result in no adverse effect on special-status bats.

Alternative 2

Modeled habitat for special-status bats is present at the GCID Main Canal diversion, GCID Main Canal improvements, TRR East, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, Dunnigan Pipeline, TC Canal intake, and the Sacramento River discharge. Potential habitat is also present along the Sacramento River in the operations study area.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for special-status bats (Table 10-2e) and potential destruction of roosts or roost abandonment, which could cause injury or mortality of individuals or non-volant pups. Impacts would be similar to those described for Alternatives 1 and 3 except that construction of South Road, TRR West, and Sacramento River discharge would result in additional loss of modeled habitat and the smaller inundation area would result in reduced loss of modeled habitat. Overall, permanent impacts on bat roosting/foraging habitat and temporary impacts on foraging habitat would be greater under Alternative 2. Overall, permanent impacts on bat foraging habitat would be less under Alternative 2 because of the smaller inundation area and impacts associated with dams and dikes, and temporary impacts on roosting/foraging habitat would be less under Alternative 2 because fewer impacts on roosting/foraging habitat from the regulating reservoirs and conveyance complex (Appendix 10C, Tables 10C-21, 10C-22, and 10C-23). Additional removal of roosting habitat would also result in an increased potential for injury or mortality of individuals.

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Operation

Potential effects on special-status bats from operation would be the same under Alternative 2 as described for Alternative 1 or 3.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that permanent impacts on bat roosting/foraging habitat and temporary impacts on foraging habitat would be greater under Alternative 2 and permanent impacts on bat foraging habitat and temporary impacts on roosting/foraging habitat would be less under Alternative 2. A net increase in the amount of suitable roosting habitat removed would also increase the potential for destruction of roosts or roost abandonment, which could cause injury or mortality of individuals, including non-volant pups. These impacts would be significant because Alternative 2 could reduce the local special-status bat populations through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.32, WILD-1.33, WILD-1.34, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2 would reduce the level of impact from construction to less than significant. Operational impacts for Alternative 2 would be less than significant for the same reasons as Alternatives 1 and 3.

NEPA Conclusion

Construction and operation effects on special-status bats would be the same as described above for CEQA. Construction of Alternative 2 would result in a substantial adverse effect on special-status bats as compared to the No Project Alternative. Construction of Alternative 2 would result in effects similar to those for Alternatives 1 and 3 except that permanent effects on bat roosting/foraging habitat and temporary effects on foraging habitat would be greater under Alternative 2 and permanent effects on bat foraging habitat and temporary effects on roosting/foraging habitat would be less under Alternative 2. A net increase in the amount of suitable roosting habitat removed would also increase the potential for destruction of roosts or roost abandonment, which could cause injury or mortality of individuals, including non-volant pups. With implementation of Mitigation Measures WILD-1.32, WILD-1.33, WILD-1.34, VEG-2.2, VEG-3.2, VEG-4.1, and VEG-4.2, effects would be reduced to no adverse effect. Operational impacts for Alternative 2 would be the same reasons as Alternatives 1 and 3 as compared to the No Project Alternative. Operation of Alternative 2 would result in no adverse effect on special-status bats.

Impact WILD-1r: American Badger

American badger was once common in California, but the population was reduced by as much as 90% in the early 1900s from trapping. Although the current population numbers are not known, this species is now considered uncommon and is threatened by habitat loss and fragmentation, vehicle strikes, trapping, predation, and depredation, including ingestion of rodenticide (Quinn 2008:108, 109).

Alternatives 1 and 3

Modeled habitat for American badger (*Taxidea taxus*) is present at the GCID Main Canal improvements, TRR East, TRR East/Funks pipelines, Funks Reservoir, inundation area, dams,

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I/O Works, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternatives 1 and 3 would result in the permanent and temporary losses of modeled habitat for American badger (Table 10-2e). Habitat loss would result from vegetation removal, conversion to unsuitable land cover types, and reservoir inundation. Clearing and grubbing, excavation, and other construction activities could result in the destruction of dens and mortality or injury of individuals from being crushed or buried by equipment. American badger could also be struck by vehicles and equipment traveling along access roads during construction.

Construction activities, including ongoing human presence in the inundation area, and roadway use, could result in disruption of breeding or foraging activities or other movements in individuals' home ranges. Noise and vibration created during operation of vehicles, equipment, and construction crews could result also in temporary disruption of foraging or breeding behaviors or alteration of movement patterns. Rock quarries and batch plants in the inundation area and dam and dikes footprints, drill and blast activities for tunneling at the I/O Works site, and pile drilling for the bridge would result in additional temporary disturbance from noise and vibration in those areas.

Operation

Impacts from maintenance activities required for operation under Alternative 1 or 3 are expected to be minimal because maintenance activities would be conducted mostly in previously disturbed areas during daytime hours and using existing roadways. American badgers are not anticipated to den near facilities that would be maintained, as they infrequently occupy developed areas (Williams 1986:66; Lay 2008:4), and noise and other disturbances from maintenance are not anticipated to affect denning American badgers. Use of rodenticides at the facilities could cause illness or mortality of American badger because they could feed on rodents that have ingested rodenticide.

New roadways could impede movement and increase the potential for American badger to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas. Fencing along roadways could cause individuals to become trapped on roadways, resulting in additional risk of vehicle strikes. The presence of Sites Reservoir would also impede movement of American badger.

The recreation areas and reservoir would be used by visitors on a regular basis, which would result in an increased human presence and noise in these areas. Although most of the activity would be in the developed areas, there is potential for visitors to access undeveloped areas, which could increase proximity of visitors to potential dens and disturb existing habitat. In addition, increased noise and activity in developed and undeveloped areas could cause American badger to avoid foraging or denning in the recreation areas or in suitable habitat near the reservoir.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and CBD outlet. Lighting could deter American

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badger from denning in areas and may affect foraging movements. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on American badger.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would result in significant impacts on American badger from removal of suitable habitat and potential loss or disturbance of active dens. Operation of Alternative 1 or 3 could result in significant impacts if American badger denning sites at or near recreation areas are disturbed or if the use of rodenticides causes illness, injury, or mortality of individuals from ingestion of rodenticides. These impacts would be significant because Alternative 1 or 3 could reduce the local American badger population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.15, WILD-1.16, WILD-1.26, WILD-1.35, and VEG-2.2 would reduce the level of impact from construction and operation to less than significant because surveys would be conducted to determine if suitable or occupied dens are present in or near work areas, no-disturbance buffers would be established around potentially active and active den sites, impacts on sensitive natural communities in which American badger may den or forage would be compensated for through offsite habitat restoration and preservation, and if found to be necessary through a wildlife corridor study, suitable crossings would be installed at appropriate locations to facilitate safe crossings.

Mitigation Measure WILD-1.15: Design and Construct Wildlife Crossings for New Roadways at Suitable Locations

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.16: Monitor and Maintain Wildlife Crossings

This mitigation measure is described above for western spadefoot.

Mitigation Measure WILD-1.26: Protect Special-Status Wildlife from Rodenticide Use

This measure is described above for northern harrier and burrowing owl.

Mitigation Measure WILD-1.35: Implement Protective Measures to Avoid and Minimize Potential Impacts on American Badger

Where suitable habitat is present for American badger in and within 200 feet of work areas where ground disturbance will occur, the Authority will implement the following protective measures.

- The Authority will retain qualified biologists (experienced with the identification of suitable badger dens) to conduct a preconstruction survey for active badger dens prior to temporary or permanent ground disturbance. The preconstruction survey will be conducted no less than 14 days and no more than 30 days before the beginning of ground disturbance. The biologists will conduct den searches by systematically

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walking transects through the area to be disturbed and a 200-foot buffer area. Transect distance should be based on the height of vegetation such that 100% visual coverage of the disturbance area is achieved. If a suitable or occupied den is found during the survey, the biologist will record the den dimensions, the shape of the den entrance, presence of tracks, scat, or prey remains, den occupancy (i.e., suitable, potentially occupied, or occupied), recent excavations at the den site, and the den location.

- To the maximum extent feasible, disturbance or destruction of suitable dens for American badger in temporary impact areas will be avoided.
- Any occupied or potentially occupied American badger den will be avoided by establishing an exclusion zone around the den. For potentially occupied dens, a 50-foot exclusion zone will be applied around the den; for occupied dens, a 100-foot exclusion zone will be applied around the den. The width of exclusion zones around maternity dens may exceed 100 feet, will be determined through coordination with CDFW, and will remain in place throughout the pup-rearing season (February 15 through July 1). Any adjustments to buffers will require prior written approval by CDFW. If the den cannot be avoided, the Authority will contact CDFW for direction on additional steps to be taken.
- Unoccupied suitable dens that would be destroyed by construction may be removed by hand excavation by a biologist or under the supervision of a biologist; a mini excavator may be used to facilitate excavation of dens.

Mitigation Measure VEG-2.2: Avoid and Compensate for Adverse Effects on Sensitive Natural Communities

This measure is described in Chapter 9, Section 9.5.4.

NEPA Conclusion

Construction and operation effects on American badger would be the same as described above for CEQA. Construction and operation of Alternatives 1 and 3 would result in a substantial adverse effect on American badger as compared to the No Project Alternative due to potential reductions of the local American badger population through direct mortality and habitat loss. With implementation of Mitigation Measures WILD-1.15, WILD-1.16, WILD-1.26, WILD-1.35, and VEG-2.2, construction and operation effects on American badger would be reduced to no adverse effect.

Alternative 2

Modeled habitat for American badger is present at the GCID Main Canal improvements, TRR, TRR/Funks pipelines, TRR West, Funks Reservoir, inundation area, I/O Works, dams, new and widened roadways, recreation areas, TC Canal intake, and Dunnigan Pipeline.

Construction

Construction of Alternative 2 would result in the permanent and temporary losses of modeled habitat for American badger (Table 10-2e) and potential destruction of dens or den abandonment,

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which could cause injury or mortality of individuals. Impacts under Alternative 2 would be similar to those described for Alternatives 1 and 3 except that construction of the new South Road and TRR West under Alternative 2 would result in additional loss of potential habitat and the smaller inundation area would result in reduced loss of modeled habitat. Overall, permanent and temporary impacts on modeled habitat for badger would be less under Alternative 2 than Alternatives 1 and 3 because of the smaller inundation area and reduced impacts from construction of dams and dikes (Appendix 10C, Table 10C-24).

Operation

Potential effects on American badger from operation would be similar under Alternative 2 as described for Alternative 1 or 3. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Because additional roadway would be constructed under Alternative 2, the greater amount of roadway would impede movement over a larger area and increase the potential for American badger to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would result in impacts similar to those for Alternatives 1 and 3 except that permanent and temporary impacts on modeled habitat for badger would be less under Alternative 2 than Alternatives 1 and 3 because of the smaller inundation area and reduced impacts from construction of dams and dikes. Operation impacts under Alternative 2 would be similar to those under Alternative 1 or 3 except that the increased amount of roadway would impede movement over a larger area and could result in additional mortality from vehicle strikes. These impacts would be significant because Alternative 2 could reduce the local American badger population through direct mortality and habitat loss. Implementation of Mitigation Measures WILD-1.15, WILD-1.16, WILD-1.26, WILD-1.35, and VEG-2.2 would reduce the level of impact from construction and operation to less than significant.

NEPA Conclusion

Construction and operation effects on American badger would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on American badger as compared to the No Project Alternative due to potential reductions of the local American badger population through direct mortality and habitat loss. Construction of Alternative 2 would result in effects similar to those for Alternatives 1 and 3 except that permanent and temporary effects on modeled habitat for badger would be less under Alternative 2 than Alternatives 1 and 3 because of the smaller inundation area and reduced effects from construction of dams and dikes. Operation effects under Alternative 2 would be similar to those under Alternative 1 or 3 except that the increased amount of roadway would impede movement over a larger area and could result in additional mortality from vehicle strikes. With implementation of Mitigation Measures WILD-1.15, WILD-1.16, WILD-1.25, WILD-1.35, and VEG-2.2, construction and operation effects would be reduced to no adverse effect.

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Impact WILD-2: Substantial interference with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impediment of the use of native wildlife nursery sites

~~Suitable habitat is required for wildlife species to provide food, water, cover, and other elements for survival. Depending on the species, a variety of habitats may be used throughout the life cycle, including reproduction and dispersal. Local movement, migration, and dispersal patterns vary for different species, and may be an important part of individual and species survival. In California, development, including agriculture, urbanization, and transportation, has resulted in substantial habitat reduction and fragmentation that presents barriers to local movements and migration for many wildlife species. Development has also resulted in additional risk to wildlife when moving through these areas, including risk of vehicle strikes on roadways.~~

~~CDFW and the California Department of Transportation have identified existing habitat blocks and linkages within the state, as well as missing linkages, and developed strategies for preserving and enhancing wildlife linkages through the California Essential Habitat Connectivity Project (Spencer et al. 2010). Mapped natural landscape blocks are large areas of mostly intact and well-conserved natural areas, and essential connectivity areas are connections between these blocks that have been identified as high priority for maintaining and enhancing ecological connectivity. In the Central Valley region, the essential connectivity areas often connect existing reserves across lands with more roads, agriculture, and urbanization, which can constrain wildlife movements. According to California Essential Habitat Connectivity Project mapping, there are multiple natural landscape blocks, essential connectivity areas, small natural areas, core reserves and corridors, potential riparian linkages, and missing linkages in the study area.~~

~~Much of the study area is comprised of natural and agricultural land covers, and there is very little existing urban development to block wildlife movement except for roadways and irrigation infrastructure.~~ As discussed under Impact WILD-1 and in Appendix 10A, there is potential habitat for multiple special-status species that could be used for~~, including suitable habitats for foraging,~~ reproduction, migration, and dispersal~~,~~ in the areas affected by Project components. In addition, there is potential for non-listed wildlife ~~to be in these areas~~, including deer, tule elk, bobcats, foxes, raccoons, skunks, squirrels, and various species of ~~raptors,~~ birds, reptiles, and amphibians that could breed in, or disperse or migrate through, the study area. ~~These species may use the area for foraging, cover, breeding, and migration.~~

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No Project

Under the No Project Alternative, new Project facilities would not be constructed or operated and there would be no temporary or permanent impacts on wildlife movement, wildlife corridors, or use of wildlife nursery sites. In addition, under the No Project Alternative the operations of existing facilities, such as TC Canal, RBPP, and GCID Main Canal, would continue. The owner/operators of these facilities would operate within the conditions and requirements of existing permits and agreements meant to protect special-status species and not interfere with the movement of a native resident or migratory wildlife. Finally, activities that currently occur within the study area such as grazing or other rural agricultural activities would continue and may result in effects wildlife movement, wildlife corridors, or use of wildlife nursery sites but would do so in the context of existing regulations, requirements, and activities.

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Significance Determination

The No Project Alternative would not substantially interfere with the movement of a native resident or migratory wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. There would be no impact/no effect.

Alternatives 1 and 3

Construction

As discussed under Impact WILD-1, construction of Alternative 1 or 3 would result in the permanent and temporary losses of modeled habitat for special-status wildlife species, including migration and dispersal habitats. Some of this habitat loss would be within existing natural landscape blocks and essential connectivity areas identified in the California Essential Habitat Connectivity Project mapping. Construction noise and activities and nighttime lighting could result in temporary disruption of wildlife movement by creating barriers or impediments to movement. Wildlife may adjust their typical foraging, migration and/or dispersal movements to avoid construction areas. These adjustments could result in increased energy expenditure or exposure to predation.

Temporary and permanent habitat loss would reduce availability or access to breeding/nursery sites in the study area, including breeding sites for aquatic invertebrates and amphibians, upland burrow and den sites for reptiles, raptors, and mammals, nesting sites for migratory birds, and roosting sites for bats. Construction activities, noise, vibration, and increased human presence could also cause wildlife to avoid existing breeding/nursery sites, impeding the use of these areas. Removal or disturbance of active nests that results in mortality of migratory birds either directly or through nest abandonment would violate the California Fish and Game Code Sections 3503 and 3503.5 and the Migratory Bird Treaty Act.

Operation

Sites Reservoir would be a new physical barrier for wildlife movement through the study area. Because the length of the reservoir would be nearly 13 miles from north to south and up to 4 miles from west to east, wildlife moving through the area would need to travel a greater distance around the reservoir to reach the other side. The reservoir would be constructed within several existing natural landscape blocks and essential connectivity areas identified in the California Essential Habitat Connectivity Project maps. Other facilities under Alternatives 1 and 3 would also fragment existing habitat blocks and linkages used by wildlife, which could impede or prevent use of these corridors.

Maintenance activities required for operation of Alternative 1 or 3 could result in wildlife being struck by vehicles and equipment traveling along access roads during operation. The presence of new facilities, fencing, noise, and presence of humans could cause wildlife to avoid the facilities and modify their movement paths, which could result in increased energy expenditure or exposure to predation.

Recreation areas would be used by visitors on a regular basis, which would result in an increased human presence in these areas. The increased proximity of visitors to natural areas could cause wildlife to modify their movement patterns to avoid these areas. In addition, increased human

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activity could result in reduced use or avoidance of these areas by wildlife for breeding.

Safety nighttime lighting would be installed at the TRR East, Funks Reservoir, Sites Reservoir, bridge, dams, recreation areas, TC Canal intake, and the CBD outlet. Lighting could cause wildlife to avoid using areas illuminated by these new sources of light or modify movement pathways to avoid the lighted areas, which could result in increased energy expenditure or exposure to predation. The Authority will implement BMP-17 that requires permanent safety lighting to be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize potential impacts from new lighting on wildlife movement.

New roadways would create physical barriers or impediments for some wildlife, including amphibians and reptiles, which may have a difficult time crossing the roadways. There are numerous waterways and wetlands in the study area, and new or larger roadways could disrupt existing connections between aquatic and upland habitats, and result in increased habitat fragmentation, which could affect seasonal movements of amphibians and reptiles. Roadways may deter some larger animals from moving through those areas, even if they are able to physically cross the roadways. In addition, some of the roadways may be fenced, which would create a greater impediment to large animals attempting to cross the road. New roadways would also increase the potential for wildlife to be struck by vehicles of workers traveling to operations facilities or visitors traveling to recreation areas, and the presence of fences could trap animals in the roadway and make them more prone to being struck by vehicles.

Maintenance activities and human activity at recreation areas could result in disturbance of active bird nests and bat roosting sites if the activities or disturbance are conducted during a sensitive period in the nesting process (e.g., when fledglings are just learning to fly) or are close to nests or roost sites. The Authority would implement the Recreation Management Plan (Section 2D.8), which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into habitat. New lighting could deter birds from nesting in areas that are illuminated by these new sources of light. Implementation of BMP-17 would minimize potential impacts from new lighting on nesting sites.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 1 or 3 would create barriers to or impede wildlife movement within existing natural landscape blocks and essential connectivity areas. Fragmentation and loss of natural landscape blocks and essential connectivity areas would result in a significant impact on wildlife movement and wildlife corridors. Construction of Alternative 1 or 3 would also result in removal or disturbance of nursery sites. Operation of Alternative 1 or 3 would result in additional vehicles on roadways and fencing that would create barriers to or impede wildlife movement. These impediments would also result in a significant impact on wildlife movement. Maintenance activities and human activity at facilities and recreation areas could cause disturbance of breeding sites or cause wildlife to avoid these areas as breeding sites. Implementation of mitigation measures discussed in Impact WILD-1 would reduce construction and operation impacts on nursery sites, wildlife movement, and the loss of habitat connectivity within existing habitat blocks, but they would not mitigate the substantial barrier created by Sites Reservoir.

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Impacts on wildlife movement and habitat connectivity after mitigation would remain significant and unavoidable.

NEPA Conclusion

Construction and operation effects on wildlife movement would be the same as described above for CEQA. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on wildlife movement and habitat connectivity as compared to the No Project Alternative due to the creation of barriers to, or impeding wildlife movement within, existing natural landscape blocks and essential connectivity areas. Implementation of mitigation measures discussed in Impact WILD-1 would reduce construction and operation impacts on nursery sites, wildlife movement, and habitat connectivity; however, they would not fully reduce effects associated with the movement barrier created by Sites Reservoir. Construction and operation of Alternative 1 or 3 would result in a substantial adverse effect on wildlife movement and habitat connectivity before and after mitigation.

Alternative 2

Construction

Construction of Alternative 2 would create barriers to or impede wildlife movement within existing habitat blocks and linkages and would remove or disturb nursery sites. Construction of Alternative 2 would result in similar impacts to Alternatives 1 and 3, except that Alternative 2 would include the construction of South Road, TRR West, and the Sacramento River discharge, which would increase the extent of construction noise and activities that could disrupt or impede wildlife movement. Wildlife may adjust their typical foraging, migration and/or dispersal movements to avoid construction areas. These adjustments could result in increased energy expenditure or exposure to predation.

Operation

Operation of Alternative 2 would result in impacts similar to those for Alternative 1 or 3, except that the reservoir would be a smaller barrier to movement (yet still a barrier) and South Road would be a potential impediment to wildlife movement over a larger area and additional wildlife trying to cross a longer segment of road could be struck by vehicles.

CEQA Significance Determination and Mitigation Measures

Construction of Alternative 2 would create barriers to or impede wildlife movement within existing natural landscape blocks and essential connectivity areas. Under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Fragmentation and loss of natural landscape blocks and essential connectivity areas would result in a significant impact on wildlife movement and wildlife corridors. Construction of Alternative 2 would also result in removal or disturbance of nursery sites. Operation of Alternative 2 would result in additional vehicles on roadways and fencing that would create barriers to or impede wildlife movement. These impediments would also result in a significant impact on wildlife movement. Maintenance activities and human activity at facilities and recreation areas could cause disturbance of breeding sites or cause wildlife to avoid these areas as breeding sites. Implementation of mitigation measures discussed in Impact WILD-1

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would reduce construction and operation impacts on nursery sites, wildlife movement, and the loss of natural landscape blocks and essential connectivity areas, but they would not mitigate the substantial barrier created by Sites Reservoir. Impacts on wildlife movement and habitat connectivity after mitigation would remain significant and unavoidable.

NEPA Conclusion

Construction and operation effects on wildlife movement would be the same as described above for CEQA. Construction and operation of Alternative 2 would result in a substantial adverse effect on wildlife movement and habitat connectivity as compared to the No Project Alternative due to the creation of barriers to, or impeding wildlife movement within, existing natural landscape blocks and essential connectivity areas. Effects under Alternative 2 would be similar to those described for Alternatives 1 and 3. However, under Alternative 2, the length of new roadway would be substantially longer (more than 10 miles) than under Alternatives 1 and 3. Implementation of mitigation measures discussed in Impact WILD-1 would reduce construction and operation effects on nursery sites, wildlife movement, and habitat connectivity, but they would not fully reduce effects associated with the movement barrier created by Sites Reservoir. Construction and operation of Alternative 2 would result in a substantial adverse effect on wildlife movement and habitat connectivity before and after mitigation.

Impact WILD-3: Conflict with any local policies or ordinances protecting wildlife resources

Local policies and ordinances protecting wildlife resources that could pertain to the Project are described in Appendix 4A, Section 4A.6.3, *Local/Regional Policies and Regulations*.

No Project

Under the No Project Alternative, new Project facilities would not be constructed or operated and there would be no temporary or permanent impacts on wildlife resources that would potentially conflict with the goals and policies of the applicable county general plans for the protection of wildlife resources. In addition, under the No Project Alternative the operations of the existing facilities, such as TC Canal, RBPP, and GCID Main Canal, would continue. The owner/operators of these facilities would operate within the conditions and requirements of existing permits and agreements in accordance with local policies or ordinances. Finally, activities that currently occur within the study area such as grazing or other rural agricultural activities would continue and would do so in the context of existing regulations, including local policies or ordinances, and activities.

Significance Determination

The No Project Alternative would not conflict with any local policies or ordinances protecting wildlife resources. There would be no impact/no effect.

Alternatives 1, 2, and 3

Construction

As discussed under Impacts WILD-1 and WILD-2, construction of Alternative 1, 2, or 3 could result in impacts on wildlife resources, which are protected under the Tehama County, Glenn

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County, Colusa County, and/or Yolo County General Plans. In Tehama County, work at the RBPP would not result in any impacts on wildlife resources. In Glenn County, construction of the GCID Main Canal diversion and GCID Canal improvements would result in permanent and temporary impacts on special-status wildlife species and their habitats. In Colusa County, construction of the TRR East, TRR/Funks pipelines, TRR West (Alternative 2), Funks Reservoir, Sites Reservoir and related facilities, and roadways would result in permanent and temporary impacts on special-status wildlife species, their habitats, habitat linkages, and wildlife corridors. In Yolo County, construction of the Dunnigan Pipeline, TC Canal intake, CBD outlet, and the Sacramento River discharge (Alternative 2) would result in permanent and temporary impacts on special-status wildlife species and their habitats.

Operation

As discussed under Impacts WILD-1 and WILD-2, operation of Alternative 1, 2, or 3 could result in impacts on special-status wildlife species during facility maintenance. In addition, lighting would be installed at several locations that could affect foraging and breeding activities and wildlife movements. Human activity at recreation areas could result in disturbance of breeding or foraging activities and wildlife movement. The reservoir would create a physical barrier to terrestrial wildlife movement and new roadways could impede movement and result in additional vehicle strikes.

In Tehama County, operation of the RBPP would not result in any impacts on special-status wildlife species. In Glenn County, operation of the GCID Main Canal diversion and GCID Canal improvements could result in periodic impacts on special-status wildlife during maintenance activities, but these impacts would mostly be temporary and short term. In Colusa County, operation of the TRR East, TRR East/Funks pipelines, TRR West (Alternative 2), Funks Reservoir, Sites Reservoir and related facilities, recreation areas, and roadways would result in impacts on special-status wildlife species, their habitats, habitat linkages, and wildlife corridors. In Yolo County, operation of the Dunnigan Pipeline, TC Canal intake, CBD outlet, and the Sacramento River discharge (Alternative 2) could cause periodic impacts related to maintenance activities but impacts from maintenance activities would mostly be temporary and short term. The Authority would implement the LMP, which will include measures and practices to avoid or minimize operations and maintenance impacts on special-status wildlife. The Authority would implement the Recreation Management Plan (Section 2D.8), which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into habitat. The Authority would implement BMP-17 for permanent lighting that specifies that safety lighting will be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize potential impacts from new lighting on wildlife breeding and foraging activities.

Stone Corral and Funks Creeks, which may provide habitat for special-status wildlife, would have increased flows that would range from 0 to 100 cfs, with larger pulse flows to emulate natural flood conditions, and lower flows in the drier months (e.g., summer). A Flow Characterization and Geomorphic Study (Section~~Appendix~~ 2D.4.3) would be conducted to determine appropriate discharges in these streams, including the appropriate timing of the releases. These flow increases would support the existing geomorphic functions and characteristics of each channel. While increased flows from bypass releases may result in minor

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increases in erosion and changes in sediment deposition, the changes are expected to be minimal and there would be no impacts on special-status wildlife or habitats associated with the creeks.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle, operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~1~~% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No ProjectAction Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February~~,~~ or June~~, or July~~) between the No ProjectAction Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, T~~t~~hese values show an increase of less than 0~~1~~% to a decrease of less than 5% when compared to No ProjectAction Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under ~~baseline~~existing conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect habitat along the river.

CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 1, 2, or 3 would conflict with policies and local ordinances protecting wildlife resources and would result in a significant impact. Implementation of mitigation measures discussed under Impacts WILD-1 would require habitat assessments and focused surveys for special-status wildlife, avoidance and minimization measures to reduce impacts on special-status wildlife and their habitats during construction and operation, replacement of permanently lost habitat, and reduction of new impediments to wildlife movement through design, construction, monitoring, and the maintenance of wildlife crossings at strategic locations. With the implementation of these measures, Alternatives 1, 2, and 3 would not conflict with the goals and policies in the Tehama County, Glenn County, Colusa County, and Yolo County General Plans, and impacts would be reduced to a less-than-significant level.

NEPA Conclusion

Construction and operation effects related to conflicts with policies and local ordinances protecting wildlife resources would be the same as described above for CEQA. Construction and operation of Alternatives 1, 2, and 3 would result in a substantial adverse effect on local policies and ordinances protecting wildlife resources as compared to the No Project Alternative. Through implementation of mitigation measures discussed under Impacts WILD-1, effects would be reduced to no adverse effect.

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Impact WILD-4: Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

The adopted plans that pertain to the study area are Yolo County Habitat Conservation Plan/Natural Community Conservation Plan (Yolo County HCP/NCCP) (Yolo Habitat Conservancy 2018) and the Yolo Bypass Wildlife Area Land Management Plan (Yolo Bypass Wildlife Area LMP) (California Department of Fish and Game 2008). These plans are described in Appendix 4A, Section 4A.6.3, *Local/Regional Policies and Regulations*. The Project facilities in the planning areas for these plans are the Dunnigan Pipeline, TC Canal intake, CBD outlet (Alternatives 1 and 3), and the Sacramento River discharge (Alternative 2). All facilities are in Yolo County, and the Yolo Bypass is within the operations study area.

No Project

Under the No Project Alternative, no new Project facilities would be constructed or operated and there would be no temporary or permanent impacts on wildlife resources that would potentially conflict with the provisions of an adopted or approved local, state, or regional habitat conservation plan. Existing facilities, such as the TC Canal or GCID Main Canal, are not located within an adopted Habitat Conservation Plan or Natural Community Conservation Plan and therefore have no ability to conflict.

Significance Determination

The No Project Alternative would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. There would be no impact/no effect.

Alternatives 1, 2, and 3

Construction

As discussed under Impacts WILD-1, WILD-2, and WILD-3, construction of the Dunnigan Pipeline, CBD outlet, and the Sacramento River discharge (Alternative 2) would result in impacts on special-status species, including valley elderberry longhorn beetle, western pond turtle, giant gartersnake, Swainson's hawk, white-tailed kite, burrowing owl, bank swallow, and tricolored blackbird and their habitats. These special-status species are covered species in the Yolo County HCP/NCCP. There would be no construction in the Yolo Bypass area.

Operation

As discussed under Impacts WILD-1, WILD-2, and WILD-3, operation of Alternative 1, 2, or 3 could result in impacts on species covered in the Yolo County HCP/NCCP (valley elderberry longhorn beetle, western pond turtle, giant gartersnake, Swainson's hawk, white-tailed kite, burrowing owl, bank swallow, and tricolored blackbird and their habitats) during facility maintenance, including maintenance of the Dunnigan Pipeline, CBD outlet, and the Sacramento River discharge. Operational impacts associated with maintenance would mostly be temporary and short term. Implementation of the LMP would reduce potential operations and maintenance impacts on species covered in the Yolo County HCP/NCCP. Human activity at recreation areas

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could cause disturbance of elderberry longhorn beetle, western pond turtle, Swainson's hawk, white-tailed kite, burrowing owl, and tricolored blackbird or their habitats. The Authority would implement the Recreation Management Plan (Section 2D.8), which will require signs, fencing in strategic areas, or other deterrents to avoid or minimize human intrusion into habitat. In addition, lighting would be installed at the TC Canal intake and the CBD outlet, which could reduce the potential for some wildlife species to use existing habitat in these areas. The Authority would implement BMP-17 that requires that permanent safety lighting be shielded to minimize offsite light spill and glare and be screened and directed away from adjacent uses to the highest degree possible. This BMP would minimize the operational impacts of new lighting on species covered by the Yolo County HCP/NCCP.

Potential impacts on the Sacramento River, Yolo Bypass, and Delta as a result of diversions from and flow releases to the Sacramento River as a result of operation of Alternatives 1 and 3 are discussed in Chapters 5 and 7. As discussed above for valley elderberry longhorn beetle, operation of Sites Reservoir (flow releases) would not have substantial effects on the Sacramento River downstream of the release locations. Based on CALSIM II modeling, the percent change in maximum monthly average flow (in January, ~~or~~ February, or April) in the Sacramento River would be a less than 0.4~~1~~% increase to a less than 2.5% decrease under Alternative 1 or 3 when compared to the No Project~~Action~~ Alternative (Table 5-34). The differences (primarily reductions) in monthly average flow exceeded 10% of the time (in February or, June, ~~or July~~) between the No Project~~Action~~ Alternative and Alternatives 1 and 3 (based on the USRDOM modeled flood flows) at various Sacramento River locations are shown in Table 7-3. Except for the Red Bluff Diversion, ~~T~~these values show an increase of ~~less than~~ 1% to a decrease of less than 6~~5~~% when compared to No Project~~Action~~ Alternative, depending on the location (Table 7-4). These percent differences are minor when considered in the context of the larger system and consequently, operational impacts on the geomorphic regime (including natural river geomorphic processes such as sediment transport and bank erosion) and existing river geomorphic characteristics (e.g., sinuosity, channel gradient, substrate composition, channel width and depth, and riparian vegetation) of the greater Sacramento River system are expected to be minimal. The overall volume of water in the Sacramento River under Alternative 1 or 3 would generally be similar to the amount of water in the river under ~~existing~~baseline conditions. The minor changes that would result from diversions from and releases to the Sacramento River would not affect habitat along the river for species covered in the Yolo County HCP/NCCP.

Based on observations during North Delta Flow Actions (Davis pers. comm.), the comparable August–October habitat flows from Sites Reservoir through the Yolo Bypass may cause limited inundation of low-elevation parcels in the upper Yolo Bypass (north of the I-80 causeway). The intent of the releases from Sites Reservoir to the Yolo Bypass during this period is to temporally and spatially distribute food resources for fish species. If the water inundates floodplain areas (i.e., areas outside existing channels) the food would be deposited and would fail to move into the Delta. As such, Sites Reservoir would be operated to maintain flows within the existing Toe Drain, Tule Canal, and other channels, and adjustments in operations would be coordinated between the Authority and parcel owners using the existing Yolo Bypass monitoring network. As a result, impacts on habitat in the Yolo Bypass for species covered in the Yolo County HCP/NCCP are not anticipated.

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CEQA Significance Determination and Mitigation Measures

Construction and operation of Alternative 1, 2, or 3 would not conflict with provisions of the Yolo Bypass Wildlife Area LMP but would conflict with provisions of the Yolo County HCP/NCCP. The conflict of Alternatives 1, 2, and 3 with the provisions of the Yolo County HCP/NCCP would be a significant impact. Implementation of mitigation measures discussed under Impact WILD-1 would avoid, minimize, and compensate for impacts on special-status wildlife included in the Yolo County HCP/NCCP. With implementation of these measures, Alternatives 1, 2, and 3 would not conflict with the provisions of the Yolo County HCP/NCCP, and impacts would be reduced to a less-than-significant level.

NEPA Conclusion

Construction and operation effects related to conflicts the Yolo County HCP/NCCP and the Yolo Bypass Wildlife Area LMP would be the same as described above for CEQA. Construction and operation of Alternative 1, 2, or 3 would not conflict with provisions of the Yolo Bypass Wildlife Area LMP but would conflict with provisions of the Yolo County HCP/NCCP as compared to the No Project Alternative. Alternatives 1, 2, and 3 would result in a substantial adverse effect from conflicting with provisions of the Yolo County HCP/NCCP, but through implementation of mitigation measures under Impact WILD-1, effects would be reduced to no adverse effect.

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10.5.2. Personal Communications

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Appendix 2D Best Management Practices, Management Plans, and Technical Studies

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Appendix 2D Introduction

The Authority has incorporated numerous best management practices (BMPs) into the Project design. In addition, the Authority has identified various plans and technical studies that are being incorporated as components of the Project, including the Initial Sites Reservoir Fill Plan, Reservoir Management Plan, Land Management Plan, and Recreation Management Plan. This appendix describes the BMPs, management plans, and technical studies that are part of the Project. These BMPs, management plans, and technical studies are discussed further where relevant to particular impact analyses in Chapters 5 through 31.

2D.1 Best Management Practices

The Project BMPs include applicable design standards, criteria, and requirements; standard general practices for construction, operations, and maintenance; and resource-specific protocols for Project implementation. Table 2D-1 identifies the key features, responsible party(ies), and timing for implementation of each BMP.

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Table 2D-1. Best Management Practices

BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-1	Conformance with Applicable Design Standards and Building Codes	The Authority will ensure that the standards, guidelines, and codes (the most current applicable version at the time of implementation), which establish minimum design criteria and construction requirements for levees, pipelines, excavations and shoring, pumping stations, dams, grading, foundations, bridges, access roads, structures, and other facilities, will be followed by the project engineers, where applicable, in the design of Project facilities and will be included as minimum standards in the construction specifications. The project engineers will follow standards, guidelines, and code requirements that are legally mandated. Proposed design standards include, but may not be limited to the following: • **Reservoir Roads and Bridges** ○ American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets" 2018, 7th edition ○ AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, 8th edition ○ California Department of Transportation (Caltrans) California Amendments to the AASHTO LRFD Bridge Design Specifications) ○ Caltrans' Seismic Design Criteria (SDC) 2.0. ARS curve ○ Caltrans Seismic Design Criteria, Version 2.0. April 2019 ○ Caltrans Highway Design Manual (HDM), 6th Edition ○ Colusa and Glenn County Standards (described in Appendix 2C). • **Conveyance Pipelines and Manifold** ○ American Railway Engineering and Maintenance-of-Way Association Manual for Railway Engineering, Volume 2, Chapter 9, Seismic Design for Railway Structures, 2008. ○ American Concrete Institute (ACI) 350 for hydraulic structures ○ ACI 318 for miscellaneous, non-hydraulic, concrete structures, including building slabs and foundations ○ American Water Works Association (AWWA) Concrete Pressure Pipe (M9) 3rd Edition. ○ AWWA Steel Pipe Guide for Design and Installation (M11) 5th Edition. ○ AWWA C200-05. ○ AWWA M11 Chapters 6, 8, 9, 12, 13. ○ AWWA C205, C207, C208, C214, 216, C217, C219, C222. ○ AWWA M-51 ○ American Society for Testing and Materials (ASTM) A1018/A1018M for specification of structural steel. ○ ASTM A516/A516M for specification of structural steel. ○ American Society of Civil Engineers (ASCE) 27-00, Standard Practice for Design of Precast Concrete Pipe for Jacking in Trenchless Construction. ○ ASCE Steel Penstock Design (Manual of Practice (MOP) 79). ○ American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (BPVC) Section VIII, Division 1, Part 2. ○ ASME 16.5 and ASME 16.47. ○ ASME BPVC, Section IX.	• Authority • Design engineers • Construction contractors	• Prior to and during construction	• The Authority will review all Project facility designs to ensure the standards, guidelines, and codes listed above are included where appropriate. The Authority will ensure that the identified design standards are treated as the minimum standard for design and construction, unless more stringent requirements are enacted or promulgated. • Project engineers will provide all draft and final Project facility designs to the Authority for review. • A seismic monitoring array will be designed and implemented as part of the Project to monitor site seismic activity, including identifying any increase in seismicity rate that could be attributed to potential reservoir triggered seismicity (RTS)	• Department of Water Resources, Division of Safety of Dams • U.S. Army Corps of Engineers (USACE) • Central Valley Flood Protection Board (CVFPB)

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		○ American Welding Society D1.1 for field welds. ○ CI/ASCE 36-01, Standard Construction Guidelines for Microtunneling. ○ New & O'Reilly 1992 or an equivalent method for settlement predictions ○ Underground Technology Research Council (UTRC) 1997 Geotechnical Baseline Reports for Underground Construction – Suggested Guidelines and Practices. Reston: American Society of Civil Engineers. ○ UTRC 2006 Final Design Geotechnical Baseline Report • **Structures (non-hydraulic concrete, steel, and masonry structures)** ○ current governing codes and standards applicable to the construction of buildings, structures, and appurtenances in the State of California (California Building Code, YEAR (Title 24 California Code of Regulations; California Code of Regulations, Title 8) ○ The Masonry Society Building Code Requirements and Specifications for Masonry Structures (TMS 402) ○ latest edition of the American National Standards Institute (ANSI) ○ /American Institute of Steel Construction (AISC) Steel Construction Manual and the ANSI/AISC Specification for Structural Steel Buildings ○ RCSC Specification for Structural Joints Using High Strength Bolts • **Electrical Supply** ○ The point of interconnection, transmission, and substation design criteria, dependent on the point of interconnection option, will incorporate the following references: • California General Order 95, Rules for Overhead Electric Line Construction • Western Area Power Administration Service and Generation Interconnection Requirements • Pacific Gas and Electric Company (PG&E) Interconnection Requirements • PG&E Substation Design Criteria ○ The latest edition and addenda of the following publications, as applicable, will be incorporated in the design specifications codes and standards sections. • ANSI • Institution of Electrical and Electronics Engineers, Inc. (IEEE) • Association of Edison Illuminating Companies (AEIC) • Transmission Interconnections Handbook (TIH) • North America Electric Reliability Corporation Standards (NERC) • National Fire Protection Agency (NFPA) 70 National Electric Code • National Electrical Safety Code (ANSI C2) • **Transmission Lines** ○ In addition to the point of interconnection requirements, transmission lines will be designed in accordance with the latest edition and addenda of the following publications, as applicable which will be incorporated in the design specifications. • California Building Code 2016, Title 24 Vol. 2 • ASCE-113 Substation Structure Design Guide • ASCE/SEI 7-05 Minimum Design Loads for Buildings and Other Structures • ANSI/AISC 41-10 Seismic Provisions for Structural Steel Buildings				

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• **Reservoir, Dam, and Inlet/Outlet Works:** The dam embankments, foundations, abutments, and appurtenant facilities must be stable under design conditions of construction and reservoir operation including seismic. Applicable guidelines and requirements include: o ASTM C33 (2018) for aggregate for filters and drains and aggregate use in structural concrete o California Department of Water Resources, Division of Safety of Dams Emergency Drawdown Criteria (DSOD) o International Building Code (IBC) (2018). Chapter 16 Structural Design. o USACE 1997 Tunnels and Shafts in Rocks, EM-2-1110-2901. o USACE 2000 Roller Compacted Concrete, EM 1110-2-2006 o USACE 2005 Stability Analysis of Concrete Structures, EM 1110-2-2100 o USACE 2018 Hydrologic Engineering Center, HEC-HMS Hydrologic Modeling System, Version 4.3. o Reclamation 1987 Design of Small Dams. o Reclamation 1989 Flood Hydrology Manual, First Edition. o Reclamation 2011 Design Standards No. 13, Embankment Dam Design Standards, Chapter 4: Static Stability Analysis Phase 4 (Final). o Reclamation 2011 Design Standards, No. 13, Embankment Dam Design Standards, Chapter 5: Protective Filters Phase 4 (Final). o Reclamation 2016 USBR Design Standards No. 6, Hydraulic and Mechanical Equipment, Chapter 12, Trashracks and Trashrack Cleaning Devices. • **Slope Protection** o USACE 2002 Coastal Engineering Manual o Reclamation 1989 Flood Hydrology Manual				
BMP-2	Siting of Recreational Structures	• The downslope portion of recreation facilities within the recreation areas will be designed above the predicted wave run-up elevation. • The determination for location will be based on Project design studies. • If the predicted seiche wave run-up level will extend into a recreation area and inundate a facility, the Authority will relocate the recreation facility accordingly during final design.	• Authority	• Prior to Construction and during final design	• None	• County
BMP-3	Completion of Pre-Construction Geotechnical Evaluations and Data Reports	Pre-construction geotechnical evaluations and data reports will be prepared as follows to develop final construction contract documents: • Geotechnical Data Reports: o Perform geotechnical laboratory testing on select samples to evaluate engineering and other properties of collected soils. o Prepare geotechnical data reports to document observations and findings of subsurface investigations and tests • Geotechnical Interpretive reports to establish parameters for designing the Project. • Geotechnical Baseline Report for use by contractors to describe expected construction conditions and provide design and construction recommendations.	• Geotechnical engineer	• Prior to construction and during final design	• The Authority will review and approve all geotechnical reports and implement subsequent measures as required based upon the results of these reports	• DSOD • County • Caltrans • Railroad • CVFPB • USACE
BMP-4	Verification and/or Relocation of Utilities and Infrastructure	• Confirm utility/infrastructure locations through consultation with utility service providers, preconstruction field surveys, and services such as Underground Service Alert.	• Authority • Contractors	• Identify all utilities/ infrastructure prior to start of	• Contractor will consult with utility service providers and cross check preconstruction field surveys to	• None

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Determine exact location of underground utilities by safe and acceptable means, including use of hand and modern techniques as well as customary types of equipment. • Confirm the specific location of all high priority utilities (i.e., pipelines carrying petroleum products, oxygen, chlorine, toxic or flammable gases; natural gas in pipelines greater than 6 inches in diameter, or with normal operating measures, greater than 60 pounds per square inch gauge; and underground electric supply lines, conductors, or cables that have a potential to ground more than 300 volts that do not have effectively grounded sheaths) and such locations will be highlighted on all construction drawings • Identified size, color, and location of existing utilities will be included on all construction drawings and/or in health and safety officer materials • Stage utility line modifications and relocations in a manner that minimizes interruption of service • In places where utility lines will be relocated, existing corridors will be utilized to the greatest extent possible, in the following order of priority: (1) existing utility corridors; (2) highway and railroad corridors; and (3) new corridors. • New poles or towers will be erected and cable-pulled prior to being connected to existing systems. Natural gas pipeline relocation will be constructed by one of several methods including cut-and-cover, trenching, or placement on at-grade saddles. Active natural gas wells in the water conveyance facilities area will be abandoned to a depth below construction excavation. • Relocate utilities and infrastructure in a way that avoids or minimizes any effect on worker and public health and safety by protecting, supporting, or removing underground utilities as necessary to safeguard employees and notifying local fire departments if a gas utility is damaged causing a leak or suspected leak, or if damage to a utility results in a threat to public safety. • Coordinate and provide design plans and construction phasing with railroad; establish communication protocol with railroad and/or have railroad staff person onsite during construction of facilities adjacent to or affecting the railroad line.	• Construction Management Team; Contractor Monitor • Health and Safety Officer	construction activities associated with any and all facilities • During construction the construction contractors will implement measures to avoid utilities/ infrastructure that are not being relocated • Prior to construction relocate utilities/infrastructure if needed	confirm exact location of underground utilities/infrastructure • The Authority or construction contractor monitor will perform regular site inspections to verify contractor compliance and retain inspection records in the Project file maintained by the Authority • Contractor-designated health and safety officer will provide written confirmation to the Authority that the utility lines/infrastructure have been adequately located, and excavation will not start until this confirmation has been received by the Authority • The Authority and Contractor will coordinate with all appropriate utility providers and local agencies to determine which utility lines will be relocated and the location of the relocated utility lines • Construction contractors will monitor the construction site(s) daily to ensure no damage occurs to utilities and if a utility is damaged which causes a threat to worker and public health and safety, construction contractors will notify the Authority and the local fire departments immediately and document the damage for the Project file to be maintained by the Authority.	
BMP-5	Decommissioning of Natural Gas Wells	• Follow California Department of Conservation, Division of Oil, Gas and Geothermal Resources (CalGEM) Guidelines, Statutes and Regulations (California Code of Regulations, April 2019), which include: o Prior to plugging and abandoning any oil and gas well or any other well under CalGEM's jurisdiction, operators must submit a Notice of Intention (NOI) to CalGEM. CalGEM will provide plugging requirements to minimize the potential for subsurface contamination and hazardous surface conditions. o Comply with applicable plugging guidelines (i.e., Coiled Tubing Plugging Guidelines, Bentonite Plugging Guidelines) (source: https://www.conservation.ca.gov/calgem/for_operators)	• Contractor	• Site preparation as part of clearing and grubbing	• Permit and procedures per regulatory agency.	• CalGEM
BMP-6	Decommissioning of Water Wells	• Wells will be decommissioned in the manner required by the local regulating jurisdiction or Department of Conservation to assure that the ground water supply is protected and preserved for further use and to eliminate the potential for physical hazard.	• Contractor	• Site preparation as part of clearing and grubbing	• Authority to maintain files on the location condition and fill process for each well filled.	• Counties

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Decommissioning of water wells will consist of the complete filling of the well in accordance with applicable requirements set out by the County that contains the well. • Prior to decommissioning of a water well, evaluations will be conducted to assess its condition, details of construction, and whether there are obstructions that will interfere with the process of filling and sealing. • Wells situated in unconsolidated material in an unconfirmed groundwater zone shall have the upper 20 feet of the well sealed with suitable sealing material and the remainder shall be filled with suitable fill or sealing material. • Fill material or sealing material placement will follow appropriate procedures as required by the applicable County.				
BMP-7	Removal and/or Reuse of Materials from Abandoned Roads	• Roads within the inundation area will be abandoned such that existing asphalt does not remain in the reservoir • Asphalt surfacing will be removed. • Asphalt or other road materials will be reused, if appropriate, and would be pulverized, excavated, and used as aggregate base for other roads to reduce costs.	• Contractor	• Site preparation as part of clearing and grubbing	• None	• None
BMP-8	Performance of Environmental Site Assessments	• Environmental site assessments (i.e., Phase I) will be performed in accordance with ASTM-Standard 1527-13 or E2247-16 for future development on or near any potentially hazardous or contaminated sites or following standard testing on buildings to be demolished for hazardous substances (e.g., lead and asbestos). Such Phase I environmental site assessments will be conducted prior to the purchase, transfer, retirement, or sale in fee or easement for land necessary for the Project. • Subsequent actions, such as Phase II environmental site assessments in accordance with ASTM E1903-19, will be taken as necessary and appropriate based on findings of Phase I environmental site assessments. • Phase II environmental site assessments will involve sample collection and analysis to identify and characterize contamination as needed. • If Phase I and Phase II environmental site assessments reveal releases of hazardous substances that require remediation under applicable laws, a plan for design and implementation remediation (e.g., Remediation Plan), will be developed consistent with applicable laws and under oversight of (Department of Toxic Substances Control) DTSC and/or the Regional Board. This plan will include, but not be limited to, removal of underground storage tanks, drums, buried waste, or other items potentially associated with contamination, and will identify the proper storage, handling, transport, disposal, and remediation of designated and hazardous waste. • Perform pre-demolition surveys for structures to be demolished within the construction footprint, characterize hazardous materials (including asbestos-containing material and lead-based paint), and dispose of them in accordance with applicable regulations.	• Authority • Hazardous waste contractors, as needed	• Prior to and during construction	• The Authority will follow applicable ASTM procedures to ensure that concentrations of hazardous constituents, if present, have been identified and treated or removed as appropriate for their concentration and in compliance with applicable state and federal laws and regulations. • An Authority-appointed qualified monitor will monitor the preconstruction and pre-demolition investigations to ensure surveys and characterization and disposal of hazardous materials are conducted according to the established procedure. • The Authority will be responsible for the disposal and handling of hazardous materials in accordance with applicable laws. • The Authority will be responsible for coordination of monitoring data from the qualified monitor to determine areas which contain hazardous materials. If hazardous materials are encountered, the Authority will determine whether the area can be avoided, soil and/or groundwater	• State Water Resources Control Board (State Water Board) • DTSC • Air Quality Management Districts (AQMDs) • U.S. Environmental Protection Agency

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
					removed from the contaminated area can be remediated and contained in compliance with applicable state and federal laws and regulations, or if consultation with the regional DTSC office is required. • The qualified monitor will be responsible for reporting monitoring data from the preconstruction surveys to the Authority. • Site-specific asbestos abatement work will meet the requirements of both the federal Clean Air Act and California Division of Occupational Safety and Health (Cal-OSHA) (CCR Title 8, Subchapter 4, Article 4, Section 1529). • The applicable AQMD(s) will be notified 10 days prior to initiation of demolition activities of asbestos-containing materials.	
BMP-9	Siting and Design of Onsite Wastewater Disposal Systems	• Soil testing at locations of habitable structures will occur as part of final design. • Final design of these structures will use an alternative wastewater disposal system, such as a mound system or pressure dose system, if needed, to overcome potential limiting soil and groundwater conditions, such that wastewater is appropriately disposed without contaminating groundwater and surface water, as required by county standards.	• Authority	• Prior to construction and during final design	• None	• County
BMP-10	Salvage, Stockpiling, and Replacement of Topsoil and Preparation of a Topsoil Storage and Handling Plan	• Depending on the thickness of the topsoil at a given construction site, topsoil may be salvaged from construction work areas, stockpiled, and then applied over the surface of spoil and borrow areas to the maximum extent practicable. Exceptions to this measure are the Sites Reservoir inundation area; the inundation area of the TRR; areas smaller than 0.1 acre; areas of nonnative soil material where the top layer of soil does not consist of native topsoil; where the soil will be detrimental to plant growth; and any other areas identified by the soil scientist in evaluating topsoil characteristics. • The detailed design of the Project-related construction activities will incorporate an evaluation, based on review of soil survey maps supplemented by field investigations and prepared by a qualified soil scientist, that documents existing soil properties, specifies the thickness of the topsoil that should be salvaged, and that identifies areas in which no topsoil should be salvaged. The soil scientist will use the exceptions listed above as the basis for identifying areas in which no topsoil should be salvaged. • A qualified soil scientist will also prepare topsoil stockpiling and handling plans for the individual Project components, establishing such guidelines as the maximum allowable thickness of soil stockpiles, temporary stockpile	• Authority • Contractors • Soil monitor	• Development of topsoil storage and handling plans will be completed before construction begins. • Salvaging, stockpiling, and reapplying of topsoil will occur throughout construction.	• The Authority will ensure that each plan is prepared by a qualified individual, that it adequately addresses all relevant activities and facilities, and that its specifications are properly executed during construction by the contractors. • The qualified soil scientist will monitor excavation sites daily to determine the correct amount of topsoil to be removed. Additionally, they will monitor stockpile health and oversee reapplication and revegetation. • Construction contractors will perform the salvaging, stockpiling, and replacing of topsoil during construction. • The Authority will perform regular site inspections to verify contractor	• None

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		stabilization/revegetation measures, and procedures for topsoil handling during salvaging and reapplication. • The plans will also specify that, where practicable, the topsoil be salvaged, transported, and applied to its destination area in one operation (i.e., without stockpiling) to minimize degradation of soil structure and the increase in bulk density as a result of excessive handling. • The stockpiling and handling plans will also specify maximum allowable stockpile sideslope gradients, seed mixes to control wind and water erosion, cover crop seed mixes to maintain soil organic matter and nutrient levels, and all other measures to avoid soil degradation and soil erosional losses caused by excavating, stockpiling, and transporting topsoil. • For staging areas and similar areas in which topsoil will not be excavated or overcovered, the stockpiling and handling plans will describe how the soil will be decompacted or otherwise remediated after demobilization.			compliance with topsoil storage and handling plans. • The Authority will incorporate reporting requirements into the topsoil storage and handling plans to be adhered to by the construction contractor. The qualified soil scientist will report results of excavation site and stockpile health monitoring to the Authority and report construction contractor adherence to storage and handling plans in a report delivered to Authority technical staff for analysis.	
BMP-11	Management of Dredged Material	• Prior to dredging, a chemical evaluation of Funks Reservoir water and sediment will be conducted to determine contaminant concentrations. This will help evaluate the suitability of dredged material for beneficial use and determine compliance with water quality standards. • Based on the chemical characterization of Funks Reservoir sediment and water, onsite water treatment for contaminant removal may be required in the dredged material containment/dewatering areas. The type of treatment required will be specific to the characteristics of the dredged material and dredged material effluent. For example, treatment could include removing the material from the site and hauling it to a certified landfill for appropriate disposal. • Following characterization of Funks Reservoir sediment and water quality, site investigations will be conducted to further inform the design and construction of the dredged material containment/dewatering areas (e.g., dike design) for containment of dredged material during dewatering and in storage areas, and evaluation of potential foundation settlement, groundwater levels, flow and direction, runoff patterns and adjacent drainage, will be considered in the investigations. • The following general best management practices (or equally effective measures) for dredged material containment/dewatering areas will be implemented to avoid adverse effects on water quality through the discharge of dredged material or dredged material effluent to surface waters or surface water drainage courses: o In siting the containment/dewatering facilities, sufficient surface area and dike/berm height with freeboard will be made available for retention of fine-grained material to maintain effluent water quality. The facilities will be designed with adequate volume to contain the total volume of sediment to be dredged, o Wet dredged material within the containment/dewatering areas will not exceed the elevation of the berms, dikes or similar containment feature of the dewatering area. o If dewatering basins are used, a containment berm will be placed around the basin to prevent runoff of dredged material. A silt fence will be installed around the perimeter of the berm to further contain any runoff.	• Authority • Contractors	• Before, during and following dredging of Funks Reservoir	• The Authority will incorporate monitoring/management requirements for operating the upland confined disposal areas. • Effluent monitoring may be specified as a requirement under the Section 401 water quality certification or the State's Porter Cologne Water Quality Act.	• USACE • State Water Resources Control Board • Regional Water Quality Control Board

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		○ Dredged material containment/dewatering areas will be returned to their pre-existing condition. ○ If dredged material effluent from dewatering or sedimentation basins is discharged back into Funks Reservoir, the effluent discharge will be monitored and analyzed for water quality constituents including, but not limited to, suspended solids, turbidity, dissolved oxygen, and temperature pursuant to 401 Water Quality Certification or Waste Discharge Requirements. • Dredged material will be screened prior to dewatering to remove debris and trash, which will be disposed of at an appropriate solid waste disposal facility. • Dredged material not suitable for reuse will be disposed of at a permitted landfill site.				
BMP-12	Development and Implementation of Stormwater Pollution Prevention Plan(s) (SWPPP) and Obtainment of Coverage under Stormwater Construction General Permit (Stormwater and Non-stormwater) (Water Quality Order No. 2009-0009-DWQ and NPDES No. CAS000002, as amended by Order No. 2010-0014-DWQ, Order No. 2012-0006-DWQ, and any amendments thereto)	• For work areas that will be inundated or otherwise temporarily or permanently isolated from receiving waters, prepare and implement SWPPP(s) per State Water Board Stormwater Construction General Permit, which will include erosion control measures, sediment control measures, post-construction erosion control measures, waste management measures, and non-stormwater management measures as described below. • **Erosion Control Measures** (e.g., silt fencing, weed-free straw bale barriers, fiber rolls, storm drain inlet protection, hydraulic mulch, and stabilized construction entrances) ○ No disturbed surfaces will be left without erosion control measures in place during the winter and spring months. ○ Keep emergency erosion-control supplies onsite at all times during construction and have the contractor(s) use these emergency stockpiles as needed. ○ Divert runoff away from steep, denuded slopes, or other critical areas with barriers, berms, ditches, or other facilities. ○ To the extent feasible, retain native trees and vegetation to help stabilize hillsides, retain moisture, and reduce erosion. ○ Plastic monofilament netting or similar material will not be used for erosion control. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds. Materials used for erosion and silt control such as fencing, coir logs, coir rolls, etc., will be monitored to ensure they do not pass downstream, and the materials composing the barriers should not pose an entanglement risk to fish or wildlife. These limitations and monitoring requirements will be communicated to the contractor through specifications or special provisions included in the construction bid solicitation package. • **Sediment Control Measures** ○ Sediment will be retained on site by a system of sediment basins, traps, or other appropriate measures. ○ Reduce runoff velocity on exposed slopes. Collect and direct surface run-on and runoff at non-erosive velocities to controlled drainage courses.	• Authority • Contractors	• Prior to any ground-disturbing activity • Before and during construction • Minimum of 5 years following completion of construction (for postconstruction stormwater management measures)	• The Authority and Contractors will prepare SWPPP(s) • During construction, Contractors will be responsible for implementation of the SWPPP(s). • Contractors will report to the Authority any deficiencies in compliance with the SWPPP(s) as well as any warnings or violations of the Construction General Permit received from the SWRCB. The Authority will evaluate these events as needed on a site-by-site basis to require the contractor to amend SWPPP(s) as needed to reduce the severity of and/or avoid the potentially significant impacts on the environment.	• State Water Board • Regional Water Quality Control Board (RWQCB)

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		○ When ground-disturbing activities are required adjacent to surface water, wetlands, or aquatic habitat, the use of sediment and turbidity barriers, soil stabilization and revegetation of disturbed surfaces. ○ Reduce off-site sediment tracking by installing gravel on primary construction ingress/egress points, rumble plates, and/or truck tire washing. ○ Deposit or store excavated soil materials and tunnel muck away from drainage courses and protect from erosion by constructing berms along the downslope perimeter if rain events are forecast within 48 hours. • **Management Measures for Construction Materials** ○ Protect stockpiled construction materials that are not scheduled to be re-disturbed for at least 14 days or in advance of forecasted rain events by constructing berms along the downslope perimeter or by covering the stockpile. ○ Store chemicals in watertight containers. ○ Minimize exposure of construction materials to stormwater. ○ Designate refueling and equipment inspection/maintenance locations per SPCCP (i.e., located 150 feet from surface waters and sensitive habitats such as wetlands). • **Waste Management Measures** ○ Prevent off-site disposal or runoff of any rinse or wash waters. ○ Implement concrete and truck washout facilities and appropriately sized storage, treatment, and disposal practices. ○ Ensure the containment of sanitation facilities (e.g., portable toilets). ○ Clean or replace sanitation facilities (as necessary) and inspect regularly for leaks/spills. ○ Cover waste disposal containers during rain events and at end of every day. • **Non-Stormwater Management Measures** ○ Control all non-stormwater discharges during construction. ○ Wash vehicles in such a manner as to prevent non-stormwater discharges to surface waters. ○ Clean streets in such a manner as to prevent non-stormwater discharges from reaching surface water. ○ Discontinue the application of any erodible landscape material during rain, or within 2 days before a forecasted rain event. • **Post-construction Stormwater Management Measures** ○ The Stormwater Construction General Permit requires that the SWPPP specify post-construction stormwater management measures and runoff reduction measures that provide for a post-Project time of runoff concentration that is equal or greater than pre-Project time of concentration. ○ The post-construction stormwater management measures must specify that BMPs be implemented to reduce pollutants in stormwater discharges that are reasonably foreseeable after all construction phases have been completed at the site. ○ A long-term maintenance plan for the post-construction stormwater management measures must be described in the SWPPP and implemented for				

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		a minimum of 5 years following completion of construction (per Attachment 1, *Compliance with Post-Construction Requirements*, of the General Permit). The plan must describe the procedures to ensure that the post-construction stormwater management measures are adequately maintained. o During operations and maintenance, Project facilities including, but not limited to, roads (including access roads), other paved and unpaved surfaces, structures, and equipment, will be properly maintained so as to avoid the potential for erosion and sediment/siltation into local waterbodies and in compliance with all applicable federal, state, and local regulations. o Project operation and maintenance erosion and sediment control plans will be prepared and implemented as determined necessary, depending on the specific activity and potential for erosion or other impacts. • Drift and runoff from areas treated with herbicides, pesticides, and other chemicals that may be harmful to aquatic habitats will be controlled. • Sediment control measures will include retaining sediment onsite by a system of sediment basins, traps, or other appropriate measures; reducing runoff velocity on exposed slopes; and collecting and directing surface run-on and runoff at non-erosive velocities to controlled drainage courses. • Post-construction erosion control measures will be implemented (such as silt fencing, fiber rolls, hydraulic mulch/seeding, and vegetative plantings) and monitored to minimize effects on water quality. • Revegetation treatments will be integrated into grading plans to create favorable planting environments that will aid plant establishment and natural regeneration. To the extent feasible and practicable, local native plants that require little or no maintenance and do not create an extreme fire hazard will be used.				
BMP-13	Development and Implementation of Spill Prevention and Hazardous Materials Management/Accidental Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) and Response Measures	• As part of the SWPPP, SPCCPs will be developed and implemented to minimize effects from spills of hazardous or petroleum substances during construction and operation/maintenance. • Multiple SPCCPs may be prepared for Project construction activities, each taking into account site-specific conditions, such as proximity to waterways and slope, type of materials being used for construction, and type of construction activity being performed (e.g., ground disturbing or other). • Spill prevention kits will always be in proximity when hazardous materials will be used (e.g., crew trucks and other logical locations). • For all fueling of stationary equipment at the construction sites, containments will be provided to the degree that any spill will not enter the channel or damage wetland or riparian vegetation. • Refueling of construction equipment will occur only in designated areas that will be a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands. • Equipment used in direct contact with water will be inspected daily for oil, grease, and other petroleum products prior to use. All equipment will be cleaned of external petroleum products prior to beginning work where contact with water may occur in order to prevent the release of such products to surface waters.	• Authority • Contractors	• Before, during, and throughout construction	• The Authority will monitor the development and implementation of the SPCCPs to minimize effects from spills of oil or oil-containing products during Project construction and operation. • Colusa, Glenn, and Yolo Counties (reporting of unforeseen hazardous conditions) • As part of each SPCCP, an inspection program which includes regularly scheduled inspections, evaluations, and testing by qualified personnel will be developed in accordance with USEPA's SPCC Guidance for Regional Inspectors. • The Authority will review and approve all SPCCPs to ensure the above measures and practices are included	• RWQCB • Cal-OSHA

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Equipment will not be serviced within the ordinary high-water mark or immediate floodplain of existing waterways (e.g., Funks Creek, Stone Corral Creek), unless the equipment stationed in these locations could not be readily relocated (e.g., pumps and generators). • Store hazardous materials in double containment. • Dispose of all hazardous and nonhazardous products following instructions and Material Safety Data Sheets and placed in nonleaking sealed containers until transport to an appropriate disposal facility. • Monitor onsite vehicles for fluid leaks and regular maintenance to reduce the chance of leakage. • Provide secondary containment (a prefabricated temporary containment mat, a temporary earthen berm, or other measure can provide containment) of bulk storage tanks having a capacity of more than 55 gallons. • The contractor will conduct sampling of runoff effluent when a leak, spill, or other discharge of non-visible pollutants is detected. • Provide equipment and materials necessary for cleanup of accidental spills onsite. • Clean up accidental spills and leaks immediately and dispose of properly. • The designated health and safety staff people will be trained in state and federal emergency response and spill containment techniques and will also be made aware of the state and federal pollution control laws, rules, and regulations applicable to their work. • Petroleum products will be stored in nonleaking containers at impervious storage sites from which an accidental spill cannot escape. • Absorbent pads, pillows, socks, booms, and other spill containment materials will be stored and maintained at the hazardous materials storage sites for use in the event of an accidental spill. • Contaminated absorbent pads, pillows, socks, booms, and other spill containment materials will be placed in nonleaking sealed containers until transport to an appropriate disposal facility. • When transferring oil or other hazardous materials from trucks to storage containers, absorbent pads, pillows, socks, booms or other spill containment material will be placed under the transfer area. • Oil-absorbent booms will be used when equipment is used in or immediately adjacent to waters. • All reserve fuel supplies will be stored only within the confines of a designated staging area, to be located a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands. • Fuel transfers will take place a minimum of 150 feet from surface waters and other sensitive habitats, such as wetlands, and absorbent pads will be placed under the fuel transfer operation. • Staging areas will be designed to contain contaminants such as oil, grease, fuel, and other petroleum products so that should an accidental spill occur, contaminants do not drain toward receiving waters or storm drain inlets. • All stationary equipment will be staged in staging areas and positioned over drip pans.			and the SPCCPs are prepared in accordance with 40 CFR Part 112. • During construction, the contractors will be responsible implementation of the SPCCP as well as conducting inspections, evaluation, and testing required in each site-specific SPCCP. • The inspection program personnel will report to the Authority any deficiencies in compliance with the SPCCP as well as any spills of gasoline, diesel fuel, oil, or other related substance. The Authority will evaluate these events as needed on a site-by-site basis to amend SPCCPs as needed to reduce the severity of and/or avoid the potentially significant impacts on the public and environment.	

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• In the event of an accidental spill, personnel will identify and secure the source of the discharge and contain the discharge with sorbents, sandbags, or other material from spill kits and will contact appropriate regulatory authorities (e.g., National Response Center will be contacted if the spill threatens navigable waters of the United States or adjoining shorelines, as well as other appropriate response personnel).				
BMP-14	Obtainment of Permit Coverage and Compliance with Requirements of Central Valley Regional Water Quality Control Board Order R5-2022-0006R5-2016-0076-01 (NPDES No. CAG995002 for Limited Threat Discharges to Surface Water) and State Water Resource Control Board Order 2003-0003-003-DWQ (Statewide General Waste Discharge Requirements For Discharges To Land With A Low Threat To Water Quality) (BMP-14 would require compliance with the existing permits and any amendments thereto.)	• Discharged surface water and groundwater from dewatering activities will meet permit water quality requirements to either surface water or land. Treatment for sediment or other pollutants may be required. Pre-discharge testing, monitoring, and reporting will be conducted in accordance with the permit. • If treatment of dewatered surface water is necessary to meet permit effluent limitations, the appropriate treatment technology will be implemented. o Treatment for reducing total suspended solids, settleable solids, and turbidity could include the following options, which are representative of typical sediment treatment methods: desilting basin; sediment trap; weir tank; dewatering tank; gravity bag filter; sand media filter. o Pre-discharge testing may be required if contamination is suspected. In this case, water collected during dewatering will be tested for contamination prior to disposal in accordance with permit requirements. • Discharge of dewatered surface water and groundwater to receiving waters will be done in manner that avoids causing erosion and scouring. Energy dissipation BMPs, such as riprap, plastic sheeting, or sand bags, will be installed at the discharge points of the dewatering system(s). • Groundwater pumped as part of construction-related dewatering will be contained onsite during construction within bermed areas adjacent to construction areas to avoid impacts to surface waters. • As necessary, the Authority will ensure that the water is pumped into Baker tanks or approved equivalent with either a filter or gel coagulant system or other containment to remove sediment as required. • BMPs, as described in the SWPPP, will also be implemented to retain, treat, and dispose of groundwater. Measures will include, but are not limited to: o Directly conveying pumped groundwater to a suitable land disposal area capable of percolating flows o Retaining pumped groundwater in surface facilities to reduce turbidity and suspended sediment concentrations o If contamination is suspected, testing water collected during dewatering for contamination prior to disposal o Treating (i.e., flocculating) pumped groundwater to reduce turbidity and concentrations of suspended sediments if turbidity exceeds Central Valley RWQCB Order R5-2022-0006R5-2016-0076-01 thresholds	• Authority • Contractors	• Before and during construction	• The Authority will comply with monitoring and reporting requirements of the permit.	• State Water Board • RWQCB
BMP-15	Performance of Site-Specific Drainage Evaluations, Design, and Implementation	• During Project design (35% completion or greater), project civil engineers and professional hydrologists will coordinate with owners and operators of local drainage systems (e.g., Counties) and/or landowners served by existing drainage systems to evaluate pre- and post-Project drainage needs and design features to	• Authority • Contractors	• Before construction	• Submittal of evaluation to Counties	• RWQCB • Counties

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		ensure local drainage infrastructure (e.g., ditches, pipes, culverts) will not be disrupted by Project facilities. • Site-specific drainage evaluations or studies will be prepared as part of final Project design. The drainage evaluations/studies will consider the design flows of any existing facilities that will be crossed by Project features and develop strategies to ensure equivalent functioning of the existing drainage system during and after construction. • These evaluations/studies will be applicable to aboveground facilities ultimately resulting in impervious surfaces, including, but not limited to: Funks and its PGP, TRR and its PGP, the administration and operations building, the maintenance and storage building, the Dunnigan Pipeline, Sacramento River discharge site, all roads (including the South Road) and impervious areas that might result due to recreation area construction or areas that will be substantially modified as a result of construction. • The drainage evaluations will demonstrate stormwater runoff detention or retention on site and/or conveyed to the nearest existing drainage facility. The drainage study will demonstrate that Project implementation will not result in increases in the peak flow runoff to adjacent lands or existing drainage facilities. Requirements of the study include: ○ Identification of pre-development hydrology based on site-specific conditions and local meteorology by using continuous simulation modeling techniques, published data or studies, or other established tools. ○ Quantification of post-development runoff volume and peak flow discharges. ○ Identification that the post-construction rate, volume, and duration of runoff will not substantially exceed the pre-development rates and the pre-development hydrologic conditions will be replicated through site design, configuration, and other appropriate practices to the maximum extent technically feasible. ○ Identification and description of strategies and other appropriate practices (based on the pre-development hydrology) include potential relocation of facilities within the existing footprints, reduction in footprint sizes, and use of appropriate drainage systems and practices that mimic natural processes to infiltrate and recharge ○ Strategies and appropriate practices may include green infrastructure, which captures, filters, or reduces stormwater (e.g., roadside plantings); low impact development practices, which are systems and practices that use or mimic natural processes that result in infiltration, evapotranspiration, or use of stormwater to protect water quality and associated aquatic habitat; bioswales; and infiltration basins.~~Strategies and appropriate practices may include green infrastructure which captures, filters or reduces stormwater (e.g., roadside plantings) or low impact development practices, which are systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat (e.g.,), bioswales, or infiltration basins are all appropriate strategies and practices to employ.~~				

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		○ Identification of features (e.g., ditches, curb and gutters, culverts) that are within 250 feet of seasonal wetlands and strategies and practices to maintain the existing hydrology of the seasonal wetlands and ensure that contaminants from impervious surfaces are not channeled into seasonal wetlands. • Implementation of drainage evaluations/studies and any strategies and other appropriate practices identified will result in equivalent functioning of the existing drainage system during and after construction.				
BMP-16	Development and Implementation of a Construction Equipment, Truck, and Traffic Management Plan (TMP)	• Coordinate haul and access routes with all contractors when multiple facility sites are under construction concurrently, so that Project-generated construction traffic is dispersed to the extent practicable and necessary (as shown in Figure 2-35). » Prohibit construction traffic in the community of Maxwell. Construction traffic, including commuting construction workers and deliveries of materials and equipment, will be prohibited on Oak Street from Old Highway 99 to Sutton Road. SitesThe Authority will work with the contractor(s) to develop a monitoring and reporting plan to ensure compliance with this measure. Prohibit construction traffic in the community of Maxwell and route construction traffic to and from the construction sites (s) around the community of Maxwell on designated construction routes (list roads or routes shown in Figure 2-35), including directing construction workers to use designated construction routesProhibit construction traffic in the community of Maxwell. » Schedule construction start and end times to the extent practicable to reduce impacts on Maxwell Colusa Road/Oak Street/Maxwell Sites Roads as it relates to the Maxwell Unified School District schoolsSchedule construction start and end times that avoid conflicts with school times. Schedule major construction activities during the summer months when feasible. Encourage construction workers to find routes that avoid Maxwell during periods when school is in session. • Install traffic control devices, as specified in Caltrans' Manual of Traffic Controls for Construction and Maintenance Work Zones, where needed to maintain safe driving conditions, including use of signage to alert motorists and bicyclists of construction activities, potential hazards, and travel detours, and use flaggers when appropriate. • During operations and maintenance, truck and other maintenance equipment will be maintained in good working condition and will be used in accordance with all applicable federal, state, and local regulations. • The Authority will coordinate with the applicable jurisdictions, including local agencies for local roads, transit providers, and rail operators where applicable. • Provide construction notification procedures for Glenn, Colusa, Yolo, and Tehama Counties' police, public works, fire departments, and other public service providers, and cycling organizations, bike shops, and schools. • Inform contractors and subcontractors of work hours, modes and locations of transportation, and parking for construction workers. • Describe the procedures for construction area evacuation in the case of an emergency declared by county or other local authorities.	• Authority • Construction Management Team; Contractor construction monitor(s)	• Prior to, during, after construction	• The Authority will appoint a construction monitor to perform site inspections to verify contractor compliance with the TMP. • Contractor should ensure that all TMP requirements are addressed; contractor will ensure that inspectors monitor traffic conditions while work is being performed to avoid impacts in excess of what was identified in the TMP.	• Counties • Local Off-Site Emergency Responders (Sheriff, fire departments)

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Identification of emergency routes available and open for county and other public emergency personnel. • Designate areas where nighttime construction will occur, if needed. • Posted information for contact in case of emergency or complaint.				
BMP-17	Implementation of Visual/Aesthetic Design, Construction, and Operation Practices	• Use native trees and shrubs for screening at the Project facilities that may substantially degrade the existing visual character of the site(s) in a manner that does not compromise facility access or safety and does not conflict with existing safety requirements of agencies (e.g., DSOD). • Incorporate high-quality site design that does not detract from the rural nature of the surroundings. New structures will be painted in a shade that is visually cohesive with the general surrounding area. Color selection will be made for the coloring of the most prevalent season. If the color selection is between two or three colors, one of the darker shades be selected. This is because choosing a darker shade will allow the surface to recede and blend within the visual landscape, whereas lighter colors advance, or are more apparent, within the visual landscape. Choosing a darker color will also reduce the potential for glare. Therefore, coloring will be slightly darker unless aesthetic design treatments indicate another color selection is appropriate with the intent to specifically improve aesthetics. Paints will be of a dull, flat, or satin finish only. Appropriate paint type will be selected for the finished structures to ensure long-term durability of the painted surfaces. • If any concrete entrance signs, barriers, or landscape accents are to be located along public roadway, then such features will receive aesthetic treatments to ensure they enhance views associated with the Project. Aesthetic treatments may include mimicking natural material (e.g., stone or rock surfacing) and using integral color to reduce visibility, improve aesthetics, and to ensure that features blend with the landscape rather than creating a utilitarian-looking concrete element. • All required lighting during construction will be directional to minimize glare impacts to humans and wildlife. • All artificial outdoor lighting associated with the Project will be limited to safety and security requirements, designed using Illuminating Engineering Society's design guidelines and in compliance with International Dark-Sky Association approved fixtures. Light emitting diode (LED) lighting will avoid the use of blue-rich white light lamps and use a correlated color temperature that is no higher than 3,000 Kelvin. Wherever possible and pragmatic, the lighting designer will select fixtures and lighting control systems that conform to International Dark-Sky Association's Fixture Seal of Approval program. In addition, LED lights will use shielding to prevent nuisance glare and ensure that light spill does not affect sensitive residential viewers. Lights along perimeter roadways and pathways, as well as safety lighting at building entrances and loading areas, will employ shielding to minimize off-site light spill and glare and be screened and directed away from residences and adjacent uses to the highest degree possible. The use of nighttime lights along perimeter roadways and pathways will be minimized to the highest degree possible to ensure that spaces are not unnecessarily over lit, while still maintaining minimum adequate lighting to provide necessary visibility	• Authority • Contractors	• Before, during, and after construction	• Include in construction plans for review and approval by the Authority	• None

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		for security. For example, the amount of artificial light can be reduced by limiting the number of light posts in higher-use areas and by using hooded wall mounts on pathways that receive primarily pedestrian traffic. Technologies to reduce light pollution evolve over time and design measures that are currently available may help but may not be the most effective means of controlling light pollution once the Project is finalized. Therefore, all design measures used to reduce light pollution will employ the technologies available at the time of Project design to allow for the highest potential reduction in light pollution.				
BMP-18	Development and Implementation of Fire Safety Plans for Prevention and Suppression/Control During Construction and Maintenance	• Prepare a fire safety plan for review by Counties and CalFire for review. This plan will include precautions to carry out during high-fire danger, a list of fire-suppression equipment and tools to have on hand, a description of available communications; procedures and policies for controlling any fires that are on the work site, and other related fire prevention and control procedures, specifications for the supply of water to have on hand, and descriptions of other actions that will reduce the risk of ignition and facilitate immediate control of an accidental fire. • Coordinate with applicable fire departments prior to construction activities to determine the appropriate type and amounts of fire equipment to be carried on vehicles. • Maintain fire-suppression equipment (e.g., fire extinguishers, fire blankets) at work locations and on equipment. • Construction personnel will be required to park vehicles away from dry vegetation. • If a fire should start, the all appropriate fire protection agencies responsible will be contacted immediately. • Maintain a list of all major potential fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each potential major hazard. • Smoking will be allowed only in areas designated for smoking. • Gasoline-powered construction equipment with catalytic converters will be equipped with shielding or other acceptable fire prevention features. Internal combustion engines will be equipped with spark arrestors. • Welding sites will include fire prevention provisions. • The contractor will maintain contact with local firefighting agencies throughout the fire season for updates on fire conditions, and such fire conditions will be communicated daily to the on-site employees of the contractor and subcontractors daily. • Red Flag Warning events from the National Weather Service will be monitored daily and construction activities that have higher potential to result in wildfires (e.g., blasting or working in areas where vegetation has not been cleared) will cease. • Provide adequate and appropriate communication throughout the construction site(s) such as cell towers and radio repeater sites, operational radios, and/or operational telephones.	• Authority • Fire suppression agencies • Contractors	• Prior to and during construction • During maintenance	• Authority (monitoring) • Fire protection agencies (report to them in the event of a fire) • Contractors (report fire incidents to the Authority)	• State Fire Marshal • CAL FIRE • Local fire suppression agencies • Counties

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Communication equipment will be provided to all construction crews and monitors and equipment will be confirmed operational each day prior to initiating construction activities at each work site. • Water tanks and/or water trucks will be made available at active construction site(s) for fire protection during construction.				
BMP-19	Development and Implementation of Worker Occupational Health and Safety Plans	• The Authority and Contractors will follow all required federal, state, and local occupational health and safety laws on the construction site(s) at all times. • The contractor is responsible for means and methods to complete the work safely and is required to provide for public safety and to provide safe access for inspection and to Authority employees. • California Code of Regulations, Title 8 (CCR Title 8) and California Department of Industrial Relations, Division of Occupational Safety and Health (Cal/OSHA) will have overall jurisdiction regarding Project safety, including tunneling. • Mine Safety and Health Administration will have jurisdiction over quarry operations. • Federal Bureau of Alcohol, Tobacco, and Firearms (ATF) will have jurisdiction over the handling of explosives related to blasting of excavations, including quarries. • Provide and maintain construction equipment as required by CCR Title 8, including any special precautions based on the type of equipment being used. • Provide project-dedicated ambulance and medical technician/first-aid trailer office. • Provide fire-fighting equipment (e.g., tools and fire extinguishers) on all vehicles as coordinated with and identified by appropriate fire departments. • Provide adequate and appropriate communication throughout the construction site(s) such as cell towers and radio repeater sites, operational radios, and/or operational telephones. • Communication equipment will be provided to all construction crews and monitors and equipment will be confirmed operational each day prior to initiating construction activities at each work site. • Identify designated location(s) for helipads during construction and will be communicated to off-site emergency responders. • Develop and implement a construction emergency action plan(s), which will include emergency notification flowcharts, notification procedures, and designated safety zones for workers for different types of emergencies that could occur during the construction of facilities (e.g., injuries to construction workers or fires) and communicate with off-site emergency responders. • Off-site emergency responders will be made aware of the emergency supplies and equipment available on site for use by workers and first responders. • A Public Information Officer or Media Contact along with a list of Cooperators will be made available and shared with emergency responding agencies (e.g., CAL FIRE). • Provide description of symptoms and sources to Valley Fever to all workers, explain measures to reduce exposure (e.g., wetting soil, wearing masks), and provide medical contact information to the on-site medical personnel should workers develop potential symptoms of Valley Fever.	• Authority • Construction Contractors	• During construction	• Construction monitors for each site will monitor construction operations to ensure the California Occupational Safety and Health Act of 1973, as administered by Cal-OSHA, will be followed as a minimum standard to protect workers. • The construction monitors will report any deficiency in compliance by the construction contractor with the California Occupational Safety and Health Act of 1973 to the Authority immediately.	• Cal-OSHA • Mine Safety and Health Administration • Federal Bureau of Alcohol, Tobacco, and Firearms • CAL FIRE • Counties • Local Off-Site Emergency Responders (Sheriff, fire departments)

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Recorded any cases of Valley Fever, if they develop, by the onsite health and safety officer; implement tracing for the potential source to identify and communicate with workers that may have been unknowingly exposed; those workers will be re-informed of symptoms and/or have the discretion to be tested.				
BMP-20	Preparation and Implementation of Blast Plans for Worker Health and Safety	Comply with all federal, state and local requirements for blasting, including handling, transport, and storage of explosive blasting materials. These include, but may not be limited to the following: • A county explosive permit • California Highway Patrol (CHP) Hazardous Materials Transport License • County Sheriff or Police or fire department for site-specific permits • U.S. Department of Transportation and California Department of Motor Vehicles (CA DMV) Motor Carry Permit • State of California Department of Justice Bureau of Firearms Licenses for each blaster ◦ A Blast Plan will be prepared for every blast performed at the quarries and will include: appropriate handling of blasting materials; appropriate timing for clearing the quarry; redundant communications; and distances for safely distancing from the blast location	• Contractor(s)	• Prior to construction • Implemented during construction	• Authority (Monitoring) • Contractors	• Bureau of Alcohol Tobacco, Firearms and Explosives • Mine Safety and Health Administration • Counties • CA DMV • CHP • Cal-OSHA
BMP-21	Performance of Mosquito and Vector Control During Construction	• Coordinate with Glenn County Mosquito and Vector Control District (MVCD) and the Colusa County Environmental Health Department (including the Colusa County Mosquito Abatement District) and Yolo County (Sacramento-Yolo Mosquito and Vector Control) related to implementation of standard local, state, and federal vector control requirements during construction of all facilities. Best management practices during construction include: ◦ Utilize water sources with mosquito predators for flooding ◦ Drain irrigation water into ditches or other water bodies with abundant mosquito predators ◦ Implement monitoring and sampling programs to detect early signs of mosquito population problems ◦ Limit standing water on all construction sites ◦ Use biological agents such as mosquito fish to limit larval mosquito populations ◦ Use larvicides and adulticides, as necessary. If larvicides and adulticides are required, the Authority will evaluate the effects of the chemicals and, if required, prepare a monitoring program for review by fish and wildlife agencies to evaluate effects, if any, application will have on macroinvertebrate and associated covered fish species	• Authority • Contractors • Mosquito and Vector Control Districts	• Before and during construction	• Contractors (during construction)	• Colusa County Environmental Health Department (including the Colusa County Mosquito Abatement District) • Glenn County MVCD • Yolo County (Sacramento-Yolo Mosquito and Vector Control)

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-22	Development and Implementation of a Construction Noise Abatement Plan	Develop and implement a noise abatement plan to avoid or reduce construction-related noise impacts. This plan will incorporate the following of best noise control practices and measures during construction depending on site-specific conditions, construction activity, and location of nearest sensitive receptor: • Prior to construction, designate a noise control coordinator and initiate a complaint/response tracking program. • Limit use of heavy equipment to daytime hours of 7:00 a.m. to 7:00 p.m. wherever possible. • Limit all vibratory and impact pile driving to daytime hours of 7:00 a.m. to 7:00 p.m. • Notify residents of nighttime work, if located within 1 mile of nighttime work areas. • Prohibit gasoline or diesel engines from having unmuffled exhaust. • Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation. • Prevent excessive noise by shutting down idle vehicles or equipment. • Locate, store, and maintain portable and stationary equipment as far as feasible from nearby residents to ensure that such residents are not exposed to on-site construction noise at unacceptable levels. ○ The following measures will be implemented on a site-specific basis, as applicable. • Use noise-reducing enclosures around stationary noise-generating equipment. • Construct barriers between noise sources and noise-sensitive land uses or take advantage of existing barrier features (e.g., terrain, structures) to block sound transmission to noise-sensitive land uses. The barriers shall be designed to obstruct the line of sight between the noise-sensitive land use and on-site construction equipment. • Use shrouds to reduce noise from pile driving. • Blasting at excavation sites will be conducted at a distance of at least 1,000 feet from the nearest noise-sensitive land use. • Select haul routes that affect the fewest number of people and implement the TMP, which avoids the community of Maxwell.	• Authority • Contractors	• During construction • During operations	• In the event of complaints by affected residents due to on-site construction noise generated during nighttime hours, the contractor will monitor noise levels intermittently (between 10:00 p.m. and 7:00 a.m.) at the dwelling unit of the person lodging the complaint. If measured construction noise during nighttime hours exceeds 45 dBA interior L_{max} or 5 dB above ambient noise, whichever is greater, at the dwelling unit, the construction contractor will implement additional sound-attenuating measures where feasible, such as limitations on the use of noise-generating equipment, or installation of additional temporary barriers or enclosures. Where the above-described strategies are ineffective in reducing noise to the identified levels or where it is infeasible to do so, the affected residents may be offered short-term relocation assistance for the duration of the time that nighttime noise levels are expected to exceed the specified levels. Exceptions to this commitment can be made for legally mandated warning devices, such as back-up alarms and warning horns.	• Counties

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-23	Development and Implementation of an Underwater Construction Noise Control, Abatement, and Monitoring Plan	• Develop and implement an underwater sound control, abatement, and monitoring plan to avoid and minimize the effects of underwater construction noise on fish, particularly underwater noise effects associated with impact pile driving activities in the Sacramento River for Alternative 2. The plan will incorporate the following types of measures: ○ Restrict in-water work and bank work within 200 feet of the shoreline to the in-water work windows specified in construction BMPs. ○ Employ underwater noise-reducing methods using the best available and practicable technologies, such as use of vibratory rather than impact pile driving equipment when appropriate; using an impact pile driver to proof piles initially placed with a vibratory pile driver; employing noise attenuation using bubble curtains, air-filled fabric barriers, or isolation piles. Specific techniques to be used will be based on site-specific conditions. ○ Restricting in-water and near-shore impact pile driving to daytime hours (7:00 a.m. to 7:00 p.m.) to provide fish with a 12-hour quiet period between impact pile driving events. ○ Monitoring underwater noise levels during all pile-driving activities on land (within 200 feet of shore) and in water to ensure that peak and cumulative sound exposure levels during pile driving do not exceed the values that were estimated (using the NMFS spreadsheet model) in support of the environmental permitting process. ○ Stopping pile driving for the day if underwater noise monitoring indicates that daily peak and cumulative sound exposure levels are being exceeded, and taking corrective actions (e.g., reducing the total number of strikes per day on subsequent days) until monitoring shows that daily peak and cumulative sound exposure levels are no longer being exceeded. • Monitoring the in-water work area for fish that may be showing signs of distress or injury as a result of pile driving activities. and stopping work when distressed or injured fish are observed. If stressed, injured, or dead fish are observed during pile driving, the Authority or its contractor(s) will reduce the number of strikes per day to ensure that fish are no longer showing signs of stress, injury, or mortality.	• Authority • Contractors	• Prior to and During construction	• Daily summaries of the hydroacoustic monitoring results. • Daily reporting of any occurrences of stressed, injured, or dead fish.	• CDFW • NMFS

Administrative Draft

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-24	Use of Design Features and Noise Control Practices to Reduce Operation and Maintenance Noise	Pump station buildings and turbine housing will be designed and constructed such that operation noise levels at neighboring residential receptors do not exceed 45 dBA L_{eq}. Acoustical measures such as terrain shielding, enclosures, exhaust silencers, sound barriers, and acoustical building treatments will be incorporated into the facility design in order to meet this performance standard. In regard to maintenance equipment, the following best noise control practices will be followed: • Limit use of heavy equipment to daytime hours of 7:00 a.m. to 7:00 p.m. wherever possible. • Prohibit gasoline or diesel engines from having unmuffled exhaust. • Require that all construction equipment powered by gasoline or diesel engines have sound-control devices that are at least as effective as those originally provided by the manufacturer and that all equipment be operated and maintained to minimize noise generation. • Prevent excessive noise by shutting down idle vehicles or equipment. • Use noise-reducing enclosures around noise-generating equipment.	• Authority • Contractors	• Prior to construction (design of pumping plants) • Operations and maintenance	• None	• Counties
BMP-25	Preparation of an Emergency Action Plan for Reservoir Operations	• An Emergency Action Plan for Reservoir Operations will be prepared pursuant to the California Office of Emergency Services and consistent with California Water Code sections 6160, 6161, and 6002.5 and will include: emergency notification flowcharts, notification procedures, inundation maps, and response protocols for notifying downstream entities if an emergency release was anticipated to occur. Content of this plan will also include but not be limited to: ○ Specification of the dam owner's responsibilities to ensure timely and effective action. Responsibilities of dam owners include surveillance (monitoring the condition of the dam) and notification (phoning local or state emergency management agency officials in charge of emergency response). ○ Inundation maps. Inundation maps show areas that may have to be evacuated in a dam emergency. The maps facilitate notification by displaying flood areas and estimated travel times for the floodwaters. ○ Definition of events that trigger emergency action	• Authority	• Prior to and during operations; reviewed annually	• These plans are typically reviewed annually and periodically tested through tabletop and functional exercises and drills	• California Office of Emergency Services • DSOD
BMP-26	Preparation and Implementation of an Electrical Power Guidelines and EMF Field Management Plan	• The Authority will specify that design and construction of power facilities be in accordance with electric and magnetic field (EMF) guidance adopted by the California Public Utility Commission (CPUC), EMF Design Guidelines for Electrical Facilities (2006). • Prepare a Field Management Plan that indicates the no-cost and low-cost EMF measures that will be installed as part of the final engineering design for the Project. (Required under CPUC Decision No. D. 06-01-042 (January 26, 2006) and CPUC General Order 131-D, Section X(A) (June 8, 1994).	• Authority	• Prior to and during construction	• A Construction Monitor will regularly inspect construction activities to ensure design and construction of power facilities are in accordance with EMF guidance adopted by the CPUC. • The Field Management Plan will include evaluating the no-cost and low-cost measures considered for the Project, the measures adopted, and reasons that certain measures were not adopted, and will be prepared during detailed Project design.	• CPUC • California Independent System Operators
BMP-27	Development and Implementation of a	• Prior to construction, the Authority will develop a construction equipment exhaust reduction plan to reduce criteria air pollutants from construction equipment.	• Authority • Contractors	• Prior to and during construction	• The Authority will submit the reduction plan to the appropriate air	• AQMDs /Air Pollution Control Districts (APCDs)

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
	Construction Equipment Exhaust Reduction Plan	• Control technology that achieves equivalent or greater reductions than those identified below may be specified as new emissions reduction technologies become available and cost-effective. • Equipment used to construct Project facilities is equivalent to Tier 4 standards as follows: ○ For conveyance facilities, all equipment less than 120 horsepower will be equivalent to Tier 4 final standards. ○ For reservoir facilities, all equipment will be equivalent to Tier 4 final standards except mast rotary percussion drills, the auger drill rigs, and grouting drill rigs. • To achieve the criteria pollutant emissions rates equivalent to the usage as indicated above, contractors may utilize a combination of newer engines, aftermarket controls, and retrofits to achieve the performance standard noted above. Potential strategies for achieving this standard may also include the following: ○ Electrification of equipment ○ Use of diesel particulate filters on non-electrified equipment ○ Use of compressed natural gas (CNG) • The Authority will quantitatively demonstrate, through equipment-specific modeling, that the fleet-wide average achieves criteria pollutant emissions rates equivalent to the use of Tier 4 final standards as noted above. ○ In addition to Tier 4 final standards, the following best management practices will be incorporated into the reduction plan. • Minimize idling time either by shutting equipment off when not in use or limiting the time of idling to 3 minutes (5 minutes required by 13 CCR 2449[d][3], 2485). Provide clear signage that posts this requirement for workers at the entrances to the site. • Maintain all construction equipment in proper working condition according to manufacturer's specifications. The equipment must be checked by an ASE-certified mechanic and determined to be running in proper condition before it is placed in operation. • Prior to construction start for each major Project feature, the Authority will ensure that all on-road heavy-duty diesel trucks shall be operated in compliance with the emission standards per CCR Title 13, Section 2025. The Authority will also ensure that its construction contractor will operate on road trucks with engines certified to the 2010 model year or newer heavy-duty diesel engine emissions standards.	• Project-area air districts		district for review prior to construction. • Ensure that emissions from all off-road diesel-powered equipment used on the Project site do not exceed 40% opacity for more than 3 minutes in any 1 hour. Any equipment found to exceed 40% opacity (or Ringelmann [Based on the Ringelmann scale, which measures the density of smoke in the air]) will be repaired immediately. • Non-compliant equipment will be documented, and a summary provided annually to the Authority and air district with jurisdiction over construction site(s). • A visual inspection of all in-operation equipment will be made at least weekly by the contractor and witnessed monthly or more frequently by the Authority and a periodic summary of the visual survey results will be submitted by the contractor throughout the duration of the Project, except that the summary will not be required for any 30-day period in which no construction activity occurs. The summary will include the quantity and type of vehicles inspected, as well as the dates of each survey. • The air districts or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure will supersede other air district or state rules or regulations.	
BMP-28	Preparation and Implementation of Fugitive Dust Control Plans	The following fugitive dust control measures are based on the Tehama County APCD fugitive PM10 mitigation measures from the 2015 Air Quality Planning and Permitting Handbook. • **Land Clearing/Earth Moving:** ○ Water shall be applied by means of truck(s), hoses, and/or sprinklers as needed prior to any land clearing or earth movement to minimize dust emissions. ○ Haul vehicles transporting soil into or out of the property shall be covered.	• Authority • Contractor(s)	Prior to final design plans and bid documents. Prior to and during construction.	• The Authority will submit the dust reduction plan to the appropriate air district for review prior to construction. • Monitoring equipment will be used to monitor dust conditions on construction site(s). • Non-compliance will be documented, and a summary provided annually to	• AQMDs /APCDs

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		○ A publicly visible sign shall be posted with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours. The telephone number of the local air district shall also be included and visible on the sign. ○ All excavation, grading, and/or earth moving activities shall be suspended when average wind speeds exceed 25 mph. • **Visibly Dry Disturbed Soil Surface Areas:** ○ All visibly dry disturbed soil surface areas of operation shall be treated with a dust palliative agent and/or watered to minimize dust emissions. • **Paved Road Track out:** ○ Existing roads and streets adjacent to the Project where there are Project construction vehicles actively entering from unpaved roads, shall be cleaned at least once per day unless conditions warrant a greater frequency. • **Visibly Dry Disturbed Unpaved Roads:** ○ All visibly dry disturbed unpaved road surface areas of operation shall be watered to minimize dust emissions. ○ Unpaved roads shall be treated with soil stabilizers or surfactants to reduce dust emissions. ○ On-site vehicles shall be limited to a speed of 15-20 miles per hour on unpaved roads. ○ Haul roads shall be sprayed down at the end of the work shift to form a thin crust. This application of water shall be in addition to the minimum rate of application. • **Vehicles Entering/Exiting Construction Area and Employee Vehicles:** ○ Vehicles entering or exiting the construction area shall travel at a speed which minimizes dust emissions. ○ Construction workers shall park in designated parking areas(s) to help reduce dust emissions. • **Soil Piles:** ○ Soil pile surfaces shall be moistened if dust is being emitted from the pile(s). Adequately secured tarps, plastic, or other material may be required to further reduce dust emissions. This includes materials stored in piles for use in the concrete batch plant.			the Authority and air district with jurisdiction over construction site(s). • The air districts or other officials may conduct periodic site inspections to determine compliance. Nothing in this measure will supersede other air district or state rules or regulations.	
BMP-29	Minimization of Asphalt and Concrete Batching Odors and GHG Emission	• The Authority will ensure that its construction contractor(s) establishes a 1-mile buffer for onsite asphalt batch plant operations during construction ○ To ensure that the temporary asphalt batch plants do not generate odors that adversely affect existing sensitive receptors, the Authority or its construction contractor(s) will locate onsite asphalt batch plants at least 1 mile from the nearest sensitive receptors. A 1-mile buffer is the screening distance established by TCAPCD. ○ If asphalt is obtained from off-site commercial sources instead of on-site batch plants, this measure will not be required. • Minimize the amount of cement in concrete by specifying higher levels of cementitious material alternatives, larger aggregate, longer final set times, or lower maximum strength where appropriate.	• Authority • Contractor(s)	• Prior to final design plans and bid documents. • Prior to and during construction.	• None	• AQMDs /APCDs

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
BMP-30	Development and Implementation of Hazardous Materials Management Plans	• The Authority will ensure that each construction contractor develops and implements a hazardous materials management plan (HMMP) before beginning construction. • It is anticipated that multiple HMMPs will be prepared for the overall Project construction activities, each considering site-specific conditions such as hazardous materials present on site and known historic site contamination. • The HMMP will include, but not be limited to, the following measures or practices. ○ Fuel, oil, and other petroleum products will be stored only at designated sites. ○ Hazardous materials containment containers will be clearly labeled with the identity of the hazardous materials contained therein, handling and safety instructions, and emergency contact information. ○ Storage, use, or transfer of hazardous materials in or near wet or dry streams will be consistent with the Fish and Game Code (Section 5650) and/or with the permission of California Department of Fish and Wildlife (CDFW). ○ Material Safety Data Sheets (MSDS) will be made readily available to the contractor's employees and other personnel at the work site. ○ The accumulation and temporary storage of hazardous wastes will not exceed 90 days. ○ Soils contaminated by spills or cleaning wastes will be contained and removed to an approved disposal site by an appropriately certified hazardous waste disposal contractor. ○ Hazardous waste generated at work sites, such as contaminated soil, will be segregated from other construction spoils and properly handled, hauled, and disposed of at an approved disposal facility by a licensed hazardous waste hauler in accordance with applicable law and regulations. The contractor will obtain permits required for such disposal. ○ Emergency spill containment and cleanup kits will be located at the work site. The contents of the kit will be appropriate to the type and quantities of chemical or goods stored at the work site.	• Authority • Contractors • Construction Monitor	• Prior to and during construction • Post construction for substances used during operation and maintenance	• The construction contractors will provide all HMMPs to the Authority for review and approval prior to commencing construction activities. • Maintain a database on known historic instances of contamination and results of any field inspections regarding the presence of hazardous chemicals. • The contractor will obtain permits required for hazardous waste generated at work sites to be disposed of at an approved facility by a licensed hazardous waste hauler in accordance with applicable law and regulations. • The Authority will monitor contractor development of HMMPs by including this requirement in construction contracts. • The Authority will review all HMMPs developed by the construction contractor to ensure compliance with this environmental commitment and inclusion of the measures and practices listed above. • During construction, the Construction Monitor will monitor implementation of specific protocol for the proper handling and disposal of hazardous materials of the measures and practices included in each HMMP by the construction contractor. • The Construction Monitor will immediately report any deficiencies in compliance with the HMMP to the Authority. • The construction contractor will report any inability to comply with the HMMP and any spills of hazardous waste to the Authority immediately.	• City, county, state, and federal emergency response agencies. • Storage, use, or transfer of hazardous materials in or near wet or dry streams will be consistent with the Fish and Game Code (Section 5650) and/or with the permission of CDFW.
BMP-31	Implementation of Onsite Security Measures and/or Personnel at Construction Sites	• As appropriate, provide 24-hour onsite security either through technological means or personnel. • Monitor construction sites, including staging and equipment storage areas. • If private patrol security operators are hired to provide site security, these personnel will have appropriate licenses from the California Bureau of Security	• Contractor(s)	• Before and during, construction.	• None.	• None

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		and Investigative Services. Individual security personnel will have a minimum-security guard registration license that meets the California Bureau of Security and Investigative Services requirements for training and continuation training as required for that license. • All security personnel will also receive environmental training similar to that of onsite construction workers so that they understand the environmental conditions and issues associated with the various areas for which they are responsible at a given time.				
BMP-32	Notification of Construction Activities in Waterways	• Before work begins in the Sacramento River for Alternative 2, post information at nearby marinas and public launch ramps. Specific locations of these notices will be determined by informed stakeholders. • This information will include maintenance site location(s), maintenance schedules, speed limits, and identification of no-wake zone and/or detours, where applicable. • Information on detours will include site-specific details regarding any temporary partial channel closures, including contacting boating organizations, marina operators, city or county parks departments, and California Department of Parks and Recreation (DPR), where applicable.	• Authority • Contractors	• At least 30 days prior to any work in waterways during construction, operations, and maintenance.	• The Authority will determine specific location and types of notices to be provided. Once these are determined, the Authority will contract with the appropriate construction contractor to implement notification and will then monitor implementation and ensure that posting of information is complete 30 days prior to in-water activities.	• Boating organizations • marina operators • city or county parks departments • DPR • U.S. Coast Guard or USACE
BMP-33	Implementation of a Worker Environmental Awareness Program (WEAP)	• All construction crews and contractors will attend WEAP training prior to working in the Project area. • The WEAP training will include documentation and a review by qualified resource specialists of the special-status species and tribal, archaeological, historic built, paleontological, and other sensitive resources and areas within the area of disturbance for a particular facility; the locations of sensitive biological resources and their legal status and protections; measures to be implemented for avoidance of these sensitive resources; and review of other required environmentally related resources for all construction personnel working on site at a particular facility footprint.	• Authority • Contractors	• Prior to the onset of construction, including mobilization and vegetation clearing, and when new personnel are added to the Project. • Construction tailgate briefings	• A record of all personnel trained will be maintained by each contractor and submitted to the Authority. • The Authority will present WEAP training documentation upon request by regulating or permitting agencies.	• CDFW • U.S. Fish and Wildlife Service (USFWS) • Authority
BMP-34	Development and Implementation of Fish Rescue and Salvage Plans for Funks Reservoir, Stone Corral Creek, Funks Creek, and CBD for Alternatives 1, 2, and 3; for Sacramento River for Alternative 2	• Fish herding and/or rescue operations will occur at any in-water construction site where dewatering and resulting isolation of fish may occur (e.g., when dewatering creates isolated pools within the stream channel). • The plans will identify the appropriate procedures (i.e., detailed fish collection, holding, handling, release, and relocation procedures and methods; and equipment) for herding and removing fish from the construction zone and preventing fish from re-entering the construction zone during construction, or prior to dewatering. • Capture, handling, holding, release, and relocation measures will be consistent with the general guidelines and procedures set forth in Chapter 9 of the most recent edition of the CDFW California Salmonid Stream Habitat Restoration Manual (California Department of Fish and Game 2010) to minimize impacts to species. • The appropriate fish collection method will be determined by a qualified fish biologist for all species of interest, in consultation with the designated resource agency biologist, and based on site-specific conditions prior to dewatering and other in-water construction activities.	• Authority • Qualified fish biologist	• Prior to and during construction	• The Authority will oversee development of the Plans in coordination with the Agencies. • The Authority will submit plans to the appropriate resource agencies (CDFW, USFWS, and the National Marine Fisheries Service [NMFS]) for their review and acceptance. • The fish rescue team will notify the contractor when the fish rescue has been completed and that dewatering can recommence. The results of the fish rescue and salvage operations (including date, time, location, comments, method of capture, fish species, number of fish, approximate age, condition, release location, and release time) will be reported to the	• CDFW • USFWS • NMFS

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Prior to construction site dewatering, fish will be herded and/or captured and relocated to minimize direct mortality and other forms of take. • All fish rescue and salvage operations will be conducted under the guidance of a qualified fish biologist. These activities will occur as soon as possible after completion of the activity which results in fish being trapped. • Unless otherwise required by these permits, the Authority, in undertaking construction at the construction sites, will provide the following: ○ A minimum 7-day notice to the appropriate fish regulatory agencies, prior to an anticipated activity that could result in isolating fish, such as installation of a coffer dam. ○ A minimum 48-hour notice to the appropriate fish regulatory agencies of dewatering activities that are expected to require fish rescue. ○ Safe working access for the appropriate fish regulatory agency personnel to the construction site for the duration of implementation of the fish rescue plan. ○ Temporary cessation of dewatering if fish rescue workers determine that water levels may drop too quickly to allow successful rescue of fish. ○ A work site that is accessible and safe for fish-rescue workers.			appropriate resource agencies, as specified in the pertinent permits. • Monitoring the implementation of the Fish Rescue and Salvage Plans and effectiveness of fish salvage and rescue will be species-, site-, and method-specific, and will be established within each Plan in coordination with the appropriate agencies.	
BMP-35	Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities	• Prepare a construction monitoring plan for the protection of fish, wildlife, and plant species. The plan will include, but not be limited to the following elements. ○ Reference to applicable items in the SWPPP. ○ A summary of preconstruction surveys required for special-status species. ○ Descriptions of measures to be implemented. ○ Descriptions of monitoring parameters (e.g., turbidity), including the specific activities to be monitored (e.g., dredging, grading activities) and monitoring frequency and duration (e.g., once per hour during all in-water construction activities), as well as parameters and reporting criteria. • All in-water construction activities within the Sacramento River under Alternative 2 will be conducted during the allowable in-water work window of September 1 through October 15 and within non-anadromous waters (e.g., Funks Creek, Stone Corral Creek, CBD) from June 1 through October 15 for the protection of fish species. • Qualified biologists will monitor construction activities in sensitive natural communities and in areas identified as suitable habitat for special-status species. The biological monitors will have the authority to temporarily stop work in any area where a special-status species has been observed until that individual has passively or physically been moved outside of the work area, or if any measures are not functioning appropriately for the protection of fish, wildlife, or plant species. • Biological monitors will be professional biologists selected for their knowledge of the special-status species and natural communities that may be affected by construction activities. The qualifications of the biologist(s) will be submitted to the fish and wildlife agencies for review and written approval prior to initiating construction.	• Authority	• Prior to construction • Implementation of plan during construction	• The Authority will appoint construction biological monitor(s) to oversee implementation of BMPs, mitigation measures, and requirements in permits and approvals by the agencies. The construction monitor will also perform inspections as necessary to ensure compliance by construction contractors with these measures and coordinate inspections by other appointed monitors and inspectors. • Prior to construction, the construction monitor will report to the Authority on the status of the monitoring plans. • During construction, the construction monitor will report to the Authority periodically or as agreed upon on the results of construction inspections related to the measures and compliance with wildlife agency requirements. • Water quality monitoring per SWPPP • Construction monitor to maintain a daily log of construction activities, notes any problems identified and solutions implemented to rectify those problems, and notifications to	• USFWS • NMFS • CDFW

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• High-visibility temporary fencing, temporary signs, staking and flagging, or other visual barriers (pylons and flagging) will be used to identify sensitive biological resources and Project personnel will be advised to avoid disturbance of these areas. These areas will be identified during pre-activity surveys. Signs, staking/pylons, and flagging will be inspected by the biological monitor in accordance with permit conditions and mitigation measures and maintained as necessary. • On-site vehicles will be limited to a speed of 15-20 miles per hour on unpaved roads. Personnel driving vehicles in the Project area will observe the posted speed limit of 20 miles per hour (mph) on paved roads. • All ingress/egress at the Project site will be restricted to those routes identified in the Project plans and description. Construction vehicles and equipment will restrict off-road travel to the designated construction areas • All vehicle parking will be restricted to established areas, existing roads, or other suitable areas. • All food-related trash will be disposed of in closed containers and removed from the work area daily during the work period. Personnel will not feed or otherwise attract fish or wildlife to the work site. • No firearms will be allowed on the Project site except for those carried by authorized security personnel or local, state, or federal law enforcement officials. • To prevent harassment, injury, or mortality of sensitive wildlife, pets will not be permitted in the active construction area. • To prevent inadvertent entrapment of wildlife during construction, all excavated, steep-walled holes, trenches, or pits more than 1 foot deep will be covered at the close of each working day with plywood or similar material. Dirt will be shoveled around all the edges of the plywood or other material to prevent animals from crawling under it. In cases where trenches or pits cannot be covered, a section of the trench or pit will be partially backfilled to create an earthen ramp with a 3:1 slope. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If a special-status species is encountered during construction work, construction activities will be diverted away from the animal until it can be moved by a USFWS- or CDFW-approved biologist. • Plastic monofilament netting or similar material will not be used for erosion control, because smaller wildlife may become entangled or trapped in it. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds. This limitation will be communicated to the contractor through specifications or special provisions included in the construction bid solicitation package. • All construction pipes, culverts, or similar structures; construction equipment; or construction debris left overnight in areas that may be occupied by wildlife will be inspected by the biological monitor prior to being used for construction. Such inspections will occur at the beginning of each day's activities, for those materials to be used or moved that day.			the construction superintendent and/or the fish and wildlife agencies regarding any exceedances of specific parameters (i.e., turbidity) or observations of special-status species. The monitoring log will also document construction start/end times, weather and general site conditions, and any other relevant information.	
BMP-36	Control of Invasive Plant Species during Construction	• All construction crews and contractors will be educated during the WEAP training about the importance of not spreading invasive plants.	• Authority • Qualified construction	• Prior to construction	• The Authority will monitor and manage invasive species locations throughout construction	• None

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BMP #	Best Management Practice(s)	Key Features	Responsible Party(ies)	Timing	Monitoring and Reporting Requirements	Regulating or Permitting Agency
		• Localized infestations of invasive plants with a California Invasive Plant Council rating of moderate or high will be identified and mapped during the botanical surveys. These areas will be flagged and avoided during construction. If these areas cannot be avoided, vegetation will be removed and bagged for disposal at a waste facility prior to work in these areas. • If areas to be cleared contain invasive plants, then chipped vegetation material from those areas will not be used for erosion control; in these cases, the material will be disposed of to minimize the spread of invasive plant propagules (e.g., burning, composting). • Upon completion of the Project, all areas subject to temporary ground disturbances will be recontoured to pre-Project elevations, as appropriate and necessary, and revegetated with native vegetation to promote restoration of the area to pre-Project or better conditions. An area subject to "temporary" disturbance is any area that is disturbed to allow for construction of the Project, but is not required for operation or maintenance of any Project-related infrastructure, will not be subject to further disturbance after Project completion, and has the potential to be revegetated. • Infestations of invasive plant species will be targeted for control or eradication as part of the revegetation of temporarily disturbed construction areas. • Appropriate methods and native plant species used to revegetate such areas will be determined on a site-specific basis in consultation with qualified biologists; site-specific characterization will include slope, soil, drainage, and exposure to determine appropriate plants.	biological monitor(s) or biologists	• During construction and immediately post construction	• This information will be compiled into a report and used to inform the management of invasive species during operation and maintenance	
BMP-37	Shading of Work Lighting for Nighttime Work (Alternative 2 Discharge Location on Sacramento River)	• If any nighttime construction work will be necessary, work lights will be shaded to minimize illumination of water in order to minimize disturbance to fish and wildlife species.	• Authority	• Before construction	• Included on construction design requirements	• None

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2D.2 Initial Sites Reservoir Fill Plan

Purpose: The Authority will prepare an Initial Sites Reservoir Fill Plan to describe the initial filling of the reservoir and the monitoring program for the Sites and Golden Gate Dams, saddle dams, saddle dikes, and areas around the reservoir during its initial filling. This document is required by the DSOD.

Outcomes: Implementing the Initial Sites Reservoir Fill Plan will allow the Authority to fill the reservoir safely.

Content: The Initial Sites Reservoir Fill Plan will describe:

- Initial filling rates and hold points.
- Visual monitoring and inspection paths and frequency.
- Instrumentation monitoring frequency, initial thresholds and actions.
- Roles and responsibilities.

Timing: The Authority will complete preparation of the Initial Sites Reservoir Fill Plan approximately 1 year prior to beginning to fill Sites Reservoir and submit the plan to DSOD for review and approval.

2D.3 Reservoir Management Plan

Purpose: The Authority will prepare a Reservoir Management Plan (RMP) to protect and maintain water quality during the operation of the reservoir. This plan will describe the management of water resources in Sites Reservoir, including monitoring water quality, fisheries management (i.e., managing reservoir to minimize accumulation of mercury and other metals in stocked fish), ~~and~~ vector management, ~~and management of including~~ invasive aquatic plant species.

Outcomes: Implementing the RMP will ensure the Authority identifies and implements water quality metrics, standards, testing and monitoring protocols, and actions to respond to water quality concerns (depending on monitoring results) to maintain and protect water quality. The RMP will also protect downstream habitats from spread of invasive aquatic plant species.

Content: The RMP will contain protocols for water quality measurements including the frequency and location of measurements in the reservoir, the source water, and the reservoir discharge for certain water quality constituents. Water quality metrics, standards, testing, and protocols will follow information and guidance available from the Central Valley Regional Water Quality Control Board (Central Valley RWQCB). The RMP will include measures to address emerging water quality concerns, such as protocols for invasive aquatic weed control, potential adjustments to inflow and release volumes, minimum reservoir storage levels, and inlet/outlet (I/O) port selection. The final RMP will be prepared after meetings and consultation with regulatory agencies and other stakeholders. ~~The RMP is, and will continue to be throughout~~

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~~the operation of the Project, a comprehensive location for information regarding water quality.~~ The Authority has already developed testing and monitoring protocols for several water quality constituents, which are described in Sections 2D.3.1 through 2D.3.5 and incorporated into the impact analysis for Chapter 6, *Surface Water Quality*. In addition, mitigation measures in Chapter 6 also incorporate some of the information described below.

Timing: Preparation of the RMP will occur prior to initial filling of the reservoir. The timing of testing and monitoring will vary depending on the constituent analyzed, as described below. Furthermore, the RMP is, and will continue to be, revised throughout the operation of the reservoir. Revisions to the RMP will account for changes to operations, site-specific conditions, adaptive management actions and decisions, and future changes to regulations or methodologies for evaluating water quality constituents.

Additional water quality monitoring is included in ~~the~~an aquatic study plan for Funks Creek and Stone Corral Creeks, as described in Section 2D.4, *Stone Corral Creek and Funks Creek Aquatic Study Plan and Adaptive Management*. The Studies Plan for the creeks includes monitoring of general water quality parameters, metals (including mercury), cyanobacteria, cyanotoxins, nutrients, and water temperature.

2D.3.1 Harmful Algal Blooms

Water quality management in Sites Reservoir as it relates to harmful algal blooms (HABs) will include implementation of a water quality monitoring program and a HABs action plan (described below) to minimize the potential for adverse effects on beneficial uses of water in Sites Reservoir and downstream.

In addition to water quality monitoring and implementation of the HABs action plan, general informational signage on HABs will be placed in visible locations around the reservoir, as well as at Peninsula Hills Recreation Area, Stone Corral Creek Recreation Area, boating kiosks, the day-use boat ramp, and/or parking areas. The signage will include basic information regarding what HABs are; how to recognize a bloom; the potential health effects of cyanotoxins; the common signs and symptoms of exposure to cyanotoxins; how to avoid recreational exposure to cyanotoxins; and information about the potential health risks to pets. All reservoir personnel will be made aware of the potential health risks of cyanotoxins and will be provided with the appropriate personal protective equipment, as needed, to reduce the potential for exposure to cyanotoxins.

1. **Water Quality Monitoring**

    a. ~~Annual seasonal~~Visual monitoring for benthic and planktonic HABs will occur ~~monthly~~seasonally, at a minimum, beginning approximately April 15 and continuing through October. Seasonal monitoring will commence with the initial filling of Sites Reservoir. Monitoring will begin earlier than April 15 if blooms are suspected. Initial early-season monitoring will consist of visual inspection and water sampling. Visual monitoring will be implemented consistent with the Surface Water Ambient Monitoring Program's (SWAMP's) *Visual Guide to Observing Blooms* (California

Commented [A1]: Consider incorporating the possibility of benthic mat samples through the language of this plan.

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Water Quality Monitoring Council 2017a) in the *California Freshwater Harmful Algal Bloom Field Guide* (SWAMP HAB Field Guide) (California Water Quality Monitoring Council 2018). Visual inspection will be made at several locations including along the perimeter of the reservoir, including and near the I/O tower.

b. It may be necessary to confirm that a suspected bloom is a cyanobacteria bloom rather than a non-toxic algal bloom. In this case, field microscopy will used to identify if cyanobacteria are present; water samples will be collected at multiple locations within the reservoir and downstream for microscopic visualization consistent with standard operating procedures in the SWAMP HAB Field Guide, which are currently under development. A qualified water quality specialist familiar with identifying cyanobacteria or otherwise appropriately trained person will be responsible for obtaining grab samples and visualizing the samples with a field microscope. If toxic benthic algal mats are suspected, their presence or absence will be confirmed with microscopy.

   Qualified personnel conducting water sampling will follow all applicable steps in the *Standard Operating Procedures – Site Reconnaissance* section of the SWAMP HAB Field Guide (California Water Quality Monitoring Council 2017b) or develop a similar protocol to maintain consistency in sampling and record keeping. This standard operating procedure is intended to describe general and specific methods, procedures, and considerations on documenting the spatial and logistical aspects of each sampling site.

c. If the presence of cyanobacteria is confirmed, additional water samples will be taken for the purpose of laboratory analysis for cell density and or the presence of cyanotoxins (specifically microcystins, anatoxin-a, and cylindrospermopsin) to determine if the trigger levels for planktonic (water column) HABs have been met (see Table 2D-2 or as amended or updated).

Commented [A2]: Consider incorporating the possibility of benthic mat samples through the language of this plan.

Table 2D-2: California Cyanobacteria and Harmful Algal Bloom Network Trigger Levels for Posting Planktonic Advisory Signs

Criteria	No Advisory[a]	Caution (Tier 1)	Warning (Tier 2)	Danger (Tier 3)
Total Microcystins[b]	< 0.8 µg/L	0.8 µg/L	6 µg/L	20 µg/L
Cylindrospermopsin	< 1 µg/L	1 µg/L	4 µg/L	17 µg/L
Anatoxin-a	Non-detect[c]	Detected[c]	20 µg/L	90 µg/L
Cell Density of Potential Toxin Producers	< 4,000 cells/mL	4,000 cells/mL	----------	----------
Site-Specific Indicators	No site-specific indicators present	Discoloration, scum, algal mats, soupy or paint-like appearance. Suspected illness	----------	----------

Source: California Water Quality Monitoring Council 2021.

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µg/L = microgram per liter.
[a] For de-posting, all criteria for no advisory must be met for a minimum of 2 weeks. General awareness sign may remain posted and healthy water habits are still recommended.
[b] Microcystins refers to the sum of all measured Microcystin congeners.
[c] Using an analytical method that detects ≤ 1 µg/L anatoxin-a.

d. Visual and water quality monitoring will continue on a regular basis until cell density and cyanotoxin concentrations at any monitored location exceeds the "Caution" action trigger level. When cell density is at or above the caution action trigger level and/or cyanotoxin concentrations are at or above the trigger levels identified in Table 2D-2, the HABs Action Plan will be implemented.

2. HABs Action Plan

a. Reservoir mMonitoring and water sampling frequency will increase from monthly to approximately bi-weekly when the "Caution" action trigger level is reached (per cell density and or cyanotoxin concentrations). When the "Caution" trigger level is met or exceeded, the Authority will report this to the HABs Hotline (managed by the State Water Resources Control Board [State Water Board] and the Regional Water Quality Control Boards) as follows:

- Online: Freshwater Bloom Incident Form
- phone: 1 (844) 729-6466 (toll free)
- email: CyanoHAB.Reports@waterboards.ca.gov

b. The Authority will coordinate the State Water Board and the Central Valley RWQCB for posting advisory warning signs corresponding to the "Caution", "Warning" or "Danger" trigger level (as applicable based on cell density and cyanotoxin concentration). The information displayed on each of these three "types" of signs will be consistent with the Planktonic HAB Advisory Signs available on the California Water Quality Monitoring Council's website but will also address boating restrictions as well.[1]

- The "Caution" sign will warn the public that harmful algae may be present in the reservoir and that swimming is allowed but should be avoided near algae and scum in the water. In addition, the sign will note the following:
  - boaters should exercise caution near visible algae in the water and avoid boating in areas of the reservoir where algae is present;
  - children should be kept away from algae in the water or on shore;
  - pets should not be allowed in the water or allowed to drink the water;

Commented [A3]: This section does address preventing some of the human health risks associated with HABs however, this plan does not consider negative impacts to fish and wildlife that frequently occur as a result of HABs. CDFW recommends including mitigation to address these risks in the Action Plan. At a minimum the project should consider reporting fish and wildlife deaths and illnesses to the Freshwater Bloom Incident Form.

Commented [A4]: Visual observations of a bloom should also trigger this "caution level"

[1] The Planktonic HAB advisory signs are available in both English and Spanish through the California Water Quality Monitoring Council at the following Web address: https://www.mywaterquality.ca.gov/habs/resources/habs_response.html.

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- fillets from fish caught in the reservoir should be cleaned with tap or bottled water before cooking, and guts thrown away;
- shellfish from the reservoir should not be consumed; and
- water from the reservoir should not be used for drinking or cooking, and boiling or filtering will not make the water safe.

- The "Warning" sign will warn that toxins from algae in the reservoir can harm people and kill animals. Further, the sign will note the following:
  - no boating is allowed;
  - no swimming is allowed;
  - stay away from scum, and cloudy or discolored areas in the reservoir;
  - pets should not be allowed to go into or drink the water, or go near scum;
  - fillets from fish caught in the reservoir should be cleaned with tap or bottled water before cooking, and guts thrown away;
  - shellfish from the reservoir should not be consumed; and
  - water from the reservoir should not be used for drinking or cooking, and boiling or filtering will not make the water safe.
- The "Danger" sign will warn that toxins from algae in the reservoir can harm people and kill animals. Further, the sign will note that the following:
  - no boating is allowed;
  - stay out of the water until further notice;
  - do not touch scum in the water or on shore;
  - pets should not be allowed to go into or drink the water, or go near scum;
  - fillets from fish caught in the reservoir should be cleaned with tap or bottled water before cooking, and guts thrown away;
  - shellfish from the reservoir should not be consumed; and
  - water from the reservoir should not be used for drinking or cooking, and boiling or filtering will not make the water safe.

Advisory warning signs will be placed in visible locations around the reservoir, and at Peninsula Hills Recreation Area, Stone Corral Creek Recreation Area, boating kiosks, the day-use boat ramp, and parking areas. In addition, reservoir operations staff will be notified and informed of the potential health risks associated with cyanobacteria and cyanotoxins.

c. Based on visual monitoring, if there are HABs near the I/O tower, water sampling will occur at multiple depths and locations in the vicinity of the tower and downstream, as necessary, to assess cyanobacteria and cyanotoxin concentrations. If cyanobacteria and cyanotoxins are confirmed near the I/O tower at a level at or

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exceeding the "Caution" action trigger level, reservoir releases will be made from deeper in the reservoir, as may be necessary to avoid high concentrations of cyanobacteria and cyanotoxins, while still considering other water quality objectives (e.g., water temperature for rice).

d. If toxic benthic algal mats are confirmed, the Authority will coordinate with the State Water Board and the Central Valley RWQCB for posting benthic HABs signs.

e. Caution and safety procedures will be used to prevent direct human contact with a bloom. The SWAMP *Health and Safety Guide* (California Water Quality Monitoring Council 2017c) from the SWAMP HAB Field Guide will be consulted to provide information for personnel protection to minimize risks during water sampling.

f. Once the visual indicators and/or cyanotoxin concentrations in the reservoir are below the posting criteria for planktonic HABs or benthic HABs for a minimum of 2 consecutive weeks, advisory warning signs will be removed in coordination with the State Water Board and/or the Central Valley RWQCB.

g. If HABs become a consistent problem near the I/O tower, additional measures may be implemented, such as oxygenation of the hypolimnion to reduce the release of bottom-sediment nutrients. Reducing reservoir nutrients may help reduce the potential for the formation of HABs and/or the production of cyanotoxins at concentrations exceeding the trigger levels identified in Table 2D-2.

2D.3.2 Methylmercury

The Authority will implement the following actions as part of the RMP to minimize reservoir methylmercury production and bioaccumulation of methylmercury in reservoir fish so that the average methylmercury concentrations in Sites Reservoir fish do not exceed 0.2 mg/kg sport fish objective[2]. Most of these actions are recommended actions for new reservoirs as part of the Statewide Mercury Control Program for Reservoirs (currently under development), as identified in the *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs* (State Water Resources Control Board 2017). The potential effectiveness of these recommended methylmercury reduction actions is supported by current research (State Water Resources Control Board 2017). Methylmercury reduction actions and fish tissue monitoring will be implemented in coordination with the State Water Board and Central Valley RWQCB, as required.

1. Remove vegetation (e.g., brush, trees) in the inundation area prior to initial Sites Reservoir filling.

[2] The average methylmercury concentrations shall not exceed 0.2 milligrams per kilogram (mg/kg) fish tissue within a calendar year. The water quality objective must be applied to trophic level 3 or trophic level 4 fish, whichever is the highest existing trophic level in the water body. The objective applies to the wet weight concentration in skinless fillet. Freshwater trophic level 3 fish are between 150 to 500 millimeters (mm) in total length and trophic level 4 fish are between 200 to 500 mm in total length, or as additionally limited in size in accordance with the "legal size" set for recreational fishing, established by Title 14, California Code of Regulations 14 §§ 1 - 53.03.

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2. Do not stock Sites Reservoir with fish for the first 10 years following its initial filling.

3. Upon completion of the initial filling of Sites Reservoir, implement a fish sampling program to determine whether game fish are present (e.g., due to unauthorized fish stocking) and whether a population has established (i.e., presence of reproductively mature fish and several year classes). This sampling program would include one or two surveys in spring or early summer using a single electrofishing crew. The survey would include several transects along the shoreline, likely in the vicinity of the boat ramps and campgrounds. Once it has been determined that a population of game fish has established in the reservoir, begin Mmonitoring Sites Reservoir fish tissue methylmercury concentrations (as total mercury) in high trophic level species via annual tissue sampling beginning the first year of reservoir stocking for a minimum of 10 years to monitor fish tissue concentrations of methylmercury. Based on results from fish tissue monitoring, and in coordination with the State Water Board, Central Valley Water Board, and the Office of Environmental Health Hazards Assessment, fish consumption warning signs will be posted in several visible locations around the reservoir if fish tissue concentrations exceed the 0.20 mg/kg wet weight (ww) sport fish objective[3]. Sport and prey-sized Ffish tissue from multiple species will be sampled in accordance with the U.S. Environmental Protection Agency's Standard Method 743 (U.S. Environmental Protection Agency 2007) and the State Water Board's Surface Water Ambient Monitoring Program, Bioaccumulation Oversight GroupSafe to Eat Workgroup protocol (Bonnema State Water Resources Control Board 2014,2021, 2022). Mercury in fish tissues will be analyzed according to the U.S. Environmental Protection Agency's Standard Method 7473 (U.S. Environmental Protection Agency 2007, or as updated).

   The annual reservoir mercury monitoring program will continue for a minimum of 10 years following the first year of regulated reservoir stocking.

3.4. Monitor and manage reservoir water chemistry according to methods proven feasible and effective at reducing mercury methylation by pilot tests undertaken in other mercury-impaired reservoirs, as determined by the State Water Board's program review at the conclusion of the Phase 1 pilot tests for the Statewide Mercury Control Program for Reservoirs. Water chemistry management actions may include the addition of an oxidant (e.g., dissolved oxygen, ozone, nitrate) to the reservoir bottom waters (near the sediment-water interface) to reduce anoxia or adjust redox potential when the reservoir is stratified. If this method is employed, reservoir releases will be made from a higher tier (i.e., higher elevation) in the I/O tower to avoid discharging bottom waters. Methylmercury concentrations in the reservoir will be assessed prior to oxidant addition and following reservoir treatment to assess effectiveness of the methylmercury management action at reducing bioaccumulation and fish methylmercury concentrations. Further, if nitrate is added to the reservoir, monitoring of reservoir releases will be implemented to ensure

[3] For evaluating compliance with the sport fish objective, monitoring will include representative trophic level (TL4) fish species, if present, or trophic level (TL3) fish if no TL4 fish are present in the reservoir. A sample will be considered either an analytical result from individual fish tissue or a composite of tissue from several fish. Sample sets for comparison with the sport fish objective shall include a range of TL3 fish between 150 to 500 mm total length and TL4 fish between 200 to 500 mm total length.

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nitrate concentrations in the releases are not substantially increased to avoid potentially affecting downstream surface water quality.

~~4.~~ 5. Manage reservoir fisheries according to methods proven feasible and effective at reducing methylmercury bioaccumulation by pilot tests undertaken in other mercury-impaired reservoirs. Fisheries management actions could include the following.

a. Intensive fishing to reduce fish populations to provide more food resources for remaining fish. This will increase the growth rate in the remaining fish and reduce their methylmercury body burdens through somatic growth dilution.

b. Stock the reservoir with low-methylmercury prey fish for stocked predator fish to consume.

c. Stock more or different sport fish species, including lower trophic level sport fish.

d. Stock large, old predator fish from hatcheries that supply fish with low methylmercury concentrations.

To assess the effectiveness of methylmercury reduction actions after initial implementation, fish tissue methylmercury concentrations (as total mercury) will be monitored. Young fish will be sampled because they have accumulated methylmercury for a shorter time period relative to older, larger sport fish and therefore will better reflect recent mercury exposure (State Water Resources Control Board 2017). Fish tissue methylmercury concentrations in young fish will be assessed prior to implementation of any methylmercury reduction action. The timing and frequency of tissue sampling following implementation of reduction actions will be informed by Phase 1 pilot tests.

To assess the effectiveness of fisheries management actions over the long term, ~~Ongoing~~ ongoing monitoring of aqueous and fish tissue methylmercury in Sites Reservoir will be implemented per ~~permit requirements or~~ conditions in a water right order, Section 401 water quality certification issued pursuant to the Clean Water Act, or other appropriate order issued by the State Water Board and/or Central Valley Regional Water Board ~~to assess the effectiveness of fisheries management actions over the long-term~~.

~~Sites~~ The Authority will coordinate with the Central Valley Regional Water Board to implement mercury/methylmercury control or reduction measures pursuant to the mercury total maximum daily load and implementation program for reservoirs (State Water Resources Control Board 2017), once adopted.

2D.3.3 Metals

The metals evaluation will focus on metals that may be affected by flow in the Sacramento River and that have concentrations that are close to or above water quality standards. These include aluminum, copper, iron, and lead. Hexavalent chromium will also be measured, at least for the first year, due to limited existing data for the Sacramento River. Measurements of metal concentrations will be accompanied by measurements of pH, DOC, and hardness because these parameters influence water quality standards for aquatic life protection for some metals.

Past studies of metal concentrations in the Sacramento River have not focused on high flows that will be the source water for Sites Reservoir. Metal concentrations at the diversion(s) will be

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measured within 24 hours of the start of diversions at RBPP and every 2 weeks during continuous diversions. Eventually these data will improve understanding of the circumstances that cause elevated concentrations and may allow some metal measurements to serve as surrogates for others. After 2 years of measuring metal concentrations in the diversions, the frequency of measurements will decrease to monthly.

Metal concentrations will also be measured at Golden Gate Dam every other month on the surface, at mid-depth, and bottom third of the reservoir and in Stone Corral Creek approximately half a mile downstream from Sites Dam. For Stone Corral Creek, these measurements will also occur for a year prior to construction to better establish ~~existing baseline~~ conditions. In addition, metal concentrations in the main Sites Reservoir release, the Dunnigan Pipeline, and the Sacramento River upstream of the Sites discharge will be measured every other month when water from Sites Reservoir is being discharged to the Sacramento River. If Sites water is released to the CBD, metal concentrations will also be measured in CBD upstream of the Dunnigan Pipeline.

To evaluate the potential metal effects in Yolo Bypass, metal concentrations will be measured in samples collected at the downstream end of the CBD and at two locations in the Yolo Bypass, one in the Tule Canal and the other in the Toe Drain. Samples will be collected monthly during June–October to evaluate concentrations before and during the period of CBD discharge to the Yolo Bypass.

The metal measurements will be used to understand differences between intake and release concentrations and the effects of in-reservoir processes such as settling of suspended sediment and actions such as selection of I/O tower tier for releases. Measurements will also be used to determine if there are vertical differences in concentration, to understand the effect of TC Canal operations and conveyance volumes on metals concentrations, and to inform actions to be taken as described in Mitigation Measures WQ-2.1 and WQ-2.2.

As understanding of metal processes is refined over time and if concerns regarding metals are diminished, monitoring intensity may be reduced.

2D.3.4 Water Temperature

The I/O tower ports/tiers will be operated to meet a rice-growing temperature objective of 65°F or higher during the rice growing season (May through September). Warm releases will also benefit native fish in Funks Creek, which are accustomed to the warm temperatures present in this creek under ~~existing baseline~~ conditions. During March through October, vertical water temperature profiles will be measured once every ~~two~~ 2 weeks at 5-foot intervals to inform decisions about which tiers of the I/O tower to use.

2D.3.5 Salt Pond

Data regarding the Salt Pond is limited regarding the flow and water quality of the salt springs that feed it. Prior to initial filling of Sites Reservoir, after land has been acquired, and during the construction phase, there will be monthly measurements of flow, electrical conductivity (EC), and metals (aluminum, copper, iron, lead, manganese, and nickel) for up to 1 year at the salt springs. These measurements will be collected in accordance with standard procedures and will provide a better understanding of the potential salt and mineral load from the salt springs. Water

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samples for these measurements will be taken from locations where water is emanating from these springs. One to three springs with the most discharge will be selected for sampling. Measurements will also be taken at a location in the pond distant from the springs to understand whether evapoconcentration or other spring input may be affecting water quality.

The amount of mixing of spring water with reservoir water is uncertain and will depend on EC, temperature, reservoir inflows, and reservoir releases. To determine whether saline spring water is accumulating at the bottom of the reservoir near Golden Gate Dam, EC measurements will be taken at the same times and locations in Sites Reservoir as the metal concentrations measurements in Section 2D.3.3.

If monitoring indicates the possibility of substantial increases in EC in the reservoir release due to temporary entrainment of accumulated salt spring water, reservoir operations will be modified to prevent this phenomenon by gradually discharging accumulated spring water. Reservoir modifications will be made gradually and may include modifications to discharge volume or selection of I/O tower tiers. For example, releases from lower-level and higher-level tiers may be blended to ensure adequate water quality. As these modifications are made, EC of the reservoir discharge will be measured hourly with a continuous device recorder to ensure that EC remains below 1,000 µmhos/cm.

2D.3.6 Invasive Aquatic Plant and Invertebrate Species

2D.3.6.1 Invasive Aquatic Plants

The Authority will implement actions to control the spread of nonnative invasive aquatic plants (submerged and floating) in Sites Reservoir. These actions will be consistent with existing control methods employed by the California Department of Boating and Waterways (DBW) under the Aquatic Invasive Plant Control Program (AIPCP). There are two programs within the AIPCP, Floating Aquatic Vegetation (FAV) and Submersed Aquatic Vegetation (SAV), that include management and control methods and monitoring. Implementation of nonnative invasive aquatic vegetation control will minimize potential for adverse effects of nonnative invasive aquatic plant species on Sites Reservoir and downstream habitats.

Typical nonnative aquatic invasive species targeted using the FAV control methods include water hyacinth (*Eichhornia crassipes*), South American spongeplant (*Limnobium laevigatum*) and Uruguay water primrose (*Ludwigia hexapetala*). Infestations of these plants can alter dissolved oxygen cycles, displace native plant species, shade shallow-water fish habitat, block waterways, and clog water intakes. Control methods for these species can include use of herbicides, mechanical (machine harvesting), biological (natural control agents, such as water hyacinth weevils), and hand picking. Monitoring included in this program includes checking herbicide-treated areas to ensure herbicide concentrations do not exceed allowable limits or have adverse effects on water quality. (California State Parks Division of Boating and Waterways 2021a).

The submersed nonnative aquatic invasive plant species targeted by the SAV control methods include Brazilian waterweed (*Egeria densa*), curlyleaf pondweed (*Potamogeton crispus*), Eurasian watermilfoil (*Myriophyllum spicatum*), coontail (*Ceratophyllum demersum*), and fanwort (*Cabomba caroliniana*). Coontail (*Ceratophyllum demersum*), which is native to

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California, is a submersed aquatic invasive plant species that is also targeted by DBW. Infestations of submersed invasive plants can have similar effects as the floating invasive species, as well as reducing water flow and trapping sediment. Control of submersed aquatic invasive plants is primarily through the use of herbicides that are approved for aquatic use by the U.S. Environmental Protection Agency and the California Department of Pesticide Regulation. The other FAV control methods, particularly mechanical control, are not applicable for submersed species, because they readily spread by small fragments that can be left behind by machine harvesting. Monitoring included in this program includes checking herbicide-treated areas to ensure herbicide concentrations do not exceed allowable limits or have adverse effects on water quality. (California State Parks Division of Boating and Waterways 2021b).

2D.3.6.2 Invasive Aquatic Invertebrates

Aquatic invertebrates including the New Zealand mudsnail (*Potamopyrgus antipodarum*), quagga mussels (*Dreissena rostriformis bugensis*), ~~and~~ and zebra mussels (*Dreissena polymorpha*) are invasive, and Chinese mystery snail (*Cipangopaludina* [=*Bellamya*] *chinensis*) that are non-invasive, are all nonnative freshwater invertebrates that compete with native and sport fish species for food. These invertebrates can be spread between waterbodies by attaching to boats, trailers, and recreational equipment or via standing water from an infested waterbody trapped in equipment or containers, including boat bilges, watercraft engines, and buckets. (California State Parks Division of Boating and Waterways 2021c; California Department of Fish and Wildlife 2021).

To minimize the potential for adverse effects of invasive aquatic invertebrates on Sites Reservoir and downstream habitats, the Authority will implement watercraft inspections at the reservoir. All watercraft and watercraft trailers intending to enter the reservoir will be inspected prior to launching. Inspection protocols will be consistent with the *Uniform Minimum Protocols and Standards for Watercraft Inspection and Decontamination Program for Dressenid Mussels in the Western United States* (Pacific States Marine Fisheries Commission 2016) and inspectors will be trained to identify invasive aquatic invertebrates as well as trained in the inspection protocol. If watercraft and associated equipment is suspected of having invasive aquatic invertebrates on board, access to the reservoir will be denied. In addition to the inspection program, the Authority will post signage at the day-use boat ramp, Peninsula Hills Recreation Area, Stone Corral Creek Recreation Area, and any additional future recreational areas at the reservoir, alerting boaters/recreationists to the harmful effects of invasive ~~mussels~~ organisms on aquatic ecosystems and directing them to clean, drain, dry and inspect their watercraft and equipment after recreating in any waterbody for attached mussels, snails, of other potentially invasive organisms..

2D.3.6.3 Vector Control

Coordinate with Glenn County Mosquito and Vector Control District (MVCD) and the Colusa County Environmental Health Department (including the Colusa County Mosquito Abatement District) related to implementation of standard local, state, and federal vector control requirements during operation of all facilities. Best management practices include:

- Implement monitoring and sampling programs to detect early signs of mosquito population problems
- Use biological agents such as mosquito fish to limit larval mosquito populations

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- Use larvicides and adulticides, as necessary. If larvicides and adulticides are required, the Authority will evaluate the effects of the chemicals and, if required, prepare a monitoring program for review by fish and wildlife agencies to evaluate effects, if any, application will have on macroinvertebrate and associated covered fish species.

2D.4 Stone Corral Creek and Funks Creek Aquatic Study Plan and Adaptive Management

~~2D.4 Technical Studies Plan and Adaptive Management for Funks and Stone Corral Creeks~~

The Authority is preparing a Stone Corral Creek and Funks Creek Aquatic Study Plan (Aquatic Study Plan) ~~Technical Studies Plan prior to construction activities~~ to guide fisheries technical studies to be conducted prior to and during construction activities, as well as ongoing monitoring during operations. Using information from these field studies, along with currently available information, the Authority will prepare a Funks Creek and Stone Corral Creeks flow schedule that could be incorporated into the Reservoir Operations Plan ~~that~~ and will identify the approach for releases, including release schedules and volumes, a monitoring plan, and an adaptive management plan to maintain fish in good condition consistent with California Fish and Game Code Section 5937 in Funks Creek and Stone Corral Creeks. Releases into Funks Creek will be made through the transition manifold ~~at the base of Golden Gate Dam~~ and a new pipeline that terminates at Funks Creek below the dam. These facilities will carry up to 100 cubic feet per second (cfs) with a release range of 0 to 100 cfs into Funks Creek. Releases into Stone Corral Creek will be made through the permanent outlet at Sites Dam. This outlet will have a release range of 0 to 100 cfs, with an emergency release capacity of ~~up to 2,500 cfs~~approximately 4,700 cfs.

The ~~technical studies~~Aquatic Study Plan ~~plan will be~~is being developed during the permitting and design process and will be adopted prior to land acquisition. Preparers of the plan ~~will be~~are technical experts in consultation with fisheries experts from CDFW, ~~NMFS,~~ and USFWS. The contents of the ~~technical studies~~Aquatic Study Plan, which will gather data ultimately used to adaptively manage flows released into Funks Creek and Stone Corral Creeks, include ~~are described below~~the following components further described below: fish monitoring, a Surface Water Ambient Monitoring Program (SWAMP) bioassessment study (including additional water quality monitoring), a hydrogeomorphic study, and a temperature study.

The hydrogeomorphic study will examine the current hydrologic regime of Funks Creek and Stone Corral Creeks. In context with the studies from other disciplines (fish assemblages, SWAMP bioassessment, etc.), consideration will be given to when and how flows might be released, whether a portion of these flows are needed to maintain fluvial geomorphic processes (based on the findings from the geomorphic assessment), and what level of variability in base flows will satisfy California Fish and Game Code Section 5937 goals consistent with the goals and objectives of the Project. Various approaches to estimate minimum streamflows to maintain ecosystem and geomorphic function, such as "the functional flow" approach suggested by

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Yarnell et al. (2015), the Instream Flow Incremental Methodology (IFIM) (National Biological Service, U.S. Department of the Interior 1995), the CDFW Instream Flow Program, the California Environmental Flows Framework and the Richter et al. (2011) approach will be investigated for their applicability to determine appropriate streamflows on Funks Creek and Stone Corral Creeks. Coordination with CDFW, USFWS, and Colusa County will be required before a method is selected.

2D.4.1 Fish Assemblage and Available Habitats

Purpose: Maintain fish populations below the dam in good condition in compliance with Fish and Game Code 5937. Identify and document ~~existing~~ fish assemblages in ~~Stone Corral~~ Funks Creek and ~~Funks~~ Stone Corral Creeks (pre-construction baseline) then monitor to identify any departure from baseline and allow for adaptive management of releases (after construction and operation), including fish species presence, ~~and~~ habitat use, and characterization of habitats available (e.g., spawning, rearing, foraging, and sheltering habitats) at varying flow levels.

Outcomes: Quantitative and qualitative monitoring data to fully characterize the ~~type of fish~~(fish species present (including abundance as catch per unit effort, condition factor and distribution), and habitat available to inform the type of releases that ~~w~~should be made to Funks Creek and Stone Corral Creeks under operating conditions.

Content: Describe and enumerate ~~existing~~ fish assemblages in Funks Creek ~~Stone Corral~~ and ~~Funks~~ Stone Corral C~~c~~reeks. Characterize available spawning, rearing, foraging, and refuge habitat for native fishes following methods described in Meador et al. (1993).

Timing: Monitoring will begin a minimum of 5 years before start of operations and will continue for 5 to 10 years after start of operations. The Authority and the permitting fish agencies (~~NMFS~~, USFWS, and CDFW) will determine the frequency of the adaptive management report and timing of any adaptive management actions.

2D.4.2 Surface Water Ambient Monitoring Program Study

Purpose: Stream bioassessment monitoring is a method of evaluating and monitoring the environmental health and integrity of freshwater wadeablewadable streams by using benthic macroinvertebrates (BMI), water quality parameters, and physical habitat (PHAB) conditions as indicators of stream condition. Bioassessments are especially useful in tracking the aquatic conditions before and after a project is implemented to determine the post-project effects on aquatic communities.

Outcomes: A Surface Water Ambient Monitoring Program (SWAMP) technical study (i.e., bioassessment) that focuses on the relationships between physical habitat, water quality, benthic macroinvertebrates and algal communities on the reaches downstream of Sites Reservoir on Funks Creek and Stone Corral Creeks to inform the type of releases that should be made to ~~Funks and Stone Corral C~~the creeks under various operating conditions.

Content: Stream bioassessment monitoring will be conducted using the methods described in the 2016 version of the SWAMP Standard Operating Procedures for the Collection of Field Data for

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Bioassessments of California ~~Wadeable~~Wadable Streams: Benthic Macroinvertebrates, Algae, and Physical Habitat (Ode et al. 2016a) and SWAMP's Supplemental Guidance for the SWAMP Bioassessment Field Protocol (Ode et al. 2016b) or any updated version thereof.

Various metrics are available for scoring the health of both the BMI communities (e.g., the California Stream Condition Index or CSCI) and overall PHAB (e.g., the PHAB Index of Physical Integrity or IPI). The CSCI is a statewide biological scoring tool that translates BMI data into an overall measure of stream health (Rehn et al. 2015). The IPI combines eight Geographic Information Systems-calculated metrics with 12 PHAB metrics to produce one overall IPI value (Rehn et al. 2018). Similar to the PHAB analysis described above, water quality results, as well as statewide diatom, soft algae, and hybrid ASCI predictive biological indices and Chlorophyll a and Ash-Free Dry Mass, will be compared to key stressor thresholds that best highlight the conditions in the sampling reaches.

In addition to the standard SWAMP water quality data, additional water quality measurements will be taken to compare pre-Project to Project values and determine any effect of operational adjustments on sampled water quality constituents. These additional water quality measurements include a suite of total and dissolved metals and metalloids, cyanobacteria and cyanotoxins, and methylmercury in fish tissue, along with some more basic water quality constituents including nutrients, dissolved organic carbon, and hardness.

CSCI, PHAB, and IPI scores and water quality and algae indices described above will be included in the reporting effort, as well as a discussion of other relevant BMI metrics (e.g., taxa richness, composition, tolerance, functional feeding groups, and habit measures). A synthesis of BMI, water quality, and PHAB data will be included in the reporting process. The SWAMP Stream Habitat Characterization Form, Full Version field forms, as well as all output data, will be provided in appendix format, along with representative photography of the sampling reaches.

The ultimate goal of the bioassessment study is to evaluate the environmental condition of both Funks Creek and Stone Corral Creek by using the indicators of stream condition, as described above. This information, along with the other studies described above, will inform the type of releases that should be made to Funks Creek and Stone Corral Creeks under operating conditions.

Timing: The standard bioassessment tasks will be performed once a year. The fieldwork required to complete the bioassessment surveys will occur prior to construction of dams on Funks and Stone Corral Creeks. Post-construction monitoring will occur for 5 to 10 years after start of Project operations. The Authority and the relevant permitting agencies (CDFW, USFWS, and Colusa County) will determine if the frequency of monitoring can be shortened after 5 years. The bioassessment specialists responsible for conducting the bioassessment surveys will coordinate directly with the agencies to develop appropriate performance standards and success criteria for the BMI communities and PHAB conditions on both Funks Creek and Stone Corral Creeks. The additional water quality measurements will be taken twice a year, once during a high flow period and once during a low flow period, at the upstream and downstream bioassessment sampling locations on each creek. Sampling will occur during the same years as the rest of the bioassessment studies.

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2D.4.22D.4.3 Flow Characterization and Geomorphic Study

Purpose: The purpose of the flow characterization and geomorphic studies will be to characterize historic and present-day flows, including baseflow during the summer months, on Funks Creek and Stone Corral Creeks; geomorphic characteristics (including substrate composition); and flow levels necessary for channel maintenance.

Outcomes: A hydrogeomorphic technical study with quantitative and qualitative monitoring data to fully characterizing the existing hydrologic regime of Funks Creek and Stone Corral Creeks, as well as the overall type and abundance of sediment available for aquatic organisms, will be developed. The study results will inform the type of releases that should be made under operating conditions, as well as potential gravel deficiencies as a result of Project operations.

Content: In order to inform the appropriate streamflows for the creeks under inquiry, a geomorphic assessment of the reaches of interest (i.e., the stream reaches below the dams) will constitute the first step in the analysis. The channel segments upstream of the dams will also be examined to provide a greater understanding of the local watershed geomorphic characteristics. The focus of the geomorphic assessment will be to determine the dominant geomorphic processes, document the landforms and channel bed topography, and determine how the observed morphology of each creek is influenced by the hydrologic regime and the surrounding land uses. Likewise, collection of geomorphic information will aid in the determination of overall channel stability for each creek. Geomorphic indicators that will be collected would include the following:

- Channel Classification (determining if the reaches of interest are transport-limited or supply-limited)
- Local Watershed Inputs (determining any major inputs of sediment and runoff; identifying any land use changes that could alter the balance of sediment supply and runoff that could lead to future instability; and documenting any other anthropogenic features [such as pipe outfalls, rock slope protection, grade control structures, etc.])
- Hydrologic and Flow Patterns (identifying whether streamflow is perennial, intermittent, or ephemeral)
- Riparian Vegetation Condition (describing the general health of the riparian area, focusing on the amount and type of vegetative cover)
- Bankfull Width and Depth and Wetted Width (determining the hydraulic capacity of the channels by recording the geomorphic or "effective" bankfull surface)
- Bank Instability and Bank Characteristics (identifying areas fluvial erosion [erosion associated with flowing water] and bank failure [erosion associated with gravitational forces and weakening processes], as well as characteristics such as bank height, bank angle, and bank composition).
- Channel Bed Substrate Composition and Embeddedness (determining the size of the substrate materials on the channel bed, and the degree to which these materials are embedded—these conditions indicate how frequently the channel substrate is mobilized)

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- Channel Complexity (determining the presence or absence of gravel bar development and evidence of scour and/or deposition; pool, and riffle and flatwater habitats containing in-channel structures [e.g., instream woody material] that create complexity and habitat niches for aquatic organisms)
- Degree of Channel Incision and Stage of Channel Evolution (determining how incised the channels are, providing a template for understanding geomorphic responses and processes within the immediate watershed, and identifying the evolutionary stage of the channels in order to predict future channel change)
- Cross Section and Longitudinal Profile Surveys (conducting topographic surveying as necessary to document existing baseline conditions)

The hydrogeomorphic technical study will also examine the current hydrologic regime of Funks and Stone Corral Creeks. Consideration will be given to when and how flows will be released, whether a portion of these flows are needed to maintain fluvial geomorphic processes (based on the findings from the geomorphic assessment), and what level of variability in base flows will satisfy California Fish and Game Code Section 5937 and is consistent with the goals and objectives of the Project. Various approaches to estimate minimum streamflows to maintain ecosystem and geomorphic function, such as "the functional flow" approach suggested by Yarnell et al. (2015), the Instream Flow Incremental Methodology (IFIM) (National Biological Service, U.S. Department of the Interior 1995), and the CDFW Instream Flow Program[4] (IFP), will be investigated for their applicability to determine appropriate streamflows on Funks and Stone Corral Creeks. Coordination with the permitting agencies will be required before a chosen method is selected.

Timing: The fieldwork required to complete the hydrogeomorphic surveys will occur prior to construction of dams on Funks Creek and Stone Corral Creek to establish the unaltered hydraulic regime and unaltered geomorphic conditions. Post-construction monitoring will occur on a regular (pre-approved) basis for 5 to 10 years after start of operations. The Authority and the relevant permitting agencies (CDFW, USFWS, and Colusa Countyand the Central Valley RWQCB) will determine if the frequency of monitoring can be shortened after 5 years. The specialists responsible for conducting the hydrogeomorphic surveys will coordinate directly with the permitting agencies to develop appropriate performance standards and success criteria for the hydrologic conditions (i.e., flow releases) and geomorphic conditions on both Funks Creek and Stone Corral Creek. The Authority and the permitting agencies will determine the timing of any adaptive management actions.

2D.4.3 Surface Water Ambient Monitoring Program Technical Study

Purpose: Stream bioassessment monitoring is a method of evaluating and monitoring the environmental health and integrity of freshwater wadeable streams by using benthic macroinvertebrates (BMI), water quality parameters, and physical habitat (PHAB) conditions as indicators of stream condition. Bioassessments are especially useful in tracking the aquatic

[4] https://wildlife.ca.gov/Conservation/Watersheds/Instream-Flow

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conditions before and after a project is implemented to determine the post-project effects on aquatic communities.

Outcomes: A Surface Water Ambient Monitoring Program (SWAMP) technical study (i.e., bioassessment) that focuses on the relationships between physical habitat, water quality, and benthic macroinvertebrates and algal communities on the reaches downstream of the proposed impoundmentsSites Reservoir on Funks and Stone Corral Creeks. The quantitative monitoring data will be used to characterize the relationships between physical habitat, water quality, and benthic macroinvertebrates to inform the type of releases that should be made to Funks and Stone Corral Creeks under various operating conditions.

Content: Stream bioassessment monitoring will be conducted using the methods described in the 2016 version of the SWAMP Standard Operating Procedures for the Collection of Field Data for Bioassessments of California Wadeable Streams: Benthic Macroinvertebrates, Algae, and Physical Habitat (Ode et al. 2016a) and SWAMP's Supplemental Guidance for the SWAMP Bioassessment Field Protocol (Ode et al. 2016b) or any updated version thereof.

Various metrics are available for scoring the health of both the BMI communities (e.g., the California Stream Condition Index or CSCI) and overall PHAB (e.g., the PHAB Index of Physical Integrity or IPI). The CSCI is a statewide biological scoring tool that translates BMI data into an overall measure of stream health (Rehn et al. 2015). The IPI combines eight Geographic Information Systems-calculated metrics with 12 PHAB metrics to produce one overall IPI value (Rehn et al. 2018). Similar to the PHAB analysis described above, water quality results, as well as statewide diatom, soft algae, and hybrid ASCI predictive biological indices and Chlorophyll a and Ash-Free Dry Mass, willould be compared to key stressor thresholds that best highlight the conditions inat the sampling reaches.

In addition to the standard SWAMP water quality data, additional water quality measurements willould be takenmade to compare pre-Project toand Project values and determine any effect of operational adjustments on sampled water quality constituents. These additional water quality measurements including a suite of total and dissolved metals and metalloids, cyanobacteria and cyanotoxins, and methylmercury in fish tissue, as well asalong with some more basic water quality constituents including nutrients, dissolved organic carbon, and hardness, which can influence water quality standards for aquatic life protection for some metals.

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CSCI, and PHAB IPI scores and water quality and algae indices described above will be included in the reporting effort, as well as a discussion of other relevant BMI metrics (e.g., taxa richness, composition, tolerance, functional feeding groups, and habit measures). A synthesis of BMI, water quality, and PHAB data will be included in the reporting process. The SWAMP Stream Habitat Characterization Form, Full Version field forms, as well as all output data, will be provided in appendix format, along with representative photography of the sampling reaches.

The ultimate goal of the bioassessment study is to evaluate the environmental condition of both Funks Creek and Stone Corral Creek by using the indicators of stream condition, as described

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~~above. This information, along with the other studies described above, will inform the type of releases that should be made to Funks and Stone Corral Creeks under operating conditions.~~

~~Timing: The standard bioassessment tasks will be performed once a year. The fieldwork required to complete the bioassessment surveys will occur prior to construction of dams on Funks and Stone Corral Creeks. Post-construction monitoring will occur for 5 to 10 years after start of Project operations. The Authority and the relevant permitting agencies (CDFW, USFWS, and Colusa Countyand the Central Valley RWQCB) will determine if the frequency of monitoring can be shortened after 5 years. The bioassessment specialists responsible for conducting the bioassessment surveys will coordinate directly with the permitting agencies to develop appropriate performance standards and success criteria for the BMI communities and PHAB conditions on both Funks and Stone Corral Creeks. The additional water quality measurements willould be taken twice a year, once during a high flow period and once during a low flow period, at the upstream and downstream bioassessment sampling locations on each creek. Sampling willould occur during the same years as the rest of the bioassessment studies.~~

2D.4.4 Temperature Study

Purpose: To define temperatures under ~~existing~~ baseline conditions and flow and storage effects on temperature in Funks Creek, ~~Stone Corral~~ and Stone Corral ~~Funks~~ Creek under post-construction conditions.

Outcomes: Temperature measurements before and after construction will be ~~evaluated in combination with the flow characterization and geomorphic study (Section 2D.4.2) and Sites Reservoir storage data~~ collected to evaluate:

- The temperatures that support the aquatic community under ~~existing~~ baseline conditions, and
- The combination of Reservoir storage and discharge needed to maintain appropriate temperatures to maintain fish in good condition in Stone Corral Creek and Funks Creek downstream of Sites Reservoir after the start of operation. ~~Reservoir discharge needed to establish suitable temperatures in Stone Corral Creek downstream of Sites Dam and Funks Creek downstream of Golden Gate Dam after construction.~~

Content:

Once access to Stone Corral Creek is obtained, a temperature probe will be installed in Stone Corral Creek at the location of Sites Dam release, and 4 additional probes will be installed downstream from there by approximately 0.5 mile, 1 mile, 2.4 miles (near where Stone Corral Creek goes under Maxwell Sites Road), and 4.4 miles (near where TC Canal goes under Stone Corral Creek).

Once access to Funks Creek is obtained, a temperature probe will be installed in Funks Creek at the location of the I/O tower release to Funks Creek, and ~~2~~ two additional probes will be installed downstream from there by approximately 0.5 mile and 1 mile (far enough upstream of Funks Reservoir to not be affected by it). In addition, probes will be installed at the TC Canal inlet to

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Funks Reservoir, at the TC Canal outlet from Funks Reservoir, and at the Funks Creek outlet from Funks Reservoir.

As described in the RMP, once construction is complete, water temperature profiles will be measured near Golden Gate Dam once every 2 weeks at 5-foot depth intervals to inform decisions about which ports of the I/O tower to use during March through October.

The temperature probes in the creeks will continuously record hourly temperatures. Temperatures recorded prior to reservoir construction will likely be close to the equilibrium values that will be expected based on ambient meteorological conditions. These temperatures will be used along with specific fish requirements to develop target temperature ranges for post-construction conditions.

Temperatures recorded after reservoir construction will be used along with flow and storage data to determine flow and storage effects on creek temperatures. If creek temperatures cannot be accurately estimated with flow, storage, and the reservoir temperature profiles, water temperature modeling will be performed for ~~both~~ Sites Reservoir, ~~and~~ Funks Creek, and Stone Corral Creek~~s~~. If modeling is necessary, models will be calibrated with the measured flow, storage, and temperature data.

Water released into Stone Corral Creek will originate from the bottom of Sites Reservoir and will likely be cooler than equilibrium values during months when the reservoir is stratified. The biggest differential between release temperatures and equilibrium values will occur when the reservoir is full and ambient air temperature conditions are high~~ambient conditions are hot~~. If it is determined that flow should be maintained in Stone Corral Creek at times when releases will be relatively cool compared to temperatures under ~~existing~~ baseline conditions, lower flows will allow the water to warm farther upstream than higher flows.

Water released to Funks Creek will originate from the I/O tower and, when the reservoir is stratified, will be warmer than the water released to Stone Corral Creek. The temperatures will be warmer because the withdrawals will come from higher in the reservoir and, as described in the RMP, the I/O tower port openings will be chosen to provide 65°F or higher water temperatures during the rice growing season (May through September).

Timing: Water temperature measurements will occur before, during, and after construction. Measurements during the initial fill period will be useful for evaluating water temperature under low-storage conditions. Reservoir profile measurements and measurements at the Stone Corral Creek and Funks Creek releases may need to continue long term. Measurements downstream of the release locations could be discontinued if the following conditions are met:

- Sites Reservoir has made releases for at least 2 years when the reservoir was at least 75% full.
- Temperature effects are found to have little effect on native fish (e.g., if only short sections of the creeks below the dams experience temperature effects) or if flow and storage effects on creek temperatures are understood well enough that average daily creek

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temperatures can be estimated within 3°F based on meteorological conditions, flow, reservoir storage, and reservoir temperature profiles.

- ~~Flow and storage effects on creek temperatures are understood well enough that creek temperatures can be estimated within 3°F based on meteorological conditions, flow, reservoir storage, and reservoir temperature profiles.~~

2D.5 Sediment ~~Technical Studies~~Monitoring Plan and Adaptive Management for Sediment Diverted from the Sacramento River

Purpose: To validate modeling results and analyses presented ~~throughout~~ in this ~~RDEIR/SDEIS~~Final EIR/EIS, a sediment monitoring ~~and aquatic resource technical studies~~plan will be prepared and implemented. ~~These~~ Implementation of this plan~~technical studies~~ will ~~refine~~ contribute to understanding ~~of~~ the effect(s) ~~that of~~ entrainment and capture of sediment ~~in~~ by the Project's diversions ~~and capture of sediment into Sites Reservoir, has on fish species and identify potentially necessary adjustments to Project operations to address those effects on fish and provide the means of making those changes~~and help determine whether a management response is necessary to reintroduce that sediment to the system.

Outcomes: The sediment monitoring ~~and aquatic resource technical studies plan~~ will provide data necessary to refine understanding of real-time effects on sediment transport and its subsequent effect on fishery resources, i.e., migration rates, rates of predation, and foraging success. ~~And it~~It will support recommendations with respect to the need for management actions. A Sediment Technical Team (STT) will be established in cooperation with the water (RWQCB, DWR, and Reclamation) and the fish agencies (NMFS, USFWS, and CDFW), ~~use~~to assist with design of the program~~plan~~, the results to adjust Project operations, if needed to minimize adverse effects on fish and explore whether operations could be implemented to benefit fish. The STT will be a multi-agency team that includes representatives from the Authority, Reclamation, California Department of Water Resources, National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife (CDFW), Central Valley Water Board, and U.S. Army Corps of Engineers (USACE).

Content: The ~~Sediment~~ sediment ~~Technical Studies Plan~~monitoring plan will consist of sediment monitoring and ~~technical~~ studies to assess the movement of sediment at the RBPP and Hamilton City Pump Station intakes and quantify amounts of entrained sediment. The results of the monitoring will be used to model sediment movement and determine whether sediment management actions are needed to address the effects of incremental loss of sediment (e.g., the need for and feasibility of reintroducing sediment to the river or Delta will be considered).

Timing: Monitoring will begin a minimum of 5 years before start of operations and will continue for 5 years after start of operations. Modeling will rely on existing sediment transport models and will begin as soon as the STST determines sufficient data are available to inform the models. The Authority ~~and the permitting~~in collaboration with the fish agencies (NMFS, USFWS, and

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CDFW) will determine the frequency of the sediment management report and timing of any ~~adaptive~~ management actions determined to be necessary.

~~2D.5.1 Sediment Monitoring, Modeling, and Reintroduction~~

Chapter 11 contains a discussion of the potential effects of reducing sediment load in the Sacramento River, particularly as it affects turbidity in the Delta. See in particular the discussion in section 11.2.2.2, *Habitat Conditions and Environmental Stressors* under subsectionin *Delta and Suisun Bay/Marsh*, and the discussion of Impact Fish-8: Operations Effects on Delta Smelt. Those discussions suggest entrainment of sediment at the two diversion locations may increase from about ~~3 per cent~~% of the sediment load in the Sacramento River under the No Project aAlternative to less than ~~5 per cent~~% under the Project alternatives~~, B~~, but that the effect of that on the system is uncertain. ~~It is estimated that less than 5% of the sediment load in the Sacramento River could be entrained by the RBPP and Hamilton City Pump Station intakes.~~ Sites Reservoir will also capture sediment in Stone Corral Creek and Funks eCreeks from above the reservoir, which otherwise may have contributed to the sediment load in the Sacramento River via the Colusa Basin Drain and Knights Landing Outfall. ~~which may have slight effects on turbidity and therefore on delta smelt habitat (for an example see Chapter 11). Sites Reservoir would also partially capture the small fraction of sediment yield to the Sacramento River that could have been delivered via Funks and Stone Corral creeks.~~ However, there is uncertainty in ~~this~~ the estimates of sediment loss due to the Project operations, so the Authority is committed to establishing a monitoring programplan to characterize sediment loads in the vicinity of the diversions and to quantify the amounts of sediment that are entrained in by the diversions and captured by the reservoir. ~~Therefore the Authority will implement a study to qualityquantify the amount of sediment entrained at its diversion locations and captured by the reservoir. conclusion multi-step process will be used to reduce uncertainty. The process will include multi-year monitoring and estimation of sediment entrainment and capture during initial operations following Sites Reservoir construction, monitoring and modeling of potential effects relative to performance criteria based on the sediment entrainment and capture estimates; and development and implementation of a sediment reintroduction plan should performance criteria have been exceeded. The process will be implemented by establishing a multi-agency STT of representatives from the Authority, Reclamation, NMFS, USFWS, CDFW, Central Valley RWQCB, and USACE. The permitting fish agencies (NMFS, USFWS, and CDFW) will have approval authority for products developed during the process (e.g., monitoring plans and annual reports).~~

The studies are expected to span a period of 10 years. This would include ~~F~~five5 years pre-project to establish baseline sediment loads in the vicinity of the diversions and contribution from Stone Corral Creek and Funks Creeks -over a variety of water-year types and ~~f~~five5 years after operations are initiated to verify the quantities of sediment diverted at each of the diversion locations and sediment captured by Sites reservoir. The Authority will collaborate with the water agencies -(RWQCB, DWR and Reclamation) and fish agencies to ensure the study design meets their needs and expectations. The Authority will prepare annual reports of its monitoring ~~program~~plan and make them publicly available.

The -Authority is also committed to collaborating with the water agencies, fish agencies, and Delta Stewardship Council, including its Science Program, and Interagency Implementing

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Committee, to determine what actions, if any, may be needed to address the incremental loss of sediment at the diversions and sediment capture by the reservoir and its effects on fishery resources.

~~The monitoring program will involve monitoring and estimating sediment entrainment and capture prior to and during the first several years of operations following Project construction. Monitoring duration will be subject to input from the STT and independent peer review but is anticipated to be at least 5 years to account for hydrological variability. Methods for estimating sediment entrainment and capture will be determined during the planning phase and may include measurement of suspended sediment concentration and flow in the Sacramento River upstream and downstream of the RBPP and Hamilton City Pump Station intakes, as well as in the water diverted by each facility, and in Stone Corral/Funks creeks. Annual monitoring plans and results reporting will be reviewed by the STT, with initial and periodic independent peer reviews facilitated by the Delta Science Program, and will be subject to approval by NMFS, USFWS, and CDFW.~~

~~The second step of the process will involve monitoring and modeling of potential effects relative to performance criteria. The specifics of the performance criteria will be developed with the input of the STT and independent peer review. The performance criteria will confirm that sediment in diversions is proportional to sediment in the Sacramento River and that less than 5% of the sediment load in the river could be entrained by the RBPP and Hamilton City Pump Station intakes. These performance criteria are expected to include assessments of habitat indicators such as the percentage of time that turbidity at monitoring stations exceeds an established threshold (e.g., 12 nephelometric turbidity units) (Sommer and Mejia 2013). To account for the likely variability in sediment delivery caused by operations (i.e., sediment entrainment) and other factors (e.g., contribution of sediment from other tributaries, including capture of sediment by Sites Reservoir that otherwise could have entered Stone Corral and Funks creeks and moved downstream), sediment modeling (e.g., using methods from Bever et al. 2018) will be used to approximate the incremental effects of operations given the estimates of sediment entrainment made during the first step of the process. Assessments of achievement of performance criteria will receive independent scientific peer review and will be subject to approval by NMFS, USFWS, and CDFW.~~

~~If the monitoring and modeling estimates of the second step indicate exceedance of performance criteria attributable to operations, the third step of the proposed process will be initiated. This step will involve development and implementation of a sediment reintroduction plan within 5 years of the end of step two. This plan will aim to reintroduce sediment to allow performance criteria to be met. Sources of sediment to be reintroduced may include proposed or existing facilities (e.g., forebays, and canals, or Sites Reservoir) or locations unrelated to the Project and will account for factors such as sediment composition to meet performance criteria (e.g., fine particles for turbidity) and reintroduction location. Subject to approval by NMFS, USFWS, and CDFW, alternative means of achieving performance criteria may also be considered (e.g., restoration of turbid tidal habitat in the vicinity of areas that do not appear to be achieving performance standards). Modeling (e.g., using methods such as those of Bever and MacWilliams 2018, Bever et al. 2018) may be used to optimize sediment reintroduction locations relative to performance criteria to be achieved. The sediment reintroduction plan will be prepared to meet~~

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~~required permitting standards from the Central Valley RWQCB and USACE. The sediment reintroduction approach will be consistent with objectives for turbidity in the Central Valley RWQCB's Water Quality Control Plan for the Sacramento River and San Joaquin River Basins. The STT and independent peer review facilitated by the Delta Science Program will review and provide input on the proposed sediment reintroduction plan and annual reports of its implementation and monitoring to assess achievement of performance standards. The sediment reintroduction plan and reports of its implementation and effectiveness will be subject to approval by NMFS, USFWS, and CDFW.~~

2D.6 Fish Monitoring and Technical Studies Plan and Adaptive Management for Diversions

As part of the adaptive management plan, the Authority will implement a fish monitoring and technical studies plan to validate modeling results and analyses presented throughout this RDFinal EIR/SDEIS. These studies will assess (but are not limited to):

- Enhanced temperature control
- Fish screens and entrainment risk at RBPP and Hamilton City Pump Station
- Bend Bridge pulse flow protection
- Minimum bypass flows in the Sacramento River at Wilkins Slough
- Fremont Weir Notch Project
- ~~Aquatic monitoring~~

The overarching purpose of these technical studies is to validate analyses conducted in this Final EIR/EIS, refine and understand the mechanism(s) by which Project operations affect aquatic resources in high flow conditions, and explore ways in which Project operations can further benefit fish populations. Specific parameters for each technical study will be developed as part of individual study plans, with the approval of the permitting fish agencies (i.e., NMFS, USFWS, and CDFW). These parameters may consist of assessing factors such as whether diversion operations have resulted in statistically significant changes in monitored variables (e.g., fish distribution and migration survival).

The technical studies will be developed by the Authority through the Adaptive Management Science Team (AMS Team) with input from the Adaptive Management Committee (AMC). The ~~TSTT~~AMC will be a multi-agency team that includes representatives from Reclamation, the Authority, GCID, TCCA, NMFS, USFWS, and CDFW. Sub-teams may be necessary to address groups of related studies. The AMC, including the permitting fish agencies (NMFS, USFWS, and CDFW), will oversee the adaptive management process and science program, vetting recommendations from the AMS Team and products developed during the technical studies (e.g., study plans, annual reports, and final reports), with independent peer review of key products, and

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where possible, will integrate with or include ongoing studies at existing Project facilities. Measures, such as limiting capture methods or the handling of listed species, may be required, if applicable, by the permitting agencies for the studies. The results of these studies will be used in conjunction with existing and new aquatic monitoring efforts to inform real-time Project operations and adjustments or refinements in Project operations for protection of fish species.

Several aquatic monitoring elements are required to support the technical studies and could for instance include rotary screw trapping; entrainment/impingement monitoring; fish attraction to screens during releases of water from Sites Reservoir; and presence of fish in forebays following fish screen overtopping events. Like the technical studies previously described, aquatic monitoring will be implemented by the AMS Team, overseen by the Authority, with input from the multi-agency AMC. Sub-teams may be formed to address different aquatic monitoring elements. Through their representatives within the AMC, the permitting fish agencies will have opportunities for independent peer review of products developed during the process (e.g., monitoring plans and annual reports). The monitoring program will also be used to monitor the effects of the project on fish species as climate change is manifest and provide information to the adaptive management program to identify and assess the feasibility of potential responses to climate change.

2D.6.1 Enhanced Temperature Control in the Upper Sacramento River

One of the anticipated benefits of the Project is the ability for Reclamation to use its resources in Sites reservoir to conserve water in Shasta Reservoir for the purpose of conserving the cold-water pool and enhancing its ability to control temperatures on salmon spawning grounds below Keswick Dam. It will accomplish this by delivering contract water to its Sacramento River Settlement Contractors from Sites Reservoir and retaining that volume of water in Shasta Reservoir for release in the late summer and fall to assist in temperature control and flow stability in the River below Keswick. The Authority expects Reclamation will lead these investigations as it is the responsible agency for compliance with WR 90-5 and the temperature requirements in the biological opinions that address long-term operations of the CVP. Nevertheless, the Authority will assist Reclamation with the evaluation of exchanges to monitor their effects on reservoir operations and aid in the development of criteria for deciding when and how exchanges could be executed.

2D.6.2 Fish Screen and Entrainment at the Red Bluff Pumping Plant and the Hamilton City Pumping Plant Study

Purpose: ~~To validate modeling results and analyses presented throughout this RDEIR/SDEIS, a fish monitoring and technical studies plan will be prepared and implemented as part of an adaptive management process. If~~The fish screen and entrainment at the Red Bluff Pumping Plant and the Hamilton City Pumping Plant study will address fish survival associated with diversion facility operations at the RBPP and Hamilton City Pump Station intakes under actual operating conditions in high Sacramento River flow conditions when Project diversions would occur. ~~In addition, the Project operation criteria include a requirement of pulse flow protection for juvenile salmonids that might benefit from a better characterization of the timing and magnitude of flows~~

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~~that initiate downstream migration. The results of the studies will be used in conjunction with existing and new aquatic monitoring to inform real-time Project operations and adjustments or refinements in Project operations for protection of fish species.~~

~~It is important to note that~~ The fish screens at RBPP and Hamilton City Pump Station are existing, authorized fish screens that have undergone extensive study to ensure they each meet NMFS and CDFW fish screen performance criteria under a range of flows in the Sacramento River. The studies proposed here would be focused on diversions at these locations during high winter flow conditions when Project diversions would occur. Although these facilities are authorized to operate in high winter flow conditions, they do so infrequently. Additional studies would verify the facilities' performance during high winter flow conditions under which the Project would be diverting in the future.

Outcomes: The technical studies will describe factors such as juvenile salmonid migration survival in high flow conditions prior to Project operations, compliance with protective criteria for screen hydraulics in high flow conditions, and changes resulting from initial and continued Project operations in high flow conditions. Additional studies will provide data and reports to document compliance with NMFS and CDFW fish screen performance criteria in high flow conditions when Project diversions would occur; the studies will be submitted to NMFS, USFWS, and CDFW for review and to inform adjustments or refinements in Project operations for the protection of fish species. ~~A Technical Study Technical Team (TSTT)~~The AMS Team ~~will use the results~~will analyze and synthesize results in cooperation with resource agencies to determine if and what actions may be needed to address screen performance (e.g., adjustments in diversion operations timing) and will consult with the AMC to develop recommendations to be forwarded for consideration by the Authority. ~~The TSTT will be a multi-agency team that includes representatives from Reclamation, the Authority, GCID, TCCA, NMFS, USFWS, and CDFW.~~

Content: The technical ~~studies~~ study will meet agency data collection and reporting requirements and will consist of at least four ~~studies~~ parts: a fish distribution and density study, a juvenile salmonid survival rates study, a predator density and distribution study, and a long-term hydraulic fish screen evaluation study.

Timing: Studies will commence subsequent to approval of the Project and continue as ~~agreed upon by the TSTT~~ proposed by the AMS Team and approved by the Authority ~~and~~ as appropriate for the specific study. Some field studies may not begin until Project operations commence if the objective of the specific study is to evaluate project operations.

~~2D.6.1 Technical Studies~~ Technical Studies

~~The technical studies will be developed by Reclamation and the Authority with input from the TSTT. Studies may be implemented by any member of the TSTT, including GCID and TCCA, as agreed to by Reclamation and the Authority. Sub-teams may be necessary to address groups of related studies. The permitting fish agencies (NMFS, USFWS, and CDFW) will have approval authority for products developed during the technical studies (e.g., study plans, annual reports, and final reports), with independent peer review of key products, and where possible, will integrate with or include ongoing studies at existing Project facilities. Measures, such as limiting~~

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~~capture methods or the handling of listed species, may be required, if applicable, by the permitting agencies for the studies.~~

~~The overarching purpose of these technical studies is to validate analyses conducted in this RDEIR/SDEIS~~FEIS, refine and understand the mechanism(s) by which Project operations affect aquatic resources in high flow conditions, and explore ways in which Project operations can ~~further benefit fish populations. Specific parameters for each technical study will be developed as part of individual study plans, with the approval of the permitting fish agencies (i.e., NMFS, USFWS, and CDFW). These parameters may consist of assessing factors such as whether diversion operations have resulted in statistically significant changes in monitored variables (e.g., fish distribution and migration survival).~~

2D.6.3 Bend Bridge Pulse Flow Protection Study

Purpose: The purposes of this study are to determine the best mechanism/criteria for initiating and terminating the pulse protection measure and how much of each pulse needs to be protected to ensure the fish experience the benefit of thea pulse.

Outcomes: Adaptive management ~~could~~will be used to ~~characterize and adjust accordingly~~refine ~~the timing and magnitude of flows that initiate downstream migration. Adaptive management~~ could also be used to address the second uncertainty by monitoring the tail end of pulses to ~~determine when to eliminate pulse flow protection measures~~, evaluate and adjust the criteria for initiation and termination of diversions during pulse flow events. The Authority anticipates use of a measure that detects fish movement in response to a pulse flow event to initiate the pulse protection measure. Its goal is to provide the benefit of the pulse to migrating fish while minimizing unnecessary foregone opportunities to divert water to storage. These studies will determine whether a fish detection measure is feasible and if not, what other criteria may be employed to optimize the opportunity to divert flows without diminishing the benefit of a pulse in flows for fish. For example, absent an executable fish criterion, the Authority will rely on predicted pulse events as described in the project description (eChapter 2), and will use the adaptive management process to refine those criteria.

Content: The technical study will meet agency data collection and reporting requirements and will be designed with input and collaboration from the fish agencies. The study will begin with a thorough evaluation of data from the USFWS Red Bluff Diversion Dam juvenile fish monitoring program to determine whether reliable indicators of a fish pulse can be detected and ~~whether that program could be adopted and~~ incorporated into an operations scenario consistent with outcomes discussed above. The technical studies may also include targeted studies using marked fish to better understand the stimuli that initiate fish movement and to develop a better understanding of the benefits of a pulse event. Studies will also investigate how much of pulse flow needs to be protected before pumping may resume. For example, does the rate of migration (e.g., fish per hour) change over the course of the pulse? Is there a magnitude of flow at which the benefit of the pulse begins to diminish? And what are the effects on migrating fish if pumping is resumed before a pulse has passed (i.e. evaluate the proposede 7day criterion in the project description (chapter 2)., In addition to investigation of fish movement, the study plan will evaluate other criteria initiating and terminating pulse protection measures e.g. the Authorities AMS Team could work with NOAA's California and Nevada River Forecast Center to investigate ways to

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integrate storm forecasts and fish monitoring to help define operations criteria not entirely dependent on a single source of information ~~, and will consist of at least four parts: a fish distribution and density study, a juvenile salmonid survival rates study, a predator density and distribution study, and a long-term hydraulic fish screen evaluation study.~~

Timing: Studies will commence subsequent to approval of the Project and continue as proposed by the AMS Team and approved by the Authority ~~agreed upon by the TSTT and~~ as appropriate for the specific study. Studies would continue into the operational phase of the project so that operating criteria are continuously monitored and refined for at least a period of ten years. This should ensure evaluation and refinement across varying water-year types. At the end of the ten yearten-year monitoring period the program will be evaluated and a determination will be made in collaboration with the fish agencies whether to extend, modify, or terminate the program.

2D.6.4 Minimum Bypass Flows in the Sacramento River at Wilkins Slough Study

Purpose: This is an area of ongoing research by the fish agencies and a focus of the Sacramento River Science Partnership (see AMP). The purpose of the Authority's study plan is to support, collaborate with, and as appropriate augment ongoing research is directed at improving our understanding of the flow-survival relationship in the middle reach of the Sacramento River (Red Bluff Diversion Dam to Verona), including the roles of pulses, base flows, sediment levels, predation, and inundated acres of side-channel habitat.

Outcomes: Findings from this ongoing research ~~may~~will be used to refine the ~~basis of~~criteria for managing diversions to protect the function of the Sacramento River between RBDD and Verona to support migration and rearing of juvenile salmon and sturgeon. ~~limiting diversions.~~ For example, adaptive management ~~c~~ould be used to test different levels of Bypass~~pulse~~ flows and channel inundation to improve understanding of how changes in managed hydrology affect Chinook salmon survival at near-field and far-field scales.

Content: The technical study will ~~meet agency data collection and reporting requirements~~will be developed in collaboration with the fish agencies and existing programs such as the Sacramento River Science Partnership. The study plan will describe how the Authority will use and support ongoing flow/survival and habitat characterization studies, and it will identify any additional studies which may be undertaken by the Authority to refine its understanding of the effect of project operations on fish survival. ~~, and will consist of at least four parts: a fish distribution and density study, a juvenile salmonid survival rates study, a predator density and distribution study, and a long-term hydraulic fish screen evaluation study.~~

Timing: ~~Studies will commence s~~Subsequent to approval of the Project, the Authority will convene its AMC and AMS Team and direct them to determine how to engage with these ongoing investigations in a way that benefits all interests. ~~and continue as proposed by the AMS Team and approved by the Authority as agreed upon by the TSTT and as appropriate for the specific study~~The Authority will consider and approve or modify the recommendation from its AMC and implement the plan for engagement as soon as practicable following approval of the

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Project. Studies would continue into the operational phase of the project so that operating criteria are continuously monitored and refined for at least a period of ten years. This should ensure evaluation and refinement across varying water-year types. At the end of the ten-year monitoring period the program will be evaluated and a determination will be made in collaboration with the fish agencies whether to extend, modify, or terminate the Authority's involvement in ongoing agency research programs.

2D.6.5 Effects on Fremont Weir Big Notch.

DWR and Reclamation have begun construction of the Fremont Weir Big Notch Project (the Notch), to enhance access to floodplain rearing habitat in the Yolo Bypass for emigrating juvenile salmon, and to improve upstream passage conditions for adult salmon and sturgeon that are migrating upstream through Yolo Bypass. The Authority expects that its operation of the project will not have an adverse effect on the performance of the Notch. Since the Notch is not yet operational, how well it works is yet to be determined. CDFW will have the lead in evaluating the effectiveness of the Notch. And should have several years of data to establish baseline performance of the Notch before the Project comes on line.

Once the Project is operational the Authority and its AMS Team will collaborate with CDFW and others to augment the monitoring program at the Notch to determine whether the operation of the Project is having an effect on the Notch. If a reduction in the performance of the Notch is documented, the Authority will engage with CDFW and the other fish agencies to determine what actions may be implement at the diversion locations (158 miles upstream) to eliminate or mitigate the adverse effect. The Authority would augment CDFW's monitoring program, as necessary, to assess the effectiveness of any measures that are employed. The Authority would utilize its AMS Team TSTTs and AMCE to work with CDFW and the fish agencies to ensure thee goal of not interfering with the Notch is achieved.

2D.6.2 Aquatic Monitoring

Several aquatic monitoring elements are required to support the technical studies identified above and could include rotary screw trapping; entrainment/impingement monitoring; fish attraction to screens during releases of water from Sites Reservoir; and presence of fish in forebays following fish screen overtopping events. Like the technical studies previously described, aquatic monitoring will be implemented by Reclamation, the Authority, and GCID and/or TCCA, with input from a multi-agency Aquatic Monitoring Technical Team (AMTT) that includes representatives from Reclamation, the Authority, GCID, TCCA, NMFS, USFWS, and CDFW. Sub-teams may be formed to address different aquatic monitoring elements. The permitting fish agencies will have approval authority for products developed during the process (e.g., monitoring plans and annual reports), with independent peer review of products.

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2D.7 Land Management Plan

Purpose: The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the specific type and frequency of maintenance activities by location. Land management, maintenance, and monitoring actions for any mitigation areas owned by the Authority will also be described in the LMP. These activities will include vegetation maintenance, invasive terrestrial plant control, and rodent control.

Outcomes: The LMP will ensure that the Authority and maintenance personnel are aware of the locations where sensitive wildlife resources may be present and steps to be taken prior to work in these areas. As part of the LMP reporting requirements, annual reports will include recommendations, as needed, to improve and refine land management procedures for the Project.

Content: The LMP will include the following components.

- A statement of purpose, including the role of the LMP in satisfying regulatory compliance obligations under state and federal laws.
- Land management, maintenance, and monitoring actions for any onsite mitigation areas owned by the Authority.
- Vegetation control activities, including the use of vegetation control and grazing around all facilities, recreation areas, and the Project buffer around all facilities.
- An Integrated Pest Management Plan (IPMP) that focuses on long-term prevention of pest damage through habitat modification (Van Vuren et al. 2014), incorporating biological control methods such as raptor perches and owl boxes to increase natural raptor predators, and limited and targeted rodenticide use when necessary. The IPMP will include measures to reduce rodent density before any anticoagulant baits are placed to reduce the number of contaminated rodents available to predators and scavengers. The IPMP will require regular monitoring to ensure rodent control measures are taken only in response to current rodent activity.
- The type and frequency of maintenance activities by location and whether pre-activity wildlife surveys or monitoring of work will be required.
- The frequency, timing, and duration of wildlife surveys or monitoring, if required, and the qualifications of the biologist conducting surveys or monitoring.
- General measures and practices when working in or near habitat for special-status wildlife (e.g., ensure appropriate distance from habitat as described by state or federal protocols, restrict nighttime work, and restrict work during nesting season if work is performed near trees).
- The procedure for reporting incidental injury or mortality of federal or state listed species.
- Clear statements about the Authority's, hired staff's, and qualified contractor's responsibilities for implementing LMP requirements.

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- Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided.
- Description of annual reporting requirements, as approved by regulatory agencies.

The LMP will require a qualified biologist to provide annual training to maintenance personnel on the general measures and practices described in the plan and to document the surveys and monitoring conducted. A qualified biologist with knowledge or oversight of LMP measures and implementation will prepare an annual report summarizing the steps that were taken to minimize impacts on wildlife resources by December 31 of each year. This report will be submitted to USFWS and CDFW by January 31 of the following year. Each annual report will include the following information.

- The date of annual training, the name of the biologist who gave the training, and a list of attendee names and signatures.
- A summary of the measures and practices implemented during any work in or near habitat.
- A summary of wildlife surveys and monitoring that were conducted that year, including the type of maintenance activity for which surveys or monitoring was required, the date(s) and location(s) of the survey(s) or monitoring, the name of the qualified biologist, and observations of the target special-status species or other special-status wildlife during the surveys or monitoring.
- Any problems that were encountered by maintenance staff during implementation of general measures or by biologists conducting surveys or monitoring and an assessment of the success of the LMP in avoiding and minimizing effects on special-status wildlife and their habitats.
- Recommendations for improving existing practices and methods for Project implementation, if needed.
- Assessment of the success of the LMP measures, practices, and methods.

Timing: The Authority and its qualified contractors will complete preparation of the LMP within 1 year of the first fee title acquisition by the Authority and will amend the LMP as needed as additional lands are acquired.

2D.8 Recreation Management Plan

Purpose: The Authority will prepare a Recreation Management Plan to describe the types, management, maintenance, and monitoring activities on all Project recreation lands and areas and related to recreation. This plan will describe the coordination with Glenn and Colusa Counties to support emergency services at the recreational facilities and will describe requirements for fire suppression in the recreation areas.

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Outcomes: Implementing the Recreation Management Plan will ensure the Authority safely manages recreational facilities in coordination with Glenn and Colusa Counties.

Content: The Recreation Management Plan will:

Support the existing emergency services and personnel by:

- Defining specific characteristics of the recreation areas and facilities expected to need emergency services and refine expected numbers of visitors based on the final design of the recreational facilities.
- Developing different measures, including but not limited to assessing the need for and considering funding for emergency response staff and purchasing equipment based on the specific characteristics of the recreation areas and facilities and in consideration of other potential funding sources that may be secured over time.
- Placing a helipad within either the Peninsula Hills Recreation Area or the day-use boat ramp area for emergency access and placing a helipad near both Golden Gate Dam and Sites Dam.
- Incorporation of prefabricated structures for storing equipment and materials to assist emergency services personnel within the footprint of the recreation areas for police and fire emergency response.

Avoid wildfires and reduce wildfire risk in recreation areas by:

- Exercising precautions, such as monitoring the National Weather Service for Red Flag Warning events, to notify recreationists of enhanced fire danger.
- Describing procedures and policies for reporting any fires that are at the recreation areas, triggers for evacuating recreation areas due to fires, and fire evacuation routes.
- Maintaining fire-suppression equipment (e.g., fire extinguishers, fire blankets) at recreational facilities, as well as in the administrative buildings, and all Authority vehicles.
- Training Authority employees in fire suppression techniques and use of all fire suppression equipment at least once a year and documenting the training.
- Posting wildfire awareness signage at locations where recreationists or maintenance staff will likely be, including at entrances to recreation areas and at kiosks for boats.
- Providing a list of all major potential fire hazards to promote caution and awareness on site.
- Assigning and enforcing all areas as designated no-smoking areas; prohibiting the use of fireworks and other potential fire ignition sources; limiting campfires to designated areas and prohibiting campfires during Red Flag Warning Events.
- Enacting fuel management and vegetation reduction practices in select locations in the recreation areas to reduce fuel load and maintain clear roadways.

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Avoid and reduce disruption of sensitive habitats in recreation areas by:

- Identifying and mapping sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction of recreation areas.
- Installing fencing, posting signage, or implementing other exclusion practices along the boundaries of sensitive habitats in the recreation areas to avoid and minimize disturbance to these habitats during operation and maintenance activities in the recreation areas.

Support management of recreation traffic through Maxwell by:

- Controlling and slowing expected recreational traffic through Maxwell in coordination and consultation with Colusa County.
- Describing and implementing specific locations for lighted pedestrian crossings, stop signs, and other traffic calming features; identify specific timing for implementing these features with the County prior to the full opening of all recreational facilities.

Support the reduction of boating emissions by developing and implementing Recreation Boating Minimization Plan, which would include strategies implemented by the Authority during the operational lifetime of the recreation areas at the reservoir that are likely to reduce emissions; the strategies that the Authority could implement to reduce boat emissions include but are not limited to the following:

- Provide free or reduced launch fees for low-emitting or electric boats, to incentivize boats that are alternatively fueled.
- Post signage near launch areas encouraging users to turn off the boat engines when not in use.
- Track boat usage and type (i.e., motorized, electric, nonmotorized) at the reservoir on an annual basis by maintaining records of the number and types of boats operated at the reservoir. To maintain these records, the Authority will operate staffed kiosks at the reservoir, and boat users will be required to check in at these kiosks prior to launching their boats. Emissions from boat usage will be quantified based on the Authority's records, and the effectiveness of the minimization plan will be assessed based on the quantification results and relative to the applicable air district threshold at the time of operations.

Timing: The Authority will complete the Recreation Management Plan at least 1 year prior to the opening of Project recreational facilities.

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Executive Summary

ES.1 Introduction

This executive summary provides background information for the Sites Reservoir Project (Project), identifies the purpose of preparing this ~~Revised Draft~~ Final Environmental Impact Report/~~Supplemental Draft~~ Environmental Impact Statement (~~Final RDEIR/SDEIS~~ EIR/EIS), describes the Project alternatives considered, and identifies the environmental effects that would result under each alternative. The environmental effects are evaluated in accordance with the requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA), and mitigation measures are recommended where applicable. The Sites Project Authority (Authority) is the lead agency under CEQA, and the U.S. Department of the Interior, Bureau of Reclamation (Reclamation) is the lead agency under NEPA.

ES.2 Project Background

The Project would construct an offstream reservoir to capture excess water from major storms and store the water until it is most needed during dry periods. These saved water supplies would be used for the environment, people, and farms. Existing water storage facilities were designed to capture snowmelt, but precipitation in present-day California occurs more commonly in the form of rain. This trend is likely to continue in climate change conditions. The state's demand for water to serve communities, fuel the economy, and revitalize the environment has increased far beyond what the water storage system was designed to support. To meet these new challenges, the Project has long been envisioned as one tool in a toolbox of actions to assist the State of California in achieving the goals of water supply reliability for all users (including the environment) and adaptation to a changing climate.

The Project was first identified by CALFED as a potential surface water storage project in 2000. In its Record of Decision (ROD), CALFED proposed the Project as part of a suite of storage projects that could help improve water supply reliability, provide water for the environment at times when it is needed most, provide flows for water quality maintenance, and protect levees through coordination with existing flood control reservoirs.

The Water Quality, Supply, and Infrastructure Improvement Act of 2014 (Proposition 1) authorized $7.545 billion in general obligation bonds to fund ecosystem and watershed protection and restoration; water supply infrastructure projects, including surface water and groundwater storage; and drinking water protection. Proposition 1 water supply infrastructure funding is administered by the California Water Commission (CWC) through the Water Storage Investment Program (WSIP). Through a rigorous selection process, the CWC issued approximately $816 million of Proposition 1 funds to the Project for its flood control, ecosystem improvement, and public recreation benefits. The CWC approved a request by the Authority to

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provide a portion of the Project's funding early to help complete environmental planning and permitting documents. Through remaining WSIP process steps, the CWC will determine whether all required feasibility studies, permits, and environmental documentation have been completed prior to determining the Project's final funding award.

The federal government has also recognized the challenges facing existing water infrastructure and in 2016 passed the Water Infrastructure Improvements for the Nation Act (WIIN Act). Under the WIIN Act, Reclamation can participate in surface water storage projects that are constructed, operated, and maintained by a state agency or agency organized pursuant to state law and provide a benefit in meeting any obligation under federal law, including regulations. As of January 2021, $24.05 million has been appropriated to Reclamation under the WIIN Act to advance the Project. The Project was determined feasible by the Secretary of the Interior in December 2020, thereby allowing the Project to continue to receive funding under the WIIN Act.

In 2019, Governor Newsom signed Executive Order N-10-19, which requires the preparation, by the California Natural Resources Agency, the California Environmental Protection Agency, and the California Department of Food and Agriculture, in consultation with the California Department of Finance, of a water resilience portfolio that meets the needs of California's communities, economy, and environment through the 21st century. The *2020 Water Resilience Portfolio* (Portfolio) was completed in July 2020 and identifies the need to expand smart surface water storage where it can benefit water supply reliability and the environment. To achieve that goal, the Portfolio proposes the acceleration of state permitting for projects selected under the WSIP that protect and enhance fish and wildlife resources and water supply reliability. The Portfolio specifically identifies the Project as one of the smart water storage projects that should qualify for such expedited permitting.

The Authority and Reclamation prepared a Public Draft EIR/EIS for the Project in 2017 (2017 Draft EIR/EIS) that evaluated four surface water reservoir size and conveyance alternatives. All four alternatives included a reservoir to be filled using existing Sacramento River diversion facilities and a Delevan Pipeline on the Sacramento River to allow for release of flows into the river. In October 2019, the Authority initiated a value planning process to identify and evaluate additional alternatives that could make the Project more affordable for the Sites Storage Partners[1] while also addressing comments received on the 2017 Draft EIR/EIS. The value planning process focused on the following primary objectives: (1) improving water supply and water supply reliability; (2) providing incremental Level 4 water supply for refuges; (3) improving the survival of anadromous fish; and (4) enhancing the Sacramento–San Joaquin Delta (Delta) ecosystem. Secondary objectives of the value planning process were to provide opportunities for flood damage reduction and recreation. Refinements from the value planning process resulted in three new alternatives, which include reservoir sizes from 1.3 to 1.5 million acre-feet (MAF) and focus on using existing facilities to the extent practical for diversions to and releases from the reservoir. In November 2021, the Authority and Reclamation issued a Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) as a complete revision of the 2017 Draft EIR/EIS to reflect changes to the

[1] The governmental agencies, water organizations, and others who have funded and received a storage allocation in Sites Reservoir and the resulting water supply or water supply-related environmental benefits from the Sites Reservoir Project. Storage Partners could include local agencies, the State of California, and the federal government.

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Project that occurred since the issuance of the 2017 Draft EIR/EIS. This RDEIR/SDEIS evaluates the environmental effects of these new alternatives.

There are several differences in the facilities and operational characteristics between the alternatives evaluated in this the RDEIR/SDEIS (Alternatives 1, 2, and 3) and the alternatives evaluated in the 2017 Draft EIR/EIS. A comparison of the current Alternatives 1, 2, and 3 to the smallest and largest reservoir alternatives evaluated in the 2017 Draft EIR/EIS (Alternatives A and D, respectively) highlights the primary differences between the alternatives evaluated in thise RDEIR/SDEIS and those analyzed in 2017:

- Elimination of the Delevan Facility on the Sacramento River and conveyance pipeline in Alternatives 1, 2, and 3 as compared to Alternatives A and D.
- Elimination of Holthouse Reservoir and existing transmission line realignments in Alternatives 1, 2, and 3 as compared to Alternatives A and D.
- Elimination of dedicated pump/generation hydropower facilities in Alternatives 1, 2, and 3 as compared to Alternatives A and D.
- Fewer saddle dams in Alternatives 1, 2, and 3 as compared to Alternative D.
- Change in location of the spillway on a saddle dam (8B) in Alternatives 1, 2, and 3 as compared to Alternatives A and D.
- New conveyance facilities, including an underground Dunnigan Pipeline, for discharge into the Colusa Basin Drain (CBD) in Alternatives 1 and 3 as compared to Alternatives A and D.
- New conveyance facilities, including an underground Dunnigan Pipeline and the Sacramento River discharge, from the Tehama-Colusa (TC) Canal to the Sacramento River in Alternative 2 as compared to Alternatives A and D.
- New operation for Alternatives 1, 2, and 3 as compared to Alternatives A and D, including bypass flows; pulse flow protection measure to be applied to precipitation-generated pulse flow events from October through May; and Wilkins Slough bypass flow and Fremont Weir notch criteria.

This Final EIR/EIS incorporates the whole of the RDEIR/SDEIS. Additional information about the differences between the alternatives can be found in Appendix 2B, *Additional Alternatives Screening and Evaluation*. As part of this Final EIR/EIS analysis, refinements have been made to these Project description. These Project refinements are detailed in Master Response 2, *Alternatives Description and Baseline*, and in Chapter 2, *Project Description and Alternatives*, and include:

- Elimination of the Saddle Dam 3 and Saddle Dam 5 emergency release structures eliminated from Alternatives 1 and 3.
- Vertical inlet/outlet (I/O) tower redesigned as sloped I/O tower.
- Two I/O 23-foot-diameter I/O tunnels redesigned to one 32-foot-diameter I/O tunnel.

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- Fall-run redd maintenance and spring pulse assistance added to Shasta Lake exchanges benefits modeled.
- Folsom Lake exchanges removed as a potential benefit.
- Operational dead pool volume reduced to 60 TAFthousand acre-feet.
- Refinements to Bend Bridge pulse protection criteria refined.
- Refinements to Wilkins Slough flow criteria refined, eliminating the need for Mitigation Measure FISH-2.1 and specific operation criteria for the Fremont Weir Notch Project.
- Releases to south-of-Delta participants included in all water year types.
- Diversions to Sites Reservoir ~~only~~ allowed only from September 1 to June 14.

ES.3 Document Overview

ES.3.1. Purpose of This RDEIR/SDEISFinal EIR/EIS

The Authority and Reclamation have prepared this RDEIR/SDEISFinal EIR/EIS because the value planning process identified Project alternatives involving facilities and operations that were different than originally proposed in the 2018 Draft EIR/EIS, and those differences may be relevant to environmental concerns to provide a response to comments submitted on the RDEIR/SDEIS, consistent with CEQA and NEPA, and prior to the Authority issuing a Notice of Determination (NOD) (State CEQA Guidelines §§Section 15089 and 15094), and prior to Reclamation issuing a Record of Decision (ROD) (40 Code of Federal Regulation [C.F.R.] 40 § 1505.2). According to the State CEQA Guidelines, a lead agency may recirculate a draft EIR for additional comments if "significant new information" (California Code of Regulations, Title 14, Section 15088.5.) is added to the document after the publication of the draft EIR but before certification. NEPA's implementing regulations require that a supplemental EIS be prepared if there are "substantial changes to the proposed action that are relevant to environmental concerns" or "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts" (Code of Federal Regulations [CFR], Title 40, Section 1502.9(d)). This RDEIR/SDEIS provides a project-level analysis that focuses on potential environmental impacts associated with construction, operation, and maintenance of the Project alternatives and mitigation measures that can minimize or avoid such impacts.

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The purpose of the Final EIR is to provide the necessary information regarding the Project and its impacts for the decision maker to determine whether a lead agency should approve of the Project (State CEQA Guidelines § Section 15132). This Final EIR includes:

- The revised RDEIR;
- Comments and recommendations received on the RDEIR;
- A list of persons, organizations, and public agencies commenting on the RDEIR; and
- The responses of the Lead Agency to significant environmental points raised in the review and consultation process.

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The purpose of the Final EIS, pursuant to NEPA, is to provide the decision maker the necessary information regarding the proposed action and its effects to determine whether to approve the Project. The Final EIS includes a summary of all alternatives, information, and analyses submitted by state, Tribal, and local governments and other public commenters for consideration by the lead and cooperating agencies (40 C.F.R. § 1502.17), and the Reclamation's response to comments on the SDEISFinal EIR (40 C.F.R. § 1503.4a).

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ES.3.2. Intended Use of ~~this~~ This RDEIR/SDEISFinal EIR/EIS

The intended use of this RDEIR/SDEISFinal EIR/EIS is to disclose the potential direct, indirect, and cumulative impacts of implementing the Project in accordance with CEQA and NEPA requirements. This RDEIR/SDEISFinal EIR/EIS serves as an informational document for decision makers, public agencies, nongovernmental organizations (NGOs), and the general public regarding the potential direct, indirect, and cumulative environmental consequences of implementing any of the alternatives. This document will be used by the following agencies:

- **The Authority.** The Authority will review and consider this RDEIR/SDEISFinal EIR/EIS, including the comments on the revised document, to understand the potential environmental impacts, alternatives, and mitigation measures before deciding whether and how to approve the Project.
- **Reclamation.** Reclamation will review and consider this RDEIR/SDEISFinal EIR/EIS, including the comments on the revised document, to understand the potential environmental impacts, alternatives, and mitigation measures before deciding whether to participate in the Project and issue approvals and agreements for the Project.
- **The CWC.** The CWC will use information in this RDEIR/SDEISFinal EIR/EIS in combination with the Feasibility Report currently being drafted by the Authority to determine if the Project remains eligible for Proposition 1 funding. In addition, the CWC will use this RDEIR/SDEISFinal EIR/EIS, including the comments on the revised document, in combination with future Project permits and agreements to approve the Project's final funding award.

A number of agencies may also use this RDEIR/SDEISFinal EIR/EIS to issue permits or other regulatory approvals. Tables 4-1 through 4-3 in Chapter 4, *Regulatory and Environmental Compliance: Federal Permits, Approvals, and Consultation Requirements*, identify agencies that may use this RDEIR/SDEISFinal EIR/EIS.

ES.4 Scoping and Public Involvement Process

The scoping and public involvement process for the Project began in 2001 when the California Department of Water Resources (DWR) published a Notice of Preparation (NOP) for an EIR under CEQA and Reclamation issued a Notice of Intent to prepare an EIS under NEPA. This was followed by a scoping process in January 2002. After the Authority assumed the role of CEQA lead agency in 2016, it issued a supplemental NOP in February 2017 and conducted two additional scoping meetings during that same month. During both the 2002 and 2017 scoping

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periods, the public was invited to submit written comments regarding the scope, content, and format of the environmental document. Reports documenting both the original and supplemental scoping processes are included in Appendix 33B, *Previous Scoping Processes*, of the RDEIR/SDEIS.

ES.4.1. 2017 Draft EIRS/EIS Public Comments

The Authority and Reclamation released the 2017 Draft EIR/EIS in August. The release of this public draft was noticed through a CEQA Notice of Availability on August 14, 2017, and through publication of the Notice of Availability in the Federal Register on August 18, 2017. The 2017 Draft EIR/EIS was available for public and agency review and comment from August 14, 2017, to January 15, 2018 (i.e., public review period). A total of 137 comment letters and emails were received on the 2017 Draft EIR/EIS, along with comments received at two public hearings held during the public review period. A summary of the issues raised in these comments can be found in Section 1.3.2, *Comments Received on the 2017 Draft EIR/EIS.* Additional comments were received after the close of the public review period that generally raised similar issues and concerns to those received during the public review period. All letters with comments on the 2017 Draft EIR/EIS, including those received after the public review period ended, have been reviewed. The Authority and Reclamation have taken into consideration all comments in developing the refined alternatives and impact analyses presented in the RDEIR/SDEIS.

ES.4.2. 2021 RDEIR/SDEIS Public Comments

The Authority and Reclamation released the RDEIR/SDEIS in JanuaryNovember 20221. The release of this public draft was noticed through a CEQA Notice of Availability on November 12, 2021, and through publication of the Notice of Availability in the Federal Register on November 12, 2021. The 2021 RDEIR/SDEIS was available for public and agency review and comment from November 12, 2021, to January 26, 2022 (i.e., public review period), and two virtual public hearings were held during the public review period. The Authority and Reclamation received approximately 101 unique letters and communications during the extended public comment period from federal, state, and local/regional agencies; elected officials; stakeholders; non-governmental organizationsNGOs; and members of the public. A summary of the issues raised in these comments can be found in Section 1.3.3, *Comments Received on the 2021 RDEIR/SDEIS.*

ES.4.3. Ongoing Public Involvement

In addition to the scoping and public involvement processes required by CEQA and NEPA, the Authority and Reclamation and the Authority have continued to meet with stakeholders, interested parties, tribes, and state and federal regulatory agencies. This includes required consultation with federal agencies, state agencies, and tribes, as well as coordination with NEPA Cooperating Agencies and CEQA Responsible and Trustee Agencies. The Authority and Reclamation and the Authority have also coordinated with Native American representatives, other government entities, NGOs, and landowners to keep them informed of Project progress and to solicit input on the Project. A series of one-on-one and group meetings have been held with NGOs and other interested parties since 2017. A summary of these consultation, coordination, and outreach activities can be found in Section 33.1, *Consultation and Coordination.*

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ES.5 Project Overview

The Project would involve the construction and operation of an offstream surface water reservoir to provide direct and real benefits to instream flows, the Delta ecosystem, and water supply reliability. The reservoir inundation area would be in rural, unincorporated areas of Glenn and Colusa Counties, and Project components would be located in Tehama County, Glenn County, Colusa County, and Yolo County. Figure ES-1 shows the county boundaries; cities, towns, and communities; and primary waterbodies (e.g., main canals, Sacramento River, Colusa Basin Drain [CBD]) in the Project area. Figures ES-2 and ES-3 show the reservoir footprint in Antelope Valley, towns, and smaller creeks (e.g., Funks Creek, Stone Corral Creek, and Hunters Creek).

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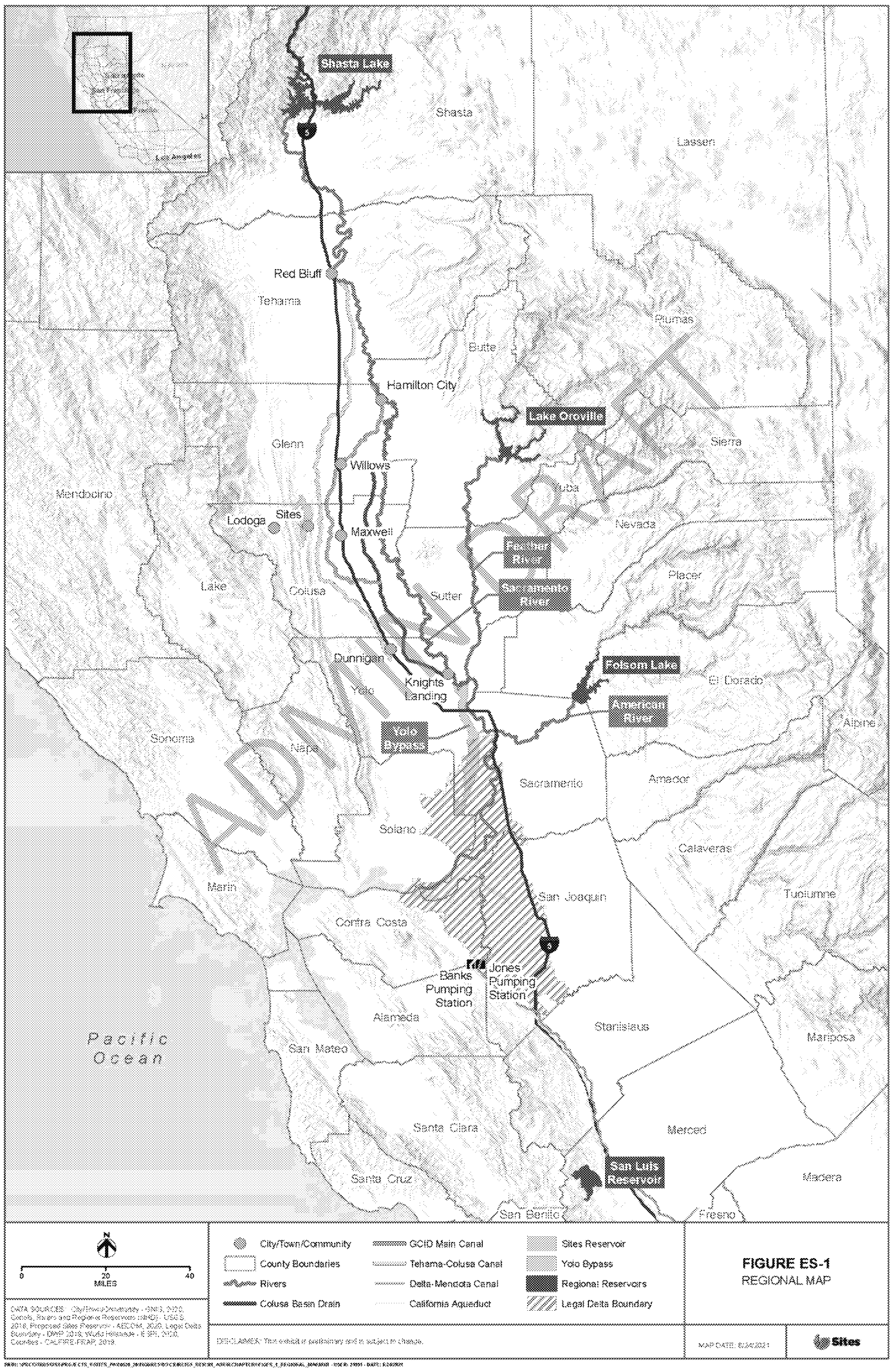
Shasta Lake
Shasta
Lassen
Red Bluff
Tehama
Plumas
Butte
Hamilton City
Lake Oroville
Glenn
Sierra
Willows
Mendocino
Lodoga
Sites
Maxwell
Nevada
Feather River
Placer
Lake
Colusa
Sutter
Sacramento River
Dunnigan
Knights Landing
Folsom Lake
El Dorado
Yolo
American River
Alpine
Sonoma
Napa
Yolo Bypass
Sacramento
Amador
Solano
Calaveras
Marin
San Joaquin
Tuolumne
Contra Costa
Banks Pumping Station
Jones Pumping Station
Alameda
Stanislaus
Mariposa
Pacific Ocean
San Mateo
Santa Clara
Merced
Santa Cruz
San Luis Reservoir
Madera
San Benito
Fresno
0
20
40
MILES
City/Town/Community
County Boundaries
Rivers
Colusa Basin Drain
GCID Main Canal
Tehama-Colusa Canal
Delta-Mendota Canal
California Aqueduct
Sites Reservoir
Yolo Bypass
Regional Reservoirs
Legal Delta Boundary
FIGURE ES-1
REGIONAL MAP
DISCLAIMER: This exhibit is preliminary and is subject to change.
MAP DATE: 6/24/2021
Sites

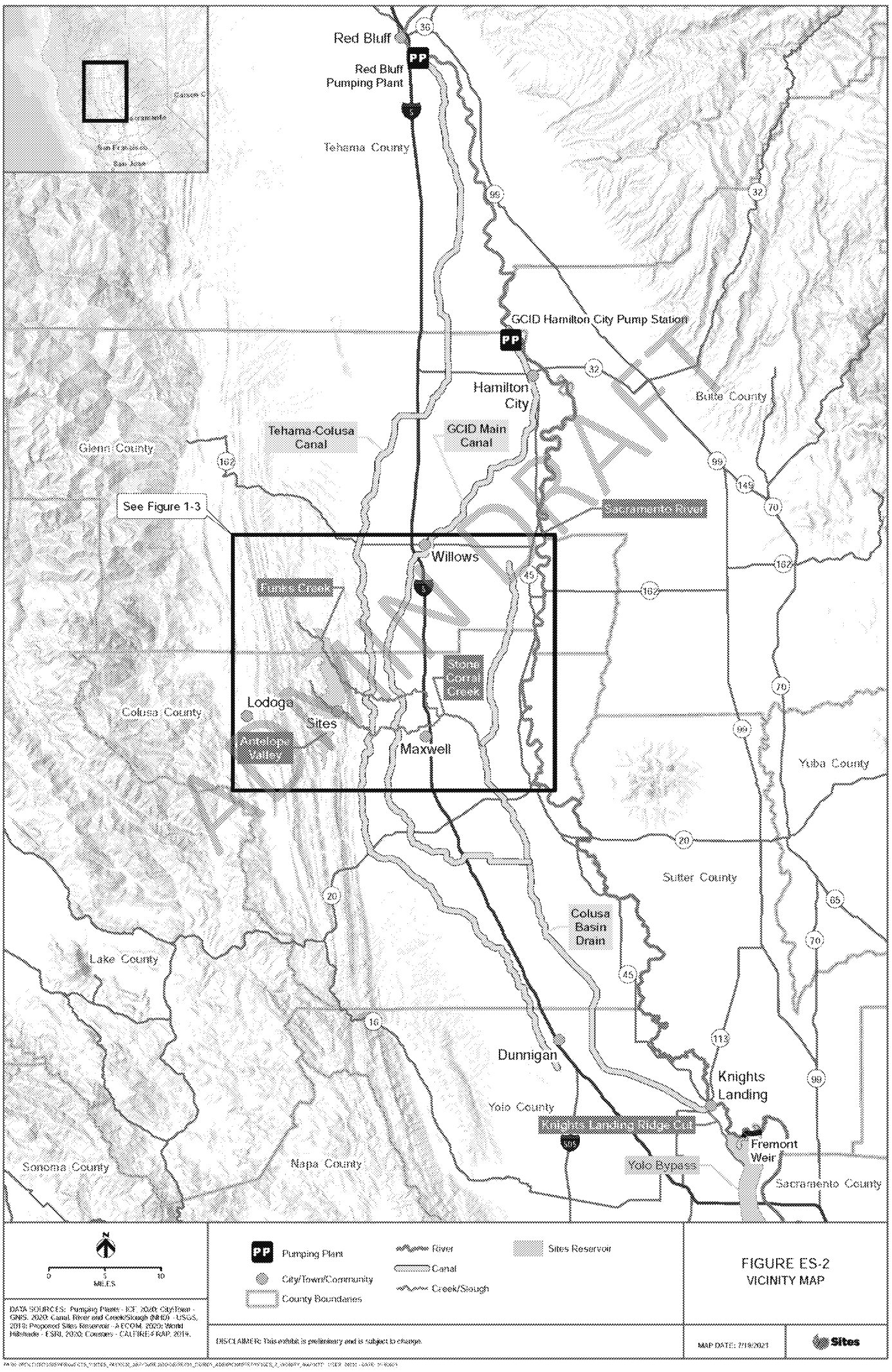

FIGURE ES-2
VICINITY MAP

Willows
Sacramento River
Tehama-Colusa Canal
GCID Main Canal
Hunters Creek
Glenn County
Colusa County
Funks Creek
Stone Lodoga Rd
Colusa Basin Drain
Stone Corral Creek
Sites
Funks Reservoir
Lodoga
Grapevine Creek
Antelope Creek
Antelope Valley
Huffmaster Rd
Maxwell Sites Rd
Maxwell
Red Bluff
Knights Landing
LEGEND
City/Town/Community
Sites Reservoir
Canal
River
Creek/Slough
DATA SOURCES: City/Town - GNIS 2020; Existing and Proposed Reservoirs - AECOM 2020; Canal, River and Creek/Slough (NHD) - U.S. Geological Survey 2018; Aerial Imagery (NAIP) - USDA 2018; World Hillshade - ESRI 2020; Counties - CALFIRE-FRAP 2019.
DISCLAIMER: This exhibit is preliminary and is subject to change.
MAP DATE: 7/19/2021
FIGURE ES-3
LOCAL VICINITY
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The Project would use existing infrastructure to divert unregulated and unappropriated flow from the Sacramento River at Red Bluff and Hamilton City and convey the water to a new offstream reservoir west of the community of Maxwell, California. New and existing facilities would move water into and out of the reservoir, with ultimate release back to the Sacramento River system via existing canals and a new pipeline located near Dunnigan. Water released from Sites Reservoir would be used to benefit local, state, and federal water use needs, including public water agencies, anadromous fish species in the Sacramento River watershed, wildlife refuges and habitats, and the Yolo Bypass to help supply food for delta smelt (*Hypomesus transpacificus*). At the time of publication of this RDEIR/SDEIS, there are were 23 Storage Partners representing local and regional water delivery agencies that serve over 24.5 million people and over 500,000 acres of farmland. Figure ES-4 shows the service areas of Storage Partners in the Project. In addition, the State of California and Reclamation are also considering participating in the Project as Storage Partners.

Construction of the Sites Reservoir would necessitate construction of a bridge or bypass road to connect Maxwell with the community of Lodoga. Additional components would include future development of new recreation facilities at the reservoir.

ES.6 CEQA Objectives and NEPA Purpose and Need

The Project is the construction and operation of a surface water reservoir in accordance with the Project's CEQA objectives and NEPA purpose and need.

The CEQA objectives are as follows:

- OBJ-1: Improve water supply reliability and resiliency to meet Storage Partners' agricultural and municipal long-term average annual water demand in a cost-effective manner for all Storage Partners, including those that are the most cost-sensitive.
- OBJ-2: Provide public benefits consistent with Proposition 1 of 2014 and use WSIP funds to improve statewide surface water supply reliability and flexibility to enhance opportunities for habitat and fisheries management for the public benefit through a designated long-term average annual water supply.
- OBJ-3: Provide public benefits consistent with the WIIN Act of 2016 by using federal funds, if available, provided by Reclamation to improve Central Valley Project (CVP) operational flexibility in meeting CVP environmental and contractual water supply needs and improving cold-pool management in Shasta Lake to benefit anadromous fish.
- OBJ-4: Provide surface water to convey biomass from the floodplain to the Delta to enhance the Delta ecosystem for the benefit of pelagic fishes in the north Delta (e.g., Cache Slough).
- OBJ-5: Provide local and regional amenities, such as developing recreational facilities, reducing local flood damage, and maintaining transportation connectivity through roadway modifications.

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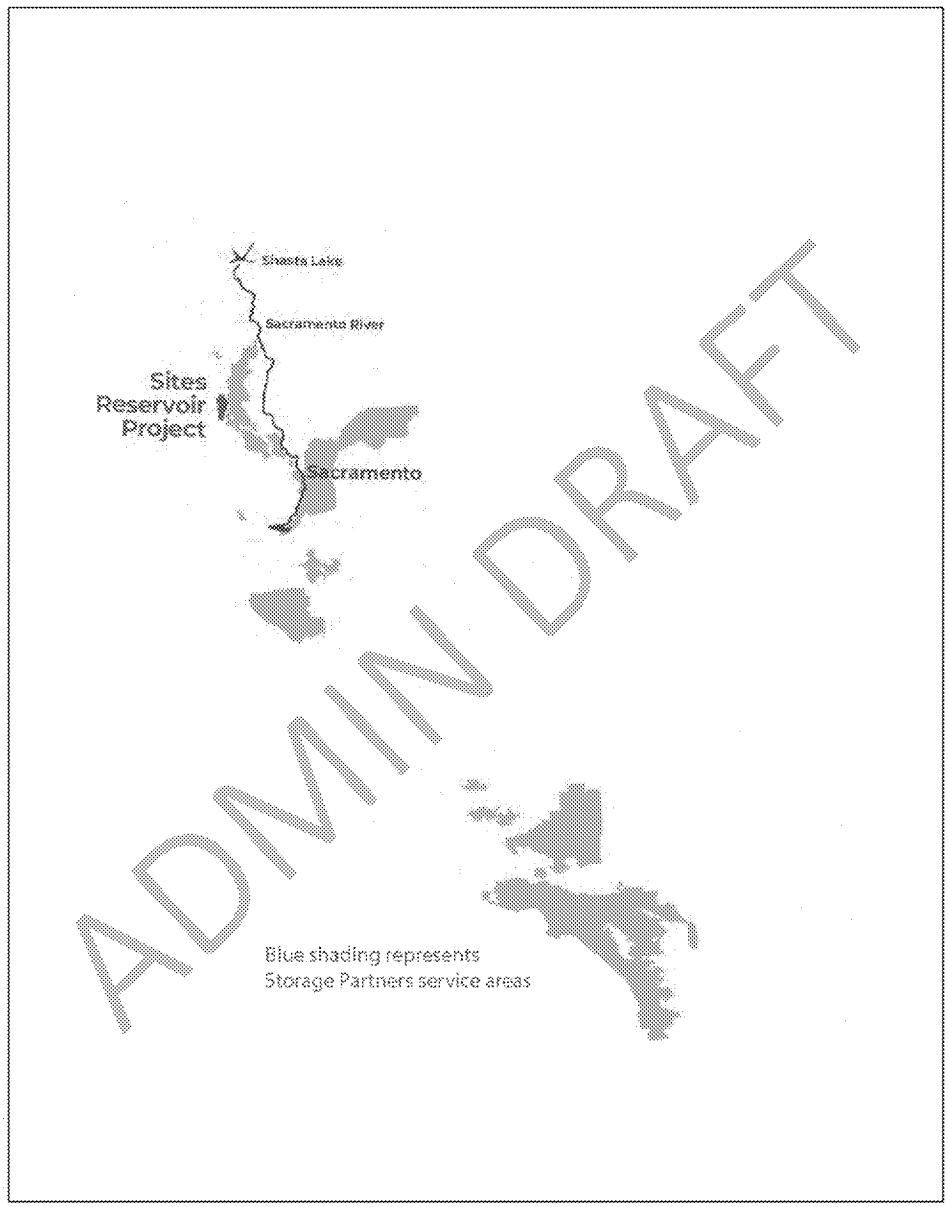

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Figure ES-4
Sites Reservoir Project Storage Partners Service Areas

Reclamation has identified the Project need as providing offstream surface water storage north of the Delta in a manner that is consistent with WIIN Act requirements and Reclamation law. The NEPA purpose of the Project is to provide:

- Increased water supply and improved reliability of water deliveries.
- Increased CVP operational flexibility.
- Benefits to anadromous fish by improving CVP operations consistent with the laws, regulations, and requirements in effect at the time of operation.
- Incremental Level 4 water supply for CVP Improvement Act (CVPIA) refuges.
- Delta ecosystem enhancement by providing water to convey food resources.

ES.7 Project Alternatives

CEQA and NEPA require that an EIR and EIS, respectively, consider a reasonable range of alternatives that would attain most of the basic project objectives while avoiding or substantially lessening the significant environmental effects of a proposed project. The reasonable range of feasible alternatives evaluated in this Final RDEIR/SDEIS is the product of an extensive screening process that has occurred over several decades and involved multiple distinct water resource planning efforts. Those planning efforts considered a wide variety of factors, including feasibility and opportunities for reducing significant impacts while meeting applicable program and Project objectives and purpose and need. The alternatives development process is described in detail in Section 2.1, *Alternatives Development Process*, of this RDEIRFinal EIR/SDEIS.

Consistent with NEPA standards, the three action alternatives (i.e., Alternatives 1, 2, and 3) described in this RDEIRFinal EIR/SDEIS are analyzed at an equal level of detail. A No Project or No Action Alternative as required under CEQA and NEPA, respectively, has been included in this Final RDEIR/SDEIS. More detail about the No Project or No Action Alternative terminology can be found in Section 3.2.1, *Existing Conditions and No Project Alternative/No Action Alternative*.

The following sections describe the alternatives analyzed in ~~this~~ the Final RDEIR/SDEIS.

ES.7.1. No Project Alternative ~~and No Action Alternative~~

The purpose of the No Project Alternative/or No Action Alternative is to serve as a benchmark against which the effects of the action alternatives may be evaluated. For CEQA, the no project analysis must discuss the existing conditions at the time the ~~notice of preparation~~NOP is published, as well as what would be reasonably expected to occur in the foreseeable future if the CEQA lead agency (in this case, the Authority) were not to adopt and implement a project. The existing conditions for the Final EIR/EIS have been defined as the 2020 environmental baseline conditions, as described in Section 3.2.1, ~~*Existing Conditions and No Project Alternative*~~. For NEPA, *no action* is defined as those conditions that would result if the federal lead agency (in this case, Reclamation) does not undertake any actions related to the proposed project and continues existing operations with no changes.

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For this ~~RDEIR~~Final EIR/~~SD~~EIS, the term *No Project Alternative* describes both the No Project Alternative and No Action Alternative for CEQA and NEPA purposes, respectively. ~~There may be instances where the *No Action Alternative* or NAA may have been retained but do not indicate any difference in the conditions represented.~~ Because no new facilities would be constructed or operated, the No Project Alternative would not materially change conditions as compared to ~~existing conditions~~the 2020 environmental baseline, and this ~~RDEIR~~Final EIR/~~SD~~EIS assumes the same regulatory criteria as existing conditions. In addition, DWR's projected future land use and water use through 2030 are used for the No Project Alternative, which assumes that the majority of the CVP and State Water Project (SWP) water contractors would use their total contract amounts and that most senior water rights users would also fully use most of their water rights, depending on hydrologic condition. This increased demand, in addition to the projects currently under construction and those that have received approvals and permits at the time of preparation of this ~~RDEIR~~Final EIR/~~SD~~EIS, constitute the No Project Alternative.

ES.7.2. Action Alternatives

Three action alternatives (Alternatives 1, 2, and 3) that are based on the results of the value planning process are analyzed in this ~~RDEIR~~Final EIR/~~SD~~EIS. These three alternatives have many common elements, including the use of existing infrastructure to divert unappropriated flow from the Sacramento River, the release of Sites Reservoir water back to the river when needed, and the construction of two new recreation areas and a boat ramp. The common elements among action alternatives are described in Section ES.7.2.1, *Elements Common to All Action Alternatives*. The defining characteristics of each alternative are shown in Table ES-1. The action alternatives are described further in Sections ES.7.2.2, (*Alternative 1*), ES.7.2.3, (*Alternative 2*), and ES.7.2.4, (*Alternative 3 (Authority Preferred Project)*).

Table ES-1. Defining Characteristics of Action Alternatives

Project Element	Alternative 1	Alternative 2	Alternative 3
Sites Reservoir Size	1.5 ~~million acre-feet~~ (MAF)	1.3 MAF	Same as Alternative 1
Inundation Area	13,200 acres	12,600 acres	Same as Alternative 1
Dams (scaled to the size of the reservoir)	Golden Gate and Sites Dams; 7 saddle dams; 2 saddle dikes	Golden Gate and Sites Dams; 4 saddle dams; 3 saddle dikes	Same as Alternative 1
Route Connecting East and West Sides of Reservoir	Permanent bridge crossing the reservoir	Paved roadway along south side of reservoir	Same as Alternative 1
Regulating Reservoirs	Funks Reservoir ~~Terminal Regulating Reservoir~~ (TRR) East	Funks Reservoir TRR West	Same as Alternative 1
Conveyance Releases	Releases 1,000 ~~cubic feet per second~~ (cfs) into new Dunnigan Pipeline discharging into the ~~Colusa Basin~~ Drain (CBD)	Releases of up to 1,000 cfs into new Dunnigan Pipeline discharging into the Sacramento River with ~~an average~~	Same as Alternative 1

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Project Element	Alternative 1	Alternative 2	Alternative 3
		of 300 cfs partial discharge into the CBD	
Releases into Funks Creek and Stone Corral Creek	Specific flow criteria to maintain flows to protect downstream water right holders and ecological function	Same as Alternative 1	Same as Alternative 1
Reclamation Involvement	Two options: • Operational exchanges[1] only (Alternative 1A); or • Funding partner (up to 7% investment) with operational exchanges[1] (Alternative 1B)	Operational exchanges[1] only	Funding partner (up to 25% investment) with operational exchanges[1]
DWR Involvement	Operational Exchanges with Oroville and use of SWP facilities South-of-Delta	Same as Alternative 1 (volumes may vary, however)	Similar to Alternative 1 (volumes may vary, however)

Notes: CBD = Colusa Basin Drain; cfs = cubic feet per second; MAF = million acre-feet; SWP = State Water Project; TRR = Terminal Regulating Reservoir

[1] Operational exchanges could include within-year exchanges and real-time exchanges.

It should be noted that the Authority and Reclamation could decide to approve a version of one of these alternatives that incorporates elements from one or multiple alternatives. For example, the Authority and Reclamation could approve a version of Alternative 2 (with a 1.3-MAF reservoir) that incorporates the bridge component of Alternative 1. In this way, the evaluation of Alternatives 1, 2, and 3 incorporates a variety of options.

Commented [A1]: Combining elements from multiple alternatives would effectively create a new alternative whose environmental effects might not be fully analyzed. Alternatives need to be clearly defined and analyzed.

Due to the availability of federal funding (see Volume 3, Chapter 3, *Master Responses*Section 3-2, Master Response 2 – *Alternatives Description and Baseline*), Alternative 3, is the Authority's preferred alternative as it is the proposed project under CEQA. Alternative 1 is the Authority's preferred Project under CEQA. This includes either Alternative 1A (operational exchanges with Reclamation but no federal investment) or Alternative 1B (Reclamation as a funding partner with operational exchanges and up to a 7% investment).

[DRAFT LANGUAGE FOR REVIEW PENDING RECLAMATON'S INDENTIFICATION OF A PREFERRED ALTERNATIVE: Reclamation has identified Alternative 3 as being the environmentally preferred action due to Alternative 3 being the alternative that provides the greatest ecosystem benefit.] At the time of publication of this RDEIR/SDEIS, Reclamation has not yet identified a preferred alternative under NEPA.

ES.7.2.1. Elements Common to All Action Alternatives

Many facility and operation elements are common to all three action alternatives. These common elements are briefly described below. More detail of these common elements is

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provided in Chapter 2, *Project Description and Alternatives*, and Appendix 2C, *Construction Means, Methods, and Assumptions*, of this RDEIR/SDEIS Final EIR/EIS.

Facility Elements

Facility elements common to all action alternatives include:

- Improvements to and use of the existing Red Bluff Pumping Plant (RBPP), Tehama-Colusa Canal (TC Canal), Hamilton City Pump Station, and Glenn-Colusa Irrigation District (GCID) Main Canal for the diversion and conveyance of water from the Sacramento River.
- Construction of regulating reservoirs and a conveyance complex to control the conveyance of water between Sites Reservoir, TC Canal, and GCID Main Canal. These facilities would include the regulating reservoirs, pipelines, pumping generating plants (PGPs), electrical substations, and maintenance buildings.
- Construction of an administration and operations building and a maintenance and storage building near the existing Funks Reservoir.
- Construction of two main dams, the Golden Gate Dam on Funks Creek and the Sites Dam on Stone Corral Creek, to impound water in the new reservoir. A series of saddle dams and saddle dikes along the northern and eastern rims of the reservoir would also be constructed to close off topographic saddles in the surrounding ridges. The inlet/outlet works (I/O Works) for the reservoir would be located near the Golden Gate Dam.
- Upgrades to the TC Canal and construction of a new pipeline (the Dunnigan Pipeline) to convey water from the new reservoir to the CBD and ultimately, to the Sacramento River.
- Development of two primary recreation areas and a day-use boat ramp. The recreation areas would also require a network of new roads and upgrades to existing roads for maintenance and local access. The Peninsula Hills Recreation Area would be located on up to 373 acres along the northwest shore of the new reservoir and the Stone Corral Creek Recreation Area would be located on up to 235 acres along the eastern shore of the new reservoir. These areas would provide multiple recreational amenities, including campsites, boat access, horse trails, hiking trails, and vista points. Both of the primary recreation areas would have a kiosk, access to electricity and potable water, picnic sites, hiking trails, vault toilets, and campsites. The day-use boat ramp and parking area would be located on up to 10 acres on the western side of the new reservoir.
- Construction of approximately 46 miles of new paved and unpaved roads to provide construction and maintenance access to the new facilities, as well as public access to the recreation areas.
- Acquisition and maintenance of a 100-foot buffer around the new reservoir and all related facilities, buildings, and recreation areas.

Operations and Maintenance Elements

This section describes operations and maintenance elements common to all action alternatives.

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Water Operations

The Project would provide water supply and water supply-related environmental benefits to the Storage Partners. Water would be diverted from the Sacramento River at the existing RBPP through the TC Canal into the existing Funks Reservoir and at the GCID Hamilton City Pump Station through the GCID Main Canal into a new Terminal Regulating Reservoir (TRR). From the existing Funks Reservoir and a new TRR, the water would be pumped into the new Sites Reservoir. Diversions could occur between September 1 and June 15[14], which corresponds with the period that the Sacramento River is not fully appropriated. Diversions would occur only when the diversion criteria are met. Water would be held in storage in the reservoir until requested for release by a Storage Partner. Water releases would generally be made from May to November but could occur at any time of the year depending on the Storage Partner's need and system conveyance capacity. Water would be released from Sites Reservoir via the I/O Works near the Golden Gate Dam back into a TRR or back into Funks Reservoir. Water released could be used along the GCID Main Canal, along the TC Canal, or conveyed to the new Dunnigan Pipeline and discharged to the CBD and conveyed via the Sacramento River or the Yolo Bypass to a variety of locations in the Delta and south of the Delta. Operations would be coordinated with Reclamation and DWR to prevent conflicts with the CVP and SWP and exchanges of water may occur with the CVP and SWP. Water would also be diverted and impounded from Funks and Stone Corral Creeks and releases from Golden Gate Dam and Sites Dam, respectively, would occur into Funks and Stone Corral Creeks to maintain flows to protect downstream water right holders and ecological function.

Energy Generation and Energy Use

All action alternatives would require power to run facilities and pump water but would also generate incidental power when water is released from Sites Reservoir at the PGPs. Hydropower generation would be an incidental benefit of stored water releases. The power needs for the Project beyond what could be generated by its operations would be purchased from market sources. The goal would be to purchase at least 60% from renewable, carbon-free sources from the start of operations to 2045, and to purchase 100% from renewable, carbon-free sources starting in 2045.

Facility Operations and Maintenance

Operations and maintenance activities for all facilities, including recreation areas, would include debris removal, vegetation control, rodent control, erosion control and protection, routine inspections (dams, tunnels, pipelines, PGPs, I/O Works, fencing, signs, and gates), painting, cleaning, repairs, and other routine tasks to maintain the facilities in accordance with design standards after construction and commissioning. Routine visual inspection of the facilities would be conducted to monitor performance and prevent mechanical and structural failures.

Best Management Practices, Management Plans, and Technical Studies

Best management practices (BMPs), management plans, and technical studies are part of the Project and are integrated into all action alternatives and the impact analyses in this RDEIR/SDEIS[Final EIR/EIS] as applicable. The BMPs would be implemented as part of Project design, construction, and operation/maintenance. The BMPs include applicable design standards, criteria, and requirements, as well as standard practices required on construction projects pursuant either to regulations or as a result of best management. The Authority would develop

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and implement a number of operations and management plans to govern the operations and maintenance activities of the Project. These would include an Initial Sites Reservoir Fill Plan, a Reservoir Management Plan, a Land Management Plan, and a Recreation Management Plan. Finally, technical studies for aquatic biological resources are incorporated as part of the Project. These technical studies will describe factors such as juvenile salmonid migration survival in high flow conditions prior to Project operations, compliance with protective criteria for screen hydraulics at the RBPP and Hamilton City Pump Station in high flow conditions, and changes resulting from initial and continued Project operations in high flow conditions. The BMPs, plans, and technical studies are discussed in detail in Appendix 2D, *Best Management Practices, Management Plans, and Technical Studies*.

ES.7.2.2. Alternative 1 ~~(Authority's Preferred Project)~~

Alternative 1 was initially identified (see Volume 3, Chapter 3, *Master Responses*, Master Response 2, *Alternatives Description and Baseline*) in the RDEIR/SDEIS as the Authority's preferred alternative and the proposed project under CEQA. ~~Alternative 1 is the Authority's preferred Project under CEQA.~~ Figures ES-5 and ES-6 depict Alternative 1's features and facilities. The unique elements of Alternative 1 include the following:

- Reservoir capacity would be 1.5 MAF;
- A bridge across the reservoir would provide access between the east and west sides of the reservoir;
- TRR East;
- The Dunnigan Pipeline would extend from the TC Canal and discharge into the CBD; and
- Reclamation could provide an investment of up to 7% of project costs, corresponding to up to 7% of Sites Reservoir storage space being dedicated to Reclamation's use.

Alternative 1 would impound surface water at the Golden Gate Dam on Funks Creek and the Sites Dam on Stone Corral Creek; a series of seven saddle dams along the surrounding eastern and northern ridges would close off topographic saddles to form Sites Reservoir. The 1.5-MAF reservoir under Alternative 1 would inundate approximately 13,200 acres of Antelope Valley in Colusa County. Under Alternative 1 water from the Sacramento River would be conveyed through existing or upgraded conveyance facilities operated by the Tehama-Colusa Canal Authority and those owned or operated by GCID to new and upgraded regulating reservoirs and into the new Sites Reservoir.

Releases from Sites Reservoir would be made to: (1) meet environmental purposes; (2) Storage Partners based on their requests to meet their water supply portfolio needs; (3) conduct operational exchanges with Reclamation in Shasta Lake ~~and Folsom Lake~~; and (4) complete operational exchanges with DWR in Lake Oroville. When releases are made from Sites Reservoir, existing and new facilities would convey water from the I/O Works to the CBD for release, from which flows could enter the Yolo Bypass or Sacramento River.

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Construction roads, local roads, and maintenance roads would be developed or realigned to accommodate the reservoir facilities, including the realignment of Sites Lodoga Road with a new bridge over the reservoir.

ES.7.2.3. Alternative 2

The unique features of Alternative 2 are shown in Figure ES-7 and ES-8 and include the following:

- Reservoir capacity would be 1.3 MAF;
- TRR West;
- A local access road around the southern end of the reservoir (i.e., South Road) would enable travel between the east and west sides of the reservoir;

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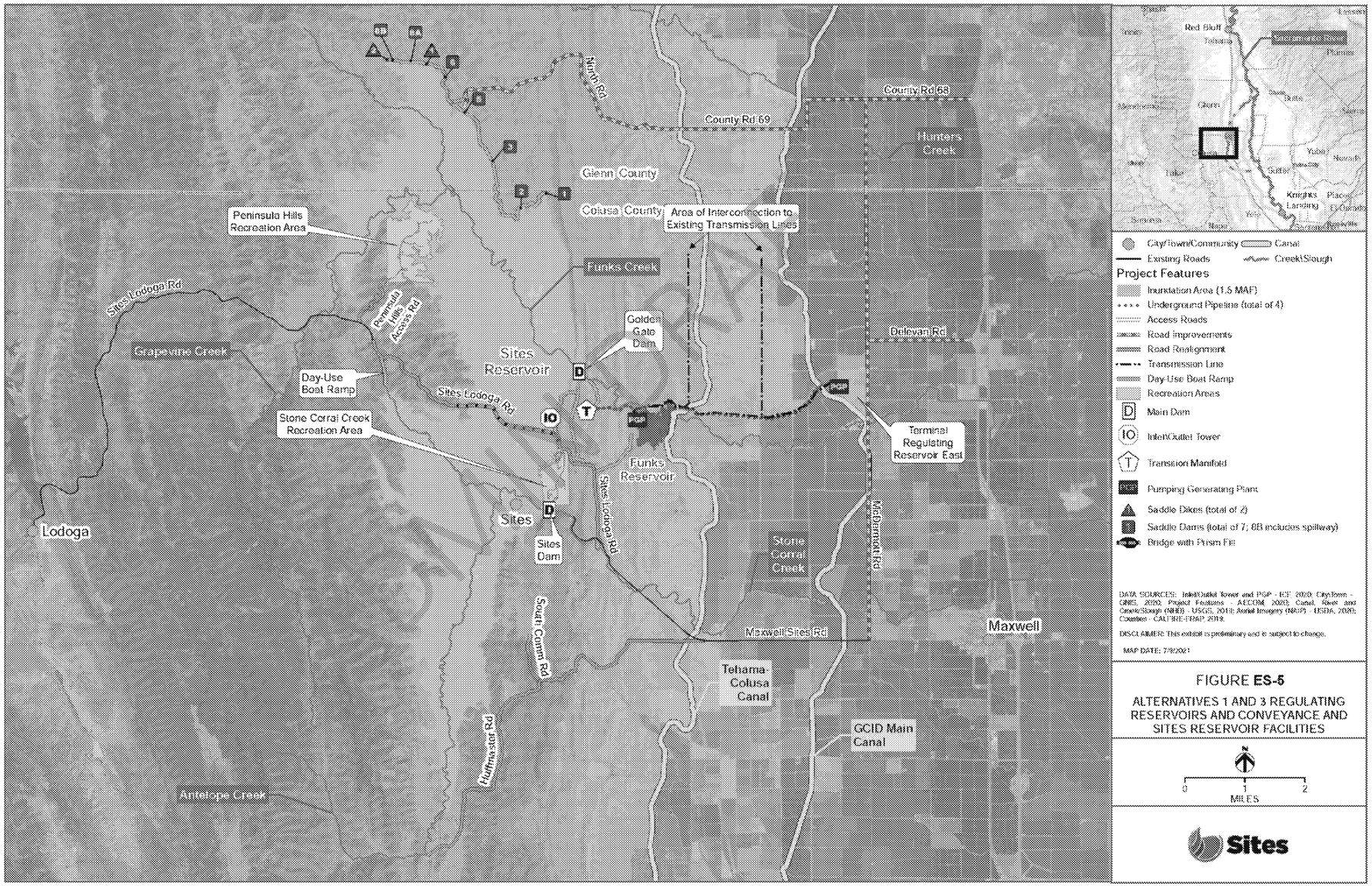

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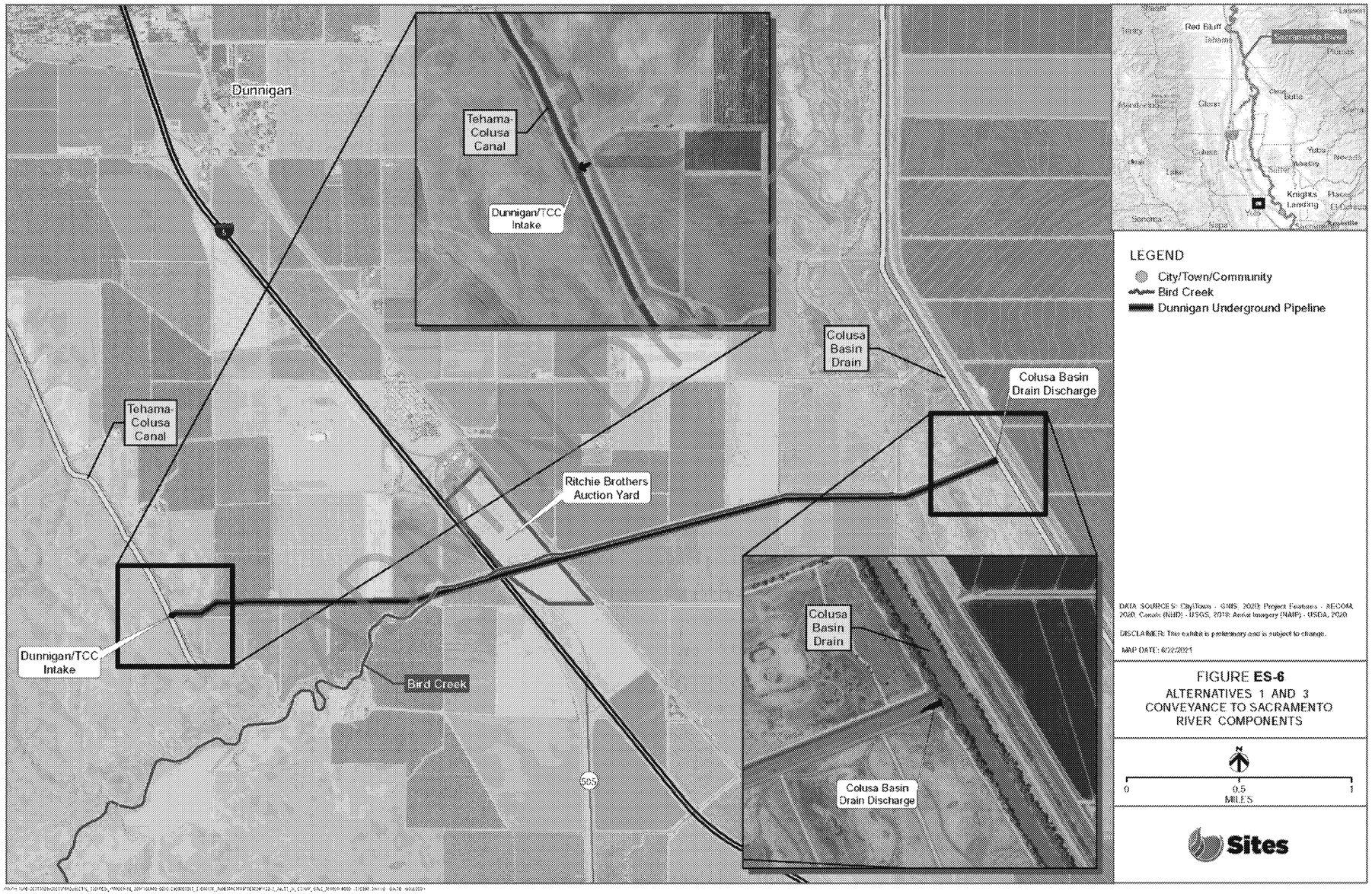
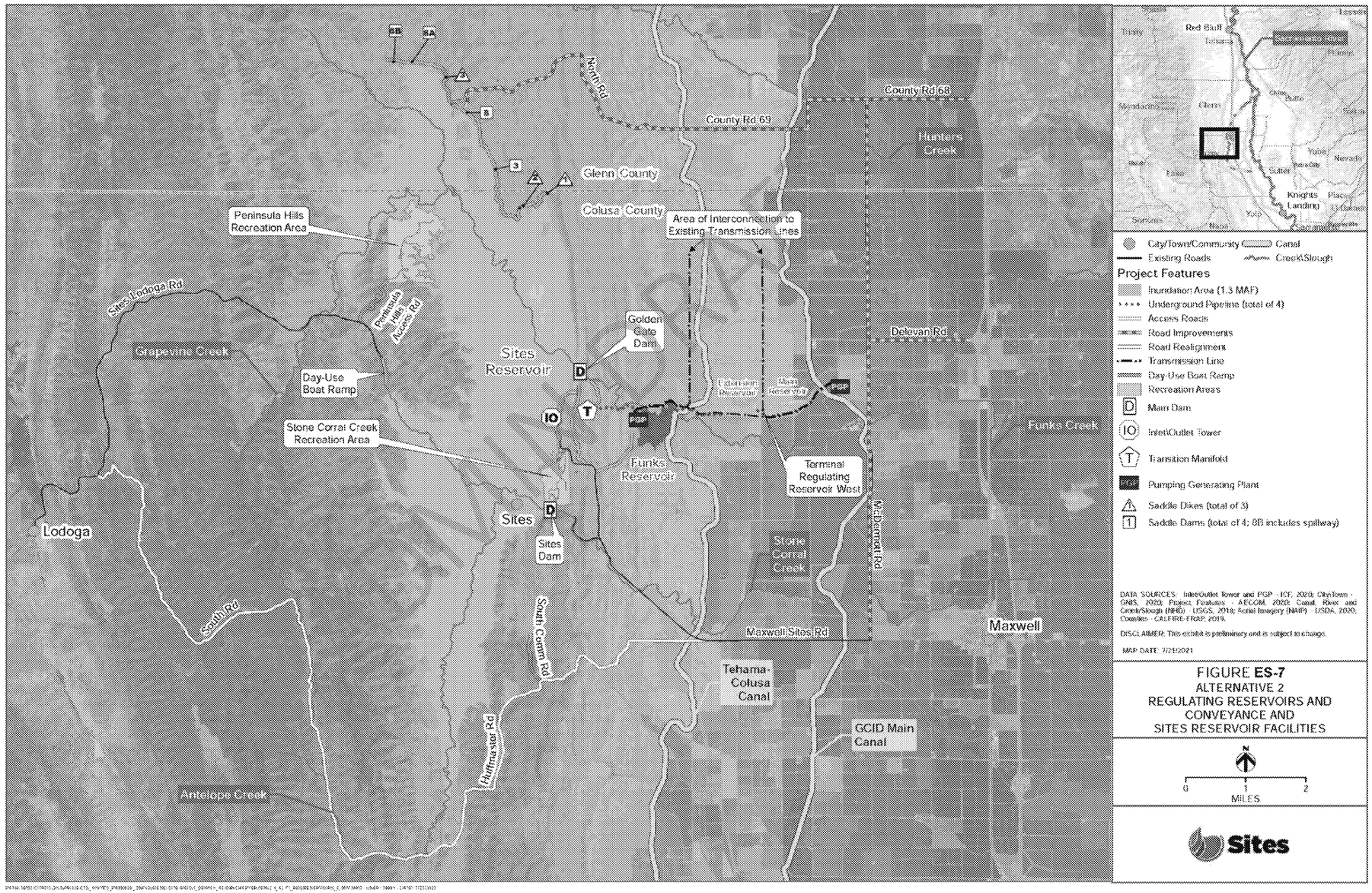
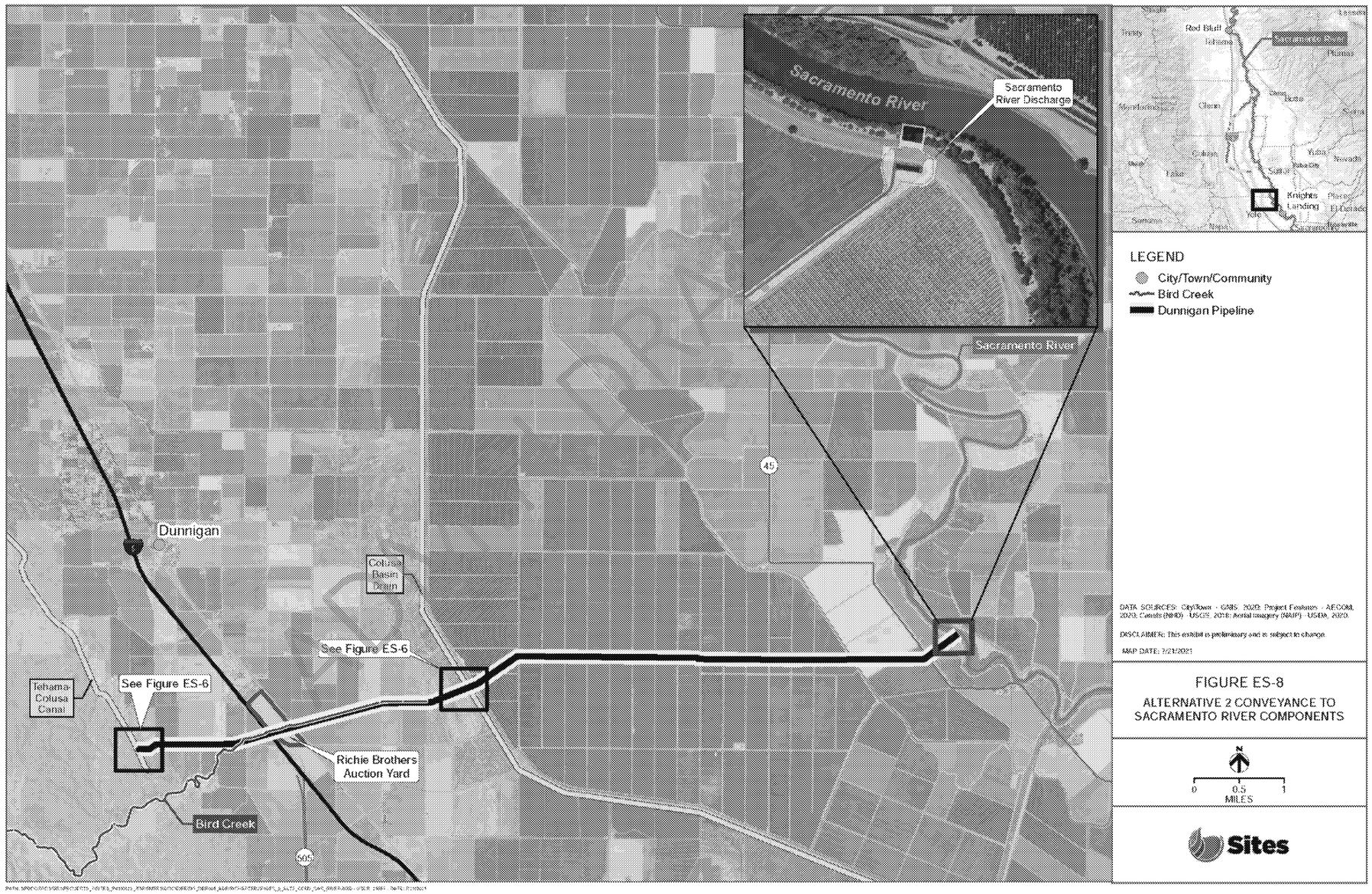

Dunnigan
Tehama-Colusa Canal
Dunnigan/TCC Intake
Colusa Basin Drain
Colusa Basin Drain Discharge
Tehama-Colusa Canal
Ritchie Brothers Auction Yard
Dunnigan/TCC Intake
Bird Creek
505
Colusa Basin Drain
Colusa Basin Drain Discharge
Red Bluff
Knights Landing
LEGEND
City/Town/Community
Bird Creek
Dunnigan Underground Pipeline
DATA SOURCES: CityTown - GNIS, 2020; Project Features - AECOM, 2020; Canals (NHD) - USGS, 2018; Aerial Imagery (NAIP) - USDA, 2020
DISCLAIMER: This exhibit is preliminary and is subject to change.
MAP DATE: 6/22/2021
FIGURE ES-6
ALTERNATIVES 1 AND 3
CONVEYANCE TO SACRAMENTO
RIVER COMPONENTS
N
0
0.5
1
MILES
Sites


SB
SA
1
2
3
4
5
North Rd
County Rd 68
County Rd 69
Hunters Creek
Glenn County
Colusa County
Area of Interconnection to Existing Transmission Lines
Peninsula Hills Recreation Area
Sites-Lodoga Rd
Peninsula Hills Access Rd
Golden Gate Dam
Grapevine Creek
Sites Reservoir
Delevan Rd
Day-Use Boat Ramp
Stone Corral Creek Recreation Area
Funks Reservoir
Terminal Regulating Reservoir West
Funks Creek
Lodoga
Sites
Sites Dam
Stone Corral Creek
McDermott Rd
South Rd
South Comm Rd
Maxwell Sites Rd
Maxwell
Tehama-Colusa Canal
GCID Main Canal
Huffmaster Rd
Antelope Creek
Red Bluff
Tehama
Trinity
Lassen
Plumas
Glenn
Butte
Sutter
Yuba
Nevada
Yolo
Solano
Napa
Lake
Knights Landing
City/Town/Community
Canal
Existing Roads
Creek/Slough
Project Features
Inundation Area (1.3 MAF)
Underground Pipeline (total of 4)
Access Roads
Road Improvements
Road Realignment
Transmission Line
Day Use Boat Ramp
Recreation Areas
Main Dam
Inlet/Outlet Tower
Transition Manifold
Pumping Generating Plant
Saddle Dikes (total of 3)
Saddle Dams (total of 4; SB includes spillway)
DATA SOURCES: Inlet/Outlet Tower and PGP - ICF, 2020; City/Town - GNIS, 2020; Project Features - AECOM, 2020; Canal, River and Creek/Slough (NHD) - USGS, 2018; Aerial Imagery (NAIP) - USDA, 2020; Counties - CALFIRE-FRAP, 2019.
DISCLAIMER: This exhibit is preliminary and is subject to change.
MAP DATE: 7/21/2021
FIGURE ES-7
ALTERNATIVE 2
REGULATING RESERVOIRS AND
CONVEYANCE AND
SITES RESERVOIR FACILITIES
0
1
2
MILES
Sites


Sacramento River
Sacramento River Discharge
Sacramento River
Dunnigan
Colusa Basin Drain
See Figure ES-6
See Figure ES-6
Tehama-Colusa Canal
Richie Brothers Auction Yard
Bird Creek
45
505
Red Bluff
Knights Landing
LEGEND
City/Town/Community
Bird Creek
Dunnigan Pipeline
DATA SOURCES: City/Town - GNIS, 2020; Project Features - AECOM, 2020; Canals (NHD) - USGS, 2018; Aerial Imagery (NAIP) - USDA, 2020.
DISCLAIMER: This exhibit is preliminary and is subject to change.
MAP DATE: 7/21/2021
FIGURE ES-8
ALTERNATIVE 2 CONVEYANCE TO SACRAMENTO RIVER COMPONENTS
N
0
0.5
1
MILES
Sites

- The Dunnigan Pipeline would extend to and discharge into the Sacramento River with primary release from the Sacramento River discharge and only a partial discharge at the CBD; and

- No Reclamation investment in the Project.

Alternative 2 would impound surface water at the Golden Gate Dam on Funks Creek and the Sites Dam on Stone Corral Creek; a series of four saddle dams (three saddle dams less than Alternative 1) along the surrounding eastern and northern ridges would close off topographic saddles to form Sites Reservoir. The 1.3-MAF reservoir (0.2 MAF less than Alternative 1) would inundate approximately 12,600 acres (600 acres less than Alternative 1) of Antelope Valley. Alternative 2 would convey water from the Sacramento River to store in the reservoir using the same existing and new diversion facilities as described for Alternative 1. Alternative 2 would involve the construction of TRR West.

As under Alternative 1, releases from Sites Reservoir under Alternative 2 would be made to meet environmental purposes, for Storage Partners based on their requests to meet their water supply portfolio needs, and for operational exchanges with Reclamation in Shasta Lake ~~and Folsom Lake~~ and with DWR in Lake Oroville. However, under Alternative 2, the Dunnigan Pipeline would be extended beyond the CBD so that releases could be discharged not only to the CBD, but also directly into the Sacramento River. Alternative 2 does not include any Reclamation investment in the Project.

Construction, local, and maintenance roads would be required and developed; however, Alternative 2 does not propose a bridge for the relocated Sites Lodoga Road. Under Alternative 2, the existing Huffmaster Road would be realigned around the southern end of the reservoir and a new South Road would connect to the realigned Huffmaster Road. The recreation areas that would be provided under Alternative 2 would be identical to those for Alternative 1. Overall, operations for Alternative 2 would be similar to those for Alternative 1 but would occur within the constraints of a smaller reservoir.

ES.7.2.4. Alternative 3 (Authority's Preferred Project)

Due to the availability of federal funding (see Volume 3, Chapter 3, *Master Responses*, Master Response 2, *Alternatives Description and Baseline*), Alternative 3 is the Authority's preferred alternative and is the proposed project under CEQA. Alternative 3 facilities and components would be the same as described for Alternative 1 and are shown in Figure ES-5. Operationally, Alternative 3 would include increased Reclamation participation and investment as compared to Alternative 1, with investment of up to 25% of the Project cost. The increased level of Reclamation investment would result in up to 25% of Sites Reservoir storage space being dedicated to Reclamation's use. Reclamation's share of Sites water would be flexibly used by Reclamation to meet CVP objectives that provide for water supply and environmental needs. The increased level of Reclamation investment would also result in increased opportunities for maintaining cold-water pool in Shasta Lake, ~~Folsom Lake,~~ and Lake Oroville. Increased Reclamation investment would require some reduction in local participation for Alternative 3 as compared with Alternative 1; it is assumed that Storage Partners that are local agencies would reduce their participation to accommodate the investment by Reclamation. All other components of Alternative 3 are the same as those for Alternative 1.

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ES.8 Project Impacts and Mitigation Measures

Table ES-2 provides a summary of impacts and mitigation measures for the Project, which are fully analyzed and discussed in Chapters 5 through 30 of this ~~RDEIR/SDEIS~~Final EIR/EIS. Within each of these chapters, as shown in Table ES-2, the impacts are listed numerically and sequentially. An impact statement precedes the discussion of each impact and provides a summary of the impact topic.

Mitigation measures are proposed, where feasible, to avoid, minimize, rectify, reduce, or compensate for significant and potentially significant impacts of the alternatives, in accordance with Section 15126.4 of the CEQA Guidelines and NEPA (40 C.F.R. §§ 1502.14, 1502.16, 1508.8) and accompany each impact discussion. Under NEPA, an EIS must identify relevant, reasonable mitigation measures that are not already included in the proposed action or alternatives to the proposed action that could avoid, minimize, rectify, reduce, eliminate, or compensate for the project's adverse environmental effects (40 C.F.R. § 1508.20). Mitigation measures are presented for each resource to avoid, minimize, rectify, reduce, eliminate, or compensate for adverse environmental effects of Alternatives 1 through 3 as compared to the No Project Alternative. Similar to the impact descriptions, mitigation measures are listed numerically and sequentially throughout each chapter. The numbering system provides a mechanism for tracking unique impacts and mitigation measures by resource area, using an acronym for each resource (e.g., Groundwater is shortened to GW; Vegetation and Wetlands to VEG). The impacts are identified, for example, as "Impact VEG-1" and the mitigation measures as "Mitigation Measure VEG-1.1" and "Mitigation Measure VEG-1.2."

Each impact is accompanied by a CEQA finding and a NEPA conclusion (except for the impacts in Chapters 28 through 30—climate change, Indian Trust Assets, and environmental justice and socioeconomics—which are unique to NEPA and are accompanied only by a NEPA conclusion). Under CEQA, the impacts of the alternatives are compared to the existing conditions baseline and the No Project Alternative and are classified as follows:

- **No impact (NI)**—No change in the environment would result from implementing the alternative.
- **Less-than-significant impact (LTS)**—No substantial adverse change in the environment would result from implementing the alternative.
- **Less than significant with mitigation (LTSM)**—The implementation of one or more mitigation measures would reduce the impact from an alternative to a less-than-significant level.
- **Significant impact (S)**—A substantial adverse change in the physical conditions of the environment would result from implementing the alternative based on the evaluation of Project effects using specified significance criteria. Mitigation measures are proposed, when feasible, to reduce effects on the environment.

Under NEPA, the environmental consequences of the action alternatives are compared to the No Action Alternative, which is equivalent to the CEQA ~~existing~~2020 environmental conditions baseline for this ~~RDEIR/SDEIS~~Final EIR/EIS, and are classified as follows:

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- **Beneficial (B)**—An effect is considered beneficial if it would provide benefit to the environment as defined for that resource.
- **No Effect (NE)**—A finding of no effect is identified if the analysis concludes that the alternative would have no effect or would not affect the particular resource in any adverse way.
- **No Adverse Effect (NE)**—A finding of no adverse effect is identified if the analysis concludes that it would cause no substantial adverse change to the environment and requires no mitigation.
- **Adverse Effect (AE) or Substantial Adverse Effect (SA)**—A finding of adverse effect or substantial adverse effect is identified if the analysis concludes that it would cause an adverse or substantial adverse change to the environment even with the inclusion of one or more feasible mitigation measures or could not be mitigated.

ES.9 Areas of Known Controversy

Several areas of controversy were identified through stakeholder meetings and during the preparation of the 2017 Draft EIR/EIS and 2021 RDEIR/SDEIS. These areas included impacts on property owners in the Project area whose property may be required for construction and impacts on tribal cultural resources because construction may affect burials and other sensitive tribal resources. Concerns were also raised about potential impacts on golden eagles (*Aquila chrysaetos*) that have been identified in and around the inundation area and the potential for impacts on aquatic biological resources due to changes in flow patterns of the Sacramento River. Concerns were also raised regarding the water quality of the water diverted from the Sacramento River and released from the Sites Reservoir. Concerns have also been raised about the potential for the Project to result in changes to Reclamation's operations of the Trinity River Division of the CVP. Many of the areas of known controversy remain the same and are addressed in specific chapters of this RDEIR/SDEIS Final EIR/EIS.

Multiple chapters in this RDEIR/SDEIS Final EIR/EIS describe and evaluate resources related to areas of known controversy described above. For previous areas of known controversy that were related to construction and operation of a Delevan Facility and the Delevan Pipeline are no longer applicable because these facilities have been eliminated from Alternatives 1, 2, and 3. Chapter 2 discusses the relocation of residents of the community of Sites and the Reservoir Management Plan that would be used to manage land resources and property once the reservoir was operational. Chapter 2, *Project Description and Alternatives*, describes that the Project would not affect or result in changes in the operation of the CVP, Trinity River Division facilities (including Clear Creek); Reclamation would continue to operate the Trinity River Division consistent with all applicable statutory, legal, and contractual obligations. Chapter 6, *Surface Water Quality*, addresses potential water quality impacts. Chapter 10, *Wildlife Resources*, addresses potential impacts on golden eagles. Chapter 11, *Aquatic Biological Resources*, addresses potential impacts on aquatic biological resources. Chapter 22, *Cultural Resources*, discusses potential impacts on cemeteries and archaeological resources that may pertain to tribes. Chapter 23, *Tribal Cultural Resources*, documents tribal cultural resources that

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have been identified by tribes through the California Assembly Bill 52 consultation process in which the Authority has been engaged.

ES.10 Commenting on this RDEIR/SDEIS Final EIR/EIS Review and Approval

Through the publication of this RDEIR/SDEIS, the 2017 Draft EIR/EIS is being revised to reflect changes to the Project and the environmental document (RDEIR/SDEIS) is being recirculated for public review and comment in accordance with Section 15088.5 of the CEQA Guidelines. Accordingly, reviewers must limit their comments only to this RDEIR/SDEIS and should not present comments on the prior 2017 Draft EIR/EIS. Although the 2017 Draft EIR/EIS is part of the administrative record in this matter, prior comments submitted on the 2017 Draft EIR/EIS do not require a response under CEQA; new comments must be submitted only on this RDEIR/SDEIS, the Authority will only respond to those comments submitted in response to this RDEIR/SDEIS. Reclamation is circulating the SDEIS for public review and comment in accordance with Title 40 of the CFR, Section 1502.9[2]. Reclamation will respond to comments submitted on the 2017 Draft EIR/EIS and this RDEIR/SDEIS in the Final EIR/EIS under NEPA. The Authority is responsible for certifying the EIR as adequate and in compliance with CEQA. The Authority will publish the response to comments on the RDEIR/SDEISR prior to certifying the Final EIR. If the Authority chooses to approve the Project, it will also be required to adopt "CEQA Findings," an Mitigation Monitoring and Reporting ProgramMRP, and, if necessary, a Statement of Overriding Consideration prior to approving the Project (see State CEQA Guidelines §§ Section 15091—15093). These Project approval documents, which will memorialize the Authority's choice amongst the alternatives developed in this EIR/EIS, would be referenced in a Notice of DeterminationNOD (State CEQA Guidelines § Section 15094.). If Reclamation determines it will approve the proposed action, it is responsible for issuing a Record of DecisionROD following a 30-day period after a Notice of Availability for the EIR has been published with the U.S. Environmental Protection Agency. The Record of DecisionROD will also include consideration of a final biological opinion issued under ESAfederal Endangered Species Act (ESA) Section 7.

The Final EIR/EIS is available for review at these locations and websites.

- Sites Project Authority office
- Bureau of Reclamation office
- https://sitesproject.org/environmental-review/

Federal and state permitting agencies will also be using the Final EIR/EIS to assist in their issuance of permits or other approvals. These agencies include the CWC, which determines eligibility for Proposition 1 funding; USEPA and USACE, which issues permits under Section

[2] The notice of intent (NOI) for which this Supplemental Draft Environmental Impact Statement is issued was published before September 14, 2020. Therefore, all references to CEQ regulations are to those regulations at 40 CFR parts 1500–1508 in existence as of the date the NOI was published in the Federal Register on May 14, 2020.

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~~404 of the Clean Water Act,~~ the U.S. Army Corps of Engineers~~USACE~~, which issues permits under Section 404 of the Clean Water Act and Sections 10 and 14 of the Rivers and Harbors Act; ~~USFWS and NMFS~~the U.S. Fish and Wildlife Service and National Marine Fisheries Service, which are responsible for enforcing the ESA; and the State Water Resources Control Board, which oversees petitions for water rights. A detailed discussion of agency roles and responsibilities and uses of the Final EIR/EIS to support issuance of permits and~~of~~approvals is provided in Chapter ~~4, *Regulatory and Environmental Compliance: Project Permits, Approvals, and Consultation Requirements*~~.

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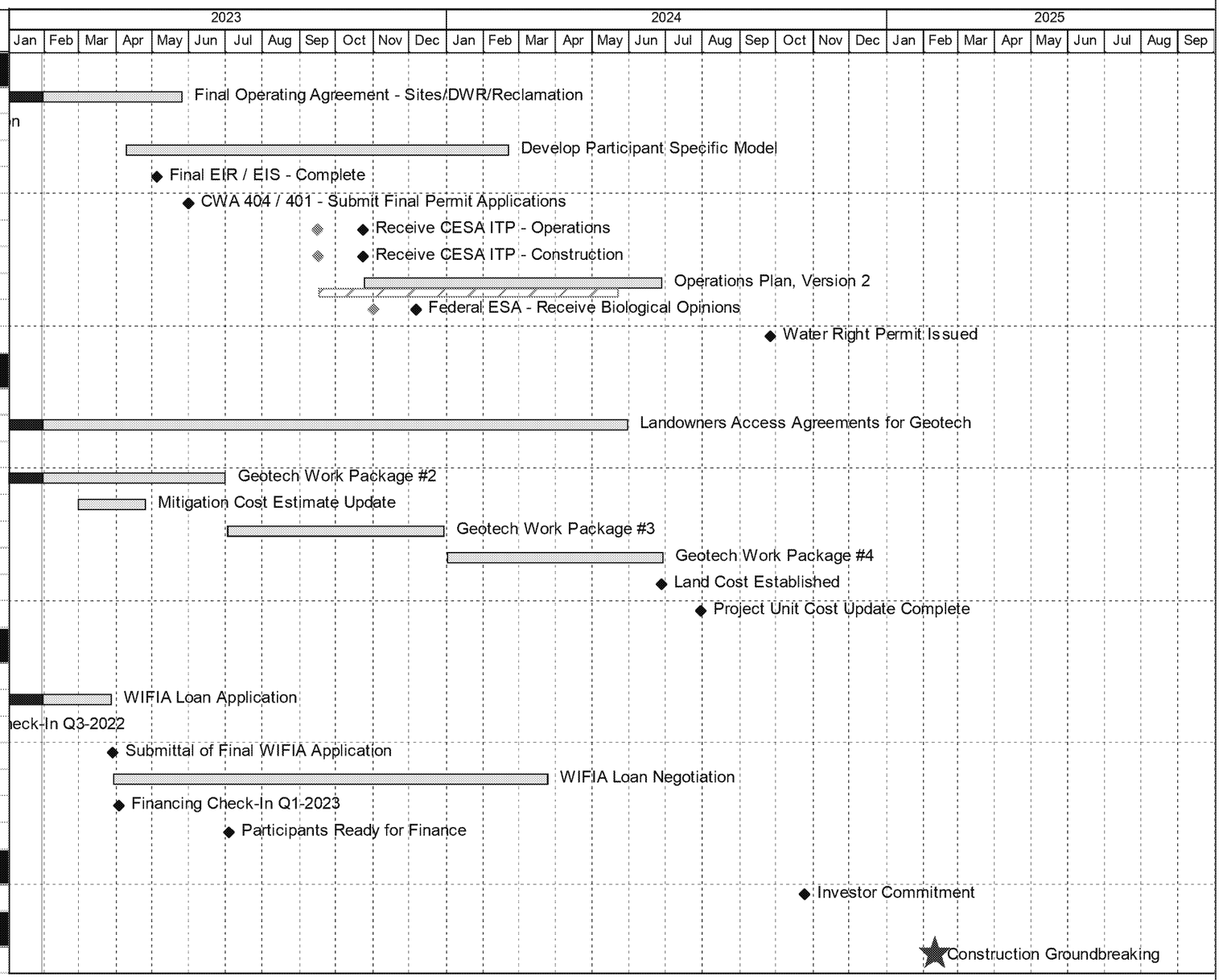
Sites Reservoir Project

Work Plan Progress Reporting

#	Activity Name	Start	Finish
1	**What do we get?**		
2	Final Operating Agreement - Sites/DWR/Reclamation	19-Apr-22 A	26-May-23
3	Submit Water Right Permit Application		11-May-22 A
4	Develop Participant Specific Model	10-Apr-23	21-Feb-24
5	Final EIR / EIS - Complete		05-May-23
6	CWA 404 / 401 - Submit Final Permit Applications		31-May-23
7	Receive CESA ITP - Operations		23-Oct-23
8	Receive CESA ITP - Construction		23-Oct-23
9	Operations Plan, Version 2	24-Oct-23	27-Jun-24
10	Federal ESA - Receive Biological Opinions		06-Dec-23
11	Water Right Permit Issued		26-Sep-24
12	**What does it cost?**		
13	Geotech EA/IS	03-Jan-22 A	28-Jul-22 A
14	Landowners Access Agreements for Geotech	22-Mar-22 A	30-May-24
15	Geotech Work Package #1	06-Sep-22 A	30-Dec-22 A
16	Geotech Work Package #2	02-Jan-23 A	30-Jun-23
17	Mitigation Cost Estimate Update	01-Mar-23	25-Apr-23
18	Geotech Work Package #3	03-Jul-23	29-Dec-23
19	Geotech Work Package #4	02-Jan-24	28-Jun-24
20	Land Cost Established		27-Jun-24
21	Project Unit Cost Update Complete		30-Jul-24
22	**How do we pay?**		
23	Financing Check-In Q2-2022		01-Jul-22 A
24	WIFIA Loan Application	05-Jul-22 A	28-Mar-23
25	Financing Check-In Q3-2022		07-Oct-22 A
26	Submittal of Final WIFIA Application		29-Mar-23
27	WIFIA Loan Negotiation	30-Mar-23	25-Mar-24
28	Financing Check-In Q1-2023		03-Apr-23
29	Participants Ready for Finance		03-Jul-23
30	**Investor Commitment**		
31	Investor Commitment		24-Oct-24
32	**Construction**		
33	Construction Groundbreaking	10-Feb-25	



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Key:
Work Completed
Work Remaining
Change from Previous Month

Data Date: 29-Jan-23 / Print Date: 07-Feb-23

From: Davis-Fadtke, Kristal@Wildlife [Kristal.Davis-Fadtke@wildlife.ca.gov]
Sent: 3/7/2023 10:18:15 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Jacobson, Allison M [ajacobson@usbr.gov]
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hi Ali,

I received a notice that the second email did not make it to you or Laurie, but John should have it. I will upload our next batch of comments to the SharePoint site.

Thanks,

Kristal

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 7, 2023 9:01 AM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hi Kristal – Thanks for the comments. Your email mentions that you'll be sending a second email with another file. I don't think we have received that yet. Did you send or can you try to resend? You can also upload it to the SharePoint Site too if that would work better.

Just want to make sure we've got all of CDFW's comments.

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: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Tuesday, March 7, 2023 8:16 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: FW: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning,

I just realized this email did not go through because the file sizes are too large. My apologies for the delay. I will send the last file in a separate email.

Kristal

From: Davis-Fadtke, Kristal@Wildlife
Sent: Friday, March 3, 2023 1:22 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; john.spranza@hdrinc.com; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hello,

Please find attached CDFW's comments on Group 1.

Have a great weekend.

Kristal

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Friday, February 24, 2023 2:11 PM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Cohen, Ariel <Ariel.Cohen@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>; Brick, David A <dbrick@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hello CEQA Responsible Agencies – We've had some feedback that folks could use additional time in their review. We also have a really tight schedule to finish the document, so are trying to balance these requests with the Project schedule. We've come up with the following approach:

Group 1 – Chapters, Appendices, and Responses generally NOT reliant on the new modeling will now be due on March 3. This gives a few extra days for your review and allows us to get moving on changes to these chapters relatively on schedule.

Group 2 – Chapters, Appendices and Responses generally WITH the new modeling will now be due on March 14. This gives an additional 2 weeks for your review of these heftier sections.

The attached document outlines this in more detail. Please let me know if you have any questions or concerns.

We look forward to your comments.

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: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Wednesday, February 22, 2023 5:17 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hi Laurie,

We have been able to access all the files and are in the middle of our review. Given that the last of the files were received on February 11, we will not be able to provide comments until March 8.

Best,

Kristal

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, February 22, 2023 12:45 PM
To: Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards

<Amanda.Montgomery@waterboards.ca.gov>; Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

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Good afternoon all -

We are checking in on the status of your review and comments on the Sites Reservoir Administrative Final EIR/EIS. Please let me know if there are any ongoing issues with access and your ability to add comments (in comment bubbles) to the files. We also would like to know if there are any problems in meeting the schedule to submit your comments by February 28th, which is next Tuesday.

Thank you for providing your review and comments, we very much value your input.

Laurie

From: Laurie Warner Herson
Sent: Saturday, February 11, 2023 8:00 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning,

ICF delivered the last of the Sites Reservoir Administrative Final EIR/EIS yesterday evening. These files include responses to individual comments in table format. The tables are organized by topic and an index of table numbers and topics has been provided. All files have been upload to the Volume 3 folder on SharePoint: Vol3 RTC

This concludes the daily emails but I'm still available should there be any questions or issues in accessing files. We look forward to receiving your comments at the end of the month.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 10, 2023 8:55 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning everyone,

The following master responses to comments on the Sites Reservoir RDEIR/SDEIS have been uploaded for your review:

- Master Responses 1, CEQA and NEPA Process, Regulatory Requirements, and General Comments
- Master Response 2, Alternatives Description and Baseline
- Master Response 3, Hydrology and Hydrologic Modeling
- Master Response 4, Water Quality
- Master Response 5, Aquatic Biological Resources
- Master Response 6, Vegetation, Wetland, and Wildlife Resources
- Master Response 7, Tribal Coordination, Consultation, and Engagement
- Master Response 8, Trinity River
- Master Response 9, Alternatives Development

Individual responses to comments, organized by topic in table format, will be uploaded later today. I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Thursday, February 9, 2023 10:45 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all –

The following additional files have been uploaded for your review:

Chapters
ES. Executive Summary
ES. Table ES2
28. Climate Change

Appendices
4A, Regulatory Requirements
30B, Comparison of Regional Hydrologic Model Results to Inform Economic Analyses

These are the last of the chapter and appendix files that have been updated (see attached revised index). Volume 3, Responses to Comments will start being uploaded later today and I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 8, 2023 8:25 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>;

dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all,

The following additional files have been uploaded for your review:

Chapters
6. Surface Water Quality
7. Fluvial Geomorphology
29. Indian Trust Assets
31. Cumulative Impacts
32. Other Required Analyses
33. Consultation and Coordination and List of Preparers

Appendices
21A, Reservoir GHG Calculations (NEW)

A revised index has also been uploaded and a copy is attached to this email. We are almost done with Volumes 1 and 2 and ICF has informed me that they will start uploading Volume 3 files soon. As always, please contact us if you have any issues accessing these files.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Monday, February 6, 2023 5:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good evening,

The following files have been uploaded today:

Chapter:
30. Environmental Justice and Socioeconomics

Appendices:
10A, Wildlife Database Results
20A, Methodology for Air Quality and GHG Emissions Calculations
20C, Ambient Air Quality and Health Risk Analysis Technical Report
20C1, AERMOD Equivalency Model Demonstration (NEW)*
20C2, Model Construction Figures (NEW)*
20C3, Modeled Emissions (NEW)*
20D, Photochemical Modeling Study to Support a Health Impact Analysis

A revised index has also been uploaded and a copy is attached to this email. Please let me know if you have any issues with access or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Sunday, February 5, 2023 4:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Hello all,

The EIR/EIS Team has submitted Chapter 11, *Aquatic Biological Resources* and all remaining Chapter 11 appendices. They have also submitted the following additional appendices:

6B3, Sacramento–-San Joaquin Delta Modeling, X2 Results (DSM2-QUAL)*
6B4, Sacramento–San Joaquin Delta Modeling, Export Loading*
6B5, Water Quality Compliance*

We have added those files to the State and Federal Agency SharePoint site for your review. We also added an updated index of chapters and appendices (attached) to SharePoint. Please let us know if you have any questions or issues with access. If there are others that need access to review the files, please forward their name and email address.

Thank you for your time and input,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 3, 2023 7:57 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Good morning,

We have uploaded additional chapters for your review. These include:

Chapters
1. Introduction
21. Greenhouse Gases

Appendices
1A Introduction to Appendices and Models
2B, Additional Alternatives Screening and Evaluation
5A, Surface Water Resources Modeling of Alternatives
5A1, Model Assumptions
5A2, CALSIM II Model Assumptions Callouts
5A3, DSM2 Model Assumptions Callouts
5A4, HEC5Q and Reclamation Temperature Model Assumptions Callouts
5A5, CALSIM II Model Delivery Specifications
5A6, Model Limitations and Improvements
5A7, Daily Pattern Development for the Estimation of Daily Flows and Weir Spills in CALSIM II
5B, Water Resources System Modeling
5B1, Project Operations
5B2, River Operations
5B3, Delta Operations
5B4, Regional Deliveries
5B5, Water Supply
5C, Upper Sacramento River Daily River Flow and Operations Model (2 parts)
6B1, Sacramento–-San Joaquin Delta Modeling, Salinity Results (DSM2-QUAL)
6B2, Sacramento–-San Joaquin Delta Modeling, Chloride Results (DSM2-QUAL)
6C, River Temperature Modeling
6D, Sites Reservoir Discharge Temperature Modeling*
6D1, Sites Reservoir Discharge Temperature Modeling, Attachment 1 Reservoir Surface Water and Release Temperature
6D2, Sites Reservoir Discharge Temperature Modeling, Attachment 2 Water Temperature at Downstream Locations

6E, Water Quality Data
6F, Mercury and Methylmercury
11D, Fisheries Water Temperature Assessment Summary Table
11N, Other Flow-Related Upstream Analyses
15A, Natural Resources Conservation Service Land Evaluation and Site Assessment Explanations and Calculations for the Sites Reservoir Project (NEW
17A, CVP/SWP Power Modeling
28A, Climate Change

Please let me know if there is any problem in accessing files or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 1, 2023 4:31 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Dear Responsible Agencies,

We have uploaded initial chapters and appendices of the Sites Administrative Final EIR/EIS for your review. The files have been copied to folders at the following location on the Sites Project State and Federal Agencies SharePoint site: https://sitesreservoirproject.sharepoint.com/sites/SitesProjectStateandFederalAgencies.

We have included an index of chapters and appendices with the files on SharePoint. The index identifies which chapters and appendices will be revised as well as the date they are uploaded. We will update the index as we receive additional chapters and appendices to SharePoint. The files uploaded to-date include:

Chapters
2. Project Description and Alternatives
3. Environmental Analysis
4. Regulatory and Environmental Compliance
5. Surface Water Resources
8. Groundwater Resources
9. Vegetation and Wetland Resources
10. Wildlife Resources
12. Geology and Soil
14. Land Use
15. Agriculture and Forestry Resources

16. Recreation Resources
17. Energy
18. Navigation, Transportation, and Traffic
20. Air Quality
23. Tribal Cultural Resources
26. Public Services and Utilities
27. Public Health and Environmental Health
34. Final EIR/EIS Document Distribution

Appendices
2D, Environmental Commitments and BMPs
2D1, Assessment of Mystery Snail Technical Memorandum (NEW)
6A, California State Water Resources Control Board Constituents of Concern
7A, Fluvial Geomorphic Setting Information
7B, Hydrodynamic Geomorphic Modeling Results
8A, Groundwater Resources Basin Setting

All documents were uploaded in a protected state, allowing comment bubbles but not changes to the document text. The ICF team is still doing editing in parallel so no changes should be made to the documents to avoid version control issues. Also:

- Please provide comments in comment bubbles where the change is needed.
- Please be specific and detailed in every comment bubble and avoid referencing another comment bubble (i.e.: "See previous comment") as all comments are compiled and individual reviewer names may not be retained.
- If referencing a previous comment made on a document in Volume 3, please add the comment to the Volume 3 document and reference the associated Comment Report number (i.e.: "Table 5, Comment 1.")
- Focus on substantial issues not editorial changes.
- Changes to the project description are described in detail in Chapter 2 and updated throughout the EIR/EIS chapters.

Please let us know if there are issues with access to filles or any other questions. We will notify you when additional files are available for review; we ask that you complete your review by February 28, 2023.

Thank you,

Laurie

Laurie Warner Herson
Principal/Owner

Phenix
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/

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/7/2023 10:26:08 AM
To: Spranza, John [john.spranza@hdrinc.com]; Davis-Fadtke, Kristal@Wildlife [Kristal.Davis-Fadtke@wildlife.ca.gov]; Alicia Forsythe [aforsythe@sitesproject.org]; Jacobson, Allison M [ajacobson@usbr.gov]
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Thanks John

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Tuesday, March 7, 2023 10:25 AM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

I have two emails from Kristal today, one 10mb and one 29mb. I will load the 29mb one to the SharePoint site.

John Spranza

D 916.679.8858 M 816.640.2487

From: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Tuesday, March 7, 2023 10:18 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

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 Ali,

I received a notice that the second email did not make it to you or Laurie, but John should have it. I will upload our next batch of comments to the SharePoint site.

Thanks,

Kristal

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 7, 2023 9:01 AM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hi Kristal – Thanks for the comments. Your email mentions that you'll be sending a second email with another file. I don't think we have received that yet. Did you send or can you try to resend? You can also upload it to the SharePoint Site too if that would work better.

Just want to make sure we've got all of CDFW's comments.

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: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Tuesday, March 7, 2023 8:16 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: FW: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning,

I just realized this email did not go through because the file sizes are too large. My apologies for the delay. I will send the last file in a separate email.

Kristal

From: Davis-Fadtke, Kristal@Wildlife
Sent: Friday, March 3, 2023 1:22 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; john.spranza@hdrinc.com; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hello,

Please find attached CDFW's comments on Group 1.

Have a great weekend.

Kristal

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Friday, February 24, 2023 2:11 PM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR

<Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Cohen, Ariel <Ariel.Cohen@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>; Brick, David A <dbrick@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hello CEQA Responsible Agencies – We've had some feedback that folks could use additional time in their review. We also have a really tight schedule to finish the document, so are trying to balance these requests with the Project schedule. We've come up with the following approach:

Group 1 – Chapters, Appendices, and Responses generally NOT reliant on the new modeling will now be due on March 3. This gives a few extra days for your review and allows us to get moving on changes to these chapters relatively on schedule.

Group 2 – Chapters, Appendices and Responses generally WITH the new modeling will now be due on March 14. This gives an additional 2 weeks for your review of these heftier sections.

The attached document outlines this in more detail. Please let me know if you have any questions or concerns.

We look forward to your comments.

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: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Wednesday, February 22, 2023 5:17 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>;

Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hi Laurie,

We have been able to access all the files and are in the middle of our review. Given that the last of the files were received on February 11, we will not be able to provide comments until March 8.

Best,

Kristal

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, February 22, 2023 12:45 PM
To: Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Good afternoon all -

We are checking in on the status of your review and comments on the Sites Reservoir Administrative Final EIR/EIS. Please let me know if there are any ongoing issues with access and your ability to add comments (in comment bubbles) to the files. We also would like to know if there are any problems in meeting the schedule to submit your comments by February 28th, which is next Tuesday.

Thank you for providing your review and comments, we very much value your input.

Laurie

From: Laurie Warner Herson
Sent: Saturday, February 11, 2023 8:00 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning,

ICF delivered the last of the Sites Reservoir Administrative Final EIR/EIS yesterday evening. These files include responses to individual comments in table format. The tables are organized by topic and an index of table numbers and topics has been provided. All files have been upload to the Volume 3 folder on SharePoint: Vol3 RTC

This concludes the daily emails but I'm still available should there be any questions or issues in accessing files. We look forward to receiving your comments at the end of the month.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 10, 2023 8:55 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning everyone,

The following master responses to comments on the Sites Reservoir RDEIR/SDEIS have been uploaded for your review:

- Master Responses 1, CEQA and NEPA Process, Regulatory Requirements, and General Comments
- Master Response 2, Alternatives Description and Baseline
- Master Response 3, Hydrology and Hydrologic Modeling
- Master Response 4, Water Quality
- Master Response 5, Aquatic Biological Resources
- Master Response 6, Vegetation, Wetland, and Wildlife Resources
- Master Response 7, Tribal Coordination, Consultation, and Engagement
- Master Response 8, Trinity River
- Master Response 9, Alternatives Development

Individual responses to comments, organized by topic in table format, will be uploaded later today. I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Thursday, February 9, 2023 10:45 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all –

The following additional files have been uploaded for your review:

Chapters
ES. Executive Summary
ES. Table ES2
28. Climate Change

Appendices

4A, Regulatory Requirements
30B, Comparison of Regional Hydrologic Model Results to Inform Economic Analyses

These are the last of the chapter and appendix files that have been updated (see attached revised index). Volume 3, Responses to Comments will start being uploaded later today and I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 8, 2023 8:25 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all,

The following additional files have been uploaded for your review:

Chapters
6. Surface Water Quality
7. Fluvial Geomorphology
29. Indian Trust Assets
31. Cumulative Impacts
32. Other Required Analyses
33. Consultation and Coordination and List of Preparers

Appendices
21A, Reservoir GHG Calculations (NEW)

A revised index has also been uploaded and a copy is attached to this email. We are almost done with Volumes 1 and 2 and ICF has informed me that they will start uploading Volume 3 files soon. As always, please contact us if you have any issues accessing these files.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Monday, February 6, 2023 5:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good evening,

The following files have been uploaded today:

Chapter:
30. Environmental Justice and Socioeconomics

Appendices:
10A, Wildlife Database Results
20A, Methodology for Air Quality and GHG Emissions Calculations
20C, Ambient Air Quality and Health Risk Analysis Technical Report
20C1, AERMOD Equivalency Model Demonstration (NEW)*
20C2, Model Construction Figures (NEW)*
20C3, Modeled Emissions (NEW)*
20D, Photochemical Modeling Study to Support a Health Impact Analysis

A revised index has also been uploaded and a copy is attached to this email. Please let me know if you have any issues with access or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Sunday, February 5, 2023 4:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh,

John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Hello all,

The EIR/EIS Team has submitted Chapter 11, *Aquatic Biological Resources* and all remaining Chapter 11 appendices. They have also submitted the following additional appendices:

6B3, Sacramento–-San Joaquin Delta Modeling, X2 Results (DSM2-QUAL)*
6B4, Sacramento–San Joaquin Delta Modeling, Export Loading*
6B5, Water Quality Compliance*

We have added those files to the State and Federal Agency SharePoint site for your review. We also added an updated index of chapters and appendices (attached) to SharePoint. Please let us know if you have any questions or issues with access. If there are others that need access to review the files, please forward their name and email address.

Thank you for your time and input,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 3, 2023 7:57 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Good morning,

We have uploaded additional chapters for your review. These include:

Chapters
1. Introduction
21. Greenhouse Gases

Appendices
1A Introduction to Appendices and Models
2B, Additional Alternatives Screening and Evaluation

5A, Surface Water Resources Modeling of Alternatives
5A1, Model Assumptions
5A2, CALSIM II Model Assumptions Callouts
5A3, DSM2 Model Assumptions Callouts
5A4, HEC5Q and Reclamation Temperature Model Assumptions Callouts
5A5, CALSIM II Model Delivery Specifications
5A6, Model Limitations and Improvements
5A7, Daily Pattern Development for the Estimation of Daily Flows and Weir Spills in CALSIM II
5B, Water Resources System Modeling
5B1, Project Operations
5B2, River Operations
5B3, Delta Operations
5B4, Regional Deliveries
5B5, Water Supply
5C, Upper Sacramento River Daily River Flow and Operations Model (2 parts)
6B1, Sacramento–-San Joaquin Delta Modeling, Salinity Results (DSM2-QUAL)
6B2, Sacramento–-San Joaquin Delta Modeling, Chloride Results (DSM2-QUAL)
6C, River Temperature Modeling
6D, Sites Reservoir Discharge Temperature Modeling*
6D1, Sites Reservoir Discharge Temperature Modeling, Attachment 1 Reservoir Surface Water and Release Temperature
6D2, Sites Reservoir Discharge Temperature Modeling, Attachment 2 Water Temperature at Downstream Locations
6E, Water Quality Data
6F, Mercury and Methylmercury
11D, Fisheries Water Temperature Assessment Summary Table
11N, Other Flow-Related Upstream Analyses
15A, Natural Resources Conservation Service Land Evaluation and Site Assessment Explanations and Calculations for the Sites Reservoir Project (NEW
17A, CVP/SWP Power Modeling
28A, Climate Change

Please let me know if there is any problem in accessing files or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 1, 2023 4:31 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Dear Responsible Agencies,

We have uploaded initial chapters and appendices of the Sites Administrative Final EIR/EIS for your review. The files have been copied to folders at the following location on the Sites Project State and Federal Agencies SharePoint site: https://sitesreservoirproject.sharepoint.com/sites/SitesProjectStateandFederalAgencies.

We have included an index of chapters and appendices with the files on SharePoint. The index identifies which chapters and appendices will be revised as well as the date they are uploaded. We will update the index as we receive additional chapters and appendices to SharePoint. The files uploaded to-date include:

Chapters
2. Project Description and Alternatives
3. Environmental Analysis
4. Regulatory and Environmental Compliance
5. Surface Water Resources
8. Groundwater Resources
9. Vegetation and Wetland Resources
10. Wildlife Resources
12. Geology and Soil
14. Land Use
15. Agriculture and Forestry Resources
16. Recreation Resources
17. Energy
18. Navigation, Transportation, and Traffic
20. Air Quality
23. Tribal Cultural Resources
26. Public Services and Utilities
27. Public Health and Environmental Health
34. Final EIR/EIS Document Distribution

Appendices
2D, Environmental Commitments and BMPs
2D1, Assessment of Mystery Snail Technical Memorandum (NEW)
6A, California State Water Resources Control Board Constituents of Concern
7A, Fluvial Geomorphic Setting Information
7B, Hydrodynamic Geomorphic Modeling Results
8A, Groundwater Resources Basin Setting

All documents were uploaded in a protected state, allowing comment bubbles but not changes to the document text. The ICF team is still doing editing in parallel so no changes should be made to the documents to avoid version control issues. Also:

- Please provide comments in comment bubbles where the change is needed.
- Please be specific and detailed in every comment bubble and avoid referencing another comment bubble (i.e.: "See previous comment") as all comments are compiled and individual reviewer names may not be retained.
- If referencing a previous comment made on a document in Volume 3, please add the comment to the Volume 3 document and reference the associated Comment Report number (i.e.: "Table 5, Comment 1.")
- Focus on substantial issues not editorial changes.
- Changes to the project description are described in detail in Chapter 2 and updated throughout the EIR/EIS chapters.

Please let us know if there are issues with access to filles or any other questions. We will notify you when additional files are available for review; we ask that you complete your review by February 28, 2023.

Thank you,

Laurie

Laurie Warner Herson
Principal/Owner

Phenix
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/

From: Davis-Fadtke, Kristal@Wildlife [Kristal.Davis-Fadtke@wildlife.ca.gov]
Sent: 3/7/2023 10:26:51 AM
To: Spranza, John [john.spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Jacobson, Allison M [ajacobson@usbr.gov]
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Thanks John!

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Tuesday, March 7, 2023 10:25 AM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

I have two emails from Kristal today, one 10mb and one 29mb. I will load the 29mb one to the SharePoint site.

John Spranza

D 916.679.8858 M 818.640.2487

From: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Tuesday, March 7, 2023 10:18 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

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 Ali,

I received a notice that the second email did not make it to you or Laurie, but John should have it. I will upload our next batch of comments to the SharePoint site.

Thanks,

Kristal

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 7, 2023 9:01 AM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hi Kristal – Thanks for the comments. Your email mentions that you'll be sending a second email with another file. I don't think we have received that yet. Did you send or can you try to resend? You can also upload it to the SharePoint Site too if that would work better.

Just want to make sure we've got all of CDFW's comments.

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: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Tuesday, March 7, 2023 8:16 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Subject: FW: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning,

I just realized this email did not go through because the file sizes are too large. My apologies for the delay. I will send the last file in a separate email.

Kristal

From: Davis-Fadtke, Kristal@Wildlife
Sent: Friday, March 3, 2023 1:22 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; john.spranza@hdrinc.com; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hello,

Please find attached CDFW's comments on Group 1.

Have a great weekend.

Kristal

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Friday, February 24, 2023 2:11 PM
To: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi,

Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Cohen, Ariel <Ariel.Cohen@hdrinc.com>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>; Brick, David A <dbrick@usbr.gov>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hello CEQA Responsible Agencies – We've had some feedback that folks could use additional time in their review. We also have a really tight schedule to finish the document, so are trying to balance these requests with the Project schedule. We've come up with the following approach:

Group 1 – Chapters, Appendices, and Responses generally NOT reliant on the new modeling will now be due on March 3. This gives a few extra days for your review and allows us to get moving on changes to these chapters relatively on schedule.

Group 2 – Chapters, Appendices and Responses generally WITH the new modeling will now be due on March 14. This gives an additional 2 weeks for your review of these heftier sections.

The attached document outlines this in more detail. Please let me know if you have any questions or concerns.

We look forward to your comments.

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: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>
Sent: Wednesday, February 22, 2023 5:17 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards

<Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Hi Laurie,

We have been able to access all the files and are in the middle of our review. Given that the last of the files were received on February 11, we will not be able to provide comments until March 8.

Best,

Kristal

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, February 22, 2023 12:45 PM
To: Young, Amy@DWR <Amy.Young@water.ca.gov>; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; Cooke, Robert@DWR <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; Torres, Juan@Wildlife <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Maroney, Jagruti@DWR <Jagruti.Maroney@water.ca.gov>; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; Wood, Dylan@Wildlife <Dylan.Wood@wildlife.ca.gov>; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; Wadsworth, Derek@Waterboards <Derek.Wadsworth@Waterboards.ca.gov>; O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Lupoli, Christina@Wildlife <Christina.Lupoli@Wildlife.ca.gov>; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Good afternoon all -

We are checking in on the status of your review and comments on the Sites Reservoir Administrative Final EIR/EIS. Please let me know if there are any ongoing issues with access and your ability to add comments (in comment bubbles) to the files. We also would like to know if there are any problems in meeting the schedule to submit your comments by February 28th, which is next Tuesday.

Thank you for providing your review and comments, we very much value your input.

Laurie

From: Laurie Warner Herson
Sent: Saturday, February 11, 2023 8:00 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning,

ICF delivered the last of the Sites Reservoir Administrative Final EIR/EIS yesterday evening. These files include responses to individual comments in table format. The tables are organized by topic and an index of table numbers and topics has been provided. All files have been upload to the Volume 3 folder on SharePoint: Vol3 RTC

This concludes the daily emails but I'm still available should there be any questions or issues in accessing files. We look forward to receiving your comments at the end of the month.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 10, 2023 8:55 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>

Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning everyone,

The following master responses to comments on the Sites Reservoir RDEIR/SDEIS have been uploaded for your review:

- Master Responses 1, CEQA and NEPA Process, Regulatory Requirements, and General Comments
- Master Response 2, Alternatives Description and Baseline
- Master Response 3, Hydrology and Hydrologic Modeling
- Master Response 4, Water Quality
- Master Response 5, Aquatic Biological Resources
- Master Response 6, Vegetation, Wetland, and Wildlife Resources
- Master Response 7, Tribal Coordination, Consultation, and Engagement
- Master Response 8, Trinity River
- Master Response 9, Alternatives Development

Individual responses to comments, organized by topic in table format, will be uploaded later today. I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Thursday, February 9, 2023 10:45 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all –

The following additional files have been uploaded for your review:

Chapters
ES. Executive Summary

ES. Table ES2
28. Climate Change

Appendices
4A, Regulatory Requirements
30B, Comparison of Regional Hydrologic Model Results to Inform Economic Analyses

These are the last of the chapter and appendix files that have been updated (see attached revised index). Volume 3, Responses to Comments will start being uploaded later today and I will notify you when they are available.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 8, 2023 8:25 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good morning all,

The following additional files have been uploaded for your review:

Chapters
6. Surface Water Quality
7. Fluvial Geomorphology
29. Indian Trust Assets
31. Cumulative Impacts
32. Other Required Analyses
33. Consultation and Coordination and List of Preparers

Appendices
21A, Reservoir GHG Calculations (NEW)

A revised index has also been uploaded and a copy is attached to this email. We are almost done with Volumes 1 and 2 and ICF has informed me that they will start uploading Volume 3 files soon. As always, please contact us if you have any issues accessing these files.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Monday, February 6, 2023 5:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Files Available for Review

Good evening,

The following files have been uploaded today:

Chapter:
30. Environmental Justice and Socioeconomics

Appendices:
10A, Wildlife Database Results
20A, Methodology for Air Quality and GHG Emissions Calculations
20C, Ambient Air Quality and Health Risk Analysis Technical Report
20C1, AERMOD Equivalency Model Demonstration (NEW)*
20C2, Model Construction Figures (NEW)*
20C3, Modeled Emissions (NEW)*
20D, Photochemical Modeling Study to Support a Health Impact Analysis

A revised index has also been uploaded and a copy is attached to this email. Please let me know if you have any issues with access or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Sunday, February 5, 2023 4:01 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>;

Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov; Miller, Aaron@DWR <Aaron.Miller@water.ca.gov>; Ely, Terri@DWR <Terri.Ely@water.ca.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Hello all,

The EIR/EIS Team has submitted Chapter 11, *Aquatic Biological Resources* and all remaining Chapter 11 appendices. They have also submitted the following additional appendices:

6B3, Sacramento–-San Joaquin Delta Modeling, X2 Results (DSM2-QUAL)*
6B4, Sacramento–San Joaquin Delta Modeling, Export Loading*
6B5, Water Quality Compliance*

We have added those files to the State and Federal Agency SharePoint site for your review. We also added an updated index of chapters and appendices (attached) to SharePoint. Please let us know if you have any questions or issues with access. If there are others that need access to review the files, please forward their name and email address.

Thank you for your time and input,

Laurie

From: Laurie Warner Herson
Sent: Friday, February 3, 2023 7:57 AM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov; christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Good morning,

We have uploaded additional chapters for your review. These include:

Chapters
1. Introduction
21. Greenhouse Gases

Appendices
1A Introduction to Appendices and Models
2B, Additional Alternatives Screening and Evaluation
5A, Surface Water Resources Modeling of Alternatives
5A1, Model Assumptions
5A2, CALSIM II Model Assumptions Callouts
5A3, DSM2 Model Assumptions Callouts
5A4, HEC5Q and Reclamation Temperature Model Assumptions Callouts
5A5, CALSIM II Model Delivery Specifications
5A6, Model Limitations and Improvements
5A7, Daily Pattern Development for the Estimation of Daily Flows and Weir Spills in CALSIM II
5B, Water Resources System Modeling
5B1, Project Operations
5B2, River Operations
5B3, Delta Operations
5B4, Regional Deliveries
5B5, Water Supply
5C, Upper Sacramento River Daily River Flow and Operations Model (2 parts)
6B1, Sacramento–-San Joaquin Delta Modeling, Salinity Results (DSM2-QUAL)
6B2, Sacramento–-San Joaquin Delta Modeling, Chloride Results (DSM2-QUAL)
6C, River Temperature Modeling
6D, Sites Reservoir Discharge Temperature Modeling*
6D1, Sites Reservoir Discharge Temperature Modeling, Attachment 1 Reservoir Surface Water and Release Temperature
6D2, Sites Reservoir Discharge Temperature Modeling, Attachment 2 Water Temperature at Downstream Locations
6E, Water Quality Data
6F, Mercury and Methylmercury
11D, Fisheries Water Temperature Assessment Summary Table
11N, Other Flow-Related Upstream Analyses
15A, Natural Resources Conservation Service Land Evaluation and Site Assessment Explanations and Calculations for the Sites Reservoir Project (NEW
17A, CVP/SWP Power Modeling
28A, Climate Change

Please let me know if there is any problem in accessing files or any other questions.

Thank you,

Laurie

From: Laurie Warner Herson
Sent: Wednesday, February 1, 2023 4:31 PM
To: Amy.Young@water.ca.gov; Montgomery, Amanda@Waterboards <Amanda.Montgomery@waterboards.ca.gov>; 'Kristal Davis Fadtke (Kristal.Davis-Fadtke@wildlife.ca.gov)' <Kristal.Davis-Fadtke@wildlife.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>; 'Cooke, Robert@DWR' <Robert.Cooke@water.ca.gov>; Biondi, Oscar@Waterboards <Oscar.Biondi@waterboards.ca.gov>; Heinrich, Dana@Waterboards <Dana.Heinrich@waterboards.ca.gov>; 'Tores, Juan Lopez' <Juan.Torres@wildlife.ca.gov>; 'Ore, AnnMarie@Waterboards' <annmarie.ore@waterboards.ca.gov>; Jagruti.Maroney@water.ca.gov; Uttley, Paige@Wildlife <Paige.Uttley@wildlife.ca.gov>; Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>; Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>; dylan.wood@wildlife.ca.gov; Sheya, Tanya@Wildlife <Tanya.Sheya@wildlife.ca.gov>; Sandino, David@DWR <David.Sandino@water.ca.gov>; Riddle, Diane@Waterboards <Diane.Riddle@waterboards.ca.gov>; Leahigh, John@DWR <John.Leahigh@water.ca.gov>; derek.wadsworth@waterboards.ca.gov; daniel.odonnell@wildlife.ca.gov; Hennessy, April@Wildlife <April.Hennessy@wildlife.ca.gov>; michael.paccassi@wildlife.ca.gov;

christina.lupoli@wildlife.ca.gov
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Review Briefing

Dear Responsible Agencies,

We have uploaded initial chapters and appendices of the Sites Administrative Final EIR/EIS for your review. The files have been copied to folders at the following location on the Sites Project State and Federal Agencies SharePoint site: https://sitesreservoirproject.sharepoint.com/sites/SitesProjectStateandFederalAgencies.

We have included an index of chapters and appendices with the files on SharePoint. The index identifies which chapters and appendices will be revised as well as the date they are uploaded. We will update the index as we receive additional chapters and appendices to SharePoint. The files uploaded to-date include:

Chapters
2. Project Description and Alternatives
3. Environmental Analysis
4. Regulatory and Environmental Compliance
5. Surface Water Resources
8. Groundwater Resources
9. Vegetation and Wetland Resources
10. Wildlife Resources
12. Geology and Soil
14. Land Use
15. Agriculture and Forestry Resources
16. Recreation Resources
17. Energy
18. Navigation, Transportation, and Traffic
20. Air Quality
23. Tribal Cultural Resources
26. Public Services and Utilities
27. Public Health and Environmental Health
34. Final EIR/EIS Document Distribution

Appendices
2D, Environmental Commitments and BMPs
2D1, Assessment of Mystery Snail Technical Memorandum (NEW)
6A, California State Water Resources Control Board Constituents of Concern
7A, Fluvial Geomorphic Setting Information
7B, Hydrodynamic Geomorphic Modeling Results
8A, Groundwater Resources Basin Setting

All documents were uploaded in a protected state, allowing comment bubbles but not changes to the document text. The ICF team is still doing editing in parallel so no changes should be made to the documents to avoid version control issues. Also:

- Please provide comments in comment bubbles where the change is needed.
- Please be specific and detailed in every comment bubble and avoid referencing another comment bubble (i.e.: "See previous comment") as all comments are compiled and individual reviewer names may not be retained.
- If referencing a previous comment made on a document in Volume 3, please add the comment to the Volume 3 document and reference the associated Comment Report number (i.e.: "Table 5, Comment 1.")
- Focus on substantial issues not editorial changes.
- Changes to the project description are described in detail in Chapter 2 and updated throughout the EIR/EIS chapters.

Please let us know if there are issues with access to filles or any other questions. We will notify you when additional files are available for review; we ask that you complete your review by February 28, 2023.

Thank you,

Laurie

Laurie Warner Herson
Principal/Owner

Phenix
Environmental Planning

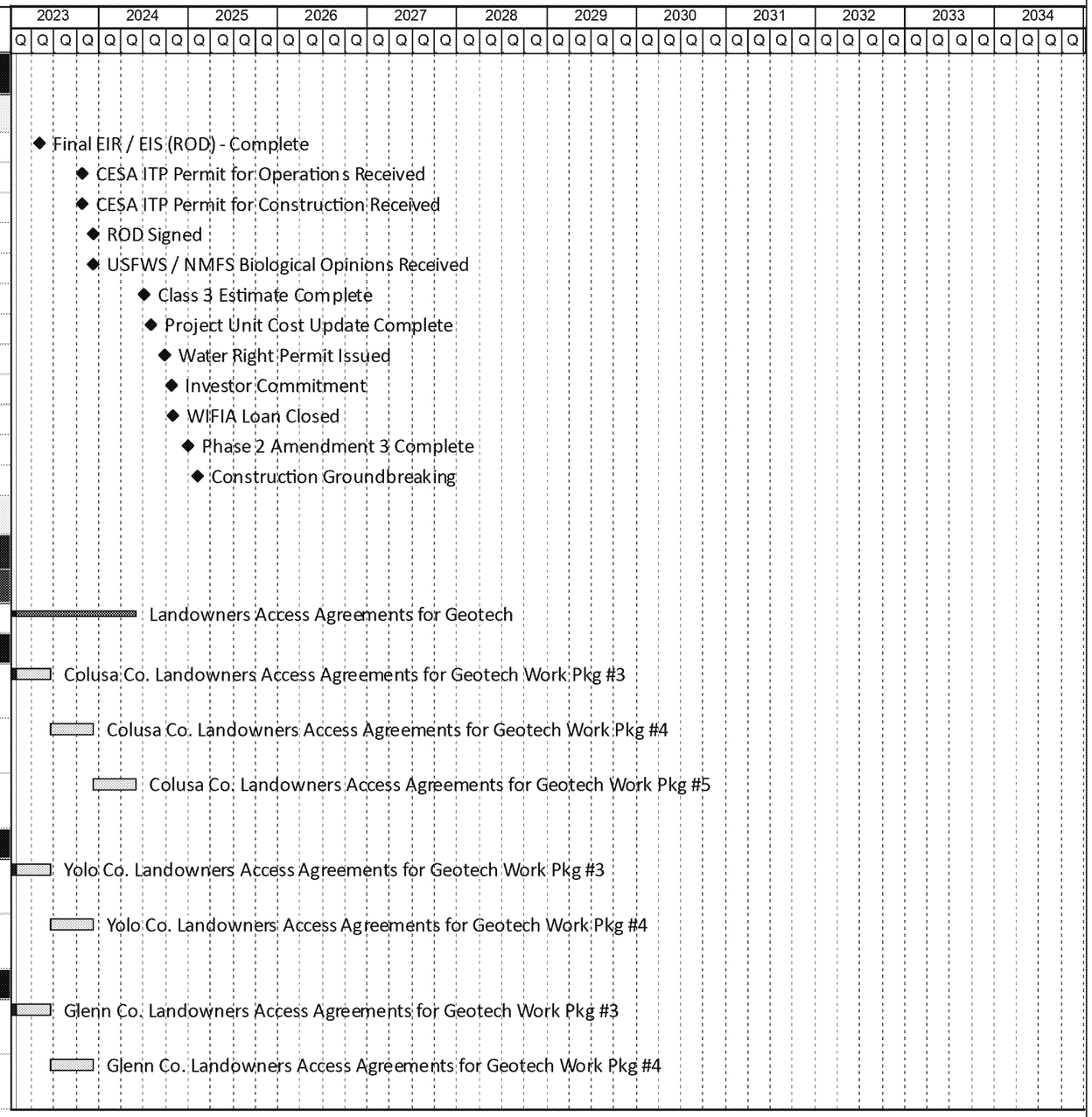
916.201.3935
laurie.warner.herson@phenixenv.com
State of California Small Business (#1796182)
Supplier Clearinghouse Women Business Enterprise (#16000323)

http://phenixenv.com/

Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Duration	Start	Finish
1	**Sites Reservoir Project DD: Feb-2023_Workshop**		2917	01-Sep-20 A	05-May-34
2	**Project Milestones**		444	05-May-23	10-Feb-25
3	MS-1200	Final EIR / EIS (ROD) - Complete	0		05-May-23
4	MS-1320	CESA ITP Permit for Operations Received	0		23-Oct-23
5	MS-1340	CESA ITP Permit for Construction Received	0		23-Oct-23
6	MS-1300	ROD Signed	0		06-Dec-23
7	MS-1150	USFWS / NMFS Biological Opinions Received	0		06-Dec-23
8	MS-1700	Class 3 Estimate Complete	0		05-Jul-24
9	MS-1450	Project Unit Cost Update Complete	0		30-Jul-24
10	MS-1400	Water Right Permit Issued	0		26-Sep-24*
11	MS-1500	Investor Commitment	0		24-Oct-24
12	MS-1600	WIFIA Loan Closed	0		31-Oct-24
13	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*
14	MS-3000	Construction Groundbreaking	0	10-Feb-25	
15	**Geotech Program**		943	22-Mar-22	12-Oct-26
16	**Real Estate**		340	22-Mar-22	30-May-24
17	**Land Access Agreements**		340	22-Mar-22	30-May-24
18	A1250	Landowners Access Agreements for Geotech	340	22-Mar-22	30-May-24
19	**Colusa County**		340	03-Jan-23 A	30-May-24
20	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	100	03-Jan-23 A	19-Jun-23
21	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23
22	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	11-Dec-23	30-May-24
23	**Yolo County**		220	03-Jan-23 A	08-Dec-23
24	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	100	03-Jan-23 A	19-Jun-23
25	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23
26	**Glenn County**		340	03-Jan-23 A	30-May-24
27	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	100	03-Jan-23 A	19-Jun-23
28	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23



Remaining Level of Effort | Remaining Work
Actual Level of Effort | Critical Remaining Work
Actual Work | Milestone

Project ID: Sites Feb-2023_Exp / Project Name: Sites Reservoir Project DD: Feb-2023_Workshop
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#	Activity ID	Activity Name	Duration	Start	Finish
29	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	11-Dec-23	30-May-24
30	**Geotechnical Engineering**		943	06-Sep-22 A	12-Oct-26
31	**Key Deliverables**		361	06-Sep-22 A	28-Jun-24
32	KD-2015	P1A Geotechnical Investigations & Reports	233	06-Sep-22 A	29-Dec-23
33	KD-2025	P1B Geotechnical Investigations & Reports	252	03-Jul-23	28-Jun-24
34	**Geotechnical Investigations**		943	02-Jan-23 A	12-Oct-26
35	P2-GEO	P2 Geotech for Final Design	500	25-Oct-24	12-Oct-26
36	**Test Pits & Trenches**		420	31-Mar-23	22-Nov-24
37	TPT-1200	Geotech Test Pits & Trenches - Short Term Pemit Window	420	31-Mar-23	22-Nov-24
38	**Work Packages**		486	02-Jan-23 A	30-Dec-24
39	GWP-1200	Geotech Work Package #2	109	02-Jan-23 A	30-Jun-23
40	GWP-1300	Geotech Work Package #3	124	03-Jul-23	29-Dec-23
41	GWP-1400	Geotech Work Package #4	128	02-Jan-24	28-Jun-24
42	GWP-1500	Geotech Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	125	01-Jul-24	30-Dec-24
43	**Preliminary Engineering**		382	30-Jan-23	30-Jul-24
44	**Key Deliverables**		75	20-Mar-24	05-Jul-24
45	KD-1180	Preliminary Engineering (30% Design Level)	0		20-Mar-24
46	KD-1190	Update to Class 3 Construction Cost Estimate	0		05-Jul-24
47	**Cost Estimate**		382	30-Jan-23	30-Jul-24
48	**Class 4 Cost Estimate Variance Reporting**		300	30-Jan-23	03-Apr-24
49	C4E-1000	Class 4 Cost Estimate Variance Reporting (reset to Sort G)	300	30-Jan-23	03-Apr-24
50	**Class 3 Cost Estimate**		82	04-Apr-24	30-Jul-24
51	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	04-Apr-24	05-Jul-24
52	CU-1000	Project Unit Cost Update	0		30-Jul-24
53	**Project Development**		1607	01-Sep-20 A	27-Apr-29
54	**Planning**		233	01-Sep-20 A	31-Dec-23
55	**Key Deliverables**		233	24-Jan-22 A	31-Dec-23
56	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	65	24-Jan-22 A	28-Apr-23
57	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3 (JBrown)	337	06-Sep-22 A	31-Dec-23
58	**NAHC/Local Tribes AB 52 Consultation**		113	01-Sep-20 A	07-Jul-23
59	STA-120	NAHC/Local Tribes AB 52 Consultation	113	01-Sep-20 A	07-Jul-23
60	**Reservoir Operations & Modeling**		463	03-Jan-22 A	21-Nov-24
61	**Operations Plan - Version 2**		172	24-Oct-23	27-Jun-24
62	KD-1510	Operations Plan, Version 2	172	24-Oct-23	27-Jun-24
63	**Final Sites DWR/Reclamation Operating Agreement**		85	19-Apr-22 A	26-May-23

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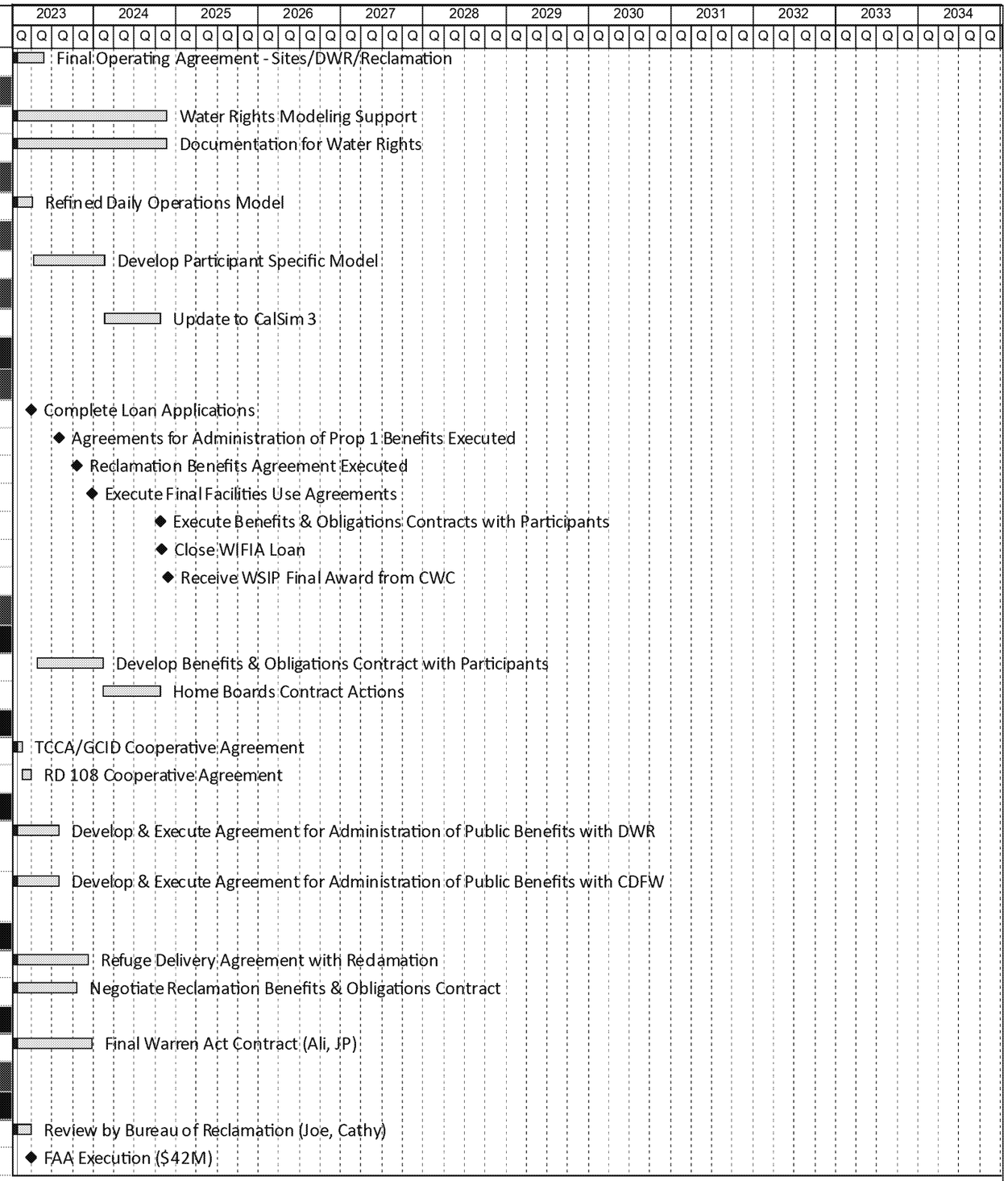
#	Activity ID	Activity Name	Duration	Start	Finish
64	OP-1005	Final Operating Agreement - Sites/DWR/Reclamation	85	19-Apr-22 A	26-May-23
65	**Water Rights Modeling**		463	03-Jan-22 A	21-Nov-24
66	A1200	Water Rights Modeling Support	463	03-Jan-22 A	21-Nov-24
67	A1210	Documentation for Water Rights	463	03-Jan-22 A	21-Nov-24
68	**Refined Daily Operations Model**		50	03-Oct-22 A	07-Apr-23
69	A1220	Refined Daily Operations Model	50	03-Oct-22 A	07-Apr-23
70	**Sites Specific Model**		220	10-Apr-23	21-Feb-24
71	OS-1150	Develop Participant Specific Model	220	10-Apr-23	21-Feb-24
72	**Update to CalSim 3**		174	22-Feb-24	25-Oct-24
73	A1230	Update to CalSim 3	174	22-Feb-24	25-Oct-24
74	**Project Agreements & Funding**		523	01-Jun-21 A	20-Feb-25
75	**Key Deliverables**		422	29-Mar-23	25-Nov-24
76	KD-1255	Complete Loan Applications	0		29-Mar-23
77	KD-1520	Agreements for Administration of Prop 1 Benefits Executed	0		31-Jul-23
78	KD-1260	Reclamation Benefits Agreement Executed	0		17-Oct-23
79	KD-1230	Execute Final Facilities Use Agreements	0		27-Dec-23
80	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		25-Oct-24
81	KD-2600	Close WIFIA Loan	0		31-Oct-24
82	KD-1310	Receive WSIP Final Award from CWC	0		25-Nov-24
83	**Inter-Agency Agreements**		444	01-Jun-21 A	25-Oct-24
84	**Benefits & Obligations Contract with Participants**		381	27-Apr-23	25-Oct-24
85	BO-1300	Develop Benefits & Obligations Contract with Participants	200	27-Apr-23	12-Feb-24
86	BO-1400	Home Boards Contract Actions	180	13-Feb-24	25-Oct-24
87	**Facility Use Agreeements**		45	27-Aug-21	31-Mar-23
88	FO-1020	TCCA/GCID Cooperative Agreement	15	27-Aug-21	17-Feb-23
89	FO-1040	RD 108 Cooperative Agreement	30	20-Feb-23	31-Mar-23
90	**Agreements for Administration of Public Benefits**		129	31-Mar-22	31-Jul-23
91	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR	129	31-Mar-22 A	31-Jul-23
92	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW	129	31-Mar-22 A	31-Jul-23
93	**Federal Funding Committment**		218	12-Dec-22	06-Dec-23
94	Refuge	Refuge Delivery Agreement with Redamation	215	12-Dec-22	06-Dec-23
95	WIIN-1170	Negotiate Reclamation Benefits & Obligations Contract	184	16-Dec-22	17-Oct-23
96	**US Bureau of Reclamation Warren Act**		231	01-Jun-21 A	27-Dec-23
97	FED-090	Final Warren Act Contract (Ali, JP)	231	01-Jun-21 A	27-Dec-23
98	**Federal Funding**		366	10-Jun-22 A	08-Jul-24
99	**WIIN Act FAA**		293	10-Jun-22 A	25-Mar-24
100	WIIN-1190	Review by Bureau of Reclamation (Joe, Cathy)	62	10-Jun-22 A	31-Mar-23
101	WIIN-1210	FAA Execution ($42M)	0		31-Mar-23



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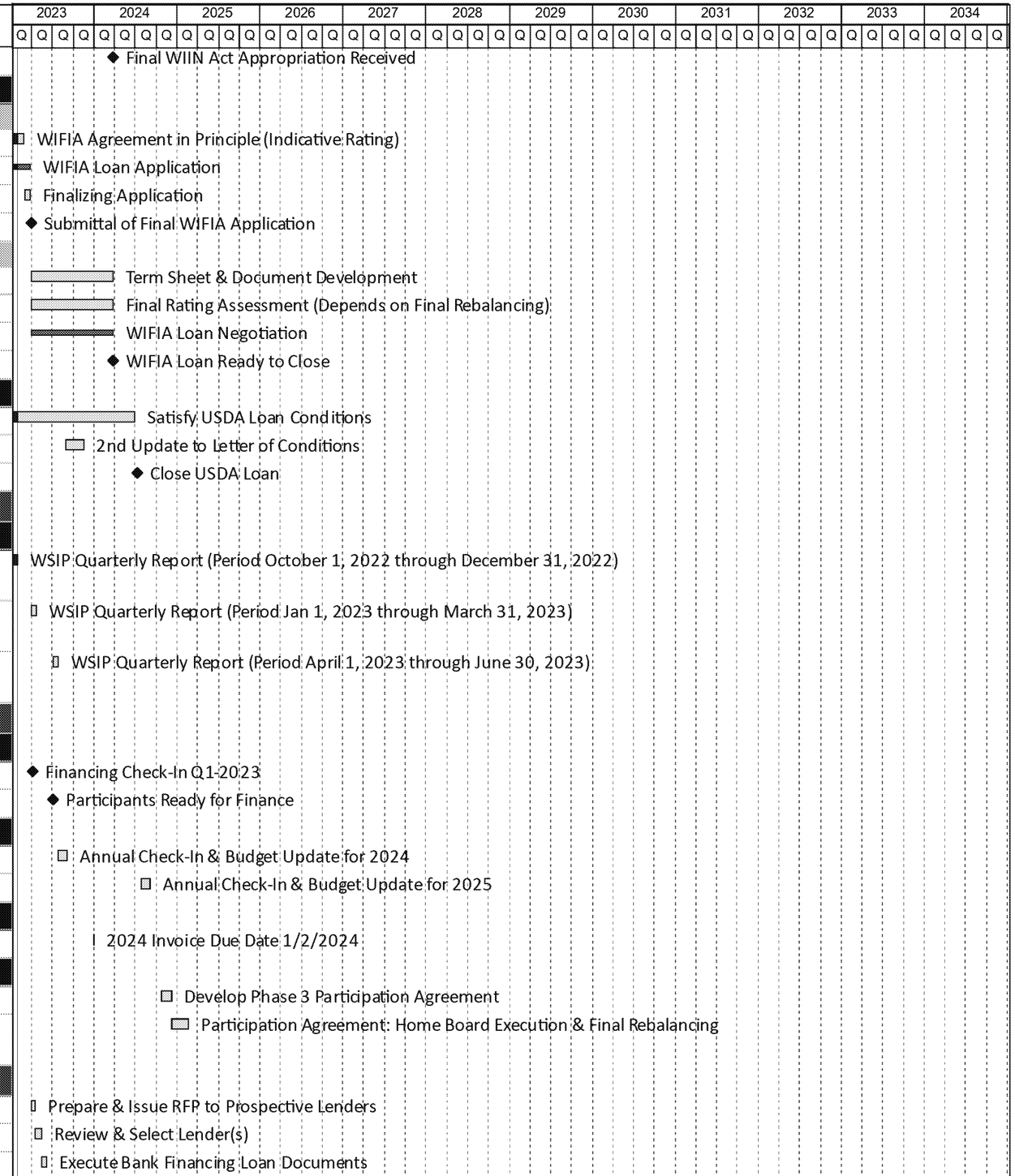
102	WIIN-1200	Final WIIN Act Appropriation Received	0		25-Mar-24
103	**WIFIA Loan**		293	05-Jul-22 A	25-Mar-24
104	**WIFIA Application**		43	05-Jul-22 A	29-Mar-23
105	WIFIA-110	WIFIA Agreement in Principle (Indicative Rating)	22	05-Jul-22 A	28-Feb-23
106	WIFIA-300	WIFIA Loan Application	41	05-Jul-22 A	28-Mar-23
107	WIFIA-130	Finalizing Application	20	01-Mar-23	28-Mar-23
108	WIFIA-140	Submittal of Final WIFIA Application	0		29-Mar-23
109	**WIFIA Negotiation**		250	30-Mar-23	25-Mar-24
110	WIFIA-210	Term Sheet & Document Development	250	30-Mar-23	25-Mar-24
111	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	30-Mar-23	25-Mar-24
112	WIFIA-240	WIFIA Loan Negotiation	247	30-Mar-23	25-Mar-24
113	WIFIA-230	WIFIA Loan Ready to Close	0		25-Mar-24
114	**USDA Loan**		366	02-Sep-22 A	08-Jul-24
115	USDA-1060	Satisfy USDA Loan Conditions	361	02-Sep-22 A	28-Jun-24
116	USDA-1080	2nd Update to Letter of Conditions	50	01-Sep-23	14-Nov-23
117	USDA-1070	Close USDA Loan	0		08-Jul-24
118	**State Funding (Water Storage Investment Program, WSIP)**		125	03-Jan-23 A	25-Jul-23
119	**WSIP Early Funding Administration**		125	03-Jan-23 A	25-Jul-23
120	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	2	03-Jan-23 A	31-Jan-23
121	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23
122	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23
123	**Local Funding**		477	03-Apr-23	20-Feb-25
124	**Finance Check-Ins**		64	03-Apr-23	03-Jul-23
125	FC-1280	Financing Check-In Q1-2023	0		03-Apr-23
126	FC-1290	Participants Ready for Finance	0		03-Jul-23
127	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		283	26-Jul-23	05-Sep-24
128	AF-1200	Annual Check-In & Budget Update for 2024	30	26-Jul-23	06-Sep-23
129	AF-1300	Annual Check-In & Budget Update for 2025	30	25-Jul-24	05-Sep-24
130	**Authority Board (Dues)**		1	02-Jan-24	02-Jan-24
131	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*
132	**Phase 3 Participation Agreement**		80	25-Oct-24	20-Feb-25
133	PA-1100	Develop Phase 3 Participation Agreement	30	25-Oct-24	09-Dec-24
134	PA-1200	Participation Agreement: Home Board Execution & Final Rebalancing	50	10-Dec-24	20-Feb-25
135	**Bank Financing (if needed)**		50	30-Mar-23	08-Jun-23
136	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	30-Mar-23	19-Apr-23
137	BF-1200	Review & Select Lender(s)	20	20-Apr-23	17-May-23
138	BF-1300	Execute Bank Financing Loan Documents	15	18-May-23	08-Jun-23



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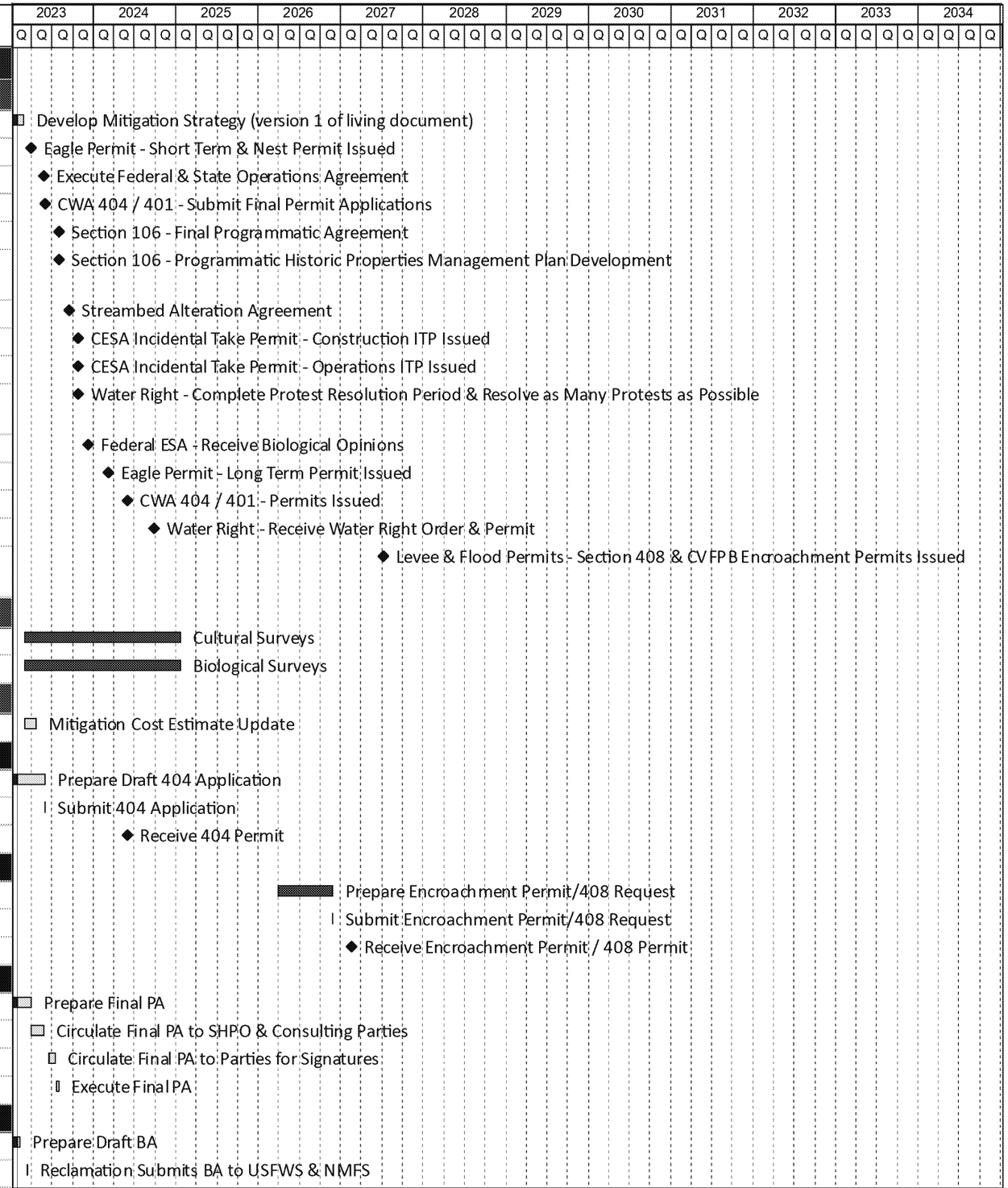
#	Activity ID	Activity Name	Duration	Start	Finish
139	**Permitting**		1136	04-Jan-21 A	08-Jul-27
140	**Key Deliverables**		1136	21-Nov-22	08-Jul-27
141	KD-1460	Develop Mitigation Strategy (version 1 of living document)	22	21-Nov-22	28-Feb-23
142	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		30-Mar-23
143	KD-1240	Execute Federal & State Operations Agreement	0		26-May-23
144	KD-1390	CWA 404 / 401 - Submit Final Permit Applications	0		31-May-23
145	KD-1350	Section 106 - Final Programmatic Agreement	0		01-Aug-23
146	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		01-Aug-23
147	KD-1420	Streambed Alteration Agreement	0		14-Sep-23
148	KD-1370	CESA Incidental Take Permit - Construction ITP Issued	0		23-Oct-23
149	KD-1380	CESA Incidental Take Permit - Operations ITP Issued	0		23-Oct-23
150	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		27-Oct-23
151	KD-1340	Federal ESA - Receive Biological Opinions	0		06-Dec-23
152	KD-1440	Eagle Permit - Long Term Permit Issued	0		06-Mar-24
153	KD-1400	CWA 404 / 401 - Permits Issued	0		31-May-24
154	KD-1330	Water Right - Receive Water Right Order & Permit	0		26-Sep-24
155	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		08-Jul-27
156	**Field Surveys**		479	01-Mar-23	21-Jan-25
157	RE-1030	Cultural Surveys	479	01-Mar-23	21-Jan-25
158	RE-1040	Biological Surveys	479	01-Mar-23	21-Jan-25
159	**Federal Agency Agreements & Permits**		1037	11-Jan-21 A	19-Feb-27
160	CE-1570	Mitigation Cost Estimate Update	40	01-Mar-23	25-Apr-23
161	**Clean Water Act Section 404**		341	04-Feb-21 A	31-May-24
162	404-050	Prepare Draft 404 Application	86	04-Feb-21 A	30-May-23
163	404-120	Submit 404 Application	1	31-May-23	31-May-23
164	404-130	Receive 404 Permit	0		31-May-24
165	**US Army Corps of Engineers Rivers & Harbors Act Section 14, Section 408**		233	01-Apr-26	19-Feb-27
166	408-150	Prepare Encroachment Permit/408 Request	172	01-Apr-26	26-Nov-26
167	408-160	Submit Encroachment Permit/408 Request	1	27-Nov-26	27-Nov-26
168	408-170	Receive Encroachment Permit / 408 Permit	0		19-Feb-27
169	**Advisory Council on Historic Preservation NHPA Section 106**		130	14-Mar-22	01-Aug-23
170	106-081	Prepare Final PA	45	14-Mar-22	31-Mar-23
171	106-092	Circulate Final PA to SHPO & Consulting Parties	40	03-Apr-23	26-May-23
172	106-096	Circulate Final PA to Parties for Signatures	20	20-Jun-23	18-Jul-23
173	106-102	Execute Final PA	10	19-Jul-23	01-Aug-23
174	**USFWS & NMFS Endangered Species Act Section 7**		218	11-Jan-21 A	06-Dec-23
175	BA-200	Prepare Draft BA	10	11-Jan-21 A	10-Feb-23
176	BA-210	Reclamation Submits BA to USFWS & NMFS	1	17-Mar-23	17-Mar-23



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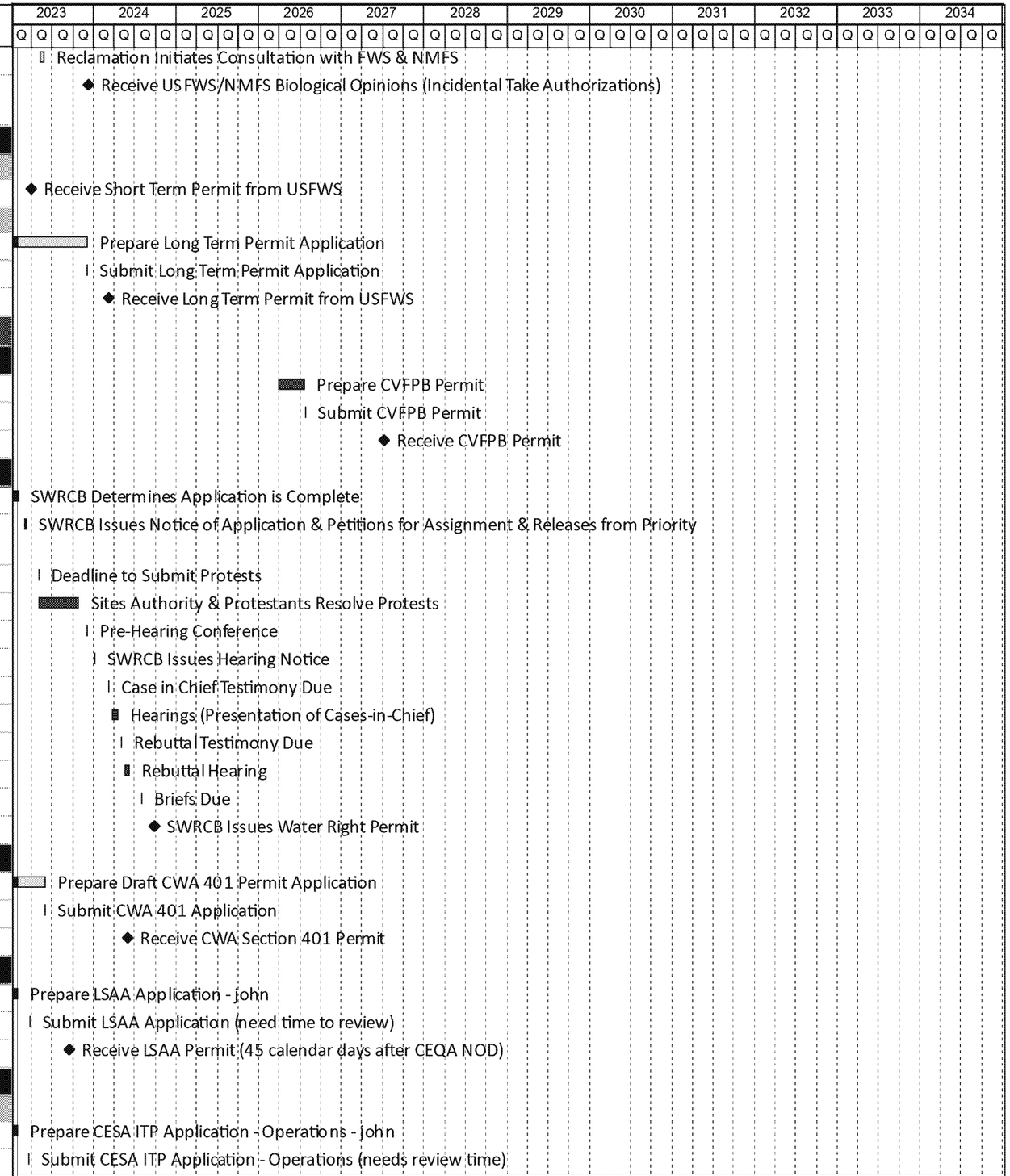
177	BA-215	Reclamation Initiates Consultation with FWS & NMFS	10	11-May-23	24-May-23
178	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		06-Dec-23
179	**USFWS Bald Eagle Protection Act**		280	27-Jul-22 A	06-Mar-24
180	**Short Term Permit**		0	30-Mar-23	30-Mar-23
181	USFWS-13	Receive Short Term Permit from USFWS	0		30-Mar-23
182	**Long Terrm Permit**		280	27-Jul-22 A	06-Mar-24
183	USFWS-14	Prepare Long Term Permit Application	216	27-Jul-22 A	04-Dec-23
184	USFWS-15	Submit Long Term Permit Application	1	05-Dec-23	05-Dec-23
185	USFWS-16	Receive Long Term Permit from USFWS	0		06-Mar-24
186	**State Agency Agreements & Permits**		1136	04-Jan-21 A	08-Jul-27
187	**Central Valley Flood Protection Board (CVFPB) Levee Encroachment**		332	01-Apr-26	08-Jul-27
188	CVFPB-200	Prepare CVFPB Permit	81	01-Apr-26	22-Jul-26
189	CVFPB-210	Submit CVFPB Permit	1	23-Jul-26	23-Jul-26
190	CVFPB-220	Receive CVFPB Permit	0		08-Jul-27
191	**SWRCB Water Right Permit**		423	12-May-22	26-Sep-24
192	WRP-115a	SWRCB Determines Application is Complete	4	12-May-22	02-Feb-23
193	WRP-115b	SWRCB Issues Notice of Application & Petitions for Assignment & Releases from Priority	1	06-Mar-23	06-Mar-23
194	WRP-115c	Deadline to Submit Protests	1	04-May-23	04-May-23
195	WRP-116	Sites Authority & Protestants Resolve Protests	122	05-May-23	27-Oct-23
196	WRP-117a	Pre-Hearing Conference	1	01-Dec-23	01-Dec-23
197	WRP-117b	SWRCB Issues Hearing Notice	1	04-Jan-24	04-Jan-24
198	WRP-117c	Case in Chief Testimony Due	1	07-Mar-24	07-Mar-24
199	WRP-117d	Hearings (Presentation of Cases-in-Chief)	20	22-Mar-24	18-Apr-24
200	WRP-117e	Rebuttal Testimony Due	1	03-May-24	03-May-24
201	WRP-117f	Rebuttal Hearing	10	20-May-24	03-Jun-24
202	WRP-117g	Briefs Due	1	31-Jul-24	31-Jul-24
203	WRP-120	SWRCB Issues Water Right Permit	0		26-Sep-24
204	**SWB CWA Section 401 Water Quality Certification**		341	04-Jan-21 A	31-May-24
205	401-200	Prepare Draft CWA 401 Permit Application	86	04-Jan-21 A	30-May-23
206	401-210	Submit CWA 401 Application	1	31-May-23	31-May-23
207	401-220	Receive CWA Section 401 Permit	0		31-May-24
208	**CDFW Streambed Alteration Agreements**		161	10-Jan-22 A	14-Sep-23
209	1600-200	Prepare LSAA Application - john	1	10-Jan-22 A	30-Jan-23
210	1600-210	Submit LSAA Application (need time to review)	1	24-Mar-23	24-Mar-23
211	1600-220	Receive LSAA Permit (45 calendar days after CEQA NOD)	0		14-Sep-23
212	**CDFW Incidental Take Permits**		188	11-Jan-21 A	23-Oct-23
213	**ITP - CESA (Se 2081) Operations**		188	11-Jan-21 A	23-Oct-23
214	2081-100	Prepare CESA ITP Application - Operations - john	1	11-Jan-21 A	30-Jan-23
215	2081-110	Submit CESA ITP Application - Operations (needs review time)	1	22-Mar-23	22-Mar-23



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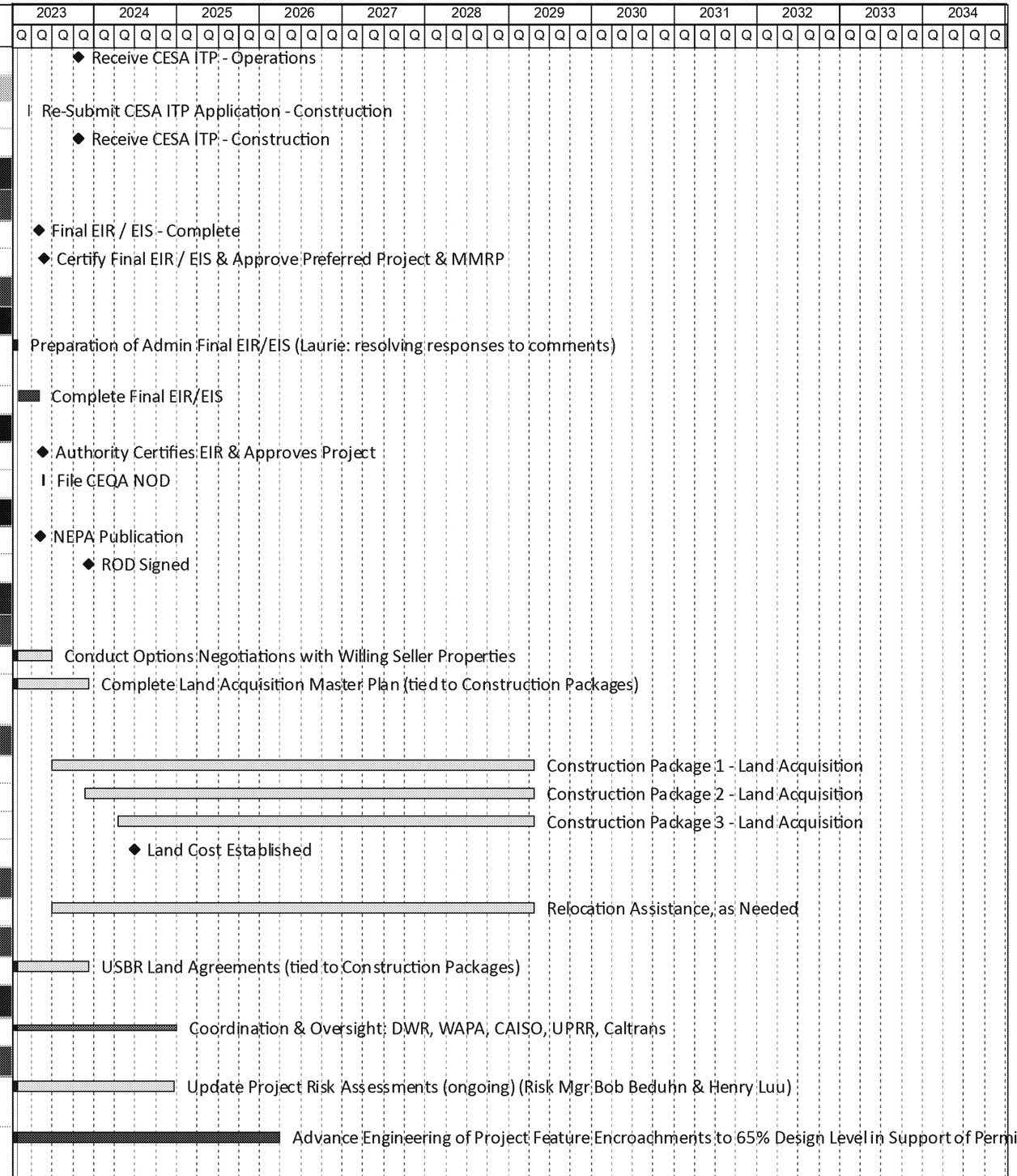
216	2081-120	Receive CESA ITP - Operations	0		23-Oct-23
217	ITP - CESA (Se 2081) Construction		151	22-Mar-23	23-Oct-23
218	2081-215	Re-Submit CESA ITP Application - Construction	1	22-Mar-23	22-Mar-23
219	2081-220	Receive CESA ITP - Construction	0		23-Oct-23
220	**Environmental**		218	03-Jan-22 A	06-Dec-23
221	**Key Deliverables**		15	05-May-23	26-May-23
222	KD-1470	Final EIR / EIS - Complete	0		05-May-23
223	KD-1480	Certify Final EIR / EIS & Approve Preferred Project & MMRP	0		26-May-23
224	**EIR/EIS**		218	03-Jan-22 A	06-Dec-23
225	**Final EIR/Final EIS**		70	03-Jan-22 A	05-May-23
226	EIR-210	Preparation of Admin Final EIR/EIS (Laurie: resolving responses to comments)	2	03-Jan-22 A	31-Jan-23
227	EIR-250	Complete Final EIR/EIS	68	01-Feb-23	05-May-23
228	**Authority Certifies EIR & Approves Project & File NOD**		5	19-May-23	26-May-23
229	EIR-370	Authority Certifies EIR & Approves Project	0		19-May-23
230	EIR-380	File CEQA NOD	5	22-May-23	26-May-23
231	**ROD**		143	12-May-23	06-Dec-23
232	EIR-440	NEPA Publication	0		12-May-23
233	EIR-450	ROD Signed	0		06-Dec-23
234	**Real Estate**		1607	02-Nov-20	27-Apr-29
235	**Key Deliverables**		218	01-Jul-22 A	06-Dec-23
236	KD-1500	Conduct Options Negotiations with Willing Seller Properties	107	01-Jul-22 A	28-Jun-23
237	KD-1490	Complete Land Acquisition Master Plan (tied to Construction Packages)	218	03-Oct-22 A	06-Dec-23
238	**Land Acquisition**		1500	29-Jun-23	27-Apr-29
239	RE-1060	Construction Package 1 - Land Acquisition	1500	29-Jun-23	27-Apr-29
240	RE-1070	Construction Package 2 - Land Acquisition	1400	20-Nov-23	27-Apr-29
241	RE-1080	Construction Package 3 - Land Acquisition	1300	15-Apr-24	27-Apr-29
242	RE-1050	Land Cost Established	0		27-Jun-24
243	**Relocation**		1500	29-Jun-23	27-Apr-29
244	RE-1100	Relocation Assistance, as Needed	1500	29-Jun-23	27-Apr-29
245	**USBR - Land Agreement**		218	02-Nov-20	06-Dec-23
246	FED-100	USBR Land Agreements (tied to Construction Packages)	218	02-Nov-20	06-Dec-23
247	**Preliminary Engineering**		804	03-Jan-22 A	31-Mar-26
248	A1180	Coordination & Oversight: DWR, WAPA, CAISO, UPRR, Caltrans	482	03-Jan-22 A	30-Dec-24
249	**Key Deliverables**		804	31-Oct-22 A	31-Mar-26
250	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	478	31-Oct-22 A	16-Dec-24
251	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	804	01-Nov-22 A	31-Mar-26



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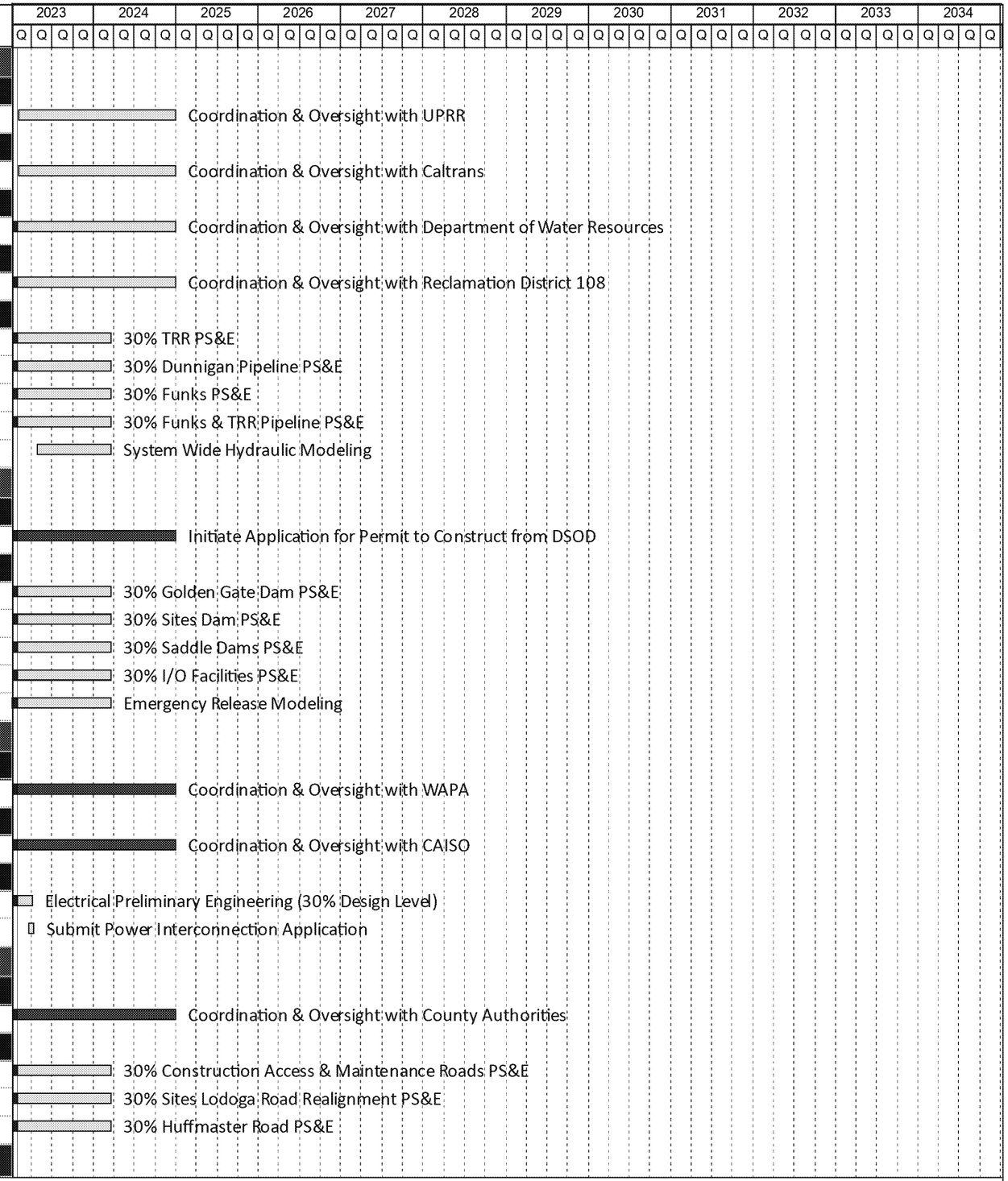
#	Activity ID	Activity Name	Duration	Start	Finish
252		**Conveyance (Pipelines, Pump Stations, Canals)**	485	03-Jan-22 A	27-Dec-24
253		**UPRR Oversight & Review**	480	06-Feb-23	27-Dec-24
254	A1110	Coordination & Oversight with UPRR	480	06-Feb-23	27-Dec-24
255		**Caltrans Oversight & Review**	480	06-Feb-23	27-Dec-24
256	A1120	Coordination & Oversight with Caltrans	480	06-Feb-23	27-Dec-24
257		**DWR Operations Oversight & Review (KLOG)**	485	03-Jan-22 A	27-Dec-24
258	A1130	Coordination & Oversight with Department of Water Resources	485	03-Jan-22 A	27-Dec-24
259		**RD 108 Oversight & Review**	485	03-Jan-22 A	27-Dec-24
260	A1140	Coordination & Oversight with Reclamation District 108	485	03-Jan-22 A	27-Dec-24
261		**Design & Analyses**	290	18-Oct-22 A	20-Mar-24
262	KD-2020	30% TRR PS&E	290	18-Oct-22 A	20-Mar-24
263	KD-1630	30% Dunnigan Pipeline PS&E	290	31-Oct-22 A	20-Mar-24
264	KD-2010	30% Funks PS&E	290	31-Oct-22 A	20-Mar-24
265	KD-2030	30% Funks & TRR Pipeline PS&E	290	31-Oct-22 A	20-Mar-24
266	KD-2080	System Wide Hydraulic Modeling	225	01-May-23	20-Mar-24
267		**Reservoir (Dams, Tunnels)**	486	01-Feb-22 A	30-Dec-24
268		**DSOD Oversight & Review**	486	01-Feb-22 A	30-Dec-24
269	KD-1100	Initiate Application for Permit to Construct from DSOD	486	01-Feb-22 A	30-Dec-24
270		**Design & Analyses**	290	31-Oct-22 A	20-Mar-24
271	KD-1660	30% Golden Gate Dam PS&E	290	31-Oct-22 A	20-Mar-24
272	KD-2040	30% Sites Dam PS&E	290	31-Oct-22 A	20-Mar-24
273	KD-2050	30% Saddle Dams PS&E	290	31-Oct-22 A	20-Mar-24
274	KD-2060	30% I/O Facilities PS&E	290	31-Oct-22 A	20-Mar-24
275	KD-2070	Emergency Release Modeling	290	05-Jan-23 A	20-Mar-24
276		**Electrical (Substation, Switchyard, Transmission Line)**	486	03-Jan-22 A	30-Dec-24
277		**WAPA Oversight & Review**	486	03-Jan-22 A	30-Dec-24
278	A1150	Coordination & Oversight with WAPA	486	03-Jan-22 A	30-Dec-24
279		**CAISO Oversight & Review**	486	03-Jan-22 A	30-Dec-24
280	A1160	Coordination & Oversight with CAISO	486	03-Jan-22 A	30-Dec-24
281		**Design & Analyses**	55	31-Oct-22 A	14-Apr-23
282	KD-1640	Electrical Preliminary Engineering (30% Design Level)	46	31-Oct-22 A	03-Apr-23
283	KD-1200	Submit Power Interconnection Application	20	20-Mar-23	14-Apr-23
284		**Roads & Bridges**	486	03-Jan-22 A	30-Dec-24
285		**County Oversight & Review**	486	03-Jan-22 A	30-Dec-24
286	A1170	Coordination & Oversight with County Authorities	486	03-Jan-22 A	30-Dec-24
287		**Design & Analyses**	290	31-Oct-22 A	20-Mar-24
288	KD-1650	30% Construction Access & Maintenance Roads PS&E	290	31-Oct-22 A	20-Mar-24
289	KD-2090	30% Sites Lodoga Road Realignment PS&E	290	31-Oct-22 A	20-Mar-24
290	KD-2100	30% Huffmaster Road PS&E	290	31-Oct-22 A	20-Mar-24
291		**Mitigation Implementation**	500	29-Jun-23	19-Jun-25



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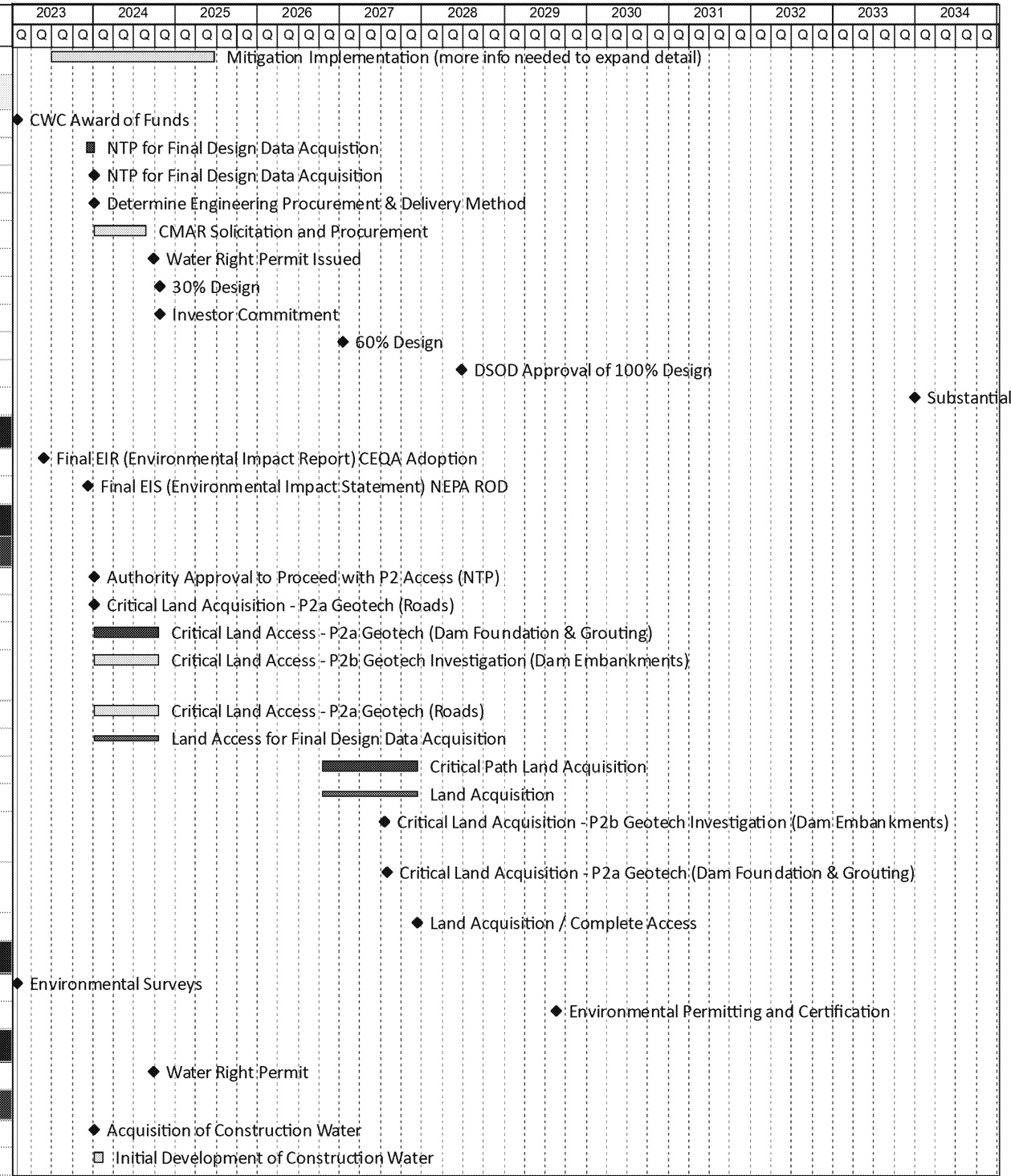
292	MI-1100	Mitigation Implementation (more info needed to expand detail)	500	29-Jun-23	19-Jun-25
293	**Sites Reservoir Construction Package**		2917	30-Jan-23	05-May-34
294	5	CWC Award of Funds	0	30-Jan-23	
295	6	NTP for Final Design Data Acquistion	23	01-Dec-23*	05-Jan-24
296	26.OE1	NTP for Final Design Data Acquisition	0		05-Jan-24
297	7	Determine Engineering Procurement & Delivery Method	0	08-Jan-24	
298	8	CMAR Solicitation and Procurement	160	08-Jan-24	20-Aug-24
299	5a.OE1	Water Right Permit Issued	0		26-Sep-24
300	85.OE1	30% Design	0		23-Oct-24
301	5b.OE1	Investor Commitment	0		24-Oct-24
302	89d.OE1	60% Design	0		15-Jan-27
303	89c.OE1	DSOD Approval of 100% Design	0		23-Jun-28
304	88	Substantial Completion	0		30-Dec-33
305	**Final EIR / EIS**		133	26-May-23	06-Dec-23
306	3.OE1	Final EIR (Environmental Impact Report) CEQA Adoption	0		26-May-23
307	4.OE1	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
308	**Real Estate**		1010	08-Jan-24	13-Dec-27
309	**Land Access and Acquisition**		1010	08-Jan-24	13-Dec-27
310	12.OE1	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
311	15	Critical Land Acquisition - P2a Geotech (Roads)	0	08-Jan-24	
312	16.OE1	Critical Land Access - P2a Geotech (Dam Foundation & Grouting)	200	08-Jan-24	16-Oct-24
313	17	Critical Land Access - P2b Geotech Investigation (Dam Embankments)	200	08-Jan-24	16-Oct-24
314	18	Critical Land Access - P2a Geotech (Roads)	200	08-Jan-24	16-Oct-24
315	12a.OE1	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
316	19	Critical Path Land Acquisition	300	19-Oct-26	10-Dec-27
317	12b.OE1	Land Acquisition	300	19-Oct-26	10-Dec-27
318	14	Critical Land Acquisition - P2b Geotech Investigation (Dam Embankments)	0	19-Jul-27	
319	13	Critical Land Acquisition - P2a Geotech (Dam Foundation & Grouting)	0	02-Aug-27	
320	20	Land Acquisition / Complete Access	0	13-Dec-27	
321	**Environmental**		1687	30-Jan-23	20-Aug-29
322	22	Environmental Surveys	0	30-Jan-23	
323	23	Environmental Permitting and Certification	0	20-Aug-29	
324	**Water**		186	08-Jan-24	26-Sep-24
325	25	Water Right Permit	0		26-Sep-24
326	**Construction Water**		30	08-Jan-24	16-Feb-24
327	27	Acquisition of Construction Water	0	08-Jan-24*	
328	28	Initial Development of Construction Water	30	08-Jan-24	16-Feb-24



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329	**Sites Reservoir Permitting, Mitigation and Cultural Work**		1394	20-Apr-26	21-Aug-31
330	32a	Permitting (Biological/Cultural/Mitigation)	1394	20-Apr-26	21-Aug-31
331	**Permitting**		890	20-Apr-26	14-Sep-29
332	**Baseline Surveys and Revised ESA Consultation**		890	20-Apr-26	14-Sep-29
333	32	Access Granted for Biological Surveys	0	20-Apr-26	
334	36	Land Cover Verification/Aquatic Delineation #1	15	20-Apr-26*	08-May-26
335	33	Plant Survey 1	15	29-Apr-26*	19-May-26
336	32.a.OE1	Plant Survey & Land Cover	158	29-Apr-26	04-Dec-26
337	37	Land Cover Verification/Aquatic Delineation #2	15	01-Jun-26	19-Jun-26
338	34	Plant Survey 2	15	17-Jun-26	07-Jul-26
339	38	Land Cover Verification/Aquatic Delineation and Report	45	13-Jul-26	11-Sep-26
340	35	Plant Survey 3 and Report	45	05-Aug-26	06-Oct-26
341	39	Revise Impact Acres and Work with Agencies	60	14-Sep-26	04-Dec-26
342	52	Vernal Pool Wet Season Survey 1	10	03-Dec-26*	16-Dec-26
343	59	CRLF Surveys and Report	200	04-Jan-27*	08-Oct-27
344	53	Vernal Pool Wet Season Survey 2	10	07-Jan-27	20-Jan-27
345	54	Vernal Pool Wet Season Survey 3	10	11-Feb-27	24-Feb-27
346	55	Vernal Pool Wet Season Survey 4 (more may be needed) and Report	60	18-Mar-27	09-Jun-27
347	45	SWHA #1 and TCBB #1	5	01-Mar-28*	07-Mar-28
348	39.9.OE1	Species Protocol Surveys; USFWS & CDFW Acceptance	358	01-Mar-28	13-Jul-29
349	46	SWHA #2 and TCBB #2	5	29-Mar-28	04-Apr-28
350	40	BUOW #1 (Burrowing Owls Study)	5	03-Apr-28*	07-Apr-28
351	47	SWHA #3 and TCBB #3	5	26-Apr-28	02-May-28
352	41	BUOW #2	5	01-May-28	05-May-28
353	56	VELB Survey and Report	30	01-May-28*	09-Jun-28
354	60	Bumble Bee Survey 1	5	01-May-28	05-May-28
355	51	TCBB Report	30	03-May-28	13-Jun-28
356	58	Bank Swallow Survey and Report	30	03-May-28	13-Jun-28
357	61	Bumble Bee Survey 2	5	29-May-28	02-Jun-28
358	48	SWHA #4	5	31-May-28	06-Jun-28
359	42	BUOW #3	5	05-Jun-28	09-Jun-28
360	64	Badger Survey and Report	30	14-Jun-28	25-Jul-28
361	62	Bumble Bee Survey 3	5	26-Jun-28	30-Jun-28
362	49	SWHA #5	5	28-Jun-28	04-Jul-28
363	43	BUOW #4 and Report	30	10-Jul-28	18-Aug-28
364	50	SWHA #6 and Report	30	14-Jul-28	24-Aug-28
365	63	Bumble Bee Survey 4 and Report	45	24-Jul-28	22-Sep-28
366	65	Bat Survey (Roosts)	10	26-Jul-28	08-Aug-28
367	66	Bat Roosts Removal	10	09-Aug-28	22-Aug-28

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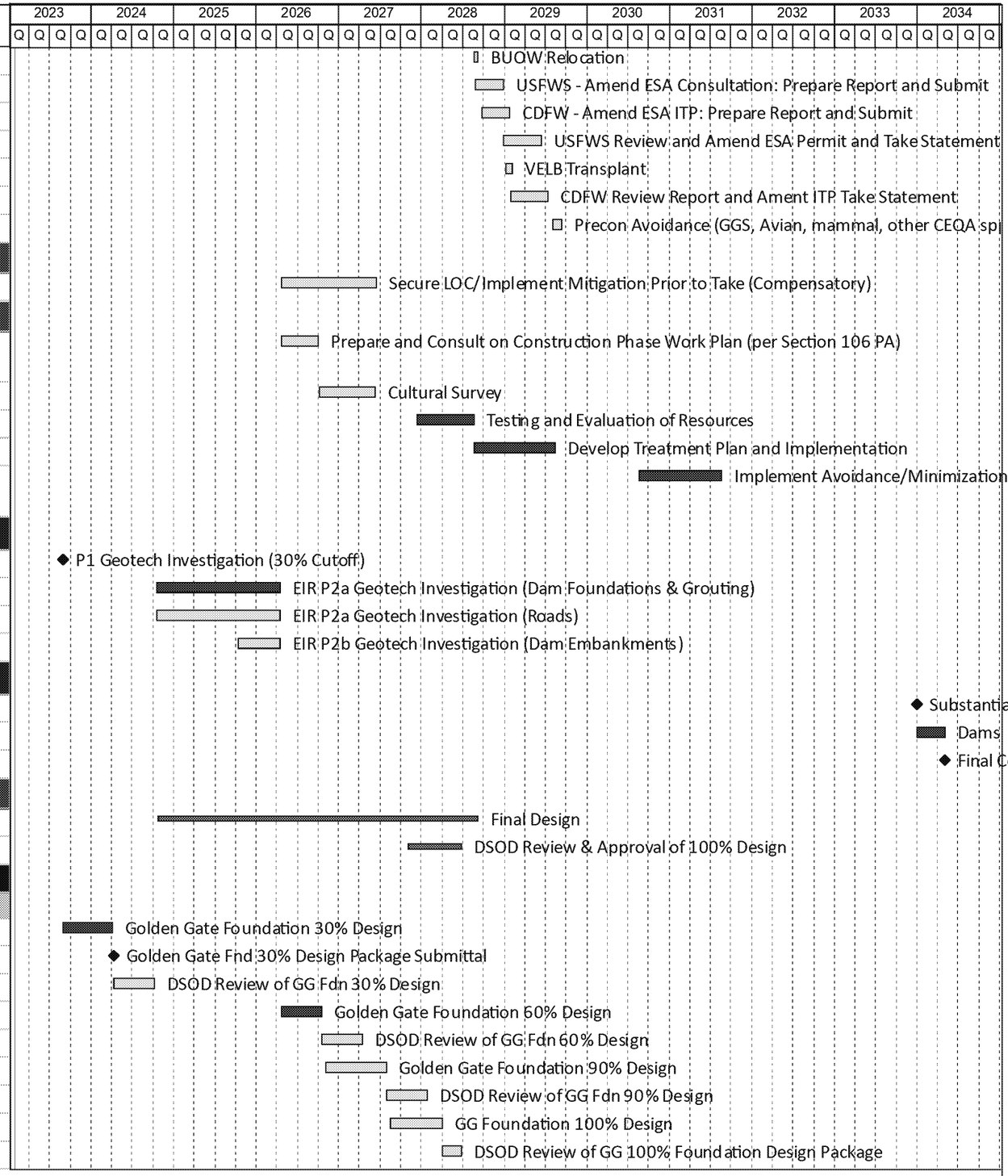
368	44	BUOW Relocation	15	21-Aug-28*	08-Sep-28
369	67	USFWS - Amend ESA Consultation: Prepare Report and Submit	90	25-Aug-28	28-Dec-28
370	69	CDFW - Amend ESA ITP: Prepare Report and Submit	90	25-Sep-28	26-Jan-29
371	68	USFWS Review and Amend ESA Permit and Take Statement	120	29-Dec-28	14-Jun-29
372	57	VELB Transplant	20	08-Jan-29	02-Feb-29
373	70	CDFW Review Report and Ament ITP Take Statement	120	29-Jan-29	13-Jul-29
374	71	Precon Avoidance (GGS, Avian, mammal, other CEQA spp)	30	06-Aug-29	14-Sep-29
375	**Compensatory Mitigation**		305	20-Apr-26	18-Jun-27
376	73.OE1	Secure LOC/Implement Mitigation Prior to Take (Compensatory)	305	20-Apr-26	18-Jun-27
377	**Cultural Work**		1394	20-Apr-26	21-Aug-31
378	75.OE1	Prepare and Consult on Construction Phase Work Plan (per Section 106 PA)	120	20-Apr-26	02-Oct-26
379	76.OE1	Cultural Survey	180	05-Oct-26	11-Jun-27
380	77.OE1	Testing and Evaluation of Resources	180	13-Dec-27	18-Aug-28
381	78.OE1	Develop Treatment Plan and Implementation	260	21-Aug-28	17-Aug-29
382	79.OE1	Implement Avoidance/Minimization Activities During Construction	260	23-Aug-30	21-Aug-31
383	**P1 / P2 Geotech Investigations**		666	31-Aug-23	17-Apr-26
384	81	P1 Geotech Investigation (30% Cutoff)	0	31-Aug-23*	
385	82.OE1	EIR P2a Geotech Investigation (Dam Foundations & Grouting)	380	17-Oct-24	17-Apr-26
386	83	EIR P2a Geotech Investigation (Roads)	380	17-Oct-24*	17-Apr-26
387	84	EIR P2b Geotech Investigation (Dam Embankments)	130	14-Oct-25*	17-Apr-26
388	**Reservoir Facilities**		2766	31-Aug-23	05-May-34
389	342.OE1	Substantial Completion - Dams Ready for Commissioning	0		30-Dec-33
390	343	Dams Startup and Commissioning	90	02-Jan-34	05-May-34
391	344	Final Completion	0		05-May-34*
392	**Engineering - Dams**		1371	31-Aug-23	01-Jan-29
393	89a.OE1	Final Design	1000	24-Oct-24	08-Sep-28
394	89b	DSOD Review & Approval of 100% Design	170	01-Nov-27	23-Jun-28
395	**Golden Gate Dam Design**		1236	31-Aug-23	26-Jun-28
396	Golden Gate Foundation Design		1236	31-Aug-23	26-Jun-28
397	89	Golden Gate Foundation 30% Design	151	31-Aug-23	05-Apr-24*
398	90	Golden Gate Fnd 30% Design Package Submittal	0	08-Apr-24	
399	91	DSOD Review of GG Fdn 30% Design	130	08-Apr-24	09-Oct-24
400	92.OE1	Golden Gate Foundation 60% Design	130	20-Apr-26	16-Oct-26
401	93	DSOD Review of GG Fdn 60% Design	130	19-Oct-26	16-Apr-27
402	94	Golden Gate Foundation 90% Design	195	02-Nov-26	30-Jul-27
403	95	DSOD Review of GG Fdn 90% Design	130	02-Aug-27	28-Jan-28
404	96	GG Foundation 100% Design	165	16-Aug-27	31-Mar-28
405	97	DSOD Review of GG 100% Foundation Design Package	60	03-Apr-28	23-Jun-28



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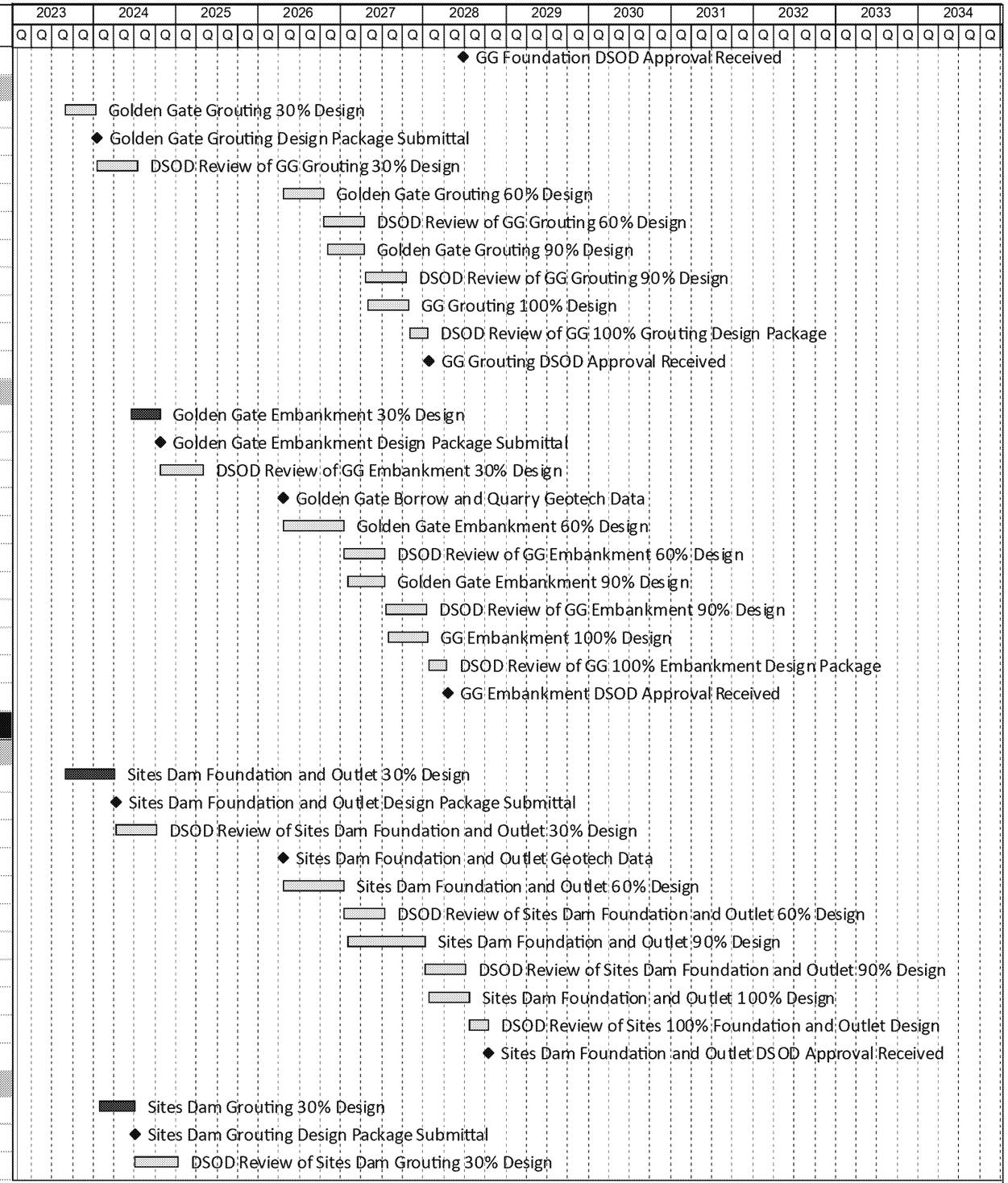
406	98	GG Foundation DSOD Approval Received	0	26-Jun-28	
407	**Golden Gate Grouting Design**		1126	31-Aug-23	24-Jan-28
408	100	Golden Gate Grouting 30% Design	91	31-Aug-23	12-Jan-24*
409	101	Golden Gate Grouting Design Package Submittal	0	15-Jan-24	
410	102	DSOD Review of GG Grouting 30% Design	130	15-Jan-24	16-Jul-24
411	103	Golden Gate Grouting 60% Design	130	20-Apr-26	16-Oct-26
412	104	DSOD Review of GG Grouting 60% Design	130	19-Oct-26	16-Apr-27
413	105	Golden Gate Grouting 90% Design	120	02-Nov-26	16-Apr-27
414	106	DSOD Review of GG Grouting 90% Design	130	19-Apr-27	15-Oct-27
415	107	GG Grouting 100% Design	130	03-May-27	29-Oct-27
416	108	DSOD Review of GG 100% Grouting Design Package	60	01-Nov-27	21-Jan-28
417	109	GG Grouting DSOD Approval Received	0	24-Jan-28	
418	**Golden Gate Embankment Design**		986	17-Jun-24	17-Apr-28
419	111	Golden Gate Embankment 30% Design	91	17-Jun-24	23-Oct-24*
420	112	Golden Gate Embankment Design Package Submittal	0	24-Oct-24	
421	113	DSOD Review of GG Embankment 30% Design	130	24-Oct-24	30-Apr-25
422	114	Golden Gate Borrow and Quarry Geotech Data	0	20-Apr-26	
423	115	Golden Gate Embankment 60% Design	195	20-Apr-26	15-Jan-27
424	116	DSOD Review of GG Embankment 60% Design	130	18-Jan-27	16-Jul-27
425	117	Golden Gate Embankment 90% Design	120	01-Feb-27	16-Jul-27
426	118	DSOD Review of GG Embankment 90% Design	130	19-Jul-27	14-Jan-28
427	119	GG Embankment 100% Design	125	02-Aug-27	21-Jan-28
428	120	DSOD Review of GG 100% Embankment Design Package	60	24-Jan-28	14-Apr-28
429	121	GG Embankment DSOD Approval Received	0	17-Apr-28	
430	**Sites Dam Design**		1371	31-Aug-23	01-Jan-29
431	**Sites Dam Foundation and Outlet Design**		1316	31-Aug-23	16-Oct-28
432	124	Sites Dam Foundation and Outlet 30% Design	151	31-Aug-23	05-Apr-24*
433	125	Sites Dam Foundation and Outlet Design Package Submittal	0	08-Apr-24	
434	126	DSOD Review of Sites Dam Foundation and Outlet 30% Design	130	08-Apr-24	09-Oct-24
435	127	Sites Dam Foundation and Outlet Geotech Data	0	20-Apr-26	
436	128	Sites Dam Foundation and Outlet 60% Design	195	20-Apr-26	15-Jan-27
437	129	DSOD Review of Sites Dam Foundation and Outlet 60% Design	130	18-Jan-27	16-Jul-27
438	130	Sites Dam Foundation and Outlet 90% Design	245	01-Feb-27	07-Jan-28
439	131	DSOD Review of Sites Dam Foundation and Outlet 90% Design	130	10-Jan-28	07-Jul-28
440	132	Sites Dam Foundation and Outlet 100% Design	130	24-Jan-28	21-Jul-28
441	133	DSOD Review of Sites 100% Foundation and Outlet Design	60	24-Jul-28	13-Oct-28
442	134	Sites Dam Foundation and Outlet DSOD Approval Received	0	16-Oct-28	
443	**Sites Dam Grouting Design**		1271	26-Jan-24	01-Jan-29
444	136	Sites Dam Grouting 30% Design	111	26-Jan-24	01-Jul-24*
445	137	Sites Dam Grouting Design Package Submittal	0	02-Jul-24	
446	138	DSOD Review of Sites Dam Grouting 30% Design	130	02-Jul-24	08-Jan-25



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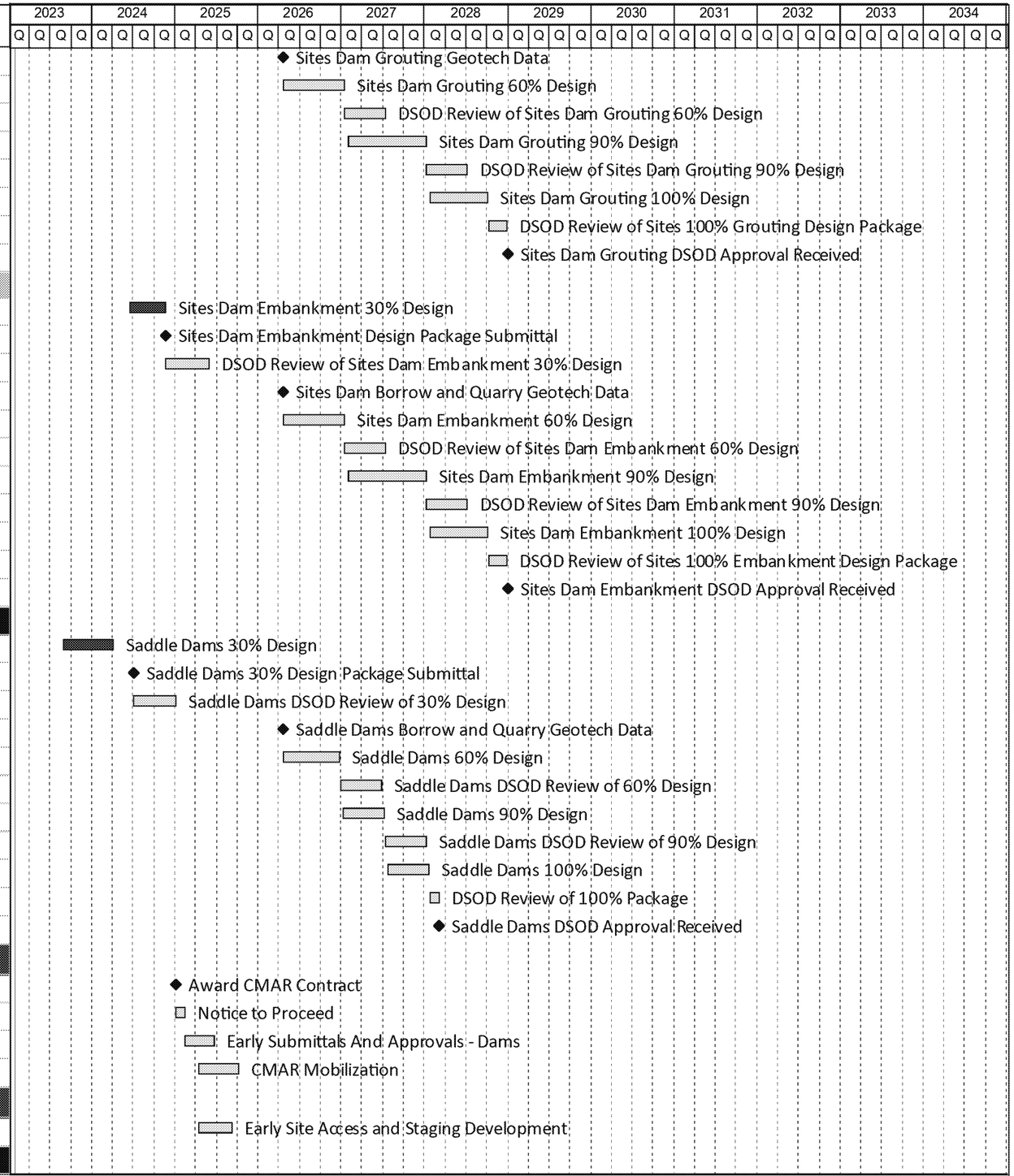
447	139	Sites Dam Grouting Geotech Data	0	20-Apr-26	
448	140	Sites Dam Grouting 60% Design	195	20-Apr-26	15-Jan-27
449	141	DSOD Review of Sites Dam Grouting 60% Design	130	18-Jan-27	16-Jul-27
450	142	Sites Dam Grouting 90% Design	245	01-Feb-27	07-Jan-28
451	143	DSOD Review of Sites Dam Grouting 90% Design	130	10-Jan-28	07-Jul-28
452	144	Sites Dam Grouting 100% Design	185	24-Jan-28	06-Oct-28
453	145	DSOD Review of Sites 100% Grouting Design Package	60	09-Oct-28	29-Dec-28
454	146	Sites Dam Grouting DSOD Approval Received	0	01-Jan-29	
455	**Sites Dam Embankment Design**		1171	17-Jun-24	01-Jan-29
456	148	Sites Dam Embankment 30% Design	111	17-Jun-24	20-Nov-24*
457	149	Sites Dam Embankment Design Package Submittal	0	21-Nov-24	
458	150	DSOD Review of Sites Dam Embankment 30% Design	130	21-Nov-24	29-May-25
459	151	Sites Dam Borrow and Quarry Geotech Data	0	20-Apr-26	
460	152	Sites Dam Embankment 60% Design	195	20-Apr-26	15-Jan-27
461	153	DSOD Review of Sites Dam Embankment 60% Design	130	18-Jan-27	16-Jul-27
462	154	Sites Dam Embankment 90% Design	245	01-Feb-27	07-Jan-28
463	155	DSOD Review of Sites Dam Embankment 90% Design	130	10-Jan-28	07-Jul-28
464	156	Sites Dam Embankment 100% Design	185	24-Jan-28	06-Oct-28
465	157	DSOD Review of Sites 100% Embankment Design Package	60	09-Oct-28	29-Dec-28
466	158	Sites Dam Embankment DSOD Approval Received	0	01-Jan-29	
467	**Saddle Dam Designs**		1156	31-Aug-23	06-Mar-28
468	160	Saddle Dams 30% Design	151	31-Aug-23	05-Apr-24*
469	161	Saddle Dams 30% Design Package Submittal	0	01-Jul-24*	
470	162	Saddle Dams DSOD Review of 30% Design	130	01-Jul-24	07-Jan-25
471	163	Saddle Dams Borrow and Quarry Geotech Data	0	20-Apr-26	
472	164	Saddle Dams 60% Design	180	20-Apr-26	25-Dec-26
473	165	Saddle Dams DSOD Review of 60% Design	130	28-Dec-26	25-Jun-27
474	166	Saddle Dams 90% Design	130	11-Jan-27	09-Jul-27
475	167	Saddle Dams DSOD Review of 90% Design	130	12-Jul-27	07-Jan-28
476	168	Saddle Dams 100% Design	130	26-Jul-27	21-Jan-28
477	169	DSOD Review of 100% Package	30	24-Jan-28	03-Mar-28
478	170	Saddle Dams DSOD Approval Received	0	06-Mar-28	
479	**CMAR Procurement**		195	02-Jan-25	06-Oct-25
480	172	Award CMAR Contract	0	02-Jan-25*	
481	173	Notice to Proceed	30	02-Jan-25	12-Feb-25
482	174	Early Submittals And Approvals - Dams	90	13-Feb-25	19-Jun-25
483	175	CMAR Mobilization	120	17-Apr-25	06-Oct-25
484	**Roads, Bridges, Access, and Site Development**		1626	11-Sep-24	20-Dec-30
485	177	Early Site Access and Staging Development	100	17-Apr-25	08-Sep-25
486	**Northern Construction Access Roads (CR68, CR 69, N. Rd)**		604	13-Dec-27	04-Apr-30



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#	Activity ID	Activity Name	Duration	Start	Finish
487	179	Northern Access Roads - Geotechnical Data	0	13-Dec-27	
488	180	Northern Access Roads - Final Design	195	13-Dec-27	08-Sep-28
489	181	Northern Access Roads - Procurement and NTP	90	11-Sep-28	12-Jan-29
490	182.OE1	Northern Access Roads - Construction (CR 68, CR 69, N. Rd)	284	05-Mar-29	04-Apr-30
491	**Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)**		595	13-Dec-27	22-Mar-30
492	189	Southern Access Roads - Geotechnical Data	0	13-Dec-27	
493	190	Southern Access Roads -Final Design	195	13-Dec-27	08-Sep-28
494	191	Southern Access Roads -Procurement and NTP	90	11-Sep-28	12-Jan-29
495	192.OE1	Southern Access Roads -Construction (Maxwell-Sites, Shoo-fly, A-1)	195	25-Jun-29	22-Mar-30
496	**County Roads F, D, McDermott, Delevan**		561	11-Sep-24	20-Nov-26
497	184	Geotechnical Data	0	11-Sep-24	
498	185	Final Design	260	11-Sep-24	19-Sep-25
499	186	Procurement and NTP	90	07-Oct-25	13-Feb-26
500	187	County Roads F, D, McDermott, Delevan	200	16-Feb-26	20-Nov-26
501	**Ancillary Roads B1, B2, C1, C2, Comm N., Comm South**		505	20-Apr-26	24-Mar-28
502	194	Geotechnical Data	0	20-Apr-26	
503	195	Final Design	195	20-Apr-26	15-Jan-27
504	196	Procurement and NTP	90	18-Jan-27	21-May-27
505	197	Ancillary Roads B1, B2, C1, C2, Comm N., Comm South	220	24-May-27	24-Mar-28
506	**Stone Corral Recreation Road to Sites Dam**		405	20-Apr-26	05-Nov-27
507	199	Geotechnical Data	0	20-Apr-26	
508	200	Final Design	195	20-Apr-26	15-Jan-27
509	201	Procurement and NTP	90	18-Jan-27	21-May-27
510	202	Stone Corral Recreation Road to Sites Dam	120	24-May-27	05-Nov-27
511	**Sites Lodoga Road Realignment and Bridge**		1220	20-Apr-26	20-Dec-30
512	204	Geotechnical Data	0	20-Apr-26	
513	205	Final Design	390	20-Apr-26	15-Oct-27
514	206	Procurement and NTP	150	18-Oct-27	12-May-28
515	207	Sites Lodoga Road Realignment and Bridge	680	15-May-28	20-Dec-30
516	**Process and Haul Filter Materials to Project**		1630	18-Jan-27	15-Apr-33
517	209	Offsite Quarry Development	50	18-Jan-27	26-Mar-27
518	210	Process Filter Materials	800	29-Mar-27	19-Apr-30
519	211.OE1	Filter Material Haul to Stockpile	800	25-Mar-30	15-Apr-33
520	**Saddle Dams Construction**		2165	09-Sep-25	30-Dec-33
521	215a	Construction	1725	24-May-27	30-Dec-33
522	**Saddle Dam 3**		535	05-Apr-30	22-Apr-32
523	**Saddle Dam 3 Foundation Excavation**		180	05-Apr-30	12-Dec-30
524	215	Saddle Dam 3 - Access and Staging	50	05-Apr-30	13-Jun-30
525	216	Erosion and Sediment Control	50	05-Apr-30	13-Jun-30
526	217	Clearing / Grubbing Topsoil Salvage from Work Areas	50	05-Apr-30	13-Jun-30

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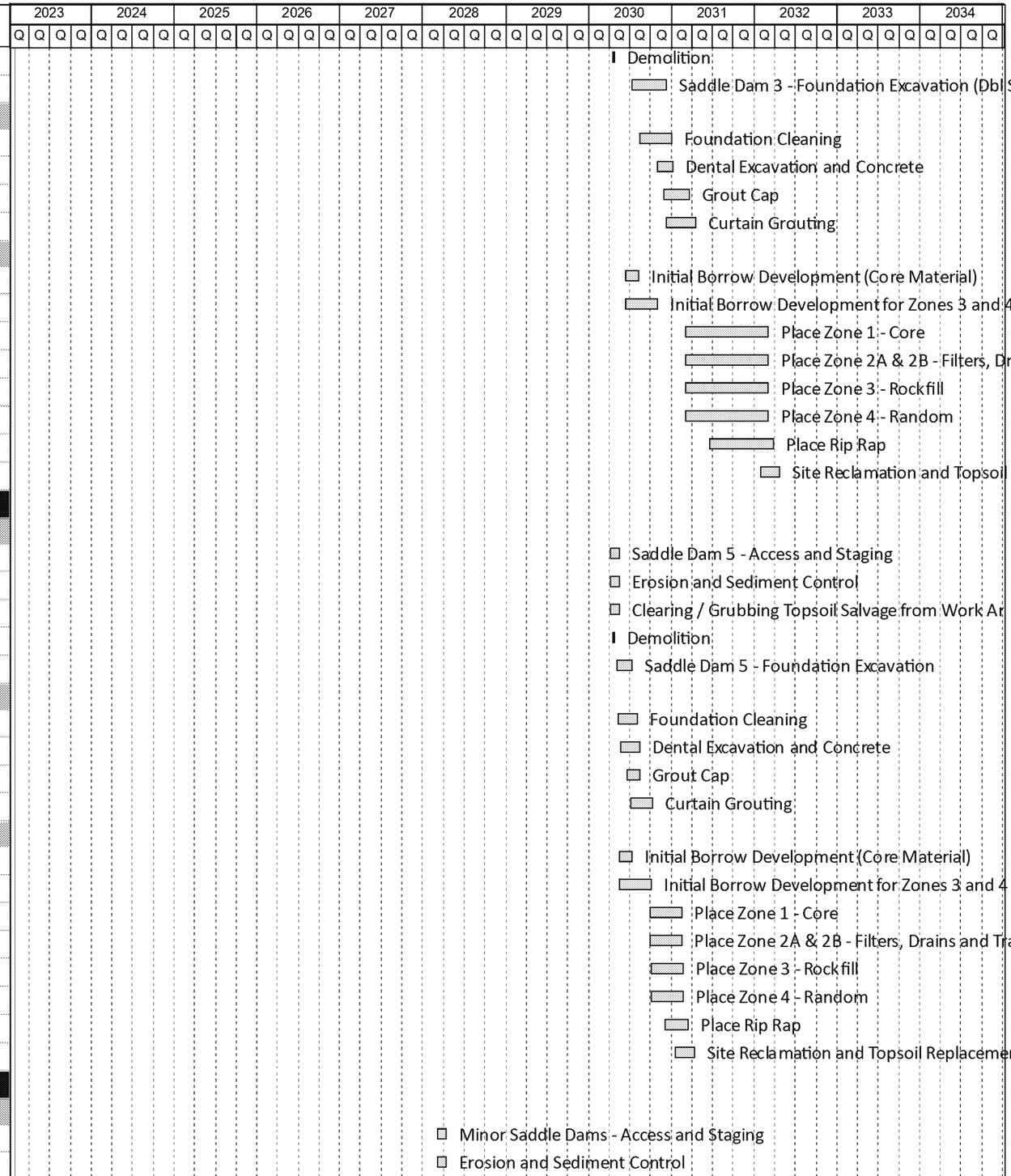
527	218	Demolition	5	19-Apr-30	25-Apr-30
528	219	Saddle Dam 3 - Foundation Excavation (Dbl Shift)	110	12-Jul-30	12-Dec-30
529	**Saddle Dam 3 - Foundation Preparation and Grouting**		175	16-Aug-30	17-Apr-31
530	221	Foundation Cleaning	100	16-Aug-30	02-Jan-31
531	222	Dental Excavation and Concrete	50	01-Nov-30	09-Jan-31
532	223	Grout Cap	80	29-Nov-30	20-Mar-31
533	224	Curtain Grouting	90	13-Dec-30	17-Apr-31
534	**Saddle Dam 3 - Embankment**		485	14-Jun-30	22-Apr-32
535	226	Initial Borrow Development (Core Material)	40	14-Jun-30	08-Aug-30
536	227	Initial Borrow Development for Zones 3 and 4	100	14-Jun-30	31-Oct-30
537	228	Place Zone 1 - Core	260	07-Mar-31	04-Mar-32
538	229	Place Zone 2A & 2B - Filters, Drains and Transitions	260	07-Mar-31	04-Mar-32
539	230	Place Zone 3 - Rockfill	260	07-Mar-31	04-Mar-32
540	231	Place Zone 4 - Random	260	07-Mar-31	04-Mar-32
541	232	Place Rip Rap	200	20-Jun-31	25-Mar-32
542	233	Site Reclamation and Topsoil Replacement	60	30-Jan-32	22-Apr-32
543	**Saddle Dam 5**		265	05-Apr-30	10-Apr-31
544	**Saddle Dam 5 - Foundation Excavation**		70	05-Apr-30	11-Jul-30
545	236	Saddle Dam 5 - Access and Staging	30	05-Apr-30	16-May-30
546	237	Erosion and Sediment Control	30	05-Apr-30	16-May-30
547	238	Clearing / Grubbing Topsoil Salvage from Work Areas	30	05-Apr-30	16-May-30
548	239	Demolition	5	19-Apr-30	25-Apr-30
549	240	Saddle Dam 5 - Foundation Excavation	50	03-May-30	11-Jul-30
550	**Saddle Dam 5 - Foundation Preparation and Grouting**		110	10-May-30	10-Oct-30
551	242	Foundation Cleaning	60	10-May-30	01-Aug-30
552	243	Dental Excavation and Concrete	60	24-May-30	15-Aug-30
553	244	Grout Cap	40	21-Jun-30	15-Aug-30
554	245	Curtain Grouting	70	05-Jul-30	10-Oct-30
555	**Saddle Dam 5 - Embankment**		235	17-May-30	10-Apr-31
556	247	Initial Borrow Development (Core Material)	40	17-May-30	11-Jul-30
557	248	Initial Borrow Development for Zones 3 and 4	100	17-May-30	03-Oct-30
558	249	Place Zone 1 - Core	100	27-Sep-30	13-Feb-31
559	250	Place Zone 2A & 2B - Filters, Drains and Transitions	100	27-Sep-30	13-Feb-31
560	251	Place Zone 3 - Rockfill	100	04-Oct-30	20-Feb-31
561	252	Place Zone 4 - Random	100	04-Oct-30	20-Feb-31
562	253	Place Rip Rap	70	06-Dec-30	13-Mar-31
563	254	Site Reclamation and Topsoil Replacement	60	17-Jan-31	10-Apr-31
564	**Minor Saddle Dams (SD1,SD2,SD6,SD8A, Dike 1, and Dike 2)**		749	06-Mar-28	16-Jan-31
565	**Minor Saddle Dams Foundation Excavation**		120	06-Mar-28	18-Aug-28
566	257	Minor Saddle Dams - Access and Staging	30	06-Mar-28	14-Apr-28
567	258	Erosion and Sediment Control	30	06-Mar-28	14-Apr-28



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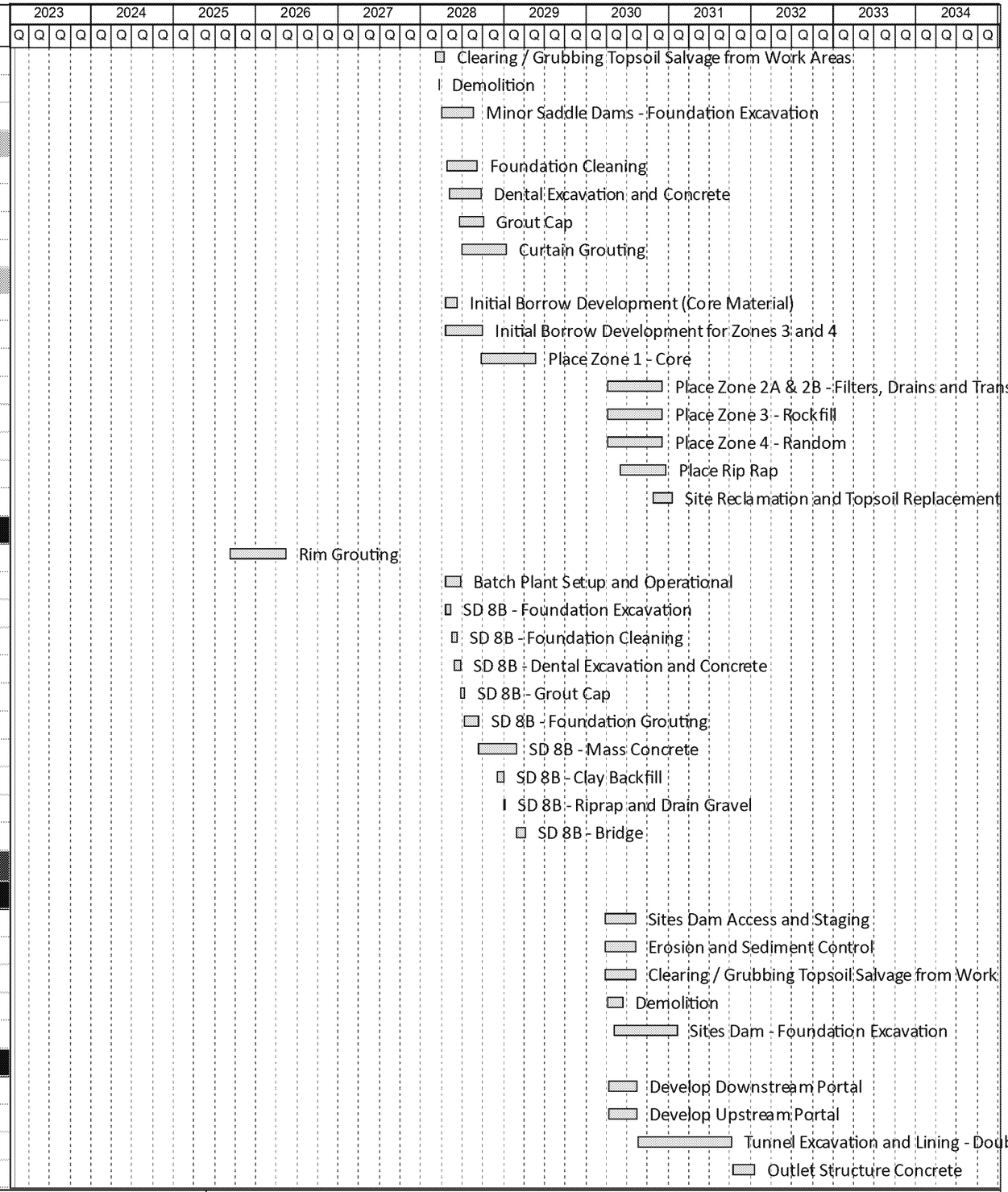
568	259	Clearing / Grubbing Topsoil Salvage from Work Areas	30	06-Mar-28	14-Apr-28
569	260	Demolition	5	20-Mar-28	24-Mar-28
570	261	Minor Saddle Dams - Foundation Excavation	100	03-Apr-28	18-Aug-28
571	**Minor Saddle Dams - Foundation Preparation and Grouting**		190	24-Apr-28	12-Jan-29
572	263	Foundation Cleaning	100	24-Apr-28	08-Sep-28
573	264	Dental Excavation and Concrete	100	08-May-28	22-Sep-28
574	265	Grout Cap	80	19-Jun-28	06-Oct-28
575	266	Curtain Grouting	140	03-Jul-28	12-Jan-29
576	**Minor Saddle Dams - Embankment**		719	17-Apr-28	16-Jan-31
577	268	Initial Borrow Development (Core Material)	40	17-Apr-28	09-Jun-28
578	269	Initial Borrow Development for Zones 3 and 4	120	17-Apr-28	29-Sep-28
579	270	Place Zone 1 - Core	175	25-Sep-28	25-May-29
580	271	Place Zone 2A & 2B - Filters, Drains and Transitions	175	05-Apr-30	05-Dec-30
581	272	Place Zone 3 - Rockfill	175	05-Apr-30	05-Dec-30
582	273	Place Zone 4 - Random	175	05-Apr-30	05-Dec-30
583	274	Place Rip Rap	145	31-May-30	19-Dec-30
584	275	Site Reclamation and Topsoil Replacement	60	25-Oct-30	16-Jan-31
585	**Saddle Dam 8B - Spillway**		932	09-Sep-25	10-Apr-29
586	287	Rim Grouting	171	09-Sep-25	11-May-26
587	277	Batch Plant Setup and Operational	50	17-Apr-28	23-Jun-28
588	278	SD 8B - Foundation Excavation	20	17-Apr-28	12-May-28
589	279	SD 8B - Foundation Cleaning	20	15-May-28	09-Jun-28
590	280	SD 8B - Dental Excavation and Concrete	20	29-May-28	23-Jun-28
591	281	SD 8B - Grout Cap	12	26-Jun-28	11-Jul-28
592	282	SD 8B - Foundation Grouting	45	12-Jul-28	12-Sep-28
593	283	SD 8B - Mass Concrete	120	13-Sep-28	27-Feb-29
594	285	SD 8B - Clay Backfill	20	06-Dec-28	02-Jan-29
595	286	SD 8B - Riprap and Drain Gravel	3	03-Jan-29	05-Jan-29
596	284	SD 8B - Bridge	30	28-Feb-29	10-Apr-29
597	**Sites Dam Construction**		585	25-Mar-30	18-Jun-32
598	**Sites Dam Foundation Excavation**		230	25-Mar-30	07-Feb-31
599	290	Sites Dam Access and Staging	100	25-Mar-30	09-Aug-30
600	291	Erosion and Sediment Control	100	25-Mar-30	09-Aug-30
601	292	Clearing / Grubbing Topsoil Salvage from Work Areas	100	25-Mar-30	09-Aug-30
602	293	Demolition	50	08-Apr-30	14-Jun-30
603	294	Sites Dam - Foundation Excavation	200	06-May-30	07-Feb-31
604	**Sites Diversion Outlet Facility**		570	15-Apr-30	18-Jun-32
605	296	Develop Downstream Portal	90	15-Apr-30	16-Aug-30
606	298	Develop Upstream Portal	90	15-Apr-30	16-Aug-30
607	297	Tunnel Excavation and Lining - Double Shift	300	19-Aug-30	10-Oct-31
608	299	Outlet Structure Concrete	70	13-Oct-31	16-Jan-32



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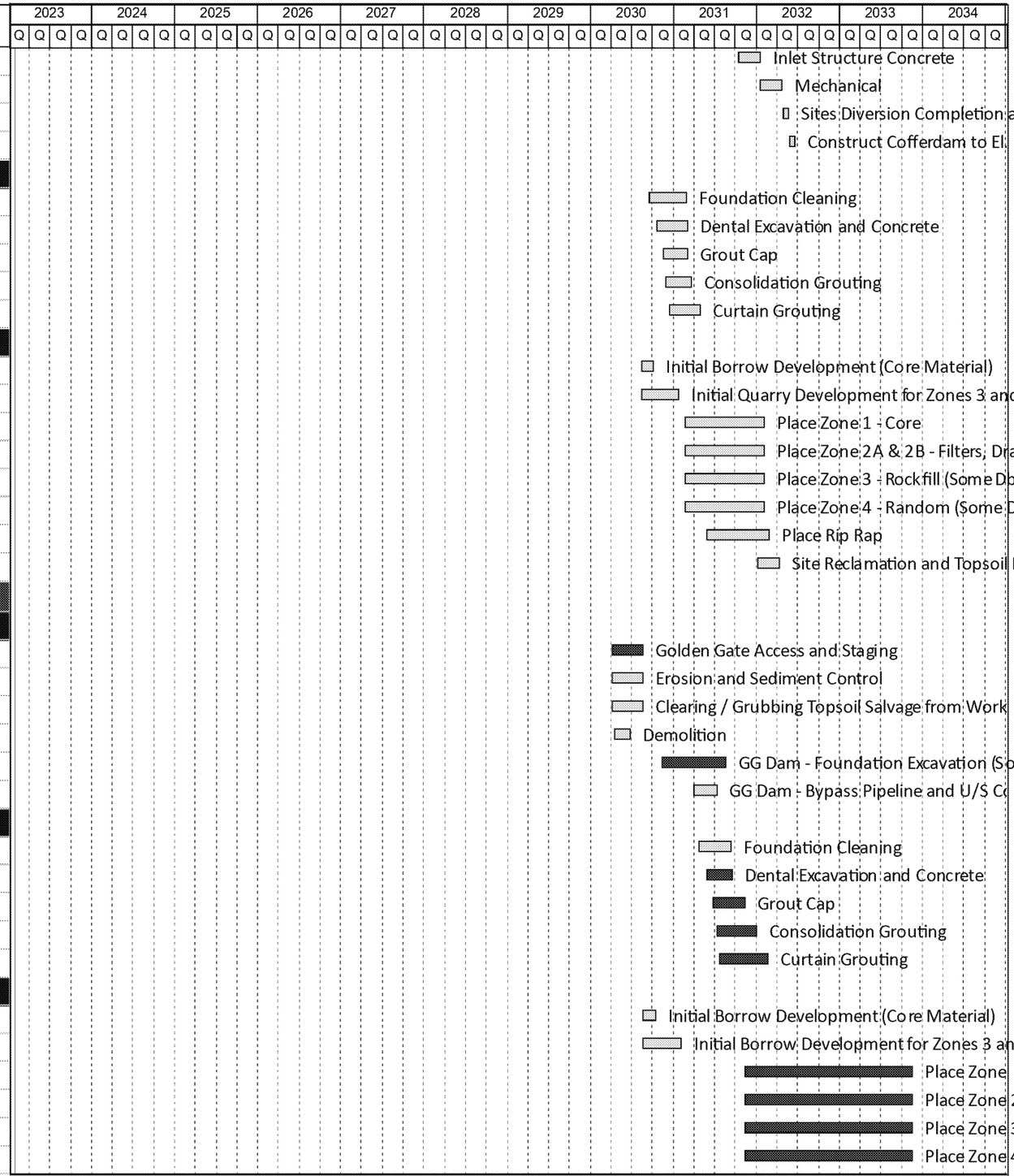
609	300	Inlet Structure Concrete	70	13-Oct-31	16-Jan-32
610	301	Mechanical	70	19-Jan-32	23-Apr-32
611	302	Sites Diversion Completion and Restoration	20	26-Apr-32	21-May-32
612	303	Construct Cofferdam to El. 310	20	24-May-32	18-Jun-32
613	**Sites Dam - Foundation Preparation and Grouting**		165	16-Sep-30	02-May-31
614	305	Foundation Cleaning	120	16-Sep-30	28-Feb-31
615	306	Dental Excavation and Concrete	100	21-Oct-30	07-Mar-31
616	307	Grout Cap	80	18-Nov-30	07-Mar-31
617	308	Consolidation Grouting	80	02-Dec-30	21-Mar-31
618	309	Curtain Grouting	100	16-Dec-30	02-May-31
619	**Sites Dam - Embankment**		435	12-Aug-30	09-Apr-32
620	311	Initial Borrow Development (Core Material)	40	12-Aug-30	04-Oct-30
621	312	Initial Quarry Development for Zones 3 and 4	120	12-Aug-30	24-Jan-31
622	313	Place Zone 1 - Core	250	24-Feb-31	06-Feb-32
623	314	Place Zone 2A & 2B - Filters, Drains and Transitions	250	24-Feb-31	06-Feb-32
624	315	Place Zone 3 - Rockfill (Some Dbl Shift)	250	24-Feb-31	06-Feb-32
625	316	Place Zone 4 - Random (Some Dbl Shift)	250	24-Feb-31	06-Feb-32
626	317	Place Rip Rap	200	26-May-31	27-Feb-32
627	318	Site Reclamation and Topsoil Replacement	70	05-Jan-32	09-Apr-32
628	**Golden Gate Dam Construction**		976	05-Apr-30	30-Dec-33
629	**GG Dam Foundation Excavation**		360	05-Apr-30	21-Aug-31
630	321.OE1	Golden Gate Access and Staging	100	05-Apr-30	22-Aug-30
631	322	Erosion and Sediment Control	100	05-Apr-30	22-Aug-30
632	323	Clearing / Grubbing Topsoil Salvage from Work Areas	100	05-Apr-30	22-Aug-30
633	324	Demolition	50	19-Apr-30	27-Jun-30
634	325.OE1	GG Dam - Foundation Excavation (Some Dbl Shift)	200	15-Nov-30	21-Aug-31
635	326	GG Dam - Bypass Pipeline and U/S Cofferdam	70	04-Apr-31	10-Jul-31
636	**GG Dam - Foundation Preparation and Grouting**		215	25-Apr-31	19-Feb-32
637	328	Foundation Cleaning	100	25-Apr-31	11-Sep-31
638	329	Dental Excavation and Concrete	80	30-May-31	18-Sep-31
639	330.OE1	Grout Cap	100	27-Jun-31	13-Nov-31
640	331.OE1	Consolidation Grouting	125	11-Jul-31	01-Jan-32
641	332.OE1	Curtain Grouting	150	25-Jul-31	19-Feb-32
642	**GG Dam - Embankment**		876	23-Aug-30	30-Dec-33
643	334	Initial Borrow Development (Core Material)	40	23-Aug-30	17-Oct-30
644	335	Initial Borrow Development for Zones 3 and 4	120	23-Aug-30	06-Feb-31
645	336.OE1	Place Zone 1 - Core	525	14-Nov-31	17-Nov-33
646	337.OE1	Place Zone 2A & 2B - Filters, Drains and Transitions	525	14-Nov-31	17-Nov-33
647	338.OE1	Place Zone 3 - Rockfill (Some Dbl Shift)	525	14-Nov-31	17-Nov-33
648	339.OE1	Place Zone 4 - Random (Some Dbl Shift)	525	14-Nov-31	17-Nov-33



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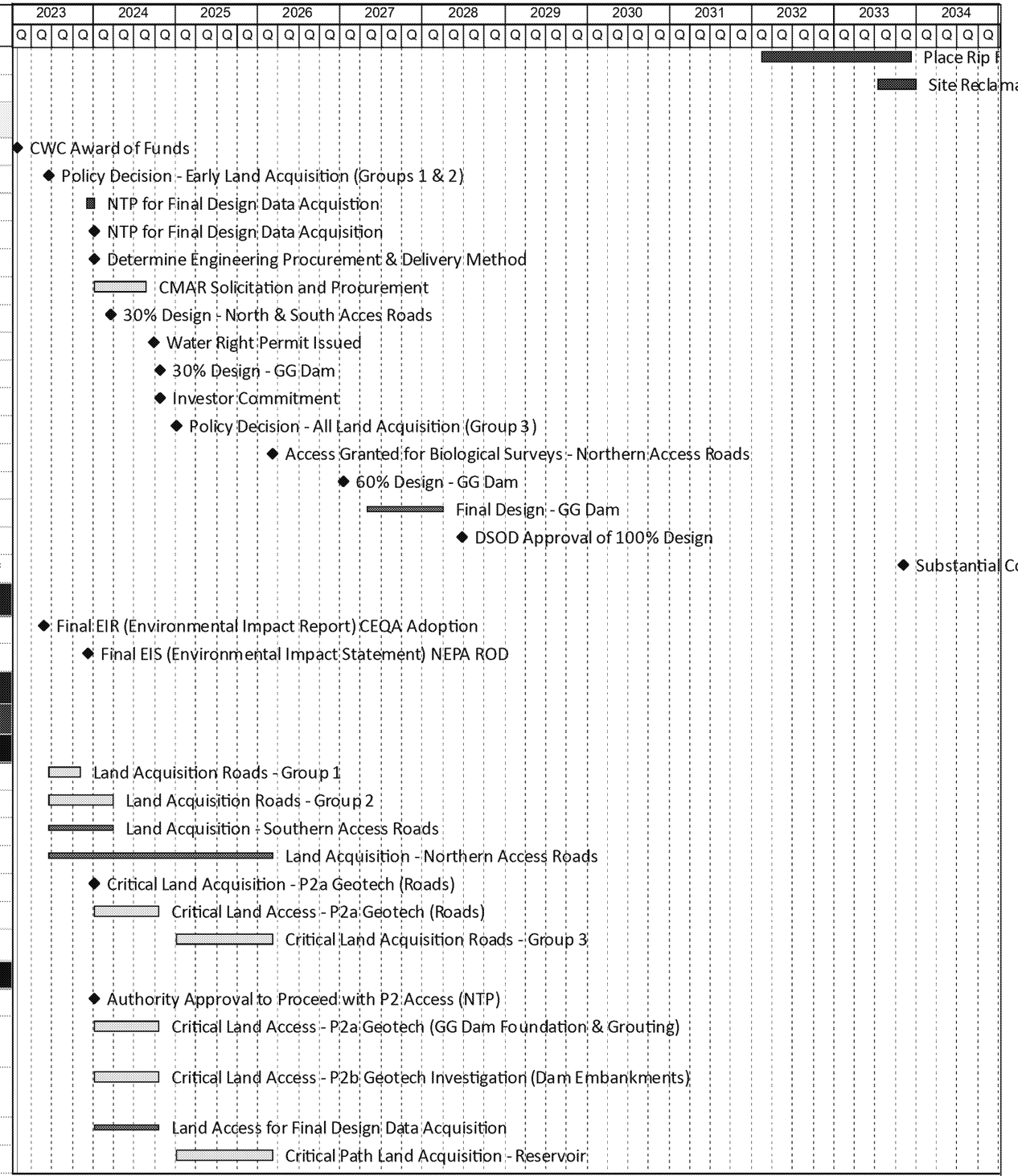
649	340.OE1	Place Rip Rap	475	13-Feb-32	08-Dec-33
650	341.OE1	Site Reclamation and Topsoil Replacement	120	18-Jul-33	30-Dec-33
651	**Sites Reservoir Construction Package Accelerated**		2876	30-Jan-23	09-Mar-34
652	X3	CWC Award of Funds	0	30-Jan-23	
653	X309.OE2	Policy Decision - Early Land Acquisition (Groups 1 & 2)	0	16-Jun-23*	
654	X4	NTP for Final Design Data Acquistion	23	01-Dec-23*	05-Jan-24
655	X299.OE2	NTP for Final Design Data Acquisition	0		05-Jan-24
656	X5	Determine Engineering Procurement & Delivery Method	0	08-Jan-24	
657	X6	CMAR Solicitation and Procurement	160	08-Jan-24	20-Aug-24
658	X307.OE2	30% Design - North & South Acces Roads	0		20-Mar-24
659	X289.OE2	Water Right Permit Issued	0		26-Sep-24
660	X297.OE2	30% Design - GG Dam	0		23-Oct-24
661	X7.OE2	Investor Commitment	0		24-Oct-24
662	X319.OE2	Policy Decision - All Land Acquisition (Group 3)	0	02-Jan-25*	
663	X809.OE2	Access Granted for Biological Surveys - Northern Access Roads	0	09-Mar-26	
664	X300.OE2	60% Design - GG Dam	0		15-Jan-27
665	X799.OE2	Final Design - GG Dam	240	03-May-27	31-Mar-28
666	X298.OE2	DSOD Approval of 100% Design	0		23-Jun-28
667	X290	Substantial Completion	0		03-Nov-33*
668	**Final EIR / EIS**		133	26-May-23	06-Dec-23
669	X1.OE2	Final EIR (Environmental Impact Report) CEQA Adoption	0		26-May-23
670	X2.OE2	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
671	**Real Estate**		1054	16-Jun-23	02-Aug-27
672	**Land Access and Acquisition**		1054	16-Jun-23	02-Aug-27
673	**Roads**		689	16-Jun-23	06-Mar-26
674	X15.b	Land Acquisition Roads - Group 1	100	16-Jun-23	06-Nov-23
675	X15.c	Land Acquisition Roads - Group 2	200	16-Jun-23	01-Apr-24
676	X15.e.OE2	Land Acquisition - Southern Access Roads	200	16-Jun-23	01-Apr-24
677	X15.f.OE2	Land Acquisition - Northern Access Roads	689	16-Jun-23	06-Mar-26
678	X11	Critical Land Acquisition - P2a Geotech (Roads)	0	08-Jan-24	
679	X14	Critical Land Access - P2a Geotech (Roads)	200	08-Jan-24	16-Oct-24
680	X15.d	Critical Land Acquisition Roads - Group 3	300	02-Jan-25	06-Mar-26
681	**Reservoir**		915	08-Jan-24	02-Aug-27
682	X8.OE2	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
683	X12	Critical Land Access - P2a Geotech (GG Dam Foundation & Grouting)	200	08-Jan-24	16-Oct-24
684	X13	Critical Land Access - P2b Geotech Investigation (Dam Embankments)	200	08-Jan-24	16-Oct-24
685	X291.OE2	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
686	X15	Critical Path Land Acquisition - Reservoir	300	02-Jan-25	06-Mar-26



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687	X292.OE2	Land Acquisition - Reservoir	300	02-Jan-25	06-Mar-26
688	X16	Land Acquisition / Complete Access - Reservoir	0		06-Mar-26
689	X10	Critical Land Acquisition - P2b Geotech Investigation (Dam Embankments)	0	19-Jul-27	
690	X9	Critical Land Acquisition - P2a Geotech (Dam Foundation & Grouting)	0	02-Aug-27	
691	**Environmental**		1557	30-Jan-23	19-Feb-29
692	X17	Environmental Surveys	0	30-Jan-23	
693	X18	Environmental Permitting and Certification	0	19-Feb-29	
694	**Water**		186	08-Jan-24	26-Sep-24
695	X19	Water Right Permit	0		26-Sep-24
696	**Construction Water**		30	08-Jan-24	16-Feb-24
697	X20	Acquisition of Construction Water	0	08-Jan-24*	
698	X21	Initial Development of Construction Water	30	08-Jan-24	16-Feb-24
699	**Sites Reservoir Permitting, Mitigation and Cultural Work**		1872	02-Apr-24	25-Jun-31
700	**Permitting**		1228	02-Apr-24	04-Jan-29
701	X293	Permitting (Biological/Cultural/Mitigation)	1228	02-Apr-24	04-Jan-29
702	**Northern Access Roads - Baseline Surveys & Revised ESA Consultation**		739	09-Mar-26	04-Jan-29
703	X379	Access Granted for Biological Surveys - Northern Access Roads	0	09-Mar-26	
704	X389	Plant Survey 1 - Northern Access Roads	15	16-Mar-26*	03-Apr-26
705	X779.OE2	Plant Survey & Land Cover - Northern Access Roads	352	16-Mar-26	20-Jul-27
706	X619	VELB Survey and Report - Northern Access Roads	30	30-Apr-26*	10-Jun-26
707	X659	Bumble Bee Survey 1 - Northern Access Roads	5	30-Apr-26	06-May-26
708	X789.OE2	Species Protocol Surveys; USFWS & CDFW - Northern Access Roads	656	30-Apr-26	02-Nov-28
709	X399	Plant Survey 2 - Northern Access Roads	15	04-May-26	22-May-26
710	X669	Bumble Bee Survey 2 - Northern Access Roads	5	28-May-26	03-Jun-26
711	X409	Plant Survey 3 and Report - Northern Access Roads	45	22-Jun-26	21-Aug-26
712	X679	Bumble Bee Survey 3 - Northern Access Roads	5	25-Jun-26	01-Jul-26
713	X689	Bumble Bee Survey 4 and Report - Northern Access Roads	45	23-Jul-26	23-Sep-26
714	X419	Land Cover Verification/Aquatic Delineation #1 - Northern Access Roads	15	02-Dec-26*	22-Dec-26
715	X579	Vernal Pool Wet Season Survey 1 - Northern Access Roads	10	03-Dec-26*	16-Dec-26
716	X649	CRLF Surveys and Report - Northern Access Roads	200	04-Jan-27*	08-Oct-27
717	X589	Vernal Pool Wet Season Survey 2 - Northern Access Roads	10	07-Jan-27	20-Jan-27
718	X629	VELB Transplant - Northern Access Roads	20	07-Jan-27	03-Feb-27
719	X429	Land Cover Verification/Aquatic Delineation #2 - Northern Access Roads	15	13-Jan-27	02-Feb-27
720	X599	Vernal Pool Wet Season Survey 3 - Northern Access Roads	10	11-Feb-27	24-Feb-27

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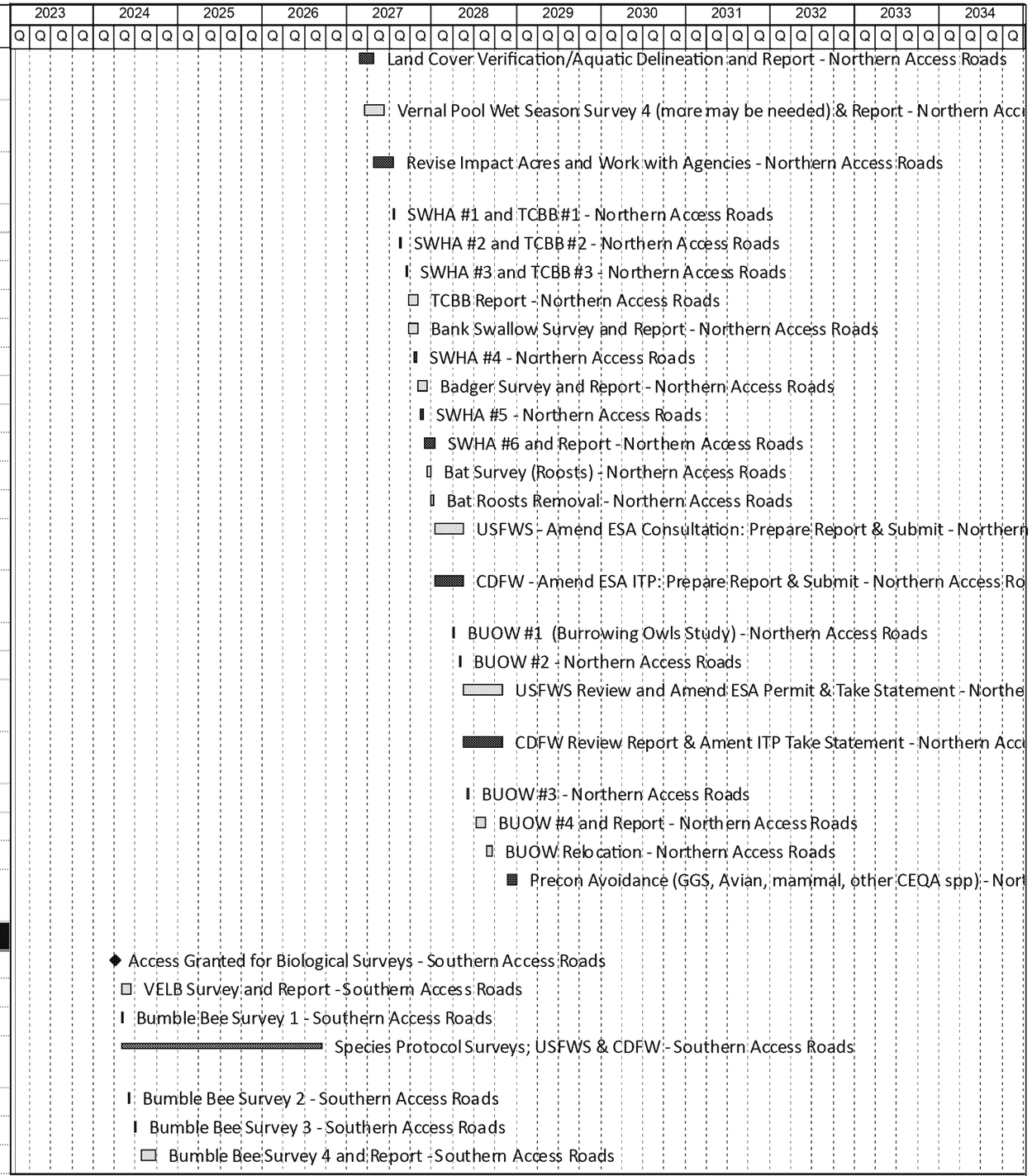
721	X439	Land Cover Verification/Aquatic Delineation and Report - Northern Access Roads	45	24-Feb-27	27-Apr-27
722	X609	Vernal Pool Wet Season Survey 4 (more may be needed) & Report - Northern Access Roads	60	18-Mar-27	09-Jun-27
723	X449	Revise Impact Acres and Work with Agencies - Northern Access Roads	60	28-Apr-27	20-Jul-27
724	X509	SWHA #1 and TCBB #1 - Northern Access Roads	5	21-Jul-27*	27-Jul-27
725	X519	SWHA #2 and TCBB #2 - Northern Access Roads	5	18-Aug-27	24-Aug-27
726	X529	SWHA #3 and TCBB #3 - Northern Access Roads	5	15-Sep-27	21-Sep-27
727	X569	TCBB Report - Northern Access Roads	30	22-Sep-27	02-Nov-27
728	X639	Bank Swallow Survey and Report - Northern Access Roads	30	22-Sep-27	02-Nov-27
729	X539	SWHA #4 - Northern Access Roads	5	20-Oct-27	26-Oct-27
730	X699	Badger Survey and Report - Northern Access Roads	30	03-Nov-27	14-Dec-27
731	X549	SWHA #5 - Northern Access Roads	5	17-Nov-27	23-Nov-27
732	X559	SWHA #6 and Report - Northern Access Roads	30	03-Dec-27	13-Jan-28
733	X709	Bat Survey (Roosts) - Northern Access Roads	10	15-Dec-27	28-Dec-27
734	X719	Bat Roosts Removal - Northern Access Roads	10	29-Dec-27	11-Jan-28
735	X729	USFWS - Amend ESA Consultation: Prepare Report & Submit - Northern Access Roads	90	14-Jan-28	18-May-28
736	X749	CDFW - Amend ESA ITP: Prepare Report & Submit - Northern Access Roads	90	14-Jan-28	18-May-28
737	X459	BUOW #1 (Burrowing Owls Study) - Northern Access Roads	5	03-Apr-28*	07-Apr-28
738	X469	BUOW #2 - Northern Access Roads	5	01-May-28	05-May-28
739	X739	USFWS Review and Amend ESA Permit & Take Statement - Northern Access Roads	120	19-May-28	02-Nov-28
740	X759	CDFW Review Report & Ament ITP Take Statement - Northern Access Roads	120	19-May-28	02-Nov-28
741	X479	BUOW #3 - Northern Access Roads	5	05-Jun-28	09-Jun-28
742	X489	BUOW #4 and Report - Northern Access Roads	30	10-Jul-28	18-Aug-28
743	X499	BUOW Relocation - Northern Access Roads	15	28-Aug-28*	15-Sep-28
744	X769	Precon Avoidance (GGS, Avian, mammal, other CEQA spp) - Northern Access Roads	30	24-Nov-28	04-Jan-29
745	**Southern Access Roads - Baseline Surveys & Revised ESA Consultation**		866	02-Apr-24	17-Aug-27
746	X819	Access Granted for Biological Surveys - Southern Access Roads	0	02-Apr-24	
747	X1059	VELB Survey and Report - Southern Access Roads	30	30-Apr-24*	11-Jun-24
748	X1099	Bumble Bee Survey 1 - Southern Access Roads	5	30-Apr-24	06-May-24
749	X1229.OE2	Species Protocol Surveys; USFWS & CDFW - Southern Access Roads	607	30-Apr-24	16-Sep-26
750	X1109	Bumble Bee Survey 2 - Southern Access Roads	5	29-May-24	04-Jun-24
751	X1119	Bumble Bee Survey 3 - Southern Access Roads	5	26-Jun-24	02-Jul-24
752	X1129	Bumble Bee Survey 4 and Report - Southern Access Roads	45	25-Jul-24	26-Sep-24



Remaining Level of Effort
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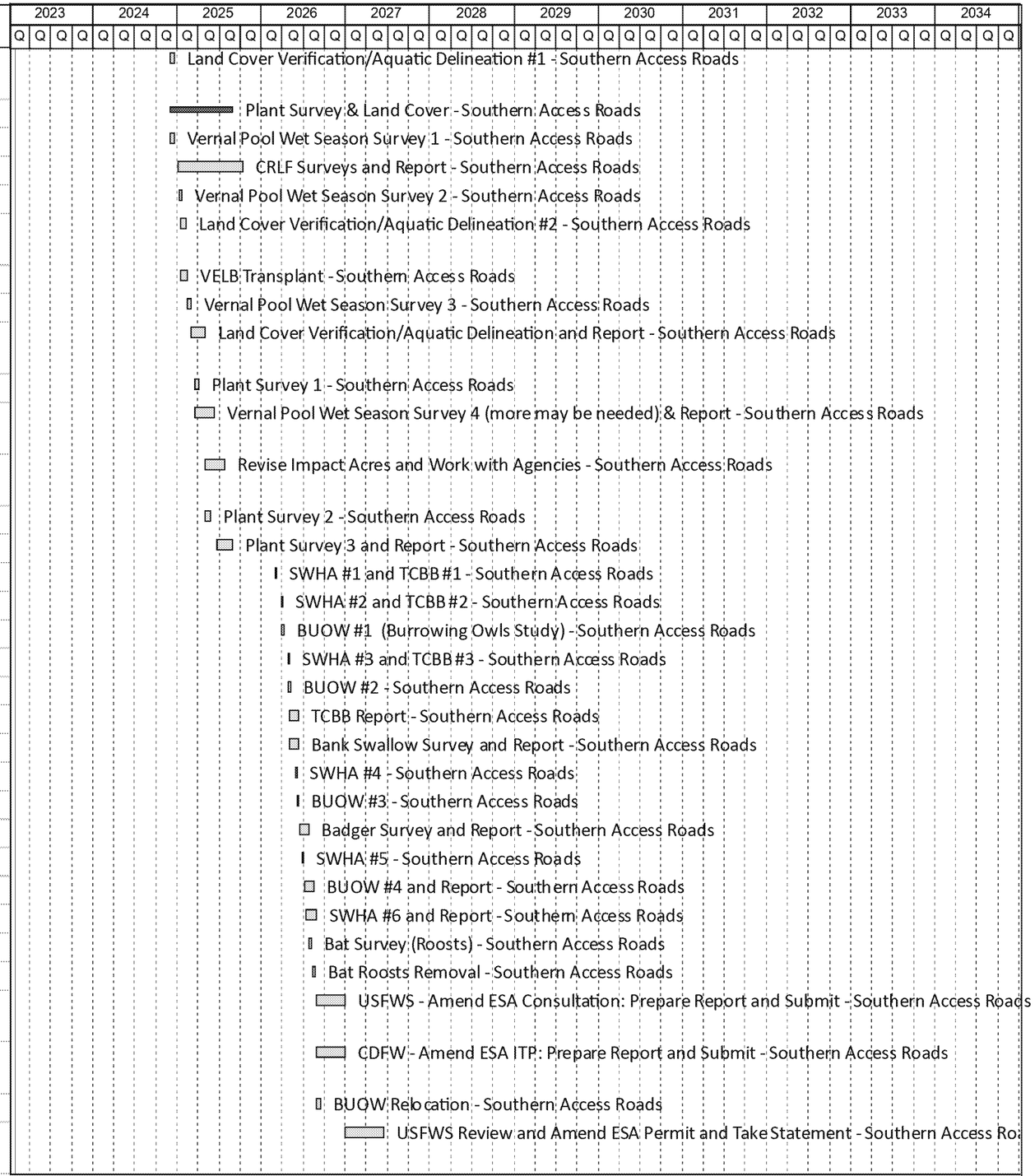
753	X859	Land Cover Verification/Aquatic Delineation #1 - Southern Access Roads	15	02-Dec-24*	20-Dec-24
754	X1219.OE2	Plant Survey & Land Cover - Southern Access Roads	187	02-Dec-24	26-Aug-25
755	X1019	Vernal Pool Wet Season Survey 1 - Southern Access Roads	10	03-Dec-24*	16-Dec-24
756	X1089	CRLF Surveys and Report - Southern Access Roads	200	03-Jan-25*	14-Oct-25
757	X1029	Vernal Pool Wet Season Survey 2 - Southern Access Roads	10	10-Jan-25	23-Jan-25
758	X869	Land Cover Verification/Aquatic Delineation #2 - Southern Access Roads	15	16-Jan-25	05-Feb-25
759	X1069	VELB Transplant - Southern Access Roads	20	17-Jan-25	13-Feb-25
760	X1039	Vernal Pool Wet Season Survey 3 - Southern Access Roads	10	14-Feb-25	27-Feb-25
761	X879	Land Cover Verification/Aquatic Delineation and Report - Southern Access Roads	45	27-Feb-25	30-Apr-25
762	X829	Plant Survey 1 - Southern Access Roads	15	17-Mar-25*	04-Apr-25
763	X1049	Vernal Pool Wet Season Survey 4 (more may be needed) & Report - Southern Access Roads	60	21-Mar-25	13-Jun-25
764	X889	Revise Impact Acres and Work with Agencies - Southern Access Roads	60	01-May-25	25-Jul-25
765	X839	Plant Survey 2 - Southern Access Roads	15	05-May-25	23-May-25
766	X849	Plant Survey 3 and Report - Southern Access Roads	45	24-Jun-25	26-Aug-25
767	X949	SWHA #1 and TCBB #1 - Southern Access Roads	5	02-Mar-26*	06-Mar-26
768	X959	SWHA #2 and TCBB #2 - Southern Access Roads	5	30-Mar-26	03-Apr-26
769	X899	BUOW #1 (Burrowing Owls Study) - Southern Access Roads	5	01-Apr-26*	07-Apr-26
770	X969	SWHA #3 and TCBB #3 - Southern Access Roads	5	27-Apr-26	01-May-26
771	X909	BUOW #2 - Southern Access Roads	5	29-Apr-26	05-May-26
772	X1009	TCBB Report - Southern Access Roads	30	04-May-26	12-Jun-26
773	X1079	Bank Swallow Survey and Report - Southern Access Roads	30	04-May-26	12-Jun-26
774	X979	SWHA #4 - Southern Access Roads	5	01-Jun-26	05-Jun-26
775	X919	BUOW #3 - Southern Access Roads	5	03-Jun-26	09-Jun-26
776	X1139	Badger Survey and Report - Southern Access Roads	30	15-Jun-26	24-Jul-26
777	X989	SWHA #5 - Southern Access Roads	5	29-Jun-26	03-Jul-26
778	X929	BUOW #4 and Report - Southern Access Roads	30	08-Jul-26	18-Aug-26
779	X999	SWHA #6 and Report - Southern Access Roads	30	15-Jul-26	25-Aug-26
780	X1149	Bat Survey (Roosts) - Southern Access Roads	10	27-Jul-26	07-Aug-26
781	X1159	Bat Roosts Removal - Southern Access Roads	10	10-Aug-26	21-Aug-26
782	X1169	USFWS - Amend ESA Consultation: Prepare Report and Submit - Southern Access Roads	90	26-Aug-26	29-Dec-26
783	X1189	CDFW - Amend ESA ITP: Prepare Report and Submit - Southern Access Roads	90	26-Aug-26	29-Dec-26
784	X939	BUOW Relocation - Southern Access Roads	15	27-Aug-26*	16-Sep-26
785	X1179	USFWS Review and Amend ESA Permit and Take Statement - Southern Access Roads	120	30-Dec-26	15-Jun-27



Remaining Level of Effort
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786	X1199	CDFW Review Report and Ament ITP Take Statement - Southern Access Roads	120	30-Dec-26	15-Jun-27
787	X1209	Precon Avoidance (GGS, Avian, mammal, other CEQA spp) - Southern Access Roads	30	07-Jul-27	17-Aug-27
788	**Reservoir - Baseline Surveys & Revised ESA Consultation**		607	20-Apr-26	15-Aug-28
789	**Compensatory Mitigation**		305	20-Apr-26	18-Jun-27
790	X62	Secure LOC/Implement Mitigation Prior to Take (Compensatory)	305	20-Apr-26	18-Jun-27
791	**Cultural Work**		1872	02-Apr-24	25-Jun-31
792	**Northern Access Roads**		1000	09-Mar-26	04-Jan-30
793	X329.OE2	Northern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	09-Mar-26	21-Aug-26
794	X339.OE2	Cultural Survey - Northern Access Roads	180	24-Aug-26	30-Apr-27
795	X349.OE2	Northern Access Roads - Testing and Evaluation of Resources	180	03-May-27	07-Jan-28
796	X359.OE2	Northern Access Roads - Develop Treatment Plan and Implementation	260	10-Jan-28	05-Jan-29
797	X369	Northern Access Roads - Implement Avoidance/Minimization Activities During Construction	260	08-Jan-29	04-Jan-30
798	**Southern Access Roads**		1000	02-Apr-24	21-Feb-28
799	X1239.OE2	Southern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	02-Apr-24	19-Sep-24
800	X1249.OE2	Cultural Survey - Southern Access Roads	180	20-Sep-24	06-Jun-25
801	X1259.OE2	Southern Access Roads - Testing and Evaluation of Resources	180	09-Jun-25	23-Feb-26
802	X1269.OE2	Southern Access Roads - Develop Treatment Plan and Implementation	260	24-Feb-26	22-Feb-27
803	X1279	Southern Access Roads - Implement Avoidance/Minimization Activities During Construction	260	23-Feb-27	21-Feb-28
804	**Reservoir**		1353	20-Apr-26	25-Jun-31
805	X63.OE2	Reservoir - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	20-Apr-26	02-Oct-26
806	X64.OE2	Cultural Survey - Reservoir	180	05-Oct-26	11-Jun-27
807	X65.OE2	Reservoir - Testing and Evaluation of Resources	180	14-Jun-27	18-Feb-28
808	X66.OE2	Reservoir - Develop Treatment Plan and Implementation	260	21-Feb-28	16-Feb-29
809	X67.OE2	Reservoir - Implement Avoidance/Minimization Activities During Construction	260	27-Jun-30	25-Jun-31
810	**P1 / P2 Geotech Investigations**		666	31-Aug-23	17-Apr-26
811	X68	P1 Geotech Investigation (30% Cutoff)	0	31-Aug-23*	
812	X69	EIR P2a Geotech Investigation (Dam Foundations & Grouting)	380	17-Oct-24	17-Apr-26
813	X70	EIR P2a Geotech Investigation (Roads)	200	17-Oct-24	01-Aug-25
814	X71	EIR P2b Geotech Investigation (Dam Embankments)	130	14-Oct-25*	17-Apr-26
815	**Reservoir Facilities**		2725	31-Aug-23	09-Mar-34
816	X286.OE2	Substantial Completion - Dams Ready for Commissioning	0		03-Nov-33

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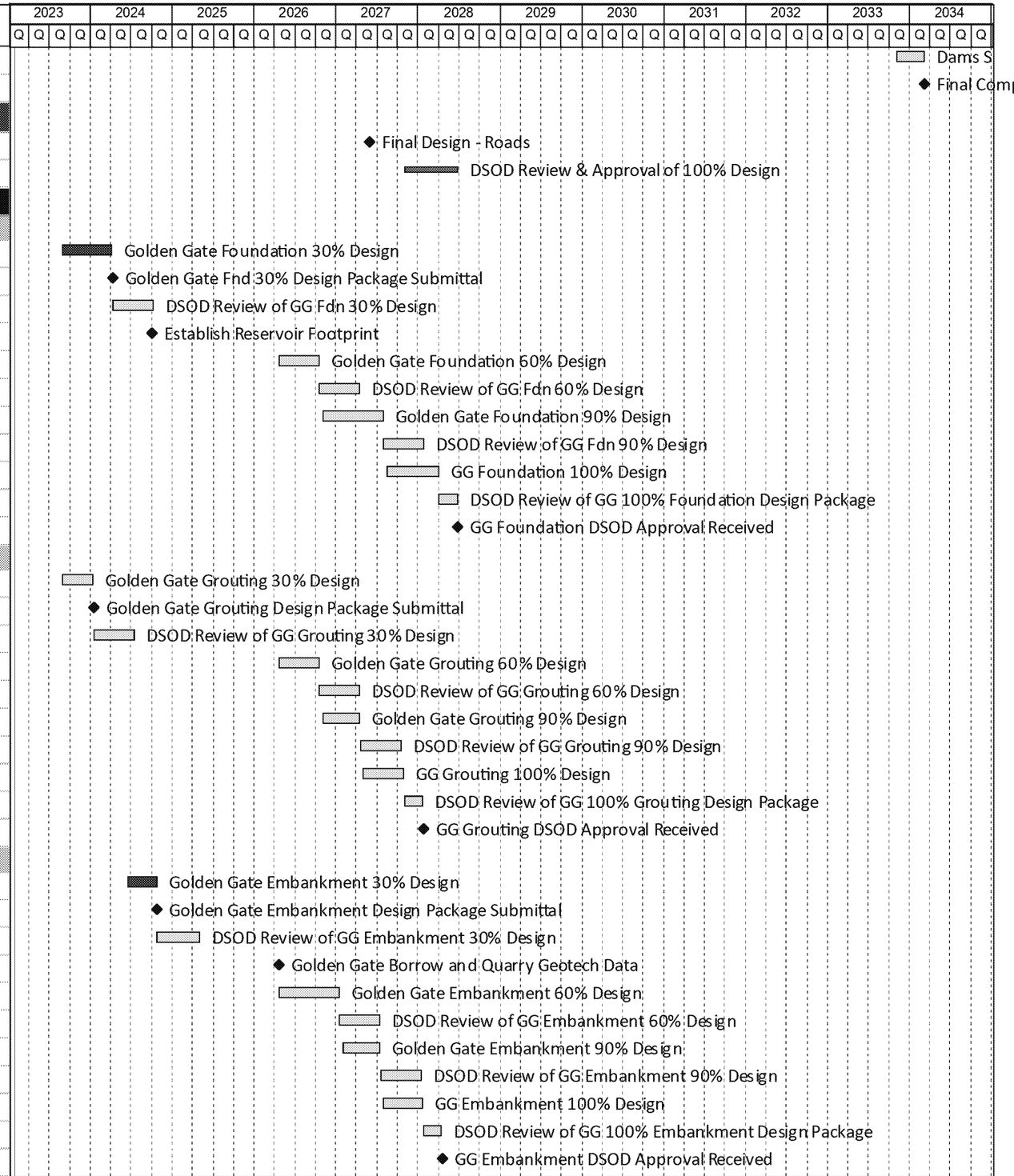
817	X287	Dams Startup and Commissioning	90	04-Nov-33	09-Mar-34
818	X288	Final Completion	0		09-Mar-34*
819	**Engineering - Dams**		1371	31-Aug-23	01-Jan-29
820	X294.OE2	Final Design - Roads	0		28-May-27
821	X295.OE2	DSOD Review & Approval of 100% Design	170	01-Nov-27	23-Jun-28
822	**Golden Gate Dam Design**		1236	31-Aug-23	26-Jun-28
823	**Golden Gate Foundation Design**		1236	31-Aug-23	26-Jun-28
824	X72	Golden Gate Foundation 30% Design	151	31-Aug-23	05-Apr-24*
825	X73	Golden Gate Fnd 30% Design Package Submittal	0	08-Apr-24	
826	X74	DSOD Review of GG Fdn 30% Design	130	08-Apr-24	09-Oct-24
827	X305.OE2	Establish Reservoir Footprint	0		02-Oct-24
828	X75	Golden Gate Foundation 60% Design	130	20-Apr-26	16-Oct-26
829	X76	DSOD Review of GG Fdn 60% Design	130	19-Oct-26	16-Apr-27
830	X77	Golden Gate Foundation 90% Design	195	02-Nov-26	30-Jul-27
831	X78	DSOD Review of GG Fdn 90% Design	130	02-Aug-27	28-Jan-28
832	X79	GG Foundation 100% Design	165	16-Aug-27	31-Mar-28
833	X80	DSOD Review of GG 100% Foundation Design Package	60	03-Apr-28	23-Jun-28
834	X81	GG Foundation DSOD Approval Received	0	26-Jun-28	
835	**Golden Gate Grouting Design**		1126	31-Aug-23	24-Jan-28
836	X82	Golden Gate Grouting 30% Design	91	31-Aug-23	12-Jan-24*
837	X83	Golden Gate Grouting Design Package Submittal	0	15-Jan-24	
838	X84	DSOD Review of GG Grouting 30% Design	130	15-Jan-24	16-Jul-24
839	X85	Golden Gate Grouting 60% Design	130	20-Apr-26	16-Oct-26
840	X86	DSOD Review of GG Grouting 60% Design	130	19-Oct-26	16-Apr-27
841	X87	Golden Gate Grouting 90% Design	120	02-Nov-26	16-Apr-27
842	X88	DSOD Review of GG Grouting 90% Design	130	19-Apr-27	15-Oct-27
843	X89	GG Grouting 100% Design	130	03-May-27	29-Oct-27
844	X90	DSOD Review of GG 100% Grouting Design Package	60	01-Nov-27	21-Jan-28
845	X91	GG Grouting DSOD Approval Received	0	24-Jan-28	
846	**Golden Gate Embankment Design**		986	17-Jun-24	17-Apr-28
847	X92	Golden Gate Embankment 30% Design	91	17-Jun-24	23-Oct-24*
848	X93	Golden Gate Embankment Design Package Submittal	0	24-Oct-24	
849	X94	DSOD Review of GG Embankment 30% Design	130	24-Oct-24	30-Apr-25
850	X95	Golden Gate Borrow and Quarry Geotech Data	0	20-Apr-26	
851	X96	Golden Gate Embankment 60% Design	195	20-Apr-26	15-Jan-27
852	X97	DSOD Review of GG Embankment 60% Design	130	18-Jan-27	16-Jul-27
853	X98	Golden Gate Embankment 90% Design	120	01-Feb-27	16-Jul-27
854	X99	DSOD Review of GG Embankment 90% Design	130	19-Jul-27	14-Jan-28
855	X100	GG Embankment 100% Design	125	02-Aug-27	21-Jan-28
856	X101	DSOD Review of GG 100% Embankment Design Package	60	24-Jan-28	14-Apr-28
857	X102	GG Embankment DSOD Approval Received	0	17-Apr-28	



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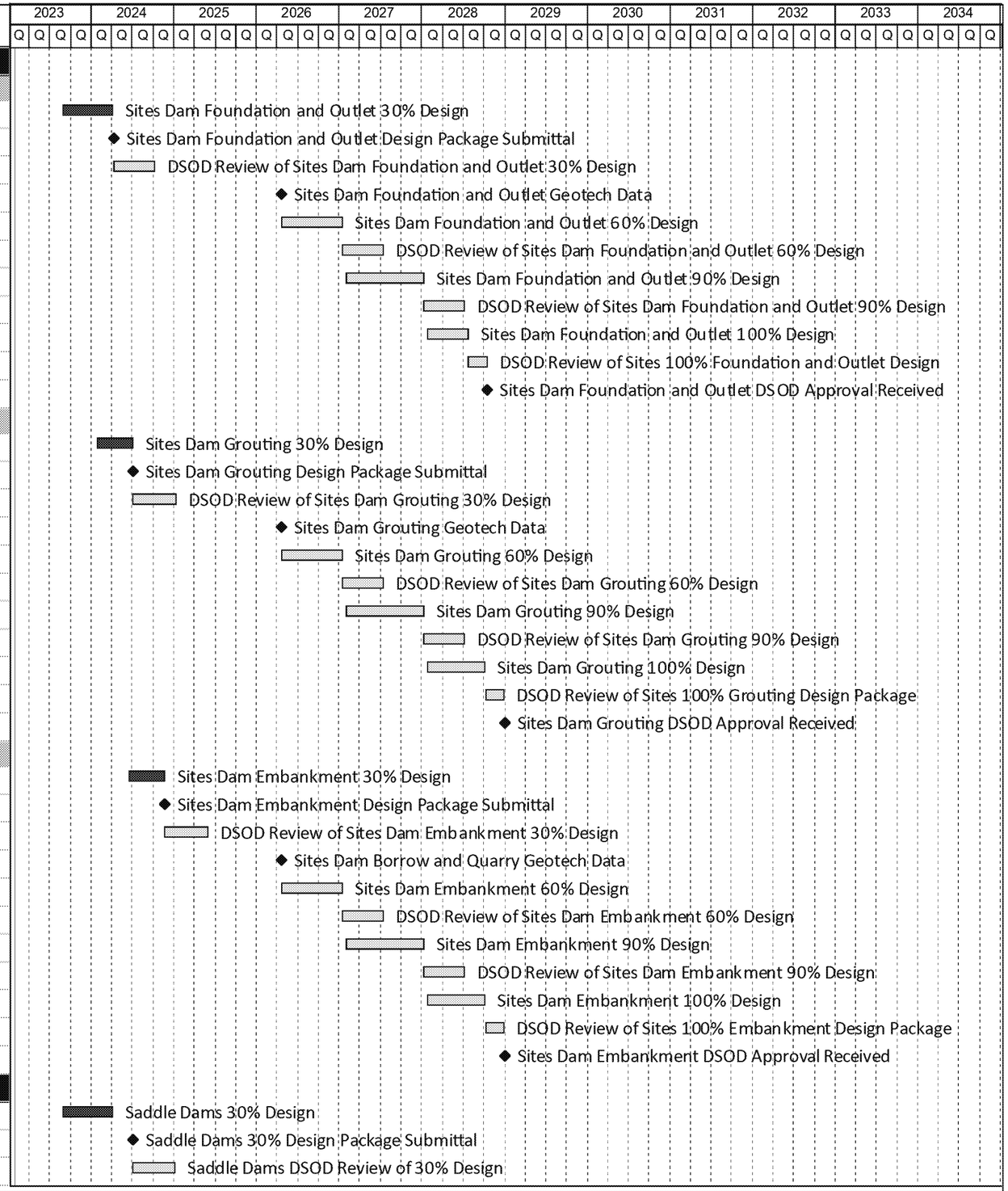
858	**Sites Dam Design**		1371	31-Aug-23	01-Jan-29
859	**Sites Dam Foundation and Outlet Design**		1316	31-Aug-23	16-Oct-28
860	X103	Sites Dam Foundation and Outlet 30% Design	151	31-Aug-23	05-Apr-24*
861	X104	Sites Dam Foundation and Outlet Design Package Submittal	0	08-Apr-24	
862	X105	DSOD Review of Sites Dam Foundation and Outlet 30% Design	130	08-Apr-24	09-Oct-24
863	X106	Sites Dam Foundation and Outlet Geotech Data	0	20-Apr-26	
864	X107	Sites Dam Foundation and Outlet 60% Design	195	20-Apr-26	15-Jan-27
865	X108	DSOD Review of Sites Dam Foundation and Outlet 60% Design	130	18-Jan-27	16-Jul-27
866	X109	Sites Dam Foundation and Outlet 90% Design	245	01-Feb-27	07-Jan-28
867	X110	DSOD Review of Sites Dam Foundation and Outlet 90% Design	130	10-Jan-28	07-Jul-28
868	X111	Sites Dam Foundation and Outlet 100% Design	130	24-Jan-28	21-Jul-28
869	X112	DSOD Review of Sites 100% Foundation and Outlet Design	60	24-Jul-28	13-Oct-28
870	X113	Sites Dam Foundation and Outlet DSOD Approval Received	0	16-Oct-28	
871	**Sites Dam Grouting Design**		1271	26-Jan-24	01-Jan-29
872	X114	Sites Dam Grouting 30% Design	111	26-Jan-24	01-Jul-24*
873	X115	Sites Dam Grouting Design Package Submittal	0	02-Jul-24	
874	X116	DSOD Review of Sites Dam Grouting 30% Design	130	02-Jul-24	08-Jan-25
875	X117	Sites Dam Grouting Geotech Data	0	20-Apr-26	
876	X118	Sites Dam Grouting 60% Design	195	20-Apr-26	15-Jan-27
877	X119	DSOD Review of Sites Dam Grouting 60% Design	130	18-Jan-27	16-Jul-27
878	X120	Sites Dam Grouting 90% Design	245	01-Feb-27	07-Jan-28
879	X121	DSOD Review of Sites Dam Grouting 90% Design	130	10-Jan-28	07-Jul-28
880	X122	Sites Dam Grouting 100% Design	185	24-Jan-28	06-Oct-28
881	X123	DSOD Review of Sites 100% Grouting Design Package	60	09-Oct-28	29-Dec-28
882	X124	Sites Dam Grouting DSOD Approval Received	0	01-Jan-29	
883	**Sites Dam Embankment Design**		1171	17-Jun-24	01-Jan-29
884	X125	Sites Dam Embankment 30% Design	111	17-Jun-24	20-Nov-24*
885	X126	Sites Dam Embankment Design Package Submittal	0	21-Nov-24	
886	X127	DSOD Review of Sites Dam Embankment 30% Design	130	21-Nov-24	29-May-25
887	X128	Sites Dam Borrow and Quarry Geotech Data	0	20-Apr-26	
888	X129	Sites Dam Embankment 60% Design	195	20-Apr-26	15-Jan-27
889	X130	DSOD Review of Sites Dam Embankment 60% Design	130	18-Jan-27	16-Jul-27
890	X131	Sites Dam Embankment 90% Design	245	01-Feb-27	07-Jan-28
891	X132	DSOD Review of Sites Dam Embankment 90% Design	130	10-Jan-28	07-Jul-28
892	X133	Sites Dam Embankment 100% Design	185	24-Jan-28	06-Oct-28
893	X134	DSOD Review of Sites 100% Embankment Design Package	60	09-Oct-28	29-Dec-28
894	X135	Sites Dam Embankment DSOD Approval Received	0	01-Jan-29	
895	**Saddle Dam Designs**		1156	31-Aug-23	06-Mar-28
896	X136	Saddle Dams 30% Design	151	31-Aug-23	05-Apr-24*
897	X137	Saddle Dams 30% Design Package Submittal	0	01-Jul-24*	
898	X138	Saddle Dams DSOD Review of 30% Design	130	01-Jul-24	07-Jan-25



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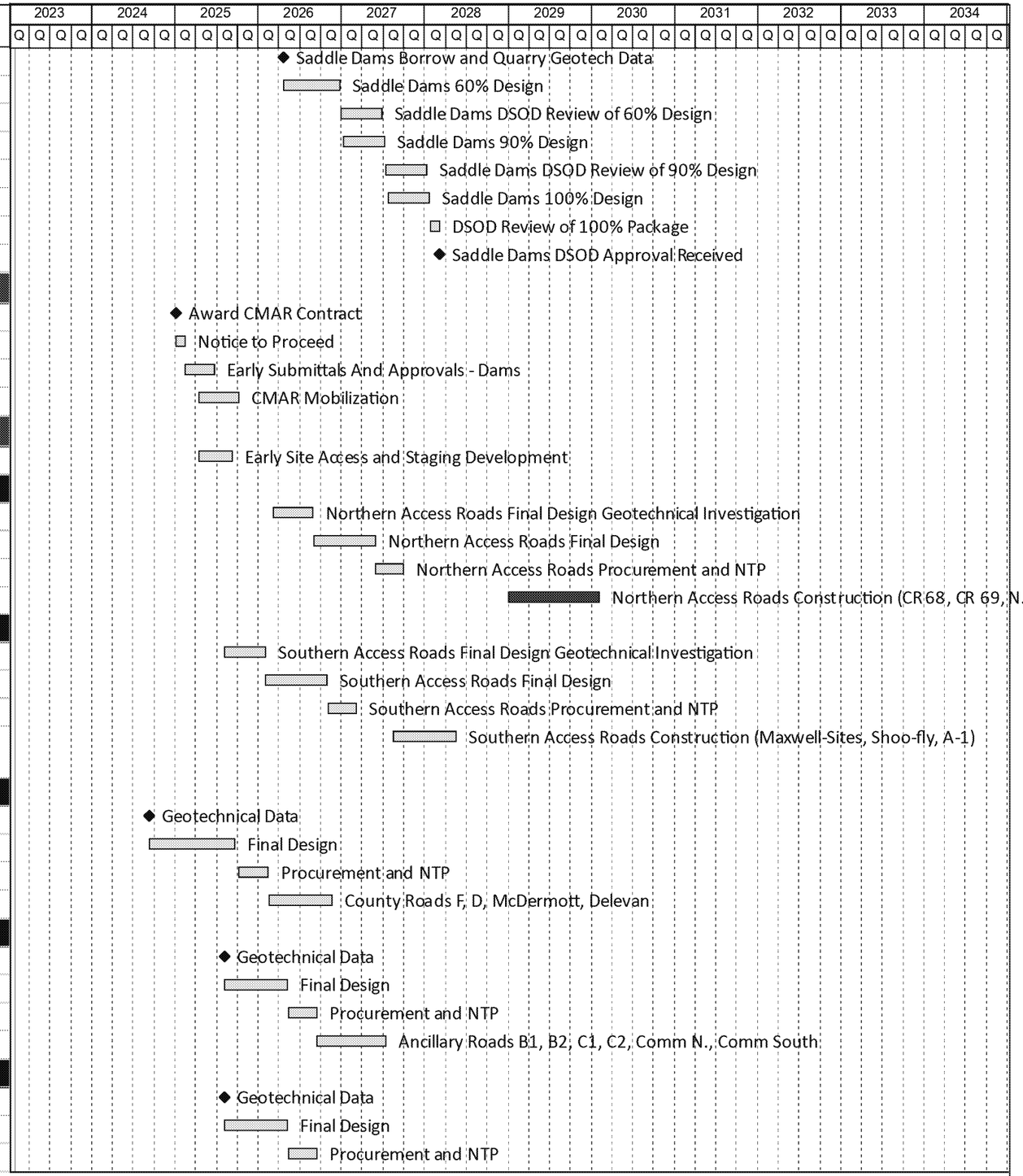
899	X139	Saddle Dams Borrow and Quarry Geotech Data	0	20-Apr-26	
900	X140	Saddle Dams 60% Design	180	20-Apr-26	25-Dec-26
901	X141	Saddle Dams DSOD Review of 60% Design	130	28-Dec-26	25-Jun-27
902	X142	Saddle Dams 90% Design	130	11-Jan-27	09-Jul-27
903	X143	Saddle Dams DSOD Review of 90% Design	130	12-Jul-27	07-Jan-28
904	X144	Saddle Dams 100% Design	130	26-Jul-27	21-Jan-28
905	X145	DSOD Review of 100% Package	30	24-Jan-28	03-Mar-28
906	X146	Saddle Dams DSOD Approval Received	0	06-Mar-28	
907	**CMAR Procurement**		195	02-Jan-25	06-Oct-25
908	X147	Award CMAR Contract	0	02-Jan-25*	
909	X148	Notice to Proceed	30	02-Jan-25	12-Feb-25
910	X149	Early Submittals And Approvals - Dams	90	13-Feb-25	19-Jun-25
911	X150	CMAR Mobilization	120	17-Apr-25	06-Oct-25
912	**Roads, Bridges, Access, and Site Development**		1446	11-Sep-24	12-Apr-30
913	X151	Early Site Access and Staging Development	100	17-Apr-25	08-Sep-25
914	**Northern Construction Access Roads (CR68, CR 69, N. Rd)**		1023	09-Mar-26	06-Feb-30
915	X152	Northern Access Roads Final Design Geotechnical Investigation	125	09-Mar-26	28-Aug-26
916	X153	Northern Access Roads Final Design	195	31-Aug-26	28-May-27
917	X154	Northern Access Roads Procurement and NTP	90	31-May-27	01-Oct-27
918	X155.OE2	Northern Access Roads Construction (CR68, CR 69, N. Rd)	284	05-Jan-29	06-Feb-30
919	**Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)**		722	04-Aug-25	16-May-28
920	X160	Southern Access Roads Final Design Geotechnical Investigation	125	04-Aug-25	30-Jan-26
921	X161	Southern Access Roads Final Design	195	02-Feb-26	30-Oct-26
922	X162	Southern Access Roads Procurement and NTP	90	02-Nov-26	05-Mar-27
923	X163.OE2	Southern Access Roads Construction (Maxwell-Sites, Shoo-fly, A-1)	195	18-Aug-27	16-May-28
924	**County Roads F, D, McDermott, Delevan**		561	11-Sep-24	20-Nov-26
925	X156	Geotechnical Data	0	11-Sep-24	
926	X157	Final Design	260	11-Sep-24	19-Sep-25
927	X158	Procurement and NTP	90	07-Oct-25	13-Feb-26
928	X159	County Roads F, D, McDermott, Delevan	200	16-Feb-26	20-Nov-26
929	**Ancillary Roads B1, B2, C1, C2, Comm N., Comm South**		505	04-Aug-25	16-Jul-27
930	X164	Geotechnical Data	0	04-Aug-25	
931	X165	Final Design	195	04-Aug-25	08-May-26
932	X166	Procurement and NTP	90	11-May-26	11-Sep-26
933	X167	Ancillary Roads B1, B2, C1, C2, Comm N., Comm South	220	14-Sep-26	16-Jul-27
934	**Stone Corral Recreation Road to Sites Dam**		405	04-Aug-25	26-Feb-27
935	X168	Geotechnical Data	0	04-Aug-25	
936	X169	Final Design	195	04-Aug-25	08-May-26
937	X170	Procurement and NTP	90	11-May-26	11-Sep-26



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#	Activity ID	Activity Name	Duration	Start	Finish
938	X171	Stone Corral Recreation Road to Sites Dam	120	14-Sep-26	26-Feb-27
939	**Sites Lodoga Road Realignment and Bridge**		1220	04-Aug-25	12-Apr-30
940	X172	Geotechnical Data	0	04-Aug-25	
941	X173	Final Design	390	04-Aug-25	05-Feb-27
942	X174	Procurement and NTP	150	08-Feb-27	03-Sep-27
943	X175	Sites Lodoga Road Realignment and Bridge	680	06-Sep-27	12-Apr-30
944	**Process and Haul Filter Materials to Project**		1147	18-Jan-27	10-Jun-31
945	X176	Offsite Quarry Development	50	18-Jan-27	26-Mar-27
946	X177	Process Filter Materials	800	29-Mar-27	19-Apr-30
947	X178	Filter Material Haul to Stockpile	800	17-May-28	10-Jun-31
948	**Saddle Dams Construction**		2124	09-Sep-25	03-Nov-33
949	X296	Construction	1864	14-Sep-26	03-Nov-33
950	**Saddle Dam 3**		535	07-Feb-30	25-Feb-32
951	**Saddle Dam 3 Foundation Excavation**		180	07-Feb-30	16-Oct-30
952	X179	Saddle Dam 3 - Access and Staging	50	07-Feb-30	17-Apr-30
953	X180	Erosion and Sediment Control	50	07-Feb-30	17-Apr-30
954	X181	Clearing / Grubbing Topsoil Salvage from Work Areas	50	07-Feb-30	17-Apr-30
955	X182	Demolition	5	21-Feb-30	27-Feb-30
956	X183	Saddle Dam 3 - Foundation Excavation (Dbl Shift)	110	16-May-30	16-Oct-30
957	**Saddle Dam 3 - Foundation Preparation and Grouting**		175	20-Jun-30	19-Feb-31
958	X184	Foundation Cleaning	100	20-Jun-30	06-Nov-30
959	X185	Dental Excavation and Concrete	50	05-Sep-30	13-Nov-30
960	X186	Grout Cap	80	03-Oct-30	22-Jan-31
961	X187	Curtain Grouting	90	17-Oct-30	19-Feb-31
962	**Saddle Dam 3 - Embankment**		485	18-Apr-30	25-Feb-32
963	X188	Initial Borrow Development (Core Material)	40	18-Apr-30	12-Jun-30
964	X189	Initial Borrow Development for Zones 3 and 4	100	18-Apr-30	04-Sep-30
965	X190	Place Zone 1 - Core	260	09-Jan-31	07-Jan-32
966	X191	Place Zone 2A & 2B - Filters, Drains and Transitions	260	09-Jan-31	07-Jan-32
967	X192	Place Zone 3 - Rockfill	260	09-Jan-31	07-Jan-32
968	X193	Place Zone 4 - Random	260	09-Jan-31	07-Jan-32
969	X194	Place Rip Rap	200	24-Apr-31	28-Jan-32
970	X195	Site Reclamation and Topsoil Replacement	60	04-Dec-31	25-Feb-32
971	**Saddle Dam 5**		265	07-Feb-30	12-Feb-31
972	**Saddle Dam 5 - Foundation Excavation**		70	07-Feb-30	15-May-30
973	X196	Saddle Dam 5 - Access and Staging	30	07-Feb-30	20-Mar-30
974	X197	Erosion and Sediment Control	30	07-Feb-30	20-Mar-30
975	X198	Clearing / Grubbing Topsoil Salvage from Work Areas	30	07-Feb-30	20-Mar-30
976	X199	Demolition	5	21-Feb-30	27-Feb-30
977	X200	Saddle Dam 5 - Foundation Excavation	50	07-Mar-30	15-May-30
978	**Saddle Dam 5 - Foundation Preparation and Grouting**		110	14-Mar-30	14-Aug-30

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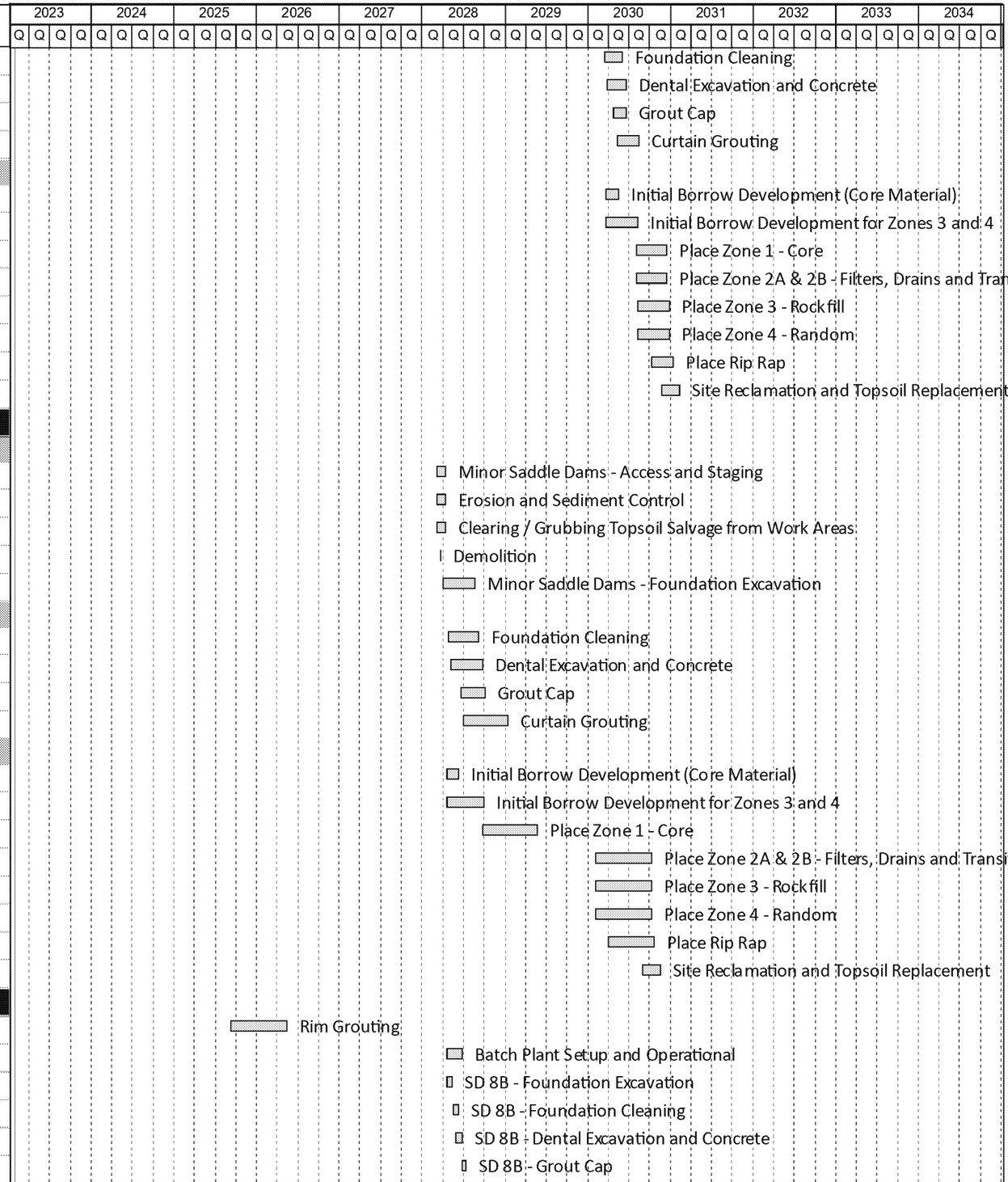
979	X201	Foundation Cleaning	60	14-Mar-30	05-Jun-30
980	X202	Dental Excavation and Concrete	60	28-Mar-30	19-Jun-30
981	X203	Grout Cap	40	25-Apr-30	19-Jun-30
982	X204	Curtain Grouting	70	09-May-30	14-Aug-30
983	**Saddle Dam 5 - Embankment**		235	21-Mar-30	12-Feb-31
984	X205	Initial Borrow Development (Core Material)	40	21-Mar-30	15-May-30
985	X206	Initial Borrow Development for Zones 3 and 4	100	21-Mar-30	07-Aug-30
986	X207	Place Zone 1 - Core	100	01-Aug-30	18-Dec-30
987	X208	Place Zone 2A & 2B - Filters, Drains and Transitions	100	01-Aug-30	18-Dec-30
988	X209	Place Zone 3 - Rockfill	100	08-Aug-30	25-Dec-30
989	X210	Place Zone 4 - Random	100	08-Aug-30	25-Dec-30
990	X211	Place Rip Rap	70	10-Oct-30	15-Jan-31
991	X212	Site Reclamation and Topsoil Replacement	60	21-Nov-30	12-Feb-31
992	**Minor Saddle Dams (SD1,SD2,SD6,SD8A, Dike 1, and Dike 2)**		708	06-Mar-28	20-Nov-30
993	**Minor Saddle Dams Foundation Excavation**		120	06-Mar-28	18-Aug-28
994	X213	Minor Saddle Dams - Access and Staging	30	06-Mar-28	14-Apr-28
995	X214	Erosion and Sediment Control	30	06-Mar-28	14-Apr-28
996	X215	Clearing / Grubbing Topsoil Salvage from Work Areas	30	06-Mar-28	14-Apr-28
997	X216	Demolition	5	20-Mar-28	24-Mar-28
998	X217	Minor Saddle Dams - Foundation Excavation	100	03-Apr-28	18-Aug-28
999	**Minor Saddle Dams - Foundation Preparation and Grouting**		190	24-Apr-28	12-Jan-29
1000	X218	Foundation Cleaning	100	24-Apr-28	08-Sep-28
1001	X219	Dental Excavation and Concrete	100	08-May-28	22-Sep-28
1002	X220	Grout Cap	80	19-Jun-28	06-Oct-28
1003	X221	Curtain Grouting	140	03-Jul-28	12-Jan-29
1004	**Minor Saddle Dams - Embankment**		678	17-Apr-28	20-Nov-30
1005	X222	Initial Borrow Development (Core Material)	40	17-Apr-28	09-Jun-28
1006	X223	Initial Borrow Development for Zones 3 and 4	120	17-Apr-28	29-Sep-28
1007	X224	Place Zone 1 - Core	175	25-Sep-28	25-May-29
1008	X225	Place Zone 2A & 2B - Filters, Drains and Transitions	175	07-Feb-30	09-Oct-30
1009	X226	Place Zone 3 - Rockfill	175	07-Feb-30	09-Oct-30
1010	X227	Place Zone 4 - Random	175	07-Feb-30	09-Oct-30
1011	X228	Place Rip Rap	145	04-Apr-30	23-Oct-30
1012	X229	Site Reclamation and Topsoil Replacement	60	29-Aug-30	20-Nov-30
1013	**Saddle Dam 8B - Spillway**		932	09-Sep-25	10-Apr-29
1014	X240	Rim Grouting	171	09-Sep-25	11-May-26
1015	X230	Batch Plant Setup and Operational	50	17-Apr-28	23-Jun-28
1016	X231	SD 8B - Foundation Excavation	20	17-Apr-28	12-May-28
1017	X232	SD 8B - Foundation Cleaning	20	15-May-28	09-Jun-28
1018	X233	SD 8B - Dental Excavation and Concrete	20	29-May-28	23-Jun-28
1019	X234	SD 8B - Grout Cap	12	26-Jun-28	11-Jul-28



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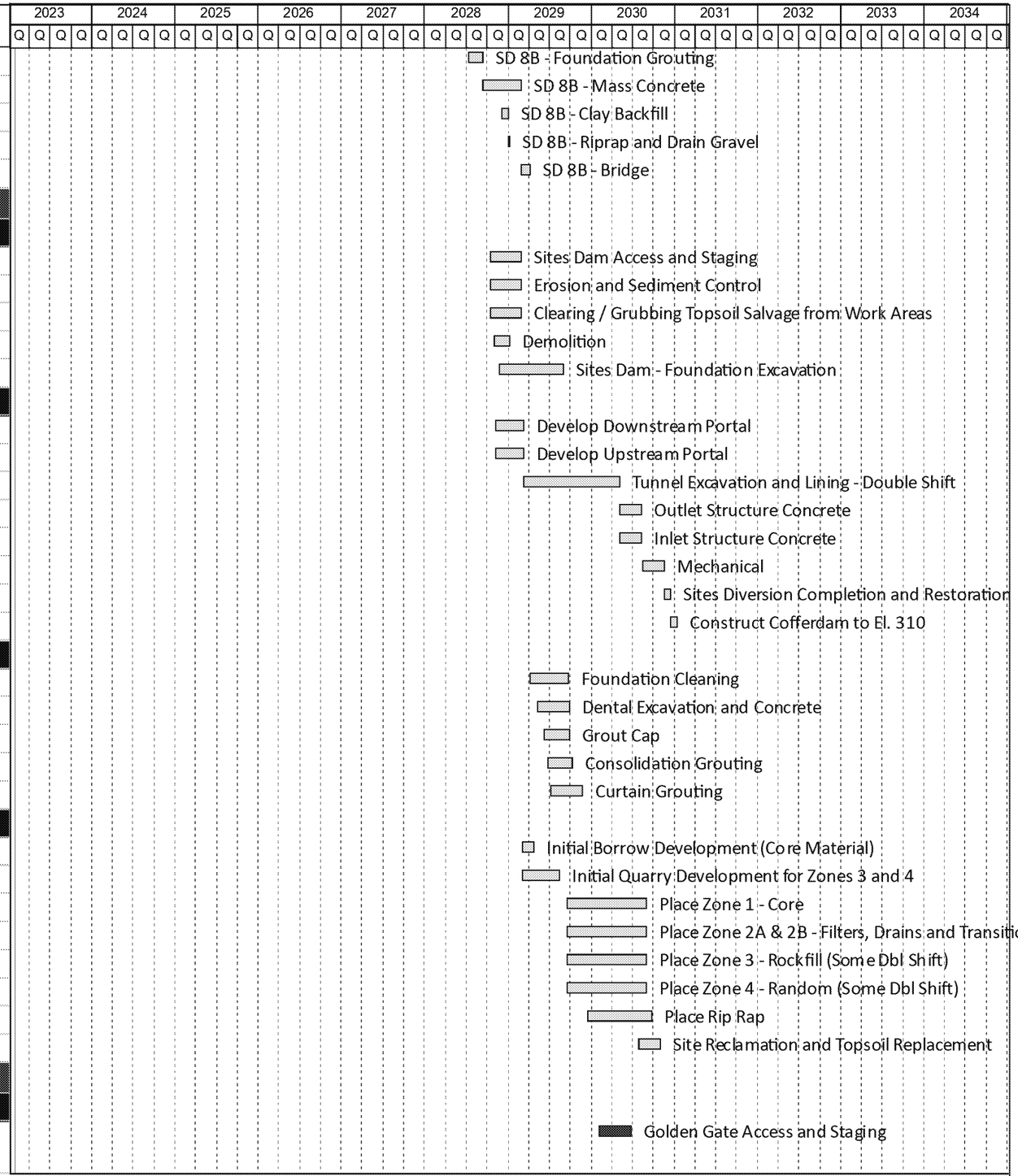
#	Activity ID	Activity Name	Duration	Start	Finish
1020	X235	SD 8B - Foundation Grouting	45	12-Jul-28	12-Sep-28
1021	X236	SD 8B - Mass Concrete	120	13-Sep-28	27-Feb-29
1022	X238	SD 8B - Clay Backfill	20	06-Dec-28	02-Jan-29
1023	X239	SD 8B - Riprap and Drain Gravel	3	03-Jan-29	05-Jan-29
1024	X237	SD 8B - Bridge	30	28-Feb-29	10-Apr-29
1025	**Sites Dam Construction**		585	16-Oct-28	10-Jan-31
1026	**Sites Dam Foundation Excavation**		230	16-Oct-28	31-Aug-29
1027	X241	Sites Dam Access and Staging	100	16-Oct-28	02-Mar-29
1028	X242	Erosion and Sediment Control	100	16-Oct-28	02-Mar-29
1029	X243	Clearing / Grubbing Topsoil Salvage from Work Areas	100	16-Oct-28	02-Mar-29
1030	X244	Demolition	50	30-Oct-28	05-Jan-29
1031	X245	Sites Dam - Foundation Excavation	200	27-Nov-28	31-Aug-29
1032	**Sites Diversion Outlet Facility**		570	06-Nov-28	10-Jan-31
1033	X246	Develop Downstream Portal	90	06-Nov-28	09-Mar-29
1034	X248	Develop Upstream Portal	90	06-Nov-28	09-Mar-29
1035	X247	Tunnel Excavation and Lining - Double Shift	300	12-Mar-29	03-May-30
1036	X249	Outlet Structure Concrete	70	06-May-30	09-Aug-30
1037	X250	Inlet Structure Concrete	70	06-May-30	09-Aug-30
1038	X251	Mechanical	70	12-Aug-30	15-Nov-30
1039	X252	Sites Diversion Completion and Restoration	20	18-Nov-30	13-Dec-30
1040	X253	Construct Cofferdam to El. 310	20	16-Dec-30	10-Jan-31
1041	**Sites Dam - Foundation Preparation and Grouting**		165	09-Apr-29	23-Nov-29
1042	X254	Foundation Cleaning	120	09-Apr-29	21-Sep-29
1043	X255	Dental Excavation and Concrete	100	14-May-29	28-Sep-29
1044	X256	Grout Cap	80	11-Jun-29	28-Sep-29
1045	X257	Consolidation Grouting	80	25-Jun-29	12-Oct-29
1046	X258	Curtain Grouting	100	09-Jul-29	23-Nov-29
1047	**Sites Dam - Embankment**		435	05-Mar-29	01-Nov-30
1048	X259	Initial Borrow Development (Core Material)	40	05-Mar-29	27-Apr-29
1049	X260	Initial Quarry Development for Zones 3 and 4	120	05-Mar-29	17-Aug-29
1050	X261	Place Zone 1 - Core	250	17-Sep-29	30-Aug-30
1051	X262	Place Zone 2A & 2B - Filters, Drains and Transitions	250	17-Sep-29	30-Aug-30
1052	X263	Place Zone 3 - Rockfill (Some Dbl Shift)	250	17-Sep-29	30-Aug-30
1053	X264	Place Zone 4 - Random (Some Dbl Shift)	250	17-Sep-29	30-Aug-30
1054	X265	Place Rip Rap	200	17-Dec-29	20-Sep-30
1055	X266	Site Reclamation and Topsoil Replacement	70	29-Jul-30	01-Nov-30
1056	**Golden Gate Dam Construction**		976	07-Feb-30	03-Nov-33
1057	**GG Dam Foundation Excavation**		360	07-Feb-30	25-Jun-31
1058	X267.OE2	Golden Gate Access and Staging	100	07-Feb-30	26-Jun-30



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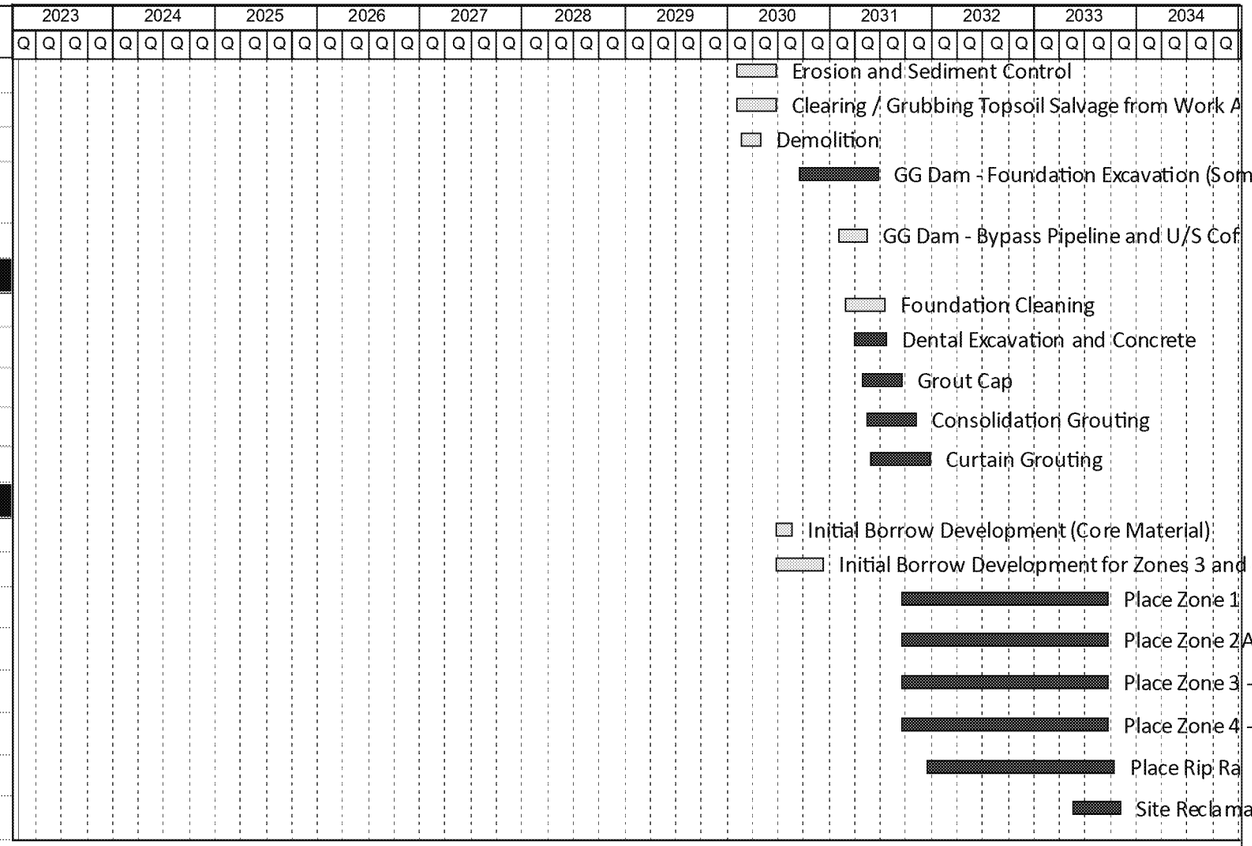
1059	X268	Erosion and Sediment Control	100	07-Feb-30	26-Jun-30
1060	X269	Clearing / Grubbing Topsoil Salvage from Work Areas	100	07-Feb-30	26-Jun-30
1061	X270.OE2	Demolition	50	21-Feb-30	01-May-30
1062	X271.OE2	GG Dam - Foundation Excavation (Some Dbl Shift)	200	19-Sep-30	25-Jun-31
1063	X272	GG Dam - Bypass Pipeline and U/S Cofferdam	70	06-Feb-31	14-May-31
1064	**GG Dam - Foundation Preparation and Grouting**		215	27-Feb-31	24-Dec-31
1065	X273.OE2	Foundation Cleaning	100	27-Feb-31	16-Jul-31
1066	X274.OE2	Dental Excavation and Concrete	80	03-Apr-31	23-Jul-31
1067	X275.OE2	Grout Cap	100	01-May-31	17-Sep-31
1068	X276.OE2	Consolidation Grouting	125	15-May-31	05-Nov-31
1069	X277.OE2	Curtain Grouting	150	29-May-31	24-Dec-31
1070	**GG Dam - Embankment**		876	27-Jun-30	03-Nov-33
1071	X278	Initial Borrow Development (Core Material)	40	27-Jun-30	21-Aug-30
1072	X279	Initial Borrow Development for Zones 3 and 4	120	27-Jun-30	11-Dec-30
1073	X280.OE2	Place Zone 1 - Core	525	18-Sep-31	21-Sep-33
1074	X281.OE2	Place Zone 2A & 2B - Filters, Drains and Transitions	525	18-Sep-31	21-Sep-33
1075	X282.OE2	Place Zone 3 - Rockfill (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
1076	X283.OE2	Place Zone 4 - Random (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
1077	X284.OE2	Place Rip Rap	475	18-Dec-31	12-Oct-33
1078	X285.OE2	Site Reclamation and Topsoil Replacement	120	20-May-33	03-Nov-33



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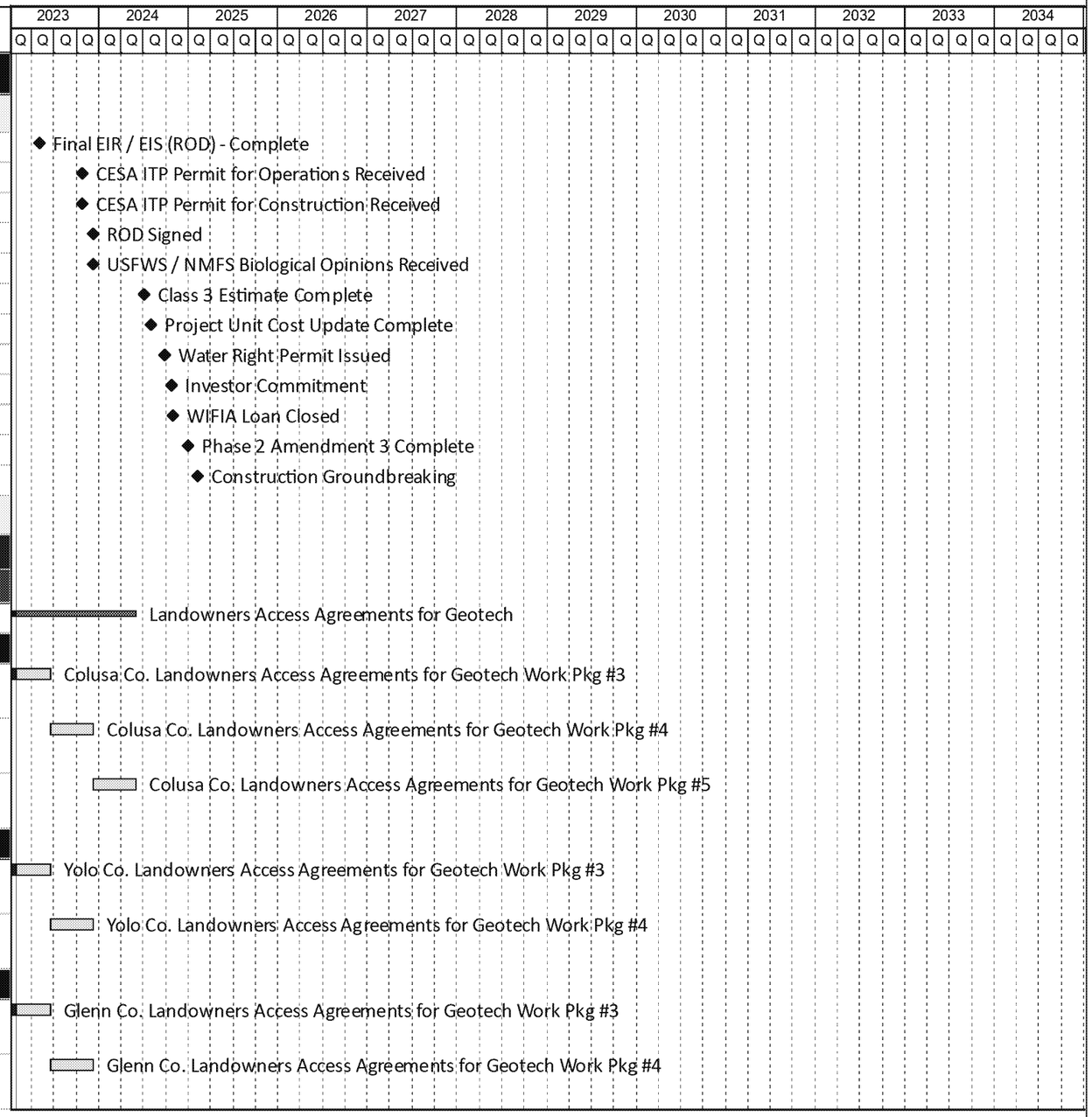
Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Duration	Start	Finish
1	**Sites Reservoir Project DD: Feb-2023_Workshop**		2917	01-Sep-20 A	05-May-34
2	**Project Milestones**		444	05-May-23	10-Feb-25
3	MS-1200	Final EIR / EIS (ROD) - Complete	0		05-May-23
4	MS-1320	CESA ITP Permit for Operations Received	0		23-Oct-23
5	MS-1340	CESA ITP Permit for Construction Received	0		23-Oct-23
6	MS-1300	ROD Signed	0		06-Dec-23
7	MS-1150	USFWS / NMFS Biological Opinions Received	0		06-Dec-23
8	MS-1700	Class 3 Estimate Complete	0		05-Jul-24
9	MS-1450	Project Unit Cost Update Complete	0		30-Jul-24
10	MS-1400	Water Right Permit Issued	0		26-Sep-24*
11	MS-1500	Investor Commitment	0		24-Oct-24
12	MS-1600	WIFIA Loan Closed	0		31-Oct-24
13	MS-5000	Phase 2 Amendment 3 Complete	0		31-Dec-24*
14	MS-3000	Construction Groundbreaking	0	10-Feb-25	
15	**Geotech Program**		943	22-Mar-22	12-Oct-26
16	**Real Estate**		340	22-Mar-22	30-May-24
17	**Land Access Agreements**		340	22-Mar-22	30-May-24
18	A1250	Landowners Access Agreements for Geotech	340	22-Mar-22	30-May-24
19	**Colusa County**		340	03-Jan-23 A	30-May-24
20	LAAC-1300	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #3	100	03-Jan-23 A	19-Jun-23
21	LAAC-1400	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23
22	LAAC-1500	Colusa Co. Landowners Access Agreements for Geotech Work Pkg #5	120	11-Dec-23	30-May-24
23	**Yolo County**		220	03-Jan-23 A	08-Dec-23
24	LAAY-1300	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #3	100	03-Jan-23 A	19-Jun-23
25	LAAY-1400	Yolo Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23
26	**Glenn County**		340	03-Jan-23 A	30-May-24
27	LAAG-1300	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #3	100	03-Jan-23 A	19-Jun-23
28	LAAG-1400	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #4	120	20-Jun-23	08-Dec-23



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#	Activity ID	Activity Name	Duration	Start	Finish
29	LAAG-1500	Glenn Co. Landowners Access Agreements for Geotech Work Pkg #5	120	11-Dec-23	30-May-24
30	**Geotechnical Engineering**		943	06-Sep-22 A	12-Oct-26
31	**Key Deliverables**		361	06-Sep-22 A	28-Jun-24
32	KD-2015	P1A Geotechnical Investigations & Reports	233	06-Sep-22 A	29-Dec-23
33	KD-2025	P1B Geotechnical Investigations & Reports	252	03-Jul-23	28-Jun-24
34	**Geotechnical Investigations**		943	02-Jan-23 A	12-Oct-26
35	P2-GEO	P2 Geotech for Final Design	500	25-Oct-24	12-Oct-26
36	**Test Pits & Trenches**		420	31-Mar-23	22-Nov-24
37	TPT-1200	Geotech Test Pits & Trenches - Short Term Pemit Window	420	31-Mar-23	22-Nov-24
38	**Work Packages**		486	02-Jan-23 A	30-Dec-24
39	GWP-1200	Geotech Work Package #2	109	02-Jan-23 A	30-Jun-23
40	GWP-1300	Geotech Work Package #3	124	03-Jul-23	29-Dec-23
41	GWP-1400	Geotech Work Package #4	128	02-Jan-24	28-Jun-24
42	GWP-1500	Geotech Work Package #5 (need for Sites Lodoga Rd. Realignment Cost Certainty)	125	01-Jul-24	30-Dec-24
43	**Preliminary Engineering**		382	30-Jan-23	30-Jul-24
44	**Key Deliverables**		75	20-Mar-24	05-Jul-24
45	KD-1180	Preliminary Engineering (30% Design Level)	0		20-Mar-24
46	KD-1190	Update to Class 3 Construction Cost Estimate	0		05-Jul-24
47	**Cost Estimate**		382	30-Jan-23	30-Jul-24
48	**Class 4 Cost Estimate Variance Reporting**		300	30-Jan-23	03-Apr-24
49	C4E-1000	Class 4 Cost Estimate Variance Reporting (reset to Sort G)	300	30-Jan-23	03-Apr-24
50	**Class 3 Cost Estimate**		82	04-Apr-24	30-Jul-24
51	C3E-1000	Class 3 Cost Estimate Preparation (Capital Cost)	65	04-Apr-24	05-Jul-24
52	CU-1000	Project Unit Cost Update	0		30-Jul-24
53	**Project Development**		1607	01-Sep-20 A	27-Apr-29
54	**Planning**		233	01-Sep-20 A	31-Dec-23
55	**Key Deliverables**		233	24-Jan-22 A	31-Dec-23
56	KD-1130	Complete Updated Master Project Schedule (Baseline Established)	65	24-Jan-22 A	28-Apr-23
57	KD-1290	Formalize AB/RC Governance & Delegation of Authority for Phase 3 (JBrown)	337	06-Sep-22 A	31-Dec-23
58	**NAHC/Local Tribes AB 52 Consultation**		113	01-Sep-20 A	07-Jul-23
59	STA-120	NAHC/Local Tribes AB 52 Consultation	113	01-Sep-20 A	07-Jul-23
60	**Reservoir Operations & Modeling**		463	03-Jan-22 A	21-Nov-24
61	**Operations Plan - Version 2**		172	24-Oct-23	27-Jun-24
62	KD-1510	Operations Plan, Version 2	172	24-Oct-23	27-Jun-24
63	**Final Sites DWR/Reclamation Operating Agreement**		85	19-Apr-22 A	26-May-23

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Project ID: Sites Feb-2023_Exp / Project Name: Sites Reservoir Project DD: Feb-2023_Workshop
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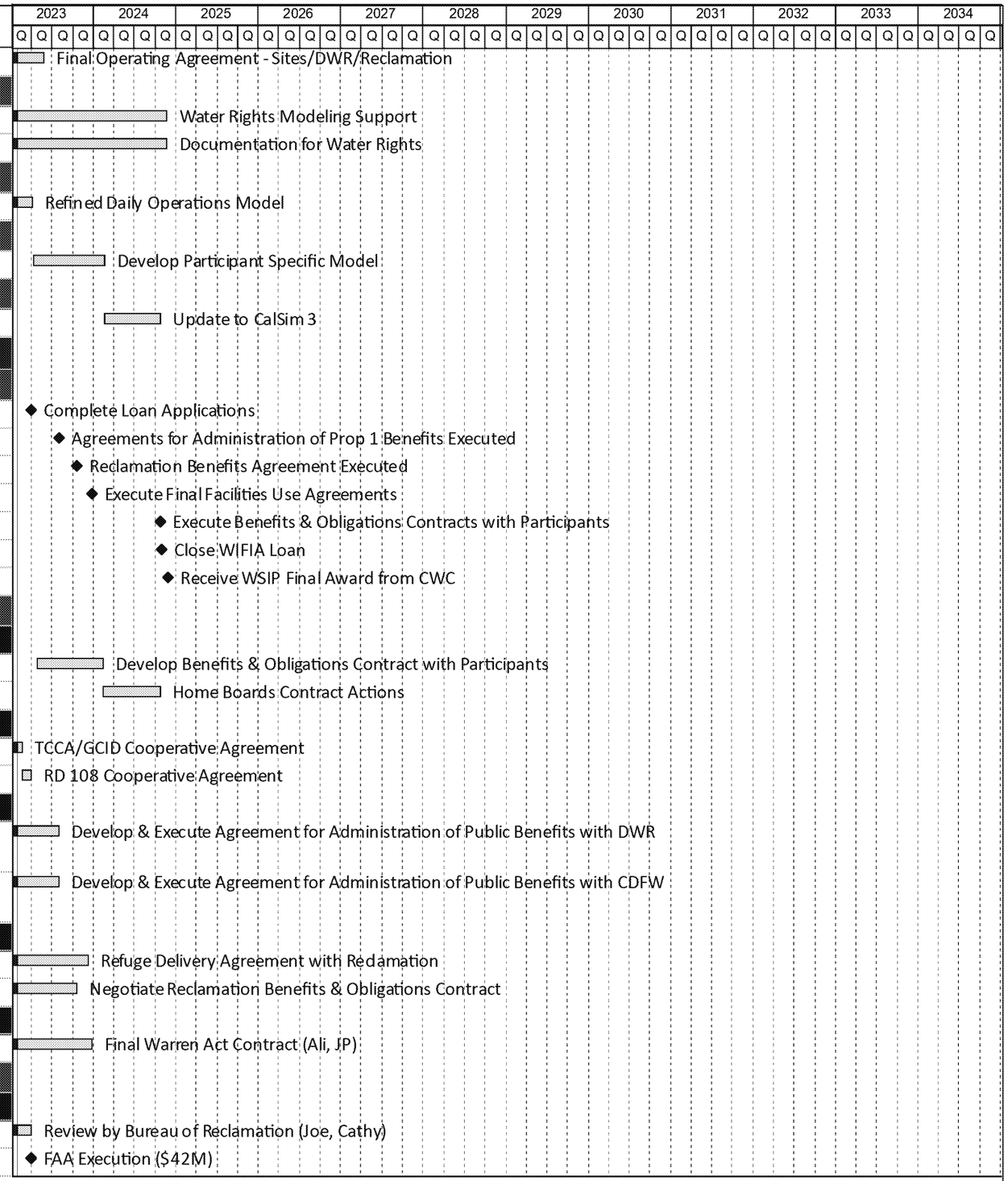
#	Activity ID	Activity Name	Duration	Start	Finish
64	OP-1005	Final Operating Agreement - Sites/DWR/Reclamation	85	19-Apr-22 A	26-May-23
65	**Water Rights Modeling**		463	03-Jan-22 A	21-Nov-24
66	A1200	Water Rights Modeling Support	463	03-Jan-22 A	21-Nov-24
67	A1210	Documentation for Water Rights	463	03-Jan-22 A	21-Nov-24
68	**Refined Daily Operations Model**		50	03-Oct-22 A	07-Apr-23
69	A1220	Refined Daily Operations Model	50	03-Oct-22 A	07-Apr-23
70	**Sites Specific Model**		220	10-Apr-23	21-Feb-24
71	OS-1150	Develop Participant Specific Model	220	10-Apr-23	21-Feb-24
72	**Update to CalSim 3**		174	22-Feb-24	25-Oct-24
73	A1230	Update to CalSim 3	174	22-Feb-24	25-Oct-24
74	**Project Agreements & Funding**		523	01-Jun-21 A	20-Feb-25
75	**Key Deliverables**		422	29-Mar-23	25-Nov-24
76	KD-1255	Complete Loan Applications	0		29-Mar-23
77	KD-1520	Agreements for Administration of Prop 1 Benefits Executed	0		31-Jul-23
78	KD-1260	Reclamation Benefits Agreement Executed	0		17-Oct-23
79	KD-1230	Execute Final Facilities Use Agreements	0		27-Dec-23
80	KD-1300	Execute Benefits & Obligations Contracts with Participants	0		25-Oct-24
81	KD-2600	Close WIFIA Loan	0		31-Oct-24
82	KD-1310	Receive WSIP Final Award from CWC	0		25-Nov-24
83	**Inter-Agency Agreements**		444	01-Jun-21 A	25-Oct-24
84	**Benefits & Obligations Contract with Participants**		381	27-Apr-23	25-Oct-24
85	BO-1300	Develop Benefits & Obligations Contract with Participants	200	27-Apr-23	12-Feb-24
86	BO-1400	Home Boards Contract Actions	180	13-Feb-24	25-Oct-24
87	**Facility Use Agreeements**		45	27-Aug-21	31-Mar-23
88	FO-1020	TCCA/GCID Cooperative Agreement	15	27-Aug-21	17-Feb-23
89	FO-1040	RD 108 Cooperative Agreement	30	20-Feb-23	31-Mar-23
90	**Agreements for Administration of Public Benefits**		129	31-Mar-22	31-Jul-23
91	PB-1100	Develop & Execute Agreement for Administration of Public Benefits with DWR	129	31-Mar-22 A	31-Jul-23
92	PB-1200	Develop & Execute Agreement for Administration of Public Benefits with CDFW	129	31-Mar-22 A	31-Jul-23
93	**Federal Funding Committment**		218	12-Dec-22	06-Dec-23
94	Refuge	Refuge Delivery Agreement with Redamation	215	12-Dec-22	06-Dec-23
95	WIIN-1170	Negotiate Reclamation Benefits & Obligations Contract	184	16-Dec-22	17-Oct-23
96	**US Bureau of Reclamation Warren Act**		231	01-Jun-21 A	27-Dec-23
97	FED-090	Final Warren Act Contract (Ali, JP)	231	01-Jun-21 A	27-Dec-23
98	**Federal Funding**		366	10-Jun-22 A	08-Jul-24
99	**WIIN Act FAA**		293	10-Jun-22 A	25-Mar-24
100	WIIN-1190	Review by Bureau of Reclamation (Joe, Cathy)	62	10-Jun-22 A	31-Mar-23
101	WIIN-1210	FAA Execution ($42M)	0		31-Mar-23



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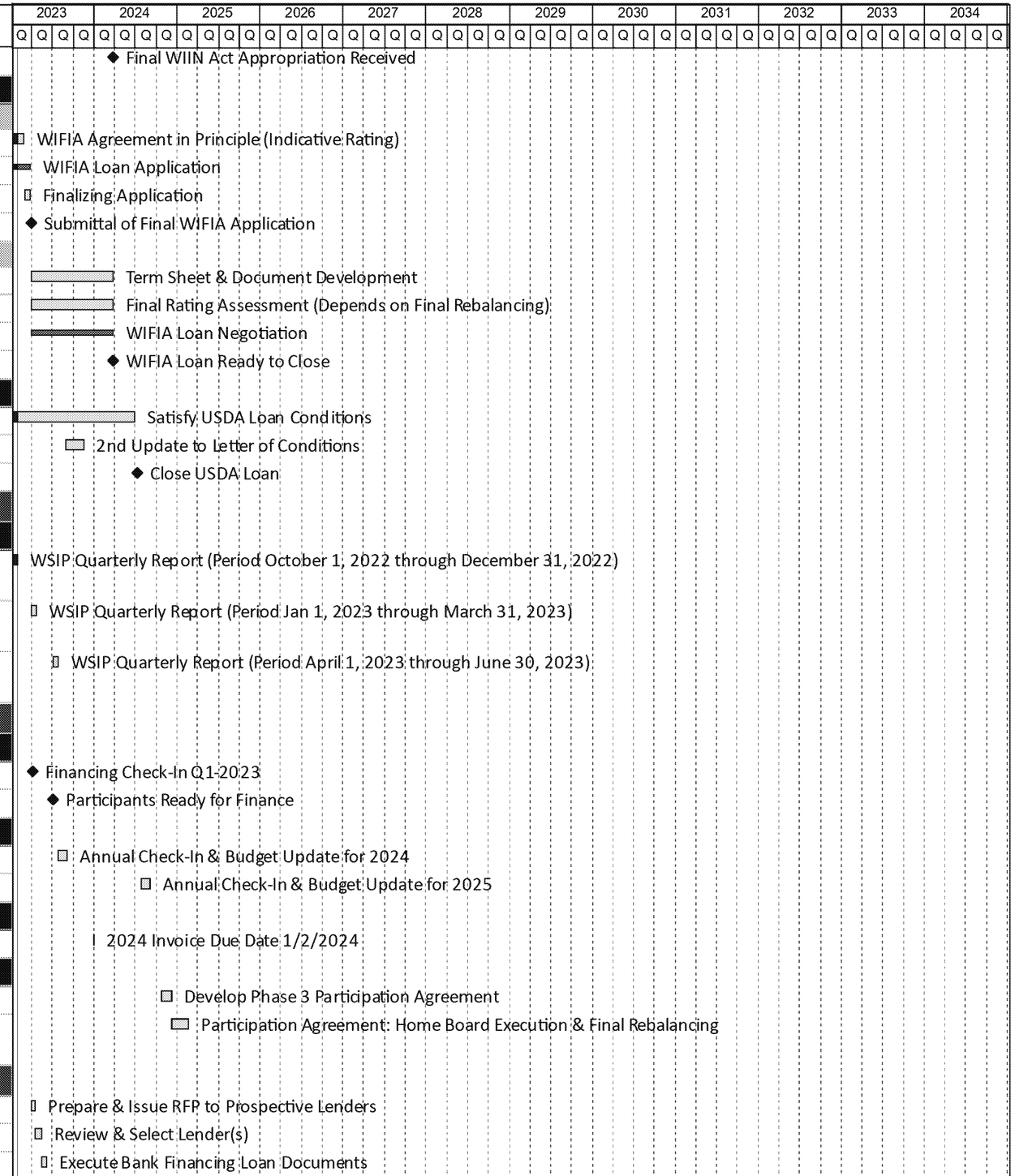
#	Activity ID	Activity Name	Duration	Start	Finish
102	WIIN-1200	Final WIIN Act Appropriation Received	0		25-Mar-24
103	**WIFIA Loan**		293	05-Jul-22 A	25-Mar-24
104	**WIFIA Application**		43	05-Jul-22 A	29-Mar-23
105	WIFIA-110	WIFIA Agreement in Principle (Indicative Rating)	22	05-Jul-22 A	28-Feb-23
106	WIFIA-300	WIFIA Loan Application	41	05-Jul-22 A	28-Mar-23
107	WIFIA-130	Finalizing Application	20	01-Mar-23	28-Mar-23
108	WIFIA-140	Submittal of Final WIFIA Application	0		29-Mar-23
109	**WIFIA Negotiation**		250	30-Mar-23	25-Mar-24
110	WIFIA-210	Term Sheet & Document Development	250	30-Mar-23	25-Mar-24
111	WIFIA-220	Final Rating Assessment (Depends on Final Rebalancing)	250	30-Mar-23	25-Mar-24
112	WIFIA-240	WIFIA Loan Negotiation	247	30-Mar-23	25-Mar-24
113	WIFIA-230	WIFIA Loan Ready to Close	0		25-Mar-24
114	**USDA Loan**		366	02-Sep-22 A	08-Jul-24
115	USDA-1060	Satisfy USDA Loan Conditions	361	02-Sep-22 A	28-Jun-24
116	USDA-1080	2nd Update to Letter of Conditions	50	01-Sep-23	14-Nov-23
117	USDA-1070	Close USDA Loan	0		08-Jul-24
118	**State Funding (Water Storage Investment Program, WSIP)**		125	03-Jan-23 A	25-Jul-23
119	**WSIP Early Funding Administration**		125	03-Jan-23 A	25-Jul-23
120	WSIP-1240	WSIP Quarterly Report (Period October 1, 2022 through December 31, 2022)	2	03-Jan-23 A	31-Jan-23
121	WSIP-1250	WSIP Quarterly Report (Period Jan 1, 2023 through March 31, 2023)	15	03-Apr-23	21-Apr-23
122	WSIP-1260	WSIP Quarterly Report (Period April 1, 2023 through June 30, 2023)	15	05-Jul-23	25-Jul-23
123	**Local Funding**		477	03-Apr-23	20-Feb-25
124	**Finance Check-Ins**		64	03-Apr-23	03-Jul-23
125	FC-1280	Financing Check-In Q1-2023	0		03-Apr-23
126	FC-1290	Participants Ready for Finance	0		03-Jul-23
127	**Acre/Feet Participation (Reservoir Committee Cash Calls)**		283	26-Jul-23	05-Sep-24
128	AF-1200	Annual Check-In & Budget Update for 2024	30	26-Jul-23	06-Sep-23
129	AF-1300	Annual Check-In & Budget Update for 2025	30	25-Jul-24	05-Sep-24
130	**Authority Board (Dues)**		1	02-Jan-24	02-Jan-24
131	AB-2300	2024 Invoice Due Date 1/2/2024	1	02-Jan-24	02-Jan-24*
132	**Phase 3 Participation Agreement**		80	25-Oct-24	20-Feb-25
133	PA-1100	Develop Phase 3 Participation Agreement	30	25-Oct-24	09-Dec-24
134	PA-1200	Participation Agreement: Home Board Execution & Final Rebalancing	50	10-Dec-24	20-Feb-25
135	**Bank Financing (if needed)**		50	30-Mar-23	08-Jun-23
136	BF-1100	Prepare & Issue RFP to Prospective Lenders	15	30-Mar-23	19-Apr-23
137	BF-1200	Review & Select Lender(s)	20	20-Apr-23	17-May-23
138	BF-1300	Execute Bank Financing Loan Documents	15	18-May-23	08-Jun-23



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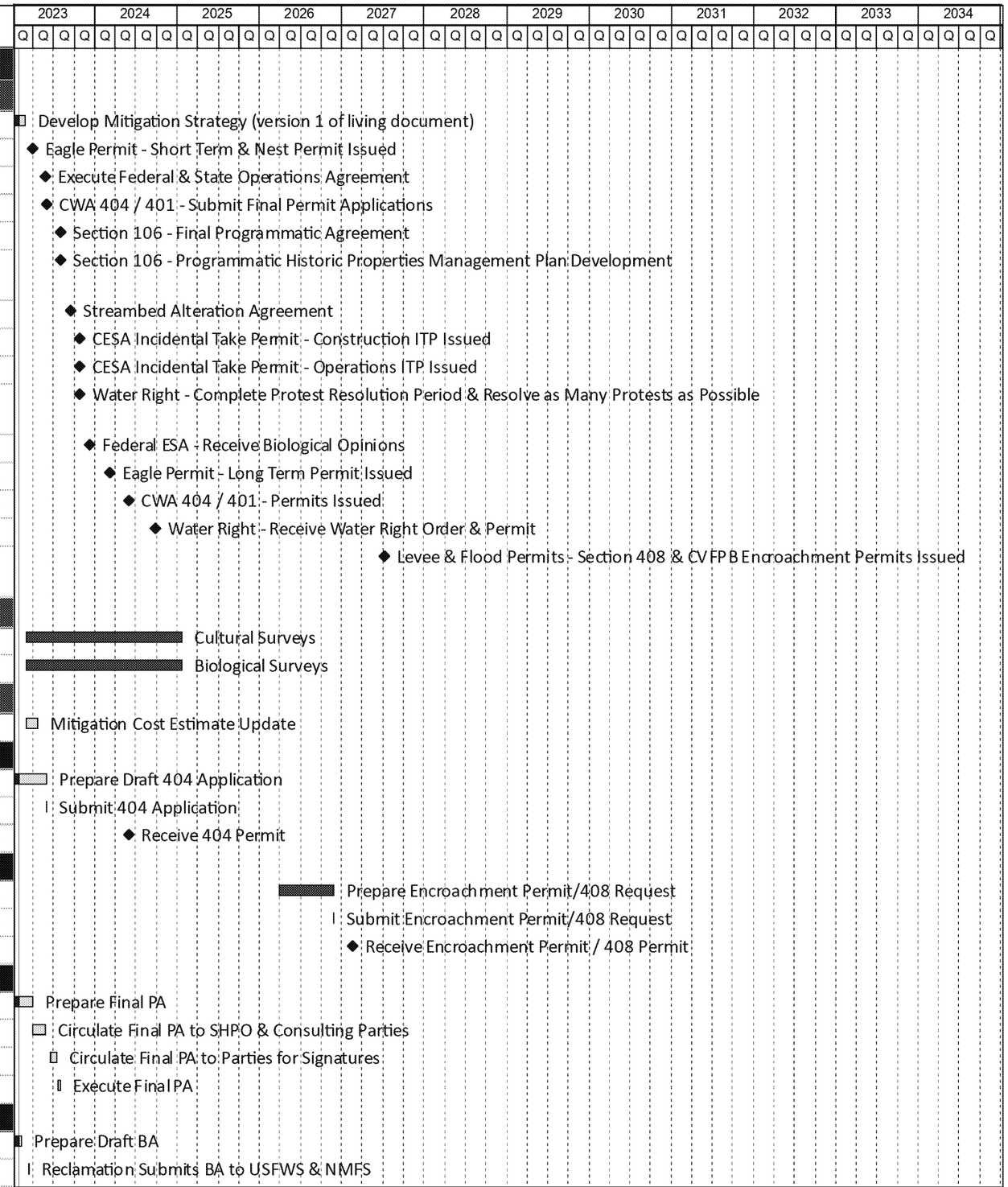
#	Activity ID	Activity Name	Duration	Start	Finish
139	**Permitting**		1136	04-Jan-21 A	08-Jul-27
140	**Key Deliverables**		1136	21-Nov-22	08-Jul-27
141	KD-1460	Develop Mitigation Strategy (version 1 of living document)	22	21-Nov-22	28-Feb-23
142	KD-1430	Eagle Permit - Short Term & Nest Permit Issued	0		30-Mar-23
143	KD-1240	Execute Federal & State Operations Agreement	0		26-May-23
144	KD-1390	CWA 404 / 401 - Submit Final Permit Applications	0		31-May-23
145	KD-1350	Section 106 - Final Programmatic Agreement	0		01-Aug-23
146	KD-1360	Section 106 - Programmatic Historic Properties Management Plan Development	0		01-Aug-23
147	KD-1420	Streambed Alteration Agreement	0		14-Sep-23
148	KD-1370	CESA Incidental Take Permit - Construction ITP Issued	0		23-Oct-23
149	KD-1380	CESA Incidental Take Permit - Operations ITP Issued	0		23-Oct-23
150	KD-1320	Water Right - Complete Protest Resolution Period & Resolve as Many Protests as Possible	0		27-Oct-23
151	KD-1340	Federal ESA - Receive Biological Opinions	0		06-Dec-23
152	KD-1440	Eagle Permit - Long Term Permit Issued	0		06-Mar-24
153	KD-1400	CWA 404 / 401 - Permits Issued	0		31-May-24
154	KD-1330	Water Right - Receive Water Right Order & Permit	0		26-Sep-24
155	KD-1410	Levee & Flood Permits - Section 408 & CVFPB Encroachment Permits Issued	0		08-Jul-27
156	**Field Surveys**		479	01-Mar-23	21-Jan-25
157	RE-1030	Cultural Surveys	479	01-Mar-23	21-Jan-25
158	RE-1040	Biological Surveys	479	01-Mar-23	21-Jan-25
159	**Federal Agency Agreements & Permits**		1037	11-Jan-21 A	19-Feb-27
160	CE-1570	Mitigation Cost Estimate Update	40	01-Mar-23	25-Apr-23
161	**Clean Water Act Section 404**		341	04-Feb-21 A	31-May-24
162	404-050	Prepare Draft 404 Application	86	04-Feb-21 A	30-May-23
163	404-120	Submit 404 Application	1	31-May-23	31-May-23
164	404-130	Receive 404 Permit	0		31-May-24
165	**US Army Corps of Engineers Rivers & Harbors Act Section 14, Section 408**		233	01-Apr-26	19-Feb-27
166	408-150	Prepare Encroachment Permit/408 Request	172	01-Apr-26	26-Nov-26
167	408-160	Submit Encroachment Permit/408 Request	1	27-Nov-26	27-Nov-26
168	408-170	Receive Encroachment Permit / 408 Permit	0		19-Feb-27
169	**Advisory Council on Historic Preservation NHPA Section 106**		130	14-Mar-22	01-Aug-23
170	106-081	Prepare Final PA	45	14-Mar-22	31-Mar-23
171	106-092	Circulate Final PA to SHPO & Consulting Parties	40	03-Apr-23	26-May-23
172	106-096	Circulate Final PA to Parties for Signatures	20	20-Jun-23	18-Jul-23
173	106-102	Execute Final PA	10	19-Jul-23	01-Aug-23
174	**USFWS & NMFS Endangered Species Act Section 7**		218	11-Jan-21 A	06-Dec-23
175	BA-200	Prepare Draft BA	10	11-Jan-21 A	10-Feb-23
176	BA-210	Reclamation Submits BA to USFWS & NMFS	1	17-Mar-23	17-Mar-23



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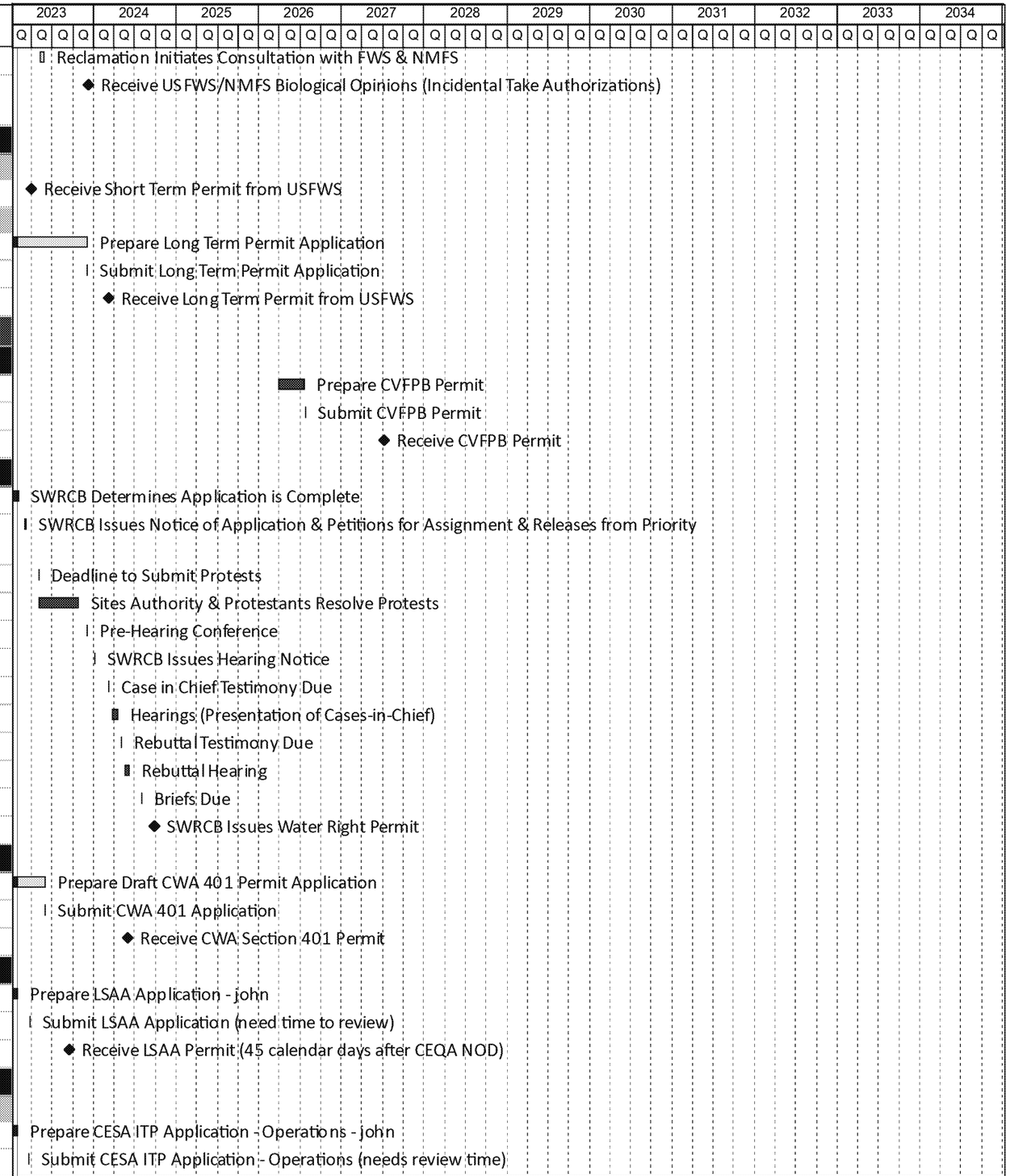
177	BA-215	Reclamation Initiates Consultation with FWS & NMFS	10	11-May-23	24-May-23
178	BA-220	Receive USFWS/NMFS Biological Opinions (Incidental Take Authorizations)	0		06-Dec-23
179	**USFWS Bald Eagle Protection Act**		280	27-Jul-22 A	06-Mar-24
180	**Short Term Permit**		0	30-Mar-23	30-Mar-23
181	USFWS-13	Receive Short Term Permit from USFWS	0		30-Mar-23
182	**Long Terrm Permit**		280	27-Jul-22 A	06-Mar-24
183	USFWS-14	Prepare Long Term Permit Application	216	27-Jul-22 A	04-Dec-23
184	USFWS-15	Submit Long Term Permit Application	1	05-Dec-23	05-Dec-23
185	USFWS-16	Receive Long Term Permit from USFWS	0		06-Mar-24
186	**State Agency Agreements & Permits**		1136	04-Jan-21 A	08-Jul-27
187	**Central Valley Flood Protection Board (CVFPB) Levee Encroachment**		332	01-Apr-26	08-Jul-27
188	CVFPB-200	Prepare CVFPB Permit	81	01-Apr-26	22-Jul-26
189	CVFPB-210	Submit CVFPB Permit	1	23-Jul-26	23-Jul-26
190	CVFPB-220	Receive CVFPB Permit	0		08-Jul-27
191	**SWRCB Water Right Permit**		423	12-May-22	26-Sep-24
192	WRP-115a	SWRCB Determines Application is Complete	4	12-May-22	02-Feb-23
193	WRP-115b	SWRCB Issues Notice of Application & Petitions for Assignment & Releases from Priority	1	06-Mar-23	06-Mar-23
194	WRP-115c	Deadline to Submit Protests	1	04-May-23	04-May-23
195	WRP-116	Sites Authority & Protestants Resolve Protests	122	05-May-23	27-Oct-23
196	WRP-117a	Pre-Hearing Conference	1	01-Dec-23	01-Dec-23
197	WRP-117b	SWRCB Issues Hearing Notice	1	04-Jan-24	04-Jan-24
198	WRP-117c	Case in Chief Testimony Due	1	07-Mar-24	07-Mar-24
199	WRP-117d	Hearings (Presentation of Cases-in-Chief)	20	22-Mar-24	18-Apr-24
200	WRP-117e	Rebuttal Testimony Due	1	03-May-24	03-May-24
201	WRP-117f	Rebuttal Hearing	10	20-May-24	03-Jun-24
202	WRP-117g	Briefs Due	1	31-Jul-24	31-Jul-24
203	WRP-120	SWRCB Issues Water Right Permit	0		26-Sep-24
204	**SWB CWA Section 401 Water Quality Certification**		341	04-Jan-21 A	31-May-24
205	401-200	Prepare Draft CWA 401 Permit Application	86	04-Jan-21 A	30-May-23
206	401-210	Submit CWA 401 Application	1	31-May-23	31-May-23
207	401-220	Receive CWA Section 401 Permit	0		31-May-24
208	**CDFW Streambed Alteration Agreements**		161	10-Jan-22 A	14-Sep-23
209	1600-200	Prepare LSAA Application - john	1	10-Jan-22 A	30-Jan-23
210	1600-210	Submit LSAA Application (need time to review)	1	24-Mar-23	24-Mar-23
211	1600-220	Receive LSAA Permit (45 calendar days after CEQA NOD)	0		14-Sep-23
212	**CDFW Incidental Take Permits**		188	11-Jan-21 A	23-Oct-23
213	**ITP - CESA (Se 2081) Operations**		188	11-Jan-21 A	23-Oct-23
214	2081-100	Prepare CESA ITP Application - Operations - john	1	11-Jan-21 A	30-Jan-23
215	2081-110	Submit CESA ITP Application - Operations (needs review time)	1	22-Mar-23	22-Mar-23



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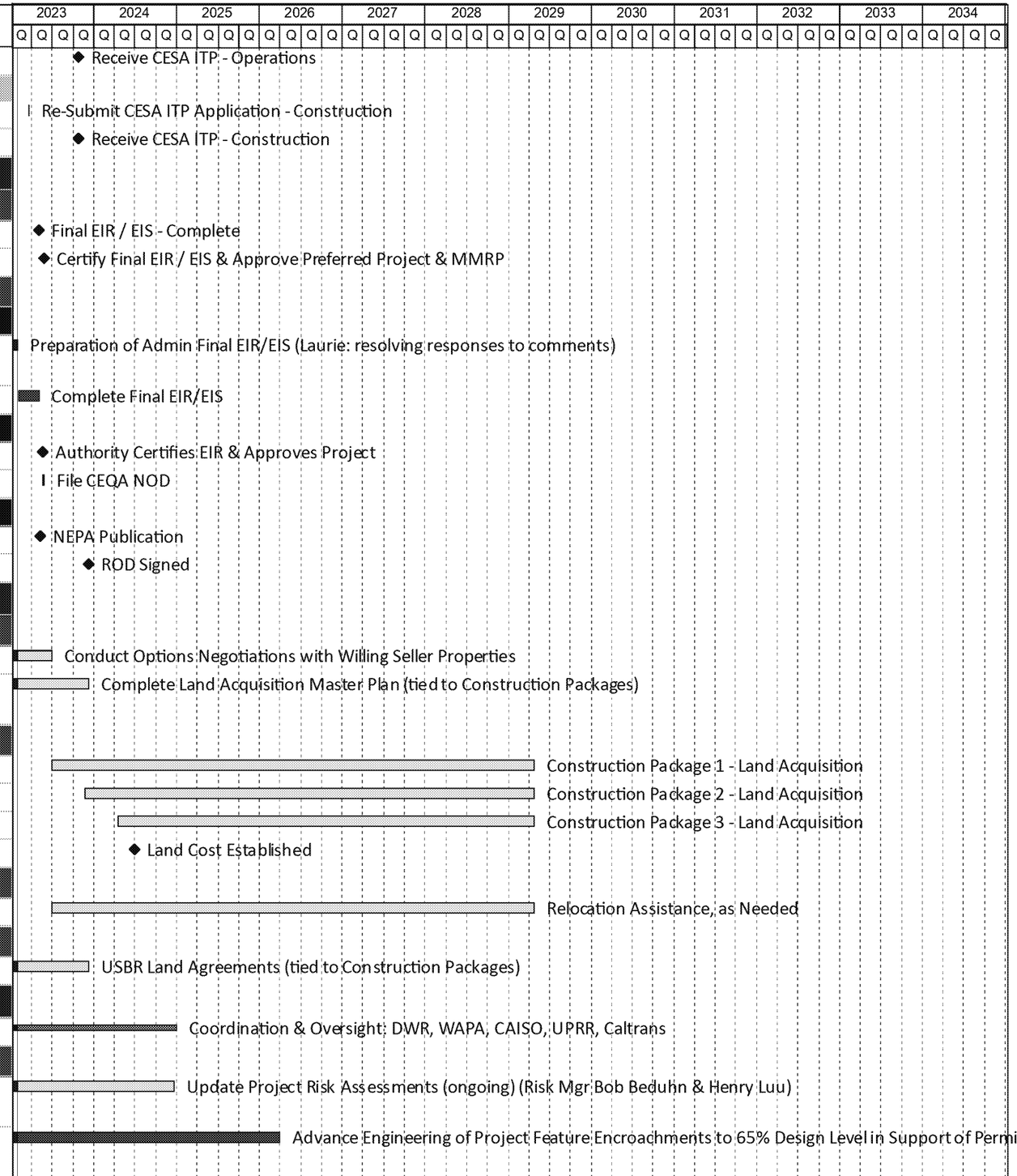
216	2081-120	Receive CESA ITP - Operations	0		23-Oct-23
217	ITP - CESA (Se 2081) Construction		151	22-Mar-23	23-Oct-23
218	2081-215	Re-Submit CESA ITP Application - Construction	1	22-Mar-23	22-Mar-23
219	2081-220	Receive CESA ITP - Construction	0		23-Oct-23
220	**Environmental**		218	03-Jan-22 A	06-Dec-23
221	**Key Deliverables**		15	05-May-23	26-May-23
222	KD-1470	Final EIR / EIS - Complete	0		05-May-23
223	KD-1480	Certify Final EIR / EIS & Approve Preferred Project & MMRP	0		26-May-23
224	**EIR/EIS**		218	03-Jan-22 A	06-Dec-23
225	**Final EIR/Final EIS**		70	03-Jan-22 A	05-May-23
226	EIR-210	Preparation of Admin Final EIR/EIS (Laurie: resolving responses to comments)	2	03-Jan-22 A	31-Jan-23
227	EIR-250	Complete Final EIR/EIS	68	01-Feb-23	05-May-23
228	**Authority Certifies EIR & Approves Project & File NOD**		5	19-May-23	26-May-23
229	EIR-370	Authority Certifies EIR & Approves Project	0		19-May-23
230	EIR-380	File CEQA NOD	5	22-May-23	26-May-23
231	**ROD**		143	12-May-23	06-Dec-23
232	EIR-440	NEPA Publication	0		12-May-23
233	EIR-450	ROD Signed	0		06-Dec-23
234	**Real Estate**		1607	02-Nov-20	27-Apr-29
235	**Key Deliverables**		218	01-Jul-22 A	06-Dec-23
236	KD-1500	Conduct Options Negotiations with Willing Seller Properties	107	01-Jul-22 A	28-Jun-23
237	KD-1490	Complete Land Acquisition Master Plan (tied to Construction Packages)	218	03-Oct-22 A	06-Dec-23
238	**Land Acquisition**		1500	29-Jun-23	27-Apr-29
239	RE-1060	Construction Package 1 - Land Acquisition	1500	29-Jun-23	27-Apr-29
240	RE-1070	Construction Package 2 - Land Acquisition	1400	20-Nov-23	27-Apr-29
241	RE-1080	Construction Package 3 - Land Acquisition	1300	15-Apr-24	27-Apr-29
242	RE-1050	Land Cost Established	0		27-Jun-24
243	**Relocation**		1500	29-Jun-23	27-Apr-29
244	RE-1100	Relocation Assistance, as Needed	1500	29-Jun-23	27-Apr-29
245	**USBR - Land Agreement**		218	02-Nov-20	06-Dec-23
246	FED-100	USBR Land Agreements (tied to Construction Packages)	218	02-Nov-20	06-Dec-23
247	**Preliminary Engineering**		804	03-Jan-22 A	31-Mar-26
248	A1180	Coordination & Oversight: DWR, WAPA, CAISO, UPRR, Caltrans	482	03-Jan-22 A	30-Dec-24
249	**Key Deliverables**		804	31-Oct-22 A	31-Mar-26
250	KD-1210	Update Project Risk Assessments (ongoing) (Risk Mgr Bob Beduhn & Henry Luu)	478	31-Oct-22 A	16-Dec-24
251	KD-1110	Advance Engineering of Project Feature Encroachments to 65% Design Level in Support of Permitting	804	01-Nov-22 A	31-Mar-26



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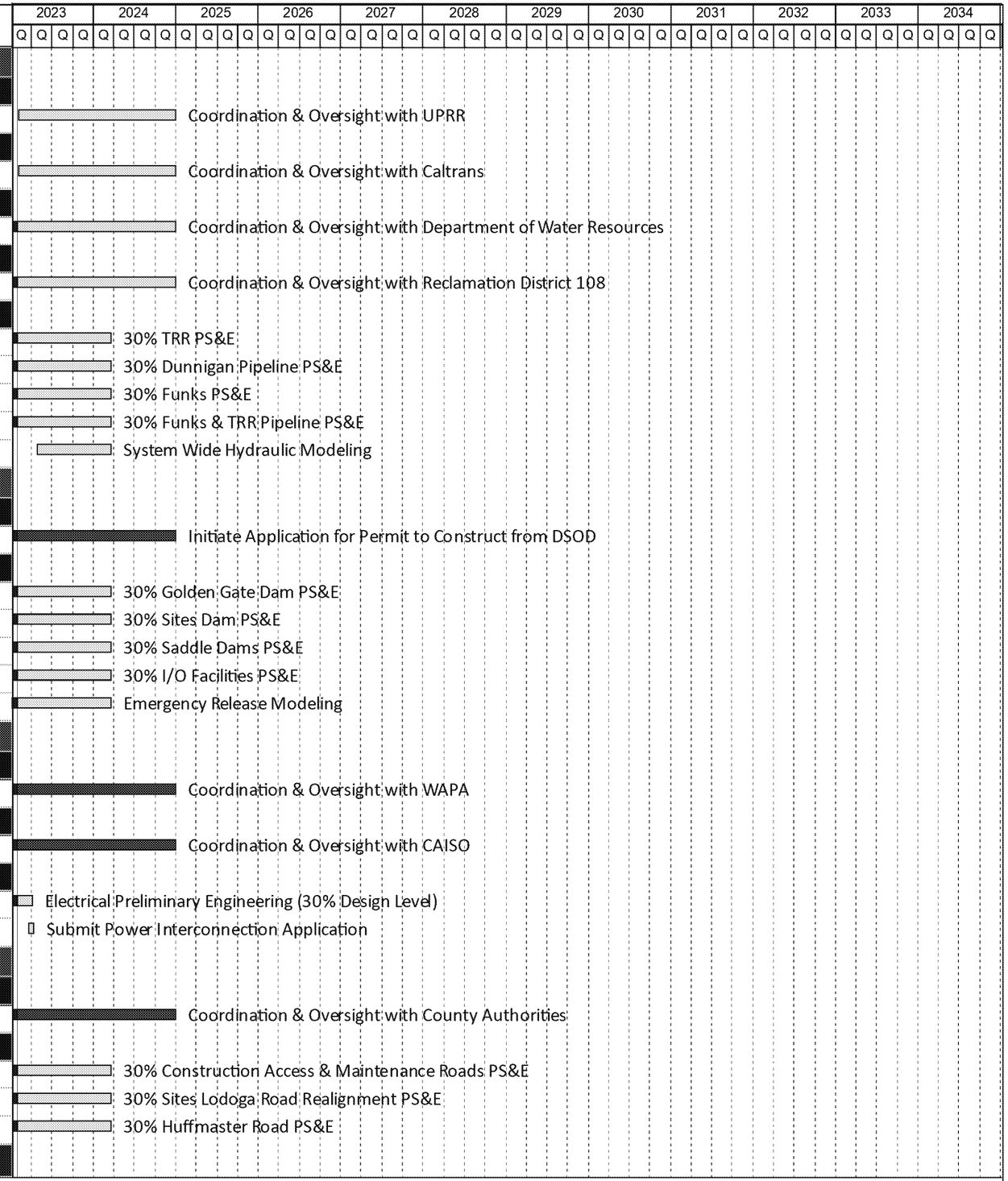
252		**Conveyance (Pipelines, Pump Stations, Canals)**	485	03-Jan-22 A	27-Dec-24
253		**UPRR Oversight & Review**	480	06-Feb-23	27-Dec-24
254	A1110	Coordination & Oversight with UPRR	480	06-Feb-23	27-Dec-24
255		**Caltrans Oversight & Review**	480	06-Feb-23	27-Dec-24
256	A1120	Coordination & Oversight with Caltrans	480	06-Feb-23	27-Dec-24
257		**DWR Operations Oversight & Review (KLOG)**	485	03-Jan-22 A	27-Dec-24
258	A1130	Coordination & Oversight with Department of Water Resources	485	03-Jan-22 A	27-Dec-24
259		**RD 108 Oversight & Review**	485	03-Jan-22 A	27-Dec-24
260	A1140	Coordination & Oversight with Reclamation District 108	485	03-Jan-22 A	27-Dec-24
261		**Design & Analyses**	290	18-Oct-22 A	20-Mar-24
262	KD-2020	30% TRR PS&E	290	18-Oct-22 A	20-Mar-24
263	KD-1630	30% Dunnigan Pipeline PS&E	290	31-Oct-22 A	20-Mar-24
264	KD-2010	30% Funks PS&E	290	31-Oct-22 A	20-Mar-24
265	KD-2030	30% Funks & TRR Pipeline PS&E	290	31-Oct-22 A	20-Mar-24
266	KD-2080	System Wide Hydraulic Modeling	225	01-May-23	20-Mar-24
267		**Reservoir (Dams, Tunnels)**	486	01-Feb-22 A	30-Dec-24
268		**DSOD Oversight & Review**	486	01-Feb-22 A	30-Dec-24
269	KD-1100	Initiate Application for Permit to Construct from DSOD	486	01-Feb-22 A	30-Dec-24
270		**Design & Analyses**	290	31-Oct-22 A	20-Mar-24
271	KD-1660	30% Golden Gate Dam PS&E	290	31-Oct-22 A	20-Mar-24
272	KD-2040	30% Sites Dam PS&E	290	31-Oct-22 A	20-Mar-24
273	KD-2050	30% Saddle Dams PS&E	290	31-Oct-22 A	20-Mar-24
274	KD-2060	30% I/O Facilities PS&E	290	31-Oct-22 A	20-Mar-24
275	KD-2070	Emergency Release Modeling	290	05-Jan-23 A	20-Mar-24
276		**Electrical (Substation, Switchyard, Transmission Line)**	486	03-Jan-22 A	30-Dec-24
277		**WAPA Oversight & Review**	486	03-Jan-22 A	30-Dec-24
278	A1150	Coordination & Oversight with WAPA	486	03-Jan-22 A	30-Dec-24
279		**CAISO Oversight & Review**	486	03-Jan-22 A	30-Dec-24
280	A1160	Coordination & Oversight with CAISO	486	03-Jan-22 A	30-Dec-24
281		**Design & Analyses**	55	31-Oct-22 A	14-Apr-23
282	KD-1640	Electrical Preliminary Engineering (30% Design Level)	46	31-Oct-22 A	03-Apr-23
283	KD-1200	Submit Power Interconnection Application	20	20-Mar-23	14-Apr-23
284		**Roads & Bridges**	486	03-Jan-22 A	30-Dec-24
285		**County Oversight & Review**	486	03-Jan-22 A	30-Dec-24
286	A1170	Coordination & Oversight with County Authorities	486	03-Jan-22 A	30-Dec-24
287		**Design & Analyses**	290	31-Oct-22 A	20-Mar-24
288	KD-1650	30% Construction Access & Maintenance Roads PS&E	290	31-Oct-22 A	20-Mar-24
289	KD-2090	30% Sites Lodoga Road Realignment PS&E	290	31-Oct-22 A	20-Mar-24
290	KD-2100	30% Huffmaster Road PS&E	290	31-Oct-22 A	20-Mar-24
291		**Mitigation Implementation**	500	29-Jun-23	19-Jun-25



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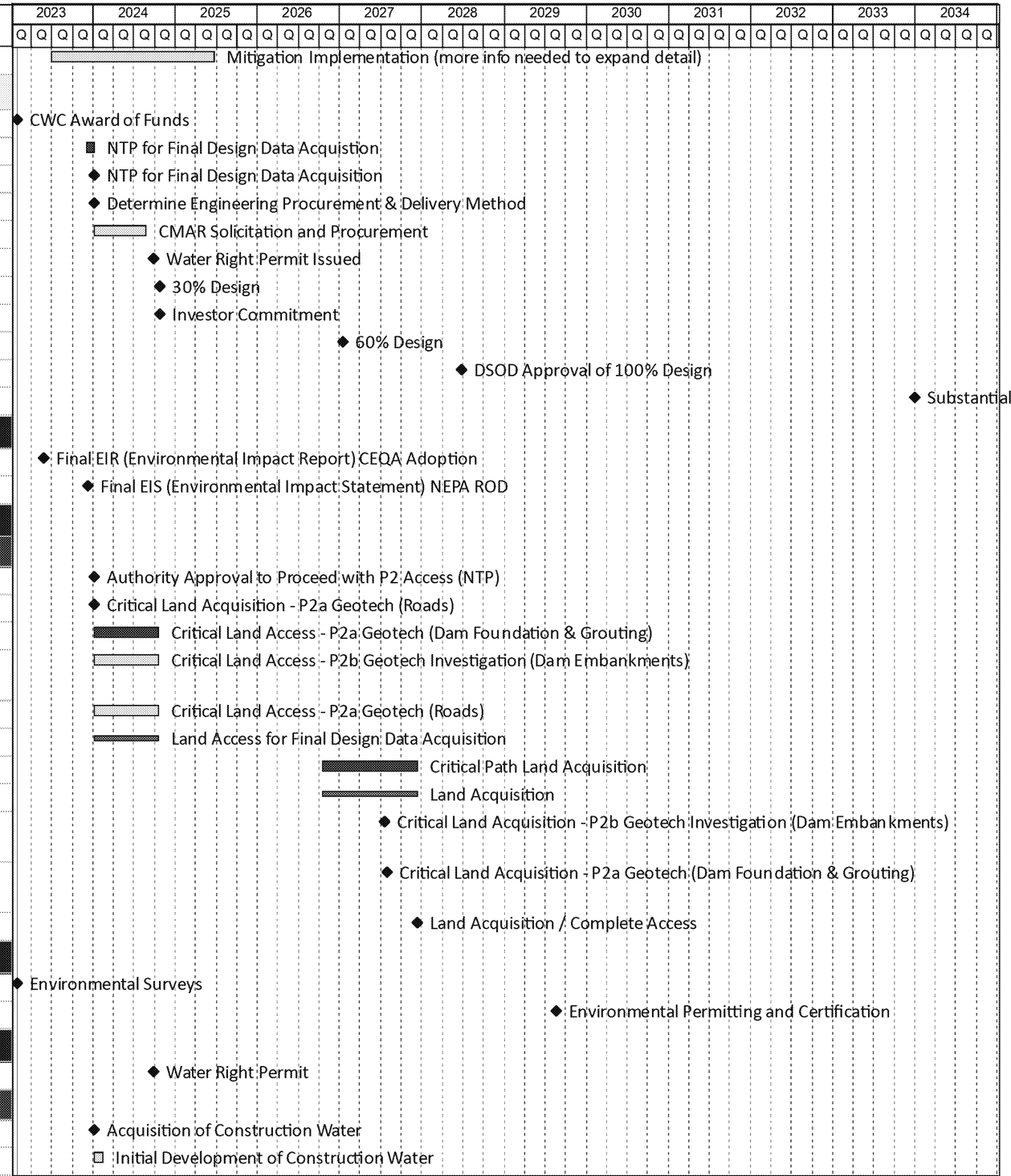
#	Activity ID	Activity Name	Duration	Start	Finish
292	MI-1100	Mitigation Implementation (more info needed to expand detail)	500	29-Jun-23	19-Jun-25
293	**Sites Reservoir Construction Package**		2917	30-Jan-23	05-May-34
294	5	CWC Award of Funds	0	30-Jan-23	
295	6	NTP for Final Design Data Acquistion	23	01-Dec-23*	05-Jan-24
296	26	NTP for Final Design Data Acquisition	0		05-Jan-24
297	7	Determine Engineering Procurement & Delivery Method	0	08-Jan-24	
298	8	CMAR Solicitation and Procurement	160	08-Jan-24	20-Aug-24
299	5a	Water Right Permit Issued	0		26-Sep-24
300	85	30% Design	0		23-Oct-24
301	5b	Investor Commitment	0		24-Oct-24
302	89d	60% Design	0		15-Jan-27
303	89c	DSOD Approval of 100% Design	0		23-Jun-28
304	88	Substantial Completion	0		30-Dec-33
305	**Final EIR / EIS**		133	26-May-23	06-Dec-23
306	3	Final EIR (Environmental Impact Report) CEQA Adoption	0		26-May-23
307	4	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
308	**Real Estate**		1010	08-Jan-24	13-Dec-27
309	**Land Access and Acquisition**		1010	08-Jan-24	13-Dec-27
310	12	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
311	15	Critical Land Acquisition - P2a Geotech (Roads)	0	08-Jan-24	
312	16	Critical Land Access - P2a Geotech (Dam Foundation & Grouting)	200	08-Jan-24	16-Oct-24
313	17	Critical Land Access - P2b Geotech Investigation (Dam Embankments)	200	08-Jan-24	16-Oct-24
314	18	Critical Land Access - P2a Geotech (Roads)	200	08-Jan-24	16-Oct-24
315	12a	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
316	19	Critical Path Land Acquisition	300	19-Oct-26	10-Dec-27
317	12b	Land Acquisition	300	19-Oct-26	10-Dec-27
318	14	Critical Land Acquisition - P2b Geotech Investigation (Dam Embankments)	0	19-Jul-27	
319	13	Critical Land Acquisition - P2a Geotech (Dam Foundation & Grouting)	0	02-Aug-27	
320	20	Land Acquisition / Complete Access	0	13-Dec-27	
321	**Environmental**		1687	30-Jan-23	20-Aug-29
322	22	Environmental Surveys	0	30-Jan-23	
323	23	Environmental Permitting and Certification	0	20-Aug-29	
324	**Water**		186	08-Jan-24	26-Sep-24
325	25	Water Right Permit	0		26-Sep-24
326	**Construction Water**		30	08-Jan-24	16-Feb-24
327	27	Acquisition of Construction Water	0	08-Jan-24*	
328	28	Initial Development of Construction Water	30	08-Jan-24	16-Feb-24



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329	**Sites Reservoir Permitting, Mitigation and Cultural Work**		1394	20-Apr-26	21-Aug-31
330	32a	Permitting (Biological/Cultural/Mitigation)	1394	20-Apr-26	21-Aug-31
331	**Permitting**		890	20-Apr-26	14-Sep-29
332	**Baseline Surveys and Revised ESA Consultation**		890	20-Apr-26	14-Sep-29
333	32	Access Granted for Biological Surveys	0	20-Apr-26	
334	36	Land Cover Verification/Aquatic Delineation #1	15	20-Apr-26*	08-May-26
335	33	Plant Survey 1	15	29-Apr-26*	19-May-26
336	32.a	Plant Survey & Land Cover	158	29-Apr-26	04-Dec-26
337	37	Land Cover Verification/Aquatic Delineation #2	15	01-Jun-26	19-Jun-26
338	34	Plant Survey 2	15	17-Jun-26	07-Jul-26
339	38	Land Cover Verification/Aquatic Delineation and Report	45	13-Jul-26	11-Sep-26
340	35	Plant Survey 3 and Report	45	05-Aug-26	06-Oct-26
341	39	Revise Impact Acres and Work with Agencies	60	14-Sep-26	04-Dec-26
342	52	Vernal Pool Wet Season Survey 1	10	03-Dec-26*	16-Dec-26
343	59	CRLF Surveys and Report	200	04-Jan-27*	08-Oct-27
344	53	Vernal Pool Wet Season Survey 2	10	07-Jan-27	20-Jan-27
345	54	Vernal Pool Wet Season Survey 3	10	11-Feb-27	24-Feb-27
346	55	Vernal Pool Wet Season Survey 4 (more may be needed) and Report	60	18-Mar-27	09-Jun-27
347	45	SWHA #1 and TCBB #1	5	01-Mar-28*	07-Mar-28
348	39.9	Species Protocol Surveys; USFWS & CDFW Acceptance	358	01-Mar-28	13-Jul-29
349	46	SWHA #2 and TCBB #2	5	29-Mar-28	04-Apr-28
350	40	BUOW #1 (Burrowing Owls Study)	5	03-Apr-28*	07-Apr-28
351	47	SWHA #3 and TCBB #3	5	26-Apr-28	02-May-28
352	41	BUOW #2	5	01-May-28	05-May-28
353	56	VELB Survey and Report	30	01-May-28*	09-Jun-28
354	60	Bumble Bee Survey 1	5	01-May-28	05-May-28
355	51	TCBB Report	30	03-May-28	13-Jun-28
356	58	Bank Swallow Survey and Report	30	03-May-28	13-Jun-28
357	61	Bumble Bee Survey 2	5	29-May-28	02-Jun-28
358	48	SWHA #4	5	31-May-28	06-Jun-28
359	42	BUOW #3	5	05-Jun-28	09-Jun-28
360	64	Badger Survey and Report	30	14-Jun-28	25-Jul-28
361	62	Bumble Bee Survey 3	5	26-Jun-28	30-Jun-28
362	49	SWHA #5	5	28-Jun-28	04-Jul-28
363	43	BUOW #4 and Report	30	10-Jul-28	18-Aug-28
364	50	SWHA #6 and Report	30	14-Jul-28	24-Aug-28
365	63	Bumble Bee Survey 4 and Report	45	24-Jul-28	22-Sep-28
366	65	Bat Survey (Roosts)	10	26-Jul-28	08-Aug-28
367	66	Bat Roosts Removal	10	09-Aug-28	22-Aug-28

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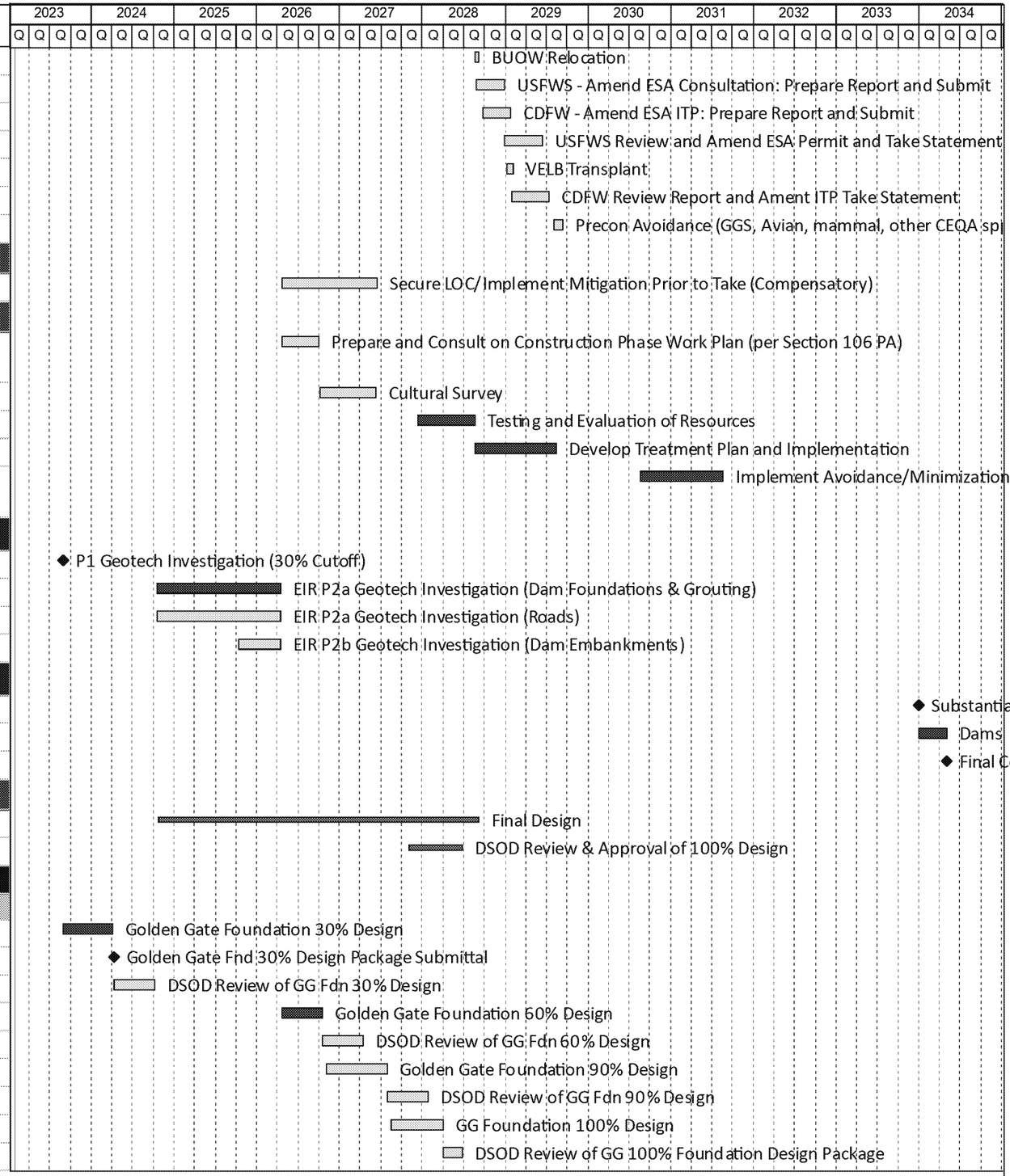
368	44	BUOW Relocation	15	21-Aug-28*	08-Sep-28
369	67	USFWS - Amend ESA Consultation: Prepare Report and Submit	90	25-Aug-28	28-Dec-28
370	69	CDFW - Amend ESA ITP: Prepare Report and Submit	90	25-Sep-28	26-Jan-29
371	68	USFWS Review and Amend ESA Permit and Take Statement	120	29-Dec-28	14-Jun-29
372	57	VELB Transplant	20	08-Jan-29	02-Feb-29
373	70	CDFW Review Report and Ament ITP Take Statement	120	29-Jan-29	13-Jul-29
374	71	Precon Avoidance (GGS, Avian, mammal, other CEQA spp)	30	06-Aug-29	14-Sep-29
375	**Compensatory Mitigation**		305	20-Apr-26	18-Jun-27
376	73	Secure LOC/Implement Mitigation Prior to Take (Compensatory)	305	20-Apr-26	18-Jun-27
377	**Cultural Work**		1394	20-Apr-26	21-Aug-31
378	75	Prepare and Consult on Construction Phase Work Plan (per Section 106 PA)	120	20-Apr-26	02-Oct-26
379	76	Cultural Survey	180	05-Oct-26	11-Jun-27
380	77	Testing and Evaluation of Resources	180	13-Dec-27	18-Aug-28
381	78	Develop Treatment Plan and Implementation	260	21-Aug-28	17-Aug-29
382	79	Implement Avoidance/Minimization Activities During Construction	260	23-Aug-30	21-Aug-31
383	**P1 / P2 Geotech Investigations**		666	31-Aug-23	17-Apr-26
384	81	P1 Geotech Investigation (30% Cutoff)	0	31-Aug-23*	
385	82	EIR P2a Geotech Investigation (Dam Foundations & Grouting)	380	17-Oct-24	17-Apr-26
386	83	EIR P2a Geotech Investigation (Roads)	380	17-Oct-24*	17-Apr-26
387	84	EIR P2b Geotech Investigation (Dam Embankments)	130	14-Oct-25*	17-Apr-26
388	**Reservoir Facilities**		2766	31-Aug-23	05-May-34
389	342	Substantial Completion - Dams Ready for Commissioning	0		30-Dec-33
390	343	Dams Startup and Commissioning	90	02-Jan-34	05-May-34
391	344	Final Completion	0		05-May-34*
392	**Engineering - Dams**		1371	31-Aug-23	01-Jan-29
393	89a	Final Design	1000	24-Oct-24	08-Sep-28
394	89b	DSOD Review & Approval of 100% Design	170	01-Nov-27	23-Jun-28
395	**Golden Gate Dam Design**		1236	31-Aug-23	26-Jun-28
396	**Golden Gate Foundation Design**		1236	31-Aug-23	26-Jun-28
397	89	Golden Gate Foundation 30% Design	151	31-Aug-23	05-Apr-24*
398	90	Golden Gate Fnd 30% Design Package Submittal	0	08-Apr-24	
399	91	DSOD Review of GG Fdn 30% Design	130	08-Apr-24	09-Oct-24
400	92	Golden Gate Foundation 60% Design	130	20-Apr-26	16-Oct-26
401	93	DSOD Review of GG Fdn 60% Design	130	19-Oct-26	16-Apr-27
402	94	Golden Gate Foundation 90% Design	195	02-Nov-26	30-Jul-27
403	95	DSOD Review of GG Fdn 90% Design	130	02-Aug-27	28-Jan-28
404	96	GG Foundation 100% Design	165	16-Aug-27	31-Mar-28
405	97	DSOD Review of GG 100% Foundation Design Package	60	03-Apr-28	23-Jun-28



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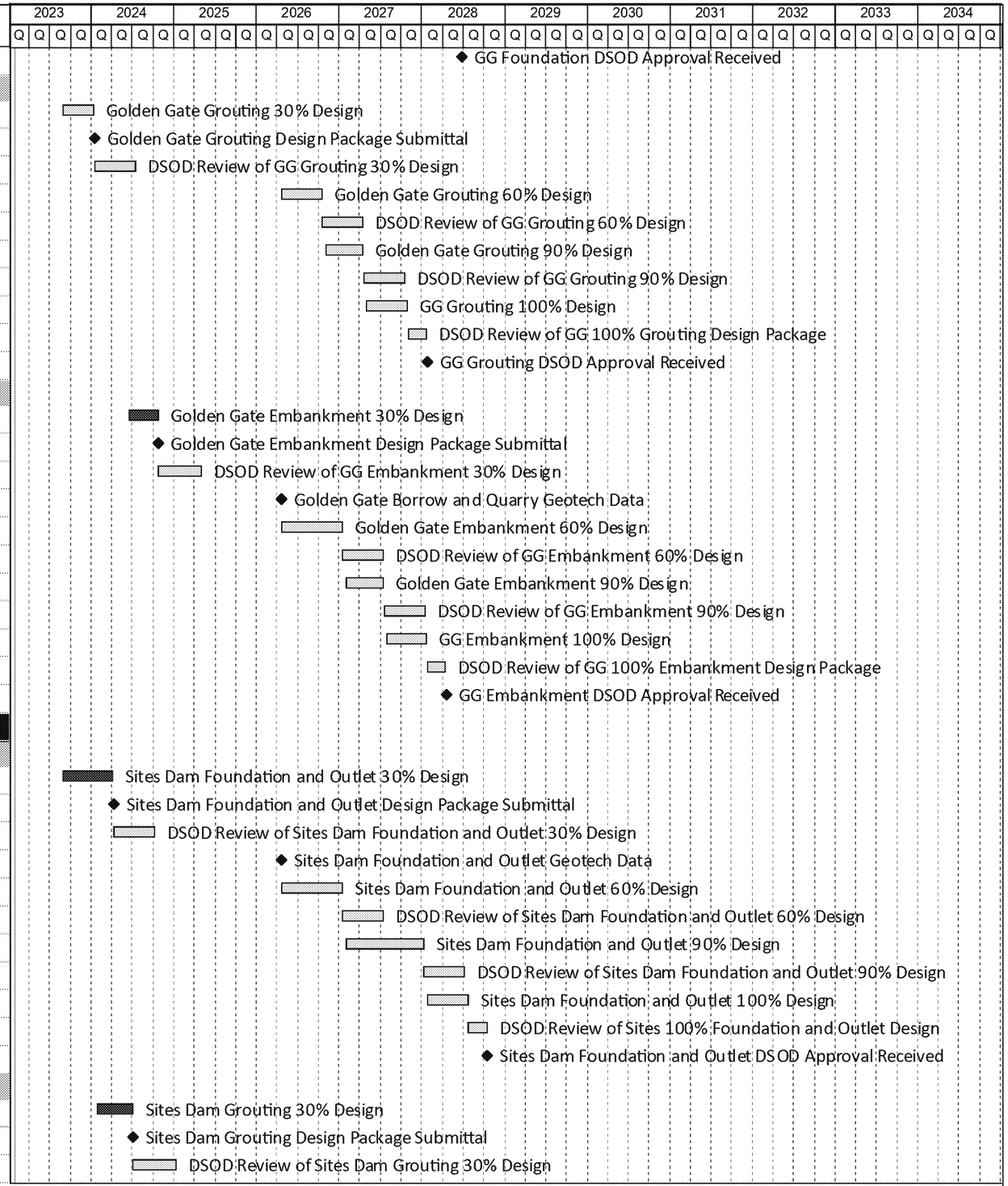
406	98	GG Foundation DSOD Approval Received	0	26-Jun-28	
407	**Golden Gate Grouting Design**		1126	31-Aug-23	24-Jan-28
408	100	Golden Gate Grouting 30% Design	91	31-Aug-23	12-Jan-24*
409	101	Golden Gate Grouting Design Package Submittal	0	15-Jan-24	
410	102	DSOD Review of GG Grouting 30% Design	130	15-Jan-24	16-Jul-24
411	103	Golden Gate Grouting 60% Design	130	20-Apr-26	16-Oct-26
412	104	DSOD Review of GG Grouting 60% Design	130	19-Oct-26	16-Apr-27
413	105	Golden Gate Grouting 90% Design	120	02-Nov-26	16-Apr-27
414	106	DSOD Review of GG Grouting 90% Design	130	19-Apr-27	15-Oct-27
415	107	GG Grouting 100% Design	130	03-May-27	29-Oct-27
416	108	DSOD Review of GG 100% Grouting Design Package	60	01-Nov-27	21-Jan-28
417	109	GG Grouting DSOD Approval Received	0	24-Jan-28	
418	**Golden Gate Embankment Design**		986	17-Jun-24	17-Apr-28
419	111	Golden Gate Embankment 30% Design	91	17-Jun-24	23-Oct-24*
420	112	Golden Gate Embankment Design Package Submittal	0	24-Oct-24	
421	113	DSOD Review of GG Embankment 30% Design	130	24-Oct-24	30-Apr-25
422	114	Golden Gate Borrow and Quarry Geotech Data	0	20-Apr-26	
423	115	Golden Gate Embankment 60% Design	195	20-Apr-26	15-Jan-27
424	116	DSOD Review of GG Embankment 60% Design	130	18-Jan-27	16-Jul-27
425	117	Golden Gate Embankment 90% Design	120	01-Feb-27	16-Jul-27
426	118	DSOD Review of GG Embankment 90% Design	130	19-Jul-27	14-Jan-28
427	119	GG Embankment 100% Design	125	02-Aug-27	21-Jan-28
428	120	DSOD Review of GG 100% Embankment Design Package	60	24-Jan-28	14-Apr-28
429	121	GG Embankment DSOD Approval Received	0	17-Apr-28	
430	**Sites Dam Design**		1371	31-Aug-23	01-Jan-29
431	**Sites Dam Foundation and Outlet Design**		1316	31-Aug-23	16-Oct-28
432	124	Sites Dam Foundation and Outlet 30% Design	151	31-Aug-23	05-Apr-24*
433	125	Sites Dam Foundation and Outlet Design Package Submittal	0	08-Apr-24	
434	126	DSOD Review of Sites Dam Foundation and Outlet 30% Design	130	08-Apr-24	09-Oct-24
435	127	Sites Dam Foundation and Outlet Geotech Data	0	20-Apr-26	
436	128	Sites Dam Foundation and Outlet 60% Design	195	20-Apr-26	15-Jan-27
437	129	DSOD Review of Sites Dam Foundation and Outlet 60% Design	130	18-Jan-27	16-Jul-27
438	130	Sites Dam Foundation and Outlet 90% Design	245	01-Feb-27	07-Jan-28
439	131	DSOD Review of Sites Dam Foundation and Outlet 90% Design	130	10-Jan-28	07-Jul-28
440	132	Sites Dam Foundation and Outlet 100% Design	130	24-Jan-28	21-Jul-28
441	133	DSOD Review of Sites 100% Foundation and Outlet Design	60	24-Jul-28	13-Oct-28
442	134	Sites Dam Foundation and Outlet DSOD Approval Received	0	16-Oct-28	
443	**Sites Dam Grouting Design**		1271	26-Jan-24	01-Jan-29
444	136	Sites Dam Grouting 30% Design	111	26-Jan-24	01-Jul-24*
445	137	Sites Dam Grouting Design Package Submittal	0	02-Jul-24	
446	138	DSOD Review of Sites Dam Grouting 30% Design	130	02-Jul-24	08-Jan-25



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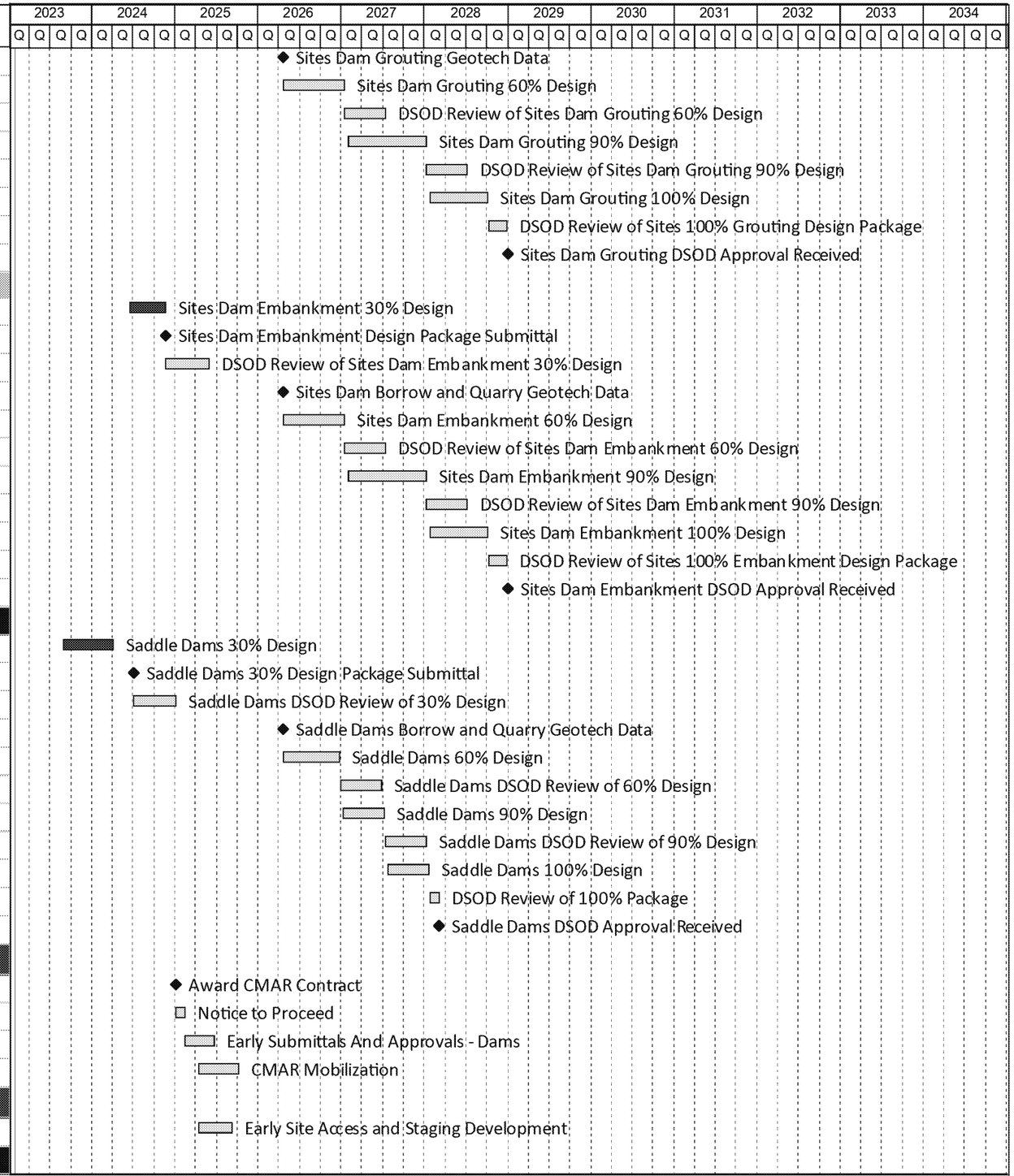
447	139	Sites Dam Grouting Geotech Data	0	20-Apr-26	
448	140	Sites Dam Grouting 60% Design	195	20-Apr-26	15-Jan-27
449	141	DSOD Review of Sites Dam Grouting 60% Design	130	18-Jan-27	16-Jul-27
450	142	Sites Dam Grouting 90% Design	245	01-Feb-27	07-Jan-28
451	143	DSOD Review of Sites Dam Grouting 90% Design	130	10-Jan-28	07-Jul-28
452	144	Sites Dam Grouting 100% Design	185	24-Jan-28	06-Oct-28
453	145	DSOD Review of Sites 100% Grouting Design Package	60	09-Oct-28	29-Dec-28
454	146	Sites Dam Grouting DSOD Approval Received	0	01-Jan-29	
455	**Sites Dam Embankment Design**		1171	17-Jun-24	01-Jan-29
456	148	Sites Dam Embankment 30% Design	111	17-Jun-24	20-Nov-24*
457	149	Sites Dam Embankment Design Package Submittal	0	21-Nov-24	
458	150	DSOD Review of Sites Dam Embankment 30% Design	130	21-Nov-24	29-May-25
459	151	Sites Dam Borrow and Quarry Geotech Data	0	20-Apr-26	
460	152	Sites Dam Embankment 60% Design	195	20-Apr-26	15-Jan-27
461	153	DSOD Review of Sites Dam Embankment 60% Design	130	18-Jan-27	16-Jul-27
462	154	Sites Dam Embankment 90% Design	245	01-Feb-27	07-Jan-28
463	155	DSOD Review of Sites Dam Embankment 90% Design	130	10-Jan-28	07-Jul-28
464	156	Sites Dam Embankment 100% Design	185	24-Jan-28	06-Oct-28
465	157	DSOD Review of Sites 100% Embankment Design Package	60	09-Oct-28	29-Dec-28
466	158	Sites Dam Embankment DSOD Approval Received	0	01-Jan-29	
467	**Saddle Dam Designs**		1156	31-Aug-23	06-Mar-28
468	160	Saddle Dams 30% Design	151	31-Aug-23	05-Apr-24*
469	161	Saddle Dams 30% Design Package Submittal	0	01-Jul-24*	
470	162	Saddle Dams DSOD Review of 30% Design	130	01-Jul-24	07-Jan-25
471	163	Saddle Dams Borrow and Quarry Geotech Data	0	20-Apr-26	
472	164	Saddle Dams 60% Design	180	20-Apr-26	25-Dec-26
473	165	Saddle Dams DSOD Review of 60% Design	130	28-Dec-26	25-Jun-27
474	166	Saddle Dams 90% Design	130	11-Jan-27	09-Jul-27
475	167	Saddle Dams DSOD Review of 90% Design	130	12-Jul-27	07-Jan-28
476	168	Saddle Dams 100% Design	130	26-Jul-27	21-Jan-28
477	169	DSOD Review of 100% Package	30	24-Jan-28	03-Mar-28
478	170	Saddle Dams DSOD Approval Received	0	06-Mar-28	
479	**CMAR Procurement**		195	02-Jan-25	06-Oct-25
480	172	Award CMAR Contract	0	02-Jan-25*	
481	173	Notice to Proceed	30	02-Jan-25	12-Feb-25
482	174	Early Submittals And Approvals - Dams	90	13-Feb-25	19-Jun-25
483	175	CMAR Mobilization	120	17-Apr-25	06-Oct-25
484	**Roads, Bridges, Access, and Site Development**		1626	11-Sep-24	20-Dec-30
485	177	Early Site Access and Staging Development	100	17-Apr-25	08-Sep-25
486	**Northern Construction Access Roads (CR68, CR 69, N. Rd)**		604	13-Dec-27	04-Apr-30



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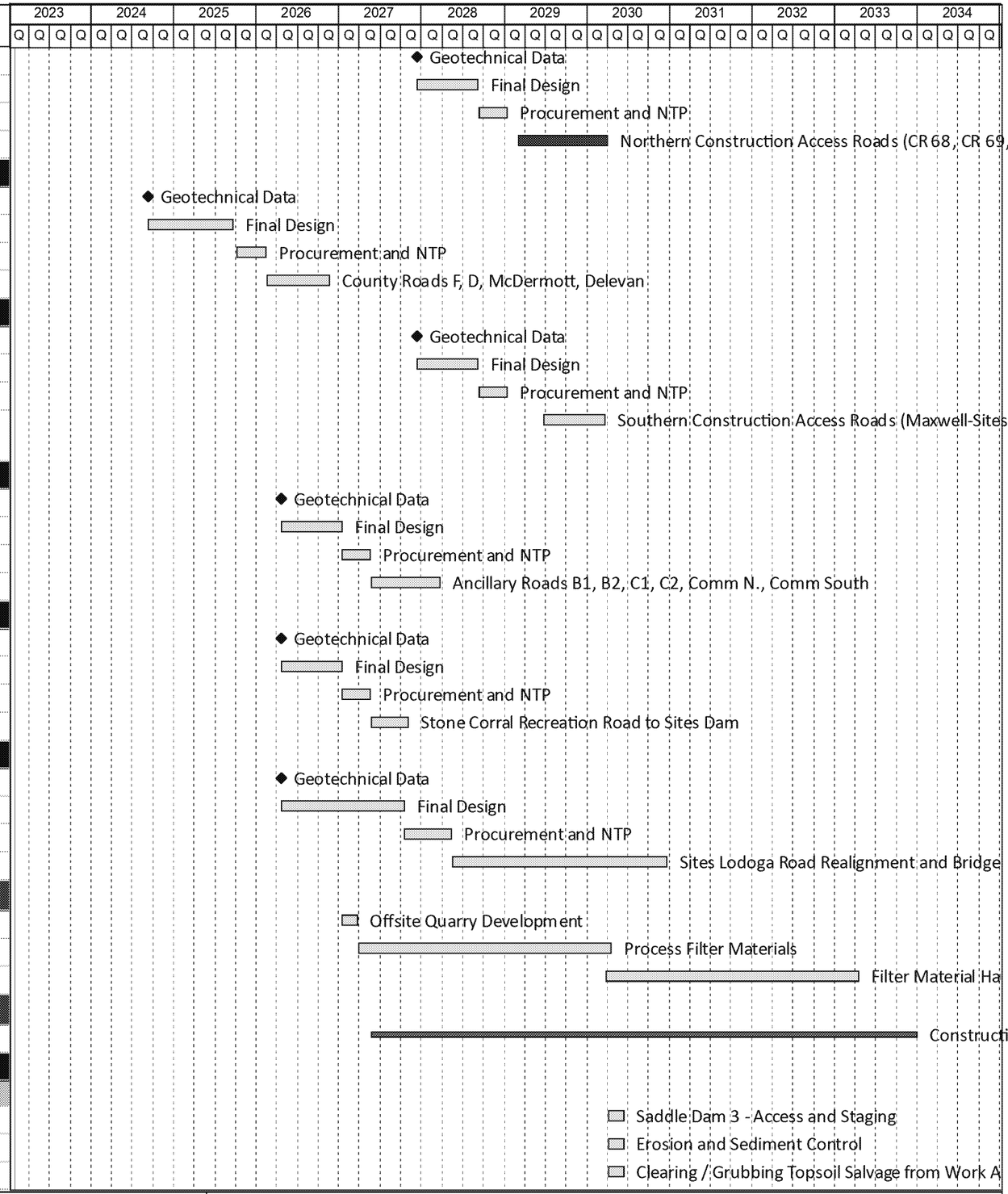
487	179	Geotechnical Data	0	13-Dec-27	
488	180	Final Design	195	13-Dec-27	08-Sep-28
489	181	Procurement and NTP	90	11-Sep-28	12-Jan-29
490	182	Northern Construction Access Roads (CR 68, CR 69, N. Rd)	284	05-Mar-29	04-Apr-30
491	**County Roads F, D, McDermott, Delevan**		561	11-Sep-24	20-Nov-26
492	184	Geotechnical Data	0	11-Sep-24	
493	185	Final Design	260	11-Sep-24	19-Sep-25
494	186	Procurement and NTP	90	07-Oct-25	13-Feb-26
495	187	County Roads F, D, McDermott, Delevan	200	16-Feb-26	20-Nov-26
496	**Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)**		595	13-Dec-27	22-Mar-30
497	189	Geotechnical Data	0	13-Dec-27	
498	190	Final Design	195	13-Dec-27	08-Sep-28
499	191	Procurement and NTP	90	11-Sep-28	12-Jan-29
500	192	Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)	195	25-Jun-29	22-Mar-30
501	**Ancillary Roads B1, B2, C1, C2, Comm N., Comm South**		505	20-Apr-26	24-Mar-28
502	194	Geotechnical Data	0	20-Apr-26	
503	195	Final Design	195	20-Apr-26	15-Jan-27
504	196	Procurement and NTP	90	18-Jan-27	21-May-27
505	197	Ancillary Roads B1, B2, C1, C2, Comm N., Comm South	220	24-May-27	24-Mar-28
506	**Stone Corral Recreation Road to Sites Dam**		405	20-Apr-26	05-Nov-27
507	199	Geotechnical Data	0	20-Apr-26	
508	200	Final Design	195	20-Apr-26	15-Jan-27
509	201	Procurement and NTP	90	18-Jan-27	21-May-27
510	202	Stone Corral Recreation Road to Sites Dam	120	24-May-27	05-Nov-27
511	**Sites Lodoga Road Realignment and Bridge**		1220	20-Apr-26	20-Dec-30
512	204	Geotechnical Data	0	20-Apr-26	
513	205	Final Design	390	20-Apr-26	15-Oct-27
514	206	Procurement and NTP	150	18-Oct-27	12-May-28
515	207	Sites Lodoga Road Realignment and Bridge	680	15-May-28	20-Dec-30
516	**Process and Haul Filter Materials to Project**		1630	18-Jan-27	15-Apr-33
517	209	Offsite Quarry Development	50	18-Jan-27	26-Mar-27
518	210	Process Filter Materials	800	29-Mar-27	19-Apr-30
519	211	Filter Material Haul to Stockpile	800	25-Mar-30	15-Apr-33
520	**Saddle Dams Construction**		2165	09-Sep-25	30-Dec-33
521	215a	Construction	1725	24-May-27	30-Dec-33
522	**Saddle Dam 3**		535	05-Apr-30	22-Apr-32
523	**Saddle Dam 3 Foundation Excavation**		180	05-Apr-30	12-Dec-30
524	215	Saddle Dam 3 - Access and Staging	50	05-Apr-30	13-Jun-30
525	216	Erosion and Sediment Control	50	05-Apr-30	13-Jun-30
526	217	Clearing / Grubbing Topsoil Salvage from Work Areas	50	05-Apr-30	13-Jun-30



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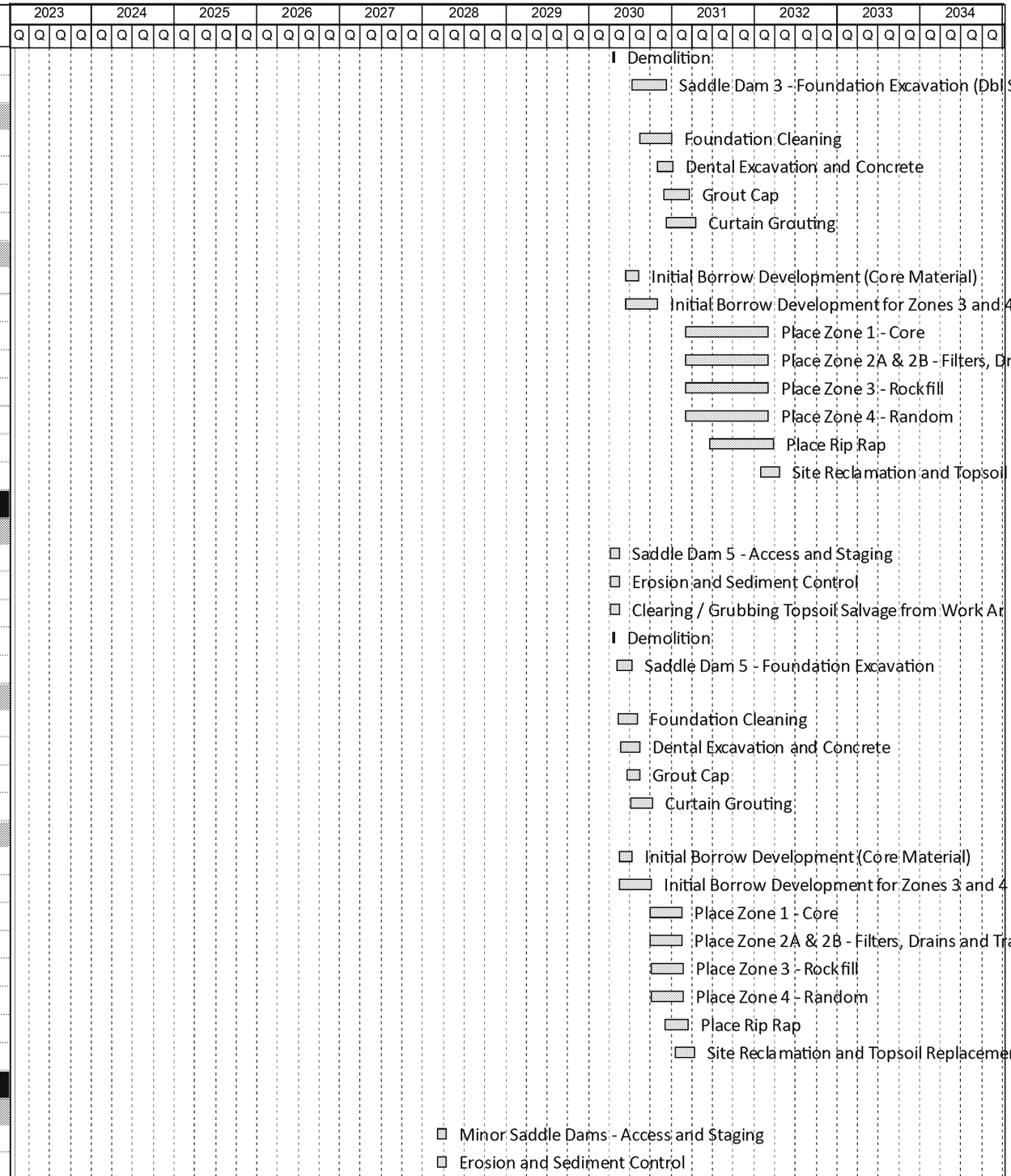
#	Activity ID	Activity Name	Duration	Start	Finish
527	218	Demolition	5	19-Apr-30	25-Apr-30
528	219	Saddle Dam 3 - Foundation Excavation (Dbl Shift)	110	12-Jul-30	12-Dec-30
529	**Saddle Dam 3 - Foundation Preparation and Grouting**		175	16-Aug-30	17-Apr-31
530	221	Foundation Cleaning	100	16-Aug-30	02-Jan-31
531	222	Dental Excavation and Concrete	50	01-Nov-30	09-Jan-31
532	223	Grout Cap	80	29-Nov-30	20-Mar-31
533	224	Curtain Grouting	90	13-Dec-30	17-Apr-31
534	**Saddle Dam 3 - Embankment**		485	14-Jun-30	22-Apr-32
535	226	Initial Borrow Development (Core Material)	40	14-Jun-30	08-Aug-30
536	227	Initial Borrow Development for Zones 3 and 4	100	14-Jun-30	31-Oct-30
537	228	Place Zone 1 - Core	260	07-Mar-31	04-Mar-32
538	229	Place Zone 2A & 2B - Filters, Drains and Transitions	260	07-Mar-31	04-Mar-32
539	230	Place Zone 3 - Rockfill	260	07-Mar-31	04-Mar-32
540	231	Place Zone 4 - Random	260	07-Mar-31	04-Mar-32
541	232	Place Rip Rap	200	20-Jun-31	25-Mar-32
542	233	Site Reclamation and Topsoil Replacement	60	30-Jan-32	22-Apr-32
543	**Saddle Dam 5**		265	05-Apr-30	10-Apr-31
544	**Saddle Dam 5 - Foundation Excavation**		70	05-Apr-30	11-Jul-30
545	236	Saddle Dam 5 - Access and Staging	30	05-Apr-30	16-May-30
546	237	Erosion and Sediment Control	30	05-Apr-30	16-May-30
547	238	Clearing / Grubbing Topsoil Salvage from Work Areas	30	05-Apr-30	16-May-30
548	239	Demolition	5	19-Apr-30	25-Apr-30
549	240	Saddle Dam 5 - Foundation Excavation	50	03-May-30	11-Jul-30
550	**Saddle Dam 5 - Foundation Preparation and Grouting**		110	10-May-30	10-Oct-30
551	242	Foundation Cleaning	60	10-May-30	01-Aug-30
552	243	Dental Excavation and Concrete	60	24-May-30	15-Aug-30
553	244	Grout Cap	40	21-Jun-30	15-Aug-30
554	245	Curtain Grouting	70	05-Jul-30	10-Oct-30
555	**Saddle Dam 5 - Embankment**		235	17-May-30	10-Apr-31
556	247	Initial Borrow Development (Core Material)	40	17-May-30	11-Jul-30
557	248	Initial Borrow Development for Zones 3 and 4	100	17-May-30	03-Oct-30
558	249	Place Zone 1 - Core	100	27-Sep-30	13-Feb-31
559	250	Place Zone 2A & 2B - Filters, Drains and Transitions	100	27-Sep-30	13-Feb-31
560	251	Place Zone 3 - Rockfill	100	04-Oct-30	20-Feb-31
561	252	Place Zone 4 - Random	100	04-Oct-30	20-Feb-31
562	253	Place Rip Rap	70	06-Dec-30	13-Mar-31
563	254	Site Reclamation and Topsoil Replacement	60	17-Jan-31	10-Apr-31
564	**Minor Saddle Dams (SD1,SD2,SD6,SD8A, Dike 1, and Dike 2)**		749	06-Mar-28	16-Jan-31
565	**Minor Saddle Dams Foundation Excavation**		120	06-Mar-28	18-Aug-28
566	257	Minor Saddle Dams - Access and Staging	30	06-Mar-28	14-Apr-28
567	258	Erosion and Sediment Control	30	06-Mar-28	14-Apr-28



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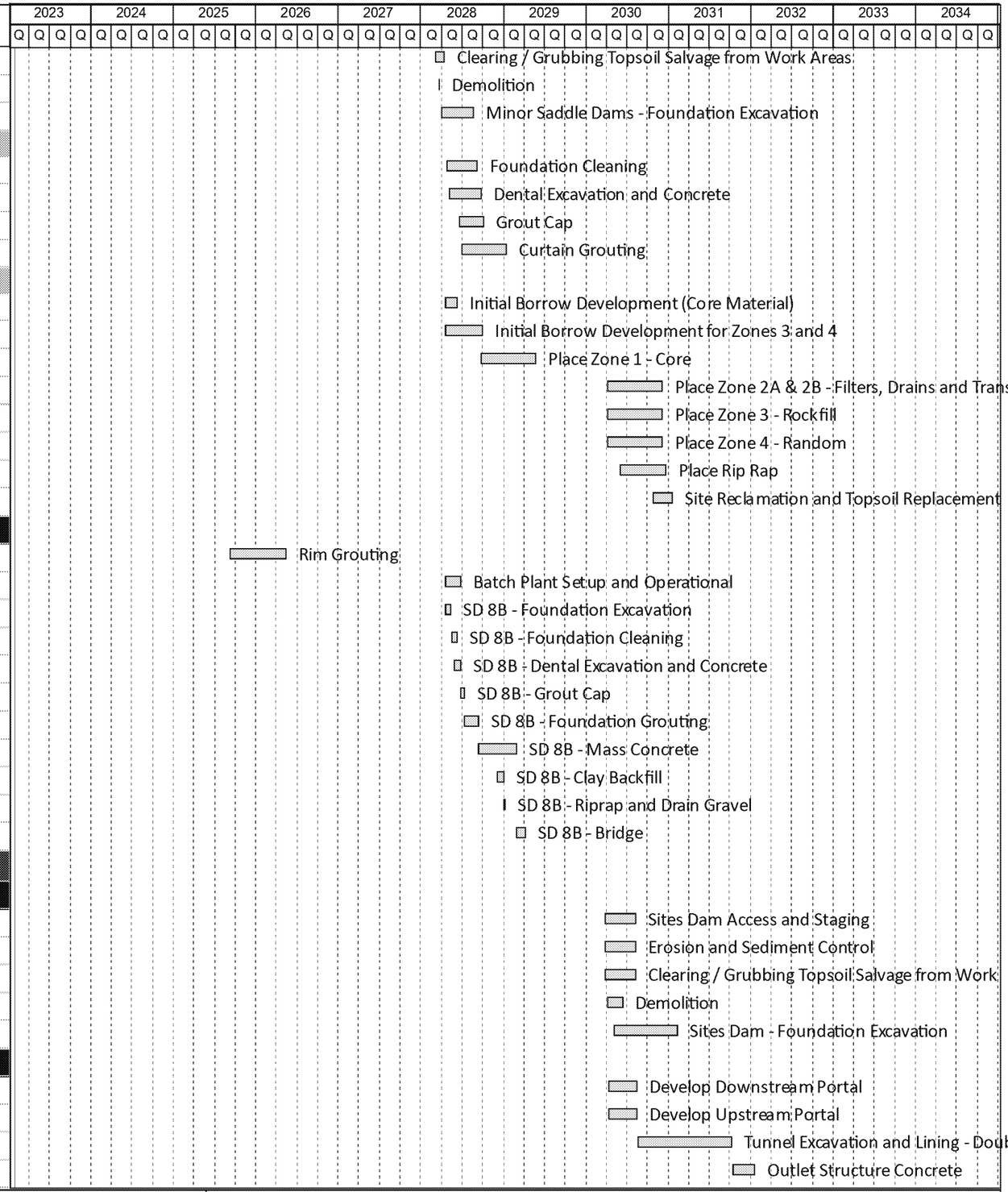
568	259	Clearing / Grubbing Topsoil Salvage from Work Areas	30	06-Mar-28	14-Apr-28
569	260	Demolition	5	20-Mar-28	24-Mar-28
570	261	Minor Saddle Dams - Foundation Excavation	100	03-Apr-28	18-Aug-28
571	**Minor Saddle Dams - Foundation Preparation and Grouting**		190	24-Apr-28	12-Jan-29
572	263	Foundation Cleaning	100	24-Apr-28	08-Sep-28
573	264	Dental Excavation and Concrete	100	08-May-28	22-Sep-28
574	265	Grout Cap	80	19-Jun-28	06-Oct-28
575	266	Curtain Grouting	140	03-Jul-28	12-Jan-29
576	**Minor Saddle Dams - Embankment**		719	17-Apr-28	16-Jan-31
577	268	Initial Borrow Development (Core Material)	40	17-Apr-28	09-Jun-28
578	269	Initial Borrow Development for Zones 3 and 4	120	17-Apr-28	29-Sep-28
579	270	Place Zone 1 - Core	175	25-Sep-28	25-May-29
580	271	Place Zone 2A & 2B - Filters, Drains and Transitions	175	05-Apr-30	05-Dec-30
581	272	Place Zone 3 - Rockfill	175	05-Apr-30	05-Dec-30
582	273	Place Zone 4 - Random	175	05-Apr-30	05-Dec-30
583	274	Place Rip Rap	145	31-May-30	19-Dec-30
584	275	Site Reclamation and Topsoil Replacement	60	25-Oct-30	16-Jan-31
585	**Saddle Dam 8B - Spillway**		932	09-Sep-25	10-Apr-29
586	287	Rim Grouting	171	09-Sep-25	11-May-26
587	277	Batch Plant Setup and Operational	50	17-Apr-28	23-Jun-28
588	278	SD 8B - Foundation Excavation	20	17-Apr-28	12-May-28
589	279	SD 8B - Foundation Cleaning	20	15-May-28	09-Jun-28
590	280	SD 8B - Dental Excavation and Concrete	20	29-May-28	23-Jun-28
591	281	SD 8B - Grout Cap	12	26-Jun-28	11-Jul-28
592	282	SD 8B - Foundation Grouting	45	12-Jul-28	12-Sep-28
593	283	SD 8B - Mass Concrete	120	13-Sep-28	27-Feb-29
594	285	SD 8B - Clay Backfill	20	06-Dec-28	02-Jan-29
595	286	SD 8B - Riprap and Drain Gravel	3	03-Jan-29	05-Jan-29
596	284	SD 8B - Bridge	30	28-Feb-29	10-Apr-29
597	**Sites Dam Construction**		585	25-Mar-30	18-Jun-32
598	**Sites Dam Foundation Excavation**		230	25-Mar-30	07-Feb-31
599	290	Sites Dam Access and Staging	100	25-Mar-30	09-Aug-30
600	291	Erosion and Sediment Control	100	25-Mar-30	09-Aug-30
601	292	Clearing / Grubbing Topsoil Salvage from Work Areas	100	25-Mar-30	09-Aug-30
602	293	Demolition	50	08-Apr-30	14-Jun-30
603	294	Sites Dam - Foundation Excavation	200	06-May-30	07-Feb-31
604	**Sites Diversion Outlet Facility**		570	15-Apr-30	18-Jun-32
605	296	Develop Downstream Portal	90	15-Apr-30	16-Aug-30
606	298	Develop Upstream Portal	90	15-Apr-30	16-Aug-30
607	297	Tunnel Excavation and Lining - Double Shift	300	19-Aug-30	10-Oct-31
608	299	Outlet Structure Concrete	70	13-Oct-31	16-Jan-32



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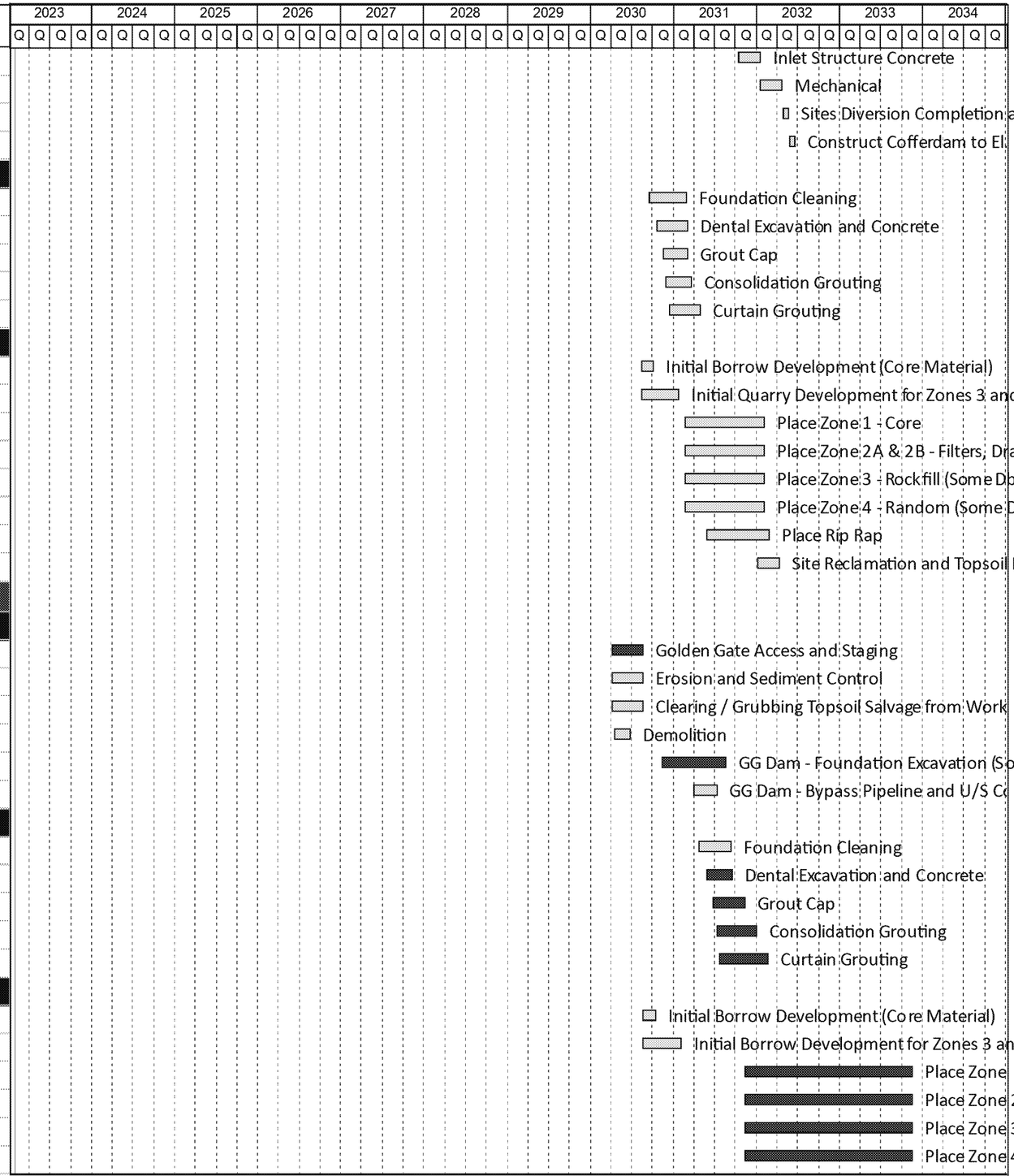
609	300	Inlet Structure Concrete	70	13-Oct-31	16-Jan-32
610	301	Mechanical	70	19-Jan-32	23-Apr-32
611	302	Sites Diversion Completion and Restoration	20	26-Apr-32	21-May-32
612	303	Construct Cofferdam to El. 310	20	24-May-32	18-Jun-32
613	**Sites Dam - Foundation Preparation and Grouting**		165	16-Sep-30	02-May-31
614	305	Foundation Cleaning	120	16-Sep-30	28-Feb-31
615	306	Dental Excavation and Concrete	100	21-Oct-30	07-Mar-31
616	307	Grout Cap	80	18-Nov-30	07-Mar-31
617	308	Consolidation Grouting	80	02-Dec-30	21-Mar-31
618	309	Curtain Grouting	100	16-Dec-30	02-May-31
619	**Sites Dam - Embankment**		435	12-Aug-30	09-Apr-32
620	311	Initial Borrow Development (Core Material)	40	12-Aug-30	04-Oct-30
621	312	Initial Quarry Development for Zones 3 and 4	120	12-Aug-30	24-Jan-31
622	313	Place Zone 1 - Core	250	24-Feb-31	06-Feb-32
623	314	Place Zone 2A & 2B - Filters, Drains and Transitions	250	24-Feb-31	06-Feb-32
624	315	Place Zone 3 - Rockfill (Some Dbl Shift)	250	24-Feb-31	06-Feb-32
625	316	Place Zone 4 - Random (Some Dbl Shift)	250	24-Feb-31	06-Feb-32
626	317	Place Rip Rap	200	26-May-31	27-Feb-32
627	318	Site Reclamation and Topsoil Replacement	70	05-Jan-32	09-Apr-32
628	**Golden Gate Dam Construction**		976	05-Apr-30	30-Dec-33
629	**GG Dam Foundation Excavation**		360	05-Apr-30	21-Aug-31
630	321	Golden Gate Access and Staging	100	05-Apr-30	22-Aug-30
631	322	Erosion and Sediment Control	100	05-Apr-30	22-Aug-30
632	323	Clearing / Grubbing Topsoil Salvage from Work Areas	100	05-Apr-30	22-Aug-30
633	324	Demolition	50	19-Apr-30	27-Jun-30
634	325	GG Dam - Foundation Excavation (Some Dbl Shift)	200	15-Nov-30	21-Aug-31
635	326	GG Dam - Bypass Pipeline and U/S Cofferdam	70	04-Apr-31	10-Jul-31
636	**GG Dam - Foundation Preparation and Grouting**		215	25-Apr-31	19-Feb-32
637	328	Foundation Cleaning	100	25-Apr-31	11-Sep-31
638	329	Dental Excavation and Concrete	80	30-May-31	18-Sep-31
639	330	Grout Cap	100	27-Jun-31	13-Nov-31
640	331	Consolidation Grouting	125	11-Jul-31	01-Jan-32
641	332	Curtain Grouting	150	25-Jul-31	19-Feb-32
642	**GG Dam - Embankment**		876	23-Aug-30	30-Dec-33
643	334	Initial Borrow Development (Core Material)	40	23-Aug-30	17-Oct-30
644	335	Initial Borrow Development for Zones 3 and 4	120	23-Aug-30	06-Feb-31
645	336	Place Zone 1 - Core	525	14-Nov-31	17-Nov-33
646	337	Place Zone 2A & 2B - Filters, Drains and Transitions	525	14-Nov-31	17-Nov-33
647	338	Place Zone 3 - Rockfill (Some Dbl Shift)	525	14-Nov-31	17-Nov-33
648	339	Place Zone 4 - Random (Some Dbl Shift)	525	14-Nov-31	17-Nov-33



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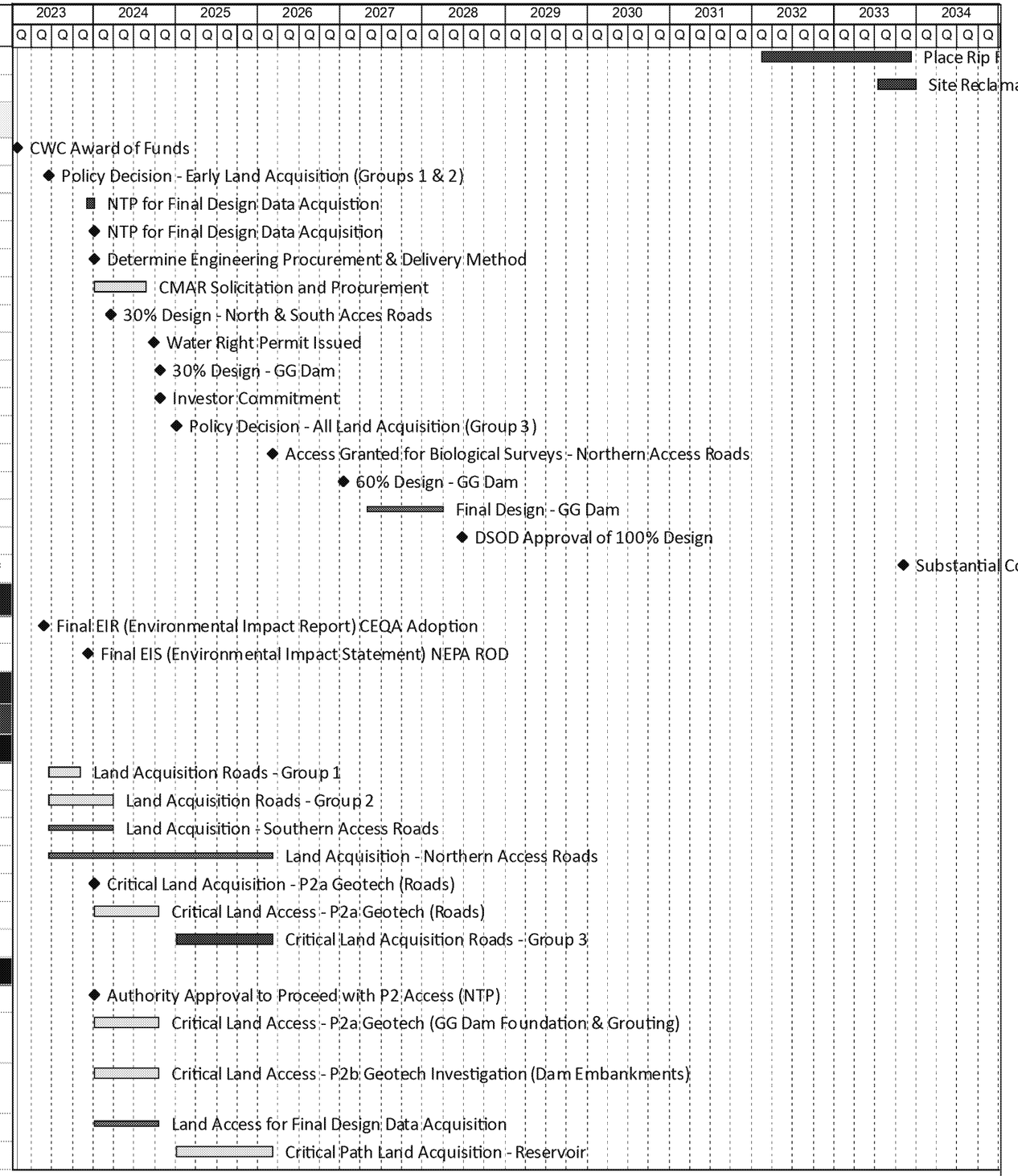
649	340	Place Rip Rap	475	13-Feb-32	08-Dec-33
650	341	Site Reclamation and Topsoil Replacement	120	18-Jul-33	30-Dec-33
651	**Sites Reservoir Construction Package Accelerated**		2876	30-Jan-23	09-Mar-34
652	X3	CWC Award of Funds	0	30-Jan-23	
653	X309	Policy Decision - Early Land Acquisition (Groups 1 & 2)	0	16-Jun-23*	
654	X4	NTP for Final Design Data Acquistion	23	01-Dec-23*	05-Jan-24
655	X299	NTP for Final Design Data Acquisition	0		05-Jan-24
656	X5	Determine Engineering Procurement & Delivery Method	0	08-Jan-24	
657	X6	CMAR Solicitation and Procurement	160	08-Jan-24	20-Aug-24
658	X307	30% Design - North & South Acces Roads	0		20-Mar-24
659	X289	Water Right Permit Issued	0		26-Sep-24
660	X297	30% Design - GG Dam	0		23-Oct-24
661	X7	Investor Commitment	0		24-Oct-24
662	X319	Policy Decision - All Land Acquisition (Group 3)	0	02-Jan-25*	
663	X809	Access Granted for Biological Surveys - Northern Access Roads	0	09-Mar-26	
664	X300	60% Design - GG Dam	0		15-Jan-27
665	X799	Final Design - GG Dam	240	03-May-27	31-Mar-28
666	X298	DSOD Approval of 100% Design	0		23-Jun-28
667	X290	Substantial Completion	0		03-Nov-33*
668	**Final EIR / EIS**		133	26-May-23	06-Dec-23
669	X1	Final EIR (Environmental Impact Report) CEQA Adoption	0		26-May-23
670	X2	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
671	**Real Estate**		1054	16-Jun-23	02-Aug-27
672	**Land Access and Acquisition**		1054	16-Jun-23	02-Aug-27
673	**Roads**		689	16-Jun-23	06-Mar-26
674	X15.b	Land Acquisition Roads - Group 1	100	16-Jun-23	06-Nov-23
675	X15.c	Land Acquisition Roads - Group 2	200	16-Jun-23	01-Apr-24
676	X15.e	Land Acquisition - Southern Access Roads	200	16-Jun-23	01-Apr-24
677	X15.f	Land Acquisition - Northern Access Roads	689	16-Jun-23	06-Mar-26
678	X11	Critical Land Acquisition - P2a Geotech (Roads)	0	08-Jan-24	
679	X14	Critical Land Access - P2a Geotech (Roads)	200	08-Jan-24	16-Oct-24
680	X15.d	Critical Land Acquisition Roads - Group 3	300	02-Jan-25	06-Mar-26
681	**Reservoir**		915	08-Jan-24	02-Aug-27
682	X8	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
683	X12	Critical Land Access - P2a Geotech (GG Dam Foundation & Grouting)	200	08-Jan-24	16-Oct-24
684	X13	Critical Land Access - P2b Geotech Investigation (Dam Embankments)	200	08-Jan-24	16-Oct-24
685	X291	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
686	X15	Critical Path Land Acquisition - Reservoir	300	02-Jan-25	06-Mar-26



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687	X292	Land Acquisition	300	02-Jan-25	06-Mar-26
688	X16	Land Acquisition / Complete Access - Reservoir	0		06-Mar-26
689	X10	Critical Land Acquisition - P2b Geotech Investigation (Dam Embankments)	0	19-Jul-27	
690	X9	Critical Land Acquisition - P2a Geotech (Dam Foundation & Grouting)	0	02-Aug-27	
691	**Environmental**		1557	30-Jan-23	19-Feb-29
692	X17	Environmental Surveys	0	30-Jan-23	
693	X18	Environmental Permitting and Certification	0	19-Feb-29	
694	**Water**		186	08-Jan-24	26-Sep-24
695	X19	Water Right Permit	0		26-Sep-24
696	**Construction Water**		30	08-Jan-24	16-Feb-24
697	X20	Acquisition of Construction Water	0	08-Jan-24*	
698	X21	Initial Development of Construction Water	30	08-Jan-24	16-Feb-24
699	**Sites Reservoir Permitting, Mitigation and Cultural Work**		1872	02-Apr-24	25-Jun-31
700	**Permitting**		1228	02-Apr-24	04-Jan-29
701	X293	Permitting (Biological/Cultural/Mitigation)	1228	02-Apr-24	04-Jan-29
702	**Northern Access Roads - Baseline Surveys & Revised ESA Consultation**		739	09-Mar-26	04-Jan-29
703	X379	Access Granted for Biological Surveys - Northern Access Roads	0	09-Mar-26	
704	X389	Plant Survey 1 - Northern Access Roads	15	16-Mar-26*	03-Apr-26
705	X779	Plant Survey & Land Cover - Northern Access Roads	352	16-Mar-26	20-Jul-27
706	X619	VELB Survey and Report - Northern Access Roads	30	30-Apr-26*	10-Jun-26
707	X659	Bumble Bee Survey 1 - Northern Access Roads	5	30-Apr-26	06-May-26
708	X399	Plant Survey 2 - Northern Access Roads	15	04-May-26	22-May-26
709	X669	Bumble Bee Survey 2 - Northern Access Roads	5	28-May-26	03-Jun-26
710	X409	Plant Survey 3 and Report - Northern Access Roads	45	22-Jun-26	21-Aug-26
711	X679	Bumble Bee Survey 3 - Northern Access Roads	5	25-Jun-26	01-Jul-26
712	X689	Bumble Bee Survey 4 and Report - Northern Access Roads	45	23-Jul-26	23-Sep-26
713	X419	Land Cover Verification/Aquatic Delineation #1 - Northern Access Roads	15	02-Dec-26*	22-Dec-26
714	X579	Vernal Pool Wet Season Survey 1 - Northern Access Roads	10	03-Dec-26*	16-Dec-26
715	X649	CRLF Surveys and Report - Northern Access Roads	200	04-Jan-27*	08-Oct-27
716	X589	Vernal Pool Wet Season Survey 2 - Northern Access Roads	10	07-Jan-27	20-Jan-27
717	X629	VELB Transplant - Northern Access Roads	20	07-Jan-27	03-Feb-27
718	X429	Land Cover Verification/Aquatic Delineation #2 - Northern Access Roads	15	13-Jan-27	02-Feb-27
719	X599	Vernal Pool Wet Season Survey 3 - Northern Access Roads	10	11-Feb-27	24-Feb-27
720	X439	Land Cover Verification/Aquatic Delineation and Report - Northern Access Roads	45	24-Feb-27	27-Apr-27
721	X609	Vernal Pool Wet Season Survey 4 (more may be needed) & Report - Northern Access Roads	60	18-Mar-27	09-Jun-27

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722	X449	Revise Impact Acres and Work with Agencies - Northern Access Roads	60	28-Apr-27	20-Jul-27
723	X509	SWHA #1 and TCBB #1 - Northern Access Roads	5	21-Jul-27*	27-Jul-27
724	X789	Species Protocol Surveys; USFWS & CDFW - Northern Access Roads	337	21-Jul-27	02-Nov-28
725	X519	SWHA #2 and TCBB #2 - Northern Access Roads	5	18-Aug-27	24-Aug-27
726	X529	SWHA #3 and TCBB #3 - Northern Access Roads	5	15-Sep-27	21-Sep-27
727	X569	TCBB Report - Northern Access Roads	30	22-Sep-27	02-Nov-27
728	X639	Bank Swallow Survey and Report - Northern Access Roads	30	22-Sep-27	02-Nov-27
729	X539	SWHA #4 - Northern Access Roads	5	20-Oct-27	26-Oct-27
730	X699	Badger Survey and Report - Northern Access Roads	30	03-Nov-27	14-Dec-27
731	X549	SWHA #5 - Northern Access Roads	5	17-Nov-27	23-Nov-27
732	X559	SWHA #6 and Report - Northern Access Roads	30	03-Dec-27	13-Jan-28
733	X709	Bat Survey (Roosts) - Northern Access Roads	10	15-Dec-27	28-Dec-27
734	X719	Bat Roosts Removal - Northern Access Roads	10	29-Dec-27	11-Jan-28
735	X729	USFWS - Amend ESA Consultation: Prepare Report & Submit - Northern Access Roads	90	14-Jan-28	18-May-28
736	X749	CDFW - Amend ESA ITP: Prepare Report & Submit - Northern Access Roads	90	14-Jan-28	18-May-28
737	X459	BUOW #1 (Burrowing Owls Study) - Northern Access Roads	5	03-Apr-28*	07-Apr-28
738	X469	BUOW #2 - Northern Access Roads	5	01-May-28	05-May-28
739	X739	USFWS Review and Amend ESA Permit & Take Statement - Northern Access Roads	120	19-May-28	02-Nov-28
740	X759	CDFW Review Report & Ament ITP Take Statement - Northern Access Roads	120	19-May-28	02-Nov-28
741	X479	BUOW #3 - Northern Access Roads	5	05-Jun-28	09-Jun-28
742	X489	BUOW #4 and Report - Northern Access Roads	30	10-Jul-28	18-Aug-28
743	X499	BUOW Relocation - Northern Access Roads	15	28-Aug-28*	15-Sep-28
744	X769	Precon Avoidance (GGS, Avian, mammal, other CEQA spp) - Northern Access Roads	30	24-Nov-28	04-Jan-29
745	**Southern Access Roads - Baseline Surveys & Revised ESA Consultation**		866	02-Apr-24	17-Aug-27
746	X819	Access Granted for Biological Surveys - Southern Access Roads	0	02-Apr-24	
747	X1059	VELB Survey and Report - Southern Access Roads	30	30-Apr-24*	11-Jun-24
748	X1099	Bumble Bee Survey 1 - Southern Access Roads	5	30-Apr-24	06-May-24
749	X1109	Bumble Bee Survey 2 - Southern Access Roads	5	29-May-24	04-Jun-24
750	X1119	Bumble Bee Survey 3 - Southern Access Roads	5	26-Jun-24	02-Jul-24
751	X1129	Bumble Bee Survey 4 and Report - Southern Access Roads	45	25-Jul-24	26-Sep-24
752	X859	Land Cover Verification/Aquatic Delineation #1 - Southern Access Roads	15	02-Dec-24*	20-Dec-24
753	X1219	Plant Survey & Land Cover - Southern Access Roads	187	02-Dec-24	26-Aug-25
754	X1019	Vernal Pool Wet Season Survey 1 - Southern Access Roads	10	03-Dec-24*	16-Dec-24
755	X1089	CRLF Surveys and Report - Southern Access Roads	200	03-Jan-25*	14-Oct-25

Remaining Level of Effort
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#	Activity ID	Activity Name	Duration	Start	Finish
756	X1029	Vernal Pool Wet Season Survey 2 - Southern Access Roads	10	10-Jan-25	23-Jan-25
757	X869	Land Cover Verification/Aquatic Delineation #2 - Southern Access Roads	15	16-Jan-25	05-Feb-25
758	X1069	VELB Transplant - Southern Access Roads	20	17-Jan-25	13-Feb-25
759	X1039	Vernal Pool Wet Season Survey 3 - Southern Access Roads	10	14-Feb-25	27-Feb-25
760	X879	Land Cover Verification/Aquatic Delineation and Report - Southern Access Roads	45	27-Feb-25	30-Apr-25
761	X829	Plant Survey 1 - Southern Access Roads	15	17-Mar-25*	04-Apr-25
762	X1049	Vernal Pool Wet Season Survey 4 (more may be needed) & Report - Southern Access Roads	60	21-Mar-25	13-Jun-25
763	X889	Revise Impact Acres and Work with Agencies - Southern Access Roads	60	01-May-25	25-Jul-25
764	X839	Plant Survey 2 - Southern Access Roads	15	05-May-25	23-May-25
765	X849	Plant Survey 3 and Report - Southern Access Roads	45	24-Jun-25	26-Aug-25
766	X949	SWHA #1 and TCBB #1 - Southern Access Roads	5	02-Mar-26*	06-Mar-26
767	X1229	Species Protocol Surveys; USFWS & CDFW - Southern Access Roads	337	02-Mar-26	15-Jun-27
768	X959	SWHA #2 and TCBB #2 - Southern Access Roads	5	30-Mar-26	03-Apr-26
769	X899	BUOW #1 (Burrowing Owls Study) - Southern Access Roads	5	01-Apr-26*	07-Apr-26
770	X969	SWHA #3 and TCBB #3 - Southern Access Roads	5	27-Apr-26	01-May-26
771	X909	BUOW #2 - Southern Access Roads	5	29-Apr-26	05-May-26
772	X1009	TCBB Report - Southern Access Roads	30	04-May-26	12-Jun-26
773	X1079	Bank Swallow Survey and Report - Southern Access Roads	30	04-May-26	12-Jun-26
774	X979	SWHA #4 - Southern Access Roads	5	01-Jun-26	05-Jun-26
775	X919	BUOW #3 - Southern Access Roads	5	03-Jun-26	09-Jun-26
776	X1139	Badger Survey and Report - Southern Access Roads	30	15-Jun-26	24-Jul-26
777	X989	SWHA #5 - Southern Access Roads	5	29-Jun-26	03-Jul-26
778	X929	BUOW #4 and Report - Southern Access Roads	30	08-Jul-26	18-Aug-26
779	X999	SWHA #6 and Report - Southern Access Roads	30	15-Jul-26	25-Aug-26
780	X1149	Bat Survey (Roosts) - Southern Access Roads	10	27-Jul-26	07-Aug-26
781	X1159	Bat Roosts Removal - Southern Access Roads	10	10-Aug-26	21-Aug-26
782	X1169	USFWS - Amend ESA Consultation: Prepare Report and Submit - Southern Access Roads	90	26-Aug-26	29-Dec-26
783	X1189	CDFW - Amend ESA ITP: Prepare Report and Submit - Southern Access Roads	90	26-Aug-26	29-Dec-26
784	X939	BUOW Relocation - Southern Access Roads	15	27-Aug-26*	16-Sep-26
785	X1179	USFWS Review and Amend ESA Permit and Take Statement - Southern Access Roads	120	30-Dec-26	15-Jun-27
786	X1199	CDFW Review Report and Ament ITP Take Statement - Southern Access Roads	120	30-Dec-26	15-Jun-27
787	X1209	Precon Avoidance (GGS, Avian, mammal, other CEQA spp) - Southern Access Roads	30	07-Jul-27	17-Aug-27

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788	**Reservoir - Baseline Surveys & Revised ESA Consultation**		607	20-Apr-26	15-Aug-28
789	X22	Access Granted for Biological Surveys - Reservoir	0	20-Apr-26	
790	X26	Land Cover Verification/Aquatic Delineation #1 - Reservoir	15	20-Apr-26*	08-May-26
791	X23	Plant Survey 1 - Reservoir	15	29-Apr-26*	19-May-26
792	X301	Plant Survey & Land Cover - Reservoir	158	29-Apr-26	04-Dec-26
793	X46	VELB Survey and Report - Reservoir	30	30-Apr-26*	10-Jun-26
794	X50	Bumble Bee Survey 1 - Reservoir	5	30-Apr-26	06-May-26
795	X51	Bumble Bee Survey 2 - Reservoir	5	28-May-26	03-Jun-26
796	X27	Land Cover Verification/Aquatic Delineation #2 - Reservoir	15	01-Jun-26	19-Jun-26
797	X24	Plant Survey 2 - Reservoir	15	17-Jun-26	07-Jul-26
798	X52	Bumble Bee Survey 3 - Reservoir	5	25-Jun-26	01-Jul-26
799	X28	Land Cover Verification/Aquatic Delineation and Report - Reservoir	45	13-Jul-26	11-Sep-26
800	X53	Bumble Bee Survey 4 and Report - Reservoir	45	23-Jul-26	23-Sep-26
801	X25	Plant Survey 3 and Report - Reservoir	45	05-Aug-26	06-Oct-26
802	X29	Revise Impact Acres and Work with Agencies - Reservoir	60	14-Sep-26	04-Dec-26
803	X42	Vernal Pool Wet Season Survey 1 - Reservoir	10	03-Dec-26*	16-Dec-26
804	X49	CRLF Surveys and Report - Reservoir	200	04-Jan-27*	08-Oct-27
805	X43	Vernal Pool Wet Season Survey 2 - Reservoir	10	07-Jan-27	20-Jan-27
806	X47	VELB Transplant - Reservoir	20	07-Jan-27	03-Feb-27
807	X44	Vernal Pool Wet Season Survey 3 - Reservoir	10	11-Feb-27	24-Feb-27
808	X35	SWHA #1 and TCBB #1 - Reservoir	5	01-Mar-27*	05-Mar-27
809	X302	Species Protocol Surveys; USFWS & CDFW Acceptance - Reservo	370	01-Mar-27	28-Jul-28
810	X45	Vernal Pool Wet Season Survey 4 (more may be needed) and Report - Reservoir	60	18-Mar-27	09-Jun-27
811	X36	SWHA #2 and TCBB #2 - Reservoir	5	29-Mar-27	02-Apr-27
812	X30	BUOW #1 (Burrowing Owls Study) - Reservoir	5	01-Apr-27*	07-Apr-27
813	X37	SWHA #3 and TCBB #3 - Reservoir	5	26-Apr-27	30-Apr-27
814	X31	BUOW #2 - Reservoir	5	29-Apr-27	05-May-27
815	X41	TCBB Report - Reservoir	30	03-May-27	11-Jun-27
816	X48	Bank Swallow Survey and Report - Reservoir	30	03-May-27	11-Jun-27
817	X38	SWHA #4 - Reservoir	5	31-May-27	04-Jun-27
818	X32	BUOW #3 - Reservoir	5	03-Jun-27	09-Jun-27
819	X54	Badger Survey and Report - Reservoir	30	14-Jun-27	23-Jul-27
820	X39	SWHA #5 - Reservoir	5	28-Jun-27	02-Jul-27
821	X33	BUOW #4 and Report - Reservoir	30	08-Jul-27	18-Aug-27
822	X40	SWHA #6 and Report - Reservoir	30	14-Jul-27	24-Aug-27
823	X55	Bat Survey (Roosts) - Reservoir	10	26-Jul-27	06-Aug-27
824	X56	Bat Roosts Removal - Reservoir	10	09-Aug-27	20-Aug-27
825	X59	CDFW - Amend ESA ITP: Prepare Report and Submit - Reservoir	90	25-Aug-27	28-Dec-27
826	X34	BUOW Relocation - Reservoir	15	27-Aug-27*	16-Sep-27

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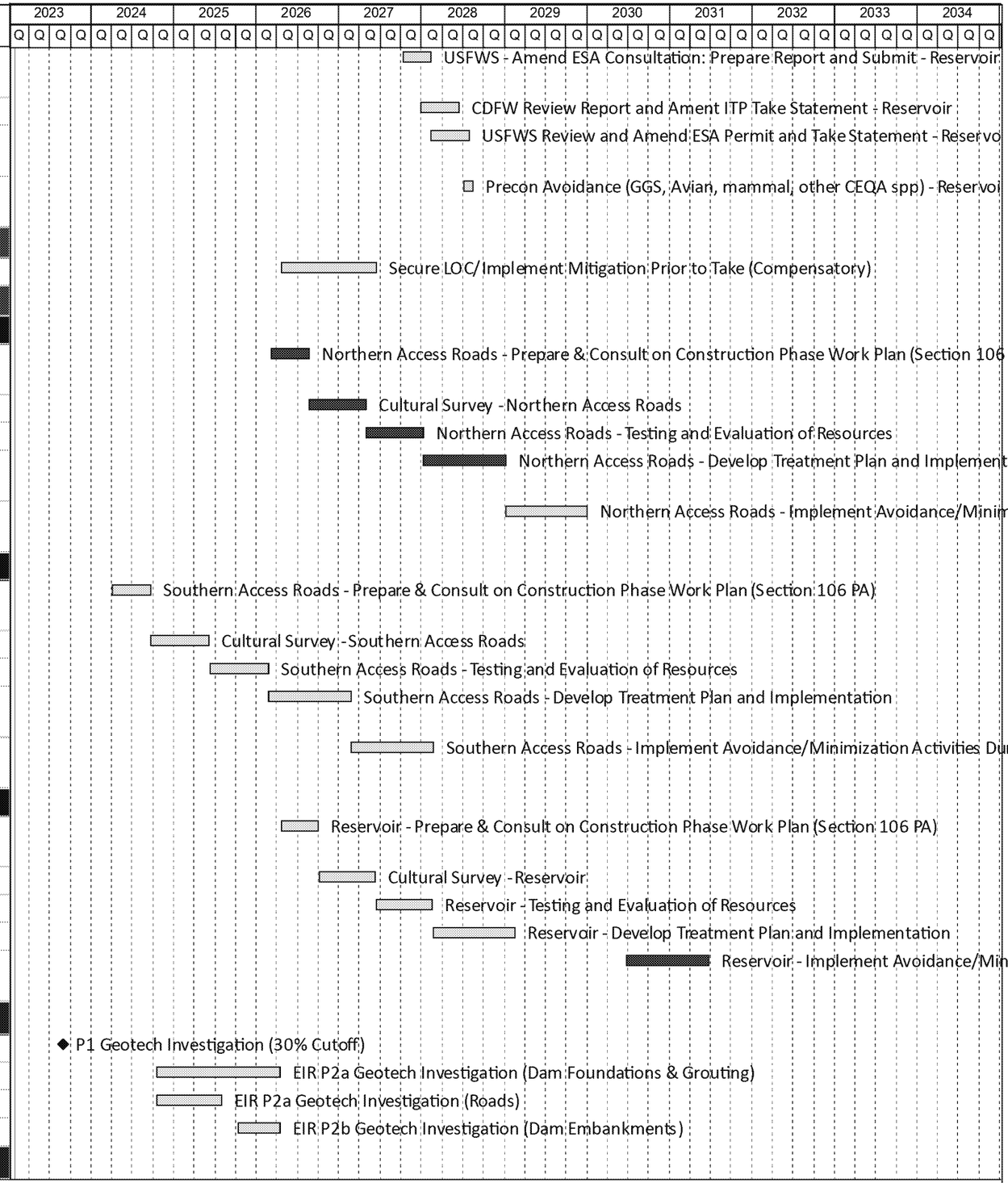
827	X57	USFWS - Amend ESA Consultation: Prepare Report and Submit - Reservoir	90	11-Oct-27	11-Feb-28
828	X60	CDFW Review Report and Ament ITP Take Statement - Reservoir	120	29-Dec-27	13-Jun-28
829	X58	USFWS Review and Amend ESA Permit and Take Statement - Reservoir	120	14-Feb-28	28-Jul-28
830	X61	Precon Avoidance (GGS, Avian, mammal, other CEQA spp) - Reservoir	30	05-Jul-28	15-Aug-28
831	**Compensatory Mitigation**		305	20-Apr-26	18-Jun-27
832	X62	Secure LOC/Implement Mitigation Prior to Take (Compensatory)	305	20-Apr-26	18-Jun-27
833	**Cultural Work**		1872	02-Apr-24	25-Jun-31
834	**Northern Access Roads**		1000	09-Mar-26	04-Jan-30
835	X329	Northern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	09-Mar-26	21-Aug-26
836	X339	Cultural Survey -Northern Access Roads	180	24-Aug-26	30-Apr-27
837	X349	Northern Access Roads - Testing and Evaluation of Resources	180	03-May-27	07-Jan-28
838	X359	Northern Access Roads - Develop Treatment Plan and Implementation	260	10-Jan-28	05-Jan-29
839	X369	Northern Access Roads - Implement Avoidance/Minimization Activities During Construction	260	08-Jan-29	04-Jan-30
840	**Southern Access Roads**		1000	02-Apr-24	21-Feb-28
841	X1239	Southern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	02-Apr-24	19-Sep-24
842	X1249	Cultural Survey -Southern Access Roads	180	20-Sep-24	06-Jun-25
843	X1259	Southern Access Roads - Testing and Evaluation of Resources	180	09-Jun-25	23-Feb-26
844	X1269	Southern Access Roads - Develop Treatment Plan and Implementation	260	24-Feb-26	22-Feb-27
845	X1279	Southern Access Roads - Implement Avoidance/Minimization Activities During Construction	260	23-Feb-27	21-Feb-28
846	**Reservoir**		1353	20-Apr-26	25-Jun-31
847	X63	Reservoir - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	20-Apr-26	02-Oct-26
848	X64	Cultural Survey -Reservoir	180	05-Oct-26	11-Jun-27
849	X65	Reservoir - Testing and Evaluation of Resources	180	14-Jun-27	18-Feb-28
850	X66	Reservoir - Develop Treatment Plan and Implementation	260	21-Feb-28	16-Feb-29
851	X67	Reservoir - Implement Avoidance/Minimization Activities During Construction	260	27-Jun-30	25-Jun-31
852	**P1 / P2 Geotech Investigations**		666	31-Aug-23	17-Apr-26
853	X68	P1 Geotech Investigation (30% Cutoff)	0	31-Aug-23*	
854	X69	EIR P2a Geotech Investigation (Dam Foundations & Grouting)	380	17-Oct-24	17-Apr-26
855	X70	EIR P2a Geotech Investigation (Roads)	200	17-Oct-24	01-Aug-25
856	X71	EIR P2b Geotech Investigation (Dam Embankments)	130	14-Oct-25*	17-Apr-26
857	**Reservoir Facilities**		2725	31-Aug-23	09-Mar-34



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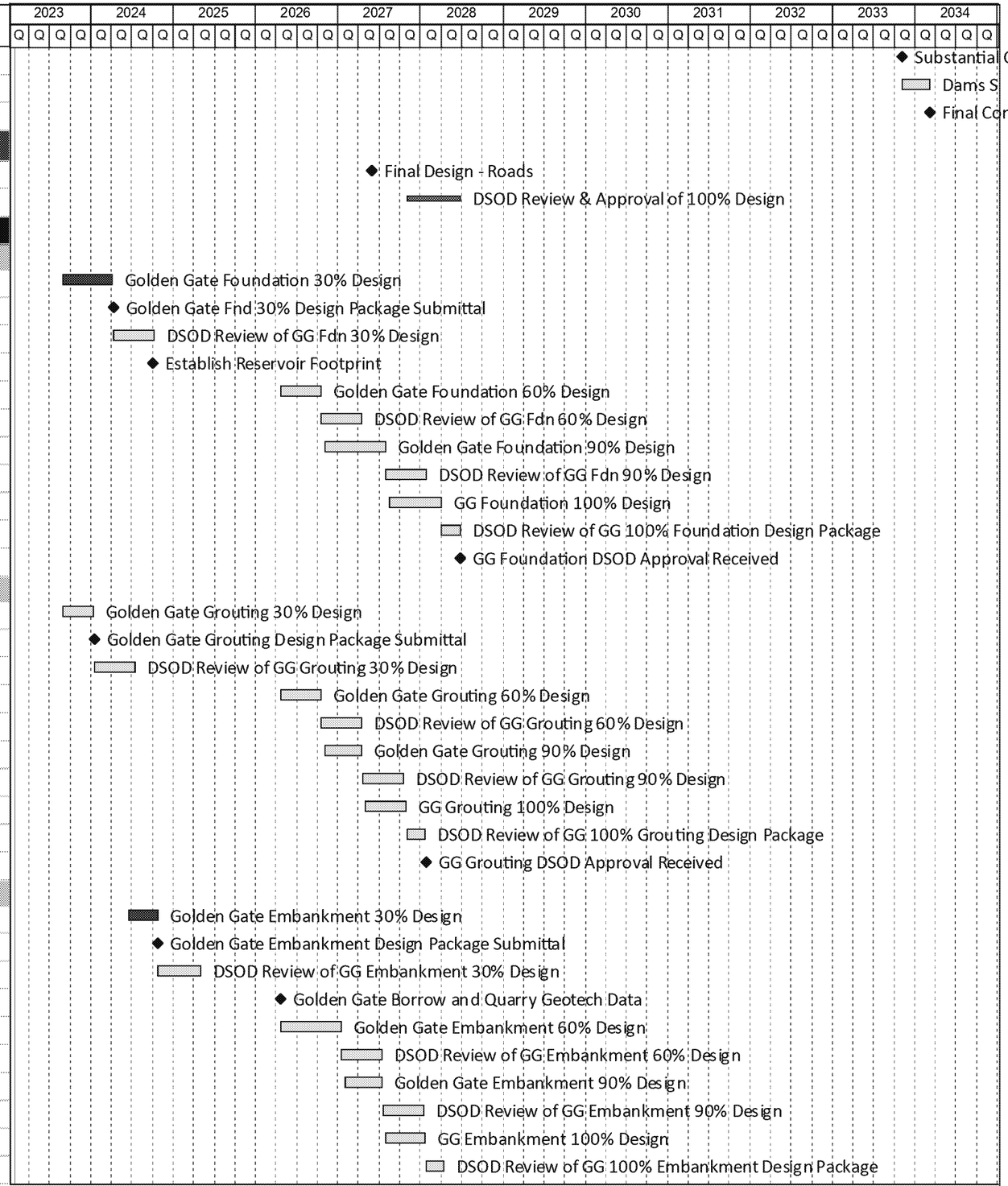
858	X286	Substantial Completion - Dams Ready for Commissioning	0		03-Nov-33
859	X287	Dams Startup and Commissioning	90	04-Nov-33	09-Mar-34
860	X288	Final Completion	0		09-Mar-34*
861	**Engineering - Dams**		1371	31-Aug-23	01-Jan-29
862	X294	Final Design - Roads	0		28-May-27
863	X295	DSOD Review & Approval of 100% Design	170	01-Nov-27	23-Jun-28
864	**Golden Gate Dam Design**		1236	31-Aug-23	26-Jun-28
865	**Golden Gate Foundation Design**		1236	31-Aug-23	26-Jun-28
866	X72	Golden Gate Foundation 30% Design	151	31-Aug-23	05-Apr-24*
867	X73	Golden Gate Fnd 30% Design Package Submittal	0	08-Apr-24	
868	X74	DSOD Review of GG Fdn 30% Design	130	08-Apr-24	09-Oct-24
869	X305	Establish Reservoir Footprint	0		02-Oct-24
870	X75	Golden Gate Foundation 60% Design	130	20-Apr-26	16-Oct-26
871	X76	DSOD Review of GG Fdn 60% Design	130	19-Oct-26	16-Apr-27
872	X77	Golden Gate Foundation 90% Design	195	02-Nov-26	30-Jul-27
873	X78	DSOD Review of GG Fdn 90% Design	130	02-Aug-27	28-Jan-28
874	X79	GG Foundation 100% Design	165	16-Aug-27	31-Mar-28
875	X80	DSOD Review of GG 100% Foundation Design Package	60	03-Apr-28	23-Jun-28
876	X81	GG Foundation DSOD Approval Received	0	26-Jun-28	
877	**Golden Gate Grouting Design**		1126	31-Aug-23	24-Jan-28
878	X82	Golden Gate Grouting 30% Design	91	31-Aug-23	12-Jan-24*
879	X83	Golden Gate Grouting Design Package Submittal	0	15-Jan-24	
880	X84	DSOD Review of GG Grouting 30% Design	130	15-Jan-24	16-Jul-24
881	X85	Golden Gate Grouting 60% Design	130	20-Apr-26	16-Oct-26
882	X86	DSOD Review of GG Grouting 60% Design	130	19-Oct-26	16-Apr-27
883	X87	Golden Gate Grouting 90% Design	120	02-Nov-26	16-Apr-27
884	X88	DSOD Review of GG Grouting 90% Design	130	19-Apr-27	15-Oct-27
885	X89	GG Grouting 100% Design	130	03-May-27	29-Oct-27
886	X90	DSOD Review of GG 100% Grouting Design Package	60	01-Nov-27	21-Jan-28
887	X91	GG Grouting DSOD Approval Received	0	24-Jan-28	
888	**Golden Gate Embankment Design**		986	17-Jun-24	17-Apr-28
889	X92	Golden Gate Embankment 30% Design	91	17-Jun-24	23-Oct-24*
890	X93	Golden Gate Embankment Design Package Submittal	0	24-Oct-24	
891	X94	DSOD Review of GG Embankment 30% Design	130	24-Oct-24	30-Apr-25
892	X95	Golden Gate Borrow and Quarry Geotech Data	0	20-Apr-26	
893	X96	Golden Gate Embankment 60% Design	195	20-Apr-26	15-Jan-27
894	X97	DSOD Review of GG Embankment 60% Design	130	18-Jan-27	16-Jul-27
895	X98	Golden Gate Embankment 90% Design	120	01-Feb-27	16-Jul-27
896	X99	DSOD Review of GG Embankment 90% Design	130	19-Jul-27	14-Jan-28
897	X100	GG Embankment 100% Design	125	02-Aug-27	21-Jan-28
898	X101	DSOD Review of GG 100% Embankment Design Package	60	24-Jan-28	14-Apr-28



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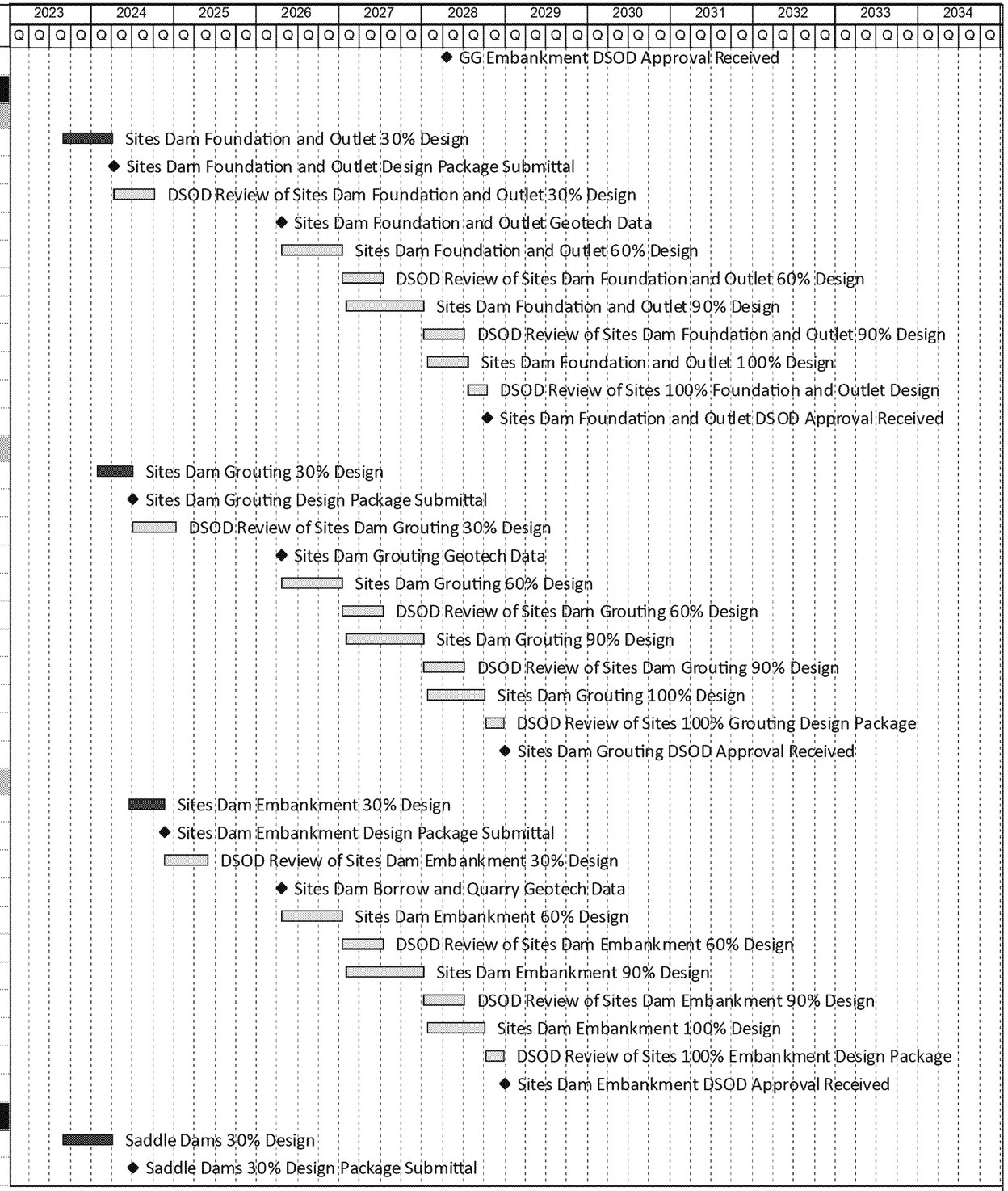
899	X102	GG Embankment DSOD Approval Received	0	17-Apr-28	
900	**Sites Dam Design**		1371	31-Aug-23	01-Jan-29
901	**Sites Dam Foundation and Outlet Design**		1316	31-Aug-23	16-Oct-28
902	X103	Sites Dam Foundation and Outlet 30% Design	151	31-Aug-23	05-Apr-24*
903	X104	Sites Dam Foundation and Outlet Design Package Submittal	0	08-Apr-24	
904	X105	DSOD Review of Sites Dam Foundation and Outlet 30% Design	130	08-Apr-24	09-Oct-24
905	X106	Sites Dam Foundation and Outlet Geotech Data	0	20-Apr-26	
906	X107	Sites Dam Foundation and Outlet 60% Design	195	20-Apr-26	15-Jan-27
907	X108	DSOD Review of Sites Dam Foundation and Outlet 60% Design	130	18-Jan-27	16-Jul-27
908	X109	Sites Dam Foundation and Outlet 90% Design	245	01-Feb-27	07-Jan-28
909	X110	DSOD Review of Sites Dam Foundation and Outlet 90% Design	130	10-Jan-28	07-Jul-28
910	X111	Sites Dam Foundation and Outlet 100% Design	130	24-Jan-28	21-Jul-28
911	X112	DSOD Review of Sites 100% Foundation and Outlet Design	60	24-Jul-28	13-Oct-28
912	X113	Sites Dam Foundation and Outlet DSOD Approval Received	0	16-Oct-28	
913	**Sites Dam Grouting Design**		1271	26-Jan-24	01-Jan-29
914	X114	Sites Dam Grouting 30% Design	111	26-Jan-24	01-Jul-24*
915	X115	Sites Dam Grouting Design Package Submittal	0	02-Jul-24	
916	X116	DSOD Review of Sites Dam Grouting 30% Design	130	02-Jul-24	08-Jan-25
917	X117	Sites Dam Grouting Geotech Data	0	20-Apr-26	
918	X118	Sites Dam Grouting 60% Design	195	20-Apr-26	15-Jan-27
919	X119	DSOD Review of Sites Dam Grouting 60% Design	130	18-Jan-27	16-Jul-27
920	X120	Sites Dam Grouting 90% Design	245	01-Feb-27	07-Jan-28
921	X121	DSOD Review of Sites Dam Grouting 90% Design	130	10-Jan-28	07-Jul-28
922	X122	Sites Dam Grouting 100% Design	185	24-Jan-28	06-Oct-28
923	X123	DSOD Review of Sites 100% Grouting Design Package	60	09-Oct-28	29-Dec-28
924	X124	Sites Dam Grouting DSOD Approval Received	0	01-Jan-29	
925	**Sites Dam Embankment Design**		1171	17-Jun-24	01-Jan-29
926	X125	Sites Dam Embankment 30% Design	111	17-Jun-24	20-Nov-24*
927	X126	Sites Dam Embankment Design Package Submittal	0	21-Nov-24	
928	X127	DSOD Review of Sites Dam Embankment 30% Design	130	21-Nov-24	29-May-25
929	X128	Sites Dam Borrow and Quarry Geotech Data	0	20-Apr-26	
930	X129	Sites Dam Embankment 60% Design	195	20-Apr-26	15-Jan-27
931	X130	DSOD Review of Sites Dam Embankment 60% Design	130	18-Jan-27	16-Jul-27
932	X131	Sites Dam Embankment 90% Design	245	01-Feb-27	07-Jan-28
933	X132	DSOD Review of Sites Dam Embankment 90% Design	130	10-Jan-28	07-Jul-28
934	X133	Sites Dam Embankment 100% Design	185	24-Jan-28	06-Oct-28
935	X134	DSOD Review of Sites 100% Embankment Design Package	60	09-Oct-28	29-Dec-28
936	X135	Sites Dam Embankment DSOD Approval Received	0	01-Jan-29	
937	**Saddle Dam Designs**		1156	31-Aug-23	06-Mar-28
938	X136	Saddle Dams 30% Design	151	31-Aug-23	05-Apr-24*
939	X137	Saddle Dams 30% Design Package Submittal	0	01-Jul-24*	



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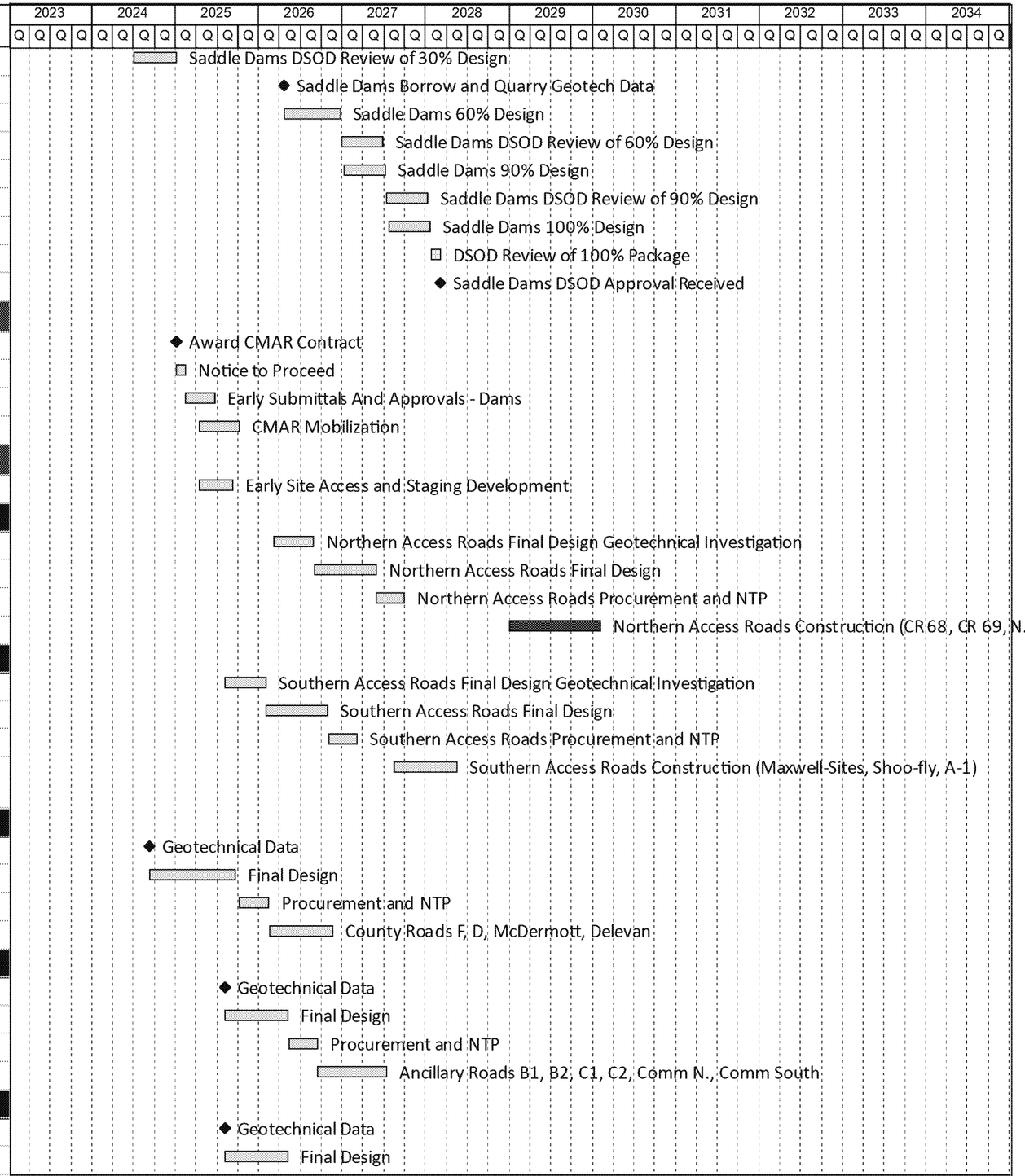
940	X138	Saddle Dams DSOD Review of 30% Design	130	01-Jul-24	07-Jan-25
941	X139	Saddle Dams Borrow and Quarry Geotech Data	0	20-Apr-26	
942	X140	Saddle Dams 60% Design	180	20-Apr-26	25-Dec-26
943	X141	Saddle Dams DSOD Review of 60% Design	130	28-Dec-26	25-Jun-27
944	X142	Saddle Dams 90% Design	130	11-Jan-27	09-Jul-27
945	X143	Saddle Dams DSOD Review of 90% Design	130	12-Jul-27	07-Jan-28
946	X144	Saddle Dams 100% Design	130	26-Jul-27	21-Jan-28
947	X145	DSOD Review of 100% Package	30	24-Jan-28	03-Mar-28
948	X146	Saddle Dams DSOD Approval Received	0	06-Mar-28	
949	**CMAR Procurement**		195	02-Jan-25	06-Oct-25
950	X147	Award CMAR Contract	0	02-Jan-25*	
951	X148	Notice to Proceed	30	02-Jan-25	12-Feb-25
952	X149	Early Submittals And Approvals - Dams	90	13-Feb-25	19-Jun-25
953	X150	CMAR Mobilization	120	17-Apr-25	06-Oct-25
954	**Roads, Bridges, Access, and Site Development**		1446	11-Sep-24	12-Apr-30
955	X151	Early Site Access and Staging Development	100	17-Apr-25	08-Sep-25
956	**Northern Construction Access Roads (CR 68, CR 69, N. Rd)**		1023	09-Mar-26	06-Feb-30
957	X152	Northern Access Roads Final Design Geotechnical Investigation	125	09-Mar-26	28-Aug-26
958	X153	Northern Access Roads Final Design	195	31-Aug-26	28-May-27
959	X154	Northern Access Roads Procurement and NTP	90	31-May-27	01-Oct-27
960	X155	Northern Access Roads Construction (CR 68, CR 69, N. Rd)	284	05-Jan-29	06-Feb-30
961	**Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)**		722	04-Aug-25	16-May-28
962	X160	Southern Access Roads Final Design Geotechnical Investigation	125	04-Aug-25	30-Jan-26
963	X161	Southern Access Roads Final Design	195	02-Feb-26	30-Oct-26
964	X162	Southern Access Roads Procurement and NTP	90	02-Nov-26	05-Mar-27
965	X163	Southern Access Roads Construction (Maxwell-Sites, Shoo-fly, A-1)	195	18-Aug-27	16-May-28
966	**County Roads F, D, McDermott, Delevan**		561	11-Sep-24	20-Nov-26
967	X156	Geotechnical Data	0	11-Sep-24	
968	X157	Final Design	260	11-Sep-24	19-Sep-25
969	X158	Procurement and NTP	90	07-Oct-25	13-Feb-26
970	X159	County Roads F, D, McDermott, Delevan	200	16-Feb-26	20-Nov-26
971	**Ancillary Roads B1, B2, C1, C2, Comm N., Comm South**		505	04-Aug-25	16-Jul-27
972	X164	Geotechnical Data	0	04-Aug-25	
973	X165	Final Design	195	04-Aug-25	08-May-26
974	X166	Procurement and NTP	90	11-May-26	11-Sep-26
975	X167	Ancillary Roads B1, B2, C1, C2, Comm N., Comm South	220	14-Sep-26	16-Jul-27
976	**Stone Corral Recreation Road to Sites Dam**		405	04-Aug-25	26-Feb-27
977	X168	Geotechnical Data	0	04-Aug-25	
978	X169	Final Design	195	04-Aug-25	08-May-26



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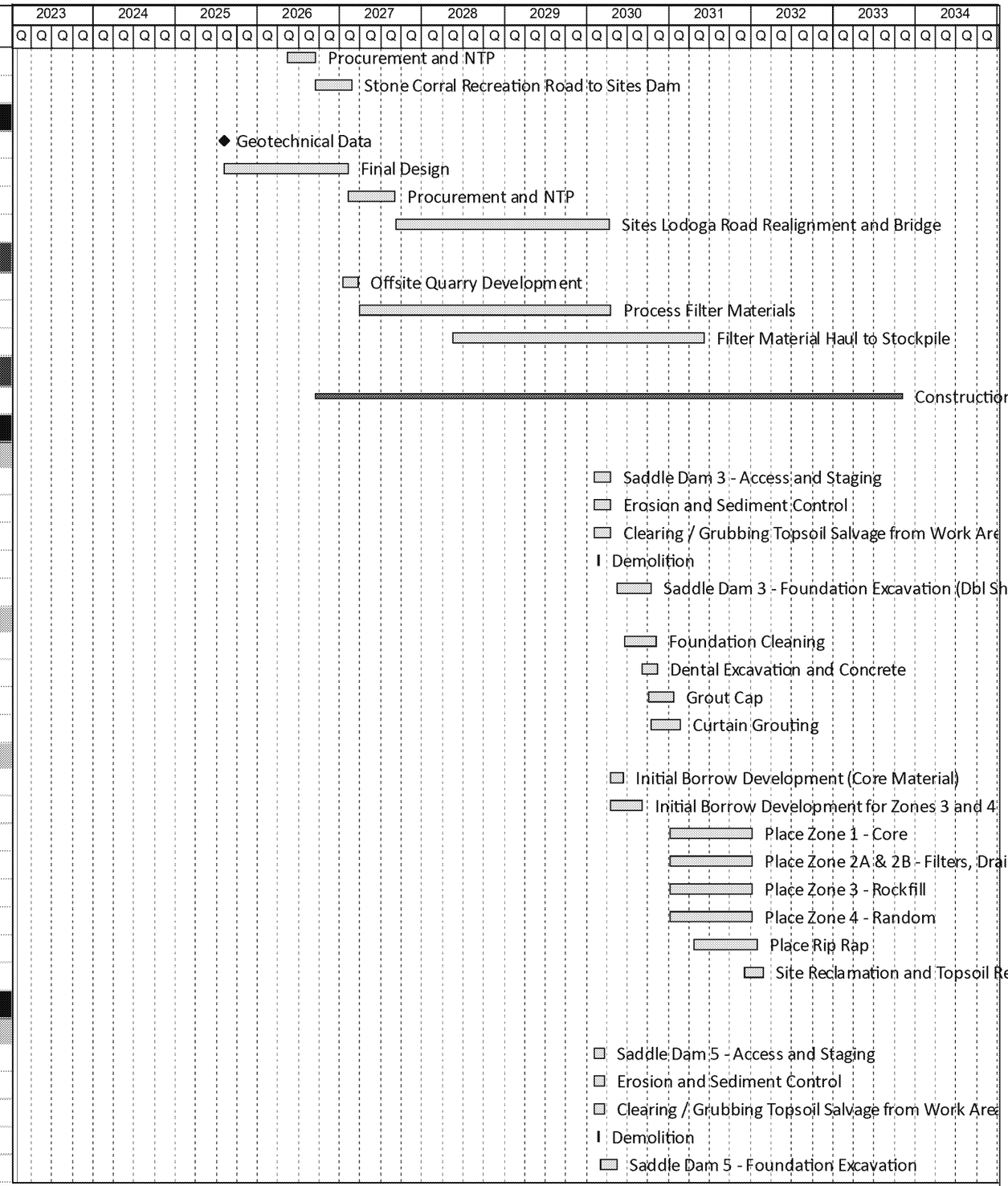
#	Activity ID	Activity Name	Duration	Start	Finish
979	X170	Procurement and NTP	90	11-May-26	11-Sep-26
980	X171	Stone Corral Recreation Road to Sites Dam	120	14-Sep-26	26-Feb-27
981	**Sites Lodoga Road Realignment and Bridge**		1220	04-Aug-25	12-Apr-30
982	X172	Geotechnical Data	0	04-Aug-25	
983	X173	Final Design	390	04-Aug-25	05-Feb-27
984	X174	Procurement and NTP	150	08-Feb-27	03-Sep-27
985	X175	Sites Lodoga Road Realignment and Bridge	680	06-Sep-27	12-Apr-30
986	**Process and Haul Filter Materials to Project**		1147	18-Jan-27	10-Jun-31
987	X176	Offsite Quarry Development	50	18-Jan-27	26-Mar-27
988	X177	Process Filter Materials	800	29-Mar-27	19-Apr-30
989	X178	Filter Material Haul to Stockpile	800	17-May-28	10-Jun-31
990	**Saddle Dams Construction**		2124	09-Sep-25	03-Nov-33
991	X296	Construction	1864	14-Sep-26	03-Nov-33
992	**Saddle Dam 3**		535	07-Feb-30	25-Feb-32
993	**Saddle Dam 3 Foundation Excavation**		180	07-Feb-30	16-Oct-30
994	X179	Saddle Dam 3 - Access and Staging	50	07-Feb-30	17-Apr-30
995	X180	Erosion and Sediment Control	50	07-Feb-30	17-Apr-30
996	X181	Clearing / Grubbing Topsoil Salvage from Work Areas	50	07-Feb-30	17-Apr-30
997	X182	Demolition	5	21-Feb-30	27-Feb-30
998	X183	Saddle Dam 3 - Foundation Excavation (Dbl Shift)	110	16-May-30	16-Oct-30
999	**Saddle Dam 3 - Foundation Preparation and Grouting**		175	20-Jun-30	19-Feb-31
1000	X184	Foundation Cleaning	100	20-Jun-30	06-Nov-30
1001	X185	Dental Excavation and Concrete	50	05-Sep-30	13-Nov-30
1002	X186	Grout Cap	80	03-Oct-30	22-Jan-31
1003	X187	Curtain Grouting	90	17-Oct-30	19-Feb-31
1004	**Saddle Dam 3 - Embankment**		485	18-Apr-30	25-Feb-32
1005	X188	Initial Borrow Development (Core Material)	40	18-Apr-30	12-Jun-30
1006	X189	Initial Borrow Development for Zones 3 and 4	100	18-Apr-30	04-Sep-30
1007	X190	Place Zone 1 - Core	260	09-Jan-31	07-Jan-32
1008	X191	Place Zone 2A & 2B - Filters, Drains and Transitions	260	09-Jan-31	07-Jan-32
1009	X192	Place Zone 3 - Rockfill	260	09-Jan-31	07-Jan-32
1010	X193	Place Zone 4 - Random	260	09-Jan-31	07-Jan-32
1011	X194	Place Rip Rap	200	24-Apr-31	28-Jan-32
1012	X195	Site Reclamation and Topsoil Replacement	60	04-Dec-31	25-Feb-32
1013	**Saddle Dam 5**		265	07-Feb-30	12-Feb-31
1014	**Saddle Dam 5 - Foundation Excavation**		70	07-Feb-30	15-May-30
1015	X196	Saddle Dam 5 - Access and Staging	30	07-Feb-30	20-Mar-30
1016	X197	Erosion and Sediment Control	30	07-Feb-30	20-Mar-30
1017	X198	Clearing / Grubbing Topsoil Salvage from Work Areas	30	07-Feb-30	20-Mar-30
1018	X199	Demolition	5	21-Feb-30	27-Feb-30
1019	X200	Saddle Dam 5 - Foundation Excavation	50	07-Mar-30	15-May-30



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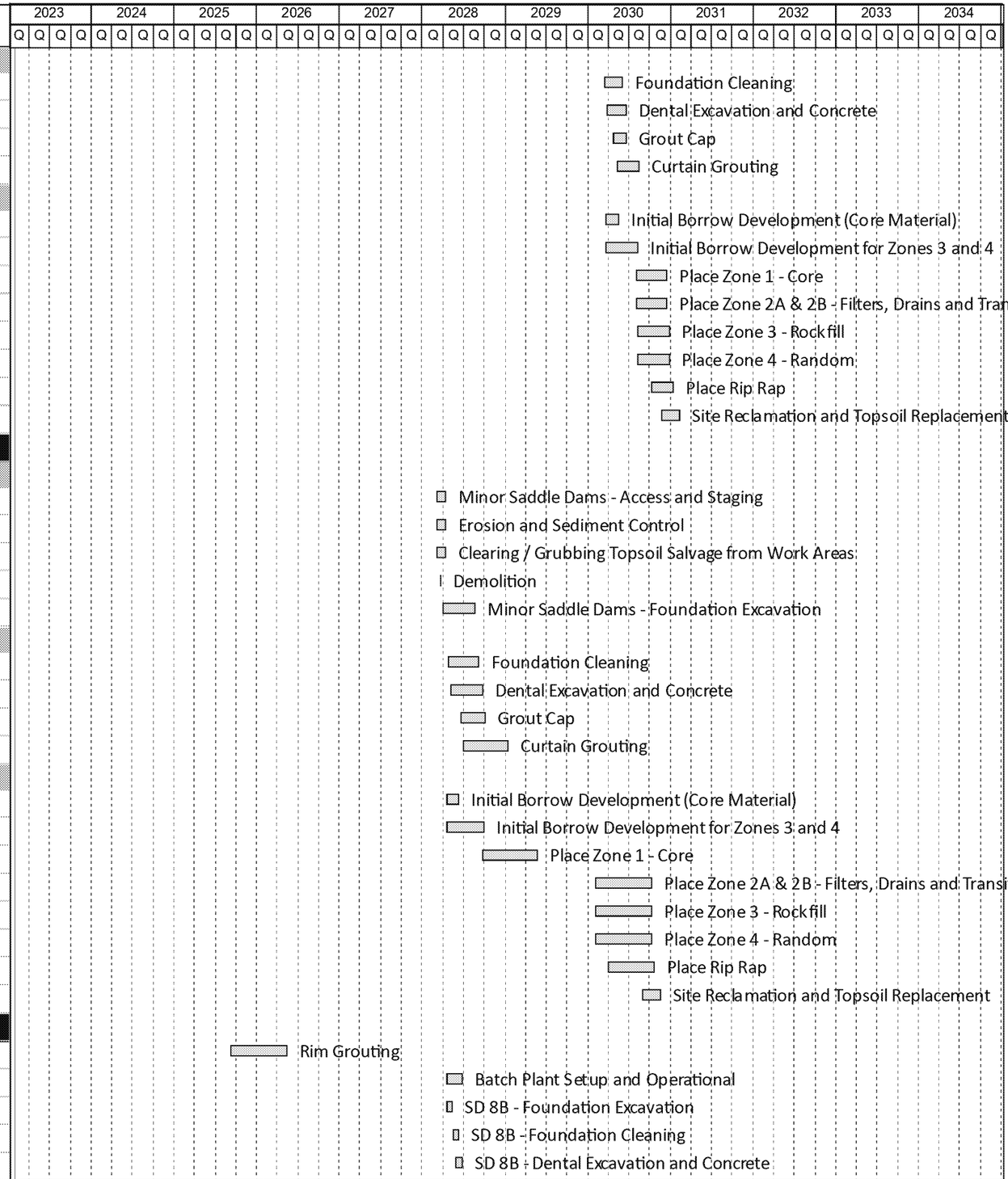
#	Activity ID	Activity Name	Duration	Start	Finish
1020		**Saddle Dam 5 - Foundation Preparation and Grouting**	110	14-Mar-30	14-Aug-30
1021	X201	Foundation Cleaning	60	14-Mar-30	05-Jun-30
1022	X202	Dental Excavation and Concrete	60	28-Mar-30	19-Jun-30
1023	X203	Grout Cap	40	25-Apr-30	19-Jun-30
1024	X204	Curtain Grouting	70	09-May-30	14-Aug-30
1025		**Saddle Dam 5 - Embankment**	235	21-Mar-30	12-Feb-31
1026	X205	Initial Borrow Development (Core Material)	40	21-Mar-30	15-May-30
1027	X206	Initial Borrow Development for Zones 3 and 4	100	21-Mar-30	07-Aug-30
1028	X207	Place Zone 1 - Core	100	01-Aug-30	18-Dec-30
1029	X208	Place Zone 2A & 2B - Filters, Drains and Transitions	100	01-Aug-30	18-Dec-30
1030	X209	Place Zone 3 - Rockfill	100	08-Aug-30	25-Dec-30
1031	X210	Place Zone 4 - Random	100	08-Aug-30	25-Dec-30
1032	X211	Place Rip Rap	70	10-Oct-30	15-Jan-31
1033	X212	Site Reclamation and Topsoil Replacement	60	21-Nov-30	12-Feb-31
1034		**Minor Saddle Dams (SD1,SD2,SD6,SD8A, Dike 1, and Dike 2)**	708	06-Mar-28	20-Nov-30
1035		**Minor Saddle Dams Foundation Excavation**	120	06-Mar-28	18-Aug-28
1036	X213	Minor Saddle Dams - Access and Staging	30	06-Mar-28	14-Apr-28
1037	X214	Erosion and Sediment Control	30	06-Mar-28	14-Apr-28
1038	X215	Clearing / Grubbing Topsoil Salvage from Work Areas	30	06-Mar-28	14-Apr-28
1039	X216	Demolition	5	20-Mar-28	24-Mar-28
1040	X217	Minor Saddle Dams - Foundation Excavation	100	03-Apr-28	18-Aug-28
1041		**Minor Saddle Dams - Foundation Preparation and Grouting**	190	24-Apr-28	12-Jan-29
1042	X218	Foundation Cleaning	100	24-Apr-28	08-Sep-28
1043	X219	Dental Excavation and Concrete	100	08-May-28	22-Sep-28
1044	X220	Grout Cap	80	19-Jun-28	06-Oct-28
1045	X221	Curtain Grouting	140	03-Jul-28	12-Jan-29
1046		**Minor Saddle Dams - Embankment**	678	17-Apr-28	20-Nov-30
1047	X222	Initial Borrow Development (Core Material)	40	17-Apr-28	09-Jun-28
1048	X223	Initial Borrow Development for Zones 3 and 4	120	17-Apr-28	29-Sep-28
1049	X224	Place Zone 1 - Core	175	25-Sep-28	25-May-29
1050	X225	Place Zone 2A & 2B - Filters, Drains and Transitions	175	07-Feb-30	09-Oct-30
1051	X226	Place Zone 3 - Rockfill	175	07-Feb-30	09-Oct-30
1052	X227	Place Zone 4 - Random	175	07-Feb-30	09-Oct-30
1053	X228	Place Rip Rap	145	04-Apr-30	23-Oct-30
1054	X229	Site Reclamation and Topsoil Replacement	60	29-Aug-30	20-Nov-30
1055		**Saddle Dam 8B - Spillway**	932	09-Sep-25	10-Apr-29
1056	X240	Rim Grouting	171	09-Sep-25	11-May-26
1057	X230	Batch Plant Setup and Operational	50	17-Apr-28	23-Jun-28
1058	X231	SD 8B - Foundation Excavation	20	17-Apr-28	12-May-28
1059	X232	SD 8B - Foundation Cleaning	20	15-May-28	09-Jun-28
1060	X233	SD 8B - Dental Excavation and Concrete	20	29-May-28	23-Jun-28



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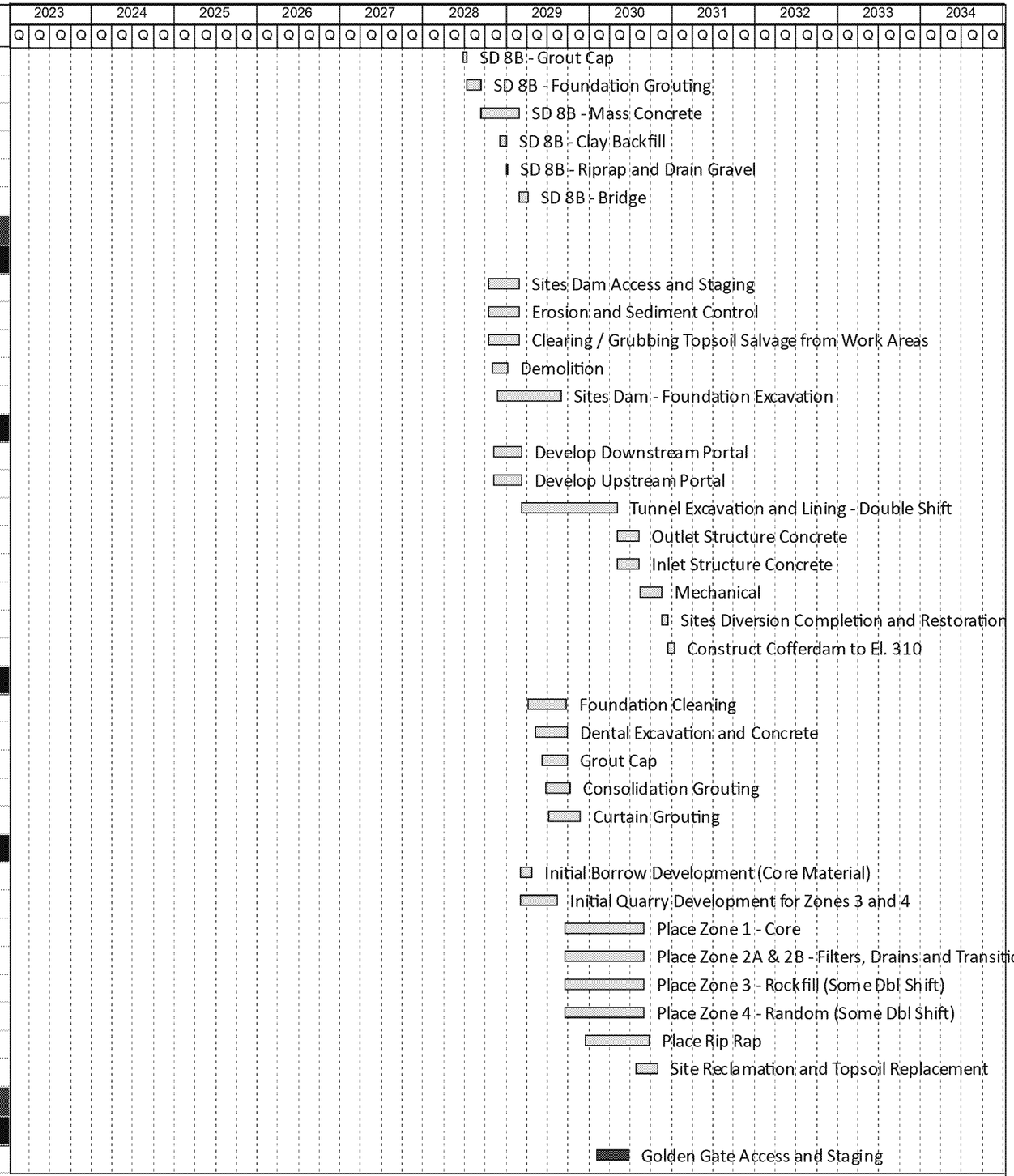
1061	X234	SD 8B - Grout Cap	12	26-Jun-28	11-Jul-28
1062	X235	SD 8B - Foundation Grouting	45	12-Jul-28	12-Sep-28
1063	X236	SD 8B - Mass Concrete	120	13-Sep-28	27-Feb-29
1064	X238	SD 8B - Clay Backfill	20	06-Dec-28	02-Jan-29
1065	X239	SD 8B - Riprap and Drain Gravel	3	03-Jan-29	05-Jan-29
1066	X237	SD 8B - Bridge	30	28-Feb-29	10-Apr-29
1067	**Sites Dam Construction**		585	16-Oct-28	10-Jan-31
1068	**Sites Dam Foundation Excavation**		230	16-Oct-28	31-Aug-29
1069	X241	Sites Dam Access and Staging	100	16-Oct-28	02-Mar-29
1070	X242	Erosion and Sediment Control	100	16-Oct-28	02-Mar-29
1071	X243	Clearing / Grubbing Topsoil Salvage from Work Areas	100	16-Oct-28	02-Mar-29
1072	X244	Demolition	50	30-Oct-28	05-Jan-29
1073	X245	Sites Dam - Foundation Excavation	200	27-Nov-28	31-Aug-29
1074	**Sites Diversion Outlet Facility**		570	06-Nov-28	10-Jan-31
1075	X246	Develop Downstream Portal	90	06-Nov-28	09-Mar-29
1076	X248	Develop Upstream Portal	90	06-Nov-28	09-Mar-29
1077	X247	Tunnel Excavation and Lining - Double Shift	300	12-Mar-29	03-May-30
1078	X249	Outlet Structure Concrete	70	06-May-30	09-Aug-30
1079	X250	Inlet Structure Concrete	70	06-May-30	09-Aug-30
1080	X251	Mechanical	70	12-Aug-30	15-Nov-30
1081	X252	Sites Diversion Completion and Restoration	20	18-Nov-30	13-Dec-30
1082	X253	Construct Cofferdam to El. 310	20	16-Dec-30	10-Jan-31
1083	**Sites Dam - Foundation Preparation and Grouting**		165	09-Apr-29	23-Nov-29
1084	X254	Foundation Cleaning	120	09-Apr-29	21-Sep-29
1085	X255	Dental Excavation and Concrete	100	14-May-29	28-Sep-29
1086	X256	Grout Cap	80	11-Jun-29	28-Sep-29
1087	X257	Consolidation Grouting	80	25-Jun-29	12-Oct-29
1088	X258	Curtain Grouting	100	09-Jul-29	23-Nov-29
1089	**Sites Dam - Embankment**		435	05-Mar-29	01-Nov-30
1090	X259	Initial Borrow Development (Core Material)	40	05-Mar-29	27-Apr-29
1091	X260	Initial Quarry Development for Zones 3 and 4	120	05-Mar-29	17-Aug-29
1092	X261	Place Zone 1 - Core	250	17-Sep-29	30-Aug-30
1093	X262	Place Zone 2A & 2B - Filters, Drains and Transitions	250	17-Sep-29	30-Aug-30
1094	X263	Place Zone 3 - Rockfill (Some Dbl Shift)	250	17-Sep-29	30-Aug-30
1095	X264	Place Zone 4 - Random (Some Dbl Shift)	250	17-Sep-29	30-Aug-30
1096	X265	Place Rip Rap	200	17-Dec-29	20-Sep-30
1097	X266	Site Reclamation and Topsoil Replacement	70	29-Jul-30	01-Nov-30
1098	**Golden Gate Dam Construction**		976	07-Feb-30	03-Nov-33
1099	**GG Dam Foundation Excavation**		360	07-Feb-30	25-Jun-31
1100	X267	Golden Gate Access and Staging	100	07-Feb-30	26-Jun-30



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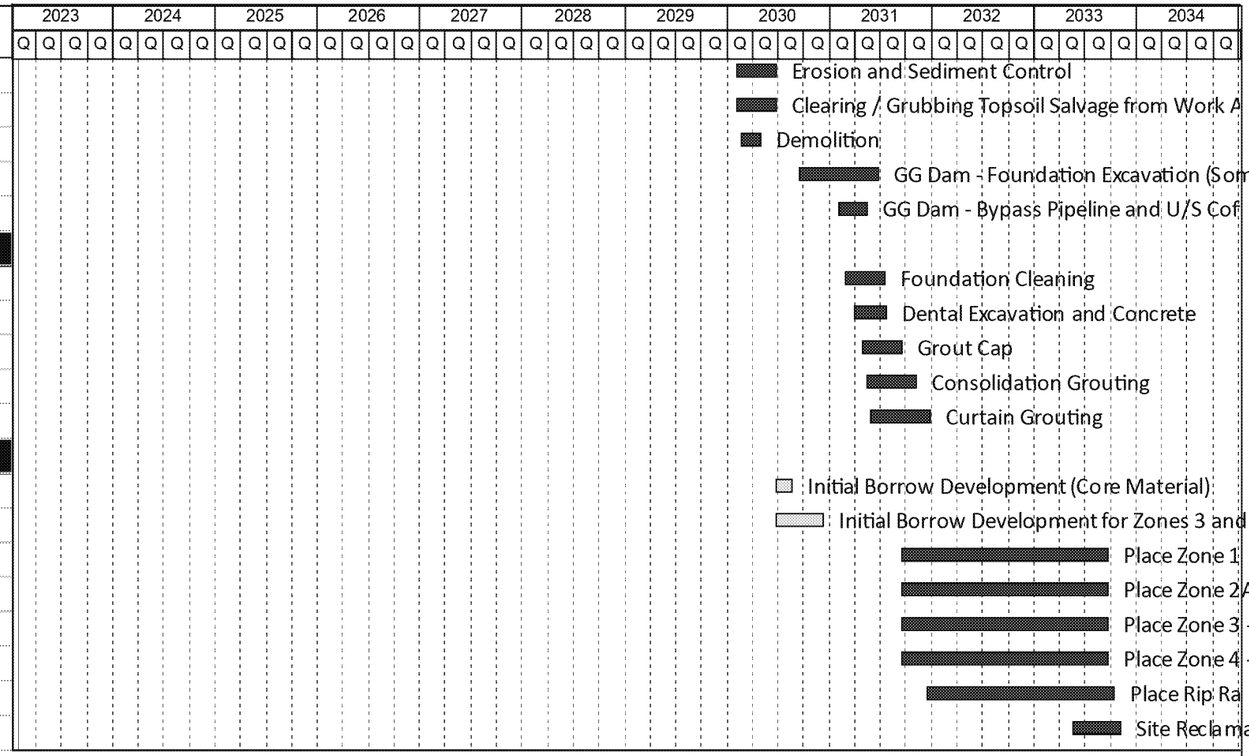
#	Activity ID	Activity Name	Duration	Start	Finish
1101	X268	Erosion and Sediment Control	100	07-Feb-30	26-Jun-30
1102	X269	Clearing / Grubbing Topsoil Salvage from Work Areas	100	07-Feb-30	26-Jun-30
1103	X270	Demolition	50	21-Feb-30	01-May-30
1104	X271	GG Dam - Foundation Excavation (Some Dbl Shift)	200	19-Sep-30	25-Jun-31
1105	X272	GG Dam - Bypass Pipeline and U/S Cofferdam	70	06-Feb-31	14-May-31
1106	**GG Dam - Foundation Preparation and Grouting**		215	27-Feb-31	24-Dec-31
1107	X273	Foundation Cleaning	100	27-Feb-31	16-Jul-31
1108	X274	Dental Excavation and Concrete	80	03-Apr-31	23-Jul-31
1109	X275	Grout Cap	100	01-May-31	17-Sep-31
1110	X276	Consolidation Grouting	125	15-May-31	05-Nov-31
1111	X277	Curtain Grouting	150	29-May-31	24-Dec-31
1112	**GG Dam - Embankment**		876	27-Jun-30	03-Nov-33
1113	X278	Initial Borrow Development (Core Material)	40	27-Jun-30	21-Aug-30
1114	X279	Initial Borrow Development for Zones 3 and 4	120	27-Jun-30	11-Dec-30
1115	X280	Place Zone 1 - Core	525	18-Sep-31	21-Sep-33
1116	X281	Place Zone 2A & 2B - Filters, Drains and Transitions	525	18-Sep-31	21-Sep-33
1117	X282	Place Zone 3 - Rockfill (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
1118	X283	Place Zone 4 - Random (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
1119	X284	Place Rip Rap	475	18-Dec-31	12-Oct-33
1120	X285	Site Reclamation and Topsoil Replacement	120	20-May-33	03-Nov-33



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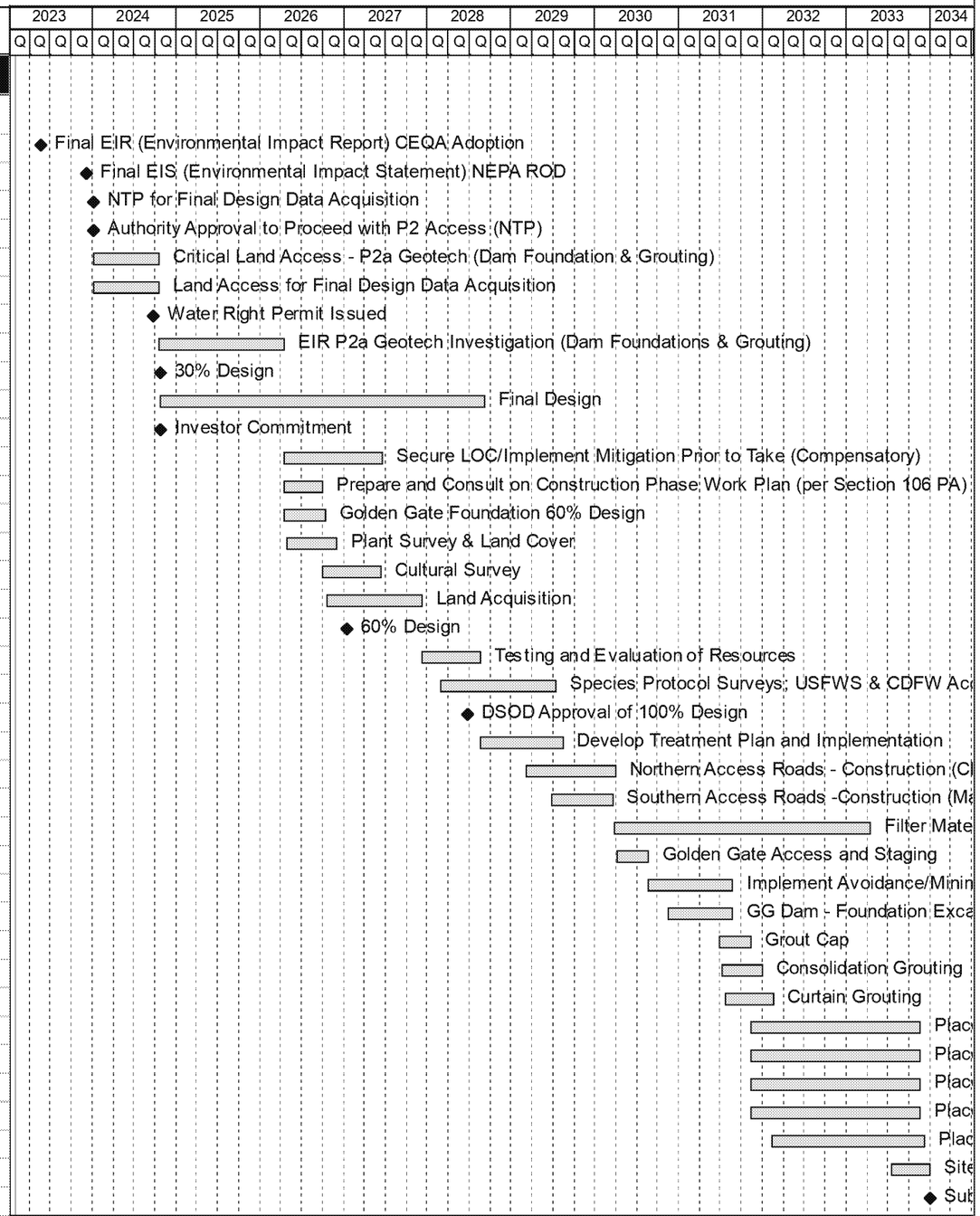
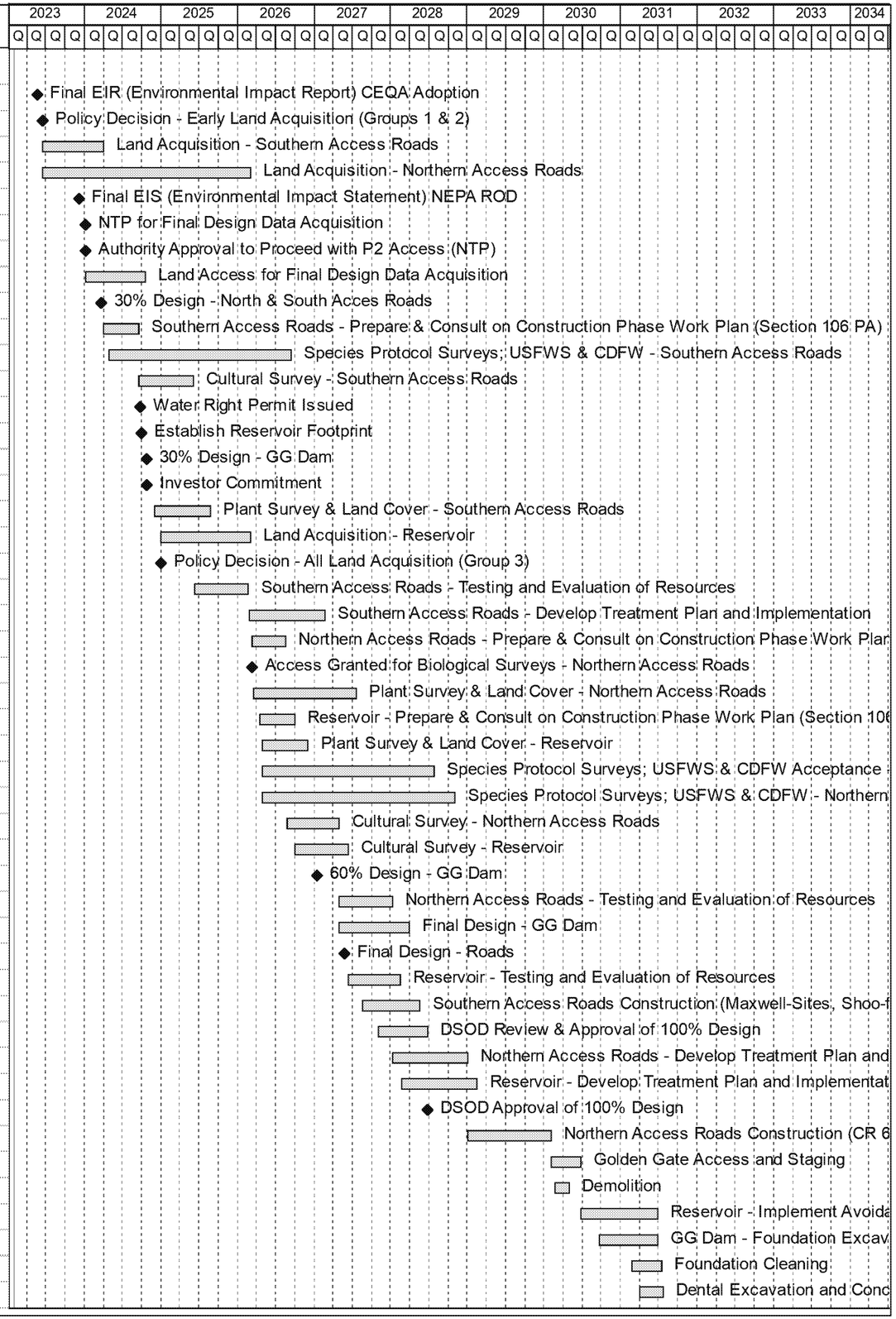
Sites Reservoir Project

Schedule

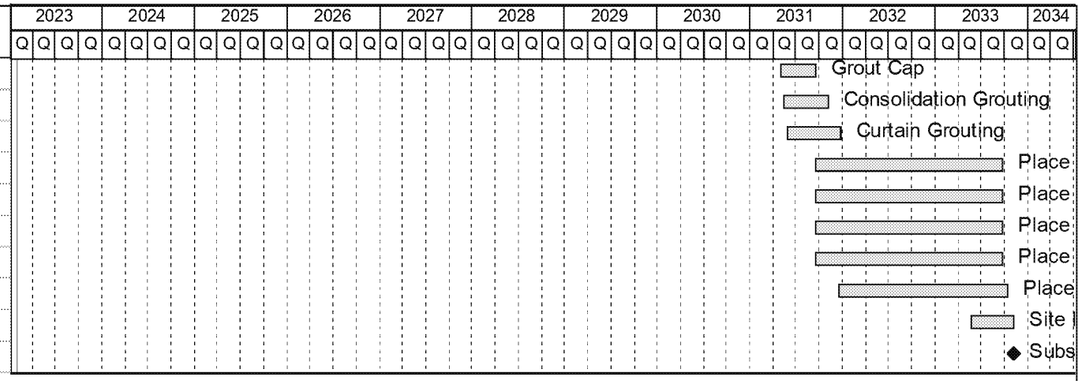
#	Activity ID	Activity Name	Duration	Start	Finish
1	**Sites Reservoir Project DD: Feb-2023_Workshop**		2742	26-May-23	30-Dec-33
2	**Sites Reservoir Construction Package**		2742	26-May-23	30-Dec-33
3	3.OE1	Final EIR (Environmental Impact Report) CEQA Adoption	0		26-May-23
4	4.OE1	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
5	26.OE1	NTP for Final Design Data Acquisition	0		05-Jan-24
6	12.OE1	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
7	16.OE1	Critical Land Access - P2a Geotech (Dam Foundation & Grouting)	200	08-Jan-24	16-Oct-24
8	12a.OE1	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
9	5a.OE1	Water Right Permit Issued	0		26-Sep-24
10	82.OE1	EIR P2a Geotech Investigation (Dam Foundations & Grouting)	380	17-Oct-24	17-Apr-26
11	85.OE1	30% Design	0		23-Oct-24
12	89a.OE1	Final Design	1000	24-Oct-24	08-Sep-28
13	5b.OE1	Investor Commitment	0		24-Oct-24
14	73.OE1	Secure LOC/Implement Mitigation Prior to Take (Compensatory)	305	20-Apr-26	18-Jun-27
15	75.OE1	Prepare and Consult on Construction Phase Work Plan (per Section 106 PA)	120	20-Apr-26	02-Oct-26
16	92.OE1	Golden Gate Foundation 60% Design	130	20-Apr-26	16-Oct-26
17	32.a.OE1	Plant Survey & Land Cover	158	29-Apr-26	04-Dec-26
18	76.OE1	Cultural Survey	180	05-Oct-26	11-Jun-27
19	12b.OE1	Land Acquisition	300	19-Oct-26	10-Dec-27
20	89d.OE1	60% Design	0		15-Jan-27
21	77.OE1	Testing and Evaluation of Resources	180	13-Dec-27	18-Aug-28
22	39.9.OE1	Species Protocol Surveys; USFWS & CDFW Acceptance	358	01-Mar-28	13-Jul-29
23	89c.OE1	DSOD Approval of 100% Design	0		23-Jun-28
24	78.OE1	Develop Treatment Plan and Implementation	260	21-Aug-28	17-Aug-29
25	182.OE1	Northern Access Roads - Construction (CR 68, CR 69, N. Rd)	284	05-Mar-29	04-Apr-30
26	192.OE1	Southern Access Roads -Construction (Maxwell-Sites, Shoo-fly, A-1)	195	25-Jun-29	22-Mar-30
27	211.OE1	Filter Material Haul to Stockpile	800	25-Mar-30	15-Apr-33
28	321.OE1	Golden Gate Access and Staging	100	05-Apr-30	22-Aug-30
29	79.OE1	Implement Avoidance/Minimization Activities During Construction	260	23-Aug-30	21-Aug-31
30	325.OE1	GG Dam - Foundation Excavation (Some Dbl Shift)	200	15-Nov-30	21-Aug-31
31	330.OE1	Grout Cap	100	27-Jun-31	13-Nov-31
32	331.OE1	Consolidation Grouting	125	11-Jul-31	01-Jan-32
33	332.OE1	Curtain Grouting	150	25-Jul-31	19-Feb-32
34	336.OE1	Place Zone 1 - Core	525	14-Nov-31	17-Nov-33
35	337.OE1	Place Zone 2A & 2B - Filters, Drains and Transitions	525	14-Nov-31	17-Nov-33
36	338.OE1	Place Zone 3 - Rockfill (Some Dbl Shift)	525	14-Nov-31	17-Nov-33
37	339.OE1	Place Zone 4 - Random (Some Dbl Shift)	525	14-Nov-31	17-Nov-33
38	340.OE1	Place Rip Rap	475	13-Feb-32	08-Dec-33
39	341.OE1	Site Reclamation and Topsoil Replacement	120	18-Jul-33	30-Dec-33
40	342.OE1	Substantial Completion - Dams Ready for Commissioning	0		30-Dec-33



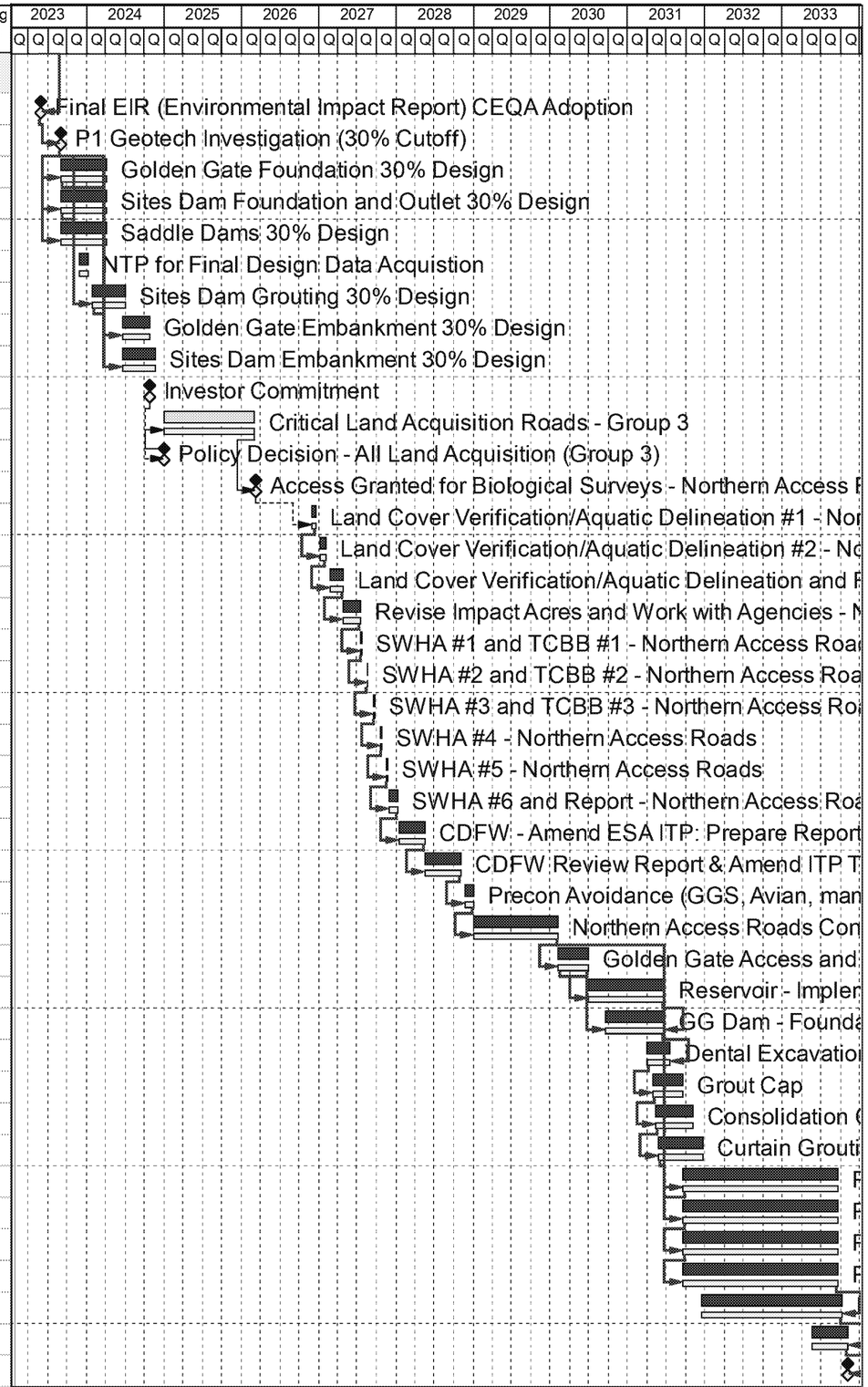
#	Activity ID	Activity Name	Duration	Start	Finish
42		**Sites Reservoir Construction Package Accelerated**	2701	26-May-23	03-Nov-33
43	X1.OE2	Final EIR (Environmental Impact Report) CEQA Adoption	0		26-May-23
44	X309.OE2	Policy Decision - Early Land Acquisition (Groups 1 & 2)	0	16-Jun-23*	
45	X15.e.OE2	Land Acquisition - Southern Access Roads	200	16-Jun-23	01-Apr-24
46	X15.f.OE2	Land Acquisition - Northern Access Roads	689	16-Jun-23	06-Mar-26
47	X2.OE2	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
48	X299.OE2	NTP for Final Design Data Acquisition	0		05-Jan-24
49	X8.OE2	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
50	X291.OE2	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
51	X307.OE2	30% Design - North & South Acces Roads	0		20-Mar-24
52	X1239.OE2	Southern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section '	120	02-Apr-24	19-Sep-24
53	X1229.OE2	Species Protocol Surveys; USFWS & CDFW - Southern Access Roads	607	30-Apr-24	16-Sep-26
54	X1249.OE2	Cultural Survey - Southern Access Roads	180	20-Sep-24	06-Jun-25
55	X289.OE2	Water Right Permit Issued	0		26-Sep-24
56	X305.OE2	Establish Reservoir Footprint	0		02-Oct-24
57	X297.OE2	30% Design - GG Dam	0		23-Oct-24
58	X7.OE2	Investor Commitment	0		24-Oct-24
59	X1219.OE2	Plant Survey & Land Cover - Southern Access Roads	187	02-Dec-24	26-Aug-25
60	X292.OE2	Land Acquisition - Reservoir	300	02-Jan-25	06-Mar-26
61	X319.OE2	Policy Decision - All Land Acquisition (Group 3)	0	02-Jan-25*	
62	X1259.OE2	Southern Access Roads - Testing and Evaluation of Resources	180	09-Jun-25	23-Feb-26
63	X1269.OE2	Southern Access Roads - Develop Treatment Plan and Implementation	260	24-Feb-26	22-Feb-27
64	X329.OE2	Northern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section 1	120	09-Mar-26	21-Aug-26
65	X809.OE2	Access Granted for Biological Surveys - Northern Access Roads	0	09-Mar-26	
66	X779.OE2	Plant Survey & Land Cover - Northern Access Roads	352	16-Mar-26	20-Jul-27
67	X63.OE2	Reservoir - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	20-Apr-26	02-Oct-26
68	X301.OE2	Plant Survey & Land Cover - Reservoir	158	29-Apr-26	04-Dec-26
69	X302.OE2	Species Protocol Surveys; USFWS & CDFW Acceptance - Reservoir	587	30-Apr-26	28-Jul-28
70	X789.OE2	Species Protocol Surveys; USFWS & CDFW - Northern Access Roads	656	30-Apr-26	02-Nov-28
71	X339.OE2	Cultural Survey - Northern Access Roads	180	24-Aug-26	30-Apr-27
72	X64.OE2	Cultural Survey - Reservoir	180	05-Oct-26	11-Jun-27
73	X300.OE2	60% Design - GG Dam	0		15-Jan-27
74	X349.OE2	Northern Access Roads - Testing and Evaluation of Resources	180	03-May-27	07-Jan-28
75	X799.OE2	Final Design - GG Dam	240	03-May-27	31-Mar-28
76	X294.OE2	Final Design - Roads	0		28-May-27
77	X65.OE2	Reservoir - Testing and Evaluation of Resources	180	14-Jun-27	18-Feb-28
78	X163.OE2	Southern Access Roads Construction (Maxwell-Sites, Shoo-fly, A-1)	195	18-Aug-27	16-May-28
79	X295.OE2	DSOD Review & Approval of 100% Design	170	01-Nov-27	23-Jun-28
80	X359.OE2	Northern Access Roads - Develop Treatment Plan and Implementation	260	10-Jan-28	05-Jan-29
81	X66.OE2	Reservoir - Develop Treatment Plan and Implementation	260	21-Feb-28	16-Feb-29
82	X298.OE2	DSOD Approval of 100% Design	0		23-Jun-28
83	X155.OE2	Northern Access Roads Construction (CR 68, CR 69, N. Rd)	284	05-Jan-29	06-Feb-30
84	X267.OE2	Golden Gate Access and Staging	100	07-Feb-30	26-Jun-30
85	X270.OE2	Demolition	50	21-Feb-30	01-May-30
86	X67.OE2	Reservoir - Implement Avoidance/Minimization Activities During Construction	260	27-Jun-30	25-Jun-31
87	X271.OE2	GG Dam - Foundation Excavation (Some Dbl Shift)	200	19-Sep-30	25-Jun-31
88	X273.OE2	Foundation Cleaning	100	27-Feb-31	16-Jul-31
89	X274.OE2	Dental Excavation and Concrete	80	03-Apr-31	23-Jul-31



#	Activity ID	Activity Name	Duration	Start	Finish
90	X275.OE2	Grout Cap	100	01-May-31	17-Sep-31
91	X276.OE2	Consolidation Grouting	125	15-May-31	05-Nov-31
92	X277.OE2	Curtain Grouting	150	29-May-31	24-Dec-31
93	X280.OE2	Place Zone 1 - Core	525	18-Sep-31	21-Sep-33
94	X281.OE2	Place Zone 2A & 2B - Filters, Drains and Transitions	525	18-Sep-31	21-Sep-33
95	X282.OE2	Place Zone 3 - Rockfill (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
96	X283.OE2	Place Zone 4 - Random (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
97	X284.OE2	Place Rip Rap	475	18-Dec-31	12-Oct-33
98	X285.OE2	Site Reclamation and Topsoil Replacement	120	20-May-33	03-Nov-33
99	X286.OE2	Substantial Completion - Dams Ready for Commissioning	0		03-Nov-33



#	Activity ID	Activity Name	Start	Finish	Remaining Duration
76	**Sites Reservoir Construction Package Accelerated**				
77	X1.OE2	Final EIR (Environmental Impact Report) CEQA Adoption		26-May-23	0
78	X68	P1 Geotech Investigation (30% Cutoff)	31-Aug-23*		0
79	X72	Golden Gate Foundation 30% Design	31-Aug-23	05-Apr-24*	151
80	X103	Sites Dam Foundation and Outlet 30% Design	31-Aug-23	05-Apr-24*	151
81	X136	Saddle Dams 30% Design	31-Aug-23	05-Apr-24*	151
82	X4	NTP for Final Design Data Acquistion	01-Dec-23*	05-Jan-24	23
83	X114	Sites Dam Grouting 30% Design	26-Jan-24	01-Jul-24*	111
84	X92	Golden Gate Embankment 30% Design	17-Jun-24	23-Oct-24*	91
85	X125	Sites Dam Embankment 30% Design	17-Jun-24	20-Nov-24*	111
86	X7.OE2	Investor Commitment		24-Oct-24	0
87	X15.d	Critical Land Acquisition Roads - Group 3	02-Jan-25	06-Mar-26	300
88	X319.OE2	Policy Decision - All Land Acquisition (Group 3)	02-Jan-25*		0
89	X379	Access Granted for Biological Surveys - Northern Access Roads	09-Mar-26		0
90	X419	Land Cover Verification/Aquatic Delineation #1 - Northern Access Roads	02-Dec-26*	22-Dec-26	15
91	X429	Land Cover Verification/Aquatic Delineation #2 - Northern Access Roads	13-Jan-27	02-Feb-27	15
92	X439	Land Cover Verification/Aquatic Delineation and Report - Northern Access Road	24-Feb-27	27-Apr-27	45
93	X449	Revise Impact Acres and Work with Agencies - Northern Access Roads	28-Apr-27	20-Jul-27	60
94	X509	SWHA #1 and TCBB #1 - Northern Access Roads	21-Jul-27*	27-Jul-27	5
95	X519	SWHA #2 and TCBB #2 - Northern Access Roads	18-Aug-27	24-Aug-27	5
96	X529	SWHA #3 and TCBB #3 - Northern Access Roads	15-Sep-27	21-Sep-27	5
97	X539	SWHA #4 - Northern Access Roads	20-Oct-27	26-Oct-27	5
98	X549	SWHA #5 - Northern Access Roads	17-Nov-27	23-Nov-27	5
99	X559	SWHA #6 and Report - Northern Access Roads	03-Dec-27	13-Jan-28	30
100	X749	CDFW - Amend ESA ITP: Prepare Report & Submit - Northern Access Roads	14-Jan-28	18-May-28	90
101	X759	CDFW Review Report & Amend ITP Take Statement - Northern Access Roads	19-May-28	02-Nov-28	120
102	X769	Precon Avoidance (GGS, Avian, mammal, other CEQA spp) - Northern Access R	24-Nov-28	04-Jan-29	30
103	X155.OE2	Northern Access Roads Construction (CR 68, CR 69, N. Rd)	05-Jan-29	06-Feb-30	284
104	X267.OE2	Golden Gate Access and Staging	07-Feb-30	26-Jun-30	100
105	X67.OE2	Reservoir - Implement Avoidance/Minimization Activities During Construction	27-Jun-30	25-Jun-31	260
106	X271.OE2	GG Dam - Foundation Excavation (Some Dbl Shift)	19-Sep-30	25-Jun-31	200
107	X274.OE2	Dental Excavation and Concrete	03-Apr-31	23-Jul-31	80
108	X275.OE2	Grout Cap	01-May-31	17-Sep-31	100
109	X276.OE2	Consolidation Grouting	15-May-31	05-Nov-31	125
110	X277.OE2	Curtain Grouting	29-May-31	24-Dec-31	150
111	X280.OE2	Place Zone 1 - Core	18-Sep-31	21-Sep-33	525
112	X281.OE2	Place Zone 2A & 2B - Filters, Drains and Transitions	18-Sep-31	21-Sep-33	525
113	X282.OE2	Place Zone 3 - Rockfill (Some Dbl Shift)	18-Sep-31	21-Sep-33	525
114	X283.OE2	Place Zone 4 - Random (Some Dbl Shift)	18-Sep-31	21-Sep-33	525
115	X284.OE2	Place Rip Rap	18-Dec-31	12-Oct-33	475
116	X285.OE2	Site Reclamation and Topsoil Replacement	20-May-33	03-Nov-33	120
117	X290	Substantial Completion		03-Nov-33*	0



From: Sara M. Katz [skatz@katzandassociates.com]
Sent: 3/7/2023 3:34:01 PM
To: Kevin Spesert [kspesert@sitesproject.org]; Ann Newton [anewton@katzandassociates.com]; Quin La Capra [qlacapra@katzandassociates.com]; Sarah Rossetto [srossetto@katzandassociates.com]; kim@floydcommunications.com; Emily Fan Michaelson [emichaelson@katzandassociates.com]
Subject: Topics for tomorrow - Sites Comms Meeting @9am

1. Kevin update
2. Annual Report/2022 Highlights: Done, posted – how to advance in other ways? (Sara)
3. Eblast: Annual report/highlights/other (Sarah)
4. 2023 Comms Overview for Q1 and Q2 (Ann)
5. March 23 Community Working Group: Topics, participation, other (Kim)
6. Water Rights Application process: Sample letter; draft press release; FAQ (Ann/Quin)
7. LA Times LTE: Sara/Ann – discuss possible author
8. ACWA – waiting for room confirmation. (Sara)
9. EIR engagement update/Review EIR video clip outline (Emily/Quin)
10. Virtual Tour video assets and drone footage (Kevin)
11. Other

K&A
KATZ & ASSOCIATES

Sara M. Katz
Founder/CEO
mobile: 619.813.9551
San Diego · Los Angeles · San Francisco

From: Brick, David A [dbrick@usbr.gov]
Sent: 3/7/2023 3:53:30 PM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Jacobson, Allison M [ajacobson@usbr.gov]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: [EXTERNAL] RE: USACE extension request

That works for me, I expect that USACE will submit their comments on the 10th. Their comments will be on those chapters, yes.

David

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, March 7, 2023 3:04 PM
To: Brick, David A <dbrick@usbr.gov>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi David,

Appendices 9A and 9B were not revised as part of the Final EIR/EIS and therefore were not submitted for comments. If they need to see Appendix 9B, it is available on the Authority's website (https://sitesproject.org/wp-content/uploads/2021/11/RDEIR-SDEIS-App09B-Vegetation-Wetland-Methods.pdf).

When you say the USACE comments will be "based off of" Chapters 1-6, and 9, does that mean they are commenting on those chapters? Given our schedule for live edit meetings next week for Chapters 1-4, I am inclined to move forward with ICF's review of the comments we have received to date in preparation for those meetings. We may be able to make additional edits to Chapters 1-4 if USACE provides comments by the 10th. Would that be ok with you?

Thank you,

Laurie

From: Brick, David A <dbrick@usbr.gov>
Sent: Tuesday, March 7, 2023 11:39 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi Laurie, I got ahold of Matthew Roberts at USACE.

USACE comments would be based off of Chapters 1-6, 9, and appendix 9b. He did mention he was unable to find Appendix 9b. Can we confirm it's available on Sharepoint?

David

From: Brick, David A
Sent: Tuesday, March 7, 2023 11:28 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>

Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi Laurie, I haven't heard back from USACE. I reached out to them again and will let you know when I hear back. It's safe to assume that they'd have comments on Ch 9 and related RTCS at a minimum.

David

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, March 7, 2023 7:06 AM
To: Brick, David A <dbrick@usbr.gov>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi David,

Did you get confirmation from USACE that they were only focused on Ch 9, Vegetation and Wetland Resources and related RTCS (MR6 and Table 15)? I'd like to make sure there aren't other topics that need to be held until Friday.

Thank you,

Laurie

From: Brick, David A <dbrick@usbr.gov>
Sent: Monday, March 6, 2023 1:04 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi Laurie, I just spoke with EPA and they said they have comments only on Group 2 chapters, and are targeting the Group 2 due date for those comments. EPA does not have any comments for Group 1.

David

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Monday, March 6, 2023 12:57 PM
To: Brick, David A <dbrick@usbr.gov>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Sounds great, thank for the quick response. I'd like to get files compiled tomorrow, if possible.

From: Brick, David A <dbrick@usbr.gov>
Sent: Monday, March 6, 2023 12:55 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi Laurie,

EPA said they'd get there Group 1 comments in by Friday, let me follow up with them. I believe they had comments.

I have Group 1 comments from NMFS in my inbox, it looks like they were not added to the Sharepoint. I'll put them in an excel sheet and drop them on Sharepoint.

I do not expect comments from USFWS.

WAPA did not have any additional comments.

David

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Monday, March 6, 2023 12:52 PM
To: Brick, David A <dbrick@usbr.gov>; Jacobson, Allison M <ajacobson@usbr.gov>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi David and Allison,

I have not seen any Group 1 comments from WAPA or EPA on SharePoint and assume that USFWS and NMFS comments will come with Group 2, if at all.

Please confirm that, with the exception of USACE, we have received all input from Reclamation and the federal cooperating agencies on Group 1 chapters/appendices and corresponding responses to comments.

Thank you,

Laurie

From: Brick, David A <dbrick@usbr.gov>
Sent: Friday, March 3, 2023 10:18 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Jacobson, Allison M <ajacobson@usbr.gov>
Subject: RE: [EXTERNAL] RE: USACE extension request

Hi Laurie, I've reached out to USACE for clarification and will let you know what I hear back. I assume it'd be all chapters and appendices related to wetlands/wetland impacts.
David

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Friday, March 3, 2023 9:01 AM
To: Brick, David A <dbrick@usbr.gov>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Jacobson, Allison M <ajacobson@usbr.gov>
Subject: [EXTERNAL] RE: USACE extension request

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Hi David,

Do they mean the Volume 1 chapters or do they mean the Group 1 Chapters/Appendices and related responses to comments? It would be good to clarify and to see whether its just a few of the topics, such as wetlands and/or wildlife.

Thanks,

Laurie

From: Brick, David A <dbrick@usbr.gov>
Sent: Friday, March 3, 2023 8:03 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Cc: Jacobson, Allison M <ajacobson@usbr.gov>
Subject: USACE extension request

Good morning,

USACE has requested an extension to provide Vol 1 comments on March 10th.

Their email did not include a request for any other extensions.

Please advise on how best to respond,
Thanks everyone

David

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

Speaker: Ali

Draft - Predecisional Working Document - For Discussion Purposes Only

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

Draft - Predecisional Working Document - For Discussion Purposes Only

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/8/2023 10:14:48 AM
To: Marcia Kivett [MKivett@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]; Quin La Capra [qlacapra@katzandassociates.com]; Emily Fan Michaelson [emichaelson@katzandassociates.com]; Sara M. Katz [skatz@katzandassociates.com]; Kevin Spesert [kspesert@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]; 8:teamsvisitor:f7e44fa70ffe446b932538073fb6ee8f; 8:orgid:9c0c2ef7-7879-4934-83ae-e1308558bae1

- Cachil Dehe Band of Wintun Indians (Colusa Indian Community Council)
- Yocha Dehe Wintun Nation
- Kletsel Dehe Wintun Nation (Cortina Indian Rancheria of Wintun Indians)[1]
- Grindstone Indian Rancheria of Wintun-Wailaki
- Paskenta Band of Nomlaki Indians
- Estom Yume Maidu Tribe of the Enterprise Rancheria
- Mechoopda Indian Tribe

[1] The Cortina Indian Rancheria of Wintun Indians officially changed their name to the Kletsel Dehe Wintun Nation in 2016. As a result, this document has been updated to reflect this change, with the exception of the previously cited 2010 document.

Sites

Sites Q1 and Q2 Work Plan

STRATEGY

- Strategic, focused, and flexible communications and community outreach approach
- Concentrated on public education and public engagement
- Approach aligns with project activities and milestones
- Utilizing project participants and 3rd party voices to amplify messaging
- Robust media/social media presence and enhanced use of communications technology and approaches
- Proactive local community outreach

AUDIENCES

- Local Landowners/Local Community Members
- Participating Agencies (Internal & External)
- Regulatory/Permitting Agencies (Federal and State)
- Elected Officials (Federal, State, Local)
- Newsom Administration
- Media (Local, Regional, Statewide, National)
- Regional/Statewide Stakeholder Organizations
    - Local Municipalities
    - Business Groups
    - Environmental/Conservation Associations
    - Agricultural Associations
    - Local Government Associations
    - Building Trades
    - Industry/Trade Groups

OBJECTIVES

- Provide communications and community outreach support for the Final EIR/EIS, Water Right, and ongoing permitting process.
- Increase engagement with the local community to address community concerns and identify areas of shared interest.
- Continue to educate key audiences about the Sites Reservoir Project and its significant statewide benefits.
- Continue to develop an informed and engaged coalition of project supporters.
- Provide communication and stakeholder engagement support for project participant's internal and external audiences.

KEY PRIORITIES

- Updating message platform, project materials and FAQ with 2023 messaging and priorities

DRAFT

Sites

- Providing communications support to the Environmental Planning Team for the roll-out of Final EIR/EIS
- Series of Landowner Meetings (Colusa/Glenn and Yolo)
- Continue with the Local Community Working Group and establish the Local Tribal Government Working Group
- Develop video series on key 2023 initiatives
- Statewide "State of the Project" virtual open house(s) focused on the Final EIR/EIS and upcoming Water Right Process
- Strategic and focused effort to engage supporters and 3rd party voices ahead of EIR/EIS Certification and Water Right process
- Project update presentations and materials for interested participating agencies following certification of Final EIR/EIS (internal/external audiences)
- Virtual Project Tour video series that highlights project facilities, operations, and benefits

WORK PLAN

Each month assumes ongoing media relations support, weekly social media posts, communications strategy, rapid response and as-needed Board Authority engagement.

January

- Finalize 2023 communications and outreach strategy (COMPLETE)
- Support Annual Report development (COMPLETE)

February

- Update and finalize 2023 message platform (COMPLETE)
- Develop outreach and communications mini-plan for water right noticing period (COMPLETE)
- Begin development of supporting materials for water right permit noticing period:
    - Talking Points
    - Press Release
    - FAQ
    - Blog
    - Social Media Posts
- Begin development of supporting materials for release and certification of Final EIR/EIS
- Launch stakeholder outreach to secure letters of support for the project
- Identify 2023 Schedule of Videos
    - Virtual Tour
    - Documentary Style Video
    - 2 EIR key themes videos
        - "A First of Its Kind"
        - "A Collaborative Effort"

March

- Update core materials, FAQ, website content to reflect 2023 message platform

DRAFT

Sites

- Complete all materials and outreach related to water right permit noticing period
- Develop Final EIR/EIS informational materials:
  - Key topic fact sheets
  - Community guide to Final EIR/EIS
  - FAQs
- Final EIR videos:
  - Scripts and storyboards
  - Schedule filming and begin production
- Hold Community Work Group Meeting 3/16
- Virtual Tour:
  - Finalize Storyboard + Participants
  - Develop Production Schedule
  - Coordinate Renderings
- Begin planning of landowner meetings
- Support Tribal Working Group as-needed

Commented [AN1]: Need input on timing from Kevin

April

- Finalize Final EIR/EIS informational materials:
  - Key topic fact sheets
  - Community guide to Final EIR/EIS
  - FAQs
- Develop notices for release and certification of Final EIR/EIS (press release and eblasts)
- Final EIR videos:
  - Filming and production
  - Final editing
- Launch Open House Planning
  - Develop Program (format, speakers, potential audiences) and determine in-person and/or virtual
  - Begin Development of Presentation Materials
- Virtual Tour:
  - Filming and production
  - Final editing

May

- Launch Final EIR videos and informational materials
- Finalize "State of the Project" Open House Planning
  - Finalize Development of Presentation Materials
  - Begin Marketing
  - Conduct Rehearsal (May or June)
- Hold Community Work Group Meeting 5/18
- Develop Plan for Participant Presentations (summer 2023)
- Begin Scheduling for Participant Presentations

DRAFT

- Launch Virtual Tour Video
- Begin development of Documentary Style Video

June

- Conduct "State of the Project" Virtual Open House in late June or early July
- Develop Presentation Materials/Support Materials for Participant Home Boards
    - Presumes presentations begin in late July/August
- Filming + Production for Documentary Style Video

July

- Launch Documentary Style Video
- Conduct Presentations at Interested Participating Agencies
- Community Working Group Meeting 7/20

DRAFT

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/8/2023 6:47:57 PM
To: Micko, Steve [Steve.Micko@jacobs.com]; Angela Bezzone [bezzone@mbkengineers.com]; Spranza, John [john.spranza@hdrinc.com]
CC: Leaf, Rob [Rob.Leaf@jacobs.com]
Subject: RE: Sites Project - NGO Follow Up Meetings

Hi Steve - Apologies for taking so long to review this. This looks great and I have no comments or suggested changes.

Thanks so much for a great presentation!

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, March 7, 2023 3:59 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Spranza, John <john.spranza@hdrinc.com>
Cc: Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: RE: Sites Project - NGO Follow Up Meetings

You bet! Draft presentation is posted here: SPJPA_Sites_NGO_Outreach_CalSimModeling_rev03_20230307.pptx

Thanks again!
Steve

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 7, 2023 11:36 AM
To: Micko, Steve <Steve.Micko@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: [EXTERNAL] RE: Sites Project - NGO Follow Up Meetings

Thanks Steve. I just sent the invite. Feel free to add others from the Jacobs team.

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, March 7, 2023 9:16 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: RE: Sites Project - NGO Follow Up Meetings

Hi Ali – I can make that work! I'll finish the draft slide deck today.

Thanks,
Steve

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 7, 2023 8:58 AM
To: Micko, Steve <Steve.Micko@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: [EXTERNAL] Sites Project - NGO Follow Up Meetings
Importance: High

Steve and Angela – Are you available March 9 from 2:30 to 4 PM for the CALSIM modeling follow up meeting with the NGOs? Is this too soon?

John – Would March 16 from 10 to 11:30 AM work for the water quality meeting? Who else do we need for this?

Ali

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

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Sites Reservoir's Novel Approach to Storing Water for the Environment

By Gokce Sencan

In 2014, Proposition 1 set aside $2.7 billion to fund the "public benefit" portions of water storage projects through the Water Storage Investment Program. Water storage for the environment played a crucial role in determining how much funding the projects would receive. One of these projects, Sites Reservoir, offers a novel approach to storing water to benefit freshwater ecosystems when they need it most. We talked to Jerry Brown, executive director of the Sites Project Authority, to learn more about plans for the reservoir and its ecosystem water budget.

Can you tell us about the Sites project's unique approach to managing water for the environment? What might operations look like in practice?

From my perspective, tThe environmental water management portion of the Sites project is probably the most innovative ~~and interesting~~ part of the project. For the first time, it introduces the idea that we create and dedicate an asset for flexibly managing water supply for environmental purposes. We already do this today to comply with environmental regulations, but Sites marks a shift to making the environment a priority, which is not how we currently manage water for environmental purposes. We will contract~~aim~~ to dedicate a share of storage space in the reservoir—about 2400,000 acre-feet—to environmental purposes. But the space alone is not as valuable without water. So we are also contracting to dedicat~~eing~~ a proportionate share of ~~the water we are able to divert toward~~~~whatever we filling~~~~divert into~~ that space—around 17%~~–18%~~. In total, this is projected to~~would~~ amount to a little over 50,000 acre-feet of new water supply every year~~average annual supplies~~ for the ~~the~~ environmental purposes deemed a priority by CDFW. .

How are you structuring governance of storage and release of environmental water? And who pays the associated operations and maintenance costs?

The governance is a work in progress. We were awarded the Proposition 1 funds for two very specific ecosystem objectives out of the 16 that California Department of Fish and Wildlife (CDFW) identified. CDFW will be the ultimate decision-maker on allocating this water—this is one possibility for how the governance is set up. Another possibility that has greater potential in my opinion ~~There~~ is where ~~a real opportunity for~~ CDFW ~~to~~ flexibly manages this asset to meet any of the 16 ecosystem objectives, instead of just the two that have been singled out. This would make it possible to include more stakeholders and interested partners in discussions about how to make the most of this environmental water in different years. It's no different from how any other operator manages water resources. After we become more confident in this process, we might find it appropriate for other applications and see better outcomes.

Operations and management (O&M) is a perplexing issue. We have a "beneficiary pays" system, so we cannot subsidize the state's O&M costs—including the O&M for this environmental water. But that doesn't mean we don't get creative and solve the problem. We've suggested that the state could make use of~~sell~~ some of the~~ir at~~ water in ways that would generate revenue to support~~to support the~~ costs of their OM&R share of the project. But this is also a work in progress. It's unclear if CDFW has the~~currently doesn't have~~ capacity to operate as a water manager because their prime duty traditionally is regulation.

Do you see opportunities for operating the whole group of Proposition 1 projects in a coordinated way to boost environmental benefits?

I do. The state is an investor in each of these seven projects, and owns an asset that they can control. In making awards under Proposition 1, the state agencies didn't think of how the projects related—each was individually evaluated. But there's definitely an opportunity to grow benefits by operating in a coordinated fashion. It's critical that Proposition 1 dollars have a successful outcome, because if we're going to need more state and federal money to support California's water system, we need to show that the dollars invested bring a positive return. It's in everybody's best interest to have coordinated oversight and operation for that reason, plus it can create more value for ecosystems.

Last fall Governor Newsom announced that the state would assemble a strike team to facilitate permitting for water projects. Why is it taking so long to develop Sites, and how is the strike team helping the process?

The strike team is the most significant development that's benefitted the project timeline. It's helped with coordination between state and federal agencies, with a concerted effort to expedite—but not short-cut—the process. Nobody wants us to cut corners or sidetrack the process; the rules are there to help us make better decisions. But we have to balance this with urgency. Our investors can't decide to go forward until they know they have a permittable project that they can afford; this ultimately relies on evaluations of state and federal regulatory agencies. Another key decision point is the water rights process. It takes time and substantial deliberation~~information-gathering~~ to get to a point where the State Water Board can actually make a decision to grant the project a water right. No magic wand can be waved over things; that's not how things work and it would likely not be the best outcome for all of us~~good if they did~~. My view is we have this unique opportunity ~~We have one chance~~ to get it right~~, and it's too important to rush~~. I want to make sure we succeed. But we also don't have a lot of time, so we have to act with urgency. I think the Governor's effort seeks to strike the right balance on this tension.

LEARN MORE
https://www.ppic.org/wp-content/uploads/0822snr-appendix-c.pdf
https://www.ppic.org/blog/the-environmental-benefits-of-the-water-storage-investment-program/
https://www.ppic.org/blog/water-trading-can-help-californias-struggling-freshwater-ecosystems/

From: Janis Offermann [janis@horizonh2o.com]
Sent: 3/9/2023 9:24:34 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: FW: [EXTERNAL] RE: Sites Reservoir Tribal Working Group

Hi, Ali
Please see the response I received from Laverne this morning, below. I was pleased to see that Paskenta is interested in engaging.
I will ask him to send some possible dates for a meeting, with a cc to all those here.

I just wanted to confirm with you that it is OK to send them the cultural reports he requested. I was thinking the confidential cultural report that was appended to the EIR, as well as the sensitivity reports for the Geotech studies.
I had to think a moment about sending the confidential cultural report, given Laverne's reaction to supplying it to United Auburn. However, that report has information pertaining to the Paskenta traditional territory, so it seems like we should provide it to them.

I thought I would ping Mark at BOR and let him know that Paskenta requested consultation, but he is listed as the contact in the BOR's letter, so he should know...unless it fell through the cracks or got lost somehow.

Please let me know your thoughts about the reports. I would like to get back to Laverne this morning, but can limit my response to dates about meeting, if need be.
Thanks
janis

From: Laverne D. Bill <lbill@paskenta.org>
Sent: Thursday, March 9, 2023 8:52 AM
To: Janis Offermann <janis@horizonh2o.com>
Subject: [EXTERNAL] RE: Sites Reservoir Tribal Working Group

Good morning, Janis. I would like to have a meeting with the team about the areas of concern we have. The upper half of project is within our aboriginal territory, and we would like to further discuss. Can we set up a meeting? Also, I sent a consultation request to BoR and have not heard anything back. Can you also send me the last reports for Sites Reservoir so we can have them in our database.

The topic of a Tribal working group is being discussed with the other Tribes and we will be having a meeting next week to discuss.

Thanks again Janis and have a great day.

Laverne Bill, B.S., M.B.A.
Cultural Resources Manager
Paskenta Band of Nomlaki Indians
22580 Olivewood Avenue
Corning, CA 96021
C: (530) 781-6699
P: (530) 670-1746
www.paskenta-nsn.gov

From: Janis Offermann <janis@horizonh2o.com>
Sent: Wednesday, March 8, 2023 12:43 PM
To: Laverne D. Bill <lbill@paskenta.org>
Subject: Sites Reservoir Tribal Working Group

Hi, Laverne
I hope you are settling in to your new position for Paskenta.
I just thought I would follow up on our earlier emails. Have you had a chance to chat with tribal leadership about participating in the Tribal Working Group? The Authority is still considering a MOA for tribal collaboration on Sites Reservoir. Is this also something that may be of interest to Paskenta?

Please don't hesitate to reach out if you have any questions.
Thanks
janis

Janis Offermann, MA, RPA
Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

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From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 3/9/2023 9:59:42 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Spranza, John [john.spranza@hdrinc.com]
Subject: RE: Forecast Figure Notes
Attachments: 2023-03-09 Sites Diversion Forecast Tool.xlsm

Thanks! Attached is the updated tool with the new disclaimer box. Make sure you keep a clean copy of this saved. If you use the update button and it downloads data with any errors, it can corrupt the spreadsheet and you would need to go back to a prior working version.

And great point, Ali! I will work with Naomi to get her set up running the forecast and sending these out to the team as needed.

Angela

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, March 9, 2023 9:10 AM
To: Angela Bezzone <bezzone@mbkengineers.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: RE: Forecast Figure Notes

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This looks good to me. I would just suggest the following

Notes:
Forecasts are based on data available the day and time the forecast is updated.
Includes current understanding of Bend Bridge Pulse Protection and Wilkins Slough bypass requirements.
Bend Bridge Pulse Protection initiation will be subject to presence of fish in actual operations.

I think the forecast data can change during the day.

Is this something you can set up and then an junior staff person can actually each day? Maybe they can actually send it out and include you too? Just thinking about how to free you up a little especially with Wes out also.

Ali

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

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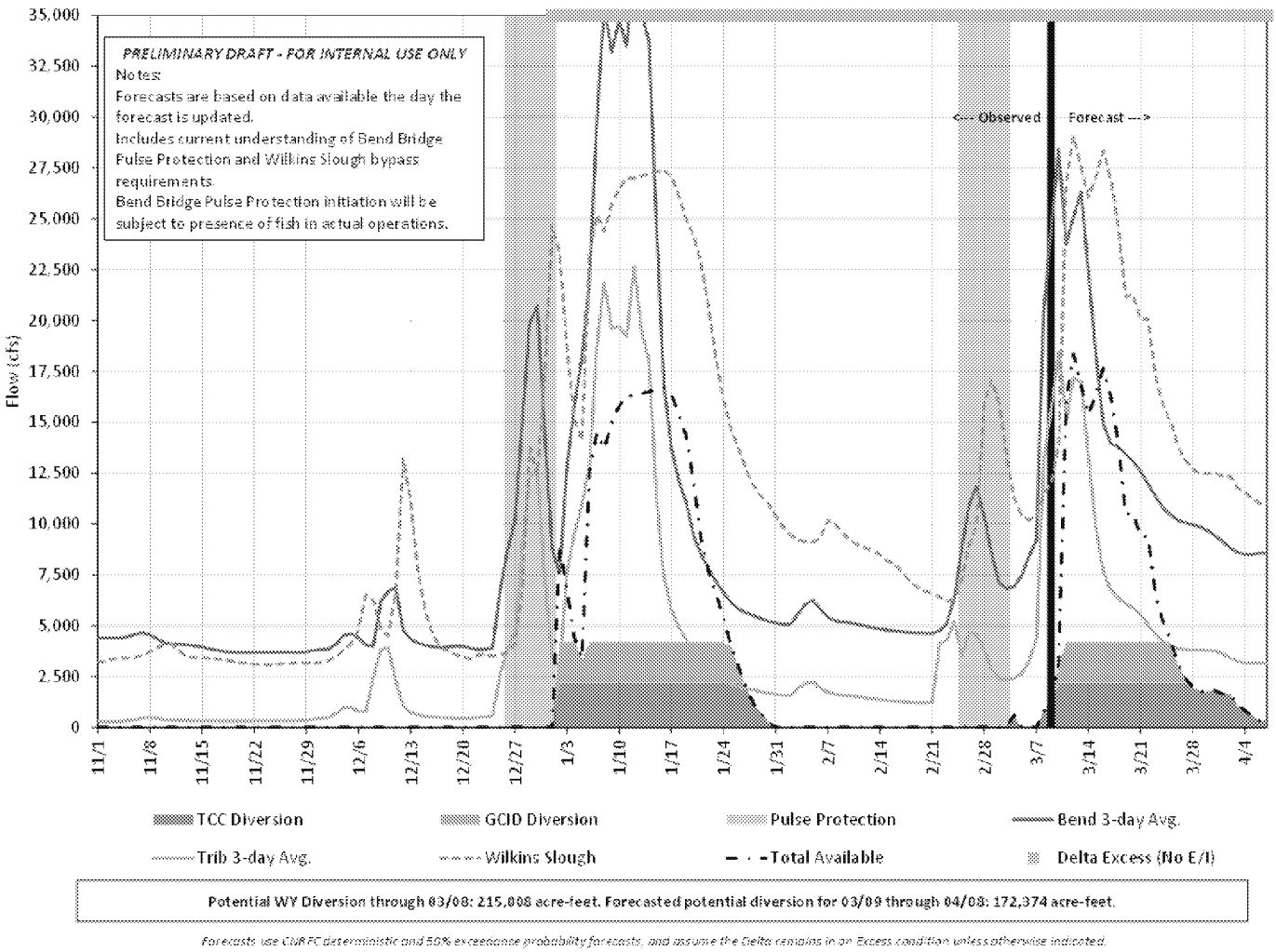
From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Thursday, March 9, 2023 8:47 AM

To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>
Subject: Forecast Figure Notes

Good morning! Jerry asked that I begin circulating the forecasts figures as storms approach and conditions indicate potential diversions. I added a disclaimer and a notes box at the top. Can you both please review this language and let me know if you have any comments? It's shown in the figure and duplicated below to make edits easier. Once I get your thoughts on the notes, I am going to send this out as mentioned below.

PRELIMINARY DRAFT - FOR INTERNAL USE ONLY
Notes:
Forecasts are based on data available the day the forecast is updated.
Includes current understanding of Bend Bridge Pulse Protection and Wilkins Slough bypass requirements.
Bend Bridge Pulse Protection initiation will be subject to presence of fish in actual operations.

The current plan is for me to send the figure out to only Jerry, Ali, JP, and Kevin. Then the four of you can decide who to engage with messaging, etc. We also discussed if Sara Katz should be cc'd – Ali, what are your thoughts? The thinking on the limited email list is to make sure that these figures don't get out in the world because they are very preliminary, and we are still developing our thoughts around how the pulse protection and Wilkins slough requirements will actually be implemented during operations. We are only interested in sharing the totals generated at the bottom. John – I'm happy to cc you or forward the email your way!



Angela Bezzone, P.E.

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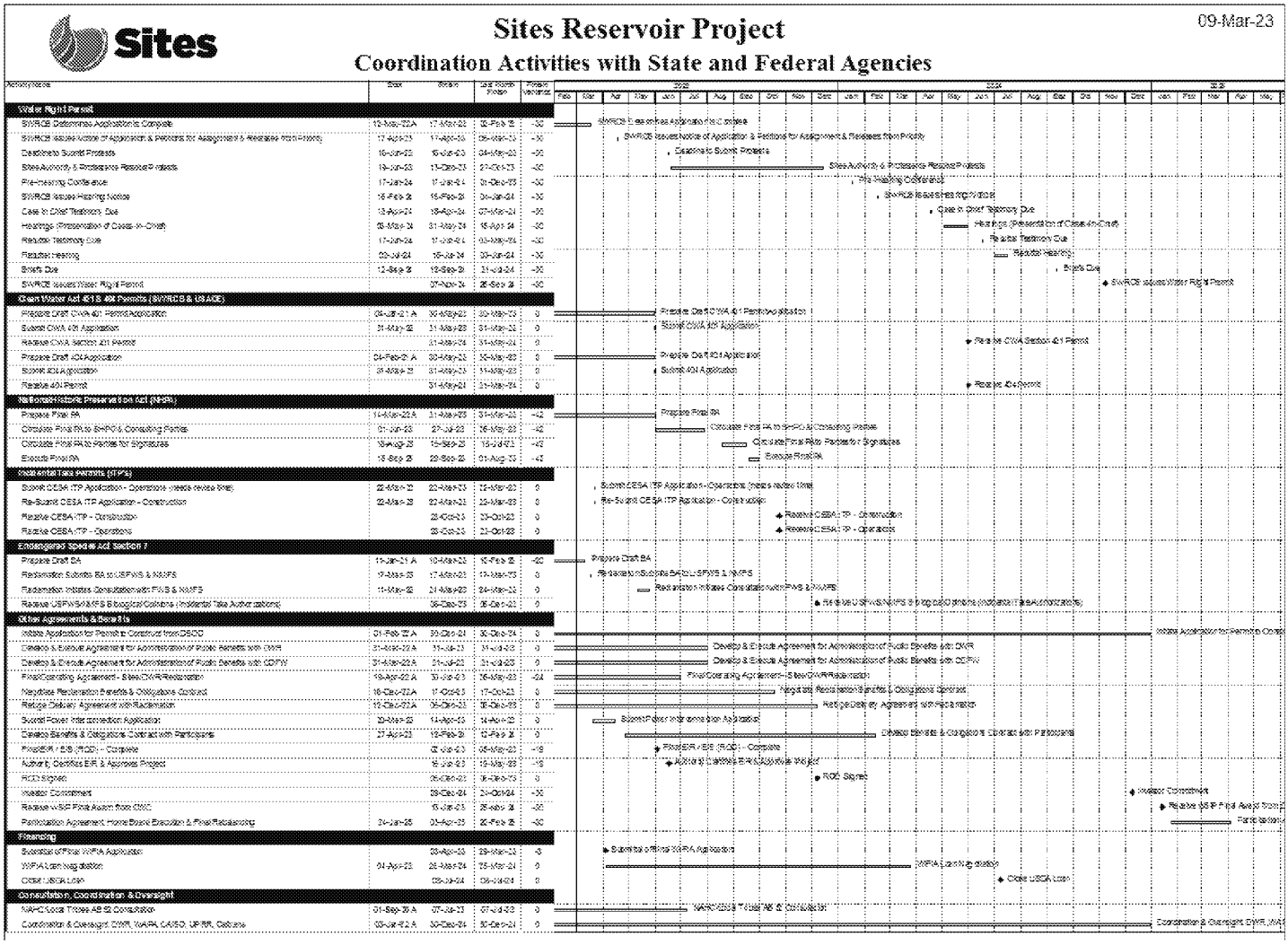
From: Marcia Kivett [MKivett@sitesproject.org]
Sent: 3/9/2023 11:13:30 AM
To: David Hubbard [Dhubbard@BrwnCald.com]; Jerry Brown [jbrown@sitesproject.org]; Benjamin Orsak [BOrsak@BrwnCald.com]
CC: mmaltby@brwncald.com; JP Robinette [jrobinette@sitesproject.org]; Luu, Henry [henry.luu@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: Re: Sites Strike Team Schedule - Comparison to Last Month

Below is the "Strike Team" update along with comparison and variance to last month's finish dates. Attached is the comparison version and the 'clean' version of the Strike Team Schedule.

- SWRCB Determination that Application is Complete continues and is now forecast to complete next Friday March 17. That's slipped 6 weeks (shown as -30). That directly pushes out Investor Commitment, WSIP Final Award from CWC and the Participation Agreement by the same 6 weeks.
- Prepare Final PA has pushed out 8 weeks. Comments from Danielle Risse are: ***Not on track – still waiting on SHPO to provide comments on the draft PA before the final can be drafted. Can we push this back to May 31, 2023? Subsequent PA dates would then be pushed back as well.***
- Prepare Draft BA slipped 4 weeks to complete 10-Mar-23 but all subsequent activities remain unchanged, so there is no "knock-on" effect with Preparing the Draft BA
- Final Operating Agreement – Sites/DWR/Reclamation pushed out 5 weeks as Reclamation is still working to complete their Basis of Negotiation (BON) and we cannot complete drafting until that is in place
- Final EIR/EIS (ROD) – Complete has pushed out 4 weeks; this is due to an extension of time given to state and federal agencies to review the Administrative Final EIR/EIS
- Authority Certifies EIR and Approves Project has slipped the same 4 weeks as the Final EIR/EIS above as they are linked



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

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Wednesday, March 8, 2023 8:11 PM
To: David Hubbard <Dhubbard@BrwnCald.com>; Benjamin Orsak <BOrsak@BrwnCald.com>
Cc: Marcus Maltby <mmaltby@BrwnCald.com>; Marcia Kivett <MKivett@sitesproject.org>; JP Robinette <jrobinette@sitesproject.org>; Luu, Henry <henry.luu@hdrinc.com>
Subject: Re: Sites Work Plan Progress Reporting (Draft) - Comparison to Last Month

Sounds good. I'd like to get this out to CWC staff before end of week so they can that inaction is causing day for day delay.

From: David Hubbard <Dhubbard@BrwnCald.com>
Date: Wednesday, March 8, 2023 at 2:29 PM

To: Benjamin Orsak <BOrsak@BrwnCald.com>
Cc: "mmaltby@brwncald.com" <mmaltby@brwncald.com>, Marcia Kivett <MKivett@sitesproject.org>, Jerry Brown <jbrown@sitesproject.org>, JP Robinette <jrobinette@sitesproject.org>, "Luu, Henry" <henry.luu@hdrinc.com>
Subject: Sites Work Plan Progress Reporting (Draft) - Comparison to Last Month

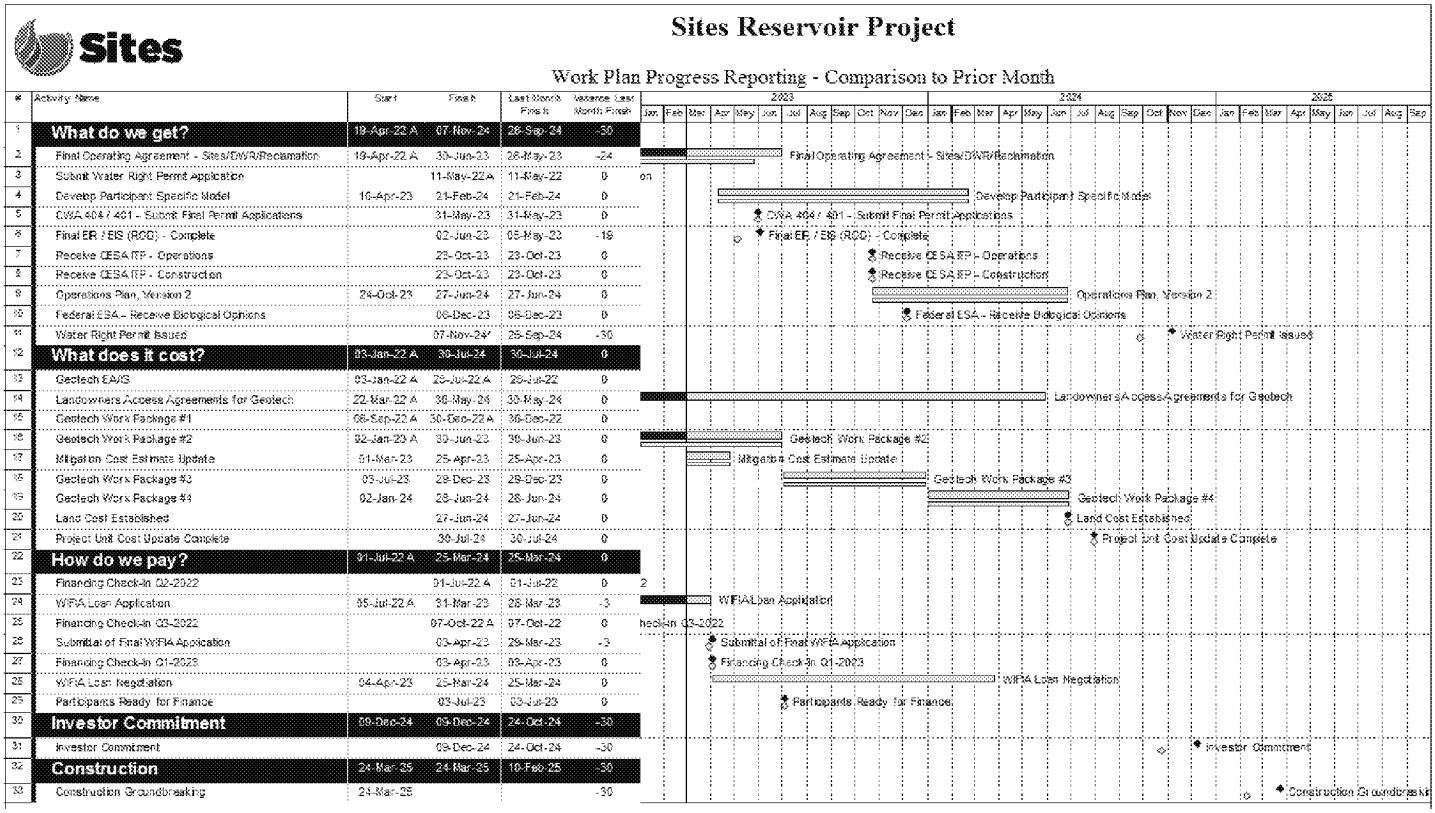
Here's a look at the DRAFT version with comparison to last month. Giving folks time to review and make any final changes before posting it in SharePoint as FINAL. I'll work on the justifications for the slippages in the meantime. Will share the Strike Team update soon. Water Right Permit slipped 6 weeks as we wait for SWRCB Determination as highlighted in a prior email.

Sites

Sites Reservoir Project

Work Plan Progress Reporting - Comparison to Prior Month

#	Activity Name	Start	Finish	Last Month Finish	Variance Last Month Finish
1	**What do we get?**	19-Apr-22 A	07-Nov-24	26-Sep-24	-30
2	Final Operating Agreement - Sites/DWR/Reclamation	19-Apr-22 A	30-Jun-23	26-May-23	-24
3	Submit Water Right Permit Application		11-May-22 A	11-May-22	0
4	Develop Participant Specific Model	16-Apr-23	21-Feb-24	21-Feb-24	0
5	CWA 404 / 401 - Submit Final Permit Applications		31-May-23	31-May-23	0
6	Final ER / EIS (ROD) - Complete		02-Jun-23	05-May-23	-19
7	Receive CESA ITP - Operations		23-Oct-23	23-Oct-23	0
8	Receive CESA ITP - Construction		23-Oct-23	23-Oct-23	0
9	Operations Plan, Version 2	24-Oct-23	27-Jun-24	27-Jun-24	0
10	Federal ESA - Receive Biological Opinions		08-Dec-23	08-Dec-23	0
11	Water Right Permit Issued		07-Nov-24	26-Sep-24	-30
12	**What does it cost?**	03-Jan-22 A	30-Jul-24	30-Jul-24	0
13	Geotech EA/IS	03-Jan-22 A	29-Jul-22 A	29-Jul-22	0
14	Landowners Access Agreements for Geotech	22-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 A	30-Jun-23	30-Jun-23	0
17	Mitigation Cost Estimate Update	01-Mar-23	25-Apr-23	25-Apr-23	0
18	Geotech Work Package #3	03-Jul-23	29-Dec-23	29-Dec-23	0
19	Geotech Work Package #4	02-Jan-24	28-Jun-24	28-Jun-24	0
20	Land Cost Established		27-Jun-24	27-Jun-24	0
21	Project Unit Cost Update Complete		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 Q2-2022		01-Jul-22 A	01-Jul-22	0
24	WIFIA Loan Application	05-Jul-22 A	31-Mar-23	28-Mar-23	-3
25	Financing Check-in Q3-2022		07-Oct-22 A	07-Oct-22	0
26	Submittal of Final WIFIA Application		03-Apr-23	28-Mar-23	-3
27	Financing Check-in Q1-2023		03-Apr-23	03-Apr-23	0
28	WIFIA Loan Negotiation	04-Apr-23	25-Mar-24	25-Mar-24	0
29	Participants Ready for Finance		03-Jul-23	03-Jul-23	0
30	**Investor Commitment**	09-Dec-24	09-Dec-24	24-Oct-24	-30
31	Investor Commitment		09-Dec-24	24-Oct-24	-30
32	**Construction**	24-Mar-25	24-Mar-25	10-Feb-25	-30
33	Construction Groundbreaking	24-Mar-25			-30



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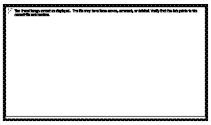

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/9/2023 11:21:19 AM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Spranza, John [john.spranza@hdrinc.com]; Nishikawa,George M [GNishikawa@mwdh2o.com]
CC: Angela Bezzone [bezzone@mbkengineers.com]
Subject: Sites Project - SharePoint Access for George with MWD

Importance: High

Hi Laurie and John – Can you both give SharePoint access to George with MWD (copied here) to the Final EIR/EIS files and the BA/ITP files? George understand that we're not accepting more comments on a number of these documents, but he's trying to get up to speed quickly on the Project and would like to look at these files.

Access ASAP would be much appreciated as George is trying to get ready for a meeting with MWD Board members on Monday.

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: 3/9/2023 11:35:31 AM
To: Angela Bezzone [bezzone@mbkengineers.com]
Subject: Sites Project - Materials for George
Attachments: Transfer Window Slide.pptx

Importance: High

I think he was generally looking for 3 more things –

1. Updated % of whos participating – Can you get him an updated list of all of the participants and their percentages?
2. Water Supply benefits specific to MWD – I think we may have this in the Proforma. Can you check in with Steve on this? I was going to look at the Plan of Finance really quick to see if there was anything in there.
3. Transfer capacity – I've used the attached slides before, but I have lost track of whether this is RDEIR/SDEIS or Final EIR/EIS modeling. But, in general, I am not sure it would change substantially between RDEIR/SDEIS and Final EIR/EIS modeling, so I think we can share this with George. What do you think?

Ali

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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/9/2023 11:46:03 AM
To: David Hubbard [Dhubbard@BrwnCald.com]; Spranza, John [john.spranza@hdrinc.com]; laurie.warner.herson [laurie.warner.herson@phenixenv.com]; Marcia Kivett [MKivett@sitesproject.org]
CC: Benjamin Orsak [BOrsak@BrwnCald.com]
Subject: RE: Sites Project - February Schedule in Board Packet

I made a few tweaks on the text document.

It looks good to me.

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: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Thursday, March 9, 2023 11:13 AM
To: Spranza, John <john.spranza@hdrinc.com>; laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Marcia Kivett <MKivett@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Benjamin Orsak <BOrsak@BrwnCald.com>
Subject: RE: Sites Project - February Schedule in Board Packet

Yeah, 6 weeks is quite a bit, but the process and logic after the Determination are pretty established and I could not justify modifying the logic or shortening any durations.
Day for day slip tied to Determination.

Dave Hubbard
Project Controls
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Cell: 832.840.1789
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From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Thursday, March 9, 2023 12:59 PM
To: laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Marcia Kivett <MKivett@sitesproject.org>; David Hubbard <Dhubbard@BrwnCald.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Benjamin Orsak <BOrsak@BrwnCald.com>
Subject: RE: Sites Project - February Schedule in Board Packet

Water right text seems fine, the 6 week delay may be a bit much, but if Ali is good with it then I have no other comments.

John Spranza

D 916.679.8858 M 818.640.2487

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Thursday, March 9, 2023 10:28 AM
To: Marcia Kivett <MKivett@sitesproject.org>; David Hubbard <Dhubbard@BrwnCald.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>
Cc: Benjamin Orsak <BOrsak@BrwnCald.com>
Subject: RE: Sites Project - February Schedule in Board Packet

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.

I provided edits to the EIR/EIS justification.

From: Marcia Kivett <MKivett@sitesproject.org>
Sent: Thursday, March 9, 2023 10:17 AM
To: David Hubbard <Dhubbard@BrwnCald.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Spranza, John <john.spranza@hdrinc.com>
Cc: Benjamin Orsak <BOrsak@BrwnCald.com>
Subject: Re: Sites Project - February Schedule in Board Packet

I've added the word document to the SharePoint staff reports area.

Ali, Laurie and John, can you please make your edits there if you have any?

From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Thursday, March 9, 2023 9:27 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Spranza, John <john.spranza@hdrinc.com>
Cc: Benjamin Orsak <BOrsak@BrwnCald.com>; Marcia Kivett <MKivett@sitesproject.org>
Subject: RE: Sites Project - February Schedule in Board Packet

See attached and please let me know if you guys want to change the "Justifications" wording. Thanks.

Dave Hubbard
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From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, March 9, 2023 11:11 AM

To: David Hubbard <Dhubbard@BrwnCald.com>; laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: RE: Sites Project - February Schedule in Board Packet

Okay. Gotcha.

Ali

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

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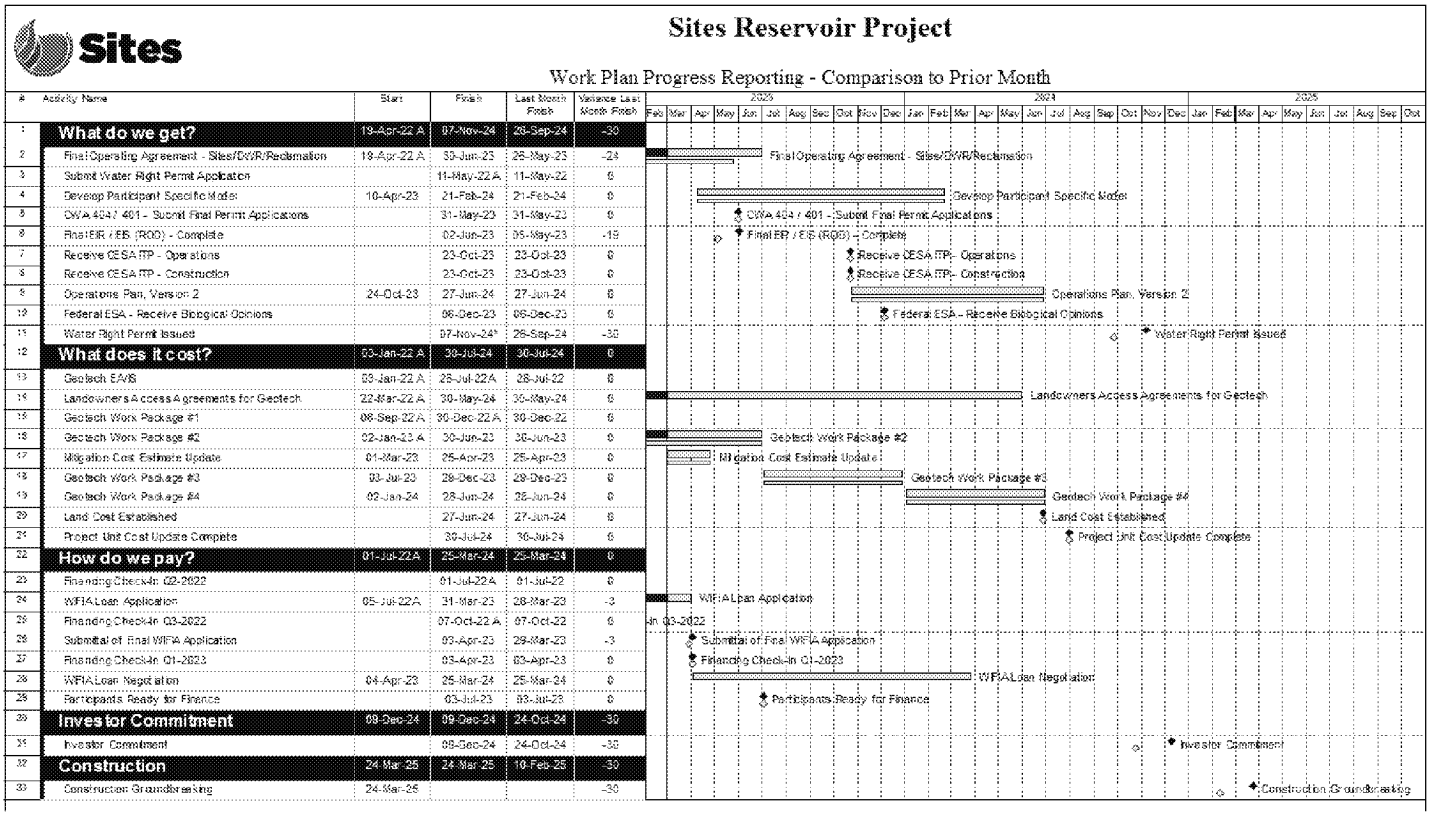
From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Thursday, March 9, 2023 8:57 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: RE: Sites Project - February Schedule in Board Packet

Correct, the ITP's moved last month so that's old dialogue.

The EIR/EIS move will be mentioned as it slipped 4 weeks (19 work days). See below, and that will be a bullet on the "Work Plan Schedule Summary of Changes" document after I update.



Sites

Sites Reservoir Project

Work Plan Progress Reporting - Comparison to Prior Month

#	Activity Name	Start	Finish	Last Month Finish	Variance Last Month Finish
1	**What do we get?**	19-Apr-22 A	07-Nov-24	26-Sep-24	-30
2	Final Operating Agreement - Sites/DWR/Reclamation	19-Apr-22 A	30-Jun-23	26-May-23	-24
3	Submit Water Right Permit Application		11-May-22 A	11-May-22	0
4	Develop Participant Specific Model	18-Apr-23	21-Feb-24	21-Feb-24	0
5	CWA 404 / 401 - Submit Final Permit Applications		31-May-23	31-May-23	0
6	Final EIR / EIS (ROD) - Complete		02-Jun-23	05-May-23	-19
7	Receive CESA ITP - Operations		23-Oct-23	23-Oct-23	0
8	Receive CESA ITP - Construction		23-Oct-23	23-Oct-23	0
9	Operations Plan, Version 2	24-Oct-23	27-Jun-24	27-Jun-24	0
10	Federal ESA - Receive Biological Opinions		06-Dec-23	06-Dec-23	0
11	Water Right Permit Issued		07-Nov-24*	26-Sep-24	-30
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-22 A	28-Jul-22	0
14	Landowners Access Agreements for Geotech	22-Mar-22 A	30-May-24	30-May-24	0
15	Geotech Work Package #1	08-Sep-22 A	30-Dec-22 A	30-Dec-22	0
16	Geotech Work Package #2	02-Jan-23 A	30-Jun-23	30-Jun-23	0
17	Mitigation Cost Estimate Update	01-Mar-23	25-Apr-23	25-Apr-23	0
18	Geotech Work Package #3	03-Jul-23	29-Dec-23	29-Dec-23	0
19	Geotech Work Package #4	02-Jan-24	28-Jun-24	28-Jun-24	0
20	Land Cost Established		27-Jun-24	27-Jun-24	0
21	Project Unit Cost Update Complete		30-Jul-24	30-Jul-24	0
22	**How do we pay?**	01-Jul-22 A	28-Mar-24	28-Mar-24	0
23	Financing Check-In Q2-2022		01-Jul-22 A	01-Jul-22	0
24	WIFIA Loan Application	05-Jul-22 A	31-Mar-23	28-Mar-23	-3
25	Financing Check-In Q3-2022		07-Oct-22 A	07-Oct-22	0
26	Submittal of Final WIFIA Application		03-Apr-23	29-Mar-23	-3
27	Financing Check-In Q1-2023		03-Apr-23	03-Apr-23	0
28	WIFIA Loan Negotiation	04-Apr-23	25-Mar-24	25-Mar-24	0
29	Participants Ready for Finance		03-Jul-23	03-Jul-23	0
30	**Investor Commitment**	09-Dec-24	09-Dec-24	24-Oct-24	-30
31	Investor Commitment		09-Dec-24	24-Oct-24	-30
32	**Construction**	24-Mar-25	24-Mar-25	19-Feb-25	-30
33	Construction Groundbreaking	24-Mar-25			-30

Dave Hubbard
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From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, March 9, 2023 10:53 AM
To: David Hubbard <Dhubbard@BrwnCald.com>; laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: RE: Sites Project - February Schedule in Board Packet

Okay. Gotcha. I think the draft report in the staff report folder is just old then.

But wouldn't we want to report the variance in the Final EIR/EIS schedule? The move into June?

Ali

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

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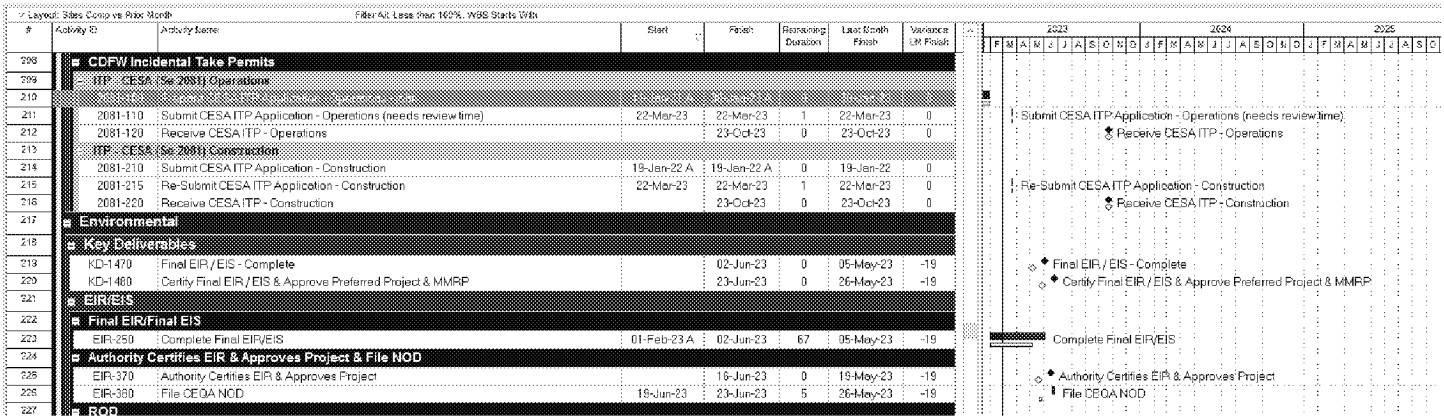
From: David Hubbard <Dhubbard@BrwnCald.com>
Sent: Thursday, March 9, 2023 8:43 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: RE: Sites Project - February Schedule in Board Packet

Ali – not sure what you're looking at, but the ITP's have not moved during this update cycle. See below – no variance to last month.
Teams me if you wanna look through the Schedule with me sharing screen. I'm open all day, right now.



#	Activity ID	Activity Name	Start	Finish	Remaining Duration	Last Month Finish	Variance - LM Finish
208		CDFW Incidental Take Permits					
209		ITP - CESA (se 2081) Operations					
210							
211	2081-110	Submit CESA ITP Application - Operations (needs review time)	22-Mar-23	22-Mar-23	1	22-Mar-23	0
212	2081-120	Receive CESA ITP - Operations		23-Oct-23	0	23-Oct-23	0
213		ITP - CESA (se 2081) Construction					
214	2081-210	Submit CESA ITP Application - Construction	19-Jan-22 A	19-Jan-22 A	0	19-Jan-22	0
215	2081-215	Re-Submit CESA ITP Application - Construction	22-Mar-23	22-Mar-23	1	22-Mar-23	0
216	2081-220	Receive CESA ITP - Construction		23-Oct-23	0	23-Oct-23	0
217		Environmental					
218		Key Deliverables					
219	KD-1470	Final EIR/EIS - Complete		02-Jun-23	0	05-May-23	-19
220	KD-1480	Certify Final EIR/EIS & Approve Preferred Project & MMRP		23-Jun-23	0	26-May-23	-19
221		EIR/EIS					
222		Final EIR/Final EIS					
223	EIR-250	Complete Final EIR/EIS	01-Feb-23 A	02-Jun-23	67	05-May-23	-19
224		Authority Certifies EIR & Approves Project & File NOD					
225	EIR-370	Authority Certifies EIR & Approves Project		16-Jun-23	0	19-May-23	-19
226	EIR-380	File CEQA NOD	19-Jun-23	23-Jun-23	5	26-May-23	-19
227		ROD					

Dave Hubbard

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dhubbard@brwncald.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, March 9, 2023 10:37 AM
To: David Hubbard <Dhubbard@BrwnCald.com>; laurie.warner.herson <laurie.warner.herson@phenixenv.com>; Spranza, John <john.spranza@hdrinc.com>
Subject: Sites Project - February Schedule in Board Packet

Hi all – I wanted to check to see what is driving the additional 5 weeks on the Operations ITP, Construction ITP in the February Board packet. Is this from delay of the Final EIR/EIS? And we don't mention moving the Final EIR/EIS into June in the packet. This seems like it should be in there as they have been super focused on May and we've now moved that to June.

Can we also take a second look at this?

Ali

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Sites Reservoir Project
EIR/EIS Fact Sheet – Fisheries

Background/Introduction

- Changes to the project including a design that is more protective of fisheries/has less impacts to fisheries
- Following the most current science to be protective of fisheries
- Commitment to be protective of fisheries

Commented [QC1]: Can you suggest specific changes we can mention that were most beneficial to fisheries?

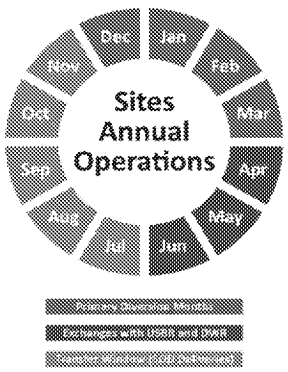
Mitigation Measures

- New benchmark on river flow protections; scientifically-based measure for Sac River flows
- Diversion criteria changes
  - Pulse protection number is lower
  - Reduced overall diversion capability with removal of Delvan Pipeline
    - Previously 5,000 cubic feet per second most of year; now 10,700 cubic feet per second during all but one month (September)
    - The Authority is currently developing an operating agreement with DWR and Reclamation for the CVP and SWP to operate in coordination with Sites Reservoir.
    - Water may be released from Sites Reservoir for export through the Delta during the transfer window (July to November)
      - [Graphic]:

Commented [QC2]: Can you provide an explanation or further clarity on this point?

Commented [QC3]: Can you verify the numbers and changes?

Commented [QC4]: This is the only mention of Reclamation and DWR in Master Response. Can you verify the narrative for this exchange period?



[Sidebar]: Hydrograph and explanation paragraph

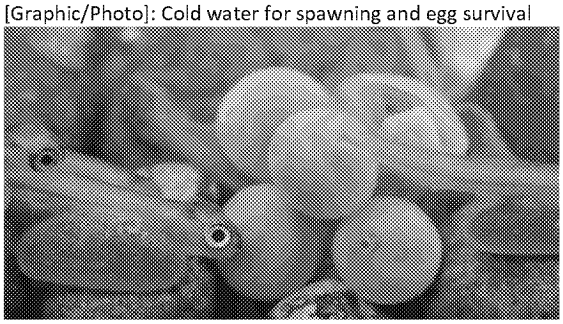
- [Graphic]: Simplified hydrograph that shows availability of water even in dry years
- Diversion criteria focuses on current conditions in the Sac River that fish are experiencing—not the water year

Commented [QC5]: Can you provide this graphic?

Value-Added Benefits

- Stores water specifically to support fish and their habitat during drought periods

- Helps preserve cold-water pool in Shasta Lake to support salmon development, spawning, and rearing
    - [Graphic/Diagram]: Different temperatures of water and how we swap water with Shasta
    - [Graphic/Photo]: Cold water for spawning and egg survival



Commented [QC6]: Can you provide this graphic?

- Improved conditions for delta smelt – estimated increases to population with Prop 1 funds

Commented [QC7]: Can you provide further clarity on this?

[Footer]: Visit sitesproject.org/environmental-review to review the Final EIR/EIS.

Sites Reservoir Project

Work Plan Progress Reporting

#	Activity Name	Start	Finish
1	**What do we get?**		
2	Final Operating Agreement - Sites/DWR/Reclamation	19-Apr-22 A	30-Jun-23
3	Submit Water Right Permit Application		11-May-22 A
4	Develop Participant Specific Model	10-Apr-23	21-Feb-24
5	CWA 404 / 401 - Submit Final Permit Applications		31-May-23
6	Final EIR / EIS (ROD) - Complete		02-Jun-23
7	Receive CESA ITP - Operations		23-Oct-23
8	Receive CESA ITP - Construction		23-Oct-23
9	Operations Plan, Version 2	24-Oct-23	27-Jun-24
10	Federal ESA - Receive Biological Opinions		06-Dec-23
11	Water Right Permit Issued		07-Nov-24*
12	**What does it cost?**		
13	Geotech EA/IS	03-Jan-22 A	28-Jul-22 A
14	Landowners Access Agreements for Geotech	22-Mar-22 A	30-May-24
15	Geotech Work Package #1	06-Sep-22 A	30-Dec-22 A
16	Geotech Work Package #2	02-Jan-23 A	30-Jun-23
17	Mitigation Cost Estimate Update	01-Mar-23	25-Apr-23
18	Geotech Work Package #3	03-Jul-23	29-Dec-23
19	Geotech Work Package #4	02-Jan-24	28-Jun-24
20	Land Cost Established		27-Jun-24
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22	**How do we pay?**		
23	Financing Check-In Q2-2022		01-Jul-22 A
24	WIFIA Loan Application	05-Jul-22 A	31-Mar-23
25	Financing Check-In Q3-2022		07-Oct-22 A
26	Submittal of Final WIFIA Application		03-Apr-23
27	Financing Check-In Q1-2023		03-Apr-23
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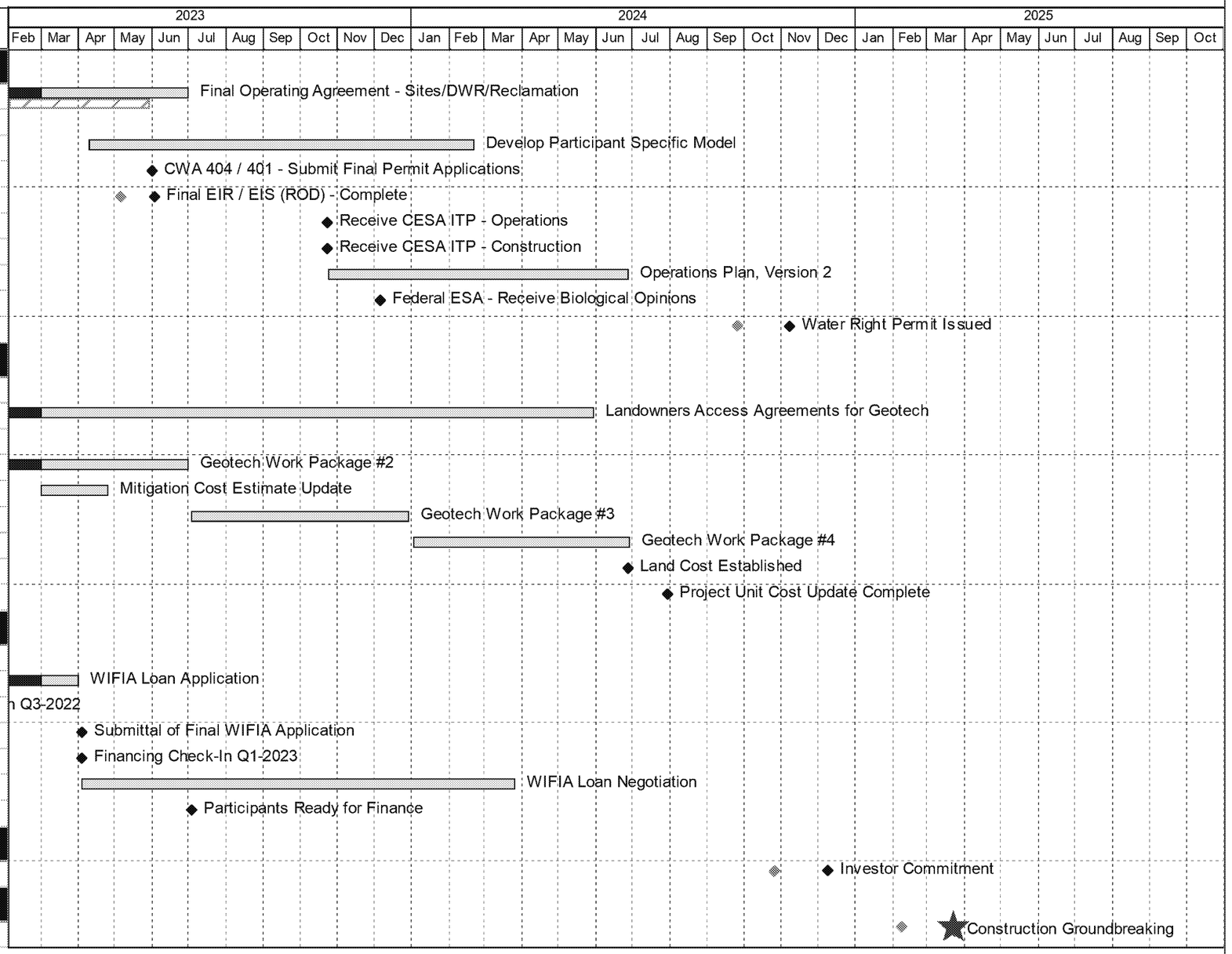
29	Participants Ready for Finance		03-Jul-23
30	**Investor Commitment**		
31	Investor Commitment		09-Dec-24
32	**Construction**		
33	Construction Groundbreaking	24-Mar-25	



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Key:
Work Completed
Work Remaining
Change from Previous Month

Data Date: 01-Mar-23 / Print Date: 09-Mar-23

Draft_0023172

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:	January 19, 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
Summer Shadley – Maxwell Unified School District8	Breyden Coma – Senator Dahle
Mike Bradwell – Colusa County Sheriff's Dept.	Juleah Cordi –Assemblymember Gallagher
Joyce Bond – Stonyford Museum	Brenda Haynes – Congressman LaMalfa
Randal Toews – Kanawha Glenn Fire District	Rita Durgin – Assemblymember Aguiar-Curry
Anastacia Allen – Colusa County Agriculture	Mary Hester – Interested Citizen
Wendy Tyler – Colusa County	Mike Azevedo – Colusa County Public Works
Jerry Brown – Sites Project Authority	Keith Dunn – Dunn Consulting
Ali Forsythe – Sites Project Authority	John Hanna – California Alliance for Jobs
JP Robinette – Sites Project Authority	Conner McDonald – CMD West
Kevin Spesert – Sites Project Authority	Kim Floyd – Floyd Communications

Welcome & Introductions

Kim Floyd (meeting facilitator) welcomed attendees to the second meeting of the Sites Project Authority's Community Working Group. Meeting attendees introduced themselves and the organizations they represent.

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. He opened by noting that had Sites Reservoir been operational during the recent January storm events, about 120,000 acre feet of water could have been diverted and stored for dry years. Other updates included:

- The waiting list for Project Participants recently expanded to 13 with the addition of Palmdale Water District and Western Municipal Water District.
- Regarding facilities, recent aerial surveys confirmed final reservoir elevations and dam siting, which are within two percent of prior estimates. The first round of geotechnical field work (Package 1) was completed in December 2022. Temporary right-of-entry agreements are being executed to support the next round of geotechnical field studies.

Draft_0023173

- The final Revised Environmental Impact Report is expected to be completed in May 2023, which is approximately the same time the State Water Resources Control Board will notice the public review and protest period for the Authority's water right permit.
- The Bureau of Reclamation has increased its interest its capacity participation to 16 percent, which amounts to about $700M in funding.

California Environmental Quality Act (CEQA) Process

Ali Forsythe, the Authority's Environmental Planning and Permitting Manager, provided an overview of the California Environmental Quality Act (CEQA) as it relates to the Sites Reservoir Project. CEQA is intended to provide decision makers and the public with information about a proposed project's significant impacts on the environment and how those impacts can be prevented, if possible. The document produced under CEQA is called an Environmental Impact Report (EIR). As the lead agency, the Sites Project Authority is responsible for development and adoption of the EIR. Ms. Forsythe emphasized that the EIR doesn't address every possible impact. Although it's useful in evaluating changes to the natural environment, such as physical changes that would require new or expanded facilities (e.g. utilities, schools), it's not effective for considering smaller impacts that can be handled within existing infrastructure (e.g. changes in traffic that are consistent with existing levels of service for roads). The EIR also considers conflicts between programs, plans and/or policies (e.g. zoning). However, the Sites Project Authority recognizes that less significant impacts as per the EIR may seem significant, especially in a small community. The Sites Project Authority is interested in developing Memorandum of Understandings (MOUs) with individual agencies, like law enforcement and schools, to navigate changes and needs. Kevin Spesert is the Authority's lead to work on development of MOUs. It was also noted that one of the purposes of the Community Working Group is to address and work through the community changes that aren't considered significant for purposes of the EIR. The EIR addresses dozens of areas of potential impact, but Ms. Forsythe focused on three that generated a lot interest: Traffic; Emergency and Law Enforcement Services; and Utilities (water/wastewater, energy).

Traffic

A number of changes were made to the project to account for concerns about traffic, such as the paved ("shoefly) road detour for Sites Ladoga Road during construction. All construction (big truck) traffic will be routed around the community, and safety improvements will be made to roads used for construction traffic (e.g. widening intersections and turns). Traffic during operations is a little trickier since types and seasons for recreation have yet to be determined. Although there are target numbers for recreators, the Authority is not yet sure how many will travel through the area. The Authority is committed to continuing to look at improvements along Oak Street and throughout the community to ensure it's safe for residents, especially school children. The group discussed the potential for balance between encouraging and prohibiting construction-related and recreation-based traffic through town, such as prohibiting big truck traffic but encouraging workers/recreators to patronize local businesses.

Law Enforcement/Emergency Services

The Authority recognizes that construction and later the addition of recreation, like camping, will increase demand for fire and law enforcement, to include water-based patrols/rescue. It intends to work with local agencies to navigate through the nearer-term issues related to construction but has also committed to adding fire and law enforcement facilities near reservoir recreation areas. Additionally, helicopter pads will be placed near both dams and one of the recreation areas. The Authority will work with local law enforcement and fire on facility type and siting. The Authority's construction management

and recreation plans will include emergency response elements, such as evacuation routes in the event of fire, and it will coordinate with local agencies on tabletop exercises to ensure coordination on emergency response. The potential for state/federal funding for additional staffing and services to address both existing and future unmet needs was also briefly discussed.

Utilities

The Project will include incidental generation of energy (hydro) upon release of water from the facility. The Authority is targeting 100 percent renewable, carbon-free by 2045. Building and facilities will have self-contained water and wastewater utilities. Project operations facilities will be minimally staffed, but there will be a larger demand on recreation facilities. Best management practices will be used to protect water quality and prevent sediment from being deposited into creeks and for the decommissioning of wells and wastewater facilities that exist within the reservoir footprint.

EIR Timeline

To date, the Authority has received 101 comment letters on the draft EIR. It is in the process of preparing a final EIR that will include responses to comments and related changes to the document where appropriate. The document will be released in May 2023, as per the current schedule. Agencies that provided comment will receive responses at least 10 days before the document can be considered for adoption by the Authority Board. Ms. Forsythe pointed out again that the EIR doesn't address all impacts and that the Authority understands its work with the community doesn't end with the adoption of the EIR.

Questions that led to group discussion included the following:

Q: Will some of the areas covered by the EIR have significant impacts?

A: Yes, some will, including visual because of the construction of the reservoir, and air quality due to construction activities. The Community Guide to the EIR that was sent out via email prior to the meeting has a detailed chart on potential impacts that are significant and unavoidable.

Q: Will all construction traffic be detoured, or just heavy trucks?

A: As per the EIR, all construction traffic will be routed around town. Concerns of construction-related traffic effecting schools, commutes, and foot traffic are currently being taken into consideration.

Q: Will construction vehicles bypass the town?

A: Construction vehicles will be routed around the town on a bypass. The bypass will be paved/improved for this purpose.

Q: How will the policies regarding use of roadways be enforced?

A: Policies implemented will be enforced through the contracts with the consulting groups hired.

Q: How will the law enforcement and fire facilities on the site be staffed? Will additional staff be paid for by the Authority? It's important that an increase in demand from services doesn't decrease response time for residents, businesses and schools.

A: This is something the Authority will discuss and work on with the individual agencies. The facilities in the EIR because that's a physical change to the environment. How they're staffed is a separate discussion with law enforcement and fire agencies.

Q: Will the recreation areas include camping sites?

A: The Authority is looking at the potential for day and overnight camping areas at several locations. Fluctuations in lake levels will be taken into consideration in terms of what types of recreation are implemented. There's some work to do within the regional recreation community

to see what types of recreation might be appropriate and makes sense. Thought is also being given to what types of recreation would be useful to local community members and even to students. (Note: disc golf was discussed as a type of recreation that wouldn't be water dependent and may not require overnight camping during discussion on this question)

Q: Who is going to manage the recreation?

A: The Authority will own it and either manage it, or contract with a concessionaire. There may be some opportunities to partner with another agency – perhaps realizing some synergies with other reservoirs, but we haven't gotten that far along in planning to broach that question.

Q: How much area around there (the reservoir) will Sites Project Authority own?

A: It will vary based upon what landowners want to sell, but generally the Authority would prefer to own land up to a 100-foot buffer from the high-water mark to reduce conflicts between landowners and recreators.

Engineering Design/Construction Considerations

JP Robinette, the Authority's Engineering and Construction Manager, introduced considerations for engineering design and construction.

Engineering Design & Construction Update

Because project design is just ramping up (currently between 10-20 percent design), there are still many unknowns. This past year, the Authority completed aerial mapping for project facilities and an initial phase of geotechnical work in public right of ways. Results of geotechnical work are critical to understanding necessary depths for excavation and even the source location for materials (20 million yards of cubic fill will be needed). This year, the Authority will advance geotechnical work, evaluate its procurement strategy, and finalize the project delivery schedule. The schedule, which will be presented to the Authority Board in April, will provide insight into "man hours" – or the number of workers -- at various project stages. Because there's no single contractor capable of completing the entire project, it has been broken down into nine "packages" (e.g. reservoir; dams and roads; pump stations/pipelines/regulatory reservoirs). The staging of each package is unknown at this time. Early contractor involvement will begin in 2025. The Authority will bring on a Construction Manager At Risk (CMAR) to manage the final steps of design, and construction. The CMAR approach is new for this type of project but was enabled by legislation championed by Congressman Gallagher.

What is generally known at this time is that construction traffic will use public roads in Glenn, Colusa and Yolo Counties. Based on community input, construction traffic will be detoured around the town of Maxwell (Oak Street). Mr. Robinette acknowledged the inherent tension between risks of heavy truck traffic and the benefits of construction-related traffic (workers) who may patronize business. Post construction access will be provided via a new bridge at Sites Ladoga Road and a realigned Huffmaster Road.

Questions from group members included the following:

Q: What outreach been done in Glenn and Yolo Counties about construction impacts to agriculture?

A: Sites Project Authority representatives have been meeting with potentially impacted landowners in groups and one-on-one for many years. The group has evolved and changed as the project elements have changed, but the outreach continues. The Authority is discussing with them the logistical issues related to farming operations, taking into consideration types of crops and operations.

Q: Who will have the control of the water rights from this project?
A: Sites Authority will "own" the water right for this project.

Following the update on design and construction, Mr. Robinette led a discussion based upon the following questions:

- What does "good" look like as it relates to mitigating impacts from construction and operations?
- How can local businesses and residents benefit from the project during construction? How about during operations?
- How will Sites impact your organization's responsibilities during construction? How about during operations?
- What are some mutually beneficial projects or "shared purposes" between Sites and your organization or group?

Responses to the "What does good look like" and supporting questions will help the group establish principles to use as a guide for future discussions and as a tool to frame input. For example, one principle may be "No heavy truck traffic along Oak Street." Another might be, "Encouraging construction workers to patronize local businesses." During group discussion, participants brainstormed the following:

- Create sustainable interest in recreation facility use for local economic benefit
- Restore and/or improve roads used for construction and operations
- Leverage Sites investment for local benefits (e.g. Grants for public safety services; flood protection grants for County)
- Coordinatewith agriculture traffic during harvest
- Consider commuter impacts at origin (e.g. Yuba City)
- Use signage to guide traffic to preferred routes for construction and operations
- Establish agreements to allow flexibility and changes for future operations to ensure benefits keep flowing to the community
- Install facilities for safe foot traffic (sidewalks, crosswalks)
- Consider issues related to no availability of local housing for additional workers
- Minimize commute times for local community, school busses during construction
- Talk to other communities about lessons learned from disaster clean-up camps
- Identify synergies between recreation facilities and housing
- Expand broadband throughout community when installing it for project construction/operations
- Implement contract incentives for desired behavior (ie. construction traffic management)

Because the discussion was not completed prior to the close of the meeting, the group agreed to spend time thinking about the four questions in context of their organizations and revisit the "Principles of Good" at the March 16 meeting. The goal of that meeting will be to develop principles to be used by staff as project design and planning continues.

Kim Floyd announced that the next meeting is to be held from 2:30-4:30 p.m., Thursday, March 16, at the Sites Project Authority Office. She adjourned the meeting at 4:30 p.m.

Future Meetings

- March 16, 2023
- May 18, 2023
- July 20, 2023
- September 21, 2023
- November 16, 2023

Draft_0023178

From: Janis Offermann [janis@horizonh2o.com]
Sent: 3/10/2023 10:47:35 AM
To: Laverne D. Bill [lbill@paskenta.org]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: [EXTERNAL] RE: Sites Reservoir Tribal Working Group

Hi, Laverne
I checked in with the Authority and there is no tribal meeting scheduled for March 15; however, they do have a follow up call with TEPA on March 21st.

Regarding your request for a meeting, we are more than happy to meet with you to discuss Paskenta's concerns. If you could please provide a few dates and times that fit your schedule and we can select from, that would be great.

I will send you the latest cultural reports through our secure file transfer site. You should see that show up shortly.

Lastly, I will reach out to BOR and nudge them to respond to you request.

Thanks for responding to my email, Laverne. It is great to hear from you.
Janis

Janis Offermann, MA, RPA
Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

From: Laverne D. Bill <lbill@paskenta.org>
Sent: Thursday, March 9, 2023 8:52 AM
To: Janis Offermann <janis@horizonh2o.com>
Subject: [EXTERNAL] RE: Sites Reservoir Tribal Working Group

Good morning, Janis. I would like to have a meeting with the team about the areas of concern we have. The upper half of project is within our aboriginal territory, and we would like to further discuss. Can we set up a meeting? Also, I sent a consultation request to BoR and have not heard anything back. Can you also send me the last reports for Sites Reservoir so we can have them in our database.

The topic of a Tribal working group is being discussed with the other Tribes and we will be having a meeting next week to discuss.

Thanks again Janis and have a great day.

Laverne Bill, B.S., M.B.A.
Cultural Resources Manager
Paskenta Band of Nomlaki Indians
22580 Olivewood Avenue
Corning, CA 96021

C: (530) 781-6699
P: (530) 670-1746

www.paskenta-nsn.gov

From: Janis Offermann <janis@horizonh2o.com>
Sent: Wednesday, March 8, 2023 12:43 PM
To: Laverne D. Bill <lbill@paskenta.org>
Subject: Sites Reservoir Tribal Working Group

Hi, Laverne
I hope you are settling in to your new position for Paskenta.
I just thought I would follow up on our earlier emails. Have you had a chance to chat with tribal leadership about participating in the Tribal Working Group? The Authority is still considering a MOA for tribal collaboration on Sites Reservoir. Is this also something that may be of interest to Paskenta?

Please don't hesitate to reach out if you have any questions.
Thanks
janis

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From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 3/10/2023 12:44:21 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Project - Materials for George

Hi Ali,

I checked with Steve. He is going to pull together MWD-specific deliveries for Alt 3 and provide those to me. For transfer capacity, the slides you sent are for Alt 1B, but Steve said that they are more conservative than Alt 3/3B, so it's good information to share. I can send the list of participants and %'s along with the transfer capacity slide now, and I'll send the MWD-specific information when Steve finishes pulling that together.

Angela

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, March 9, 2023 11:36 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Subject: Sites Project - Materials for George
Importance: High

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I think he was generally looking for 3 more things –

1. Updated % of whos participating – Can you get him an updated list of all of the participants and their percentages?
2. Water Supply benefits specific to MWD – I think we may have this in the Proforma. Can you check in with Steve on this? I was going to look at the Plan of Finance really quick to see if there was anything in there.
3. Transfer capacity – I've used the attached slides before, but I have lost track of whether this is RDEIR/SDEIS or Final EIR/EIS modeling. But, in general, I am not sure it would change substantially between RDEIR/SDEIS and Final EIR/EIS modeling, so I think we can share this with George. What do you think?

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: 3/10/2023 1:24:43 PM
To: Janis Offermann [janis@horizonh2o.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: [EXTERNAL] RE: Sites Reservoir Tribal Working Group

Janis, thank you for setting up this meeting and I look forward to seeing everyone again. I also appreciate you following up with BoR about our request to consult. Thanks again and have a great weekend.

Laverne Bill, B.S., M.B.A.
Cultural Resources Manager
Paskenta Band of Nomlaki Indians
22580 Olivewood Avenue
Corning, CA 96021
C: (530) 781-6699
P: (530) 670-1746
www.paskenta-nsn.gov

From: Janis Offermann <janis@horizonh2o.com>
Sent: Friday, March 10, 2023 10:48 AM
To: Laverne D. Bill <lbill@paskenta.org>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: [EXTERNAL] RE: Sites Reservoir Tribal Working Group

Hi, Laverne
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Regarding your request for a meeting, we are more than happy to meet with you to discuss Paskenta's concerns. If you could please provide a few dates and times that fit your schedule and we can select from, that would be great.

I will send you the latest cultural reports through our secure file transfer site. You should see that show up shortly.

Lastly, I will reach out to BOR and nudge them to respond to you request.

Thanks for responding to my email, Laverne. It is great to hear from you.
Janis

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Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

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Sent: Thursday, March 9, 2023 8:52 AM
To: Janis Offermann <janis@horizonh2o.com>
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C: (530) 781-6699
P: (530) 670-1746
www.paskenta-nsn.gov

From: Janis Offermann <janis@horizonh2o.com>
Sent: Wednesday, March 8, 2023 12:43 PM
To: Laverne D. Bill <lbill@paskenta.org>
Subject: Sites Reservoir Tribal Working Group

Hi, Laverne
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I just thought I would follow up on our earlier emails. Have you had a chance to chat with tribal leadership about participating in the Tribal Working Group? The Authority is still considering a MOA for tribal collaboration on Sites Reservoir. Is this also something that may be of interest to Paskenta?

Please don't hesitate to reach out if you have any questions.
Thanks
janis

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Cultural Resources Practice Lead
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you are not the intended recipient, you are hereby notified that any disclosure, use, dissemination, copying, or storage of this message or its attachments is strictly prohibited.

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From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 3/10/2023 1:26:10 PM
To: Nishikawa,George M [GNishikawa@mwdh2o.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Hawk,Nina E [NHawk@mwdh2o.com]; Randall Neudeck [rneudeck@mwdh2o.com]
Subject: RE: Sites - Operations
Attachments: CONFORMED Amendment 3 Project Agreement Exhibit A.pdf; Transfer Window Slide.pptx

Hi George,

It was nice to meet you yesterday! Attached are two files with information we discussed yesterday.

- Current summary of Sites Participants including the annualized Sites release modeled over the 82-year CalSim period, the storage allocation, and the associated percent of storage/inflow (note that the percentage is based on local public water agencies, and does not include State of California and Bureau of Reclamation.
- Slides providing information regarding through-Delta movement of Sites water. The second slide shows estimates of Sites exports and remaining available transfer capacity.

I have also asked our Jacobs team to pull some information from the CalSim model to provide MWD-specific deliveries. I will send this to you as soon as possible. Please let me know if you have any questions about the attached information, or any other follow up questions to what we discussed yesterday.

Have a great weekend,
Angela

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 6, 2023 4:29 PM
To: Nishikawa,George M <GNishikawa@mwdh2o.com>; Hawk,Nina E <NHawk@mwdh2o.com>; Randall Neudeck <rneudeck@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites - Operations

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

Wonderful! I just sent an invite.

I look forward to the discussion.

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: Nishikawa,George M <GNishikawa@mwdh2o.com>
Sent: Monday, March 6, 2023 4:25 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Hawk,Nina E <NHawk@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites - Operations

Hi Ali,

Thanks for the warm welcome!

Let's plan to chat on:

Thursday, March 9 – 10 to 11 AM

Best,

George Nishikawa
Resource Specialist, Bay Delta Initiatives
Metropolitan Water District of Southern California
812-606-3315 (c)
gnishikawa@mwdh2o.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 6, 2023 4:02 PM
To: Hawk,Nina E <NHawk@mwdh2o.com>; Nishikawa,George M <GNishikawa@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites - Operations

Wonderful! Welcome to the Sites Team George!

I saw John sent you an overview presentation earlier today. We do also have the admin Final EIR/EIS that the MWD team has access to for a description of operations. But likely the most efficient thing would be for Angela and I to meet with you and provide an overview of the Project and Project operations. We can then chat about what parts you'd like to dig into further and get you lined up with the right people. Jacobs/CH2M is our modeling contractor so ultimately, it would likely be chatting with them about the in and outs of the Calsim modeling along with all the subsequent modeling. But lets schedule something first and get you headed in the right direction.

Below are a few dates/times that work for Angela and I to chat:

Thursday, March 9 – 10 to 11 AM; 2 to 3 PM
Friday, March 10 – 1:30 to 3 PM
Monday, March 13 – 9 to 10 AM; 11:30 AM to 1 PM
Tuesday, March 14 – anytime 2:30 PM to 5 PM
Thursday, March 16 – 11 to noon

Let me know what works for you.

Ali

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

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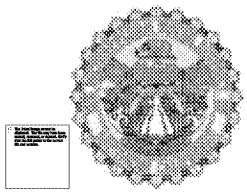
From: Hawk,Nina E <NHawk@mwdh2o.com>
Sent: Monday, March 6, 2023 10:01 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Nishikawa,George M <GNishikawa@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>
Subject: Sites - Operations

Hi Ali,

I hope that you are well! As we get busy and have more engagement with our board on a variety of topics this year, Sites will be one of major interest. To help support Randall with this engagement, and our group, can you please connect George Nishikawa (cc:ed on this email) with whom is best to connect with to get understanding around operations and modeling of the project to date? He is our Bay-Delta water operations point of contact and internal expert on these topics, however is not as familiar with Sites and its overall operation in detail.

Can you please let myself and George know who would be best to connect with at Sites? This would also include those working directly on CalSIm model runs etc.

Thank you!



Nina Hawk
Chief of Bay-Delta Resources
Bay-Delta Initiatives
Metropolitan Water District
1121 L Street, Suite 900, Sacramento, CA 95814
Phone: (510) 299-8289 (mobile)
nhawk@mwdh2o.com

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GCID Siphon Condition Assessment
Draft Technical Memorandum

To:	Henry Luu/HDR
CC:	Holly Dawley/GCID and Zac Dickens/GCID
Date:	March 5, 2021
From:	Jeremy Kellogg, S.E. /Jacobs
Quality Review:	Howie Henrikson, P E./Jacobs and Peter Rude, P.E./Jacobs
Authority Agent Review:	
Subject:	Glen Colusa Irrigation District Siphon Condition Assessment

1.0 Summary

The purpose of this technical memorandum (TM) is to summarize the findings of the structural condition assessment of three existing siphons in the Glen Colusa Irrigation District (GCID) main canal near the town of Willows, California. The siphons assessed included Walker Creek Siphon, Willow Creek Siphon, and the Railroad Siphon. These siphons were deemed to be potential critical infrastructure in their ability to convey water through the GCID main canal for the Sites Project (Project) due to their age and hydraulic conveyance capacity.

On February 4, 2021, Jeremy Kellogg and Jason Blum, from Jacobs, conducted a site visit to perform visual observations in accordance with the recommendations of American Concrete Institute (ACI) 201.1R. The observations included inspections of the concrete surfaces that were visually accessible. The goal of the assessment was to develop an initial understanding of the structures' behavior and characterize the performance and durability of the structures. Nondestructive hammer sounding was also implemented at accessible areas to verify the concrete conditions. The site visit was supplemented by a review of the siphon record drawings. Differences and variations between the record drawings and actual structures were documented. In general, the overall condition of the siphon structures was classified as satisfactory to good, with no major deficiencies or distress observed. The following sections outline the findings at each siphon.

1.1 Willow Creek Siphon

Willow Creek Siphon is a cast-in-place, concrete structure, approximately 55 feet wide (not including the wing walls) and 180 feet long which conveys water under Willow Creek. The siphon consists of six individual bays. Four original bays are approximately 6.5 feet wide; two retrofit bays are approximately 10 feet wide. The height of the siphon bays varies at the inlet and outlet with a minimum height of 8.5 feet tall through the middle of the structure. No visible movement joints were observed within the

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siphon bays. Record drawings for the existing original siphon construction were not obtained. However, record drawings were provided for an inlet and outlet modification project from the mid-1970s. The main siphon structure is assumed to have been constructed in the early-1900s when the canal was originally constructed.

Prior to the February site visit, GCID personnel had dewatered Willow Creek Siphon. Approximately 12 inches of water remained in the bottom of the siphon at the time of the site visit. The floor of the siphon was not assessed in detail because it was covered with water and sediment. The depth of sediment varied throughout the structure and was generally not more than a couple inches thick, at most. Based on observations that were made while walking along the floor, there were no indications of distress at the floor slab. In general, the structure appeared to be in good condition. There were no significant areas of concern or concrete degradation. Accessible portions of the structure were sounded with a hammer. All concrete sounded with a hammer appeared dense and structurally sound. No significant cracks or corroded reinforcing were observed. The following photos document the observations and surface conditions.

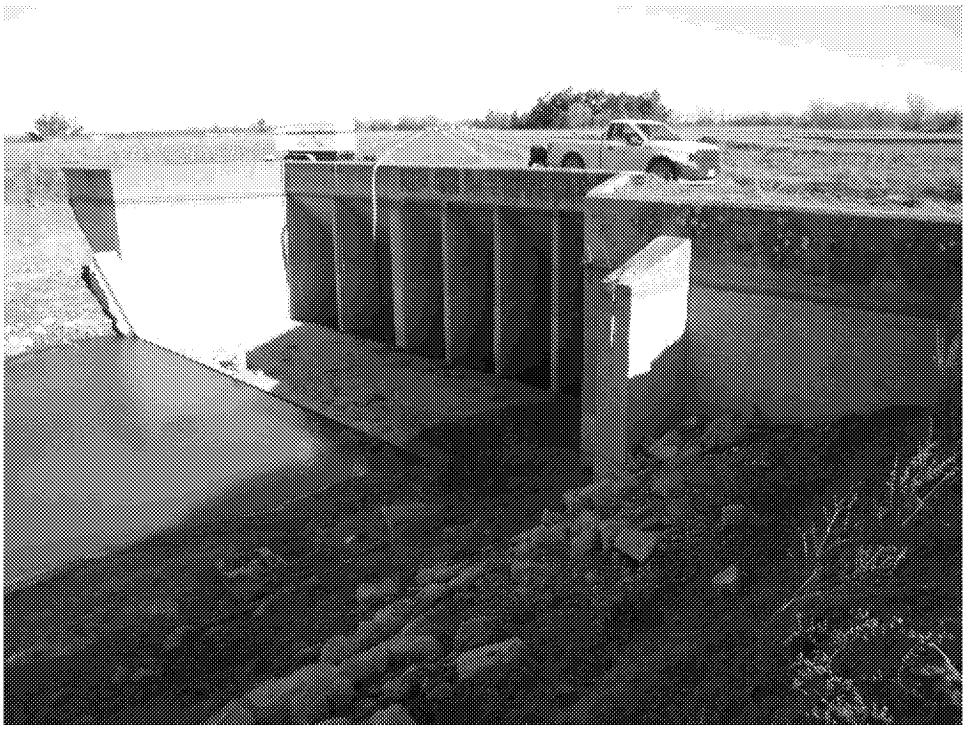

Figure 1. Willow Creek Siphon Outlet

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Figure 2. Willow Creek Siphon Inlet

Figure 3. Typical Siphon Bay from the 1970s Project

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Figure 4. Typical Siphon Bay from the Original Siphon Project

1.1.1 Willow Creek Siphon Observed Defects

As with most aging structures, there are areas which could benefit from preventative maintenance. The following items were observed and documented in the corresponding photos:

- Concrete erosion from abrasion was observed at the base of the original divider walls at the siphon inlet. The depth of erosion was approximately 6 inches from the original upstream divider wall nose. No reinforcing or evidence of corroded reinforcing were observed in the areas with concrete erosion. Given the lack of observed reinforcing in the concrete erosion, future assessments should consider verifying that the walls are not unreinforced. The concrete surfaces surrounding the erosion was observed to be sound. Therefore, rebuilding the walls to their original shape would be possible when the canal is empty.

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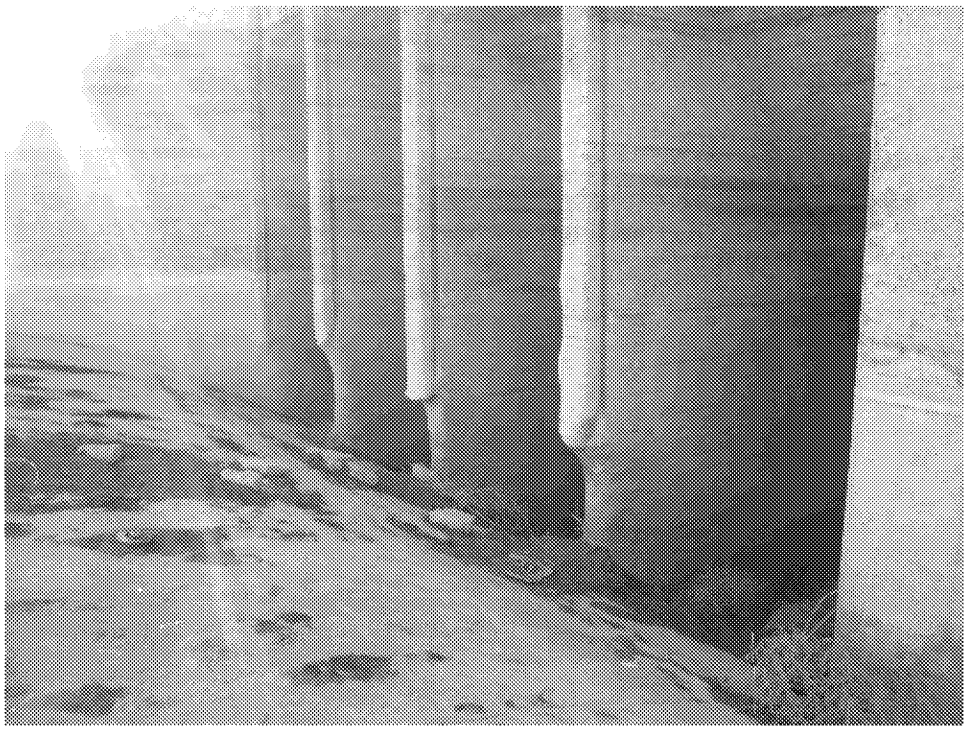

Figure 5. Concrete Erosion

- Canal bank erosion was observed at both ends of the siphon. The loss of material was not significant enough to pose a structural risk to the siphon structure. However, rebuilding the canal banks as material is lost over time would be beneficial to prevent signification issues in the future.

Figure 6. Canal Bank at Siphon Inlet

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1.2 Walker Creek Siphon

Walker Creek Siphon is very similar to Willow Creek Siphon in its geometry and condition. Walker Creek Siphon is a cast-in-place, concrete structure, approximately 55 feet wide (not including the wing walls) and 250 feet long which conveys water under Walker Creek. The siphon consists of six individual bays. Four original bays are approximately 6.5 feet wide; two retrofit bays are approximately 10 feet wide. The height of the siphon bays varies at the inlet and outlet with a minimum height of 8.5 feet tall through the middle of the structure. No visible movement joints were observed within the siphon bays. Record drawings for the existing original siphon construction were not obtained. However, record drawings were provided for an inlet and outlet modification project from the mid-1970s. The main siphon structure is assumed to have been constructed in the early-1900s when the canal was originally constructed.

Prior to the site visit in February, GCID personnel had dewatered Willow Creek Siphon. There were approximately 12 inches of water in the bottom of the siphon at the time of the site visit. The floor of the siphon was not assessed in detail because it was covered with water and sediment. The depth of sediment varied throughout the structure and was generally not more than a couple inches thick, at most. Based on observations that were made while walking along the floor, there were no indications of distress at the floor slab. In general, the structure appeared to be in good condition, with no significant areas of concern or concrete degradation. Accessible portions of the structure were sounded with a hammer. All concrete sounded with a hammer appeared dense and structurally sound. No significant cracks or corroded reinforcing were observed. The following photos document the observations and surface conditions.

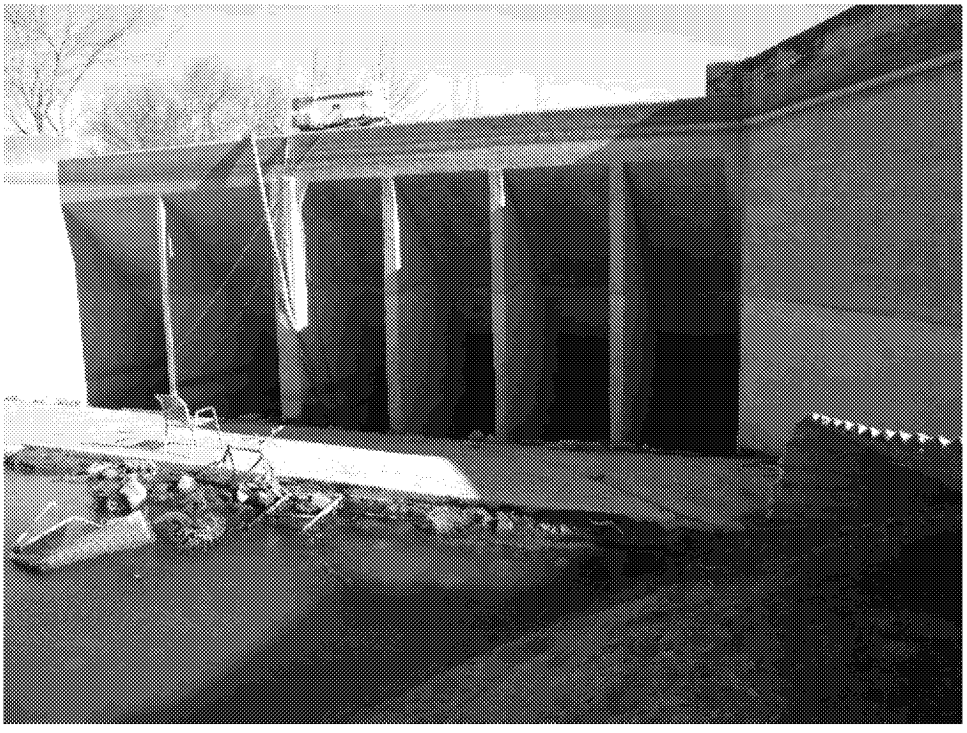

Figure 7. Walker Creek Siphon Outlet

Draft_0023193

Figure 8. Walker Creek Siphon Inlet

Figure 9. Typical Siphon Bay from the 1970s Project

Draft_0023194

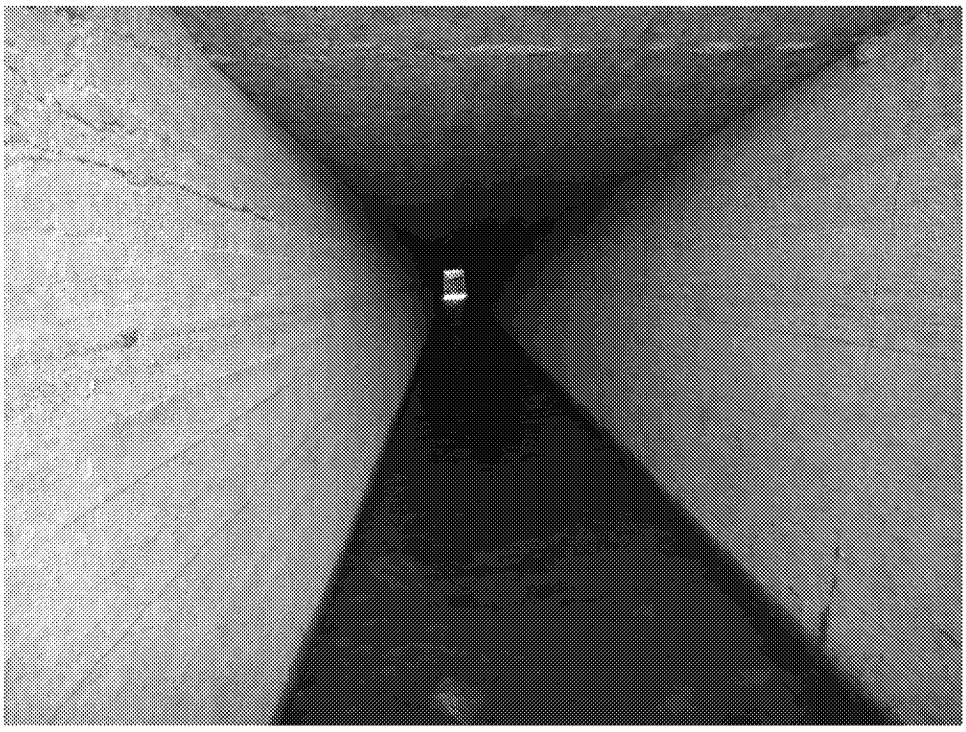

Figure 10. Typical Siphon Bay from the Original Siphon Project

1.2.1 Walker Creek Siphon Observed Defects

Walker Creek Siphon experienced similar areas of potential maintenance as Willow Creek Siphon, including concrete erosion and canal bank erosion/scour. The following images documented the areas which could receive future maintenance:

- Concrete erosion from abrasion was observed at the base of the original divider walls at the siphon inlet. The depth of erosion was approximately 6 inches. No reinforcing or evidence of corroded reinforcing were observed in the areas with concrete erosion. Given the lack of observed reinforcing in the concrete erosion, future assessments should consider verifying that the walls are not unreinforced. The concrete surfaces surrounding the erosion was observed to be sound. Therefore, rebuilding the walls to their original shape would be possible when the canal is empty.

Draft_0023195

Figure 11. Concrete Erosion

- Canal bank erosion and scour were observed at both ends of the siphon. The loss of material was not significant enough to pose an immediate structural risk to the siphon structure. However, rebuilding the canal banks as material is lost over time would be beneficial to prevent signification issues in the future.

Draft_0023196

Figure 12. Canal Bank at Siphon Outlet

1.3 Railroad Siphon

Railroad Siphon is a cast-in-place, concrete structure constructed in 1911 (according to the date on the structure). The overall structure is approximately 90 feet wide and 50 feet long. The siphon consists of five rectangular bays and two circular bays. The circular siphon bays appeared to be constructed from precast concrete pipe cast into the structure. The siphon conveys water under the railroad. The top slab of the siphon structure supports the railroad tracks. A one-page record drawing was reviewed prior to the site visit. There were significant discrepancies between the record drawings and the actual structure. For example, the record drawings did not include the two circular portions of the siphon, and the depth of the siphon bays did not match the record drawings.

GCID did not dewater the siphon structure prior to the condition assessment because of the challenges of isolating the siphon from the water in the main canal and limitations on pumping the water to another location. The depth of water varied in the main canal and siphon structure, from anywhere between 1 and 4 feet deep. Accessible portions of the structure were assessed. This included the above grade components and the areas where the depth of water was less than approximately 2 feet.

When compared to Walker and Willow siphons, overall, Railroad Siphon was observed to be in poorer condition, with degradation as noted. The portions of the structure below the normal water level were observed to be in good to satisfactory conditions. The guardrail, which is mostly above the normal water level, were observed to be in satisfactory to poor condition. The concrete canal liner at the slopes adjacent to the inlet and outlet were observed to be in poor condition. The following photos document the observations and surface conditions.

Draft_0023197

Figure 13. Railroad Siphon Outlet

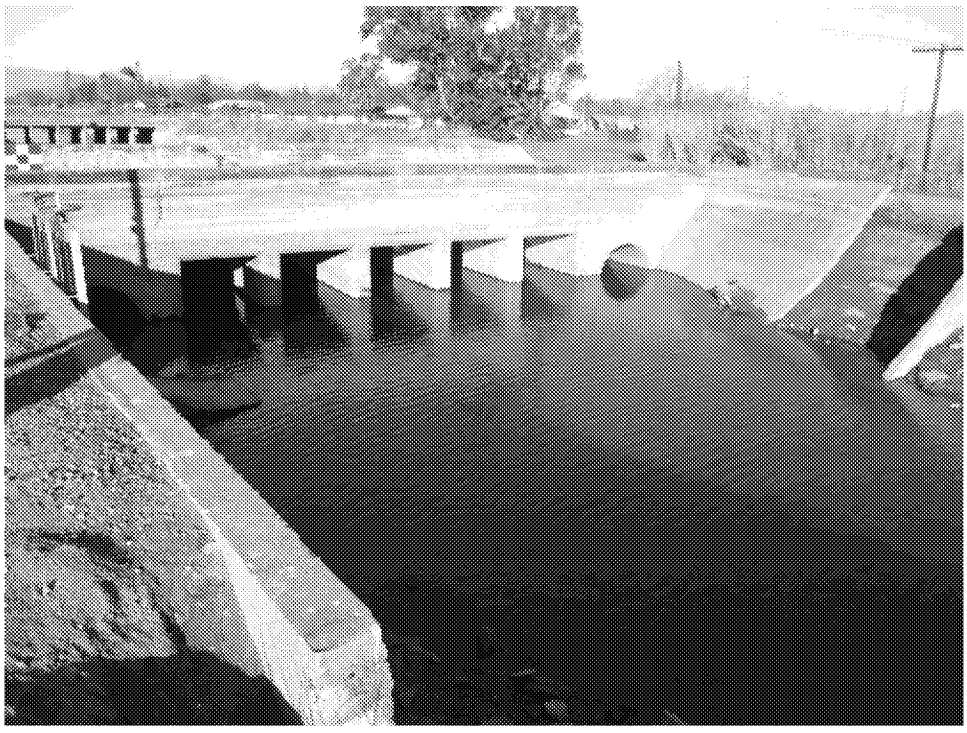

Figure 14. Railroad Siphon Inlet

Draft_0023198

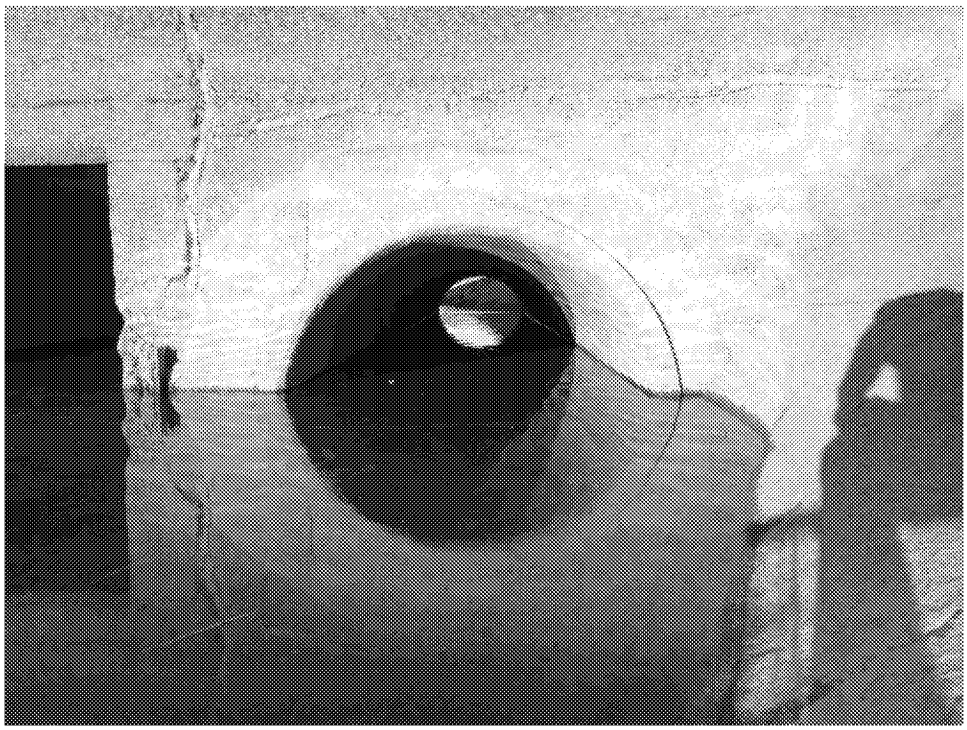

Figure 15. Typical Circular Siphon Bay

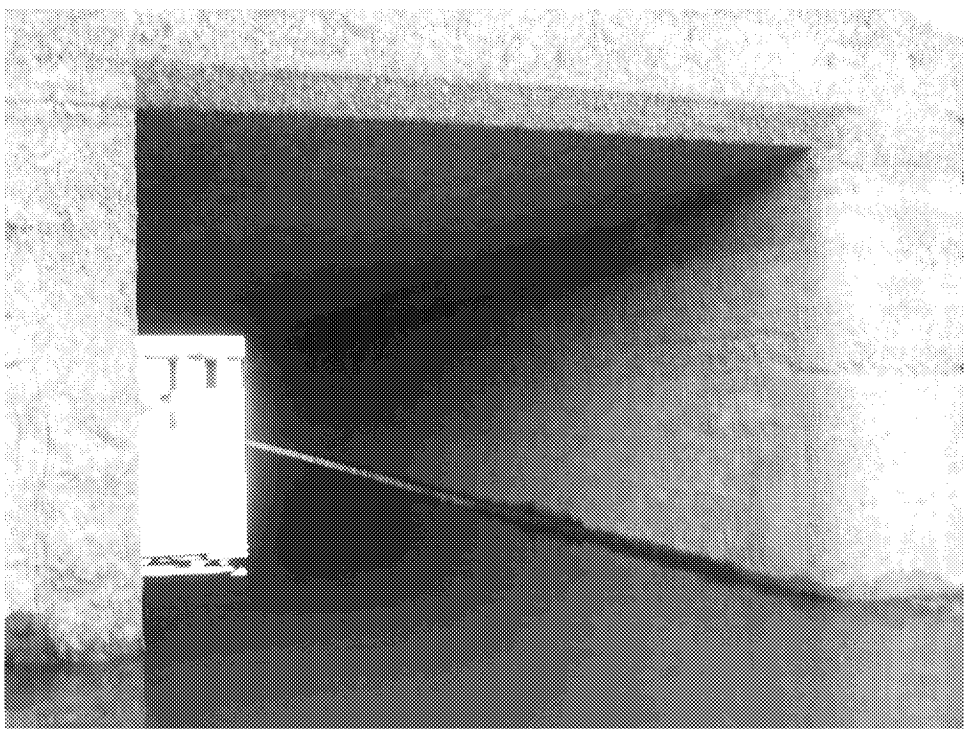

Figure 16. Typical Rectangular Siphon Bay

1.3.1 Railroad Siphon Observed Defects

Railroad Siphon revealed a few defects and some degree of distress. The observed defects are more extensive than defects observed at Walker and Willow siphons. The observations of the areas of distress are as follows.

Draft_0023199

- Canal bank erosion was observed at both ends of the siphon. Portions of the canal bank are shotcrete lined where the erosion has removed significant quantities of material from below/behind the liner.

Figure 17. Canal Bank Erosion at Eastern Side of Inlet

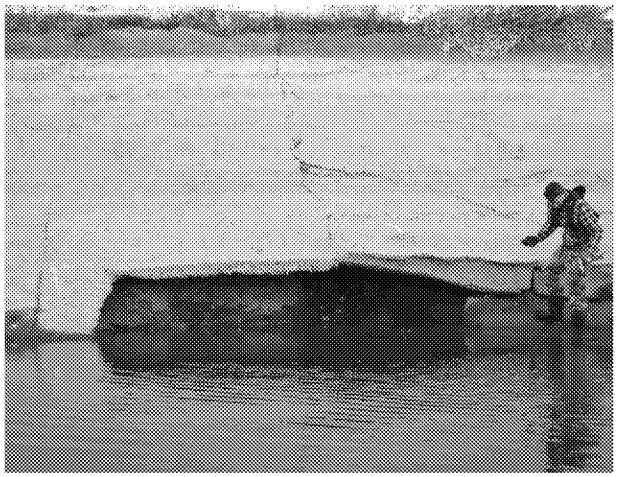

Figure 18. Canal Bank Erosion at Eastern Side of Outlet

Figure 19. Canal Bank Erosion at Western Side of Inlet

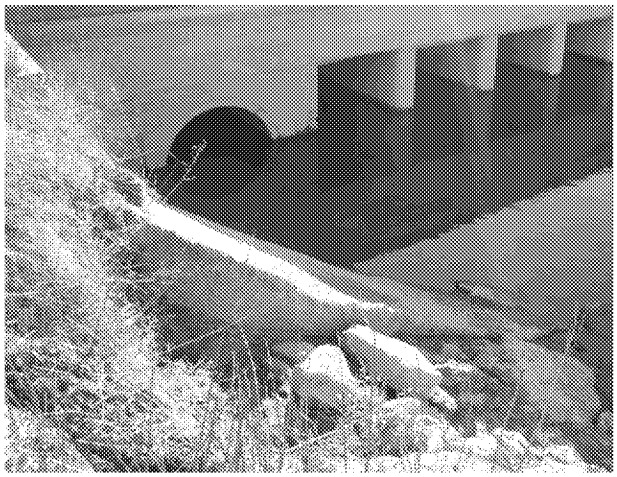

Figure 20. Canal Bank Erosion at Western Side of Outlet

- Spalled concrete and corroded reinforcing were noted at the outlet bays on the western side of the structure. The depth of water was too deep to access the spalled concrete; therefore, these areas were only documented in photos. It appeared that the concrete spalling was minor and could be repaired relatively easily when the canal is empty.

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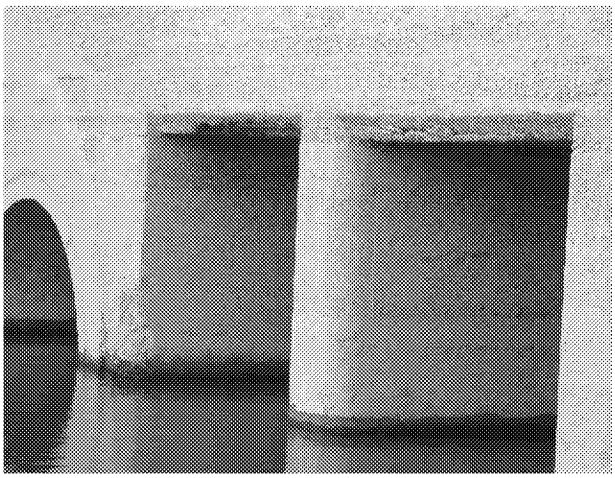

Figure 21. Spalled Concrete

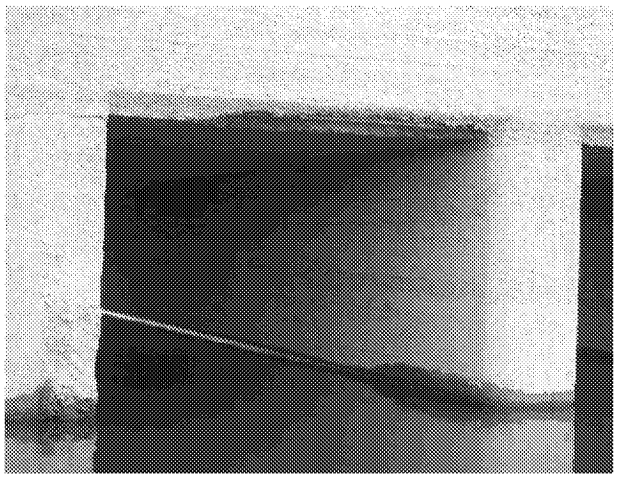

Figure 22. Spalled Concrete

- Minor concrete erosion was observed on the inlet side of the of the siphon pier walls. Because of the depth of water in the siphon, the depth of the erorion was not percisely measured, but was estimated to be less than 1 inch. The concrete erosion documented does not pose a signifcant near-term concern. However, the surfaces could be rebuilt during future maintenance activities, when more significant defects are addressed.

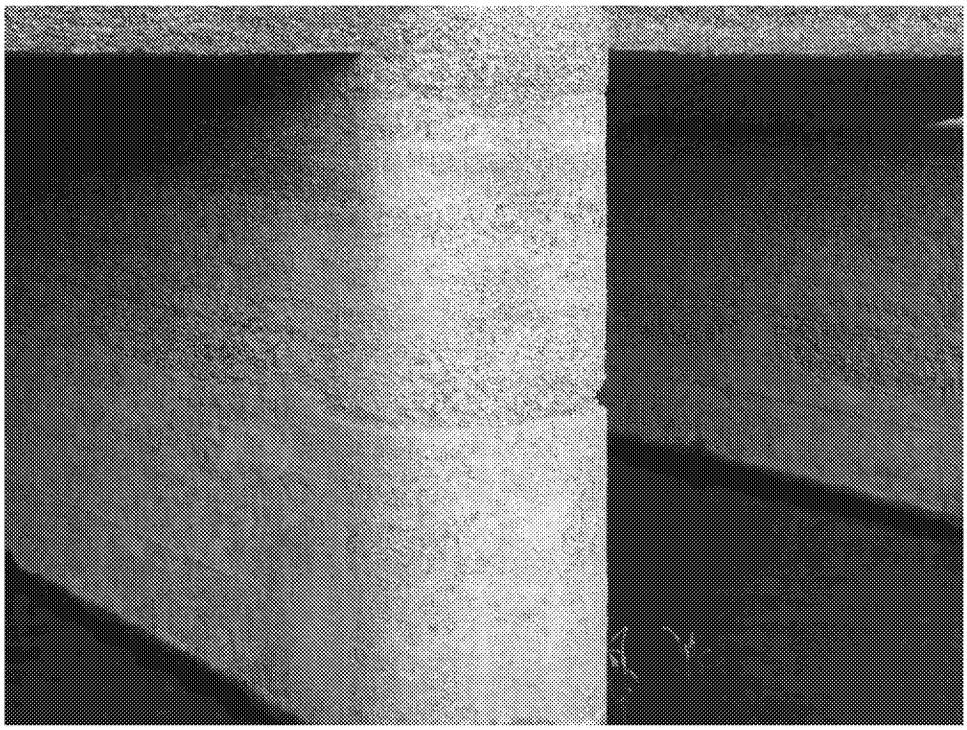

Figure 23. Concrete Erosion at Siphon Inlet

- Numerous concrete cracks were documented in the guardrail portion of the structure. The width of the cracks varied from hairline cracks to 0.25 inch. Some cracks were documented to extend through the full thickness of the concrete guardrail section. Very few cracks were noted below the guardrail. Two significant cracks were observed between the circular and rectangular siphon bays on the inlet side. These cracks were filled with a repair material that appeared to

Draft_0023201

have been installed long ago. The crack repair material appeared to be sufficiently sealing the cracks. In the future, repairing the cracks throughout the structure will help to preserve the structure's integrity and extend its useful life.

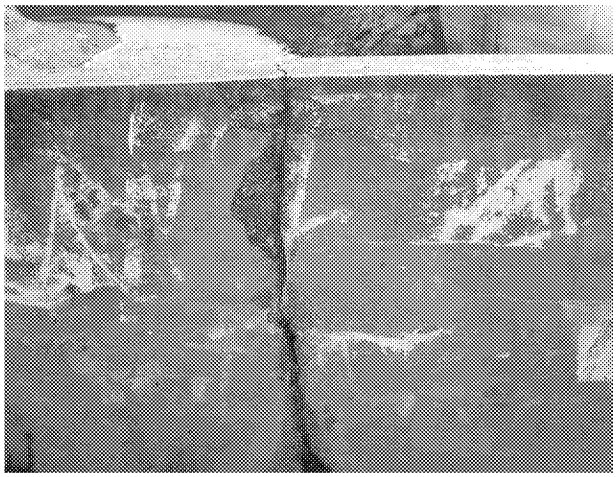

Figure 24. Crack Through Guardrail Wall

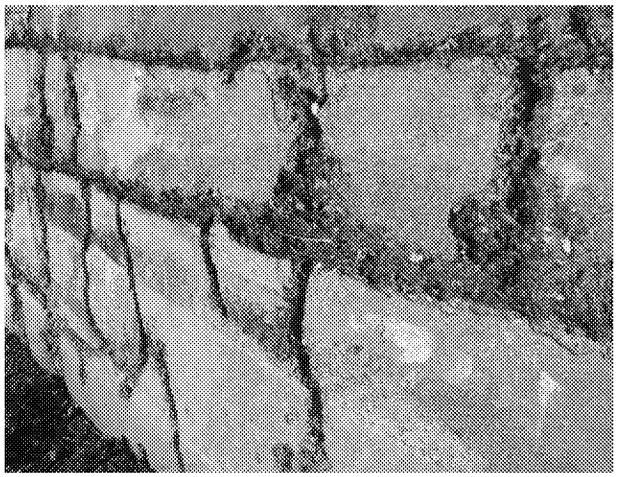

Figure 25. Extensive Cracks at Guardrail Wall

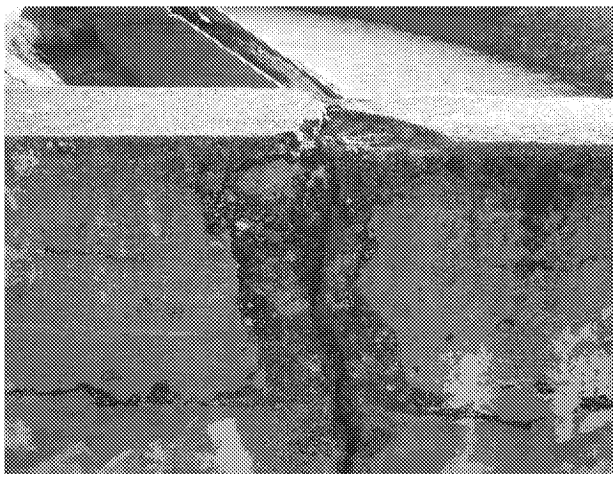

Figure 26. Crack Through Guardrail Wall and Spalled Concrete

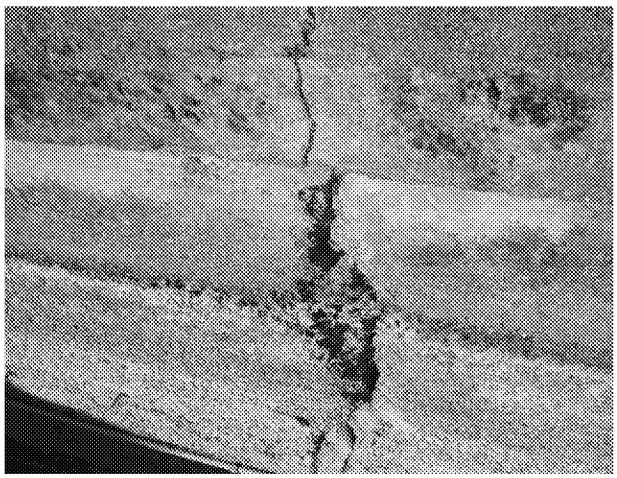

Figure 27. Crack Through Guardrail Wall

Figure 28. Crack at Western Side of Inlet

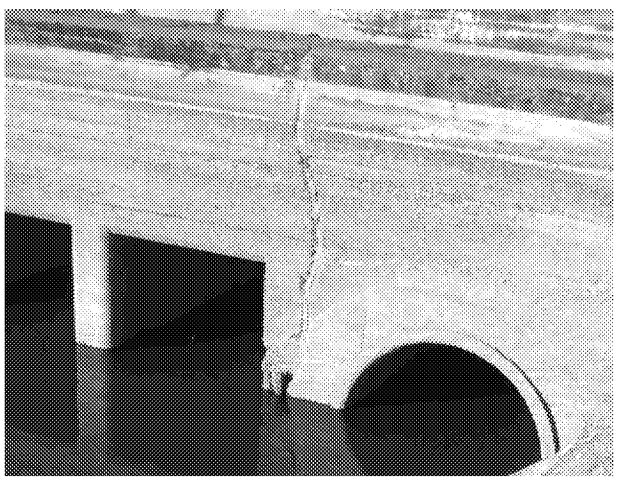

Figure 29. Crack at Eastern Side of Inlet

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2.0 Conclusion

The overall condition of the siphons can be defined as good to satisfactory. However, Railroad Siphon included localized areas in poor condition above grade. Deficiencies were noted at each facility. The deficiencies observed appear to be items that can be addressed through future maintenance projects and do not pose an immediate risk to the siphons. Implementing maintenance repair projects will help to preserve the structures' integrity and extend their useful service life.

Walker Creek Siphon and Willow Creek Siphon do not have any immediate maintenance service needs. Therefore, we believe that they have a long useful service life. Railroad Siphon has localized above grade deficiencies that could benefit from maintenance activities. The above grade deficiencies which would benefit from maintenance would fall into the railroad's jurisdiction and are somewhat independent on the ability of the siphon to convey water. Given the minor degradation observed at the below grade components of the Railroad Siphon, we would conclude that the below grade components that convey water would have a long useful service life.

This TM provides the results of the preliminary visual condition assessment. While a service life prediction is beyond the scope of a visual assessment, should the need arise, additional analysis could be performed to define a predicted service life of the structures. A service life analysis would consider decisions concerning the end of service life related to safety, serviceability, functionality, and economic considerations. To make service life predictions, information is required on the present condition of concrete and reinforcement, concrete material properties, rates of degradation, past and future loading, structural analysis, and definition of the end of life. Based on remaining life predictions, economic decisions can be made on whether a structure should be repaired, rehabilitated, or replaced.

The service life prediction would need to define the quantity of data to be accumulated, laboratory testing procedures, desired accuracy of the predictions, and available budget for the predictive effort. Performing a service life prediction is an in-depth numerical analysis that uses input parameters, based on field data, laboratory testing, and environmental effects, to extrapolate the time from the present state to the condition constituting the end of service life. Theoretical models should be developed in addition to empirical models to give realistic predictions of the remaining service life. The cost to develop a complete service life prediction analysis would be between $____ and $____.

3.0 Citations

ACI 201.1R-08. 2008. *Guide for Conducting a Visual Inspection of Concrete in Service.*

Draft_0023203

From: Nishikawa,George M [GNishikawa@mwdh2o.com]
Sent: 3/10/2023 1:56:26 PM
To: Angela Bezzone [bezzone@mbkengineers.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Hawk,Nina E [NHawk@mwdh2o.com]; Neudeck,Randall D [rneudeck@mwdh2o.com]
Subject: RE: Sites - Operations

Hi Angela,

It was great meeting you as well, thank you so very much for this information and for the great conversation yesterday.

I really appreciate the help in getting me up to speed on Sites and will keep an eye on my inbox!

Best,
George

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Friday, March 10, 2023 1:26 PM
To: Nishikawa,George M <GNishikawa@mwdh2o.com>
Cc: 'Alicia Forsythe' <aforsythe@sitesproject.org>; Hawk,Nina E <NHawk@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>
Subject: RE: Sites - Operations

Hi George,

It was nice to meet you yesterday! Attached are two files with information we discussed yesterday.

- Current summary of Sites Participants including the annualized Sites release modeled over the 82-year CalSim period, the storage allocation, and the associated percent of storage/inflow (note that the percentage is based on local public water agencies, and does not include State of California and Bureau of Reclamation.
- Slides providing information regarding through-Delta movement of Sites water. The second slide shows estimates of Sites exports and remaining available transfer capacity.

I have also asked our Jacobs team to pull some information from the CalSim model to provide MWD-specific deliveries. I will send this to you as soon as possible. Please let me know if you have any questions about the attached information, or any other follow up questions to what we discussed yesterday.

Have a great weekend,
Angela

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 6, 2023 4:29 PM
To: Nishikawa,George M <GNishikawa@mwdh2o.com>; Hawk,Nina E <NHawk@mwdh2o.com>; Randall Neudeck <rneudeck@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites - Operations

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

Wonderful! I just sent an invite.

I look forward to the discussion.

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: Nishikawa,George M <GNishikawa@mwdh2o.com>
Sent: Monday, March 6, 2023 4:25 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Hawk,Nina E <NHawk@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites - Operations

Hi Ali,

Thanks for the warm welcome!

Let's plan to chat on:

Thursday, March 9 – 10 to 11 AM

Best,

George Nishikawa
Resource Specialist, Bay Delta Initiatives
Metropolitan Water District of Southern California
812-606-3315 (c)
gnishikawa@mwdh2o.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 6, 2023 4:02 PM
To: Hawk,Nina E <NHawk@mwdh2o.com>; Nishikawa,George M <GNishikawa@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites - Operations

Wonderful! Welcome to the Sites Team George!

I saw John sent you an overview presentation earlier today. We do also have the admin Final EIR/EIS that the MWD team has access to for a description of operations. But likely the most efficient thing would be for Angela and I to meet with you and provide an overview of the Project and Project operations. We can then chat about what parts you'd like to dig into further and get you lined up with the right people. Jacobs/CH2M

is our modeling contractor so ultimately, it would likely be chatting with them about the in and outs of the Calsim modeling along with all the subsequent modeling. But lets schedule something first and get you headed in the right direction.

Below are a few dates/times that work for Angela and I to chat:

Thursday, March 9 – 10 to 11 AM; 2 to 3 PM
Friday, March 10 – 1:30 to 3 PM
Monday, March 13 – 9 to 10 AM; 11:30 AM to 1 PM
Tuesday, March 14 – anytime 2:30 PM to 5 PM
Thursday, March 16 – 11 to noon

Let me know what works for you.

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: Hawk,Nina E <NHawk@mwdh2o.com>
Sent: Monday, March 6, 2023 10:01 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Nishikawa,George M <GNishikawa@mwdh2o.com>; Neudeck,Randall D <rneudeck@mwdh2o.com>
Subject: Sites - Operations

Hi Ali,

I hope that you are well! As we get busy and have more engagement with our board on a variety of topics this year, Sites will be one of major interest. To help support Randall with this engagement, and our group, can you please connect George Nishikawa (cc:ed on this email) with whom is best to connect with to get understanding around operations and modeling of the project to date? He is our Bay-Delta water operations point of contact and internal expert on these topics, however is not as familiar with Sites and its overall operation in detail.

Can you please let myself and George know who would be best to connect with at Sites? This would also include those working directly on CalSIm model runs etc.

Thank you!

Nina Hawk
Chief of Bay-Delta Resources
Bay-Delta Initiatives
Metropolitan Water District
1121 L Street, Suite 900, Sacramento, CA 95814
Phone: (510) 299-8289 (mobile)
nhawk@mwdh2o.com

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Reservoir Conceptual Construction Schedule and Sequencing Plan (Draft) Technical Memorandum

To:	J. P. Robinette, P.E. (Sites Project Authority)
CC:	Henry Luu, P.E. (HDR)
Date:	March 10, 2023
From:	Michael Forrest, P.E., G.E.; Michael Smith, P.E., G.E., Jeff Wisniewski, P.E. (AECOM); Dan Hertel, P.E. and Dave Hardy (Engineering Solutions)
Quality Review:	Joe Barnes, P.E. (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Reservoir Conceptual Construction Schedule and Sequencing Plan (Draft) Task Order No. 3, Task HR30.01

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Appendix A – Reservoir Conceptual Construction Schedule

Acronyms and Abbreviations

Authority	Sites Project Authority
B&C	Brown and Caldwell
cfs	cubic feet per second
CMAR	Construction Manager at Risk
CP	Contract Package
DBB	Design-Bid-Build
DSOD	Division of Safety of Dams
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
I/O	Inlet/Outlet Works
lf	lineal feet
MAF	million-acre-feet
PGP	Pump-generating plant
ROD	Record of Decision
TCCA	Tehama-Colusa Canal Authority
TM	Technical Memorandum

Draft_0023209

Executive Summary

The purpose of this Technical Memorandum (TM) is to present a Dams and Reservoir Conceptual Construction Schedule for the Sites Project Authority's (Authority) use in preparation of an overall ("primary") Project Schedule. This TM reflects the construction schedule considerations for the reservoir HR contract facilities that will be constructed under Contract Package 1 (CP 1) using the Construction Manager at Risk (CMAR) delivery approach.

The Dams and Reservoir Conceptual Construction Schedule will be integrated into the overall Project Schedule, developed by Team members, which will include design phases, Division of Safety of Dams (DSOD) reviews, CMAR procurement, property acquisition/access (including any construction easements), geotechnical investigations, etc. Also included will be schedule-related activities needed from the Authority that are prerequisites for the design phases, including permitting activities. The Project Schedule will also address interfaces with the conveyance (pump station/pipeline) Contract Package 2 (CP 2) and other contracts. The integration could also lead to modifications of AECOM's construction schedule to accommodate interface requirements.

The Project schedule prepared by Brown & Caldwell (B&C) goes beyond what we show in this TM. Although the CP-1 schedule presented in this TM shows a substantial completion date of December 2036, the dates in our CP 1 schedule are superseded by the Project schedule, which is still in progress. The CP 1 schedule was used to provide design and construction logic input to the Project schedule.

Further construction schedule iterations are anticipated as more information is received and AECOM advances the current design. The construction schedule presented in this TM is therefore considered to be a work in progress. We expect that the Project Schedule (including the construction schedule component), will be shared with the CMAR who will confirm or modify the schedule.

AECOM provided a list of potential opportunities in Section 5.0 to shorten the schedule for the Reservoir Engineering (HR) service area. We recommend a meeting of service area leads to understand the Project Schedule and how it may be expedited.

There are a number of risks that could adversely affect schedule (and cost) as discussed in Section 6.0 of this TM. These risks should be included in the Authority's risk register along with consideration of mitigation measures.

This TM concludes with Section 7.0 on considerations for commissioning and interfacing with the conveyance facilities HC that will be constructed under CP 2. The reservoir HR contract facilities schedule must be properly linked to pumping and conveyance HC facilities. The commissioning schedule for CP 1 is tied to CP 2 and cannot occur until some amount of water has been pumped into the reservoir.

We recommend that an appropriate schedule duration contingency be discussed with the Authority and applied to the Project Schedule to account for unknowns and uncertainties. We understand that this would be addressed in alternative Project Schedule scenarios.

The detailed CP 1 Reservoir Conceptual Construction Schedule is presented in Appendix A.

Draft_0023210

1.0 Introduction

1.1 Project Overview

The Sites Project Authority (Authority) developed a Feasibility Report to support a funding application under California's Water Storage Investment Program (Authority, 2021) for a 1.5-million-acre-foot (MAF) reservoir as the preferred alternative for the Sites Reservoir Project. An initial evaluation of constructability was included as an appendix to the Feasibility Report (Constructability Analysis Technical Memorandum, AECOM, 2021a). This Technical Memorandum (TM) presents a Dams and Reservoir Conceptual Construction Schedule for the Sites Project Authority's (Authority) use in preparation of an overall ("primary") Project Schedule.

The principal storage feature of the Project is Sites Reservoir. **Error! Reference source not found.** shows the location of Sites Reservoir and the various dams, roads, and other features to be constructed to form the reservoir. Sites Reservoir will have a nominal gross storage capacity of approximately 1.5 MAF. Table 1-1 outlines key aspects of Sites reservoir.

Table 1-1. Sites Reservoir Characteristics[1]

Approximate Nominal Gross Storage Capacity	1.5 MAF
Active Storage Capacity	1.4 MAF
Approximate Inundation Area	13,200 acres
Dam/Saddle Dam/Dike Crest Elevation (Without Camber)	517 feet
Dam Heights (approx. - maximum height above streambed):	
Golden Gate Dam	287 feet
Sites Dam	267 feet
7 Saddle Dams / 4 Saddle Dikes	12 – 107 feet
Normal Maximum Operating Water Elevation	498 feet
Normal Minimum Operating Water Elevation	340 feet
Top of Dead Storage Elevation	300 feet
Inlet/Outlet Facilities – Total Normal Operating Conveyance Capacity	3,900 cfs

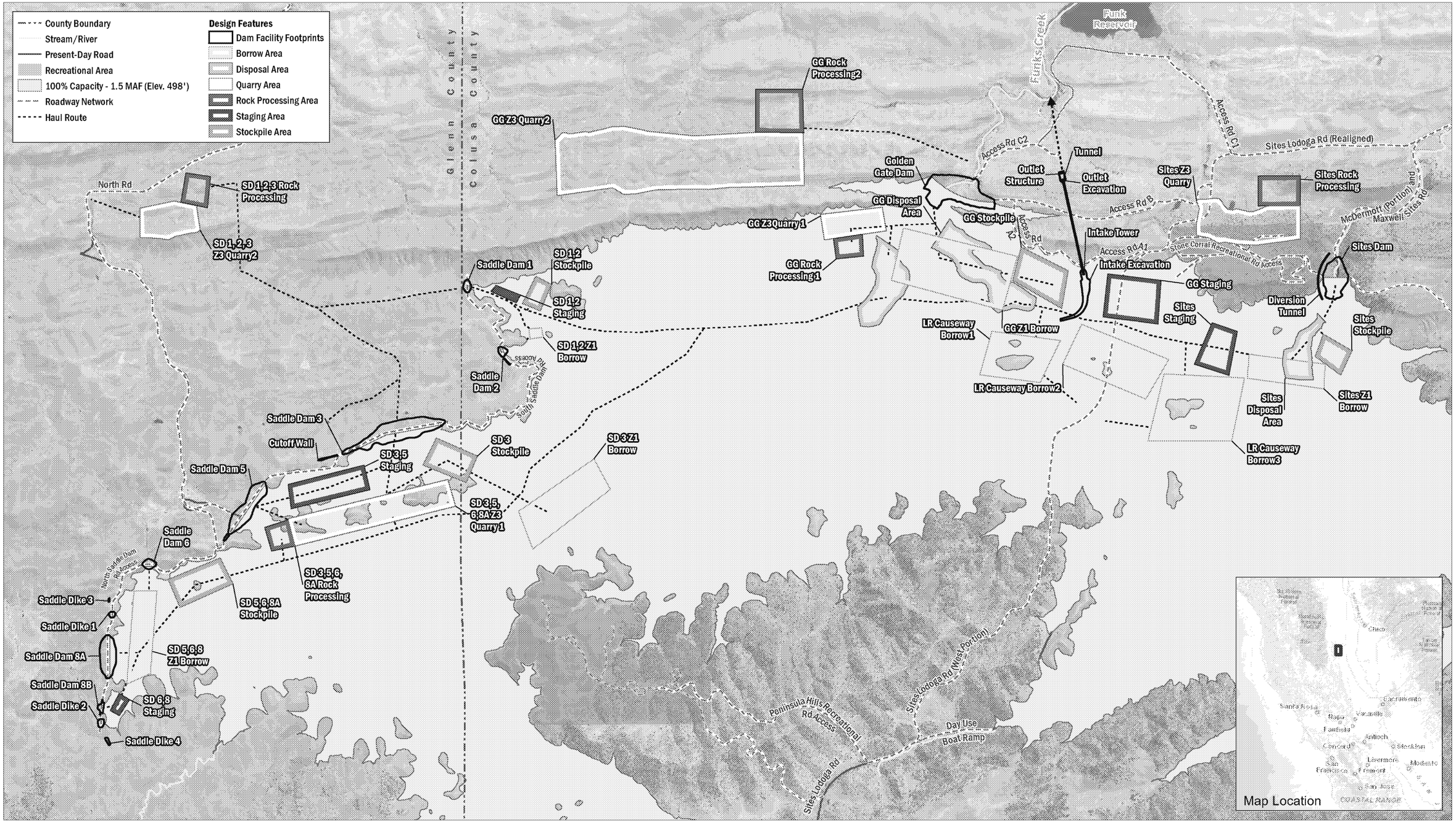
[1] As of December 2022.

cfs = cubic feet per second

MAF = million-acre-feet

Draft_0023211

AECOM Oakland CA 2/6/2023 10:58 P alexander.reiner PATH: \\na.aecomnet.com\sfo\AMER\Oakland\US\OAK01\DCS\Projects\GIS\Projects\SitesDam\02_Maps\02_Map_Production_and_Reports\Figure X - Haul Routes Disposal Stockpile Staging RP Areas.mxd



AECOM
Sites

FIGURE 1-1

Haul Routes, Borrow, Disposal, Stockpile, Staging, and Rock Processing Areas

Draft_0023212

The Dams and Reservoir Conceptual Construction Schedule covers the following reservoir HR contract facilities in Contract Package CP 1 (refer to **Error! Reference source not found.** and Section 2.0).

- Main Dams, Saddle Dams and Dikes: 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.
- Spillway: This structure is a concrete overflow spillway located in a concrete gravity dam at Saddle Dam 8B that will discharge into Hunters Creek to the north.
- Sites Dam Outlet Works: This outlet works tunnel will be located in the north abutment of Sites Dam. It would be used initially for construction diversion 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) will 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 will 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/public access roads and construction access roads. The map of the roads is shown on Figure 1-2.
- Bridge: A bridge crossing the reservoir and fill prism will provide an east-west connection between the rural communities of Maxwell, Lodoga, and Stonyford.

As discussed in Section 2.0, the inlet/outlet (I/O) works will be designed and constructed as part of CP 2, separate from the reservoir facilities. The I/O works include the low-level outlet and a sloping intake constructed against the hillside with multiple intake levels. The low-level outlet and sloping intake connect to a single outlet works tunnel that is part of the reservoir HC contract CP 2. The I/O works will provide for normal reservoir operation as well as making emergency reservoir releases that will be required by DSOD as part of dam permitting. The outlet works tunnel will connect to reservoir conveyance pipelines (within HC) at the downstream tunnel portal.

1.2 Purpose and Scope

California's recent prolonged periods of drought demonstrate the immediate need for Sites Reservoir. The scope and nature of the Project facilities presents the challenge of sequencing activities to provide an operational reservoir in a timely fashion.

This TM focuses on construction activities and construction sequencing based on feasibility-level engineering completed in December 2021. Other activities (e.g., environmental documentation and permitting) must also be analyzed and sequenced in conjunction with the construction process before the completion date for the project may be established. The effects of the construction sequence on the local communities (especially traffic) must also be considered in the final selection of the most appropriate sequencing of activities. The timing and sequencing of activities will affect the risk to the Authority and Project investors undertaking the Project. These risks must be considered prior to finalizing the sequence of construction activities and the schedule.

The purpose of this TM is to develop a Conceptual Construction Schedule for the reservoir facilities to inform the Authority on construction sequencing. The reservoir HR contract construction schedule will be integrated into the overall Project Schedule. The Task Order 3 scope of work for this TM includes assessing construction logistics, identifying critical path activities and potential constraints on construction, and recommending construction contract duration.

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LEGEND

- CONSTRUCTION ROUTE (EXISTING ROAD)
- CONSTRUCTION/MAINTENANCE ROUTE
- NEW/REALIGNED PERMANENT ROAD
- MAINTENANCE ACCESS ROAD
- EXISTING ROAD
- TEMPORARY DETOUR (PROPOSED)
- BRIDGE CROSSING
- RECREATIONAL ACCESS ROAD

PLAN – ROADS

Sites

SITES RESERVOIR

OVERVIEW ROADWAY MAP
FIGURE 1-2

Plot Date: 2/1/2023 10:24 AM File: C:\pwworking\uscaldms\107035\STS-1705-R-Overview Map.dwg
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The scope also includes identifying and evaluating potential construction risks and opportunities (mitigation measures) to reduce risks.

The selection of most appropriate sequence and schedule for the reservoir HR contract should include input from all disciplines, including real estate, permitting, risk analysis, geotechnical, and community outreach. As the Project proceeds, the sequence will need to be re-evaluated and streamlined where possible. Early involvement of the Construction Manager at Risk (CMAR) entity is recommended to align the schedule with the anticipated construction approach.

1.3 Limitations

The scope of work for this TM focused on the development of the conceptual construction schedule for the Sites Reservoir under the Reservoir HR contract. Conveyance facilities are separately considered in a companion TM for the HC contract.

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 Contract Packages

The following contract packages were initially developed by the Authority in August 2022 with input from AECOM for the reservoir HR contract facilities, and subsequently in November 2022 with input from Jacobs for the HC facilities. As described below, some of the contract packages will be delivered using the CMAR approach while others will use the conventional Design-Bid-Build (DBB) approach (see Alternative Contract Delivery Methods TM, AECOM, 2021b). The CMAR contracting approach will permit beneficial early contractor involvement in the design and construction planning process, as well as increased cost certainty.

Contract Package 1 – Dams, Roads and Sites-Lodoga Bridge - CMAR

- CP 1 (reservoir HR contract facilities) includes all dams, which are under DSOD jurisdiction, and Sites-Lodoga Road as well as other local roads for construction. CP 1 comprises Golden Gate, Sites and Saddle dams and dikes; spillway; diversions at Golden Gate and Sites dams; production and hauling of filter and drain materials; County roads; traffic detour around Sites Dam site; and Sites-Lodoga Road and Bridge. This work will require large amounts of earth moving and logistical challenges, potentially requiring use of the same borrow areas and transfer of materials from one site to another. This TM focuses on CP 1.

- CP 1 would benefit from having a single CMAR entity involved in early planning and responsible for managing the overall logistical challenges. The CMAR contracting approach allows a single contractor to issue work packages for bid by potential subcontractors but reduces the number of contracts the Authority will be responsible for directly managing.

- Preliminary schedule analysis indicates this work, in the nearer term, is most likely to drive the schedule for the overall Sites Project. As a result, the Authority recommended focusing near-term work on this package.

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Contract Package 2 – Conveyance - CMAR

- CP 2 (HC conveyance facilities) includes Terminal Regulating Reservoir (TRR)-West, TRR Pumping-Generating Plant (PGP), TRR Pipelines, Inlet/Outlet (I/O) Facilities (including sloping intake, low-level outlet and tunnel to the downstream portal), improvements to Funks Reservoir (owned by Reclamation and operated by TCCA), Funks Pump-Generating Plant (PGP), Funks Pipelines, PG&E Point of Interconnection, 230 kV Power Transmission Lines and Substation at each PGP, Administration and Operations Building (Part of Funks PGP), Maintenance and Storage Building (Part of Funks PGP), Access Roads, and Electrical Overhead from Funks PGP to Sites Dam and I/O Control Building. The I/O Facilities will be under the jurisdiction of DSOD and the TRR may be under DSOD jurisdiction (determination to be made by DSOD).

- The CMAR contracting approach allows a single contractor to issue work packages for bid by potential subcontractors but reduces the number of contracts the Authority will be responsible for directly managing.

- Initial preliminary schedule analysis indicates this work, in the nearer term, is not likely to drive the schedule for the overall Sites Project. As a result, the Authority recommended focusing near-term work on this package to those elements that are most critical and time sensitive.

Contract Package 3 - Reservoir Clearing – DBB, and
Contract Package 4 - Huffmaster Road – DBB

- These packages are fairly straightforward and allow opportunities for local or regional contractors to prime.

- The Authority's preliminary schedule analysis indicates these packages are not likely to drive schedule for the overall Sites Project in the near term.

3.0 Basis of Schedule Development

The following sections summarize the assumptions and constraints used to develop the draft CP 1 schedule discussed in Section 4.0.

3.1 Real Estate, Permitting, Environmental Studies and EIR

- Predecessors and successors for this group of tasks are based on preliminary input from the environmental planning and permitting team. These tasks generally precede and control design and construction.
- Real Estate is the most critical task that controls schedule for completion of construction and commissioning.
- The EIR was used as the basis for permitting and environmental successors. It is assumed that the EIR is completed 6 months before the EIS and ROD (not shown, however we recommend it be added to the Project Schedule with the appropriate predecessors and successors as it could result in delays).
- Based on input from Real Estate, final land acquisition needs to be based on 90% design because final feature footprints are needed. (This should not be the case for all project features. The Limits of Work and Permanent Acquisition boundaries, which control areas that will be affected and can reasonably be fixed at 60% design level for the dams, but may require 90% completion for roads and pipelines.)

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- Some constraints for environmental studies are based on month of year. Due to timing, this can move the schedule out nearly a year.
- **The Preconstruction Avoidance activity controls (is the predecessor for) the start of construction of the roads and dams in September 2031. This is a critical schedule constraint.**

3.2 Geotechnical Investigation, Design and DSOD Reviews

The following geotechnical investigation, design and DSOD reviews are constraints to the CP 1 Schedule:

- Access was used as the predecessor for Geotechnical Investigations P2a/P2b. (Need to confirm if access or land acquisition controls.)
- Geotechnical data for each feature component needs to be received prior to commencing 60% design of each component:
    - Investigation of the dam foundations are needed prior to start of 60% design for foundation excavation and grouting.
    - Investigation of rock and earth borrow areas are needed prior to start of 60% design for the embankment dams.
- DSOD reviews/approvals are assumed to be as follows:
    - Six (6) months each for 30, 60, 90% reviews; design and cost estimation continue while DSOD reviews taking place. Three (3) months for 100% review and approval.
    - DSOD staffing and ability is assumed to be sufficient to accommodate DSOD review within the timeframes shown in the schedule; communication with DSOD will be needed to confirm this assumption.

3.3 Construction

The Conceptual Construction Schedule for the reservoir HR contract facilities (CP 1) is based on the following assumptions (also refer to Appendix A for the detailed schedule):

- Construction activity durations were adapted from the Constructability Analysis TM (AECOM, 2021a). Durations are based on the quantities calculated for the various work items at the Feasibility Design level, using reasonable, sustainable average production rates, with equipment sized appropriately for magnitude of the work. As the design progresses, quantities may change and schedule adjustments may be needed.
- The construction schedule is calculated on an average of 20 working days per month to account for holidays and weather delays.
- In general, productions and durations at any given dam are calculated on 10-hour work shifts, 90% efficiency (effectively 9 hours of production during a 10-hour shift) five days per week, accounting for breaks. Items such as dam excavation, placement of the zoned dam embankments, and tunnel excavation and support, are scheduled as double shift work as needed to maintain the critical path.
- Expected construction productions are variable and will depend on actual contractor resources and other factors. The productions listed below are based on realistic models, founded on past experience, and are consistent with those used in the Constructability Analysis TM (AECOM, 2021a) and in the Feasibility-Level Cost Estimate TM (AECOM, 2021c). Additionally, the productions shown below are foreseen at any given dam (e.g., Golden Gate, Sites, etc.). These activities would be concurrent at two or more dams during much of the course of construction.

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- Foundation Excavation – up to ~54,000 cy/week for common excavation and rippable rock, when double shifted
- Foundation Excavation – up to ~36,000 cy/week for drilled and blasted rock when double shifted
- Grouting –
  - Curtain Grouting – ~2,400 lineal feet (lf)/week using 3 drill rigs, likely double shift, including night shift grouting as applicable.
  - Consolidation Grouting – ~1,600 lf/week using 2 drill rigs, likely double shift, including night shift grouting as applicable.
- Embankment Placement – all dam embankment zones, excluding riprap; average placement of up to ~83,000 cy/week when double shifted
- Material imported from off-site to stockpile or placement in dam – truck haul using between 30 and 50 trucks, single shift, up to ~5,000 tons/shift

- Crews would likely work 6 days per week on critical functions. This could be to make up for work delays or to perform additional work.
- Some activities, such as placement of Zone 1 clay core material would be weather-dependent during the winter rainy season. Higher production rates and use of double shifts are more likely during the summer and fall dry seasons.
- It is anticipated that night or second-shift work will be necessary. This generally pertains to tunneling work and various portions of dam foundation excavation and dam embankment. Night or second shifts would be employed for logistics reasons, as well as weather make-up. An example of this would be to place Zone 1 core material and Zone 2 filter and drain materials during day shift, and place Zone 3 rockfill shell and Zone 4 random fill shell at night or both day and night. As the dam section changes with height and relative proportion of materials, the strategy and resources would be adjusted.
- The Conceptual CP 1 Construction Schedule this TM does not attempt to show winter block-out periods, but the overall durations used in the schedule reflect some double shifting during dry periods, particularly of the Zone 1 core, to compensate for winter conditions when this work would be shut down or impeded.

4.0 Reservoir Facilities Construction Schedule

The construction schedule in this TM is presented to inform the Authority on construction sequencing and for CP 1. The TM identifies input needed from the Authority on activities that are prerequisites for the design phases as discussed below. These predecessor activities, together with the design and construction phases, will feed into the Project Schedule. The current draft CP 1 schedule was developed with input from the Sites Reservoir Team during discussions in January 2023.

Although the CP-1 schedule presented in this TM shows a substantial completion date of December 2036, the dates in our CP-1 schedule are superseded by the Project schedule that is still in progress. The CP-1 schedule provides design and construction logic input to the Project schedule.

Further schedule iterations are anticipated as more information is received. The schedule presented in this TM is therefore considered to be a work in progress. We expect that this schedule, or subsequent iterations, will be shared with the CMAR who will confirm or modify the schedule.

The following is the general sequence of activities as shown on the summary CP 1 schedule, in Appendix A:

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1. Real estate - land access and acquisition for geotechnical exploration, permitting and surveying
2. Environmental - surveys, permitting and certifications
3. Water - permanent water rights and construction water
4. Geotechnical investigations – Phase 1 (for 30% design) and Phases 2a/2b (for 60% design)
5. Final identification of potential off-site aggregate materials for construction.
6. Engineering – design and DSOD reviews and approvals for excavation, grouting and embankment for the dams (Golden Gate, Sites and Saddle dams, spillway and dikes)
7. CMAR procurement
8. Roads, bridges, access and site development - County roads, construction access roads, Sites Lodoga Road and bridge
9. Processing and hauling filter and drain materials to the Project site
10. Borrow area development and zoned embankment material production/stockpiling
11. Dam construction - foundation excavation, grouting, embankment construction and diversion
12. Site reclamation and startup and commissioning.

The reservoir facilities Conceptual Construction Schedule for CP 1, showing the critical path activities (highlighted in yellow), is presented in Appendix A.

5.0 Opportunities to Shorten Schedule

AECOM provided a list of potential opportunities to shorten the schedule for the Reservoir Engineering (HR) service area (via e-mail, 2/3/23). Any potential time savings indicated below are rough estimates and need to be evaluated. Also, note that all of these time savings may not be cumulative. Some opportunities could shorten the schedule without affecting the critical path. For Golden Gate Dam (on the critical path), it is especially important to find ways to advance the start of construction. It is important to note that time savings that do not advance the start of construction will do little to move up the completion date.

The following are key opportunities to be considered that were adapted from the e-mail list (1 through 4 are the main opportunities):

1. Engineering to accelerate roadway design to set the roads with high level of confidence during 30 percent design. This will require close coordination with engineering, environmental, real estate, and the LMC to come to agreement on routes and the start of construction to advance the roads. We recommend finalizing the limits of work during preliminary engineering to expedite permitting. This could potentially save approximately a year and likely includes prioritizing design and development of access roads to provide for earliest possible site access to critical path activities.
2. Engineering to set limits of work for construction and for permanent reservoir facilities to a high level of confidence during 30 percent design. This would allow real estate and environmental to acquire properties and perform surveys earlier and the CMAR to start construction earlier. This could potentially save approximately two years.
3. Stagger geotechnical investigations to focus on key features first. This includes critical roads, borrow areas (including rock borrow test blast and test fill to expedite DSOD approvals) and Golden Gate and Sites Dams. This would enable engineering to perform designs sooner. For example, there is significant benefit to completing critical road geotechnical investigations in 2025 instead of 2026. Some roads are on the critical path.
4. The current design calls for the construction of new access roads and widening of narrow, rural roads. There is an existing service road for the Tehama Colusa Canal that could be enlarged to

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support investigation and construction activities, including hauling. Reclamation already owns this road, so no real estate would be required, only an agreement with Reclamation would be needed. This road can be accessed from Road 69 in Glenn County. It may also be possible to access it with a short extension of the new access road to TRR west. This would provide access to the downstream side of Golden Gate Dam and Sites Lodoga Road. This could shorten the schedule by approximately 1 to 2 years and might also reduce cost.

5. Engineering to reduce design submittals from 30, 60, 90, Final to 30, 80, Final. This could potentially save approximately 3 to 6 months on design durations by reducing the cycles of review. Coordination with DSOD and CMAR would be needed.
6. CMAR may be on board in 2024. The CMAR could provide critical input to sequencing, which could impact schedule either positively or negatively. CMAR input may impact the project schedule, but would provide confidence going forward.
7. Use global resources to staff 24-hour design process to reduce the duration of design. Will need to identify any funding restrictions or security concerns that restrict international design.
8. Leverage USBR staff participation on geotechnical investigation, lab testing, and engineering review to accomplish more in-parallel design (would require schedule commitments from USBR staff).
9. Utilize on-site material for transition zones and roadway aggregate (need geotechnical data to confirm source is available). This is one of the proposed cost saving VE measures, but it will also save time and reduce schedule risk, if we can get an onsite source of suitable rock materials developed early. Using an onsite source would lower the demand and dependency on offsite aggregate plants and offsite trucking. Savings could be approximately 3 to 6 months.
10. Use the upstream axis for Golden Gate Dam. This is another potential VE opportunity that was previously identified. Using the upstream axis reduces the time needed to construct Golden Gate Dam. Additional geotechnical data are needed to verify feasibility and will be needed to support DSOD approval of this alignment.

In order to advance the schedule completion date, the environmental process (Preconstruction Avoidance) will need to be advanced, even if for localized areas. Critical land acquisition is needed for the environmental surveys, as this controls the start of construction. AECOM recommends a meeting of service area leads to understand the Project Schedule and how it may be expedited.

6.0 Schedule Risks

There are a number of risks that could adversely affect schedule (and cost) and are presented by risk category and associated risk descriptions in Table 5-1.

Table 5-1. Schedule Risks

No.	Risk Category	Risk Description
1.	Administrative and Agency Issues	Administrative milestones not being met and delays in real estate acquisition, legal, geotechnical investigation, engineering and design, and agency (DSOD) approvals
2.	Administrative and Agency Issues	Delays in procurement
3.	Administrative and Agency Issues	Delays in gaining access or completing access improvements
4.	Permitting and Compliance	Protected and endangered species work windows or mitigation measures are changed

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5.	Permitting and Compliance	Cultural clearing and accommodation for tribal, cemetery and other cultural resources cause delays
6.	Contractor Resources	Insufficient or unqualified labor force due to regional economy, labor disputes, or other factors
7.	Contractor Resources	Unsatisfactory contractor performance, lack of experience or resources
8.	Contractor Resources	Unavailability of heavy construction equipment and crews for the Project due to other large competing projects in the State or region.
9.	Unexpected/Unforeseen Construction Conditions	Insufficient construction water availability
10.	Unexpected/Unforeseen Construction Conditions	Insufficient quality and availability of off-site materials for filters, drains, transition, concrete, and road aggregates
11.	Unexpected/Unforeseen Construction Conditions	Unexpected foundation conditions requiring deeper excavations or other remediation
12.	Unexpected/Unforeseen Construction Conditions	Significant unanticipated conditions in on-site borrow areas related to material quality or quantity
13.	Unexpected/Unforeseen Construction Conditions	Growth of quantities, particularly in dam foundation excavations, grouting, or embankment dams
14.	Unexpected/Unforeseen Construction Conditions	Dam foundation grouting could take longer than anticipated thus delaying embankment construction
15.	Unexpected/Unforeseen Construction Conditions	Unexpected tunneling ground, temporary support, and dewatering conditions
16.	Unexpected/Unforeseen Construction Conditions	Difficulties in developing and processing material from on-site borrow areas and coordination of borrow area use between contractors on different contracts
17.	Uncontrollable Conditions	Adverse weather conditions beyond those normally experienced at this site
18.	Uncontrollable Conditions	Wildfires that force construction to temporarily shut down
19.	Contractual	Termination of the CMAR before establishing the guaranteed maximum price (GMP) if the pricing or scope of services is not acceptable to the Authority (also a cost risk)
20.	Contractual	Poor working relationship between Authority, engineers, and CMAR contractor

These risks and other risks identified as the construction and Project Schedule is further refined should be included in the Authority's risk register along with mitigation measures to be incorporated during design and construction. The risk register should be periodically reviewed and updated with the Project design team and CMAR contractor as the work progresses.

7.0 Commissioning and Interface with HC Facilities

Commissioning of the reservoir HR contract facilities relies on several key elements: roadwork must be substantially completed such that public traffic is routed in its final form across the Sites Lodoga causeway (roadway prisms and bridge), the dam and reservoir facilities are complete, and the outlet works tunnel and Sites Dam tunnel facilities are complete and operable. Commissioning of the reservoir HR contract facilities requires the inlet/outlet works and pumping and conveyance facilities in the HC contract be completed sufficiently to provide water for operational testing.

This reservoir HR contract facilities schedule must be properly linked to pumping and conveyance (HC) facilities in CP 2. At ready for commissioning, equipment and the dams would need to be operable. However, the commissioning schedule is tied to CP 2 and cannot occur until some amount of water has

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been pumped into the reservoir. As such, the assumed 90 days for commissioning would be affected by CP 2 commissioning and filling.

8.0 References

AECOM (2021a). Constructability Analysis Technical Memorandum – Final, Task Order No. 2, Task HR53. April 14.

AECOM (2021b). Alternative Contract Delivery Methods, HR Facilities – Draft Task Order No. 2, Task HR64. September 15.

AECOM (2021c). Final Feasibility-Level Cost Estimate Technical Memorandum – Task Order No. 2, Task HR56. May 20.

Authority (2021). California's Water Storage Investment Program.

Department of Water Resources (DWR) (2003). Sites Reservoir Engineering Feasibility Study, Golden Gate, Sites, and Saddle Dams. February.

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Appendix A
Reservoir Conceptual Construction Schedule

(This CP-1 schedule provides design and construction logic input to the Project schedule. For activity dates, refer to the Project schedule under development.)

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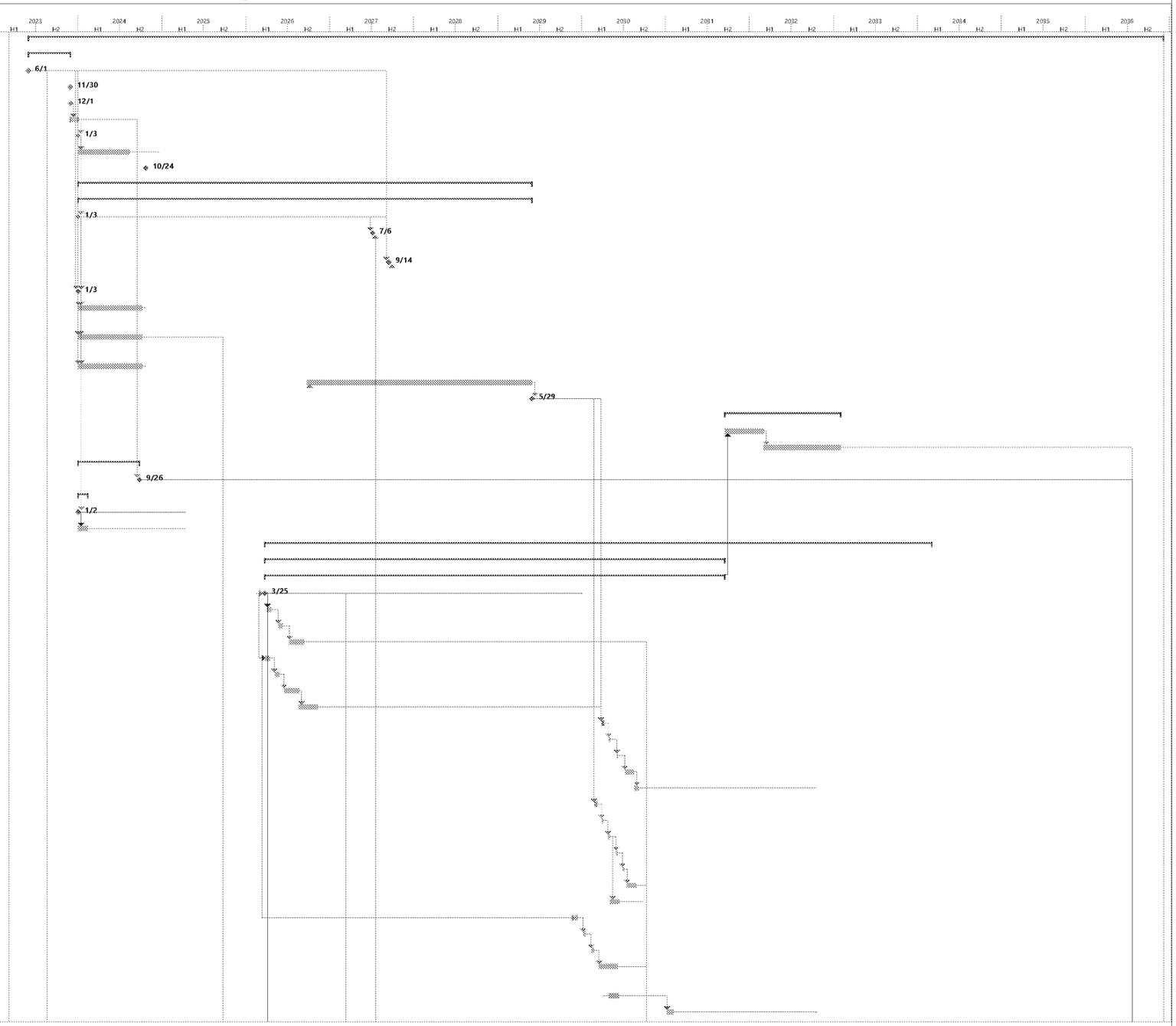
Sites Reservoir, CP-1
DRAFT Conceptual Construction Schedule
HR Facilities - 1.5 MAF
Roadways and Dams
January 2023

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
1		Sites Reservoir - CP-1	3527 days	Thu 6/1/23	Fri 12/5/36		
2		Final EIR / EIS	130 days	Thu 6/1/23	Thu 11/30/23		
3		Final EIR (Environmental Impact Report) CEQA Adoptio	0 days	Thu 6/1/23	Thu 6/1/23		14,15,16,17,18,81
4		Final EIS (Environmental Impact Statement) NEPA ROD	0 days	Thu 11/30/23	Thu 11/30/23		
5		CWC Award of Funds	0 days	Fri 12/1/23	Fri 12/1/23		6
6		Sites Board Approval/NTP for Phase 3	23 days	Fri 12/1/23	Tue 1/2/24	5	7,12,27,25
7		Determine Engineering Procurement & Delivery Method	0 days	Wed 1/3/24	Wed 1/3/24	6	8
8		CMAR Solicitation and Procurement	8 mons	Wed 1/3/24	Tue 8/13/24	7	172
9		Investor Commitment	0 days	Thu 10/24/24	Thu 10/24/24		
10		Real Estate	1410 days	Wed 1/3/24	Tue 5/29/29		
11		Land Access and Acquisition	1410 days	Wed 1/3/24	Tue 5/29/29		
12		Authority Approval to Proceed with P2 Access (NTP)	0 days	Wed 1/3/24	Wed 1/3/24	6	16,17,18,13,14,15
13		Critical Land Acquisition - P2a Geotech (Dam Foundation & Grouting)	0 days	Tue 7/6/27	Tue 7/6/27	12,94	
14		Critical Land Acquisition - P2b Geotech Investigation (Dam Embankments)	0 days	Tue 9/14/27	Tue 9/14/27	12,117,3	
15		Critical Land Acquisition - P2a Geotech (Roads)	0 days	Wed 1/3/24	Wed 1/3/24	12,3	
16		Critical Land Access - P2a Geotech (Dam Foundation & Grouting)	200 days	Wed 1/3/24	Tue 10/8/24	12,3	82
17		Critical Land Acccess - P2b Geotech Investigation (Dam Embankments)	200 days	Wed 1/3/24	Tue 10/8/24	12,3	84
18		Critical Land Access - P2a Geotech (Roads)	200 days	Wed 1/3/24	Tue 10/8/24	12,3	83
19		Critical Path Land Acquisition	700 days	Wed 9/23/26	Tue 5/29/29	92	20
20		Land Acquisition / Complete Access	0 days	Tue 5/29/29	Tue 5/29/29	19	40,45,76
21		**Environmental**	**360 days**	**Tue 9/16/31**	**Mon 1/31/33**		
22		Environmental Surveys	6 mons	Tue 9/16/31	Mon 3/1/32	31	23
23		Environmental Permitting and Certification	12 mons	Tue 3/2/32	Mon 1/31/33	22	343
24		**Water**	**191 days**	**Tue 1/2/24**	**Thu 9/26/24**		
25		Water Rights Acquisition (Permanent)	0 days	Thu 9/26/24	Thu 9/26/24	6	343
26		**Construction Water**	**30 days**	**Tue 1/2/24**	**Tue 2/13/24**		
27		Acquisition of Construction Water	0 days	Tue 1/2/24	Tue 1/2/24	6	175,28
28		Initial Development of Construction Water	30 days	Wed 1/3/24	Tue 2/13/24	27	175
29		Sites Reservoir Permitting, Mitigation and Cultural Work	2073 days	Wed 3/25/26	Fri 3/3/34		
30		Permitting	**1429 days**	**Wed 3/25/26**	**Mon 9/15/31**		
31		**Baseline Surveys and Revised ESA Consultation**	**1429 days**	**Wed 3/25/26**	**Mon 9/15/31**		**22**
32		Access Granted for Biological Surveys	0 days	Wed 3/25/26	Wed 3/25/26	92SS	33FS+7 days,59,36SS,73,75
33		Plant Survey 1	15 days	Fri 4/3/26	Thu 4/23/26	32FS+7 days	34FS+20 days
34		Plant Survey 2	15 days	Fri 5/22/26	Thu 6/11/26	33FS+20 days	35FS+20 days
35		Plant Survey 3 and Report	45 days	Fri 7/10/26	Thu 9/10/26	34FS+20 days	67,69
36		Land Cover Verification/Aquatic Delineation #1	15 days	Wed 3/25/26	Tue 4/14/26	32SS	52SS,37FS+15 days
37		Land Cover Verification/Aquatic Delineation #2	15 days	Wed 5/6/26	Tue 5/26/26	36FS+15 days	38FS+15 days
38		Land Cover Verification/Aquatic Delineation and F	45 days	Wed 6/17/26	Tue 8/18/26	37FS+15 days	39
39		Revise Impact Acres and Work with Agencies	60 days	Wed 8/19/26	Tue 11/10/26	38	40,45
40		BUOW #1 (Burrowing Owls Study)	5 days	Mon 4/1/30	Fri 4/5/30	39,20	41FS+15 days
41		BUOW #2	5 days	Mon 4/29/30	Fri 5/3/30	40FS+15 days	42FS+20 days
42		BUOW #3	5 days	Mon 6/3/30	Fri 6/7/30	41FS+20 days	43FS+20 days
43		BUOW #4 and Report	30 days	Mon 7/8/30	Fri 8/16/30	42FS+20 days	44
44		BUOW Relocation	15 days	Mon 8/19/30	Fri 9/6/30	43	322
45		SWHA #1 and TCBB #1	5 days	Fri 3/1/30	Thu 3/7/30	39,20	46FS+15 days
46		SWHA #2 and TCBB #2	5 days	Fri 3/29/30	Thu 4/4/30	45FS+15 days	47FS+15 days
47		SWHA #3 and TCBB #3	5 days	Fri 4/26/30	Thu 5/2/30	46FS+15 days	48FS+20 days,51,58
48		SWHA #4	5 days	Fri 5/31/30	Thu 6/6/30	47FS+20 days	49FS+15 days
49		SWHA #5	5 days	Fri 6/28/30	Thu 7/4/30	48FS+15 days	50FS+7 days
50		SWHA #6 and Report	30 days	Tue 7/16/30	Mon 8/26/30	49FS+7 days	67,69
51		TCBB Report	30 days	Fri 5/3/30	Thu 6/13/30	47	69
52		Vernal Pool Wet Season Survey 1	10 days	Mon 12/3/29	Fri 12/14/29	36SS	53FS+15 days
53		Vernal Pool Wet Season Survey 2	10 days	Mon 1/7/30	Fri 1/18/30	52FS+15 days	54FS+15 days
54		Vernal Pool Wet Season Survey 3	10 days	Mon 2/11/30	Fri 2/22/30	53FS+15 days	55FS+15 days
55		Vernal Pool Wet Season Survey 4 (more may be needed) and Report	60 days	Mon 3/18/30	Fri 6/7/30	54FS+15 days	67
56		VELB Survey and Report	30 days	Tue 4/30/30	Mon 6/10/30		57FS+150 days,67,60SS
57		VELB Transplant	20 days	Tue 1/7/31	Mon 2/3/31	56FS+150 days	322



DRAFT Conceptual Construction Schedule Sites Reservoir CP-1.
26-Jan-2023

Task, Split, Milestone, Summary, Project Summary, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, External Tasks, External Milestone, Deadline, Critical, Critical Split, Progress, Manual Progress

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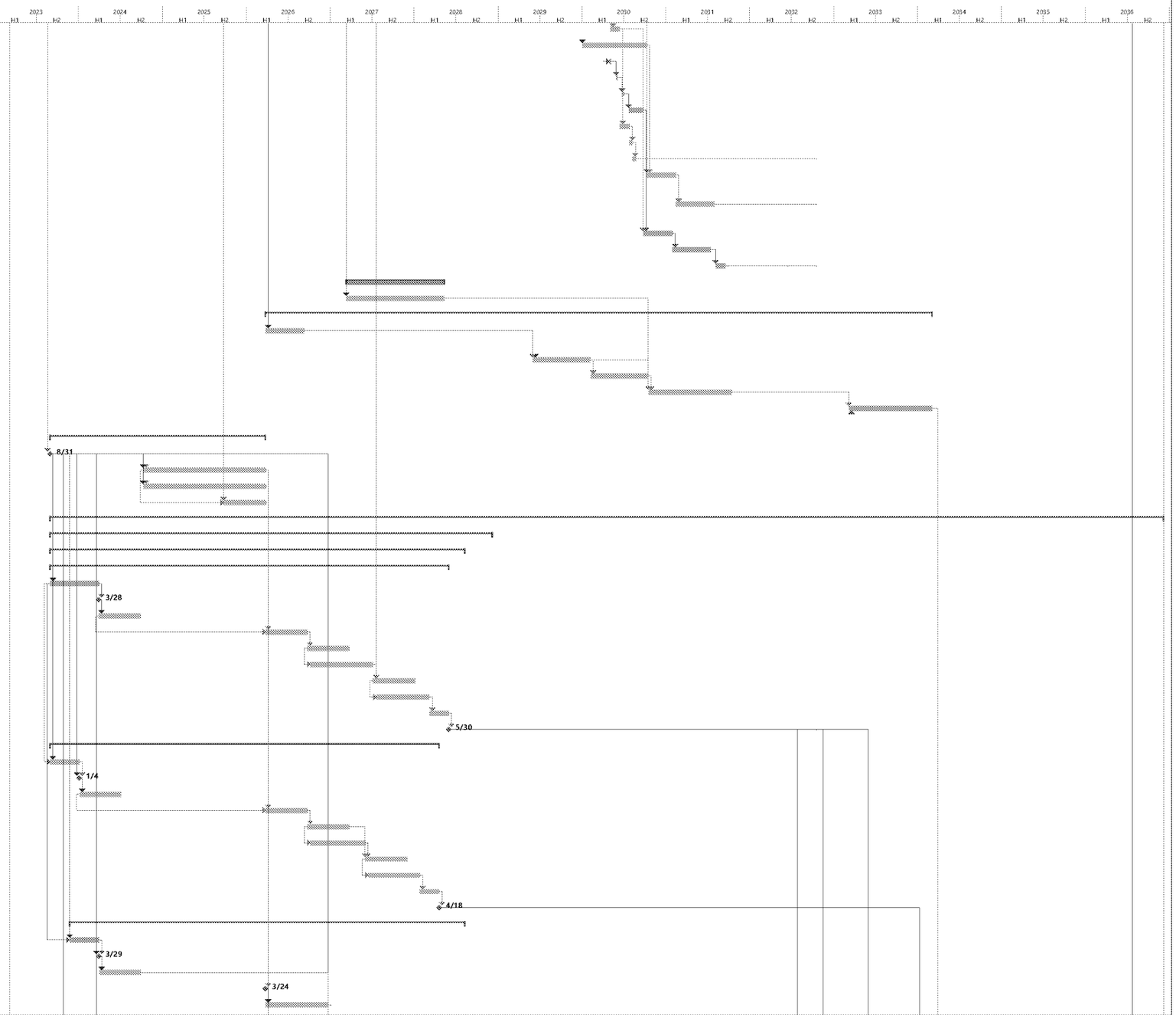
Draft_0023224

Sites Reservoir, CP-1
DRAFT Conceptual Construction Schedule
HR Facilities - 1.5 MAF
Roadways and Dams
January 2023

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
58		Bank Swallow Survey and Report	30 days	Fri 5/3/30	Thu 6/13/30	47	64,69
59		CRLF Surveys and Report	200 days	Thu 1/3/30	Wed 10/9/30	32	67
60		Bumble Bee Survey 1	5 days	Tue 4/30/30	Mon 5/6/30	56SS	61FS+15 days
61		Bumble Bee Survey 2	5 days	Tue 5/28/30	Mon 6/3/30	60FS+15 days	62FS+15 days
62		Bumble Bee Survey 3	5 days	Tue 6/25/30	Mon 7/1/30	61FS+15 days	63FS+15 days
63		Bumble Bee Survey 4 and Report	45 days	Tue 7/23/30	Mon 9/23/30	62FS+15 days	69
64		Badger Survey and Report	30 days	Fri 6/14/30	Thu 7/25/30	58	65
65		Bat Survey (Roosts)	10 days	Fri 7/26/30	Thu 8/8/30	64	66
66		Bat Roosts Removal	10 days	Fri 8/9/30	Thu 8/22/30	65	322
67		USFWS - Amend ESA Consultation: Prepare Report and Submit	90 days	Thu 10/10/30	Wed 2/12/31	35,50,55,56,59	68
68		USFWS Review and Amend ESA Permit and Take Statement	120 days	Thu 2/13/31	Wed 7/30/31	67	322
69		CDFW - Amend ESA ITP: Prepare Report and Subm	90 days	Tue 9/24/30	Mon 1/27/31	35,50,51,58,63	70
70		CDFW Review Report and Ament ITP Take Statem	120 days	Tue 1/28/31	Mon 7/14/31	69	71FS+15 days
71		Precon Avoidance (GGS, Avian, mammal, other CE	30 days	Tue 8/5/31	Mon 9/15/31	70FS+15 days	322,177,182,188,193,198,203,208,212,216,2
72		**Compensatory Mitigation**	**305 days**	**Fri 3/12/27**	**Thu 5/11/28**		
73		Secure LOC/Implement Mitigation Prior to Take	305 days	Fri 3/12/27	Thu 5/11/28	32	78
74		Cultural Work	2073 days	Wed 3/25/26	Fri 3/3/34		
75		Prepare and Consult on Construction Phase Work Plan (per Section 106 PA)	120 days	Wed 3/25/26	Tue 9/8/26	32	76
76		Cultural Survey - with Fee Title	180 days	Wed 5/30/29	Tue 2/5/30	75,20	77,78
77		Testing and Evaluation of Resources	180 days	Wed 2/6/30	Tue 10/15/30	76	78
78		Develop Treatment Plan and Implementation	260 days	Wed 10/16/30	Tue 10/14/31	76,73,77	79
79		Implement Avoidance/Minimization Activities During Construction	260 days	Mon 3/7/33	Fri 3/3/34	78,322	326FF
80		P1 / P2 Geotech Investigations	669 days	Thu 8/31/23	Tue 3/24/26		
81		P1 Geotech Investigation (30% Cutoff)	0 days	Thu 8/31/23	Thu 8/31/23	3	101,112,137,149,210,89,124,160,100,111,13
82		EIR P2a Geotech Investigation (Dam Foundations & Gr	76 wks	Wed 10/9/24	Tue 3/24/26	16,81	92,127,139,103,84SS+50 wks,163
83		EIR P2a Geotech Investigation (Roads)	76 wks	Wed 10/9/24	Tue 3/24/26	81,18	179,185,190,195,200,205
84		EIR P2b Geotech Investigation (Dam Embankments)	26 wks	Wed 9/24/25	Tue 3/24/26	17,82SS+50 wks	151,114,163
85		Reservoir Facilities	3462 days	Thu 8/31/23	Fri 12/5/36		
86		Engineering - Dams	1374 days	Thu 8/31/23	Tue 12/5/28		
87		**Golden Gate Dam Design**	1289 days	Thu 8/31/23	Tue 8/8/28		
88		**Golden Gate Foundation Design**	1239 days	Thu 8/31/23	Tue 5/30/28		
89		Golden Gate Foundation 30% Design	151 days	Thu 8/31/23	Thu 3/28/24	81	90,100SS,111SS+200 days
90		Golden Gate Fnd 30% Design Package Submitta	0 days	Thu 3/28/24	Thu 3/28/24	89	91
91		DSOD Review of GG Fdn 30% Design	26 wks	Fri 3/29/24	Thu 9/26/24	90	92SS+10 days
92		Golden Gate Foundation 60% Design	26 wks	Wed 3/25/26	Tue 9/22/26	82,91SS+10 days	93,32SS,19
93		DSOD Review of GG Fdn 60% Design	26 wks	Wed 9/23/26	Tue 3/23/27	92	94SS+10 days
94		Golden Gate Foundation 90% Design	39 wks	Wed 10/7/26	Tue 7/6/27	93SS+10 days	95,13
95		DSOD Review of GG Fdn 90% Design	26 wks	Wed 7/7/27	Tue 1/4/28	94	96SS+10 days
96		GG Foundation 100% Design	33 wks	Wed 7/21/27	Tue 3/7/28	95SS+10 days	97
97		DSOD Review of GG 100% Foundation Design P	12 wks	Wed 3/8/28	Tue 5/30/28	96	98
98		GG Foundation DSOD Approval Received	0 days	Tue 5/30/28	Tue 5/30/28	97	322,326,295,241
99		**Golden Gate Grouting Design**	**1209 days**	**Thu 8/31/23**	**Tue 4/18/28**		
100		Golden Gate Grouting 30% Design	91 days	Thu 8/31/23	Thu 1/4/24	89SS,81	101
101		Golden Gate Grouting Design Package Submitta	0 days	Thu 1/4/24	Thu 1/4/24	81,100	102
102		DSOD Review of GG Grouting 30% Design	26 wks	Fri 1/5/24	Thu 7/4/24	101	103SS+10 days
103		Golden Gate Grouting 60% Design	26 wks	Wed 3/25/26	Tue 9/22/26	102SS+10 days,82	104
104		DSOD Review of GG Grouting 60% Design	26 wks	Wed 9/23/26	Tue 3/23/27	103	105SS+10 days,106
105		Golden Gate Grouting 90% Design	34 wks	Wed 10/7/26	Tue 6/1/27	104SS+10 days	106
106		DSOD Review of GG Grouting 90% Design	26 wks	Wed 6/2/27	Tue 11/30/27	105,104	107SS+10 days
107		GG Grouting 100% Design	32 wks	Wed 6/16/27	Tue 1/25/28	106SS+10 days	108
108		DSOD Review of GG 100% Grouting Design Pac	12 wks	Wed 1/26/28	Tue 4/18/28	107	109
109		GG Grouting DSOD Approval Received	0 days	Tue 4/18/28	Tue 4/18/28	108	331
110		**Golden Gate Embankment Design**	1228 days	Fri 11/24/23	Tue 8/8/28		
111		Golden Gate Embankment 30% Design	91 days	Fri 11/24/23	Fri 3/29/24	81,89SS+200 days	112
112		Golden Gate Embankment Design Package Sub	0 days	Fri 3/29/24	Fri 3/29/24	111,81	113
113		DSOD Review of GG Embankment 30% Design	26 wks	Mon 4/1/24	Fri 9/27/24	112	116
114		Golden Gate Borrow and Quarry Geotech Data	0 days	Tue 3/24/26	Tue 3/24/26	84	115
115		Golden Gate Embankment 60% Design	39 wks	Wed 3/25/26	Tue 12/22/26	114	116,210



DRAFT Conceptual Construction Schedule Sites Reservoir CP-1.
26-Jan-2023

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Progress | Manual Progress

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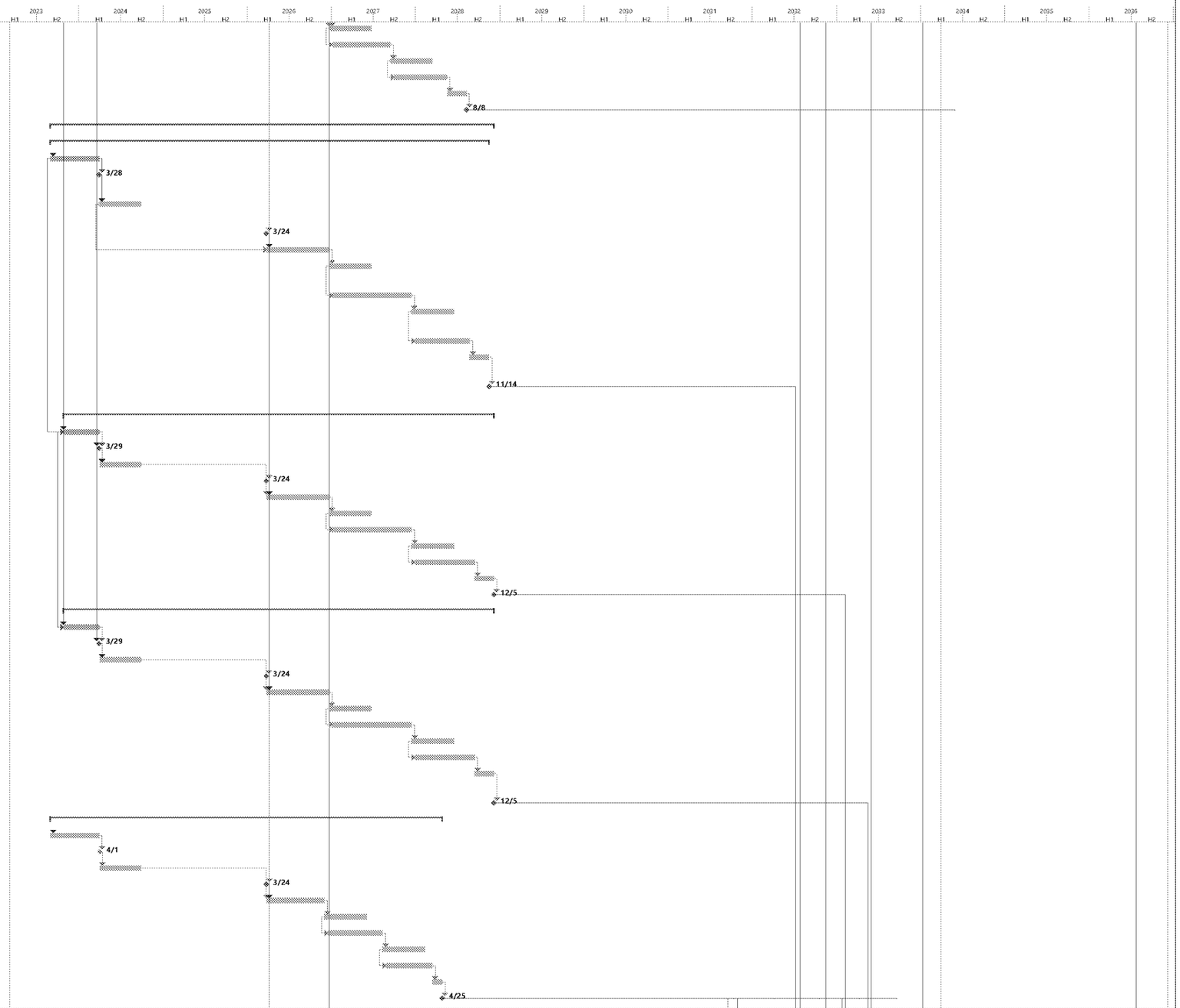
Sites Reservoir, CP-1
DRAFT Conceptual Construction Schedule
HR Facilities - 1.5 MAF
Roadways and Dams
January 2023

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
116		DSOD Review of GG Embankment 60% Design	26 wks	Wed 12/23/26	Tue 6/22/27	115,113	117SS+10 days
117		Golden Gate Embankment 90% Design	36 wks	Wed 1/6/27	Tue 9/14/27	116SS+10 days	118,14
118		DSOD Review of GG Embankment 90% Design	26 wks	Wed 9/15/27	Tue 3/14/28	117	119SS+10 days
119		GG Embankment 100% Design	33 wks	Wed 9/29/27	Tue 5/16/28	118SS+10 days	120
120		DSOD Review of GG 100% Embankment Design	12 wks	Wed 5/17/28	Tue 8/8/28	119	121
121		GG Embankment DSOD Approval Received	0 days	Tue 8/8/28	Tue 8/8/28	120	337,338,339,340
122		Sites Dam Design	1374 days	Thu 8/31/23	Tue 12/5/28		
123		**Sites Dam Foundation and Outlet Design**	1359 days	Thu 8/31/23	Tue 11/14/28		
124		Sites Dam Foundation and Outlet 30% Design	151 days	Thu 8/31/23	Thu 3/28/24	81	125,136SS+100 days
125		Sites Dam Foundation and Outlet Design Package Submittal	0 days	Thu 3/28/24	Thu 3/28/24	124	126
126		DSOD Review of Sites Dam Foundation and Outlet 30% Design	26 wks	Fri 3/29/24	Thu 9/26/24	125	128SS+10 days
127		Sites Dam Foundation and Outlet Geotech Data	0 days	Tue 3/24/26	Tue 3/24/26	82	128,152
128		Sites Dam Foundation and Outlet 60% Design	39 wks	Wed 3/25/26	Tue 12/22/26	127,126SS+10 days	129
129		DSOD Review of Sites Dam Foundation and Outlet 60% Design	26 wks	Wed 12/23/26	Tue 6/22/27	128	130SS+10 days
130		Sites Dam Foundation and Outlet 90% Design	49 wks	Wed 1/6/27	Tue 12/14/27	129SS+10 days	131
131		DSOD Review of Sites Dam Foundation and Outlet 90% Design	26 wks	Wed 12/15/27	Tue 6/13/28	130	132SS+10 days
132		Sites Dam Foundation and Outlet 100% Design	34 wks	Wed 12/29/27	Tue 8/22/28	131SS+10 days	133
133		DSOD Review of Sites 100% Foundation and Outlet Design	12 wks	Wed 8/23/28	Tue 11/14/28	132	134
134		Sites Dam Foundation and Outlet DSOD Approval Received	0 days	Tue 11/14/28	Tue 11/14/28	133	291,297
135		**Sites Dam Grouting Design**	1333 days	Fri 10/27/23	Tue 12/5/28		
136		Sites Dam Grouting 30% Design	111 days	Fri 10/27/23	Fri 3/29/24	81,124SS+100 days	137,148SS+100 days
137		Sites Dam Grouting Design Package Submittal	0 days	Fri 3/29/24	Fri 3/29/24	81,136	138
138		DSOD Review of Sites Dam Grouting 30% Desig	26 wks	Mon 4/1/24	Fri 9/27/24	137	140
139		Sites Dam Grouting Geotech Data	0 days	Tue 3/24/26	Tue 3/24/26	82	140
140		Sites Dam Grouting 60% Design	39 wks	Wed 3/25/26	Tue 12/22/26	139,138	141
141		DSOD Review of Sites Dam Grouting 60% Desig	26 wks	Wed 12/23/26	Tue 6/22/27	140	142SS+10 days
142		Sites Dam Grouting 90% Design	49 wks	Wed 1/6/27	Tue 12/14/27	141SS+10 days	143
143		DSOD Review of Sites Dam Grouting 90% Desig	26 wks	Wed 12/15/27	Tue 6/13/28	142	144SS+10 days
144		Sites Dam Grouting 100% Design	37 wks	Wed 12/29/27	Tue 9/12/28	143SS+10 days	145
145		DSOD Review of Sites 100% Grouting Design Pa	12 wks	Wed 9/13/28	Tue 12/5/28	144	146
146		Sites Dam Grouting DSOD Approval Received	0 days	Tue 12/5/28	Tue 12/5/28	145	308
147		**Sites Dam Embankment Design**	1333 days	Fri 10/27/23	Tue 12/5/28		
148		Sites Dam Embankment 30% Design	111 days	Fri 10/27/23	Fri 3/29/24	81,136SS+100 days	149
149		Sites Dam Embankment Design Package Submitt	0 days	Fri 3/29/24	Fri 3/29/24	81,148	150
150		DSOD Review of Sites Dam Embankment 30% D	26 wks	Mon 4/1/24	Fri 9/27/24	149	152
151		Sites Dam Borrow and Quarry Geotech Data	0 days	Tue 3/24/26	Tue 3/24/26	84	152
152		Sites Dam Embankment 60% Design	39 wks	Wed 3/25/26	Tue 12/22/26	127,151,150	153
153		DSOD Review of Sites Dam Embankment 60% D	26 wks	Wed 12/23/26	Tue 6/22/27	152	154SS+10 days
154		Sites Dam Embankment 90% Design	49 wks	Wed 1/6/27	Tue 12/14/27	153SS+10 days	155
155		DSOD Review of Sites Dam Embankment 90% D	26 wks	Wed 12/15/27	Tue 6/13/28	154	156SS+10 days
156		Sites Dam Embankment 100% Design	37 wks	Wed 12/29/27	Tue 9/12/28	155SS+10 days	157
157		DSOD Review of Sites 100% Embankment Design Package	12 wks	Wed 9/13/28	Tue 12/5/28	156	158
158		Sites Dam Embankment DSOD Approval Receiv	0 days	Tue 12/5/28	Tue 12/5/28	157	314,315,316,317
159		**Saddle Dam Designs**	1214 days	Thu 8/31/23	Tue 4/25/28		
160		Saddle Dams 30% Design	151 days	Thu 8/31/23	Thu 3/28/24	81	161
161		Saddle Dams 30% Design Package Submittal	0 days	Mon 4/1/24	Mon 4/1/24	160	162
162		Saddle Dams DSOD Review of 30% Design	26 wks	Mon 4/1/24	Fri 9/27/24	161	164
163		Saddle Dams Borrow and Quarry Geotech Data	0 days	Tue 3/24/26	Tue 3/24/26	82,84	164
164		Saddle Dams 60% Design	36 wks	Wed 3/25/26	Tue 12/1/26	163,162	165
165		Saddle Dams DSOD Review of 60% Design	26 wks	Wed 12/2/26	Tue 6/1/27	164	166SS+10 days
166		Saddle Dams 90% Design	34 wks	Wed 12/16/26	Tue 8/10/27	165SS+10 days	167
167		Saddle Dams DSOD Review of 90% Design	26 wks	Wed 8/11/27	Tue 2/8/28	166	168SS+10 days
168		Saddle Dams 100% Design	29 wks	Wed 8/25/27	Tue 3/14/28	167SS+10 days	169
169		DSOD Review of 100% Package	6 wks	Wed 3/15/28	Tue 4/25/28	168	170
170		Saddle Dams DSOD Approval Received	0 days	Tue 4/25/28	Tue 4/25/28	169	216,237,258,278,220,229,230,231,232,262,2



DRAFT Conceptual Construction Schedule Sites Reservoir CP-1.
26-Jan-2023

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Progress | Manual Progress

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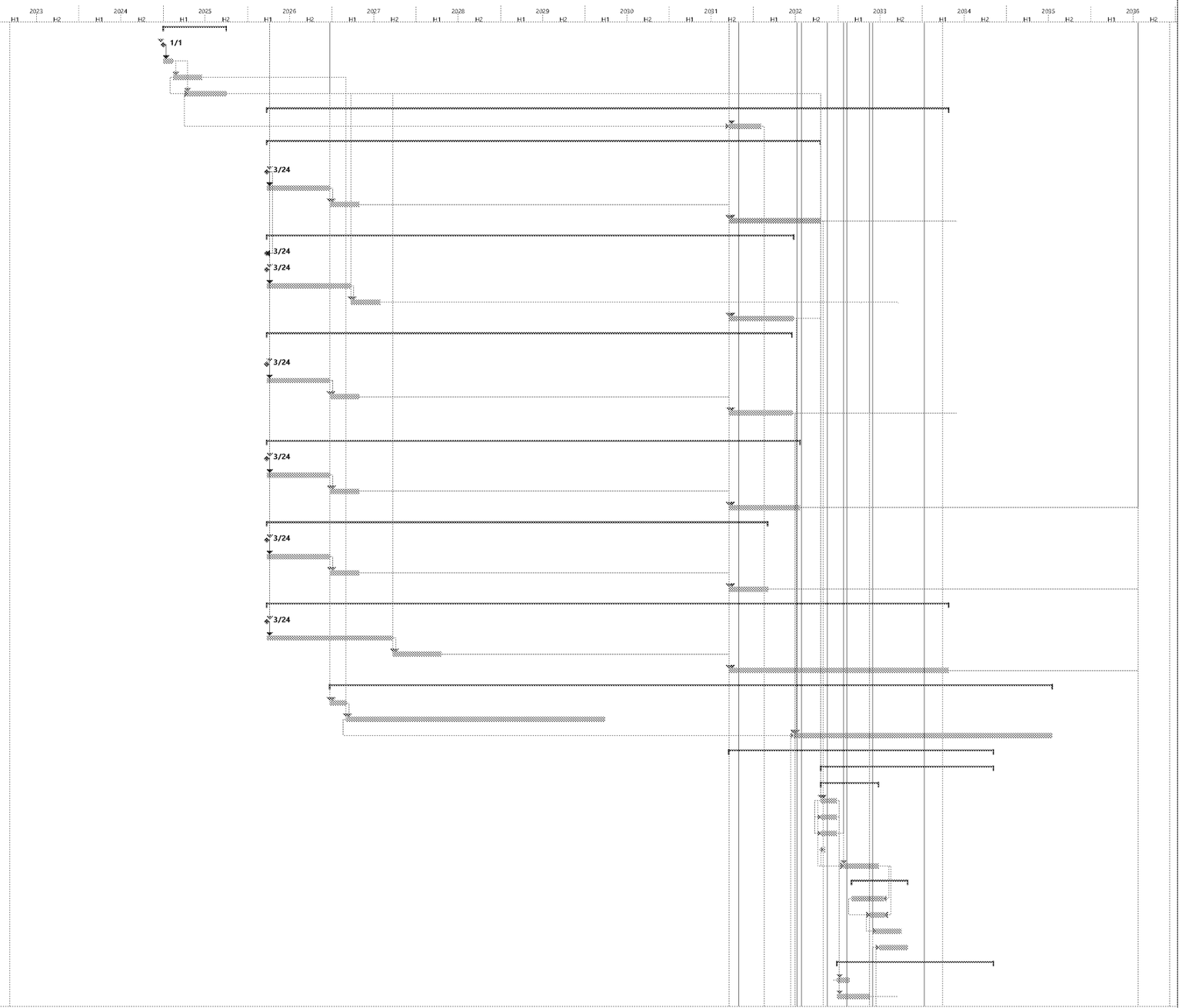
Sites Reservoir, CP-1
DRAFT Conceptual Construction Schedule
HR Facilities - 1.5 MAF
Roadways and Dams
January 2023

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
171		**CMAR Procurement**	**195 days**	**Wed 1/1/25**	**Tue 9/30/25**		
172		Award CMAR Contract	0 days	Wed 1/1/25	Wed 1/1/25	8	173
173		Notice to Proceed	6 wks	Wed 1/1/25	Tue 2/11/25	172	175,174
174		Early Submittals And Approvals - Dams	90 days	Wed 2/12/25	Tue 6/17/25	173	211,175SS+45 days
175		CMAR Mobilization	6 mons	Wed 4/16/25	Tue 9/30/25	173,174SS+45 days,27,28	322,291,216,237,258,192,177SS,181,187,197
176		**Roads, Bridges, Access, and Site Development**	**2109 days**	**Tue 3/24/26**	**Mon 4/24/34**		
177		Early Site Access and Staging Development	100 days	Tue 9/16/31	Mon 2/2/32	175SS,71	288
178		Northern Construction Access Roads (CR 68, CR 69, N. Rd)	1713 days	Tue 3/24/26	Fri 10/15/32		
179		Preliminary Design	0 days	Tue 3/24/26	Tue 3/24/26	83	180,184FF
180		Final Design	39 wks	Wed 3/25/26	Tue 12/22/26	179	181
181		Procurement and NTP	90 days	Wed 12/23/26	Tue 4/27/27	175,180	182
182		Northern Construction Access Roads (CR 68, CR 69	284 days	Tue 9/16/31	Fri 10/15/32	181,71	338,230,251,272,322,237,216
183		**County Roads F, D, McDermott, Delevan**	**1629 days**	**Tue 3/24/26**	**Mon 6/21/32**		
184		Preliminary Design	0 days	Tue 3/24/26	Tue 3/24/26	179FF	
185		Geotechnical Data	0 days	Tue 3/24/26	Tue 3/24/26	83	186
186		Final Design	52 wks	Wed 3/25/26	Tue 3/23/27	185	187
187		Procurement and NTP	90 days	Wed 3/24/27	Tue 7/27/27	175,186	230,251,272,188
188		County Roads F, D, McDermott, Delevan	200 days	Tue 9/16/31	Mon 6/21/32	187,71	212,322
189		**Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)**	**1624 days**	**Tue 3/24/26**	**Mon 6/14/32**		
190		Geotechnical Data	0 days	Tue 3/24/26	Tue 3/24/26	83	191
191		Final Design	39 wks	Wed 3/25/26	Tue 12/22/26	190	192
192		Procurement and NTP	90 days	Wed 12/23/26	Tue 4/27/27	175,191	193
193		Southern Construction Access Roads (Maxwell-Sites, Shoo-fly, A-1)	195 days	Tue 9/16/31	Mon 6/14/32	192,71	291,338,315,212
194		**Ancillary Roads B1, B2, C1, C2, Comm N., Comm So**	**1649 days**	**Tue 3/24/26**	**Mon 7/19/32**		
195		Geotechnical Data	0 days	Tue 3/24/26	Tue 3/24/26	83	196
196		Final Design	39 wks	Wed 3/25/26	Tue 12/22/26	195	197
197		Procurement and NTP	90 days	Wed 12/23/26	Tue 4/27/27	175,196	198
198		Ancillary Roads B1, B2, C1, C2, Comm N., Comm S	220 days	Tue 9/16/31	Mon 7/19/32	197,71	343
199		**Stone Corral Recreation Road to Sites Dam**	**1549 days**	**Tue 3/24/26**	**Mon 3/1/32**		
200		Geotechnical Data	0 days	Tue 3/24/26	Tue 3/24/26	83	201
201		Final Design	39 wks	Wed 3/25/26	Tue 12/22/26	200	202
202		Procurement and NTP	90 days	Wed 12/23/26	Tue 4/27/27	175,201	203
203		Stone Corral Recreation Road to Sites Dam	120 days	Tue 9/16/31	Mon 3/1/32	202,71	343
204		**Sites Lodoga Road Realignment and Bridge**	**2109 days**	**Tue 3/24/26**	**Mon 4/24/34**		
205		Geotechnical Data	0 days	Tue 3/24/26	Tue 3/24/26	83	206
206		Final Design	78 wks	Wed 3/25/26	Tue 9/21/27	205	207
207		Procurement and NTP	150 days	Wed 9/22/27	Tue 4/18/28	175,206	208
208		Sites Lodoga Road Realignment and Bridge	680 days	Tue 9/16/31	Mon 4/24/34	207,71	343
209		**Process and Haul Filter Materials to Project**	**2234 days**	**Wed 12/23/26**	**Mon 7/16/35**		
210		Offsite Quarry Development	50 days	Wed 12/23/26	Tue 3/2/27	81,115,175	211
211		Process Filter Materials	800 days	Wed 3/3/27	Tue 3/26/30	174,210	212SS+30 days
212		Filter Material Haul to Stockpile	800 days	Tue 6/22/32	Mon 7/16/35	211SS+30 days,188,193,71	338SS+30 days,315SS+30 days,230SS+30 day
213		**Saddle Dams Construction**	**819 days**	**Tue 9/16/31**	**Fri 11/3/34**		
214		**Saddle Dam 3**	**535 days**	**Mon 10/18/32**	**Fri 11/3/34**		
215		**Saddle Dam 3 Foundation Excavation**	**180 days**	**Mon 10/18/32**	**Fri 6/24/33**		
216		Saddle Dam 3 - Access and Staging	50 days	Mon 10/18/32	Fri 12/24/32	170,175,182,71	217SS,219SS+10 days,218SS,227,228,220SS+
217		Erosion and Sediment Control	50 days	Mon 10/18/32	Fri 12/24/32	216SS	220SS+20 days,227,228
218		Clearing / Grubbing Topsoil Salvage from Work	50 days	Mon 10/18/32	Fri 12/24/32	216SS	220FS+20 days,227,228
219		Demolition	5 days	Mon 11/1/32	Fri 11/5/32	216SS+10 days	220SS+20 days
220		Saddle Dam 3 - Foundation Excavation (Dbl Shif	110 days	Mon 1/24/33	Fri 6/24/33	216SS+20 days,217SS+20 days,218I	222FF+15 days,223FF+20 days
221		**Saddle Dam 3 - Foundation Preparation and Grou**	**175 days**	**Mon 2/28/33**	**Fri 10/28/33**		
222		Foundation Cleaning	100 days	Mon 2/28/33	Fri 7/15/33	220FF+15 days	223SS+10 days
223		Dental Excavation and Concrete	50 days	Mon 5/16/33	Fri 7/22/33	220FF+20 days,222SS+10 days	224SS+20 days
224		Grout Cap	80 days	Mon 6/13/33	Fri 9/30/33	223SS+20 days	225SS+10 days
225		Curtain Grouting	90 days	Mon 6/27/33	Fri 10/28/33	224SS+10 days	229SS+60 days
226		**Saddle Dam 3 - Embankment**	**485 days**	**Mon 12/27/32**	**Fri 11/3/34**		
227		Initial Borrow Development (Core Material)	40 days	Mon 12/27/32	Fri 2/18/33	216,217,218	229SS+20 days
228		Initial Borrow Development for Zones 3 and 4	100 days	Mon 12/27/32	Fri 5/13/33	216,217,218	231,232



DRAFT Conceptual Construction Schedule Sites Reservoir CP-1.
26-Jan-2023

Task | Milestone | Project Summary | Inactive Milestone | Manual Task | Manual Summary Rollup | Start-only | External Tasks | Deadline | Critical Split | Manual Progress
Split | Summary | Inactive Task | Inactive Summary | Duration-only | Manual Summary | Finish-only | External Milestone | Critical | Progress

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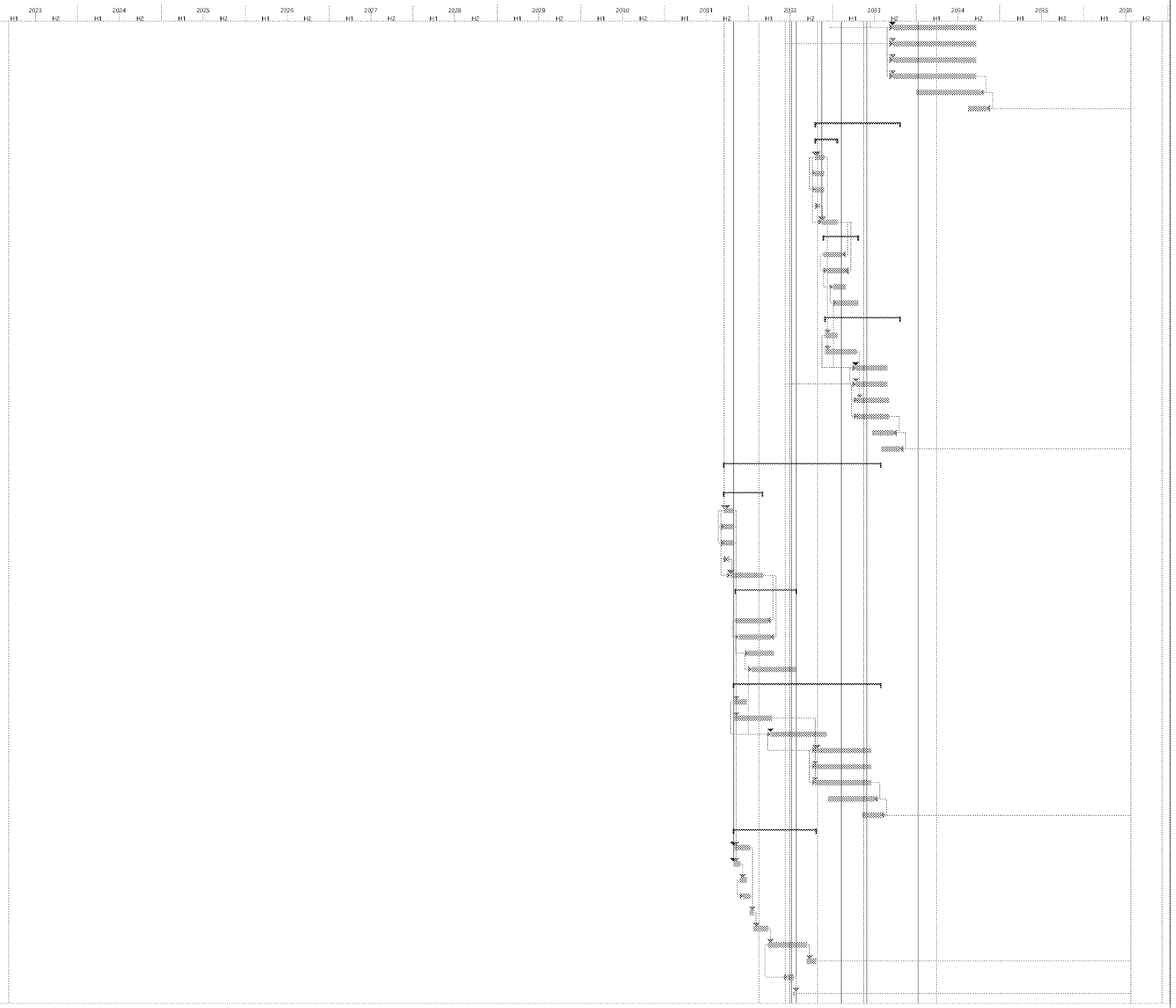
Sites Reservoir, CP-1
DRAFT Conceptual Construction Schedule
HR Facilities - 1.5 MAF
Roadways and Dams
January 2023

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
229		Place Zone 1 - Core	260 days	Mon 9/19/33	Fri 9/15/34	227SS+20 days,225SS+60 days,170	230SS
230		Place Zone 2A & 2B - Filters, Drains and Transit	260 days	Mon 9/19/33	Fri 9/15/34	229SS,182,187,170,212SS+30 days	231SS
231		Place Zone 3 - Rockfill	260 days	Mon 9/19/33	Fri 9/15/34	230SS,228,170	232SS
232		Place Zone 4 - Random	260 days	Mon 9/19/33	Fri 9/15/34	231SS,228,170	233FF+15 days
233		Place Rip Rap	200 days	Mon 1/2/34	Fri 10/6/34	232FF+15 days	234FF+20 days
234		Site Reclamation and Topsoil Replacement	60 days	Mon 8/14/34	Fri 11/3/34	233FF+20 days	343
235		**Saddle Dam 5**	**265 days**	**Mon 10/18/32**	**Fri 10/21/33**		
236		**Saddle Dam 5 - Foundation Excavation**	**70 days**	**Mon 10/18/32**	**Fri 1/21/33**		
237		Saddle Dam 5 - Access and Staging	30 days	Mon 10/18/32	Fri 11/26/32	170,175,182,71	240SS+10 days,238SS,239SS,241SS+20 days,2
238		Erosion and Sediment Control	30 days	Mon 10/18/32	Fri 11/26/32	237SS	241SS+20 days
239		Clearing / Grubbing Topsoil Salvage from Work	30 days	Mon 10/18/32	Fri 11/26/32	237SS	241SS+20 days
240		Demolition	5 days	Mon 11/1/32	Fri 11/5/32	237SS+10 days	241
241		Saddle Dam 5 - Foundation Excavation	50 days	Mon 11/15/32	Fri 1/21/33	237SS+20 days,238SS+20 days,239	243FF+15 days,244FF+15 days
242		**Saddle Dam 5 - Foundation Preparation and Grou**	**110 days**	**Mon 11/22/32**	**Fri 4/22/33**		
243		Foundation Cleaning	60 days	Mon 11/22/32	Fri 2/11/33	241FF+15 days	244SS+10 days
244		Dental Excavation and Concrete	60 days	Mon 12/6/32	Fri 2/25/33	241FF+15 days,243SS+10 days	245SS+20 days
245		Grout Cap	40 days	Mon 1/3/33	Fri 2/25/33	244SS+20 days	246SS+10 days
246		Curtain Grouting	70 days	Mon 1/17/33	Fri 4/22/33	245SS+10 days	250SS+60 days
247		**Saddle Dam 5 - Embankment**	**235 days**	**Mon 11/29/32**	**Fri 10/21/33**		
248		Initial Borrow Development (Core Material)	40 days	Mon 11/29/32	Fri 1/21/33	237	250SS+20 days
249		Initial Borrow Development for Zones 3 and 4	100 days	Mon 11/29/32	Fri 4/15/33	237	252
250		Place Zone 1 - Core	100 days	Mon 4/11/33	Fri 8/26/33	246SS+60 days,248SS+20 days,170	251SS
251		Place Zone 2A & 2B - Filters, Drains and Transit	100 days	Mon 4/11/33	Fri 8/26/33	250SS,182,187,212SS+30 days	252SS
252		Place Zone 3 - Rockfill	100 days	Mon 4/18/33	Fri 9/2/33	251SS,249	253SS
253		Place Zone 4 - Random	100 days	Mon 4/18/33	Fri 9/2/33	252SS	254FF+15 days
254		Place Rip Rap	70 days	Mon 6/20/33	Fri 9/23/33	253FF+15 days	255FF+20 days
255		Site Reclamation and Topsoil Replacement	60 days	Mon 8/1/33	Fri 10/21/33	254FF+20 days	343
256		**Minor Saddle Dams (SD1,SD2,SD6,SD8A, Dike 1, and Dike 2)**	**489 days**	**Tue 9/16/31**	**Fri 7/29/33**		
257		**Minor Saddle Dams Foundation Excavation**	**120 days**	**Tue 9/16/31**	**Mon 3/1/32**		
258		Minor Saddle Dams - Access and Staging	30 days	Tue 9/16/31	Mon 10/27/31	170,175,71	259SS,261SS+10 days,260SS,269,270,278,279
259		Erosion and Sediment Control	30 days	Tue 9/16/31	Mon 10/27/31	258SS	262SS+20 days,269,270,279
260		Clearing / Grubbing Topsoil Salvage from Work	30 days	Tue 9/16/31	Mon 10/27/31	258SS	262SS+20 days,269,270,279
261		Demolition	5 days	Tue 9/30/31	Mon 10/6/31	258SS+10 days	262
262		Minor Saddle Dams - Foundation Excavation	100 days	Tue 10/14/31	Mon 3/1/32	258SS+20 days,259SS+20 days,260	264FF+15 days,265FF+20 days
263		**Minor Saddle Dams - Foundation Preparation and Grouting**	**190 days**	**Tue 11/4/31**	**Mon 7/26/32**		
264		Foundation Cleaning	100 days	Tue 11/4/31	Mon 3/22/32	262FF+15 days	265SS+10 days
265		Dental Excavation and Concrete	100 days	Tue 11/18/31	Mon 4/5/32	262FF+20 days,264SS+10 days	266SS+30 days
266		Grout Cap	80 days	Tue 12/30/31	Mon 4/19/32	265SS+30 days	267SS+10 days
267		Curtain Grouting	140 days	Tue 1/13/32	Mon 7/26/32	266SS+10 days	271SS+60 days
268		**Minor Saddle Dams - Embankment**	**459 days**	**Tue 10/28/31**	**Fri 7/29/33**		
269		Initial Borrow Development (Core Material)	40 days	Tue 10/28/31	Mon 12/22/31	258,259,260	271SS+20 days
270		Initial Borrow Development for Zones 3 and 4	120 days	Tue 10/28/31	Mon 4/12/32	258,259,260	273,274
271		Place Zone 1 - Core	175 days	Tue 4/6/32	Mon 12/6/32	267SS+60 days,269SS+20 days,170	272SS
272		Place Zone 2A & 2B - Filters, Drains and Transit	175 days	Mon 10/18/32	Fri 6/17/33	271SS,182,187,170	273SS
273		Place Zone 3 - Rockfill	175 days	Mon 10/18/32	Fri 6/17/33	272SS,170,270	274SS
274		Place Zone 4 - Random	175 days	Mon 10/18/32	Fri 6/17/33	273SS,170,270	275FF+10 days
275		Place Rip Rap	145 days	Mon 12/13/32	Fri 7/1/33	274FF+10 days	276FF+20 days
276		Site Reclamation and Topsoil Replacement	60 days	Mon 5/9/33	Fri 7/29/33	275FF+20 days	343
277		**Saddle Dam 8B - Spillway**	**257 days**	**Tue 10/28/31**	**Wed 10/20/32**		
278		Batch Plant Setup and Operational	50 days	Tue 10/28/31	Mon 1/5/32	258,170	282
279		SD 8B - Foundation Excavation	20 days	Tue 10/28/31	Mon 11/24/31	258,259,260,170	280
280		SD 8B - Foundation Cleaning	20 days	Tue 11/25/31	Mon 12/22/31	279	281SS+10 days
281		SD 8B - Dental Excavation and Concrete	20 days	Tue 12/9/31	Mon 1/5/32	280SS+10 days	282
282		SD 8B - Grout Cap	12 days	Tue 1/6/32	Wed 1/21/32	281,278	283
283		SD 8B - Foundation Grouting	45 days	Thu 1/22/32	Wed 3/24/32	282	284
284		SD 8B - Mass Concrete	120 days	Thu 3/25/32	Wed 9/8/32	283	285,286SS+60 days
285		SD 8B - Bridge	30 days	Thu 9/9/32	Wed 10/20/32	284	343
286		SD 8B - Clay Backfill	20 days	Thu 6/17/32	Wed 7/14/32	284SS+60 days	287
287		SD 8B - Riprap and Drain Gravel	3 days	Thu 7/15/32	Mon 7/19/32	286	343



DRAFT Conceptual Construction Schedule Sites Reservoir CP-1.
26-Jan-2023

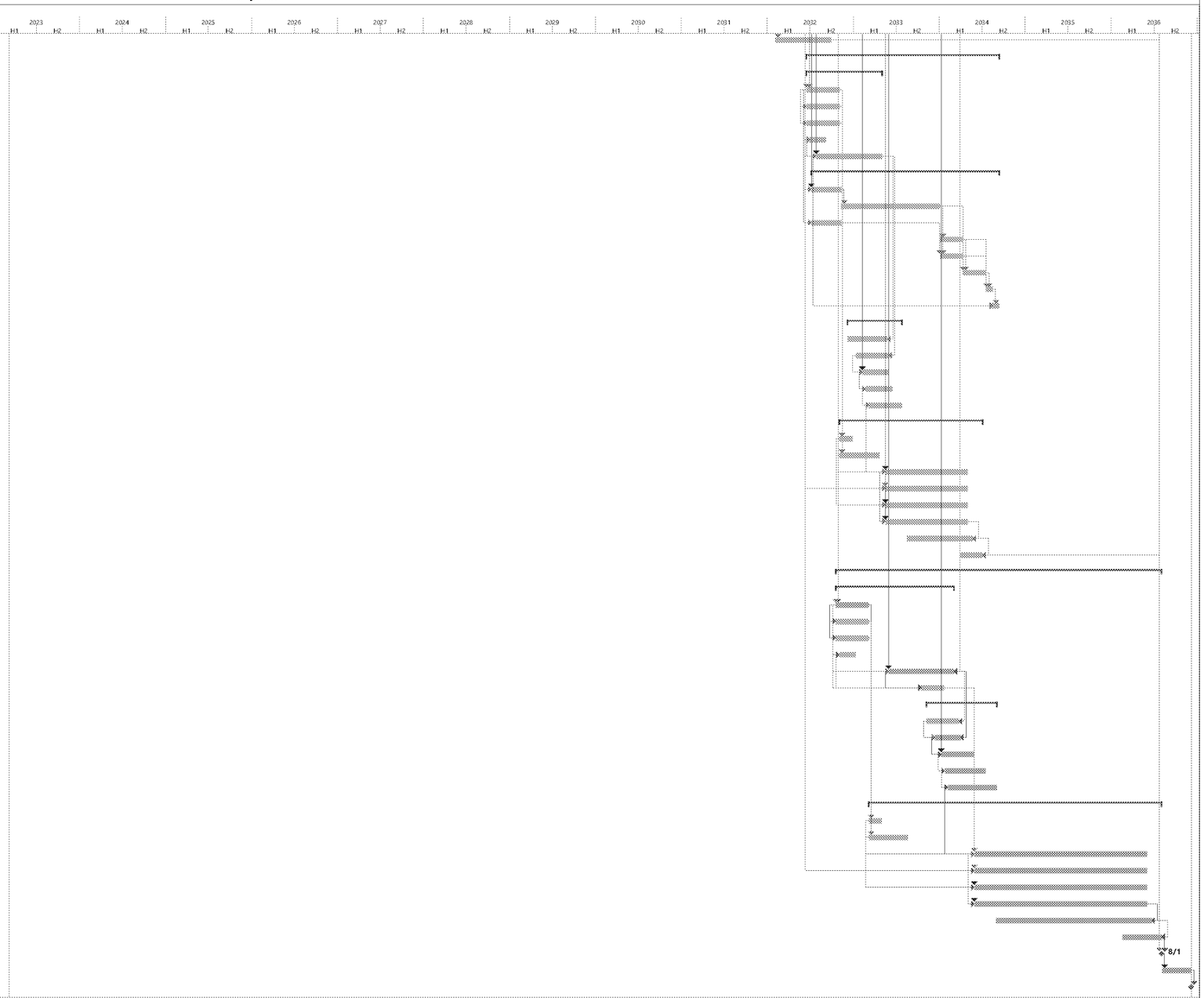
Task | Milestone | Project Summary | Inactive Milestone | Manual Task | Manual Summary Rollup | Start-only | External Tasks | Deadline | Critical Split | Manual Progress
Split | Summary | Inactive Task | Inactive Summary | Duration-only | Manual Summary | Finish-only | External Milestone | Critical | Progress

The dates, durations and sequencing shown are based on limited project information.
Additional information aquired, CMAR's approach to the work and other factors will result in a different approach to the work, sequencing, durations and dates.

Draft_0023228

Sites Reservoir, CP-1
DRAFT Conceptual Construction Schedule
HR Facilities - 1.5 MAF
Roadways and Dams
January 2023

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors
288		Rim Grouting	171 days	Tue 2/3/32	Tue 9/28/32	177	343
289		**Sites Dam Construction**	**585 days**	**Tue 6/15/32**	**Mon 9/11/34**		
290		**Sites Dam Foundation Excavation**	**230 days**	**Tue 6/15/32**	**Mon 5/2/33**		
291		Sites Dam Access and Staging	100 days	Tue 6/15/32	Mon 11/1/32	193,134,175,71	292SS,294SS+10 days,293SS,312,313,297SS+
292		Erosion and Sediment Control	100 days	Tue 6/15/32	Mon 11/1/32	291SS	312,295SS+20 days,313
293		Clearing / Grubbing Topsoil Salvage from Work Ar	100 days	Tue 6/15/32	Mon 11/1/32	291SS	312,295SS+20 days,313
294		Demolition	50 days	Tue 6/29/32	Mon 9/6/32	291SS+10 days	295SS+20 days
295		Sites Dam - Foundation Excavation	200 days	Tue 7/27/32	Mon 5/2/33	291SS+20 days,292SS+20 days,293	306FF+15 days,304SS+30 days,307FF+20 day
296		**Sites Diversion Outlet Facility**	**570 days**	**Tue 7/6/32**	**Mon 9/11/34**		
297		Develop Downstream Portal	90 days	Tue 7/6/32	Mon 11/8/32	291SS+15 days,134	298
298		Tunnel Excavation and Lining - Double Shift	300 days	Tue 11/9/32	Mon 1/2/34	297	301,300,302
299		Develop Upstream Portal	90 days	Tue 7/6/32	Mon 11/8/32	291SS+15 days	301
300		Outlet Structure Concrete	70 days	Tue 1/3/34	Mon 4/10/34	298	303,302
301		Inlet Structure Concrete	70 days	Tue 1/3/34	Mon 4/10/34	298,299	303,302
302		Mechanical	70 days	Tue 4/11/34	Mon 7/17/34	298,300,301	303
303		Sites Diversion Completion and Restoration	20 days	Tue 7/18/34	Mon 8/14/34	300,301,302	304
304		Construct Cofferdam to El. 310	20 days	Tue 8/15/34	Mon 9/11/34	295SS+30 days,303	
305		**Sites Dam - Foundation Preparation and Grouting**	**165 days**	**Tue 12/7/32**	**Mon 7/25/33**		
306		Foundation Cleaning	120 days	Tue 12/7/32	Mon 5/23/33	295FF+15 days	
307		Dental Excavation and Concrete	100 days	Tue 1/11/33	Mon 5/30/33	295FF+20 days	308SS+20 days
308		Grout Cap	80 days	Tue 2/8/33	Mon 5/30/33	307SS+20 days,146	309SS+10 days
309		Consolidation Grouting	80 days	Tue 2/22/33	Mon 6/13/33	308SS+10 days	310SS+10 days
310		Curtain Grouting	100 days	Tue 3/8/33	Mon 7/25/33	309SS+10 days	314SS+50 days
311		**Sites Dam - Embankment**	**435 days**	**Tue 11/2/32**	**Mon 7/3/34**		
312		Initial Borrow Development (Core Material)	40 days	Tue 11/2/32	Mon 12/27/32	291,292,293	314SS+20 days
313		Initial Quarry Development for Zones 3 and 4	120 days	Tue 11/2/32	Mon 4/18/33	291,292,293	316SS+40 days
314		Place Zone 1 - Core	250 days	Tue 5/17/33	Mon 5/1/34	312SS+20 days,310SS+50 days,158	315SS
315		Place Zone 2A & 2B - Filters, Drains and Transition	250 days	Tue 5/17/33	Mon 5/1/34	314SS,193,158,212SS+30 days	316SS
316		Place Zone 3 - Rockfill (Some Dbl Shift)	250 days	Tue 5/17/33	Mon 5/1/34	315SS,313SS+40 days,158	317SS
317		Place Zone 4 - Random (Some Dbl Shift)	250 days	Tue 5/17/33	Mon 5/1/34	316SS,158	318FF+15 days
318		Place Rip Rap	200 days	Tue 8/16/33	Mon 5/22/34	317FF+15 days	319FF+30 days
319		Site Reclamation and Topsoil Replacement	70 days	Tue 3/28/34	Mon 7/3/34	318FF+30 days	343
320		Golden Gate Dam Construction	990 days	Mon 10/18/32	Fri 8/1/36		
321		GG Dam Foundation Excavation	360 days	Mon 10/18/32	Fri 3/3/34		
322		Golden Gate Access and Staging	100 days	Mon 10/18/32	Fri 3/4/33	175,98,57,66,68,71,44,188,182	323SS,325SS+10 days,324SS,335,336,327SS+
323		Erosion and Sediment Control	100 days	Mon 10/18/32	Fri 3/4/33	322SS	327SS+100 days,326SS+20 days,335,336
324		Clearing / Grubbing Topsoil Salvage from Work Ar	100 days	Mon 10/18/32	Fri 3/4/33	322SS	327SS+100 days,326SS+20 days,335,336
325		Demolition	50 days	Mon 11/1/32	Fri 1/7/33	322SS+10 days	327SS+100 days,326SS+20 days
326		GG Dam - Foundation Excavation (Some Dbl Shift)	200 days	Mon 5/30/33	Fri 3/3/34	322SS+20 days,323SS+20 days,324	329FF+15 days,330FF+20 days,327SS+100 da
327		GG Dam - Bypass Pipeline and U/S Cofferdam	70 days	Mon 10/17/33	Fri 1/20/34	322SS+100 days,323SS+100 days,3	337
328		GG Dam - Foundation Preparation and Grouting	215 days	Mon 11/7/33	Fri 9/1/34		
329		Foundation Cleaning	100 days	Mon 11/7/33	Fri 3/24/34	326FF+15 days	330SS+10 days
330		Dental Excavation and Concrete	80 days	Mon 12/12/33	Fri 3/31/34	326FF+20 days,329SS+10 days	331SS+20 days
331		Grout Cap	100 days	Mon 1/9/34	Fri 5/26/34	330SS+20 days,109	332SS+10 days
332		Consolidation Grouting	125 days	Mon 1/23/34	Fri 7/14/34	331SS+10 days	333SS+10 days
333		Curtain Grouting	150 days	Mon 2/6/34	Fri 9/1/34	332SS+10 days	337SS+80 days
334		GG Dam - Embankment	890 days	Mon 3/7/33	Fri 8/1/36		
335		Initial Borrow Development (Core Material)	40 days	Mon 3/7/33	Fri 4/29/33	322,323,324	337SS+20 days
336		Initial Borrow Development for Zones 3 and 4	120 days	Mon 3/7/33	Fri 8/19/33	322,323,324	339SS+40 days
337		Place Zone 1 - Core	525 days	Mon 5/29/34	Fri 5/30/36	335SS+20 days,333SS+80 days,121,	338SS
338		Place Zone 2A & 2B - Filters, Drains and Transition	525 days	Mon 5/29/34	Fri 5/30/36	337SS,193,182,121,212SS+30 days	339SS
339		Place Zone 3 - Rockfill (Some Dbl Shift)	525 days	Mon 5/29/34	Fri 5/30/36	338SS,336SS+40 days,121	340SS
340		Place Zone 4 - Random (Some Dbl Shift)	525 days	Mon 5/29/34	Fri 5/30/36	339SS,121	341FF+15 days
341		Place Rip Rap	475 days	Mon 8/28/34	Fri 6/20/36	340FF+15 days	342FF+30 days
342		Site Reclamation and Topsoil Replacement	120 days	Mon 2/18/36	Fri 8/1/36	341FF+30 days	343
343		Dams Ready for Commissioning	0 days	Fri 8/1/36	Fri 8/1/36	288,208,203,319,342,287,285,255,	344
344		Dams Startup and Commissioning	90 days	Mon 8/4/36	Fri 12/5/36	343	345
345		Substantial Completion	0 days	Fri 12/5/36	Fri 12/5/36	344	



DRAFT Conceptual Construction Schedule Sites Reservoir CP-1.
26-Jan-2023

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Critical | Critical Split | Progress | Manual Progress

The dates, durations and sequencing shown are based on limited project information.
Additional information aquired, CMAR's approach to the work and other factors will result in a different approach to the work, sequencing, durations and dates.

Draft_0023229

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/13/2023 12:04:27 PM
To: Angela Bezzone [bezzone@mbkengineers.com]; 'Luu, Henry' [Henry.Luu@hdrinc.com]
Subject: RE: Operations Info

Hi all – I am working through previous emails so apologies for the tardiness of this response.

I think DSOD would likely be more interested in the probable maximum flood from Funks and Stone Corral creeks when considering dam failure mechanisms. It is my understanding that DWR did a calculation of this years ago and we, Sites, used that in our WSIP application and maybe in the 2017 draft EIR/EIS. Are you familiar with this Henry? If not, I can try to dig it up. Or I am sure Jeff Herrin would have it as I think I got it from him or he directed me to it at some point in time.

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: Tuesday, February 28, 2023 1:42 PM
To: 'Luu, Henry' <Henry.Luu@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Operations Info

Hi Henry – In response to your two questions below:

1. This is outside of my wheelhouse… I have reached out to others at MBK to see what I can find! I will get back to you soon.

2. There is no modeled reservoir storage past 2003. However, the Daily Ops Model will provide daily water surface elevation and storage data for 1921-2003. We could find good comparable years to discuss with DSOD, such as 1973, 1983, and 1997. I can reach out to Jacobs to get the reservoir elevation and storage data on a daily basis. Do you know which scenarios DSOD is most interested in? We may be able to generate some scenarios to look at. For instance, an expected/imminent sunny day failure may just be to look at how fast a full reservoir can be drawndown. Or if they're more interested in a flood event failure, we might want to look at maximum potential inflows from Funks and Stone Corral Creeks and precipitation on the reservoir in addition to a full reservoir. Either way, I'm happy to brainstorm and help provide scenarios for discussion with DSOD.

Angela

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Monday, February 27, 2023 10:15 AM
To: Angela Bezzone <bezzone@mbkengineers.com>

Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Operations Info

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Hi Angela – this is great, thank you! A couple of questions:
1. Is it possible to correlate the January data with a storm event, i.e. is it a 2, 5, or 10 year event?
2. Are there additional forecasted reservoir storage and WSE data (the past 10-20 years) that can be shared? If so, DSOD may be more interested in seeing recent data as we discuss an acceptable reservoir drawdown duration (7 day vs. 10 day).

Thanks,
Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Friday, February 24, 2023 1:23 PM
To: Luu, Henry <henry.luu@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Operations Info

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Hi Henry –

I have compiled information about the things we have talked about over the last couple weeks.

1. Using the forecast tool, Wes and I looked at change in river stage at Hamilton City and Wilkins Slough. For Hamilton City, we assumed a 1-day travel time from the TC POD and 0-day travel time from GCID POD. For Wilkins Slough, we assumed a 3-day travel time from TC POD and 2-day travel time from GCID. No assumptions were included for flow attenuation. The largest change in river stage at Hamilton City was estimated as 1.5 feet on 1/4/23 (day after diversions were forecasted to start) and 4.0 feet at Wilkins Slough on 1/26/23. See attached graphs in Word doc. This was a quick calculation, and may be something we could further refine if needed.

2. The attached Excel file has the monthly timeseries of Reservoir storage and water surface elevation.

3. The PDF has a slide that was presented in closed session about changes in active storage, explaining that with the change in dead pool and survey refinements, the current active storage is 1.41 MAF. There has been basically no reaction/concern expressed when sharing this information.

Please let me know if you have any questions about the attached or need any additional information.

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: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 3/13/2023 12:09:23 PM
To: 'Nishikawa,George M' [GNishikawa@mwdh2o.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Hawk,Nina E [NHawk@mwdh2o.com]; Randall Neudeck [rneudeck@mwdh2o.com]
Subject: RE: Sites - Operations
Attachments: ParticipantDeliveries_rev09_4scn__ALT3_051722_vs_NOACTION_051422.pdf; ParticipantDeliveries_rev09_4scn__ALT3_051722_vs_NOACTION_051422_MWDSC.pdf

Hi George,

Attached is information regarding modeled releases from Sites Reservoir under Alternative 3 (the preferred alternative in the Final EIS/EIR). Notes from Jacobs regarding this information are:

The first attachment contains participant deliveries for all members.
The second attachment is the MWDSC page from full participant deliveries pdf (1st attachment).

Please let me know if you have any questions or need any additional information.

Thanks!
Angela

From: Nishikawa,George M <GNishikawa@mwdh2o.com>
Sent: Friday, March 10, 2023 1:56 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: 'Alicia Forsythe' <aforsythe@sitesproject.org>; Hawk,Nina E <NHawk@mwdh2o.com>; Randall Neudeck <rneudeck@mwdh2o.com>
Subject: RE: Sites - Operations

You don't often get email from gnishikawa@mwdh2o.com. Learn why this is important

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Hi Angela,

It was great meeting you as well, thank you so very much for this information and for the great conversation yesterday.

I really appreciate the help in getting me up to speed on Sites and will keep an eye on my inbox!

Best,
George

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Friday, March 10, 2023 1:26 PM
To: Nishikawa,George M <GNishikawa@mwdh2o.com>
Cc: 'Alicia Forsythe' <aforsythe@sitesproject.org>; Hawk,Nina E <NHawk@mwdh2o.com>; Neudeck,Randall D

<rneudeck@mwdh2o.com>
Subject: RE: Sites - Operations

Hi George,

It was nice to meet you yesterday! Attached are two files with information we discussed yesterday.

- Current summary of Sites Participants including the annualized Sites release modeled over the 82-year CalSim period, the storage allocation, and the associated percent of storage/inflow (note that the percentage is based on local public water agencies, and does not include State of California and Bureau of Reclamation.
- Slides providing information regarding through-Delta movement of Sites water. The second slide shows estimates of Sites exports and remaining available transfer capacity.

I have also asked our Jacobs team to pull some information from the CalSim model to provide MWD-specific deliveries. I will send this to you as soon as possible. Please let me know if you have any questions about the attached information, or any other follow up questions to what we discussed yesterday.

Have a great weekend,
Angela

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 6, 2023 4:29 PM
To: Nishikawa,George M <GNishikawa@mwdh2o.com>; Hawk,Nina E <NHawk@mwdh2o.com>; Randall Neudeck <rneudeck@mwdh2o.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Sites - Operations

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Wonderful! I just sent an invite.

I look forward to the discussion.

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: Nishikawa,George M <GNishikawa@mwdh2o.com>
Sent: Monday, March 6, 2023 4:25 PM
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Subject: RE: Sites - Operations

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Let's plan to chat on:

Thursday, March 9 – 10 to 11 AM

Best,

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Resource Specialist, Bay Delta Initiatives
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Subject: RE: Sites - Operations
Attachments: SitesMetrics_rev28_2scn__ALT3A_041222_ALT3B_041222.pdf; ParticipantDeliveries_rev09_4scn__ALT3A_041122_2035CT_vs_ALT3B_041122_2035CT.pdf

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We will be reviewing and following up with you soon.

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Sites
Program Management Team

Concept Road Alignments Meeting

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	March 13, 2023
From:	Jeffrey Wisniewski, P.E., G.E.; Mike Smith, P.E., G.E.
Subject:	Notes from Concept Road Alignments Meeting

A meeting regarding the Sites concept road alignments was held on Wednesday March 1, 2023, virtually via Microsoft Teams. The objective of the meeting was to address the status of the Sites road alignments. Participants include individuals representing Sites Project Authority, HDR, AECOM, and Jacobs.

Participants:

Henry Luu	HDR	Howard Michael	AECOM
JP Robinette	Sites Project Authority	Mike Smith	AECOM
Kevin Spesert	Sites Project Authority	Jeffrey Wisniewski	AECOM
Connor McDonald	Sites Project Authority	Mike Forrest	AECOM
Jeff Matthews	Sites Project Authority	Ron Valdez	AECOM
Pete Rude	Jacobs	Vanessa Doctolero	AECOM

The Project team discussed technical materials relating to the status of roads and road alignments.

Key decisions:

- Authority wants to craft land use agreements that benefit both the project and the landowner.
- SLR is preferable alternative for the balance of design speed and real estate impacts.
    - Kevin prefers the pink (magenta) alignment (Alt. West 03) that accommodates 45 mph speed, which is less straight than Alt. West 02 that accommodates 45 mph speed with greater earthwork, and straighter than the most curvilinear Alt. West 01 that accommodates 25 mph speed with similar earthwork).
    - Each alternative should be presented to Colusa County and the First Responders for confirmation of the alignment to be advanced through design.
- Southerly project access
    - Dirks Construction Access Road

- Selected as best alternative over McDermott/Maxwell Sites/Sutton/Wadleigh/Old 99.
- Cease further consideration of McDermott/Maxwell Sites/Sutton/Wadleigh/Old 99 other than to complete the impact analysis at a high-level for the section of McDermott that shifts through close/tight reversing curves to align immediately adjacent the GCID Main Canal in preparation for presentation to Colusa County and for further justification for the selection of Dirks Road Alternative.

- Selected Alignment
  - Each should be presented to the Colusa County and the First Responders for confirmation of the alignment to be advanced through design.
- All agree to criteria as presented during the meeting for Valley Roads, Dirks Road, and SL Road.
- Current target of mid-April for Board/County meeting.

Action items:

1. In anticipation of meeting with Colusa County, AECOM will provide a summary of illustrated impacts that could be avoided with the use of Dirks Road as the access alternative. This analysis will further develop the layout (plan view) at the short limit of McDermott directly along the canal (between reversing curves as was presented during the meeting) to better illustrate impacts based on: refined layout of ROW per topo features (fences, etc.) and field observations, and GIS depicted ROW width. We will also prepare two cross sections for discussion's sake and to complete our due diligence to define impacts and justify avoiding McDermott and other county roads. This work will be kept to a fairly high level will summarize impacts of paving up to the toe of the canal bank and the improve the roadway from this control point (least impacting), and another section where the existing EP would be the control point for improving the roadway (greatest impact). Both would illustrated impacts that would be completely avoided with the Dirks Road access alternative.
2. AECOM to verify need for 6-foot shoulders on SLR realignment from westerly recreational area to easterly recreational area. This will be revisited with Colusa County for final confirmation to plan for bike lanes.
3. AECOM to consider a 100-foot buffer with SLR Alts 1, 2 and 3 and adjust as needed to accommodate and to verify that 100-foot buffer is a project requirement first.
4. Confirm with GCID if they would accept utility poled relocated into GCID canal embankment.
5. JP to set up meeting with Glenn County to discuss alternatives – approximately three weeks out (from meeting date).
6. Kevin to set up meeting with first responders to discuss alignments on SKR realignment.
7. Kevin to set up meeting with Colusa County – approximately six weeks out (from meeting date).

WRLCM Report 2035, Sites Alt3A_Mod, Alt3B_Mod, and NAA DRAFT

QEDA Consulting, LLC

Feb 27, 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).

Draft_0023249

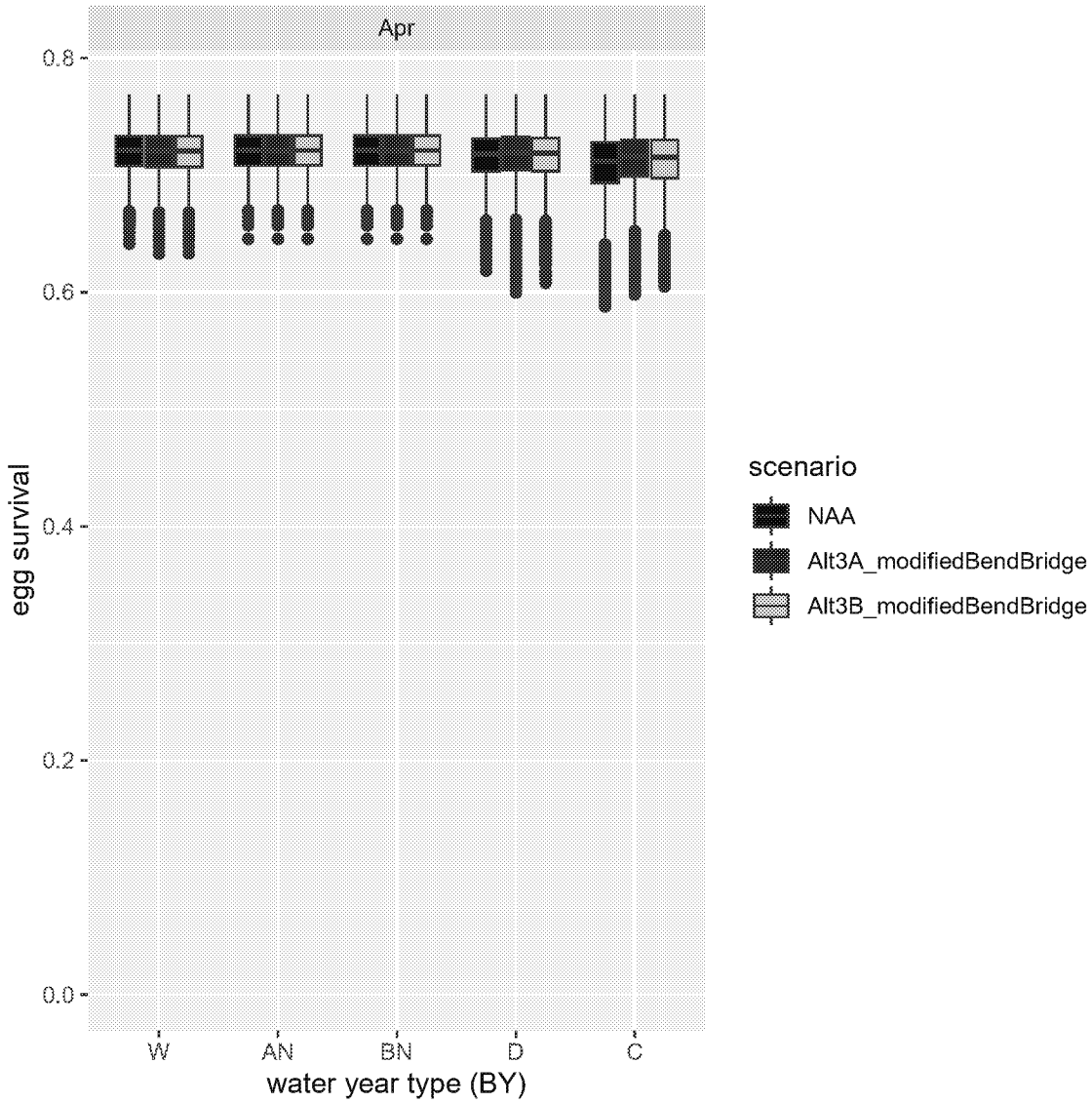

Figure 1: Apr egg survival by water year type.

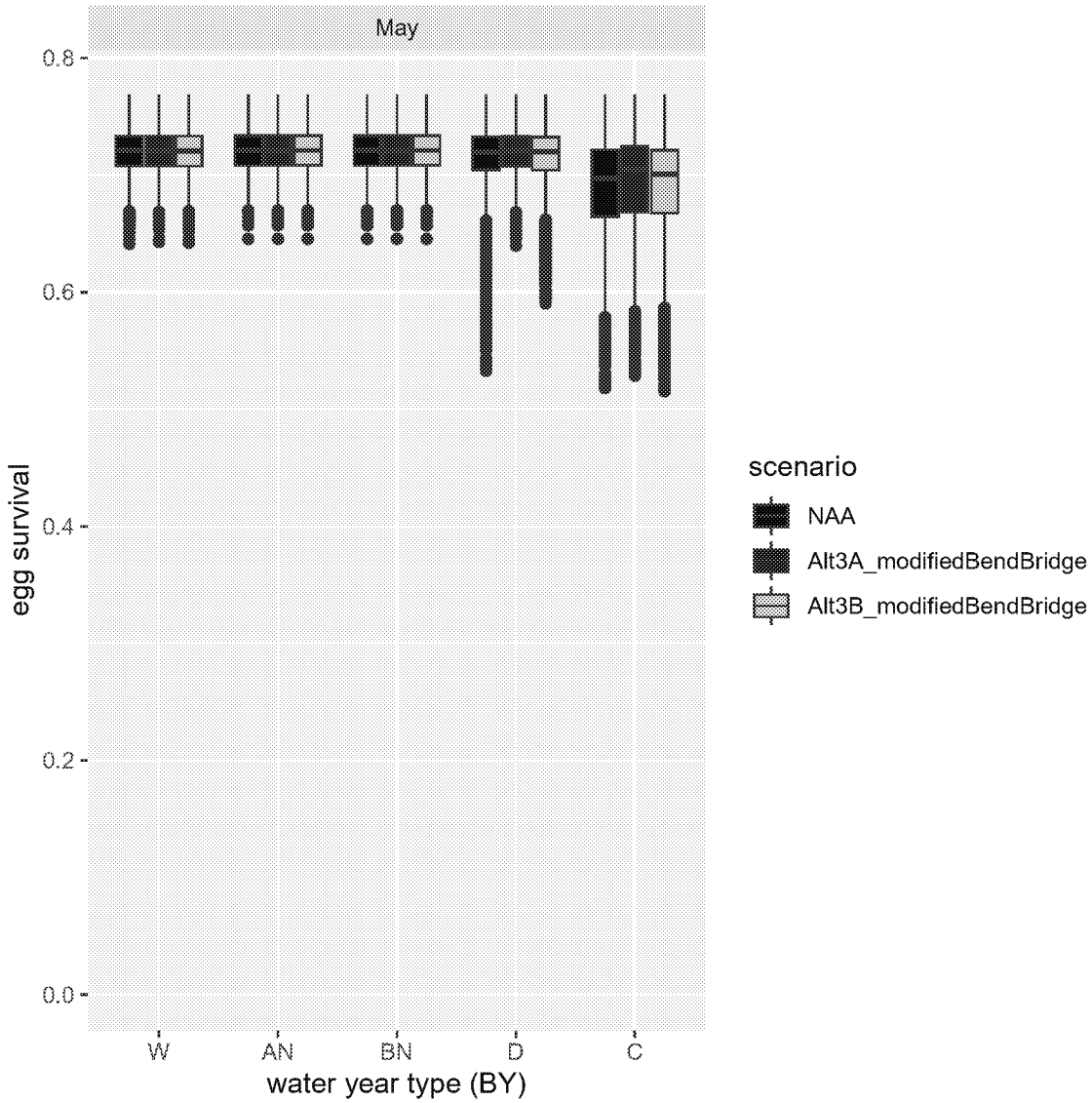

Figure 2: May egg survival by water year type.

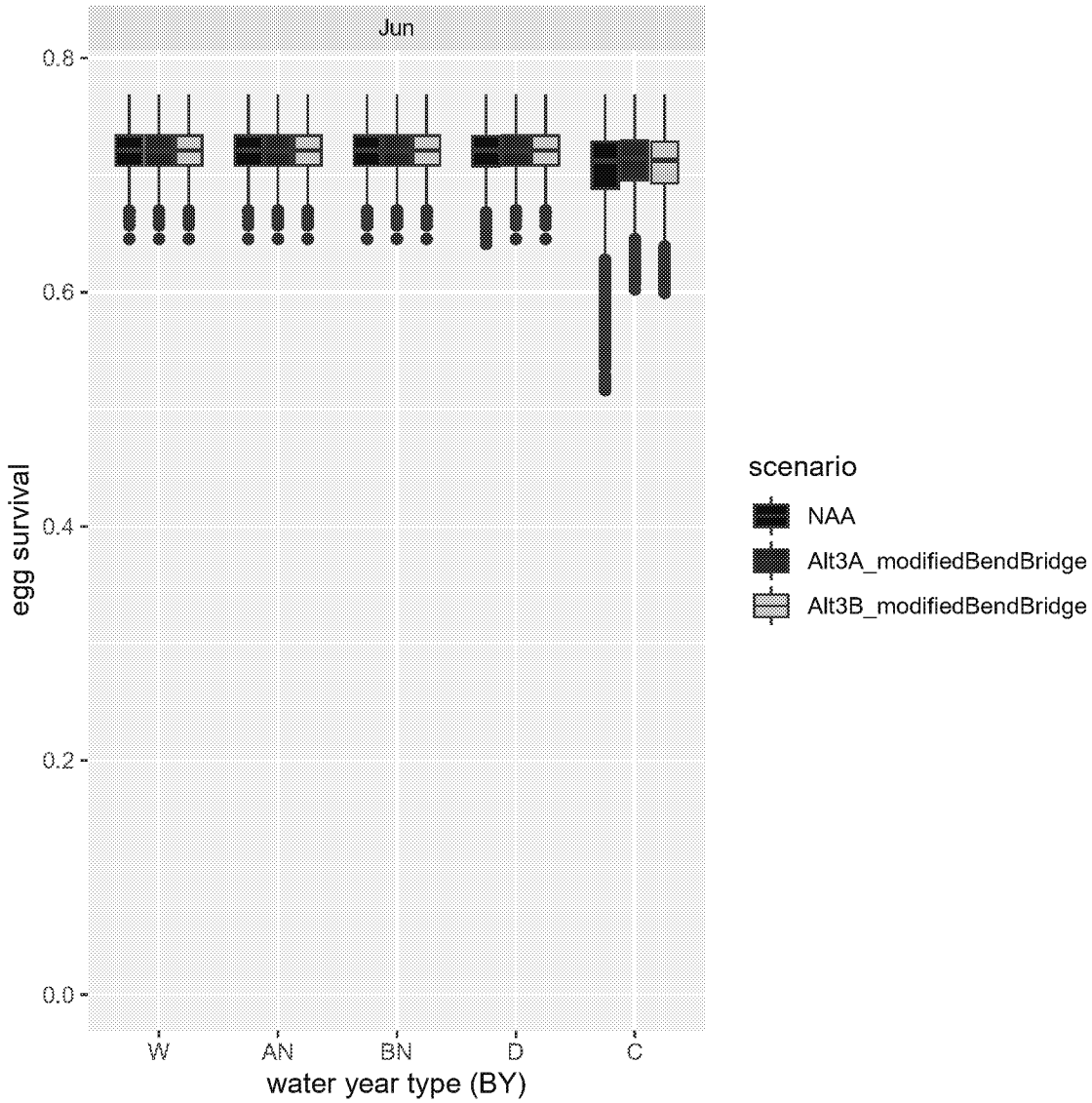

Figure 3: Jun egg survival by water year type.

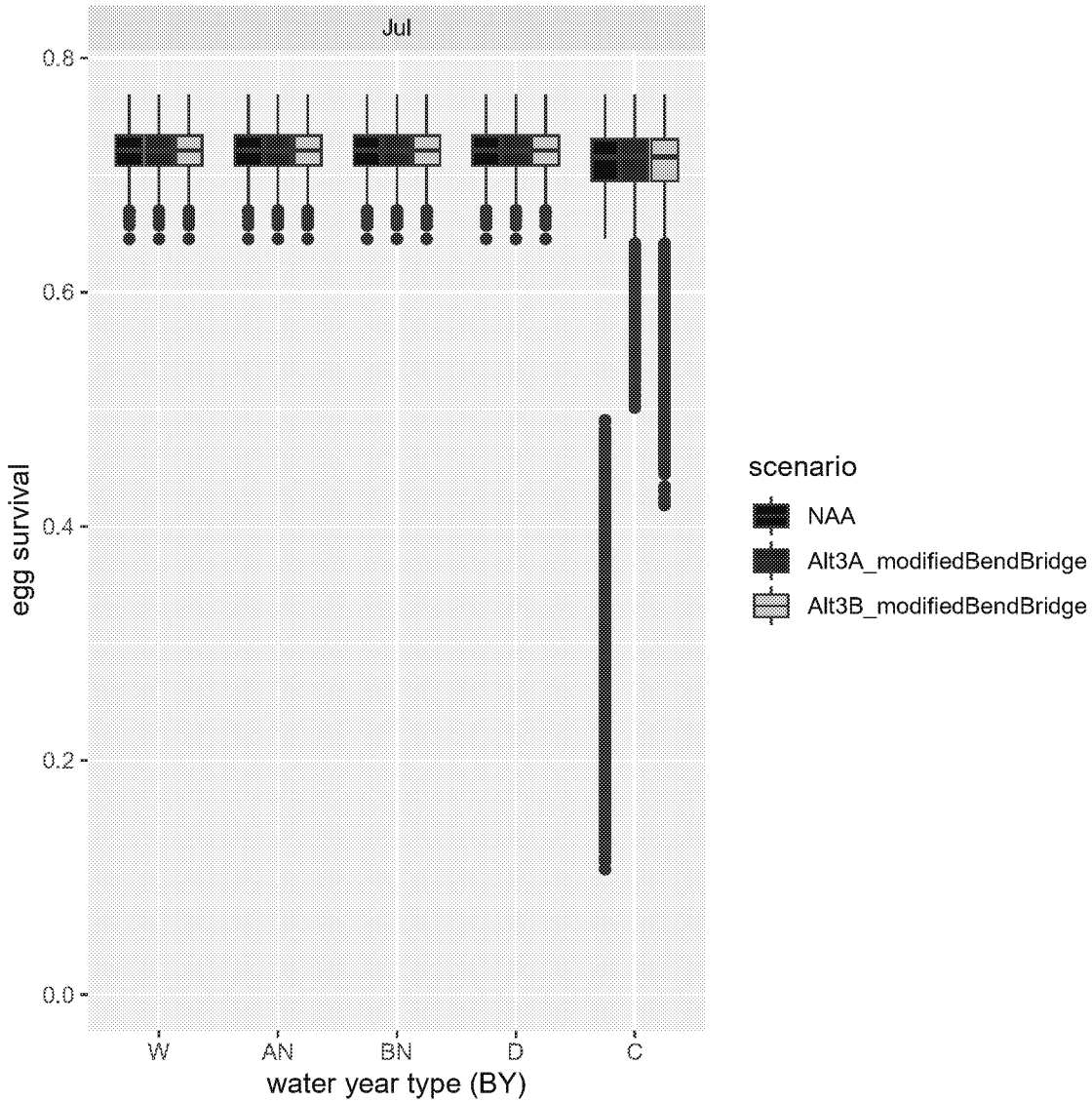

Figure 4: Jul egg survival by water year type.

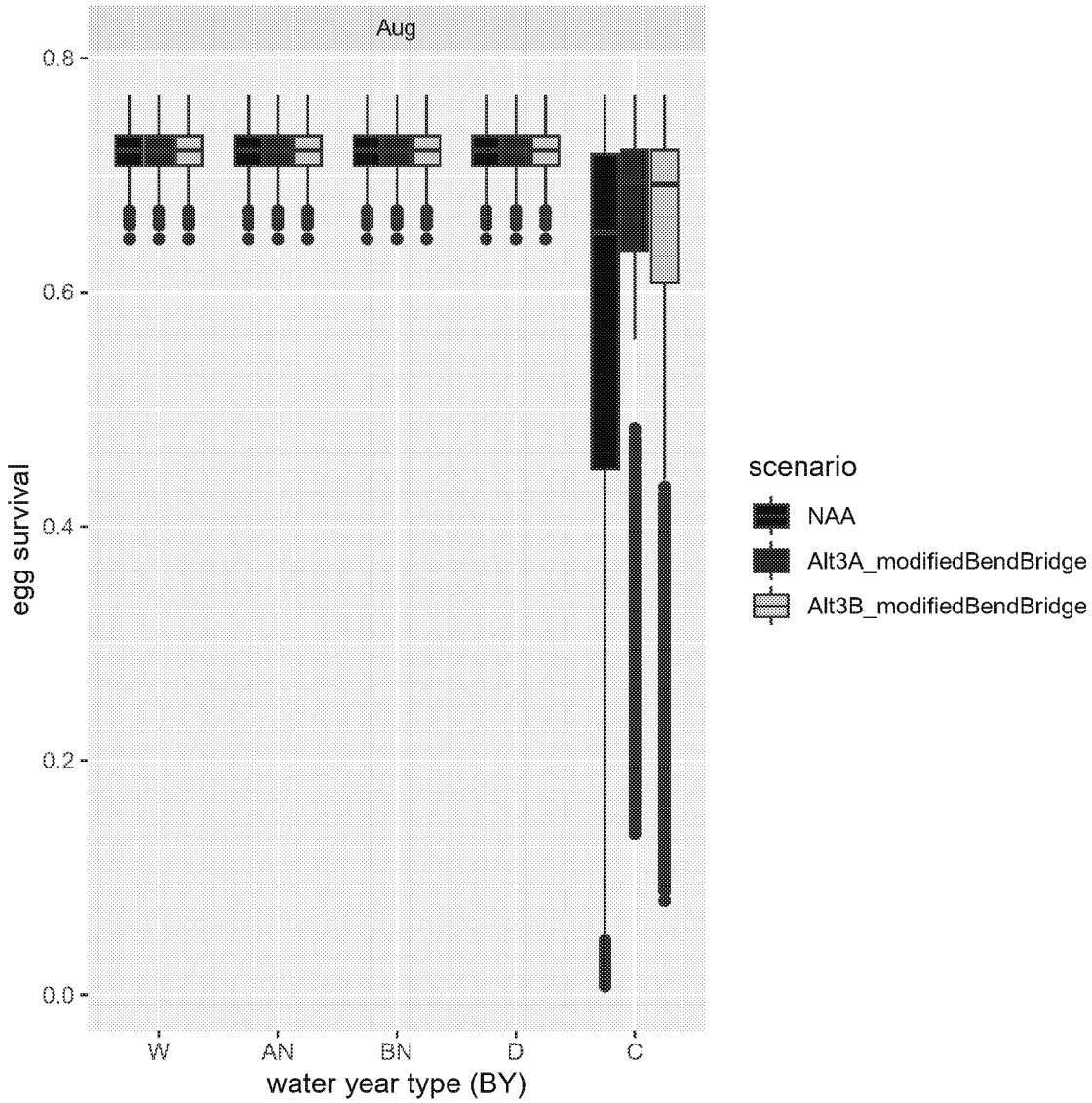

Figure 5: Aug egg survival by water year type.

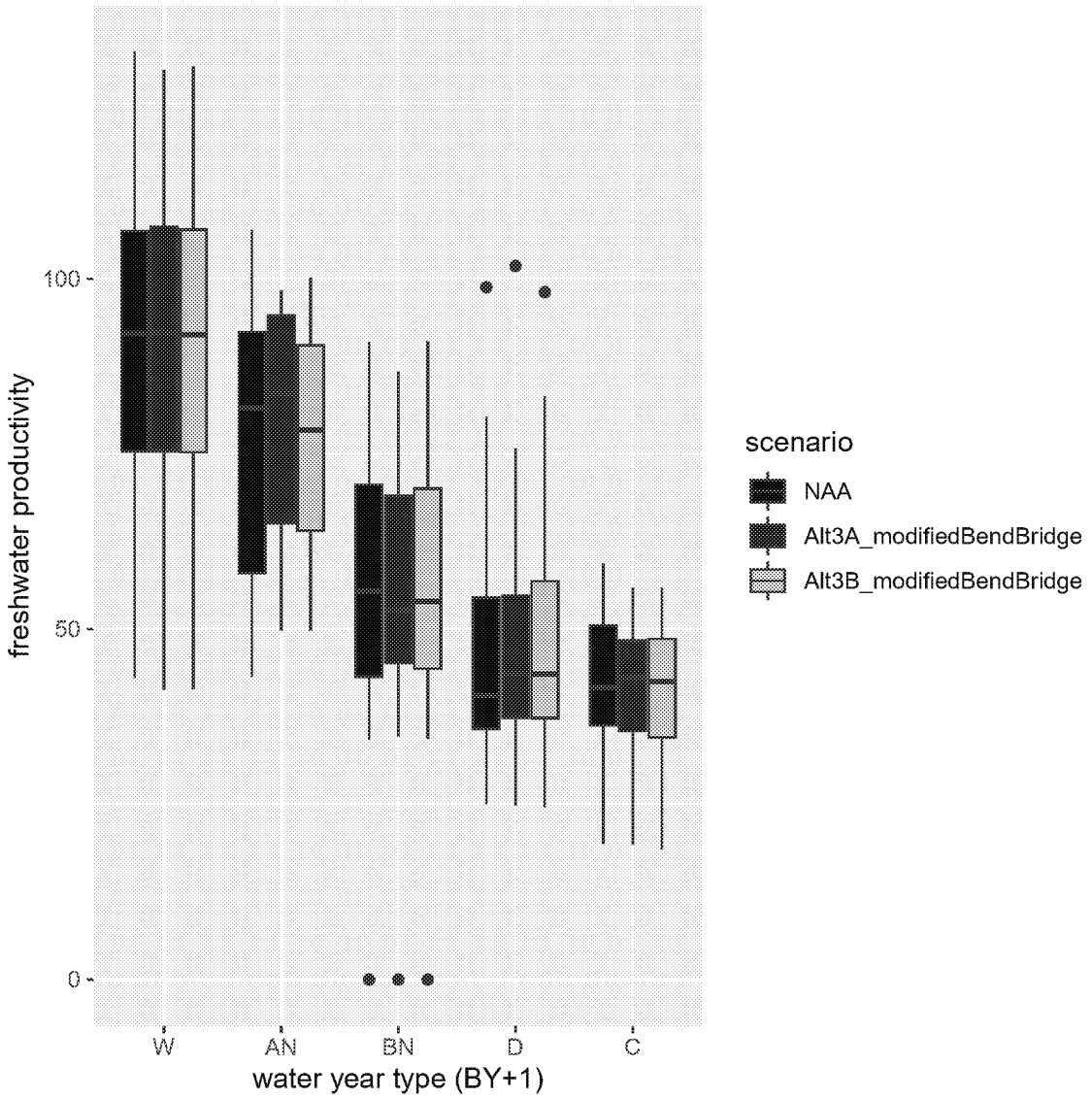

Figure 6: Boxplots of median freshwater productivity (gulf smolts per spawner) by water year type.

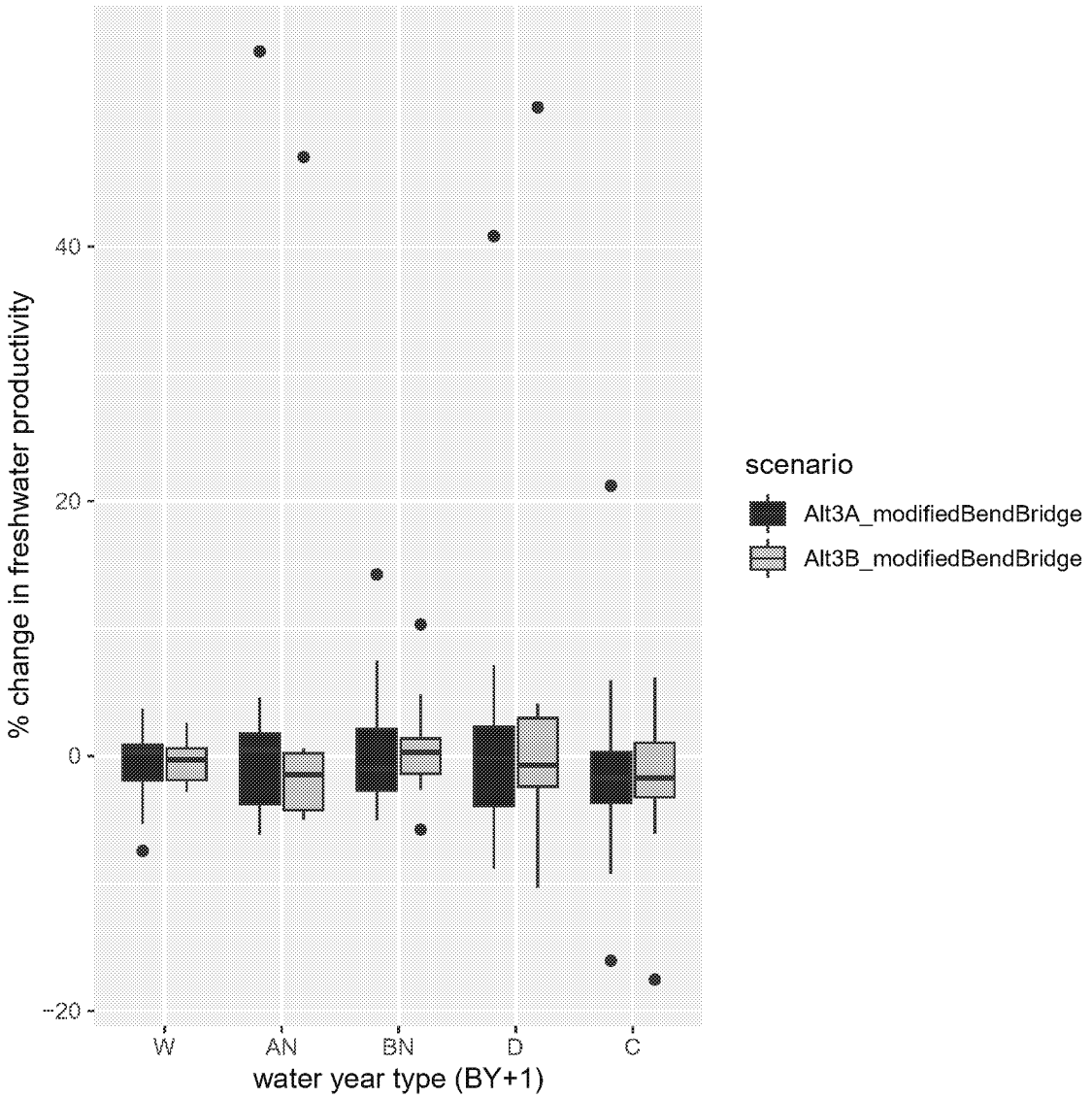

Figure 7: Boxplots of percent change in median freshwater productivity (gulf smolts per spawner) by water year type.

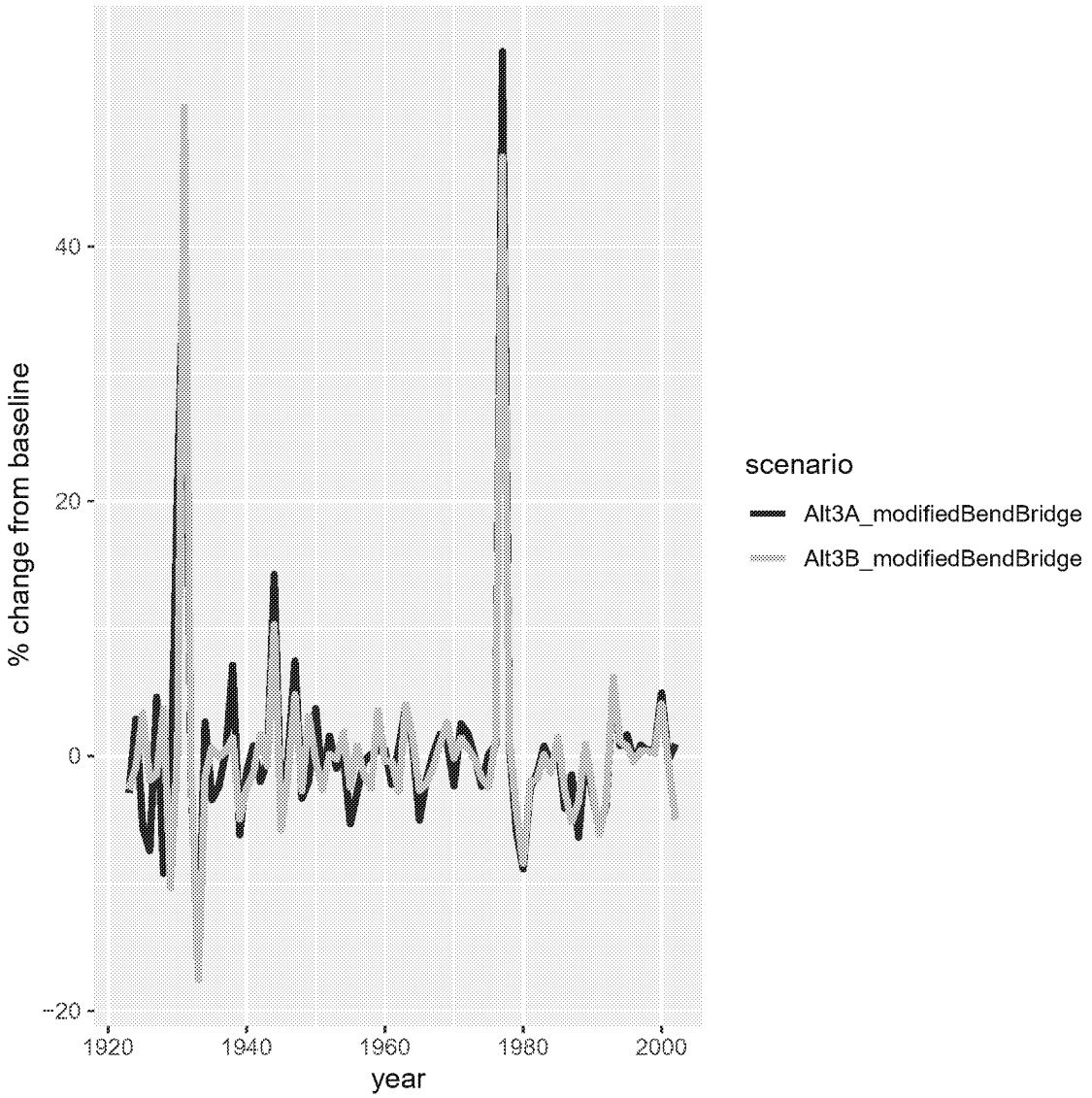

Figure 8: Percent change in freshwater productivity (gulf smolts per spawner).

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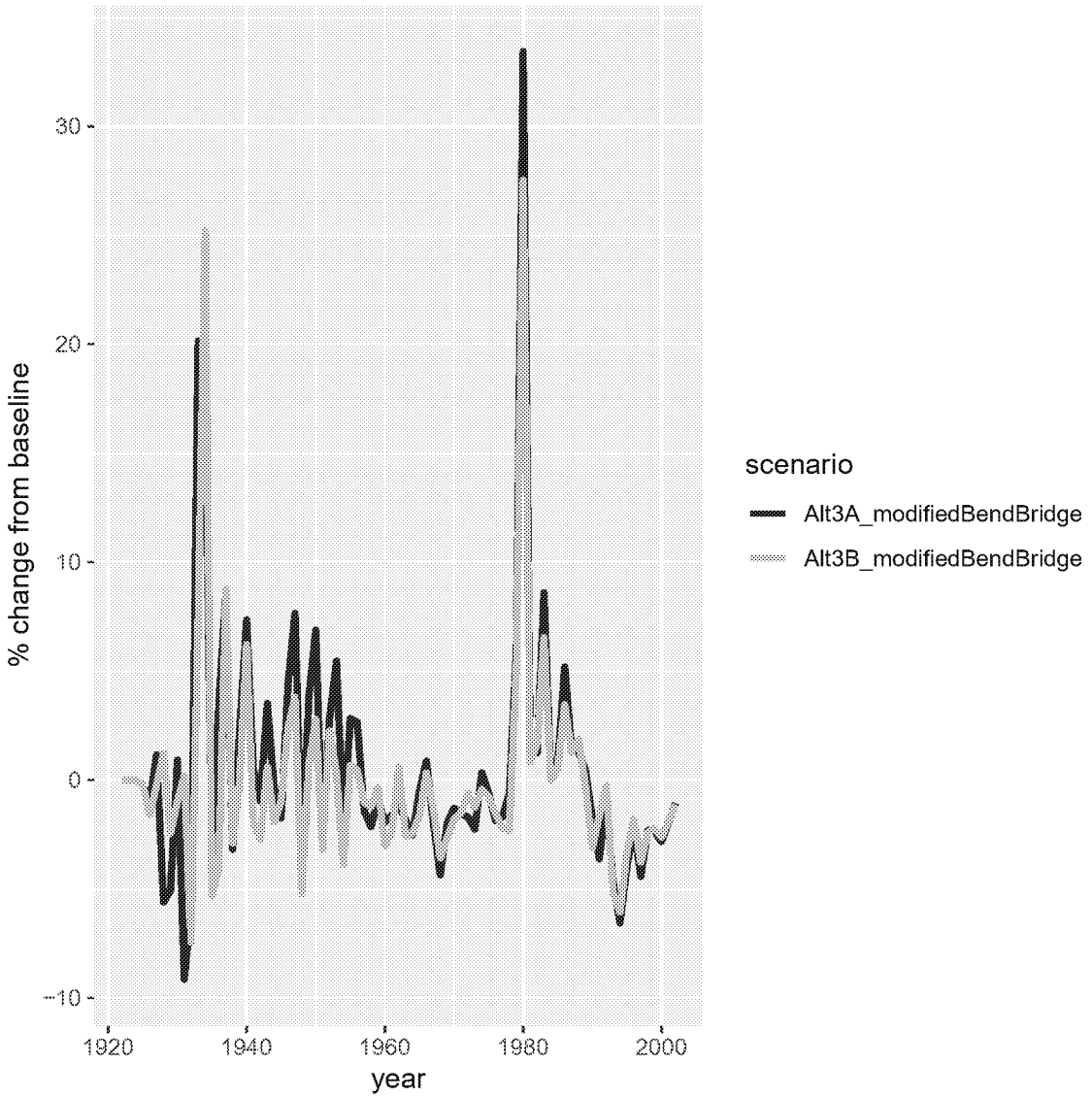

Figure 9: Percent change in annual escapement.

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

Draft_0023259

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.

Draft_0023260

NEPA Coordination Meeting - Agenda

Affordable Water, Sustainably Managed

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 15, 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	Allison Jacobson, Reclamation
Monique Briard, ICF	Ali Forsythe, Sites Authority	Laurie Warner Herson, Integration
Ariel Cohen, HDR	Melissa Harris, ICF	

Agenda:

Discussion Topic	Topic Leader	Time Allotted
1. Admin Final EIR/EIS Review Status	Laurie	10 min
2. Live Edit Meetings	Melissa H	15 min
3. Next Deliverable for SES/Solicitor a. Schedule b. Comment tables organized by letter	Melissa H	15 min
4. ADA Compliance Coordination	Melissa H	5 min
5. Draft ROD	Laurie	5 min
6. PAM/CAR	Reclamation	5 min
7. Action Items	All	5 min

Draft_0023261

From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/14/2023 11:16:52 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]; Risse, Danielle [Danielle.Risse@hdrinc.com]; Janis Offermann [janis@horizonh2o.com]; Kevin Spesert [kspesert@sitesproject.org]; Emily Fan Michaelson [emichaelson@katzandassociates.com]
CC: Sara M. Katz [skatz@katzandassociates.com]
Subject: Tribal Coordination Meeting Notes
Attachments: EIR Tribal Coordination Meeting Notes.docx

Hi everyone,
Attached are the notes from last week's EIR topic meeting on Tribal Coordination. Please note the action item at the end of the document and let me know if any edits are needed.

Best,
Quin

K&A
KATZ & ASSOCIATES

Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/14/2023 11:21:23 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Harris, Melissa [Melissa.Harris@icf.com]; Briard, Monique [monique.briard@icf.com]
CC: Cohen, Ariel [Ariel.Cohen@hdrinc.com]
Subject: RE: Sites - Focus on Key Comments
Attachments: Admin Chapters 1-4, MRs - key comments.docx

Hi Ali,

I agree, we need to discuss internally. When we met yesterday, I think we all felt that many of these comments are much more than text changes. So, although these comments were provided in the review of Chapter 2, many of them may be better resolved when we are addressing comments on Group 2 (hydro and aquatic resources) due today with Group 2. I have taken the example comments that were in the agenda yesterday and my earlier list and sorted by topic:

Chapter 2 Text Revisions – Appropriate to discuss during live edit meeting since we need Reclamation input and PC concurrence:

- Need more robust explanation of why Alternative 3 is the proposed
- Expand Warren Act contract description to include additional CVP facilities; additional NEPA requirements
- Suggest a clear description of what specific factors led to the reevaluation of the 120 TAF assumption and to the determination that 60 TAF was appropriate.
- Re: Bend Bridge Pulse Protection, there are several issues with this paragraph that we recommend resolving before release of the Final EIR/EIS.
  - There is no mention in Chapter 11 of the fish monitoring program or the Bend Bridge Pulse Protection and its impacts on aquatic resources. The analysis in the PD and Chapter 11 should be aligned.
  - The description of the fish monitoring program reference was deleted in Chapter 11. Is that an error? Or will the operations plan still contain a fish monitoring program.
  - If the fish monitoring program should be included, then the description of it should be revised to avoid deferral concerns discussed on our 3/1/23 call. We suggest revising to be more specific about the criteria that will be used, which provide a floor of protection that may be increased/modified with consultation with the agencies. We will include proposed language in the rewrites we are working on per the 3/1/23 meeting.

Operational Considerations – May be better addressed as part of the review of comments on Chapters 5 and 11 since we assume these same comments will be raised as part of the review of the impact analysis:

- Sites Reservoir will affect Shasta operations due to exchanges, does it have the potential to improve, or exacerbate, conditions on the Trinity. [NMFS]
- CDWF requests that the Authority consider scenarios when very few fish can be "detected" by sampling regimes such as rotary screw traps.
- CDFW has questioned what will occur if forecasted flows by CNRFC do not materialize.
- Re: Bend Bridge Pulse Protection, NMFS suggests that diversions cease on the ascending limb of the hydrograph (based on forecasted flows) until it's been demonstrated that fish passage is low (based on rotary screw trap observations).
- NMFS suggests developing criteria beyond minimum static flows (bypass flows of 3,250 cfs at Red Bluff Pumping Plant (RBPP) and 4,000 cfs at Hamilton City Pump Station) that better reflect the intra- and inter- annual variability of a natural hydrograph with criteria that vary by season and water year.
- NMFS questions releases from Shasta in late summer and fall that can have adverse impacts on salmon spawning, rearing, redd dewatering, and stranding...the exchanges for Cold Water Pool maintenance could exacerbate the challenge of stabilizing flows for Fall-Run Redd Maintenance

We can schedule an internal meeting on the comments related to operations and associated impacts but suggest that we do this in the context of comments on Group 2 chapters, etc. We may need to go back and make changes to Chapter 2 for consistency after Group 2.

Please let us know how you feel about this approach. We can jump on a quick call to discuss this.

Thank you,

Laurie

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 13, 2023 4:23 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Harris, Melissa <Melissa.Harris@icf.com>; Briard, Monique <monique.briard@icf.com>
Cc: Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites - Focus on Key Comments

Hi all – I am sorry that I missed the call today. In reading through the list, we need to discuss some of these comments internally first. Can you break these out by resource area and schedule calls to discuss these internally? We should coordinate on these prior to the live edits so we come to the meetings prepared with a resolution.

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: Monday, March 13, 2023 10:55 AM
To: Harris, Melissa <Melissa.Harris@icf.com>; Briard, Monique <monique.briard@icf.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Subject: RE: Sites - Focus on Key Comments

I pulled together the attached to provide talking points for our call at 2:30 pm. I would like to discuss how we address of these comments since some may be better resolved during permitting and associated consultation rather than in the EIR/EIS or during a live edit situation.

-----Original Appointment-----
From: Cohen, Ariel <Ariel.Cohen@hdrinc.com>
Sent: Thursday, March 9, 2023 11:24 AM
To: Cohen, Ariel; Laurie Warner Herson; Harris, Melissa; Briard, Monique; Alicia Forsythe
Subject: Sites - Focus on Key Comments
When: Monday, March 13, 2023 2:30 PM-3:30 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

Microsoft Teams meeting

Join on your computer, mobile app or room device
Click here to join the meeting

Meeting ID: 217 463 497 040
Passcode: oBRKsV
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Key Comments on Group 1 - Chapters 1-4 and Master Reponses

Executive Summary

- Needs a more robust explanation of why Alternative 3 is the proposed project, including a description of increased environmental benefits under the alternative as compared to the others. The simple clause "due to the availability of federal funding" is not sufficient. [PC-comment repeated elsewhere]

Chapter 2

- Should expand Warren Act contract description to include additional CVP facilities. IL4 could be moved SOD by the Authority through CVP facilities to Refuge Water Supply Program's existing points of acceptance.
- Re: "The use of these federal facilities [RBPP and TC Canal] is included in the Project, and thus the impacts of the anticipated Warren Act contract(s) are covered by this Final EIR/EIS." - Does not contemplate use of any other federal facility, i.e. Jones, San Luis Canal, Delta-Mendota Canal, or San Luis Reservoir. Site specific NEPA will need to be done if use of these facilities is required to convey the non-CVP Water (i.e. Sites Project Water).
- Re: "The use of these federal facilities [RBPP and TC Canal] is included in the Project, and thus the impacts of the anticipated Warren Act contract(s) are covered by this Final EIR/EIS." - Does not contemplate use of any other federal facility, i.e. Jones, San Luis Canal, Delta-Mendota Canal, or San Luis Reservoir. Site specific NEPA will need to be done if use of these facilities is required to convey the non-CVP Water (i.e. Sites Project Water).
- 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]
- Table 2-5 - Please consider scenarios where very few fish are at large which can be "detected" by sampling regimes such as rotary screw traps. For example the extremely low numbers of juvenile winter-run detected at RBDD in 2022 due to the effects of Thiamine. There will likely be situations where detecting just a few fish is significant and an indicator that the pulse event is moving fish.[CDFW]
- What will occur if forecasted flows by CNRFC do not materialize? I.E. the CNRFC forecast is incorrect?[CDFW]
- Re: "Senior downstream water rights, existing CVP and SWP and other water rights diversions including CVP 215 water, and Article 3F water, and SWP Article 21 (interruptible supply), and other more senior flow priorities (such as diversions associated with Freeport Regional Water Project and existing Los Vaqueros Reservoir) have been satisfied"

- CVP 215 water" should read "water diverted pursuant to Section 215 of the Reclamation Reform Act"
- "Article 3F" water should read "Article 3(f)" as it's Article 3(f) in the water service/repayment contracts.
- And I don't know that Reclamation would categorize Section 215 and Article 3(f) water as "other water rights diversions" as the text suggests. I would say "other annual and long term contractual obligations having agreed upon priority over Sites"

- NMFS appreciates the Bend Bridge Pulse Protection being implemented based on forecasted flows. Building on that, we'd suggest that diversions cease on the ascending limb of the hydrograph (based on forecasted flows) until it's been demonstrated that fish passage is low (based on rotary screw trap observations). For example, under this approach, the protection can cease earlier than 7 days if, after 4 days, there are not substantial detections of fish. We suggest this approach since it can reduce fish exposure during increasing flows (when a disproportionate percentage of the fish may be mobilized) and also to circumvent the problematic lag times in earlier proposals (due to the use of 3-day trailing averages as well as the delay inherent in monitoring to detect of fish or flow events). Additionally, the bypass criteria on the mainstem shouldn't be contingent on tributary flows, since Keswick pulses, in isolation, have been shown to mobilize fish (e.g. the Fall 2019 experimental pulses).
- The project division criteria set bypass flows of 3,250 cfs at Red Bluff Pumping Plant (RBPP) and 4,000 cfs at Hamilton City Pump Station. NMFS would suggest developing criteria beyond these minimum static flows - for example targets that better reflect the intra- and inter- annual variability of a natural hydrograph with criteria that vary by season and water year. The criteria should also take into consideration the Fall Reclamation's Base flows (e.g. when Shasta Storage is ≤ 2.2 MAF, flow is 3,250 cfs; ≤ 2.8 MAF, flow is 4,000 cfs; ≤ 3.2 MAF, flow is 4,500 cfs; > 3.2 MAF, flow is 5,000 cfs). NMFS appreciates that language was added to this draft acknowledging the 3,250cfs bypass flow could be, "...overridden by regulatory requirement for higher flow, e.g., requirements, biological opinions" but nonetheless it's unclear what assumptions were used in modeling to represent the Minimum Bypass Flows in the Sacramento River at the RBPP.[NMFS]
- The project description states that in late summer and fall (i.e., August through November) Reclamation would release water from Shasta Lake and/or CVP share of Sites Reservoir for Storage Partners. It should be noted, however, that releases in this time period can have adverse impacts on salmon spawning, rearing, redd dewatering, and stranding. In short, and as previously noted, the exchanges for Cold Water Pool maintenance could exacerbate the challenge of stabilizing flows for Fall-Run Redd Maintenance.[NMFS]
- Re: Bend Bridge Pulse Protection, there are several issues with this paragraph that we recommend resolving before release of the Final EIR/EIS.
  - There is no mention in Chapter 11 of the fish monitoring program or the Bend Bridge Pulse Protection and its impacts on aquatic resources. The analysis in the PD and Chapter 11 should be aligned.
  - The description of the fish monitoring program reference was deleted in Chapter 11. Is that an error? Or will the operations plan still contain a fish monitoring program.
  - If the fish monitoring program should be included, then the description of it should be revised to avoid deferral concerns discussed on our 3/1/23 call. We suggest revising to be more specific about the criteria that will be used, which provide a floor of protection

that may be increased/modified with consultation with the agencies. We will include proposed language in the rewrites we are working on per the 3/1/23 meeting.

- Re: fish detection, if possible, we should better define the fish detection criterion to avoid an argument of deferral per the discussion 3/1/23 conference call.
- Any need to address releases made to Storage Partners downstream from Knights Landing (e.g., Woodland Davis) that would not occur via exchange?
- Re: Deadpool, the use of the terms "was allowed" and "now allow" is a bit awkward and unclear to the lay reader. Suggest a clear description of what specific factors led to the reevaluation of the 120 TAF assumption and to the determination that 60 TAF was appropriate.
- P. Re: "...Sacramento Valley in-basin uses and CVP and SWP exports" - This is the first mention of in basin uses in the PD and there must be some description earlier, in section 2.5.2.1, since this is an important element in understanding the water resource and the integration and coordination of operation between Sites Reservoir and the CVP/SWP. As a water operations agreement, COA is the connecting element between DWR and Reclamation, which enables the agencies to meet water right and contract obligations upstream of the Delta; Delta water quality and flow objectives; joint Delta water right requirements issued by the SWRCB; and CVP/SWP water right and contract obligations that depend upon diversions from the Delta. The two projects share joint responsibilities for meeting in-basin uses and share water supplies. Reclamation and DWR recognize that both agencies have similar interests and goals, including providing for the public's safety and economic well-being in an environmentally sound manner. In-basin uses are defined in COA as the legal uses of water in the Sacramento River Basin, plus the flow needed to meet current Delta water quality and flow objectives, water for wildlife refuges, Delta water quality maintenance; and environmental uses for instream flows, river temperatures, and required Delta outflow. Throughout any given year, California's water "system" status falls into two broad categories: balanced conditions and excess conditions. Balanced conditions are periods when it is agreed that the releases from the upstream reservoirs and unregulated flow approximately equal the water supply needed to meet in-basin uses in the Sacramento Valley, plus exports. Excess conditions are periods when it is agreed that releases from reservoirs, plus unregulated flow exceed the Sacramento Valley in-basin uses, plus exports.

  Sites Reservoir facilities and its operation will be integrated with the CVP/SWP since the water supply that is developed with its facilities will be enhancing the water supply availability to the CVP/SWP and they share common goals for beneficial use of water for application to overlapping CVP/SWP authorized places of use and project purposes. Changing the delivery of water to CVP-SWP lands changes the Sacramento Valley In-basin use considerations and sharing as defined in the current COA framework.

  The addition of Sites Reservoir facilities will fundamentally change the performance and goals of the CVP/SWP at a functional level because of the introduction of new water supplies into the CVP/SWP and modifications to in-basin demand of CVP/SWP supplies, and facilitation of CVP/SWP facilities in the movement of 3rd party water.
- P. 2-91, re: "This type of exchange or transfer is most likely to occur with GCID but could also occur with the Sacramento River Settlement Contractors and Reclamation." What is being contemplated here? Why is GCID called out?

Appendix 2D

- BMP-3, Recommend (1) establishing a clear performance standard (e.g., "... to develop final construction contract documents that will ensure compliance with applicable federal (USACE), state (DSOD, Caltrans, CVFPB), and local county engineering and structural standards"); and (2) elaborating on examples of some specific "design and construction recommendations" that could potentially be implemented.
- BMP-12, Recommend establishing a clear performance standard (e.g., "as described below, in order to prevent degradation of water quality and adverse effects to beneficial uses from sedimentation, erosion, construction materials, waste management, non-stormwater discharges, and post-construction runoff").
- Re: land management plan - Can we provide any more specificity as to what these management, maintenance and monitoring actions might entail?
- Re: HABS Action Plan- This section does address preventing some of the human health risks associated with HABs however, this plan does not consider negative impacts to fish and wildlife that frequently occur as a result of HABs. CDFW recommends including mitigation to address these risks in the Action Plan. At a minimum the project should consider reporting fish and wildlife deaths and illnesses to the Freshwater Bloom Incident Form [CDFW]

Chapter 3

- Re: contracts under No Project vs. baseline, This depends on the type of contract. For Ag and M&I service contracts, they are also dependent on allocations which CalSim would adjust according to water supply. For Senior Water Rights, using historical demands versus full contract demands is trickier since the CVP does not have discretion on those deliveries. I don't think it would be a bad assumption to use historical Settlement Contract demands, especially since it would be hard to predict their future choices to take more or less than the historical demand, but there is a distinction there.
- Re: future conditions, this discussion would be strengthened by using growth projections that are more long-term than the commencement of project operations.
- Re: change in footprint since 2017 - Our understanding is that the Authority previously indicated it was going to prepare a figure that overlaps prior survey boundaries with the current footprint. We believe this could be a useful figure.

Chapter 4

- Add information provided by DWR (see file)

Table 6

- Comment 72-4 - Provide a more robust and detailed response to the claim that the EIR/EIS should have evaluated an alternative with reduced diversions. Presumably, this is because an alternative with reduced diversions would not meet the basic purpose and need for the project. This is different than the point that reduced diversions would not change footprint impacts. It's ok to make this latter point, but it does not directly address the substance of the comment.
- Comment 78-50 - This is confusing (e.g., the meaning and implications of the term "altered condition" are unclear), and the text could be construed to support a claim that the impact

analysis does not reflect real-world conditions. Recommend a more thorough explanation of the role that the unimpaired hydrograph plays in the CALSIM II simulation and why that simulation presents a realistic and reliable picture of potential project impacts.

Table 14

- Comment 70-10 - Recommend a brief explanation of why the project does not significantly affect groundwater sustainability.
- Comment 70-14 - Recommend adding a brief explanation why groundwater use would not deplete aquifers or interfere with recharge.
- Comment 70-52 - Recommend deleting this text for several reasons. First, the discussion of the baseline indicates that it was updated to include post-2017 information (including the 2019 BiOps), so stating that there is a fixed baseline in 2017 conflicts with this approach. Second, regardless of when the baseline is set, they could argue that this is new information requiring recirculation. As a result, recommend starting this response with the text: "Conditions for groundwater levels continually fluctuate and vary over time."

Table 21

- Comment 70-28- Figure 16-1 does not purport to only show recreational areas in the study area (the figure is labeled " . . . Recreation Near the Study Area). It would be clearer to explain that (1) only major urban areas are identified in the Figure 16-1 and does not include smaller towns such as Leesville, Lodoga, and Stonyford, and (2) why Leesville, Lodoga, and Stonyford are not affected by the Project.

Table 28

- Several comments written as if there's an existing RMP, but there isn't one; there's just App. 2D.3, describing a future RMP. Suggested language is provided.

NS1

- Suggest moving all comments on Tribal issues out of the non-substantive comments table and into Table 26. Characterizing comments on Tribal issues as "non-substantive" could be interpreted as not taking Tribal issues seriously.
- "...comments that do not raise significant environmental issues" - Suggest omitting this phrase since it could be interpreted to characterize tribal consultation as an insignificant issue. Instead, suggest referencing the section entitled "Public Review and Outreach Process for the RDEIR/DEIS."

NS2

- Comment 16-1 - This response should specifically address the topic of water supply availability and where in FEIR/FEIS it addresses the sufficiency of water to operate Sites. [NOTE -see revisions to Ch 2 that address water right application and WAA, which found that there is sufficient water for the Project]

- Comment 42-1 - Suggest a more direct response to the comment referencing where in the FEIR/EIS (likely Chapter 2, in the project description) where project decommissioning is discussed.

Master Response 2

- P. MR2-6 - Recommend a more detailed explanation of the environmental benefits of Alt. 3.
- P. MR2-7- Recommend expanding on this explanation to the extent feasible to justify the selection of Alt. 3 as the preferred alternative.
- P. MR2-11 - This text could be used to support a claim that the new availability of CALSIM 3 is new information that would support recirculation. Rather than (or at least in addition to) the focus on the timing of the NOI and NOP, we believe a more defensible approach is to explain all the work that went into developing a project model based on CALSIM II for the RDEIR/SDEIS, and that the CALSIM 3 approach is not feasible for the Final EIR/EIS, although a project model based on CALSIM 3 might be used in future permit reviews.

  Laura and I would like to discuss this issue with the Authority and the ICF team; we believe it is important to develop this line of reasoning to support the continued use of CALSIM II, and to make the reader understand that CALSIM 3 is not a feasible approach for the EIR/EIS - rather than only saying that when we did the NOI/NOP or Draft, CALSIM II was all that we could use at that time.

Master Response 6

- Recommend adding how these surveys will factor into mitigation.

Master Response 7

- Rather than say the changes "offer additional protection," this statement should be framed in terms of the CEQA/NEPA significance determinations - e.g., explain that impacts either remain the same or are lessened, and consider identifying which significance determinations were lessened with cross-references to the relevant chapter.

Master Response 9

- Recommend providing a more robust and detailed explanation of what the benefits are and how they would be substantially reduced by these operating criteria.

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/14/2023 11:24:18 AM
To: Williams, Jonathan@Wildlife [Jonathan.Williams@wildlife.ca.gov]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Davis-Fadtke, Kristal@Wildlife [Kristal.Davis-Fadtke@wildlife.ca.gov]; Miller, Kathleen A.@Wildlife [Kathleen.Miller@Wildlife.ca.gov]
Subject: RE: CDFW Group 2 Comments

Hi Jon,

Thank you for uploading the comments. I will be downloading to our internal SharePoint site momentarily.

Have a great day –

Laurie

From: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>
Sent: Tuesday, March 14, 2023 11:21 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; aforsythe@sitesproject.org
Cc: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: CDFW Group 2 Comments

Hi Laurie,

CDFW's comments for the Group 2 Admin Draft Final EIR/EIS documents have been uploaded to the Sites sharepoint.

Thanks,
Jon

Jonathan Williams
Senior Environmental Scientist (Specialist)
California Department of Fish and Wildlife – Water Branch
1010 Riverside Parkway, West Sacramento, CA. 95605
Jonathan.williams@wildlife.ca.gov
(916) 936-5433

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/14/2023 11:43:32 AM
To: Spranza, John [john.spranza@hdrinc.com]; Angela Bezzone [bezzone@mbkengineers.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: CDFW Group 2 Comments on the Admin Final EIR-EIS

Hi Ali, Angela and John,

CDFW has uploaded their comments on the Group 2 chapters, appendices and relevant responses to comments. I've uploaded their comments to SharePoint: CDFW Group 2 Comments. These are available should you want to start revieing comments prior to live edit meetings schedule for next week.

I will be going through comments as well and will try to pull together a list of key issues raised.

Thank,

Laurie

From: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>
Sent: Tuesday, March 14, 2023 11:21 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; aforsythe@sitesproject.org
Cc: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: CDFW Group 2 Comments

Hi Laurie,

CDFW's comments for the Group 2 Admin Draft Final EIR/EIS documents have been uploaded to the Sites sharepoint.

Thanks,
Jon

Jonathan Williams
Senior Environmental Scientist (Specialist)
California Department of Fish and Wildlife – Water Branch
1010 Riverside Parkway, West Sacramento, CA. 95605
Jonathan.williams@wildlife.ca.gov
(916) 936-5433

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/14/2023 1:50:26 PM
To: Spranza, John [john.spranza@hdrinc.com]; Angela Bezzone [bezzone@mbkengineers.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: CDFW Group 2 Comments on the Admin Final EIR-EIS

Hi John and Angela – we just received comments on the Admin Final EIR/EIS from the State Water Board. I have uploaded them to SharePoint SWB Comments.

From: Laurie Warner Herson
Sent: Tuesday, March 14, 2023 11:44 AM
To: Spranza, John <John.Spranza@hdrinc.com>; Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: FW: CDFW Group 2 Comments on the Admin Final EIR-EIS

Hi Ali, Angela and John,

CDFW has uploaded their comments on the Group 2 chapters, appendices and relevant responses to comments. I've uploaded their comments to SharePoint: CDFW Group 2 Comments. These are available should you want to start revieing comments prior to live edit meetings schedule for next week.

I will be going through comments as well and will try to pull together a list of key issues raised.

Thank,

Laurie

From: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>
Sent: Tuesday, March 14, 2023 11:21 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; aforsythe@sitesproject.org
Cc: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: CDFW Group 2 Comments

Hi Laurie,

CDFW's comments for the Group 2 Admin Draft Final EIR/EIS documents have been uploaded to the Sites sharepoint.

Thanks,
Jon

Jonathan Williams
Senior Environmental Scientist (Specialist)
California Department of Fish and Wildlife – Water Branch
1010 Riverside Parkway, West Sacramento, CA. 95605
Jonathan.williams@wildlife.ca.gov
(916) 936-5433

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/14/2023 3:29:04 PM
To: Luu, Henry [Henry.Luu@hdrinc.com]; Angela Bezzone [bezzone@mbkengineers.com]
Subject: RE: Operations Info

Thanks Henry. We have CALSIM runs with climate change. We have 2035 CT, 2070 CT, 2070 wetter cooler, and 2070 drier warmer. The last 2 are sensitivity runs (so not super duper quality controlled) but are usable. CT = central tendency. The 2070 hydrology was developed by DWR for the CWC – so I would think it would be acceptable to DSOD.

Jacobs can provide us info on these if you think it would be helpful for DSOD.

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: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Tuesday, March 14, 2023 2:11 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: RE: Operations Info

Hi Ali and Angela, thank you for the supporting data and input – this will help the team initiate follow-up conversations with DSOD.

The current approach is that any required releases related to an over-pumping scenario or over-topping conditions will be accommodated through the Project's Saddle Dam 8B spillway. The engineering team is planning to engage DSOD in a follow-up conversation related to emergency drawdown duration requirements, which is release of 10% of the max storage depth in 7 or 10 days and drawdown of the full reservoir within 90 or 120 days. Sizing of Project facilities for longer emergency drawdown durations will optimize project cost and may increase reaction time for those impacted by the drawdown. From a risk standpoint, the CalSim 82-year historical model is helpful because it demonstrates that Sites Reservoir water surface elevations is anticipated to be below the elevation associated with the 10% reduction in hydrostatic head approximately 70% of the time. Given this reduced probability of a full reservoir during a potential crisis and a modern design approach, the team is advocating for a 10-day drawdown duration. My inquiry for more recent data, i.e. after 2003, was in anticipation that DSOD may bring up climate change and potential influence on how often the reservoir may be full. As I'm writing this last sentence it occurred to me that the opposite could potentially occur and the reservoir could be lower more often with prolong dry years. On average there is probably minimal difference between 2003+ vs. CalSim. I talked myself out of it – no need for a follow-up 😊.

Thanks again,

Henry M. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 13, 2023 12:04 PM
To: Angela Bezzone <bezzone@mbkengineers.com>; Luu, Henry <Henry.Luu@hdrinc.com>
Subject: RE: Operations Info

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 all – I am working through previous emails so apologies for the tardiness of this response.

I think DSOD would likely be more interested in the probable maximum flood from Funks and Stone Corral creeks when considering dam failure mechanisms. It is my understanding that DWR did a calculation of this years ago and we, Sites, used that in our WSIP application and maybe in the 2017 draft EIR/EIS. Are you familiar with this Henry? If not, I can try to dig it up. Or I am sure Jeff Herrin would have it as I think I got it from him or he directed me to it at some point in time.

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: Tuesday, February 28, 2023 1:42 PM
To: 'Luu, Henry' <Henry.Luu@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Operations Info

Hi Henry – In response to your two questions below:

1. This is outside of my wheelhouse… I have reached out to others at MBK to see what I can find! I will get back to you soon.

2. There is no modeled reservoir storage past 2003. However, the Daily Ops Model will provide daily water surface elevation and storage data for 1921-2003. We could find good comparable years to discuss with DSOD, such as 1973, 1983, and 1997. I can reach out to Jacobs to get the reservoir elevation and storage data on a daily basis. Do you know which scenarios DSOD is most interested in? We may be able to generate some scenarios to look at. For instance, an expected/imminent sunny day failure may just be to look at how fast a full reservoir can be drawndown. Or if they're more interested in a flood event failure, we might want to look at maximum potential inflows from Funks and Stone Corral Creeks and precipitation on the reservoir in addition to a full reservoir. Either way, I'm happy to brainstorm and help provide scenarios for discussion with DSOD.

Angela

From: Luu, Henry <Henry.Luu@hdrinc.com>
Sent: Monday, February 27, 2023 10:15 AM

To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Operations Info

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

Hi Angela – this is great, thank you! A couple of questions:
1. Is it possible to correlate the January data with a storm event, i.e. is it a 2, 5, or 10 year event?
2. Are there additional forecasted reservoir storage and WSE data (the past 10-20 years) that can be shared? If so, DSOD may be more interested in seeing recent data as we discuss an acceptable reservoir drawdown duration (7 day vs. 10 day).

Thanks,
Henry H. Luu, PE
D 916.679.8857 M 916.754.7566

hdrinc.com/follow-us

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Friday, February 24, 2023 1:23 PM
To: Luu, Henry <henry.luu@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Operations Info

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 Henry –

I have compiled information about the things we have talked about over the last couple weeks.

1. Using the forecast tool, Wes and I looked at change in river stage at Hamilton City and Wilkins Slough. For Hamilton City, we assumed a 1-day travel time from the TC POD and 0-day travel time from GCID POD. For Wilkins Slough, we assumed a 3-day travel time from TC POD and 2-day travel time from GCID. No assumptions were included for flow attenuation. The largest change in river stage at Hamilton City was estimated as 1.5 feet on 1/4/23 (day after diversions were forecasted to start) and 4.0 feet at Wilkins Slough on 1/26/23. See attached graphs in Word doc. This was a quick calculation, and may be something we could further refine if needed.

2. The attached Excel file has the monthly timeseries of Reservoir storage and water surface elevation.

3. The PDF has a slide that was presented in closed session about changes in active storage, explaining that with the change in dead pool and survey refinements, the current active storage is 1.41 MAF. There has been basically no reaction/concern expressed when sharing this information.

Please let me know if you have any questions about the attached or need any additional information.

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

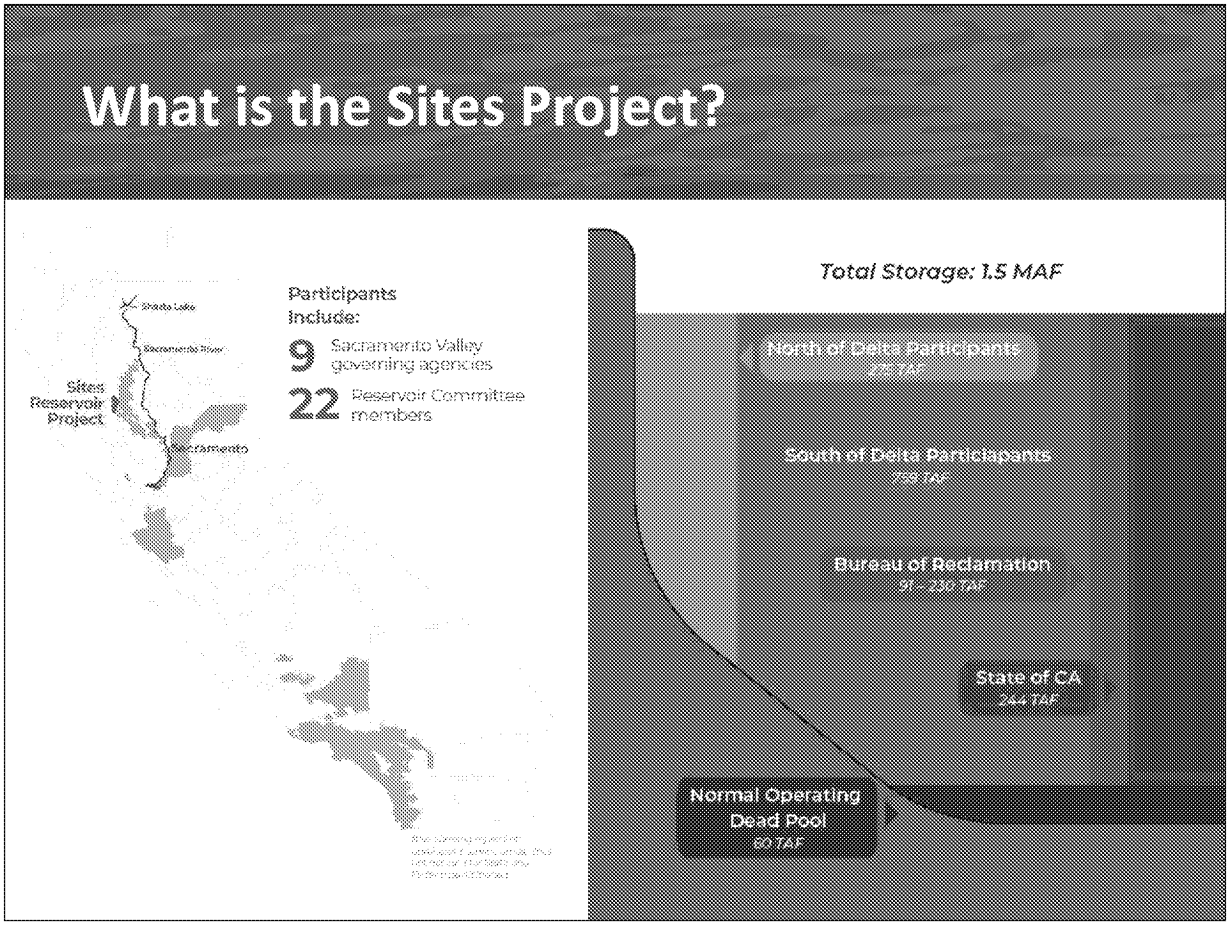
Sites Project Operations and Water Right Overview

January 2023

Sites

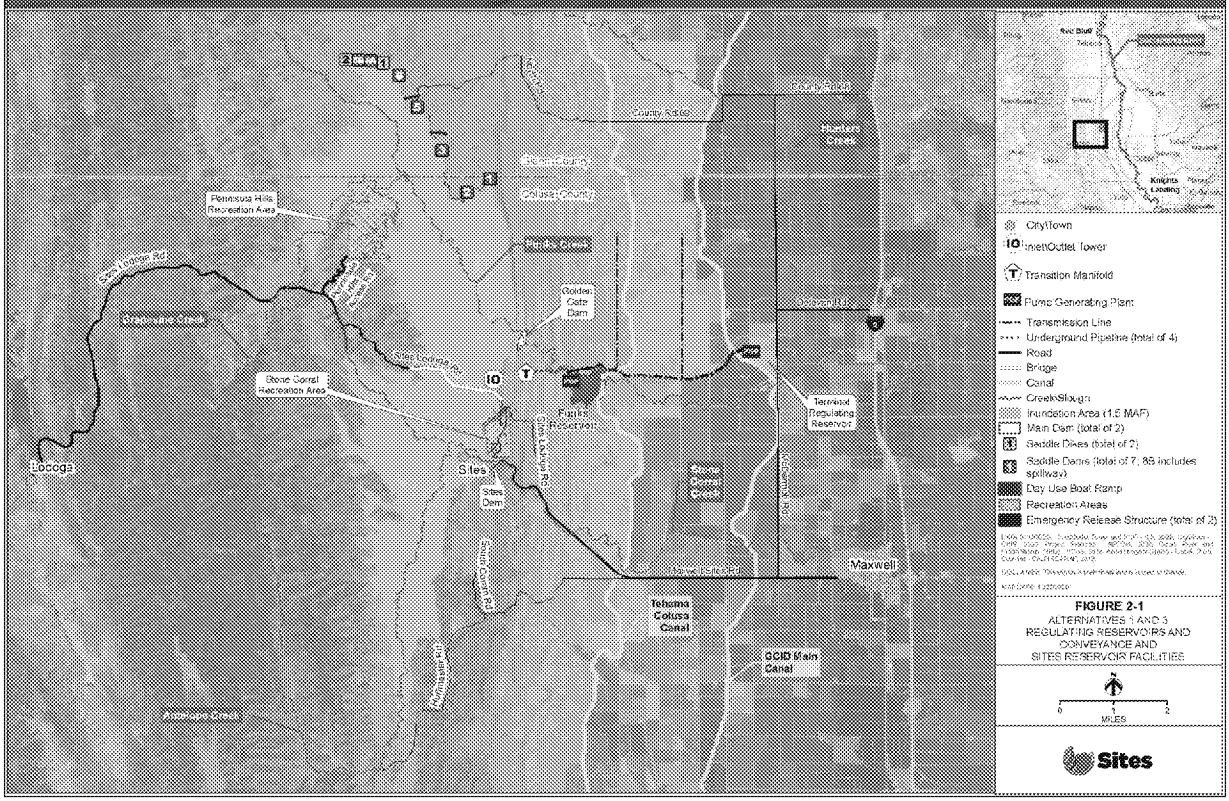
Draft - For Discussion Purposes Only - Not to be Distributed Outside Sites Project Authority

Project Overview

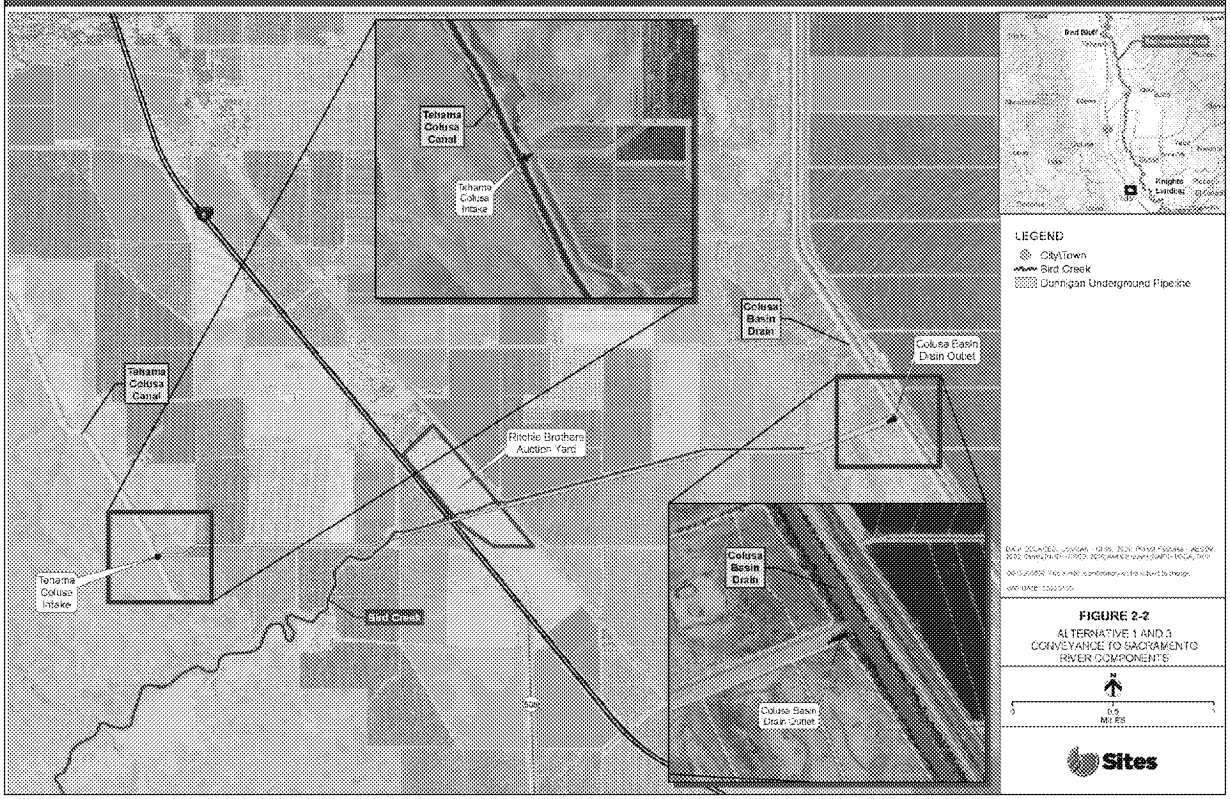


NOD = 19%
SOD = 57%
State = 18%
Fed = 6%

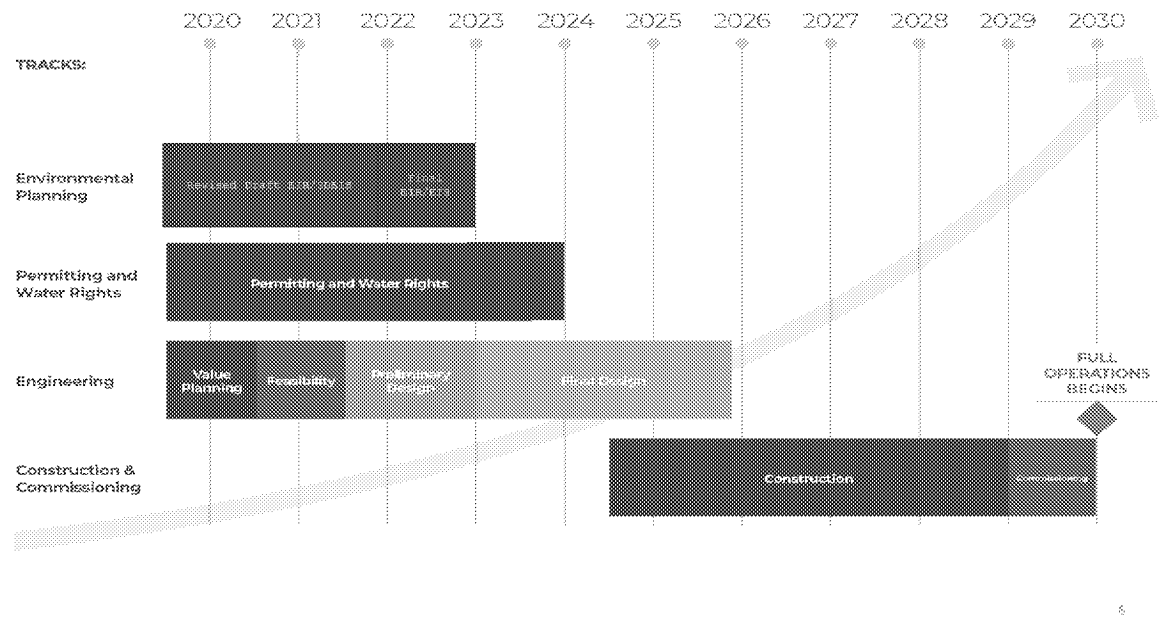
Alternative 1 and 3 Facilities



Alternative 1 and 3 Facilities



Project Schedule



Speaker: Laurie

Draft - Predecisional Working Document - For Discussion Purposes Only

Operations Overview

- Sites seeking to divert Sacramento River flows when all of the following conditions are met:
  - Flows exceed minimum project diversion criteria
  - Delta is in "excess" conditions as determined by Reclamation and DWR under the Coordinated Operations Agreement
  - Senior downstream water rights have been satisfied
  - Flows are available above those needed to meet all applicable laws, regulations, BiOps and court orders in place at the time of diversion
  - Season of diversion = Sept 1 to June 14; when Sacramento River is not fully appropriated
- Project-Specific Criteria:
  - Wilkins Slough Bypass flows
  - Pulse flow protection

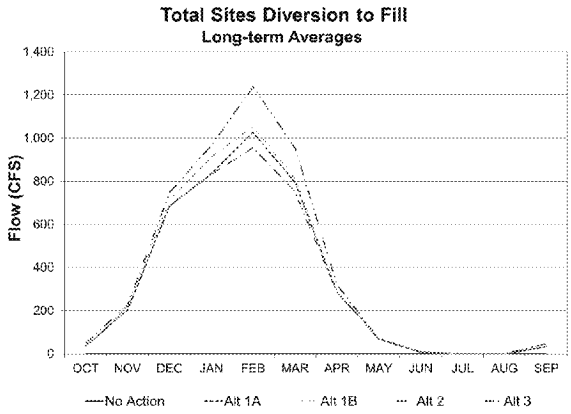
Draft_0023285

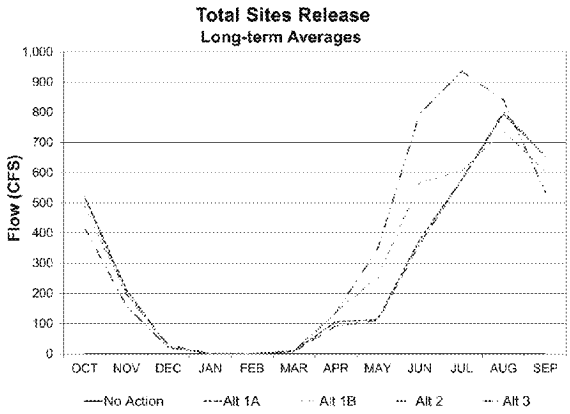
Annual Operations

- Diversions
- Exchanges
  - Reclamation
  - DWR
- Releases
  - TC Canal
  - GCID Canal
  - North Delta (Yolo Bypass)
  - South of Delta
- Exports through the Delta

Draft_0023286

Diversions and Releases





Water Right Approach – Application #A025517X01

Sites

State Filing – Petition to Assign

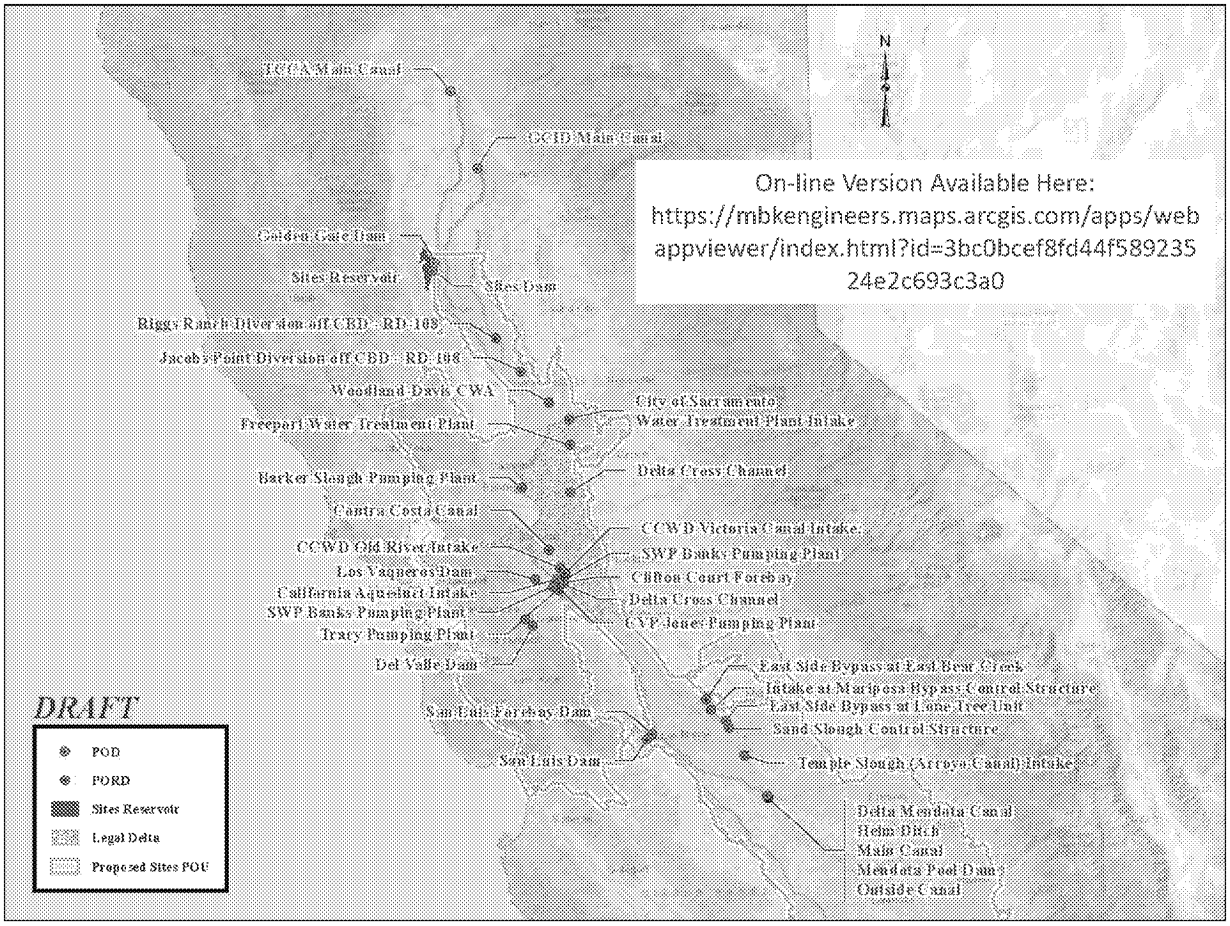
- Petition to amend and assign State Filing A025517 (Colusa Reservoir)
  - Priority date of 9/30/77
- Request release from priority
  - A025514 (Glenn Reservoir)
  - A025513 (Glenn Reservoir - power)
  - Among other State filings in the Sacramento River watershed
- Sites water right application is for diversion of Sites water only – no diversions of CVP or SWP water is included in water right
  - Some Sites water is provided to Reclamation as a participant
  - Sites is not applying for a water right to divert or redivert Trinity River water

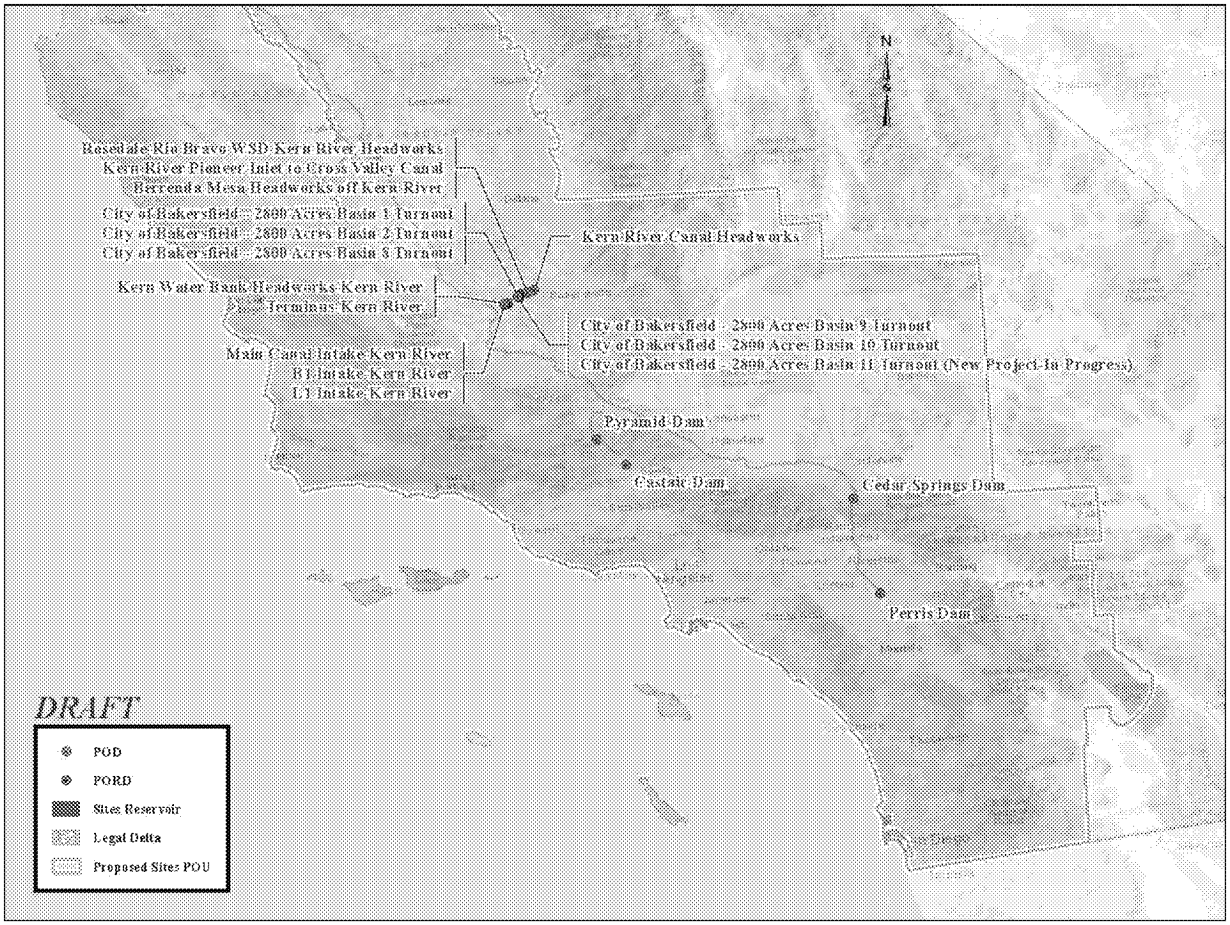
Speaker: John

Key Water Right Parameters

- Sources
  - Sacramento River
  - Stone Corral and Funks creeks
- Points of Diversion
  - Tehama-Colusa Canal (existing, screened facility)
  - Glenn-Colusa Irrigation District's Main Canal (existing, screened facility)
  - Sites Dam and Golden Gate Dams
- Diversion to storage = 1,500,000 AF; no direct diversion
- Points of Rediversion and Place of Use on next slides

Draft_0023290


N
On-line Version Available Here:
https://mbkengineers.maps.arcgis.com/apps/webappviewer/index.html?id=3bc0bcef8fd44f58923524e2c693c3a0
TCCA Main Canal
GCID Main Canal
Golden Gate Dam
Sites Reservoir
Sites Dam
Riggy Ranch Diversion off CBD - RD 108
Jacobs Point Diversion off CBD - RD 108
Woodland-Davis CWA
City of Sacramento Water Treatment Plant Intake
Freeport Water Treatment Plant
Delta Cross Channel
Barker Slough Pumping Plant
Contra Costa Canal
CCWD Victoria Canal Intake
CCWD Old River Intake
SWP Banks Pumping Plant
Los Vaqueros Dam
Clifton Court Forebay
California Aqueduct Intake
Delta Cross Channel
SWP Banks Pumping Plant
CVP Jones Pumping Plant
Tracy Pumping Plant
Del Valle Dam
East Side Bypass at East Bear Creek
Intake at Mariposa Bypass Control Structure
East Side Bypass at Lone Tree Unit
San Luis Forebay Dam
Sand Slough Control Structure
San Luis Dam
Temple Slough (Arroyo Canal) Intake
Delta Mendota Canal
Helm Ditch
Main Canal
Mendota Pool Dam
Outside Canal
DRAFT
POD
PORD
Sites Reservoir
Legal Delta
Proposed Sites POU


N
Rosedale Rio Bravo WSD Kern River Headworks
Kern River Pioneer Inlet to Cross Valley Canal
Barrenda Mesa Headworks off Kern River
City of Bakersfield - 2800 Acres Basin 1 Turnout
City of Bakersfield - 2800 Acres Basin 2 Turnout
City of Bakersfield - 2800 Acres Basin 8 Turnout
Kern River Canal Headworks
Kern Water Bank Headworks Kern River
Terminus Kern River
City of Bakersfield - 2800 Acres Basin 9 Turnout
City of Bakersfield - 2800 Acres Basin 10 Turnout
City of Bakersfield - 2800 Acres Basin 11 Turnout (New Project-In Progress)
Main Canal Intake Kern River
B1 Intake Kern River
L1 Intake Kern River
Pyramid Dam
Castaic Dam
Cedar Springs Dam
Perris Dam
DRAFT
POD
PORD
Sites Reservoir
Legal Delta
Proposed Sites POU

Water Right Terms

Sites

Special or Project-Specific Terms

- Right now, envisioning 5 for the Project
  1. Winter water rights
  2. Funks and Stone Corral Creeks Flows
  3. Diversion Criteria
  4. CVP and SWP
  5. Trinity River
- Items 1 to 3 were included in our May 2022 application
- Items 4 and 5 were included in our January 2023 supplemental information response
- Proactively addressing issues and concerns

Draft_0023294

Winter Water Right Term

- Diversions of water under the following listed water rights shall have priority over the right to divert water under this permit:
    1. AGENCY appropriative water right issued pursuant to Permit XXXXX (Application YYYYYY);

Priority Date	Application	Owner
12/22/1977	A025616	City Of West Sacramento
05/01/1978	A025727	Natomas Central Mutual Water Co
09/07/1984	A028238	Willow Creek Mutual Water Co
04/19/1994	A030358	Woodland-Davis Clean Water Agency
11/02/1994	A030410	Pelger Mutual Water Company
05/30/1995	A030445	Maxwell Irrigation District
06/13/1995	A030454	Sacramento County Water Agency
11/19/1998	A030812	Princeton-Codora-Glenn Irrigation District
11/19/1998	A030813	Provident Irrigation District
02/18/1999	A030838	Glenn-Colusa Irrigation District
05/13/2003	A031436	Reclamation District #108
01/20/2012	A031919	River Garden Farms

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Funks and Stone Corral Creeks Flows Term

- Proposed Term summary
  - Within 1 year of permit issuance, prepare Technical Studies Plan to collect information necessary to address Fish and Game Code 5937
    - Develop in consultation with CDFW, USFWS, and Colusa County
    - Implement Study Plan
  - Within 5 years of permit issuance, develop Funks and Stone Corral Creek Operations Plan
    - Describe approach to addressing 5937 requirements, if any
    - Approach for releases
    - Monitoring plan
    - Develop in consultation with CDFW, USFWS, and Colusa County
    - Approved by Deputy Director for Water Rights
- Term mimics the text in the RDEIR/SDEIS

Draft_0023296

Diversion Criteria Term

- Diversions under this permit shall be subject to the Permittee complying with the California Endangered Species Act (Fish & G. Code, § 2050 et seq.), including any conditions of approval relative to Permittee's water operations in an Incidental Take Permit

Draft_0023297

CVP and SWP Term

- No diversion is authorized that would adversely affect the operation of the CVP or SWP 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 Reclamation and DWR have declared the Delta to be in balanced water conditions under the Coordinated Operation Agreement, unless otherwise agreed by Reclamation and DWR.
- An adverse effect shall also include any time that such diversion would directly or indirectly require the CVP or SWP to release water from storage or to reduce their diversion or rediversion 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 DWR, Reclamation, and the Sites Authority, as may be amended from time to time.

Draft_0023298

Trinity River Term

- The Sites Project's diversions to storage under this Permit shall not include the diversion or rediversion of Trinity River water (water diverted by 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 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.

Draft_0023299

Standard Terms

- Included these in our application
  - Term 90, Reduction of Diversion Season
    - Subject to prior rights; during some years, water will not be available for diversion during portions or all of the season authorized
  - Term 91, Inbasin Entitlements
    - No diversion authorized when satisfaction of inbasin entitlements requires supplemental releases by CVP and SWP
  - Term 96, Reserved Jurisdiction for Bay-Delta Plan Amendments
    - SWRCB reserves jurisdiction to amend water right to establish new and modified Bay-Delta Plan
  - Term 70, Compliance Plan (mandatory)
    - Compliance Plan required identifying how water right holder will comply with the terms and conditions of water right
- List is not exhaustive of what we expect in the permit. More will come during the protest resolution process and at final permit issuance

Draft_0023300

Water Availability Analysis

Requirements and Approach Overview

- Projects seeking to appropriate water must demonstrate a "Reasonable likelihood of water available for appropriation"
- Three approaches, 6 analyses
  - Historical
  - CalSim II
    - Historical hydrology
    - Climate change – 2035 Central Tendency
    - Climate change – 2070 Central Tendency
    - Unimpaired Flow – Based on Reclamation's Alternative 4 in their 2019 Reconsultation EIS
  - Face Value
- Voluntary Agreements addressed qualitatively

Draft_0023302

Summary of Approaches/Assumptions

Approach	Time Period	Supply	Demand
Historical	Daily data from January 2000 – September 2021	Historical flow data from 5 gages on Sacramento River from Red Bluff to Freeport	Face value of all water rights in Sacramento River reach and Delta Conditions
CalSim II			
Historical hydrology	Monthly analysis for water years 1922-2003	Historical hydrology	2030 planning level demands
Climate change – 2035 Central Tendency	Monthly analysis for water years 1922-2003	2035 central tendency	2030 planning level demands
Climate change – 2070 Central Tendency	Monthly analysis for water years 1922-2003	2070 central tendency developed for WSIP projects	2030 planning level demands
Unimpaired Flow – Based on Reclamation's Alternative 4 in their 2019 Reconsultation EIS	Monthly analysis for water years 1922-2003	Historical hydrology with modifications to account for a 55% unimpaired inflow requirement	2030 planning level demands
Face Value	Analyzed on a seasonal basis for water years 1922-2014	Monthly unimpaired flow data from DWR Natural Flow report	Water right face value throughout Sacramento Watershed (~8,500 water rights)

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Summary of 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)

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Water Availability Analysis – Overall Conclusions

- Thorough analysis used three separate approaches with six different analyses conducted with varying degree of conservatism
- All analyses indicate:
  - Reasonable likelihood of water available for Sites Project diversions
  - Additional water available beyond the Sites Project diversions
    - Sites is not taking ALL of the available water in the system

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Water Right Schedule

Sites

Water Right Schedule

- May 2022 – Submitted Application
- August 2022 – State Water Board accepted application and requested additional information
- January 2023 – Sites submitted additional information
- Early Spring 2023 – State Board Notice
- Late Spring/Summer/Fall 2023 – Formal Protest Resolution Period
- Late Spring 2023 – Final EIR/EIS
- Winter 2023/early Summer 2024 – Hearing on remaining protests (mandatory hearing for State filing)
- Late Summer 2024 – State Board issues Order and water right

Ali Forsythe
916-880-0676
aforsythe@sitesproject.org

Sites

From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 3/14/2023 4:54:58 PM
To: 'Whittington, Chad' [Chad.Whittington@jacobs.com]; steve.micko@jacobs.com; Leaf, Rob [Rob.Leaf@jacobs.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: SPJPA Sites: DDFT and Water Availability Updates for Development of TUFLOW Inputs
Attachments: 2023-03-14_Wilkins Slough from Historical WAA.xlsm

All –

For our meeting tomorrow, attached is an analysis to estimate Wilkins Slough flows based on estimated Sites diversions using the Historical WAA Tool (without adding in downstream face value demands of senior water rights). I've created two timeseries: the first uses all diversions from the WAA Tool, the second limits diversions based on assumptions for EOS storage.

I'd also like to add a topic to our agenda tomorrow regarding DSM2 modeling and North Delta Water Agency potential water quality questions.

Thanks!
Angela

From: Whittington, Chad <Chad.Whittington@jacobs.com>
Sent: Wednesday, March 8, 2023 10:52 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: Micko, Steve <Steve.Micko@jacobs.com>; Leaf, Rob <Rob.Leaf@jacobs.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: SPJPA Sites: DDFT and Water Availability Updates for Development of TUFLOW Inputs

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

Hi Angela,

As discussed on the call this morning, we will estimate Tisdale Weir spills using 5-day averaged Sacramento River flows upstream of Tisdale Weir. The river flow vs spill curve used by the DDFT is below.

Please let me know if you have any questions or need anything else.

Sac R upstream of Tisdale Weir (cfs)	Tisdale Weir Spill (cfs)
0	0
23,500	0
26,200	2,000
27,600	3,000
29,600	4,000
32,000	6,000
37,000	10,000
42,500	15,000
50,400	22,000

59,000	30,000
69,600	40,000
82,400	52,000
96,000	65,000

Thanks!
Chad

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Tuesday, March 7, 2023 6:56 PM
To: Micko, Steve <Steve.Micko@jacobs.com>; Whittington, Chad <Chad.Whittington@jacobs.com>
Cc: Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: [EXTERNAL] RE: SPJPA Sites: DDFT and Water Availability Updates for Development of TUFLOW Inputs

Chad & Steve –

Apologies for not getting back to you sooner on this! Your write up of assumptions makes sense to me, and I think it can also be applied using the results of the Historical WAA. The only part I am not sure about is Tisdale flows. Is there an equation that can be applied to estimate flows over Tisdale? I'm assuming these weir flows would then be subtracted from Wilkins Slough. Or is it that we calculate the change in Tisdale weir flows to apply to Wilkins…? Let's discuss this tomorrow morning!

Thanks for putting together your thoughts on this. I'm sorry if my delayed response slowed you down.

Angela

From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Friday, March 3, 2023 1:39 PM
To: Whittington, Chad <Chad.Whittington@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>
Cc: Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: RE: SPJPA Sites: DDFT and Water Availability Updates for Development of TUFLOW Inputs

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We're also happy to walk through the document on a quick call!

Have a great weekend!
Steve

From: Whittington, Chad <Chad.Whittington@jacobs.com>
Sent: Friday, March 3, 2023 1:06 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: Micko, Steve <Steve.Micko@jacobs.com>; Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: SPJPA Sites: DDFT and Water Availability Updates for Development of TUFLOW Inputs

Hi Angela,

I attached two files documenting a proposed approach to update the DDFT to:

- Attenuate results with a 5-day moving average to account for the lack of flow routing of Sites diversions

- Estimate Sites releases, evaporation, and storage; thereby limiting Sites diversions based on storage conditions

The first file, "DDFT_Assumptions_Outline_20230303.docx" summarizes the overall approach. "Sites_Project_2009-2022_Fill_Release_Storage_Estimates_Documentation_20230130_v1.docx" serves as supplemental documentation that further details the recommended Sites release, evaporation, and storage condition functions discussed in the first file.

Please let me know if you are in agreement with the proposed approach and whether it could be adopted by the Water Availability Tool.

Thank you,

Chad Whittington, PE (he/him) | Jacobs | Water Resources Engineer
925.788.1087 | Chad.Whittington@jacobs.com
2485 Natomas Park Drive Suite 600 | Sacramento, CA 95833 | USA

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File Provided Natively

From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/14/2023 5:11:35 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Emily Fan Michaelson [emichaelson@katzandassociates.com]; Ann Newton [anewton@katzandassociates.com]; Sara M. Katz [skatz@katzandassociates.com]
Subject: RE: EIR Video Questions for Ali and Kevin

Hi everyone,
Thank you so much for meeting today! Here are notes on what we discussed—action items are highlighted for convenience.

Best,
Quin

Who is the best person to reach out to confirm each speaker and their availability? (See below for confirmed list of who we want to ask to be in the videos.)
Kevin to ask everyone about participating and float the dates at Friday's Board Meeting.

- Rob Cooke- California Department of Water Resources
  - DWR has recently done videos with partner agencies
  - May be more work to get it approved – keep script general and factual (no advocacy language), similar to what was shared with media
- Don Bader- U.S. Bureau of Reclamation
- Heather Dyer- San Bernadino Valley
- Valerie Pryor- Zone 7 Water Agency
- Zach Dennis- Tehama-Colusa Canal Authority
- Hal Charter- Colusa County

We are targeting the week of April 17th for filming (April 20th preferably)—Does that work for everyone?

- Kevin to ask potential speakers on Friday whether April 20th would work for them
- Sara to reach out to Heather Dyer about travel preference—Would she like to come to Maxwell or if she would prefer we come to San Bernadino?

Where are Rob and Don located? Would it be easier to film them in Sacramento?

- Rob is in Sacramento and Don is in Redding
- Both should be able to travel to Maxwell – Possibly film at other state and federal facilities (like Funks Reservoir)

Do we need any permits for drone footage or permission to film at federal locations?

- Kevin to weigh in on permission for Maxwell locations
- Usually no problem filming at federal locations if it is not for profit
  - K&A to confirm with Reclamation Public Affairs Department – Ali to send contact

K&A KATZ & ASSOCIATES
Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Sara M. Katz <skatz@katzandassociates.com>
Sent: Monday, March 13, 2023 4:39 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Quin La Capra <qlacapra@katzandassociates.com>; Emily Fan Michaelson <emichaelson@katzandassociates.com>; Ann Newton <anewton@katzandassociates.com>; Eric Bishop <ericbishop@mac.com>
Subject: RE: EIR Video Questions for Ali and Kevin

It does not have to be done before the 9am meeting on Wednesday, just offering that time slot. That said, Kevin – can you make this work?

Sara M. Katz
Founder/CEO
mobile: 619.813.9551
San Diego · Los Angeles · San Francisco

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 13, 2023 4:34 PM
To: Sara M. Katz <skatz@katzandassociates.com>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Quin La Capra <qlacapra@katzandassociates.com>; Emily Fan Michaelson <emichaelson@katzandassociates.com>; Ann Newton <anewton@katzandassociates.com>
Subject: RE: EIR Video Questions for Ali and Kevin

I am only available from 3:30 to 4:30 tomorrow if we want to do it prior to 9 am on Wednesday.

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

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From: Sara M. Katz <skatz@katzandassociates.com>
Sent: Monday, March 13, 2023 4:13 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Quin La Capra <qlacapra@katzandassociates.com>; Emily Fan Michaelson <emichaelson@katzandassociates.com>; Ann Newton <anewton@katzandassociates.com>
Subject: FW: EIR Video Questions for Ali and Kevin

Ali/Kevin – can we get a call on the books with the two of you and our video team to hammer out some of the questions below. The sooner the better. And we would really like to confirm shooting dates and give anyone we are asking to participate the necessary lead time to plan accordingly. Any chance you have some time this week? Maybe before our 9am meeting on Wednesday Kevin? I am in an off-site retreat all day Thursday and Friday so if one of those days is preferable, I will ask Ann to participate along with Quin and or Emily, instead of me. Thanks in advance. Sara

Sara M. Katz
Founder/CEO
mobile: 619.813.9551
San Diego · Los Angeles · San Francisco

From: Quin La Capra <glacapra@katzandassociates.com>
Sent: Monday, March 13, 2023 3:56 PM
To: Sara M. Katz <skatz@katzandassociates.com>; Emily Fan Michaelson <emichaelson@katzandassociates.com>
Subject: EIR Video Questions for Ali and Kevin

Thank you both for joining that impromptu meeting! Here are the questions I noted for Ali and Kevin. Please let me know if I missed anything.

- Who is the best person to reach out to confirm each speaker and their availability? We would only do so once we internally confirm these are the individuals, we want to ask to be in one of the three videos.
  - Rob Cooke- California Department of Water Resources
  - Don Bader- U.S. Bureau of Reclamation
  - Heather Dyer- San Bernadino Valley, Joe Yun- CA Water Commission (start with preferred speaker with other one as alternate)
  - MBK Engineers representative
  - Valerie Pryor- Zone 7 Water Agency
- We are targeting the week of April 17th for filming (April 20th preferably)—Does that work for you and Jerry? Given this is the day before the April board meeting, we wanted to schedule around that hoping that if we wanted or needed any select individuals, we could wait until after the board meeting to film, their schedules permitting. One example would be Fritz. If we do decide to ask Heather Dyer, maybe she would come in the afternoon before, and this might make her participation more viable?
- Where are Rob and Don located? Would it be easier to film them in Sacramento? (Though, we would prefer to film them at the project site for visuals, again if that was possible). Showing Don, Rob, and Jerry all together in a causal setting – maybe Mary Wells home again – visually helps tell the story that we are in this together. Three separate talking heads in more office like environments is just not as inspiring. If we need to meet in Sacramento, we could find a nice park-like setting etc.
- Don't think we do, but confirming we would not need any permits for drone footage. Depending on the locations, we would coordinate with Kevin to obtain site access where necessary.
- We will develop a short waiver statement for the participants to sign they are being filmed with their consent.

Thank you,
Quin

K&A
KATZ & ASSOCIATES

Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

File Provided Natively

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/15/2023 2:11:47 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: NMFS 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

Laurie Warner Herson
Principal/Owner

Phenix
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/

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 3/15/2023 2:55:35 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Erecius, Lesa [lesa.erecius@icf.com]; Huber, Anne [anne.huber@icf.com]
Subject: Draft WQ PowerPoint for tomorrow.
Attachments: 20230316_Water Quality Discussion_Presentation_FEIR-S.pptx

Hi,
Attached is the draft for tomorrow's NGO meeting, I'm still backchecking the mercury slides, but it is at 95% so please feel free to provide comments or questions on this version.
Thanks,
John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist
He/Him

HDR
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Sites Project Water Quality Group Discussion

March 16,2023

Sites

Draft - For Discussion Purposes Only - Not for Distribution Outside Sites Project Group

Agenda

1. Introductions
2. Key Concepts
   a) Analytical Methods – Overview
   b) Reservoir Management Plan
   c) Evapoconcentration
3. In-Lake Effects
4. Discharge Effects
5. Action Items and Next Steps

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John

Method Analysis Overview

Mechanisms by which Sites Reservoir Operations Could Affect Water Quality	Main Constituents Considered	Qualitative	Quantitative	Model Results Considered
Temporal Shift	Metals Pesticides Salinity	X	X	CalSim
Evapoconcentration	Metals Salinity		X	CalSim
In-Reservoir Processes	Mercury HABs Nutrients/OC/DO Temperature	X	X	Reservoir temperature modeling (CE QUAL W2)
Change in System Reservoir Operations	Temperature HABs Mercury	X	X	CalSim, HEC5Q and Reclamation temperature model
Change in Delta Operations	Salinity Chloride	X	X	CalSim and DSM2 QUAL
Redirection of CBD Flow to Yolo Bypass	Pesticides Nutrients/OC/DO HABs Mercury Temperature	X	X	CalSim

Water quality models
Reservoir Temperature: CE QUAL W2
River Temperature: HEC5Q, Reclamation Temperature Model
Delta salinity: DSM2 QUAL

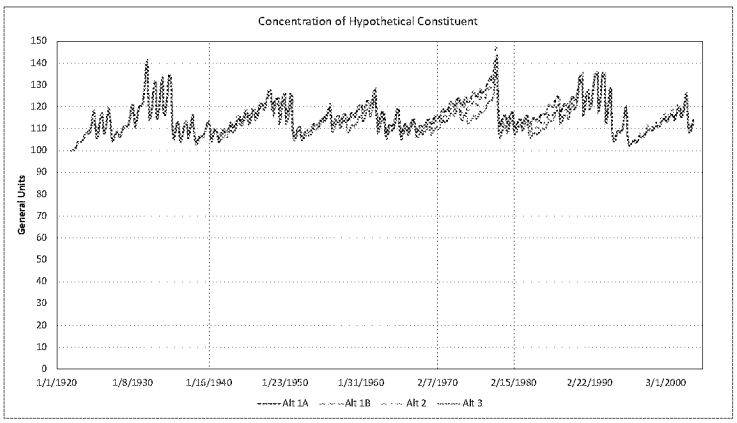
Reservoir Management Plan

- Purpose: describe the management of water resources in Sites Reservoir
- Water Quality: describe metrics, standards, testing and monitoring protocols, and outcomes
  - HABs
  - Methylmercury
  - Metals
  - Water Temperature
  - Salt and Minerals
- Releases: managed for agricultural and environmental
- Recreation and Fishery
- Vector and Invasive Species

Other notes about RMP:
- As described in Chapter 2 released by the Authority on 2/19 the Reservoir Management Plan is part of the project
- RMP describes the management of water resources in Sites Reservoir, including monitoring water quality, fisheries management, and vector management.
Protocols to respond to emerging water quality concerns, such as protocols for invasive aquatic weed control, potential adjustments to inflow and release volumes, minimum reservoir storage levels, and inlet/outlet port selection will be included.
Water quality metrics, standards, testing, and protocols would follow information and guidance available from the Central Valley regional board.
The full and final details of the RMP will not be established until after meetings and consultation with other parties.

Evapoconcentration

- Calculations using water balance information from CALSIM
- Increase in concentration limited by freshening due to release and refilling
- Most relevant to conservative constituents
- Average concentration approximately 13-16 percent higher than the inflow concentration
- Maximum of 41 – 48 percent depending on alternative



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In-Lake Analyses

Sites

Mercury Analysis

- Approach
  - Input sources
    - Diversions and local sources
  - Transformation processes
  - Comparison with similar/nearby reservoirs
    - Concentrations in surface waters and in fish tissues
    - Annual reservoir water level fluctuation
- Key Data Sources
  - California Environmental Data Exchange Network (CEDEN)
  - DWR Water Data Library
  - SWRCB 2017 – Reservoir TMDL draft staff report

Assessment area includes:
Funks Creek
Colusa Basin Drain
Sacramento River at diversion locations
Sacramento River ds of diversion locations
Yolo Bypass
Reservoirs include:
Clear Lake
Black Butte Reservoir
Indian Valley Reservoir
Lake Berryessa

Mercury – Sites Reservoir

- Total mercury
  - Estimated short-term and reasonable worst-case* short-term concentrations = 2.8 ng/L and 3.6 ng/L
  - Estimated long-term and reasonable worst-case long-term concentrations = 1.4 ng/L and 1.8 ng/L
- Mean total mercury in nearby reservoirs
  - 0.54 ng/L in Lake Oroville to 4.42 ng/L in Indian Valley Reservoir
- Total mercury concentrations would not exceed California Toxics Rule Objective (50 ng/L)

*"Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

Mercury – Sites Reservoir (cont)

- Aqueous Methylmercury
  - Sites expected short-term and reasonable worst-case short-term concentrations 0.16 ng/L and 0.24 ng/L
  - Sites expected long-term and reasonable worst-case long-term concentrations are 0.08 ng/L and 0.12 ng/L
- Mean methylmercury in nearby reservoirs
  - 0.011 ng/L in Lake Oroville to 0.093 ng/L in Indian Valley Reservoir
- Estimated fish tissue concentrations similar to other nearby reservoirs
  - Range from 0.32 – 0.85 mg/kg ww
  - Exceed CA sport fish objective (0.2 mg/kg ww in 350 mm largemouth bass)

Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

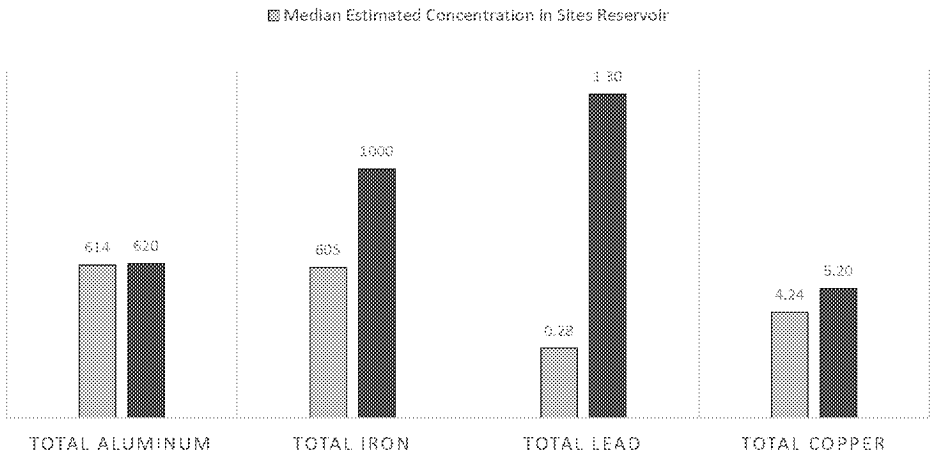
Mercury Mitigation and Management

- RMP and Mitigation Measure WQ-1.1, *Methylmercury Management*
  - Remove vegetation in inundation footprint prior to initial filling
  - Delay fish stocking- approx. 10 years after initial filling
  - Monitor reservoir fish tissue methylmercury
  - 4. Monitor and manage reservoir water chemistry according to methods proven feasible and effective at reducing mercury methylation
  - Post fish consumption warning signs if fish tissue methylmercury concentrations exceed CA sport fish objective
  - Implement methylmercury reduction actions for new reservoirs as identified in the implementation plan for Statewide Mercury Control Program for Reservoirs[a]
- Goal of reducing the methylation of mercury in Sites Reservoir

[a] SWRCB. 2017. *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs*

Slide placed here to be after the first mention of a significant mercury affect. Alternative location would be near the end of the presentation.

Other Metal Concentrations – Sites Reservoir



- Median estimated concentrations lower than chronic standard for aquatic life protection
  - Assumes some settling of suspended sediment and evapoconcentration
  - Effects would be less than significant

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Harmful Agal Blooms (HABs)

- HABs occur in many reservoirs including those near Sites (e.g., Black Butte)
- Sufficient nutrients and higher water temperatures (≥66 °F) in Sites Reservoir in May through September could create conditions conducive to formation and maintenance of HABs
- Reservoir Management Plan
  - Monitor for presence of HABs and, if found, cyanotoxins. Add warning signage if warranted
  - Coordinate with Water Board
  - Operate inlet/outlet tower to reduce likelihood of cyanotoxins in release

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John

Mixing Temperature – Sacramento River

Month	Mean Estimated Change in Water Temperature (ºF) from Sites Reservoir Releases in the Sacramento River	Median Estimated Change in Water Temperature (ºF) from Sites Reservoir Releases in the Sacramento River
January	--	--
February	--	--
March	--	--
April	-0.21	0
May	-0.26	-0.11
June	-0.12	-0.07
July	-0.12	-0.11
August	-0.28	-0.28
September	-0.12	-0.08
October	-0.15	0
November	-0.24	-0.08
December	-0.13	-0.12

- Slightly lower localized temperature in Sacramento River
- Range of temperature change: low of -1.1, high of 0.0

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Mercury – Stone Corral and Funks Creeks

- Mean mercury and methylmercury concentrations in the creeks would increase.
  - Long term increases lower than short term
  - Uncertainty of increase requires mitigation
- Significant effect – Levels could cause exceedances of the 0.2 mg/kg sport fish objective under certain reservoir conditions
  - Stone Corral Creek may be higher than Funks Creek due to difference in intake locations in reservoir
- Mitigation required
  - Mitigation Measure WQ-1.1, *Methylmercury Management*
  - Effect would remain significant and unavoidable due to uncertainty in effectiveness

Existing Funks Creek – 0.35 mean, 1.2 max ng/L
Stone corral Creek: 0.85 mean, 2.3 max ng/l

Mercury – Colusa Basin Drain

- Total Mercury
  - Mean concentrations in CDB at Knights Landing prior to 1998 was 8.6 ng/L and from 1999–2007 was 4.5 ng/L
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would not increase concentrations in the CBD or cause exceedances of the 50 ng/L CTR criterion
- Aqueous Mercury and Methylmercury
  - Sites Reservoir releases may temporarily increase aqueous and fish tissue methylmercury concentrations in the CBD
    - Mean concentrations in CDB at Knights Landing prior to 1998 was 0.17 ng/L and from 1999–2007 was 0.13 ng/L
    - Sites expected short-term and reasonable worst-case short-term concentrations 0.16 ng/L and 0.24 ng/L
    - Sites expected long-term and reasonable worst-case long-term concentrations are 0.08 ng/L and 0.12 ng/L
  - Significant Effect - Could cause exceedances of the sport fish objective (0.2 mg/kg ww)

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Mercury – Yolo Bypass

- Total Mercury
  - Existing mean total mercury in Yolo bypass is 73.2 ng/L
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would not substantially increase concentrations in the bypass or cause exceedances of the 50 ng/L CTR criterion
- Aqueous Mercury and Methylmercury
  - Concentrations in the Yolo Bypass would not increase substantially
    - Existing mean methylmercury concentration in Yolo bypass is 0.35 ng/L
    - Sites expected short-term and reasonable worst-case long-term concentrations (0.16 ng/L and 0.24 ng/L) are lower than Yolo
    - Sites expected long-term and reasonable worst-case long-term concentrations (0.08 ng/L and 0.12 ng/L) are lower than Yolo
- Fish Tissue Methylmercury
  - No long-term increases expected

Draft_0023337

Mercury – Delta

- Total Mercury
  - Historical mean total mercury concentration entering the Delta from the Sacramento River is 4.5 ng/L at Freeport
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would be diluted prior to entering Delta and below the 50 ng/L CTR
- Aqueous Mercury and Methylmercury
  - Concentrations in the Sacramento River at Freeport may increase measurably in Dry and Critical water years during release periods
    - Historical mean methylmercury concentration entering the Delta from the Sacramento River is 0.069 ng/L at Freeport
    - Sites expected short-term and reasonable worst-case long-term concentrations (0.16 ng/L and 0.24 ng/L)) are higher than Delta
    - Sites expected long-term and reasonable worst-case long-term concentrations (0.08 ng/L and 0.12 ng/L) are lower than Yolo
  - Significant Effect - Could cause exceedances of mercury TMDL in Dry and Critically Dry Water Years during release periods

Central Valley RWQCB methylmercury TMDL tissue concentration goal of 0.24 mg/kg ww for TL4 fish

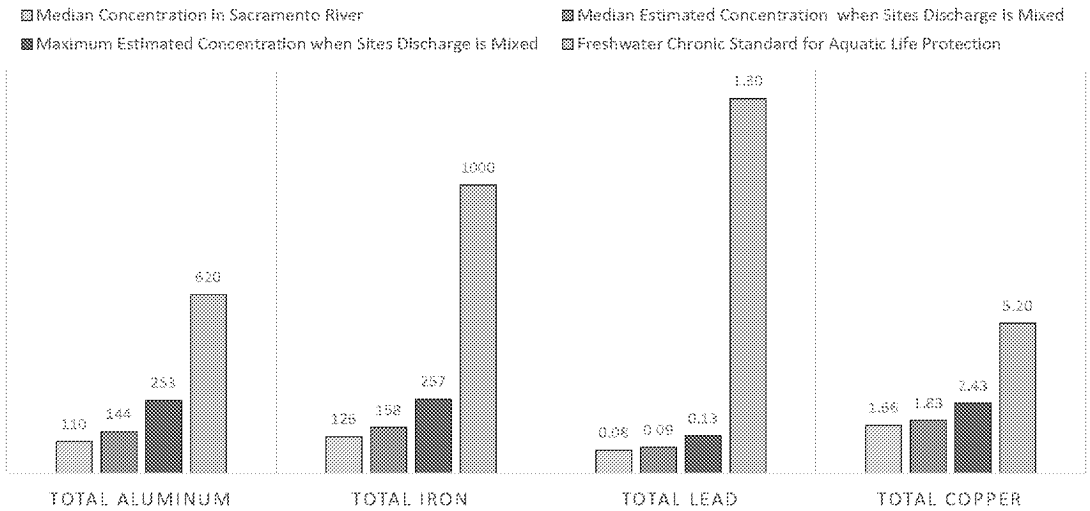
Mercury Mitigation and Management

- Mitigation Measure WQ-1.1 *Methylmercury Management*
  - Remove vegetation in inundation footprint prior to initial filling
  - Delay fish stocking- approx. 10 years after initial filling
  - Monitor reservoir fish tissue methylmercury
  - Implement annual reservoir mercury monitoring program
  - Post fish consumption warning signs if fish tissue methylmercury concentrations exceed CA sport fish objective
  - Implement methylmercury reduction actions for new reservoirs as identified in the implementation plan for Statewide Mercury Control Program for Reservoirs[a]

[a] SWRCB. 2017. *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs*

Slide placed here to be after the first mention of a significant mercury affect. Alternative location would be near the end of the presentation.

Other Metals – Sacramento River



- Calculated for the primary sites discharge season (May–September)
- Estimated discharge concentrations higher than median Sac River but lower than chronic standard for aquatic life protection

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Other Metals – Stone Corral Creek

- Operation could cause elevated concentrations of some metals in Stone Corral Creek
  - Related to intake location for Stone Corral Creek Discharge
- Significant effect – Levels could exceed water quality standards for the protection of aquatic life during the drier parts of the year.
- Mitigation required
  - Mitigation Measure Mitigation Measure WQ-2.1, *Prevent Metal Impacts in Stone Corral Creek Associated with Sites Reservoir Discharge*
    - Monitor metal concentrations to assess effect
    - Evaluate effect of modifying releases to Stone Corral Creek
    - Add vertical extension to reservoir at the withdrawal point
    - Pump water from the top of Sites Reservoir
  - Effect would be reduced to less than significant

Existing Funks Creek – 0.35 mean, 1.2 max ng/L
Stone corral Creek: 0.85 mean, 2.3 max ng/l

Other Metals – Yolo Bypass

- Operation could cause elevated concentrations of some metals and pesticides in Yolo Bypass
  - Redirection of CBD water to Yolo Bypass during August–October
- Significant effect – Levels could exceed water quality standards for total aluminum, copper, and iron
- Mitigation required
  - Mitigation Measure Mitigation Measure WQ-2.2, *Prevent Net Detrimental Metal and Pesticide Effects Associated with Moving Colusa Basin Drain Water Through the Yolo Bypass*
  - Includes evaluation of metals and pesticide concentrations in Yolo Bypass to ensure net benefits for aquatic communities and discontinuing flows if shown otherwise
  - Effect would be reduced to less than significant

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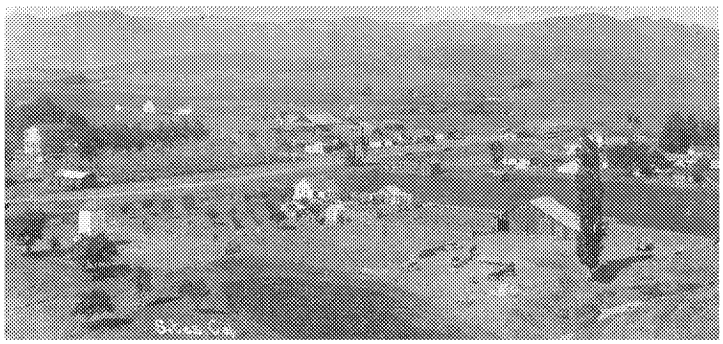
Open Topics and Action Items

Sites

Questions and Open Topics

- Any additional questions, thoughts or topics for the next meeting?
- Action item review



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Thank you!

Sites

Temperature Model: CE QUAL W2

- CE QUAL W2
  - 2D Reservoir Temperature Model
  - Daily timestep
- Assumptions:
  - Reservoir size
  - Estimates surface area with storage volume
  - Considers I/O Tower
- Inputs
  - Daily flows from operations model (USRDOM)
  - Daily temperature from Sacramento River temperature model (HEC5Q)
  - Daily net evaporation rate (consistent with CalSim II)
- Outputs
  - Surface water temperature
  - Release temperature

Steve
Hydrodynamic and water quality model
Utilized for American River temperature modeling
longitudinal and vertical
2 ft layer height
Variable distances from I/O tower

Total Mercury Concentrations (ug/L)

Location	Station	n	Mean Concentration	Maximum Concentration	75th Percentile	Data Range (years)	Source
Funks Creek	Golden Gate	2	0.35	1.2	0.93	2006-2007	DWR Data Library
Stone Coral Creek	-	3	0.85	2.3	1.61	2007	DWR Data Library
Colusa Basin Drain	Knights Landing	26	8.6	19.3	10.8	1996-1998	USGS 2000
Colusa Basin Drain	Knights Landing	66	4.5	75	5.9	1999-2007	CEDEN
Sacramento River	Red Bluff	66	1.3	14.4	1.6	1999-2007	CEDEN
Sacramento River	Hamilton City	66	2.2	54	2.6	1999-2016	CEDEN
Sacramento River	Freeport	217	4.5	89	8.8	1994-2015	CEDEN
Yolo Bypass	Prospect Slough	28	73.2	696	-	1995-2003	Central Valley RWQCB 2010

Evaporation and Seepage???

- Long-term average evaporative losses are 27 TAF per year
  - Roughly 10% of the long-term average annual diversion volume
- Seepage losses would be roughly 2,150 gallons per minute, or 3.5 TAF per year,
  - Calculated under the larger 1.8 MAF reservoir
  - Would decrease under 1.5 MAF Alternative
  - Volume of loss to seepage is within 1–2% of the long-term average annual diversion

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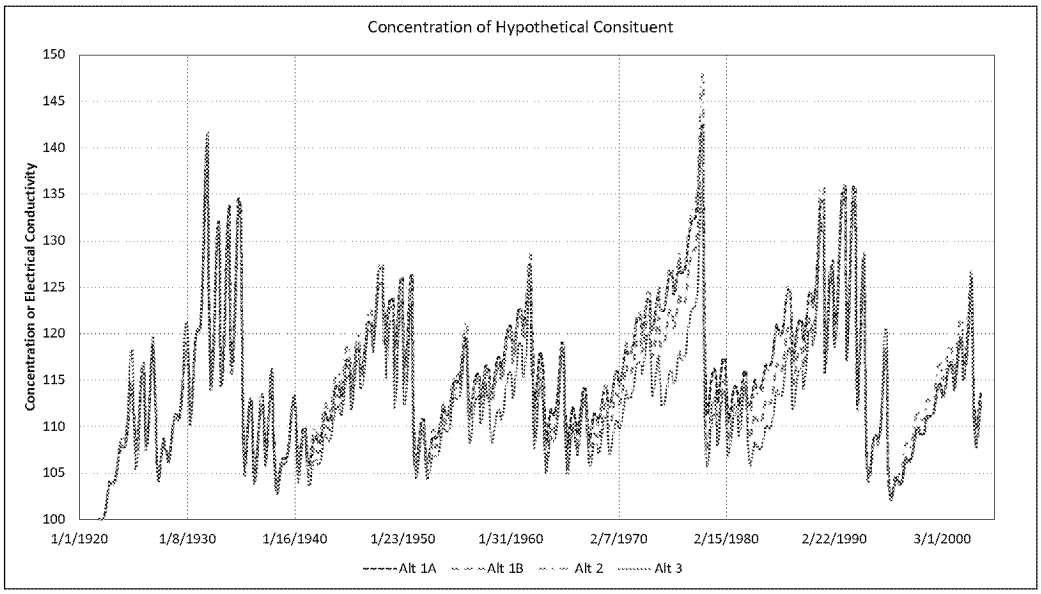
Evapoconcentration

- Calculations using water balance information from CALSIM



Other Metals

- Calculations include:
  - Improved estimation of inflow concentration (based on both flow at Keswick and Keswick/Bend Bridge)
  - Evapoconcentration
  - With some settling of suspended sediment

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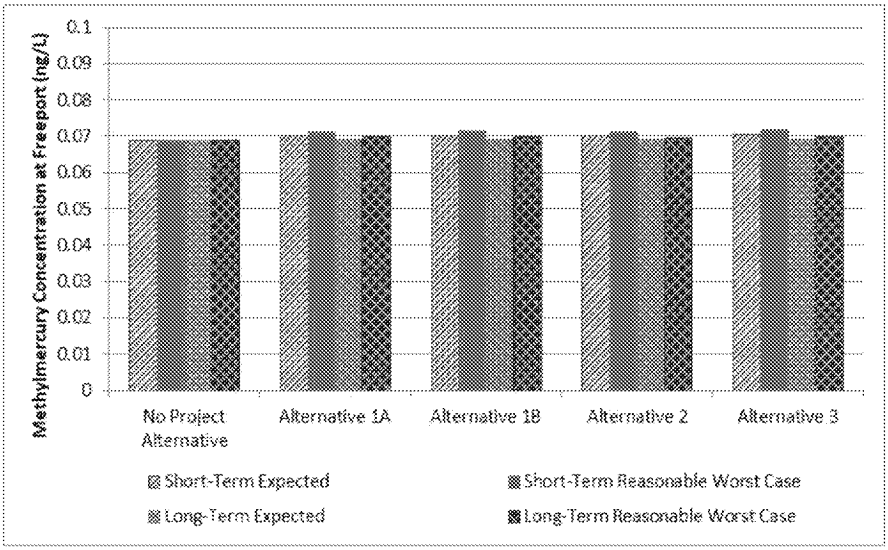
Average Metal/Metalloid Concentrations

- Units are in micrograms per liter
- No available data for Funks Creek
- Source for Stone Corral Creek and Sacramento River = DWR Water Data Library. See Slide 14
- Source for groundwater is DWR NODOS study (2007)

Metal/Metalloid	Stone Corral Creek	Groundwater in Sites Reservoir Footprint	Sacramento River at Intake Locations
Dissolved Aluminum	149	3	94
Total Aluminum	562	12	359
Dissolved Arsenic	2.8	0.7	1.5
Total Arsenic	3.1	0.8	1.6
Dissolved Cadmium	0.05	0.02	0.03
Total Cadmium	0.06	0.05	0.04
Dissolved Chromium	2.9	2.6	0.7
Total Chromium	4.0	3.3	1.4
Dissolved Copper	2.8	2.7	1.3
Total Copper	3.9	3.4	2.3
Dissolved Iron	123	7	67
Total Iron	512	81	426
Dissolved Lead	0.08	0.12	0.03
Total Lead	0.31	0.27	0.20
Dissolved Manganese	12	18	2
Total Manganese	37	21	15
Dissolved Nickel	2.8	1.0	1.3
Total Nickel	4.0	1.3	2.2
Dissolved Selenium	6.1	4.6	1.2
Total Selenium	6.7	5.0	0.2
Dissolved Silver	0.03	0.00	0.01
Total Silver	0.05	0.01	0.03
Dissolved Zinc	1.4	112.5	0.9
Total Zinc	3.7	115.2	3.8

Anne

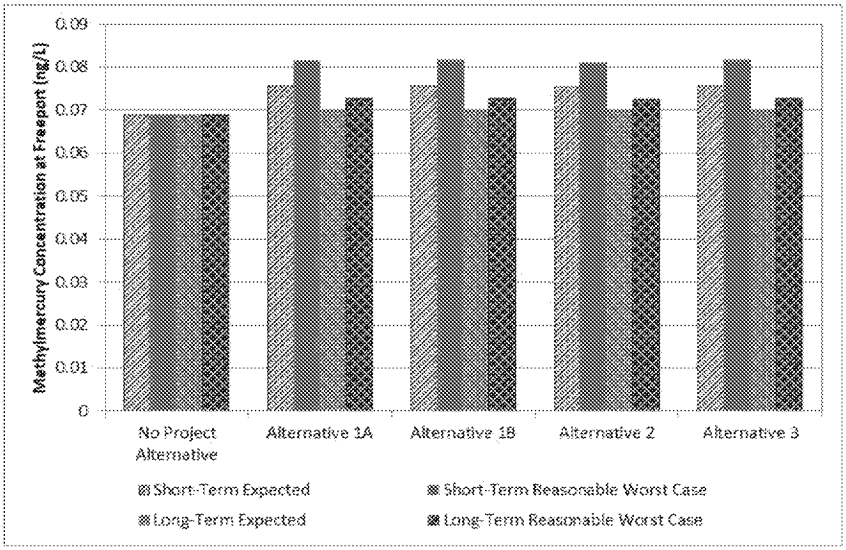
Methylmercury Concentrations at Freeport: Annual Average Flows



- Estimated Aqueous Methylmercury Concentrations at Freeport for Annual Average Flows – Long term increase of up to 4% increase over baseline

RWQCB model results for aqueous and fish tissue methylmercury concentrations

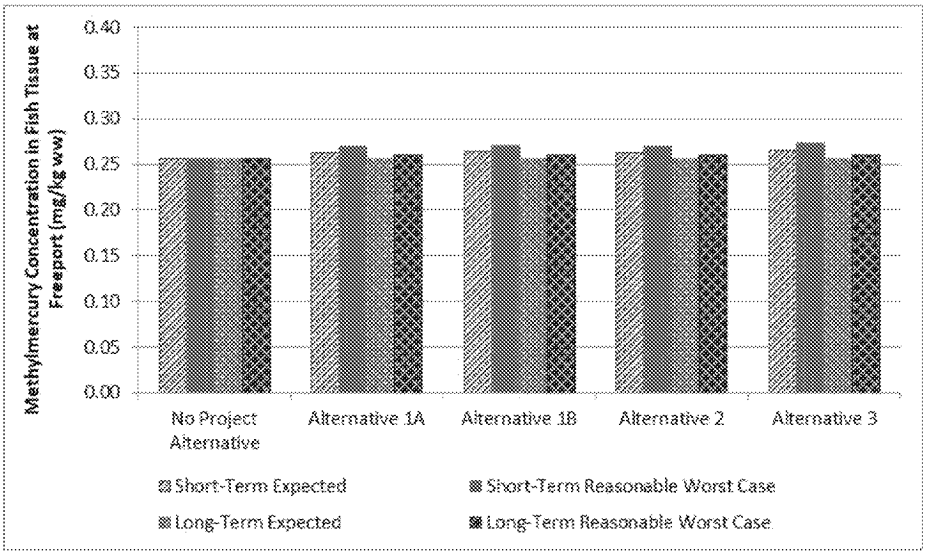
Methylmercury Concentrations at Freeport: Dry and Critical Years



- Estimated Aqueous Methylmercury Concentrations at Freeport for Mean Monthly Flows in May–November of Dry and Critically Dry Water Years – Long term increase of up to 5% increase over baseline

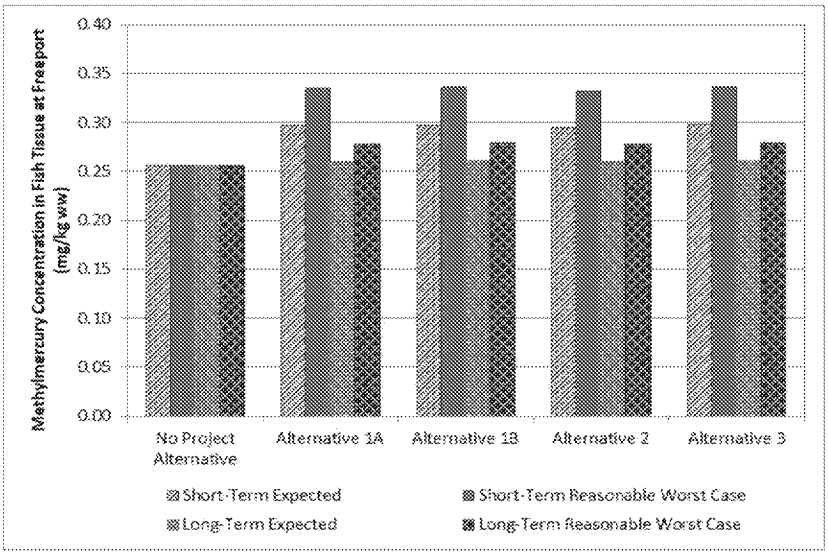
RWQCB model results for aqueous and fish tissue methylmercury concentrations

Fish Tissue Methylmercury at Freeport : Average Annual Flows



- Estimated Fish Tissue Methylmercury Concentrations at Freeport for Annual Average Flows – Long term increase of up to 6% increase over baseline

Fish Tissue Methylmercury at Freeport: Dry and Critical Years



- Estimated fish tissue methylmercury concentrations at Freeport for dry and critical years

Draft_0023356

Other Topics: Salt Pond

- Salt Pond Evaluation:
  - Not expected to have substantial water quality effects
  - Conservatively assumed no decrease in spring discharge
  - Fate of spring discharge:
    - Full mixing of 0.1 cfs for a year into a volume of 200 TAF would represent 0.04 percent of the total volume (EC increase from 130 µS/cm to between 133 – 208 µS/cm)
    - Accumulation at bottom of reservoir due to higher density (74 years to reach low-level intake)
- Reservoir Management Plan
  - Measure EC in springs before construction
  - Measure EC in reservoir after inundation

Draft_0023357

Other Topics: Salt Pond

- Salt Pond Evaluation:

Estimated Electrical Conductivity (EC in µS/cm) of reservoir release assuming 0.1 cfs salt spring flow is continually mixed with reservoir release and that Sacramento River EC is 130 µS/cm.

Spring EC	Reservoir Release (cfs)	
(µS/cm)[a]	10 cfs	1,200 cfs
7,200	201	131
194,100	2,070	146

[a] Spring EC between these two values.

Draft_0023358

From: Huber, Anne [Anne.Huber@icf.com]
Sent: 3/15/2023 4:23:16 PM
To: Spranza, John [john.spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Erecius, Lesa [Lesa.Erecius@icf.com]
Subject: RE: Draft WQ PowerPoint for tomorrow.
Attachments: 20230316_Water Quality Discussion_Presentation_FEIR-S_ah.pptx

Hi John,

I added some comments bubbles and proposed changes in the attached file – mostly related to updating results.
Proposed changes to the slides are in yellow highlights.
Lesa will likely have separate input regarding mercury and HABs.

I will be heading out to catch the bus in 8 minutes, but can be back online later this evening if you have any questions.
Thanks,
-Anne

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Wednesday, March 15, 2023 2:56 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Erecius, Lesa <Lesa.Erecius@icf.com>; Huber, Anne <Anne.Huber@icf.com>
Subject: Draft WQ PowerPoint for tomorrow.

Hi,
Attached is the draft for tomorrow's NGO meeting, I'm still backchecking the mercury slides, but it is at 95% so please feel free to provide comments or questions on this version.
Thanks,
John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist
He/Him

HDR
2379 Gateway Oaks Drive, Suite 200
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D 916.679.8858 M 818.640.2487
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hdrinc.com/follow-us
hdrinc.com/follow-us

Sites Project Water Quality Group Discussion

March 16,2023

Sites

Draft – For Discussion Purposes Only – Not for Distribution Outside Project Team

Agenda

1. Introductions
2. Key Concepts
   a) Analytical Methods – Overview
   b) Reservoir Management Plan
   c) Evapoconcentration
3. In-Lake Effects
4. Discharge Effects
5. Action Items and Next Steps

Draft_0023361

John

Method Analysis Overview

Mechanisms by which Sites Reservoir Operations Could Affect Water Quality	Main Constituents Considered	Qualitative	Quantitative	Model Results Considered
Temporal Shift	Metals Pesticides Salinity	X	X	CalSim
Evapoconcentration	Metals Salinity		X	CalSim
In-Reservoir Processes	Mercury, Metals, HABs Nutrients/OC/DO Temperature, Salinity	X	X	Reservoir temperature modeling (CE QUAL W2)
Change in System Reservoir Operations	Temperature HABs Mercury	X	X	CalSim, HEC5Q and Reclamation temperature model
Change in Delta Operations	Salinity Chloride	X	X	CalSim and DSM2 QUAL
Redirection of CBD Flow to Yolo Bypass	Pesticides, Metals, Nutrients/OC/DO HABs Mercury Temperature	X	X	CalSim

Water quality models
Reservoir Temperature: CE QUAL W2
River Temperature: HEC5Q, Reclamation Temperature Model
Delta salinity: DSM2 QUAL

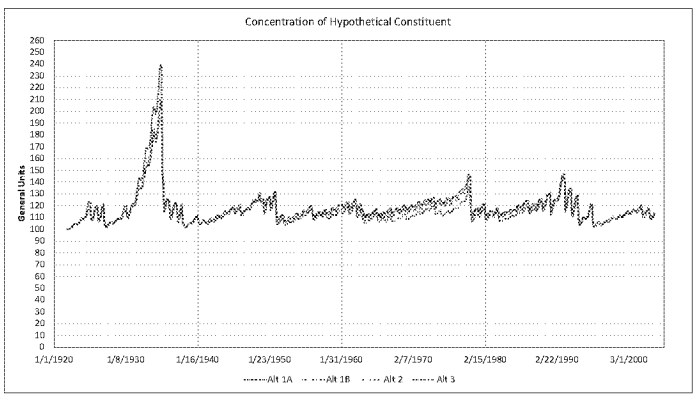
Reservoir Management Plan

- Purpose: describe the management of water resources in Sites Reservoir
- Water Quality: describe metrics, standards, testing and monitoring protocols, and outcomes
  - HABs
  - Methylmercury
  - Metals
  - Water Temperature
  - Salt and Minerals
- Releases: managed for agricultural and environmental
- Recreation and Fishery
- Vector and Invasive Species

Other notes about RMP:
- As described in Chapter 2 released by the Authority on 2/19 the Reservoir Management Plan is part of the project
- RMP describes the management of water resources in Sites Reservoir, including monitoring water quality, fisheries management, and vector management.
Protocols to respond to emerging water quality concerns, such as protocols for invasive aquatic weed control, potential adjustments to inflow and release volumes, minimum reservoir storage levels, and inlet/outlet port selection will be included.
Water quality metrics, standards, testing, and protocols would follow information and guidance available from the Central Valley regional board.
The full and final details of the RMP will not be established until after meetings and consultation with other parties.

Evapoconcentration

- Calculations using water balance information from CALSIM
- Increase in concentration limited by freshening due to release and refilling
- Most relevant to conservative constituents
- Average concentration approximately 16-18 percent higher than the inflow concentration
- Maximum of 139 percent occurs when no releases for water supply



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In-Lake Analyses

Sites

Mercury Analysis

- Approach
  - Input sources
    - Diversions and local sources
  - Transformation processes
  - Comparison with similar/nearby reservoirs
    - Concentrations in surface waters and in fish tissues
    - Annual reservoir water level fluctuation
- Key Data Sources
  - California Environmental Data Exchange Network (CEDEN)
  - DWR Water Data Library
  - SWRCB 2017 – Reservoir TMDL draft staff report

Assessment area includes:
Funks Creek
Colusa Basin Drain
Sacramento River at diversion locations
Sacramento River ds of diversion locations
Yolo Bypass
Reservoirs include:
Clear Lake
Black Butte Reservoir
Indian Valley Reservoir
Lake Berryessa

Mercury – Sites Reservoir

- Total mercury
  - Estimated short-term and reasonable worst-case* short-term concentrations = 2.8 ng/L and 3.6 ng/L
  - Estimated long-term and reasonable worst-case long-term concentrations = 1.4 ng/L and 1.8 ng/L
- Mean total mercury in nearby reservoirs
  - 0.54 ng/L in Lake Oroville to 4.42 ng/L in Indian Valley Reservoir
- Total mercury concentrations would not exceed California Toxics Rule Objective (50 ng/L)

*"Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

Mercury – Sites Reservoir (cont)

- Aqueous Methylmercury
  - Sites expected short-term and reasonable worst-case short-term concentrations 0.16 ng/L and 0.24 ng/L
  - Sites expected long-term and reasonable worst-case long-term concentrations are 0.08 ng/L and 0.12 ng/L
- Mean methylmercury in nearby reservoirs
  - 0.011 ng/L in Lake Oroville to 0.093 ng/L in Indian Valley Reservoir
- Estimated fish tissue concentrations similar to other nearby reservoirs
  - Range from 0.32 – 0.85 mg/kg ww
  - Exceed CA sport fish objective (0.2 mg/kg ww in 350 mm largemouth bass)

Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

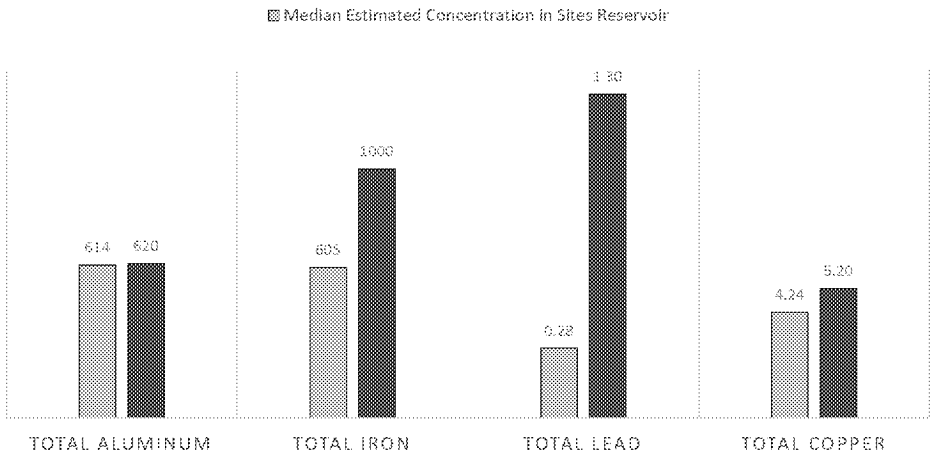
Mercury Mitigation and Management

- RMP and Mitigation Measure WQ-1.1, *Methylmercury Management*
  - Remove vegetation in inundation footprint prior to initial filling
  - Delay fish stocking- approx. 10 years after initial filling
  - Monitor reservoir fish tissue methylmercury
  - 4. Monitor and manage reservoir water chemistry according to methods proven feasible and effective at reducing mercury methylation
  - Post fish consumption warning signs if fish tissue methylmercury concentrations exceed CA sport fish objective
  - Implement methylmercury reduction actions for new reservoirs as identified in the implementation plan for Statewide Mercury Control Program for Reservoirs[a]
- Goal of reducing the methylation of mercury in Sites Reservoir

[a] SWRCB. 2017. *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs*

Slide placed here to be after the first mention of a significant mercury affect. Alternative location would be near the end of the presentation.

Other Metal Concentrations – Sites Reservoir



- Median estimated concentrations lower than chronic standard for aquatic life protection
  - Assumes some settling of suspended sediment and evapoconcentration
  - Effects would be less than significant

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Harmful Agal Blooms (HABs)

- HABs occur in many reservoirs including those near Sites (e.g., Black Butte)
- Sufficient nutrients and higher water temperatures (≥66 °F) in Sites Reservoir in May through September could create conditions conducive to formation and maintenance of HABs
- Reservoir Management Plan
  - Monitor for presence of HABs and, if found, cyanotoxins. Add warning signage if warranted
  - Coordinate with Water Board
  - Operate inlet/outlet tower to reduce likelihood of cyanotoxins in release

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John

Mixing Temperature – Sacramento River

Month	Mean Estimated Change in Water Temperature (ºF) from Sites Reservoir Releases in the Sacramento River	Median Estimated Change in Water Temperature (ºF) from Sites Reservoir Releases in the Sacramento River
January	--	--
February	--	--
March	--	--
April	-0.21	0
May	-0.26	-0.11
June	-0.12	-0.07
July	-0.12	-0.11
August	-0.28	-0.28
September	-0.12	-0.08
October	-0.15	0
November	-0.24	-0.08
December	-0.13	-0.12

- Generally slightly lower localized temperature in Sacramento River
- Range of temperature change: low of -1.1, high of 0.64 F

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Mercury – Stone Corral and Funks Creeks

- Mean mercury and methylmercury concentrations in the creeks would increase.
  - Long term increases lower than short term
  - Uncertainty of increase requires mitigation
- Significant effect – Levels could cause exceedances of the 0.2 mg/kg sport fish objective under certain reservoir conditions
  - Stone Corral Creek may be higher than Funks Creek due to difference in intake locations in reservoir
- Mitigation required
  - Mitigation Measure WQ-1.1, *Methylmercury Management*
  - Effect would remain significant and unavoidable due to uncertainty in effectiveness

Existing Funks Creek – 0.35 mean, 1.2 max ng/L
Stone corral Creek: 0.85 mean, 2.3 max ng/l

Mercury – Colusa Basin Drain

- Total Mercury
  - Mean concentrations in CDB at Knights Landing prior to 1998 was 8.6 ng/L and from 1999–2007 was 4.5 ng/L
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would not increase concentrations in the CBD or cause exceedances of the 50 ng/L CTR criterion
- Aqueous Mercury and Methylmercury
  - Sites Reservoir releases may temporarily increase aqueous and fish tissue methylmercury concentrations in the CBD
    - Mean concentrations in CDB at Knights Landing prior to 1998 was 0.17 ng/L and from 1999–2007 was 0.13 ng/L
    - Sites expected short-term and reasonable worst-case short-term concentrations 0.16 ng/L and 0.24 ng/L
    - Sites expected long-term and reasonable worst-case long-term concentrations are 0.08 ng/L and 0.12 ng/L
  - Significant Effect - Could cause exceedances of the sport fish objective (0.2 mg/kg ww)

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Mercury – Yolo Bypass

- Total Mercury
  - Existing mean total mercury in Yolo bypass is 73.2 ng/L
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would not substantially increase concentrations in the bypass or cause exceedances of the 50 ng/L CTR criterion
- Aqueous Mercury and Methylmercury
  - Concentrations in the Yolo Bypass would not increase substantially
    - Existing mean methylmercury concentration in Yolo bypass is 0.35 ng/L
    - Sites expected short-term and reasonable worst-case long-term concentrations (0.16 ng/L and 0.24 ng/L) are lower than Yolo
    - Sites expected long-term and reasonable worst-case long-term concentrations (0.08 ng/L and 0.12 ng/L) are lower than Yolo
- Fish Tissue Methylmercury
  - No long-term increases expected

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Mercury – Delta

- Total Mercury
  - Historical mean total mercury concentration entering the Delta from the Sacramento River is 4.5 ng/L at Freeport
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would be diluted prior to entering Delta and below the 50 ng/L CTR
- Aqueous Mercury and Methylmercury
  - Concentrations in the Sacramento River at Freeport may increase measurably in Dry and Critical water years during release periods
    - Historical mean methylmercury concentration entering the Delta from the Sacramento River is 0.069 ng/L at Freeport
    - Sites expected short-term and reasonable worst-case long-term concentrations (0.16 ng/L and 0.24 ng/L)) are higher than Delta
    - Sites expected long-term and reasonable worst-case long-term concentrations (0.08 ng/L and 0.12 ng/L) are lower than Yolo
  - Significant Effect - Could cause exceedances of mercury TMDL in Dry and Critically Dry Water Years during release periods

Central Valley RWQCB methylmercury TMDL tissue concentration goal of 0.24 mg/kg ww for TL4 fish

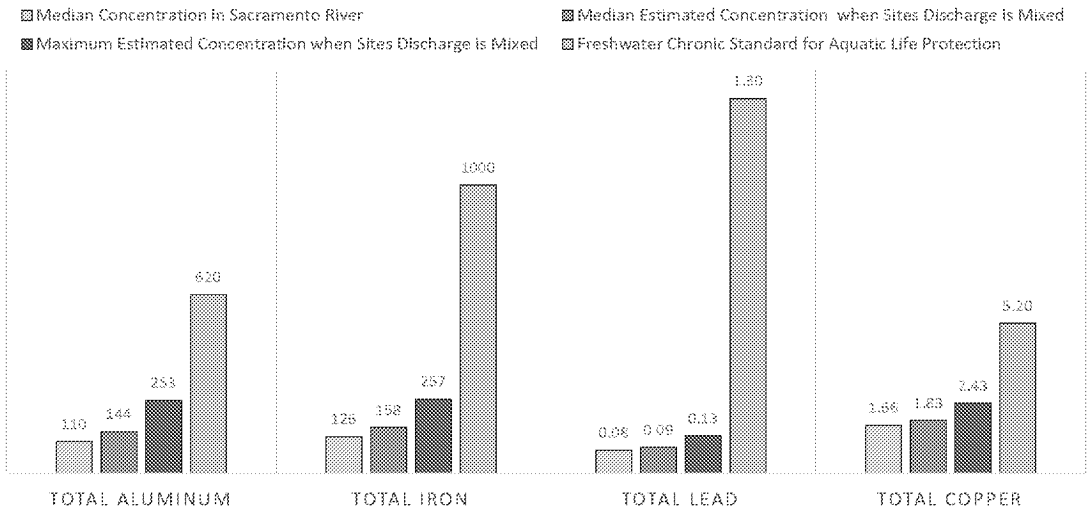
Mercury Mitigation and Management

- Mitigation Measure WQ-1.1 *Methylmercury Management*
  - Remove vegetation in inundation footprint prior to initial filling
  - Delay fish stocking- approx. 10 years after initial filling
  - Monitor reservoir fish tissue methylmercury
  - Implement annual reservoir mercury monitoring program
  - Post fish consumption warning signs if fish tissue methylmercury concentrations exceed CA sport fish objective
  - Implement methylmercury reduction actions for new reservoirs as identified in the implementation plan for Statewide Mercury Control Program for Reservoirs[a]

[a] SWRCB. 2017. *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs*

Slide placed here to be after the first mention of a significant mercury affect. Alternative location would be near the end of the presentation.

Other Metals – Sacramento River



- Calculated for the primary Sites discharge season (May–September)
- Estimated discharge concentrations higher than median Sac River but lower than chronic standard for aquatic life protection

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Other Metals – Stone Corral Creek

- Operation could cause elevated concentrations of some metals in Stone Corral Creek
  - Related to intake location for Stone Corral Creek Discharge
- Significant effect – Levels could exceed water quality standards for the protection of aquatic life during the drier parts of the year.
- Mitigation required
  - Mitigation Measure ~~Mitigation Measure~~ WQ-2.1, *Prevent Metal Impacts in Stone Corral Creek Associated with Sites Reservoir Discharge*
    - Monitor metal concentrations to assess effect
    - Evaluate effect of modifying releases to Stone Corral Creek
    - Add vertical extension to reservoir at the withdrawal point
    - Pump water from the top of Sites Reservoir
  - Effect would be reduced to less than significant

Existing Funks Creek – 0.35 mean, 1.2 max ng/L
Stone corral Creek: 0.85 mean, 2.3 max ng/l

Other Metals – Yolo Bypass

- Operation could cause elevated concentrations of some metals and pesticides in Yolo Bypass
  - Redirection of CBD water to Yolo Bypass during August–October
- Significant effect – Levels could exceed water quality standards for total aluminum, copper, and iron
- Mitigation required
  - Mitigation Measure Mitigation Measure WQ-2.2, *Prevent Net Detrimental Metal and Pesticide Effects Associated with Moving Colusa Basin Drain Water Through the Yolo Bypass*
  - Includes evaluation of metals and pesticide concentrations in Yolo Bypass to ensure net benefits for aquatic communities and discontinuing flows if shown otherwise
  - Effect would be reduced to less than significant

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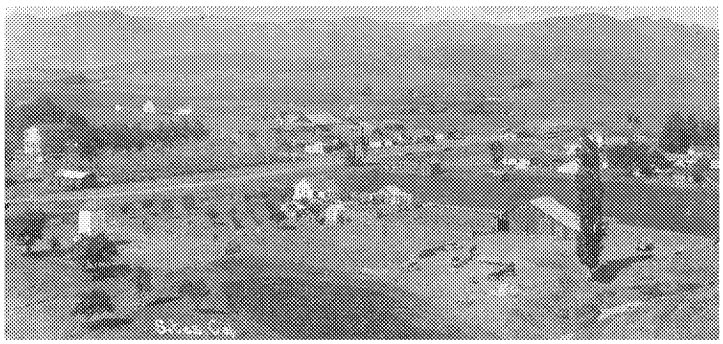
Open Topics and Action Items

Sites

Questions and Open Topics

- Any additional questions, thoughts or topics for the next meeting?
- Action item review



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Thank you!

Sites

Temperature Model: CE QUAL W2

- CE QUAL W2
  - 2D Reservoir Temperature Model
  - Daily timestep
- Assumptions:
  - Reservoir size
  - Estimates surface area with storage volume
  - Considers I/O Tower
- Inputs
  - Daily flows from operations model (USRDOM)
  - Daily temperature from Sacramento River temperature model (HEC5Q)
  - Daily net evaporation rate (consistent with CalSim II)
- Outputs
  - Surface water temperature
  - Release temperature

Steve
Hydrodynamic and water quality model
Utilized for American River temperature modeling
longitudinal and vertical
2 ft layer height
Variable distances from I/O tower

Total Mercury Concentrations (ug/L)

Location	Station	n	Mean Concentration	Maximum Concentration	75th Percentile	Data Range (years)	Source
Funks Creek	Golden Gate	2	0.35	1.2	0.93	2006-2007	DWR Data Library
Stone Coral Creek	-	3	0.85	2.3	1.61	2007	DWR Data Library
Colusa Basin Drain	Knights Landing	26	8.6	19.3	10.8	1996-1998	USGS 2000
Colusa Basin Drain	Knights Landing	66	4.5	75	5.9	1999-2007	CEDEN
Sacramento River	Red Bluff	66	1.3	14.4	1.6	1999-2007	CEDEN
Sacramento River	Hamilton City	66	2.2	54	2.6	1999-2016	CEDEN
Sacramento River	Freeport	217	4.5	89	8.8	1994-2015	CEDEN
Yolo Bypass	Prospect Slough	28	73.2	696	-	1995-2003	Central Valley RWQCB 2010

Evaporation and Seepage???

- Long-term average evaporative losses are 27 TAF per year
  - Roughly 10% of the long-term average annual diversion volume
- Seepage losses would be roughly 2,150 gallons per minute, or 3.5 TAF per year,
  - Calculated under the larger 1.8 MAF reservoir
  - Would decrease under 1.5 MAF Alternative
  - Volume of loss to seepage is within 1–2% of the long-term average annual diversion

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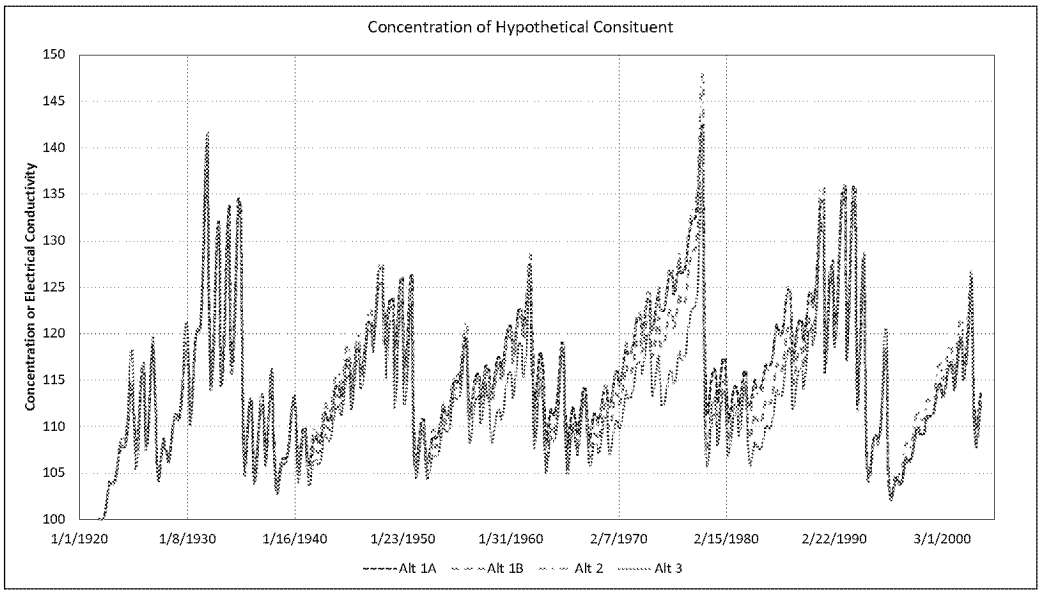
Evapoconcentration

- Calculations using water balance information from CALSIM



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Other Metals

- Calculations include:
  - Improved estimation of inflow concentration (based on both flow at Keswick and Keswick/Bend Bridge)
  - Evapoconcentration
  - With some settling of suspended sediment

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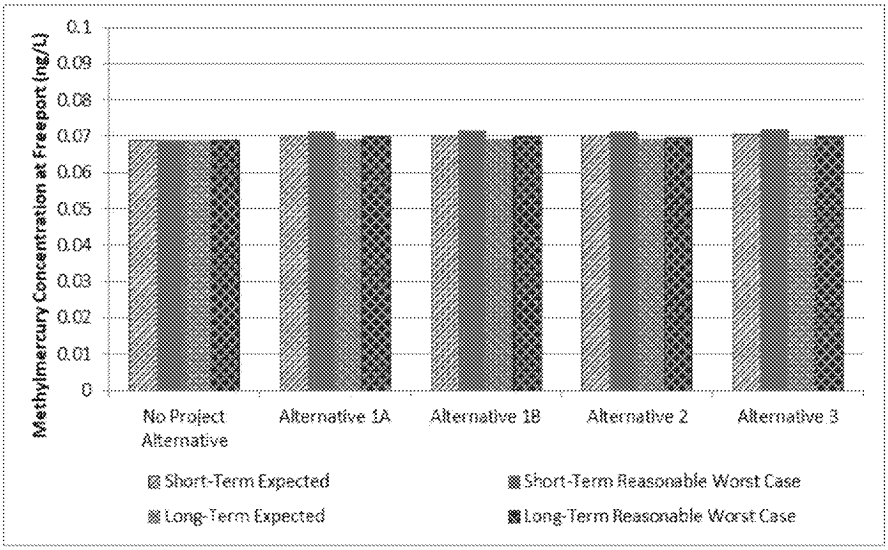
Average Metal/Metalloid Concentrations

- Units are in micrograms per liter
- No available data for Funks Creek
- Source for Stone Corral Creek and Sacramento River = DWR Water Data Library. See Slide 14
- Source for groundwater is DWR NODOS study (2007)

Metal/Metalloid	Stone Corral Creek	Groundwater in Sites Reservoir Footprint	Sacramento River at Intake Locations
Dissolved Aluminum	149	3	94
Total Aluminum	562	12	359
Dissolved Arsenic	2.8	0.7	1.5
Total Arsenic	3.1	0.8	1.6
Dissolved Cadmium	0.05	0.02	0.03
Total Cadmium	0.06	0.05	0.04
Dissolved Chromium	2.9	2.6	0.7
Total Chromium	4.0	3.3	1.4
Dissolved Copper	2.8	2.7	1.3
Total Copper	3.9	3.4	2.3
Dissolved Iron	123	7	67
Total Iron	512	81	426
Dissolved Lead	0.08	0.12	0.03
Total Lead	0.31	0.27	0.20
Dissolved Manganese	12	18	2
Total Manganese	37	21	15
Dissolved Nickel	2.8	1.0	1.3
Total Nickel	4.0	1.3	2.2
Dissolved Selenium	6.1	4.6	1.2
Total Selenium	6.7	5.0	0.2
Dissolved Silver	0.03	0.00	0.01
Total Silver	0.05	0.01	0.03
Dissolved Zinc	1.4	112.5	0.9
Total Zinc	3.7	115.2	3.8

Anne

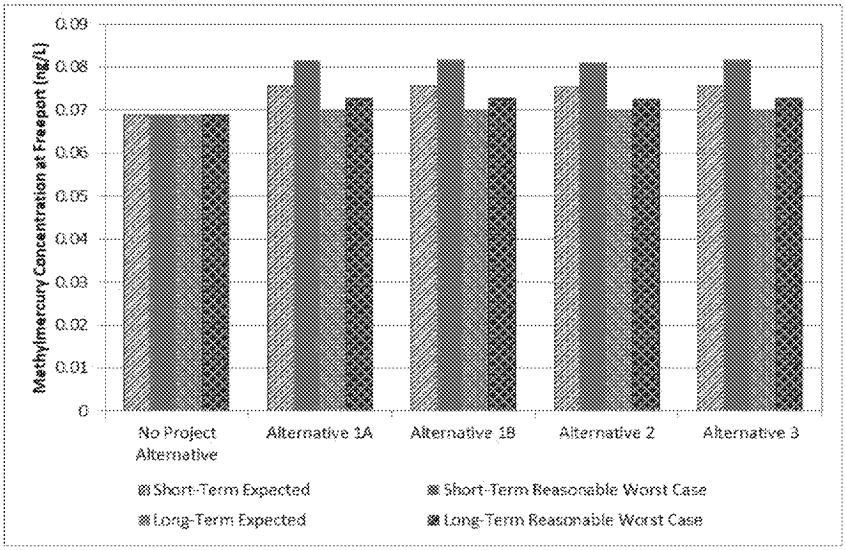
Methylmercury Concentrations at Freeport: Annual Average Flows



- Estimated Aqueous Methylmercury Concentrations at Freeport for Annual Average Flows – Long term increase of up to 4% increase over baseline

RWQCB model results for aqueous and fish tissue methylmercury concentrations

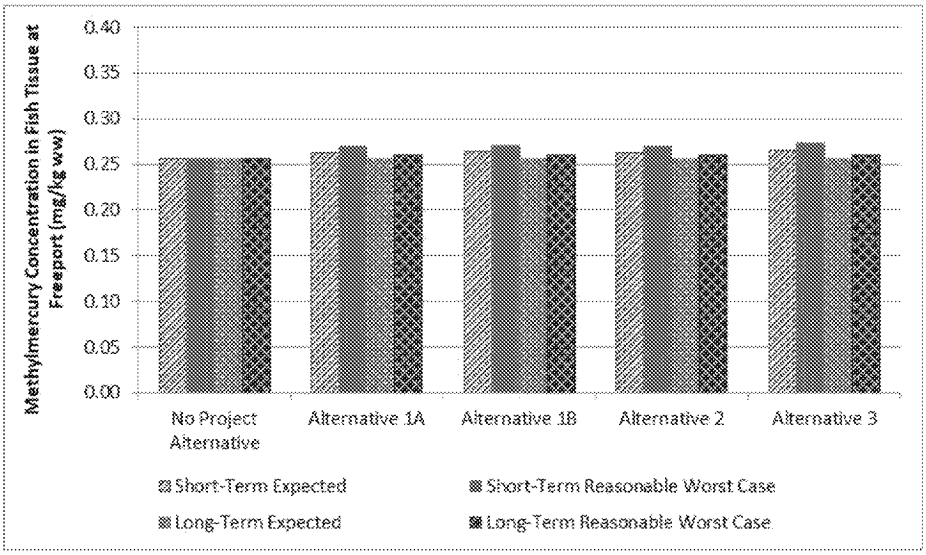
Methylmercury Concentrations at Freeport: Dry and Critical Years



- Estimated Aqueous Methylmercury Concentrations at Freeport for Mean Monthly Flows in May–November of Dry and Critically Dry Water Years – Long term increase of up to 5% increase over baseline

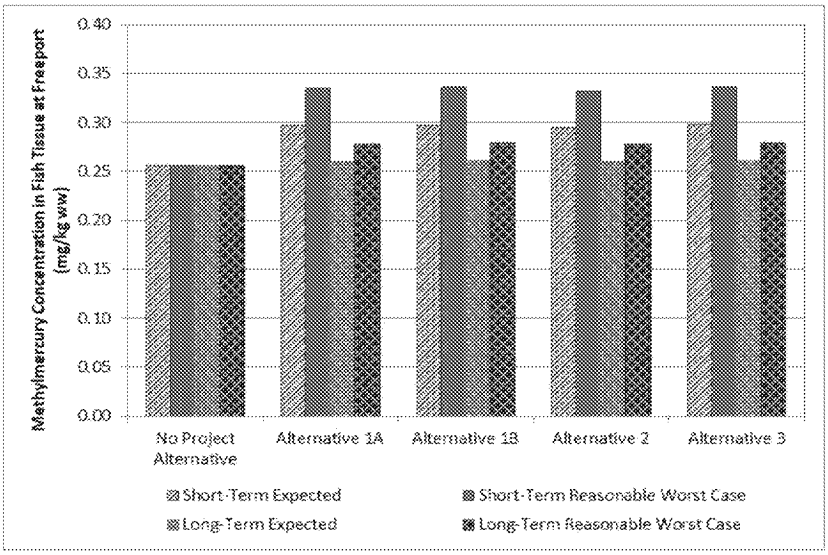
RWQCB model results for aqueous and fish tissue methylmercury concentrations

Fish Tissue Methylmercury at Freeport : Average Annual Flows



- Estimated Fish Tissue Methylmercury Concentrations at Freeport for Annual Average Flows – Long term increase of up to 6% increase over baseline

Fish Tissue Methylmercury at Freeport: Dry and Critical Years



- Estimated fish tissue methylmercury concentrations at Freeport for dry and critical years

Other Topics: Salt Pond

- Salt Pond Evaluation:
  - Not expected to have substantial water quality effects
  - Conservatively assumed no decrease in spring discharge
  - Fate of spring discharge:
    - Full mixing of 0.1 cfs for a year into a volume of 200 TAF would represent 0.04 percent of the total volume (EC increase from 130 µS/cm to between 133 – 208 µS/cm)
    - Accumulation at bottom of reservoir due to higher density (74 years to reach low-level intake)
- Reservoir Management Plan
  - Measure EC in springs before construction
  - Measure EC in reservoir after inundation

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Other Topics: Salt Pond

- Salt Pond Evaluation:

Estimated Electrical Conductivity (EC in µS/cm) of reservoir release assuming 0.1 cfs salt spring flow is continually mixed with reservoir release and that Sacramento River EC is 130 µS/cm.

Spring EC	Reservoir Release (cfs)	
(µS/cm)[a]	10 cfs	1,200 cfs
7,200	201	131
194,100	2,070	146

[a] Spring EC between these two values.

Draft_0023398

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 3/15/2023 4:41:16 PM
To: Huber, Anne [Anne.Huber@icf.com]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Erecius, Lesa [Lesa.Erecius@icf.com]
Subject: RE: Draft WQ PowerPoint for tomorrow.
Attachments: 20230316_Water Quality Discussion_Presentation_FEIR-S-1630 time.pptx

Thanks Anne,
Revised version attached…I made a few other changes/clarifications.

John Spranza

D 916.679.8858 M 818.640.2487

From: Huber, Anne <Anne.Huber@icf.com>
Sent: Wednesday, March 15, 2023 4:23 PM
To: Spranza, John <John.Spranza@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Erecius, Lesa <Lesa.Erecius@icf.com>
Subject: RE: Draft WQ PowerPoint for tomorrow.

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,

I added some comments bubbles and proposed changes in the attached file – mostly related to updating results.
Proposed changes to the slides are in yellow highlights.
Lesa will likely have separate input regarding mercury and HABs.

I will be heading out to catch the bus in 8 minutes, but can be back online later this evening if you have any questions.
Thanks,
-Anne

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Wednesday, March 15, 2023 2:56 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Erecius, Lesa <Lesa.Erecius@icf.com>; Huber, Anne <Anne.Huber@icf.com>
Subject: Draft WQ PowerPoint for tomorrow.

Hi,
Attached is the draft for tomorrow's NGO meeting, I'm still backchecking the mercury slides, but it is at 95% so please feel free to provide comments or questions on this version.
Thanks,
John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist
He/Him

HDR
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833

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john.spranza@hdrinc.com

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hdrinc.com/follow-us

From: Erecius, Lesa [Lesa.Erecius@icf.com]
Sent: 3/15/2023 4:52:54 PM
To: Spranza, John [john.spranza@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Huber, Anne [Anne.Huber@icf.com]; Briard, Monique [Monique.Briard@icf.com]; Harris, Melissa [Melissa.Harris@icf.com]
Subject: RE: Draft WQ PowerPoint for tomorrow.
Attachments: 20230316_Water Quality Discussion_Presentation_FEIR-S_le.pptx

John-

I double-checked the Hg/MeHg results just in case. They all looked updated. I have left a few comments in bubbles and a few suggested revisions in highlighted red text.

-Lesa

From: Huber, Anne <Anne.Huber@icf.com>
Sent: Wednesday, March 15, 2023 4:23 PM
To: Spranza, John <John.Spranza@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>
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John Spranza, MS, CCN
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Sites Project Water Quality Group Discussion

March 16,2023

Sites

Draft – For Discussion Purposes Only | Draft – For Discussion Purposes Only

Agenda

1. Introductions
2. Key Concepts
   a) Analytical Methods – Overview
   b) Reservoir Management Plan
   c) Evapoconcentration
3. In-Lake Effects
4. Discharge Effects
5. Action Items and Next Steps

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John

Method Analysis Overview

Mechanisms by which Sites Reservoir Operations Could Affect Water Quality	Main Constituents Considered	Qualitative	Quantitative	Model Results Considered
Temporal Shift	Metals Pesticides Salinity	X	X	CalSim
Evapoconcentration	Metals Salinity		X	CalSim
In-Reservoir Processes	Mercury HABs Nutrients/OC/DO Temperature	X	X	Reservoir temperature modeling (CE QUAL W2)
Change in System Reservoir Operations	Temperature HABs Mercury	X	X	CalSim, HEC5Q and Reclamation temperature model
Change in Delta Operations	Salinity Chloride	X	X	CalSim and DSM2 QUAL
Redirection of CBD Flow to Yolo Bypass	Pesticides Nutrients/OC/DO HABs Mercury Temperature	X	X	CalSim

Water quality models
Reservoir Temperature: CE QUAL W2
River Temperature: HEC5Q, Reclamation Temperature Model
Delta salinity: DSM2 QUAL

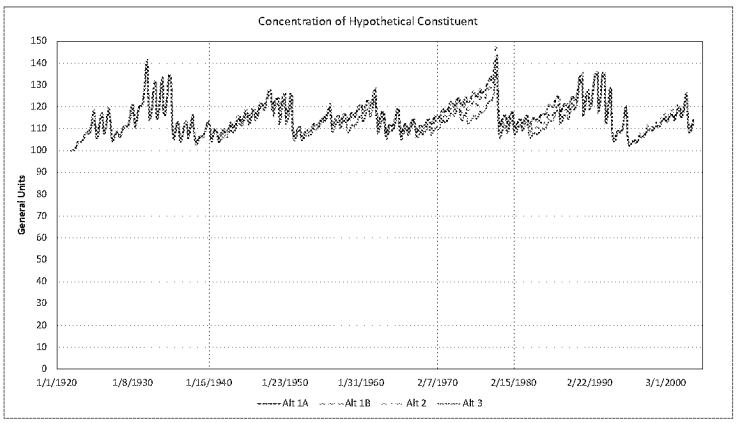
Reservoir Management Plan

- Purpose: describe the management of water resources in Sites Reservoir
- Water Quality: describe metrics, standards, testing and monitoring protocols, and outcomes
  - HABs
  - Methylmercury
  - Metals
  - Water Temperature
  - Salt and Minerals
- Releases: managed for agricultural and environmental
- Recreation and Fishery
- Vector and Invasive Species

Other notes about RMP:
- As described in Chapter 2 released by the Authority on 2/19 the Reservoir Management Plan is part of the project
- RMP describes the management of water resources in Sites Reservoir, including monitoring water quality, fisheries management, and vector management.
Protocols to respond to emerging water quality concerns, such as protocols for invasive aquatic weed control, potential adjustments to inflow and release volumes, minimum reservoir storage levels, and inlet/outlet port selection will be included.
Water quality metrics, standards, testing, and protocols would follow information and guidance available from the Central Valley regional board.
The full and final details of the RMP will not be established until after meetings and consultation with other parties.

Evapoconcentration

- Calculations using water balance information from CALSIM
- Increase in concentration limited by freshening due to release and refilling
- Most relevant to conservative constituents
- Average concentration approximately 13-16 percent higher than the inflow concentration
- Maximum of 41 – 48 percent depending on alternative



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In-Lake Analyses

Sites

Mercury Analysis

- Approach
  - Input sources
    - Diversions and local sources
  - Transformation processes
  - Comparison with similar/nearby reservoirs
    - Concentrations in surface waters and in fish tissues
    - Annual reservoir water level fluctuation
- Key Data Sources
  - California Environmental Data Exchange Network (CEDEN)
  - DWR Water Data Library
  - SWRCB 2017 – Reservoir TMDL draft staff report

Assessment area includes:
Funks Creek
Colusa Basin Drain
Sacramento River at diversion locations
Sacramento River ds of diversion locations
Yolo Bypass
Reservoirs include:
Clear Lake
Black Butte Reservoir
Indian Valley Reservoir
Lake Berryessa

Mercury – Sites Reservoir

- Total mercury
  - Estimated short-term and reasonable worst-case* short-term concentrations = 2.8 ng/L and 3.6 ng/L
  - Estimated long-term and reasonable worst-case long-term concentrations = 1.4 ng/L and 1.8 ng/L
- Mean total mercury in nearby reservoirs
  - 0.54 ng/L in Lake Oroville to 4.42 ng/L in Indian Valley Reservoir
- Total mercury concentrations would not exceed California Toxics Rule Objective (50 ng/L)

*"Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

Mercury – Sites Reservoir (cont)

- Aqueous Methylmercury
  - Sites expected short-term and reasonable worst-case short-term concentrations 0.16 ng/L and 0.24 ng/L
  - Sites expected long-term and reasonable worst-case long-term concentrations are 0.08 ng/L and 0.12 ng/L
- Mean methylmercury in nearby reservoirs
  - 0.011 ng/L in Lake Oroville to 0.093 ng/L in Indian Valley Reservoir
- Estimated fish tissue concentrations similar to other nearby reservoirs
  - Range from 0.32 – 0.85 mg/kg ww
  - Exceed CA sport fish objective (0.2 mg/kg ww in 350 mm largemouth bass)

Reasonable worst-case" is not necessarily the maximum concentrations that could occur at Sites but instead is an estimated upper bound of expected average concentration based on published literature and site-specific conditions.

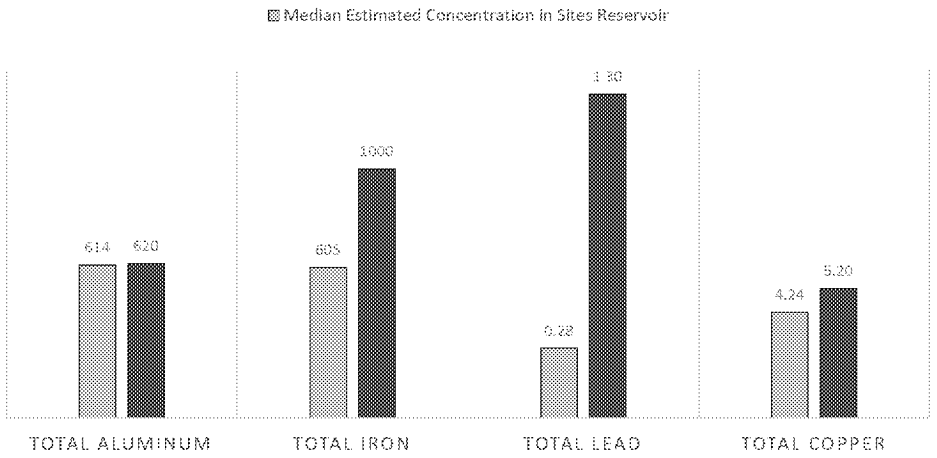
Mercury Mitigation and Management

- RMP and Mitigation Measure WQ-1.1, *Methylmercury Management*
  - Remove vegetation in inundation footprint prior to initial filling
  - Delay fish stocking- approx. 10 years after initial filling
  - Monitor reservoir fish tissue methylmercury
  - 4. Monitor and manage reservoir water chemistry according to methods proven feasible and effective at reducing mercury methylation
  - Post fish consumption warning signs if fish tissue methylmercury concentrations exceed CA sport fish objective
  - Implement methylmercury reduction actions for new reservoirs as identified in the implementation plan for Statewide Mercury Control Program for Reservoirs[a]
- Goal of reducing the methylation of mercury in Sites Reservoir

[a] SWRCB. 2017. *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs*

Slide placed here to be after the first mention of a significant mercury affect. Alternative location would be near the end of the presentation.

Other Metal Concentrations – Sites Reservoir



- Median estimated concentrations lower than chronic standard for aquatic life protection
  - Assumes some settling of suspended sediment and evapoconcentration
  - Effects would be less than significant

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Harmful Agal Blooms (HABs)

- HABs occur in many reservoirs including those near Sites (e.g., Black Butte)
- Sufficient nutrients and higher water temperatures (≥66 °F) in Sites Reservoir in May through September could create conditions conducive to formation and maintenance of HABs
- Reservoir Management Plan
  - Monitor for presence of HABs and, if found, cyanotoxins. Add warning signage if warranted
  - Coordinate with Water Board
  - Operate inlet/outlet tower to reduce likelihood of cyanotoxins in release

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John

Mixing Temperature – Sacramento River

Month	Mean Estimated Change in Water Temperature (ºF) from Sites Reservoir Releases in the Sacramento River	Median Estimated Change in Water Temperature (ºF) from Sites Reservoir Releases in the Sacramento River
January	--	--
February	--	--
March	--	--
April	-0.21	0
May	-0.26	-0.11
June	-0.12	-0.07
July	-0.12	-0.11
August	-0.28	-0.28
September	-0.12	-0.08
October	-0.15	0
November	-0.24	-0.08
December	-0.13	-0.12

- Slightly lower localized temperature in Sacramento River
- Range of temperature change: low of -1.1, high of 0.0

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Mercury – Stone Corral and Funks Creeks

- Mean mercury and methylmercury concentrations in the creeks would increase.
  - Long term increases lower than short term
  - Uncertainty of increase requires mitigation
- Significant effect – Levels could cause exceedances of the 0.2 mg/kg sport fish objective under certain reservoir conditions
  - Stone Corral Creek may be higher than Funks Creek due to difference in intake locations in reservoir
- Mitigation required
  - Mitigation Measure WQ-1.1, *Methylmercury Management*
  - Effect would remain significant and unavoidable due to uncertainty in effectiveness

Existing Funks Creek – 0.35 mean, 1.2 max ng/L
Stone corral Creek: 0.85 mean, 2.3 max ng/l

Mercury – Colusa Basin Drain

- Total Mercury
  - Mean concentrations in CDB at Knights Landing prior to 1998 was 8.6 ng/L and from 1999–2007 was 4.5 ng/L
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would not increase concentrations in the CBD or cause exceedances of the 50 ng/L CTR criterion
- Aqueous ~~Mercury and~~ Methylmercury
  - Sites Reservoir releases may temporarily increase aqueous and fish tissue methylmercury concentrations in the CBD
    - Mean concentrations in CDB at Knights Landing prior to 1998 was 0.17 ng/L and from 1999–2007 was 0.13 ng/L
    - Sites expected short-term and reasonable worst-case short-term concentrations 0.16 ng/L and 0.24 ng/L
    - Sites expected long-term and reasonable worst-case long-term concentrations are 0.08 ng/L and 0.12 ng/L
  - Significant Effect - Could cause exceedances of the sport fish objective (0.2 mg/kg ww)

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Mercury – Yolo Bypass

- Total Mercury
  - Existing mean total mercury in Yolo ~~b~~Bypass is 73.2 ng/L
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would not substantially increase concentrations in the bypass or cause exceedances of the 50 ng/L CTR criterion
- Aqueous ~~Mercury and~~ Methylmercury
  - Concentrations in the Yolo Bypass would not increase substantially
    - Existing mean methylmercury concentration in Yolo ~~b~~Bypass is 0.35 ng/L
    - Sites expected short-term and reasonable worst-case long-term concentrations (0.16 ng/L and 0.24 ng/L) are lower than Yolo Bypass
    - Sites expected long-term and reasonable worst-case long-term concentrations (0.08 ng/L and 0.12 ng/L) are lower than Yolo Bypass
- Fish Tissue Methylmercury
  - No long-term increases expected

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Mercury – Delta

- Total Mercury
  - Historical mean total mercury concentration entering the Delta from the Sacramento River is 4.5 ng/L at Freeport
  - Discharges from Sites would be not expected to exceed 3.6 ng/L
  - Would be diluted prior to entering Delta and below the 50 ng/L CTR
- Aqueous ~~Mercury and~~ Methylmercury
  - Concentrations in the Sacramento River at Freeport may increase measurably in Dry and Critical water years during release periods
    - Historical mean methylmercury concentration entering the Delta from the Sacramento River is 0.069 ng/L at Freeport
    - Sites expected short-term and reasonable worst-case long-term concentrations (0.16 ng/L and 0.24 ng/L)) are higher than Delta
    - Sites expected long-term and reasonable worst-case long-term concentrations (0.08 ng/L and 0.12 ng/L) are lower than Yolo
  - Significant Effect - Could cause exceedances of methylmercury TMDL in Dry and Critically Dry Water Years during release periods

Central Valley RWQCB methylmercury TMDL tissue concentration goal of 0.24 mg/kg ww for TL4 fish

Mercury Mitigation and Management

- Mitigation Measure WQ-1.1 *Methylmercury Management*
  - Remove vegetation in inundation footprint prior to initial filling
  - Delay fish stocking- approx. 10 years after initial filling
  - Monitor reservoir fish tissue methylmercury
  - Implement annual reservoir mercury monitoring program
  - Post fish consumption warning signs if fish tissue methylmercury concentrations exceed CA sport fish objective
  - Implement methylmercury reduction actions for new reservoirs as identified in the implementation plan for Statewide Mercury Control Program for Reservoirs[a]

[a] SWRCB. 2017. *Draft Staff Report for Scientific Peer Review for the Amendment to the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, Mercury Reservoir Provisions – Mercury TMDL and Implementation Program for Reservoirs*

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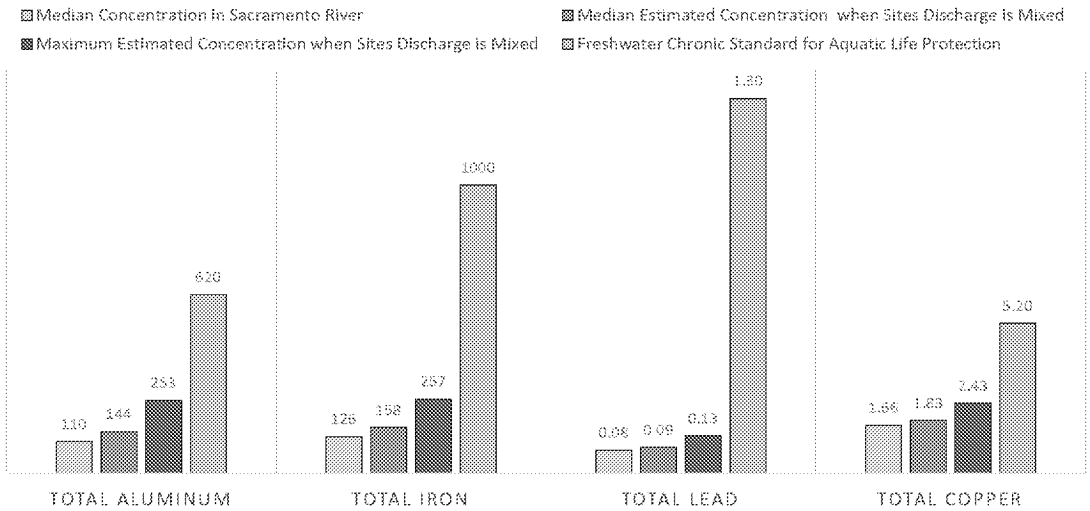
Other Metals – Sacramento River



- Calculated for the primary sites discharge season (May–September)
- Estimated discharge concentrations higher than median Sac River but lower than chronic standard for aquatic life protection

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Other Metals – Stone Corral Creek

- Operation could cause elevated concentrations of some metals in Stone Corral Creek
  - Related to intake location for Stone Corral Creek Discharge
- Significant effect – Levels could exceed water quality standards for the protection of aquatic life during the drier parts of the year.
- Mitigation required
  - Mitigation Measure Mitigation Measure WQ-2.1, *Prevent Metal Impacts in Stone Corral Creek Associated with Sites Reservoir Discharge*
    - Monitor metal concentrations to assess effect
    - Evaluate effect of modifying releases to Stone Corral Creek
    - Add vertical extension to reservoir at the withdrawal point
    - Pump water from the top of Sites Reservoir
  - Effect would be reduced to less than significant

Existing Funks Creek – 0.35 mean, 1.2 max ng/L
Stone corral Creek: 0.85 mean, 2.3 max ng/l

Other Metals – Yolo Bypass

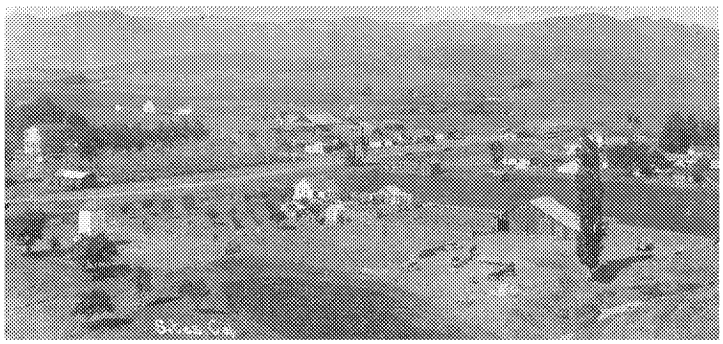
- Operation could cause elevated concentrations of some metals and pesticides in Yolo Bypass
  - Redirection of CBD water to Yolo Bypass during August–October
- Significant effect – Levels could exceed water quality standards for total aluminum, copper, and iron
- Mitigation required
  - Mitigation Measure Mitigation Measure WQ-2.2, *Prevent Net Detrimental Metal and Pesticide Effects Associated with Moving Colusa Basin Drain Water Through the Yolo Bypass*
  - Includes evaluation of metals and pesticide concentrations in Yolo Bypass to ensure net benefits for aquatic communities and discontinuing flows if shown otherwise
  - Effect would be reduced to less than significant

Draft_0023425

Open Topics and Action Items

Questions and Open Topics

- Any additional questions, thoughts or topics for the next meeting?
- Action item review



Draft_0023427

Thank you!

Sites

Temperature Model: CE QUAL W2

- CE QUAL W2
  - 2D Reservoir Temperature Model
  - Daily timestep
- Assumptions:
  - Reservoir size
  - Estimates surface area with storage volume
  - Considers I/O Tower
- Inputs
  - Daily flows from operations model (USRDOM)
  - Daily temperature from Sacramento River temperature model (HEC5Q)
  - Daily net evaporation rate (consistent with CalSim II)
- Outputs
  - Surface water temperature
  - Release temperature

Steve
Hydrodynamic and water quality model
Utilized for American River temperature modeling
longitudinal and vertical
2 ft layer height
Variable distances from I/O tower

Total Mercury Concentrations (ug/L)

Location	Station	n	Mean Concentration	Maximum Concentration	75th Percentile	Data Range (years)	Source
Funks Creek	Golden Gate	2	0.35	1.2	0.93	2006-2007	DWR Data Library
Stone Coral Creek	-	3	0.85	2.3	1.61	2007	DWR Data Library
Colusa Basin Drain	Knights Landing	26	8.6	19.3	10.8	1996-1998	USGS 2000
Colusa Basin Drain	Knights Landing	66	4.5	75	5.9	1999-2007	CEDEN
Sacramento River	Red Bluff	66	1.3	14.4	1.6	1999-2007	CEDEN
Sacramento River	Hamilton City	66	2.2	54	2.6	1999-2016	CEDEN
Sacramento River	Freeport	217	4.5	89	8.8	1994-2015	CEDEN
Yolo Bypass	Prospect Slough	28	73.2	696	-	1995-2003	Central Valley RWQCB 2010

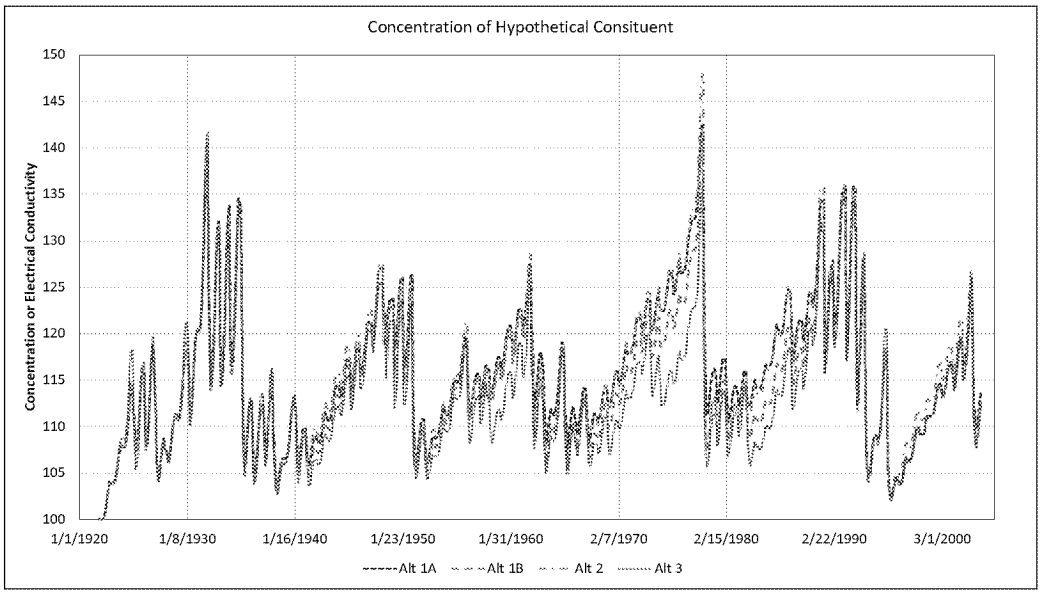
Evaporation and Seepage???

- Long-term average evaporative losses are 27 TAF per year
  - Roughly 10% of the long-term average annual diversion volume
- Seepage losses would be roughly 2,150 gallons per minute, or 3.5 TAF per year,
  - Calculated under the larger 1.8 MAF reservoir
  - Would decrease under 1.5 MAF Alternative
  - Volume of loss to seepage is within 1–2% of the long-term average annual diversion

Draft_0023432

Evapoconcentration

- Calculations using water balance information from CALSIM



Draft_0023433

Other Metals

- Calculations include:
  - Improved estimation of inflow concentration (based on both flow at Keswick and Keswick/Bend Bridge)
  - Evapoconcentration
  - With some settling of suspended sediment

Draft_0023434

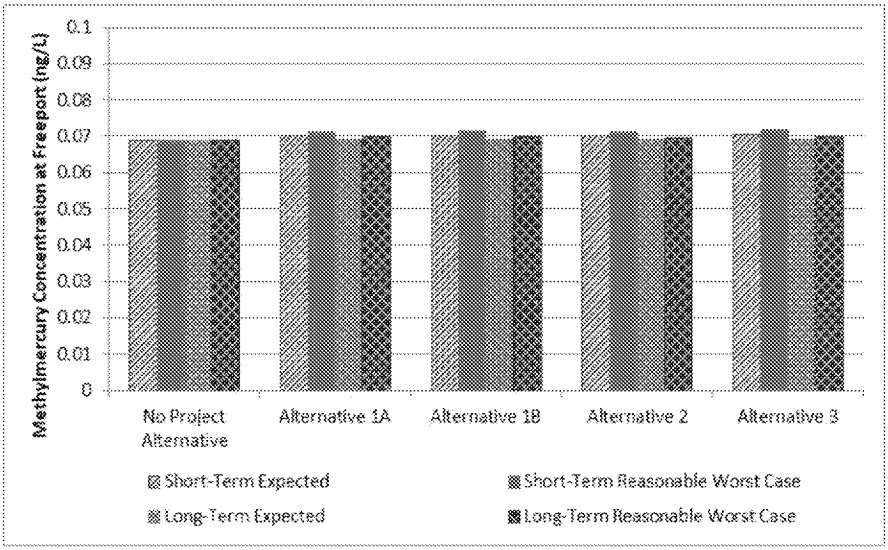
Average Metal/Metalloid Concentrations

- Units are in micrograms per liter
- No available data for Funks Creek
- Source for Stone Corral Creek and Sacramento River = DWR Water Data Library. See Slide 14
- Source for groundwater is DWR NODOS study (2007)

Metal/Metalloid	Stone Corral Creek	Groundwater in Sites Reservoir Footprint	Sacramento River at Intake Locations
Dissolved Aluminum	149	3	94
Total Aluminum	562	12	359
Dissolved Arsenic	2.8	0.7	1.5
Total Arsenic	3.1	0.8	1.6
Dissolved Cadmium	0.05	0.02	0.03
Total Cadmium	0.06	0.05	0.04
Dissolved Chromium	2.9	2.6	0.7
Total Chromium	4.0	3.3	1.4
Dissolved Copper	2.8	2.7	1.3
Total Copper	3.9	3.4	2.3
Dissolved Iron	123	7	67
Total Iron	512	81	426
Dissolved Lead	0.08	0.12	0.03
Total Lead	0.31	0.27	0.20
Dissolved Manganese	12	18	2
Total Manganese	37	21	15
Dissolved Nickel	2.8	1.0	1.3
Total Nickel	4.0	1.3	2.2
Dissolved Selenium	6.1	4.6	1.2
Total Selenium	6.7	5.0	0.2
Dissolved Silver	0.03	0.00	0.01
Total Silver	0.05	0.01	0.03
Dissolved Zinc	1.4	112.5	0.9
Total Zinc	3.7	115.2	3.8

Anne

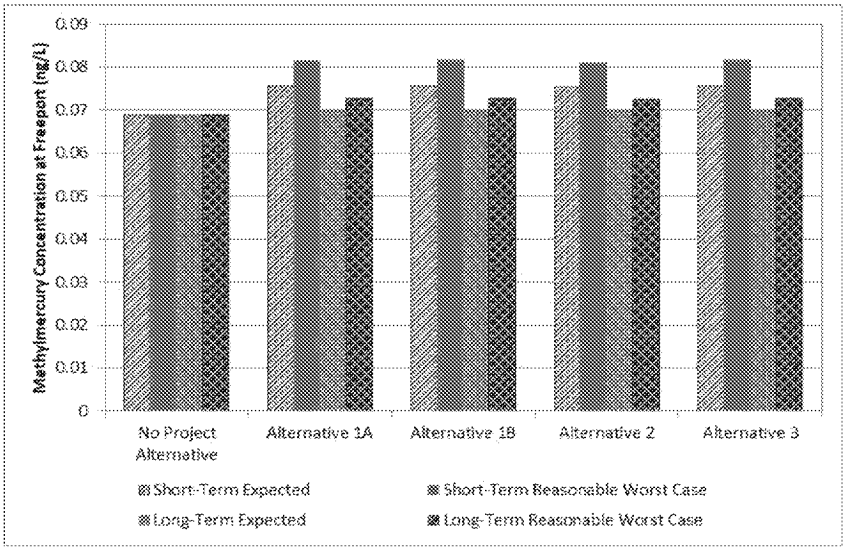
Methylmercury Concentrations at Freeport: Annual Average Flows



- Estimated Aqueous Methylmercury Concentrations at Freeport for Annual Average Flows – Long term increase of up to 4% increase over baseline

RWQCB model results for aqueous and fish tissue methylmercury concentrations

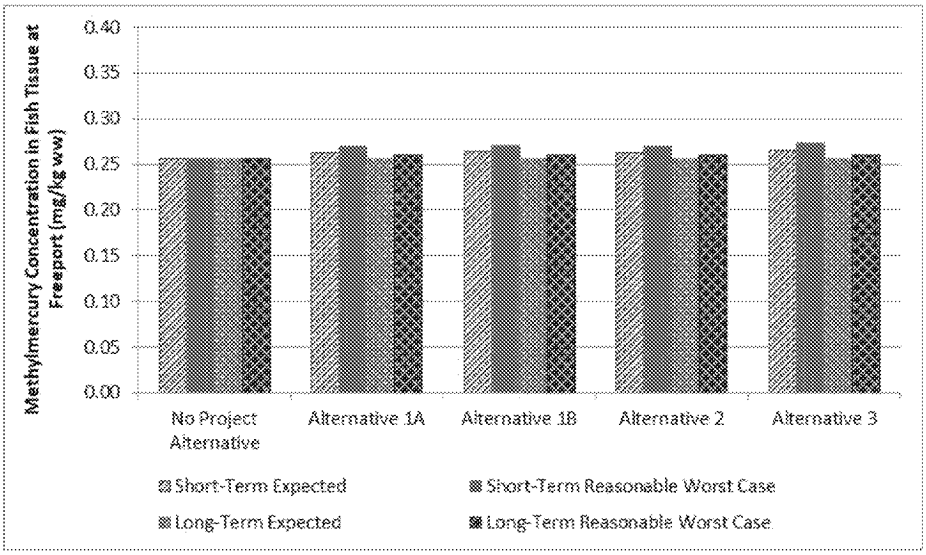
Methylmercury Concentrations at Freeport: Dry and Critical Years



- Estimated Aqueous Methylmercury Concentrations at Freeport for Mean Monthly Flows in May–November of Dry and Critically Dry Water Years – Long term increase of up to 5% increase over baseline

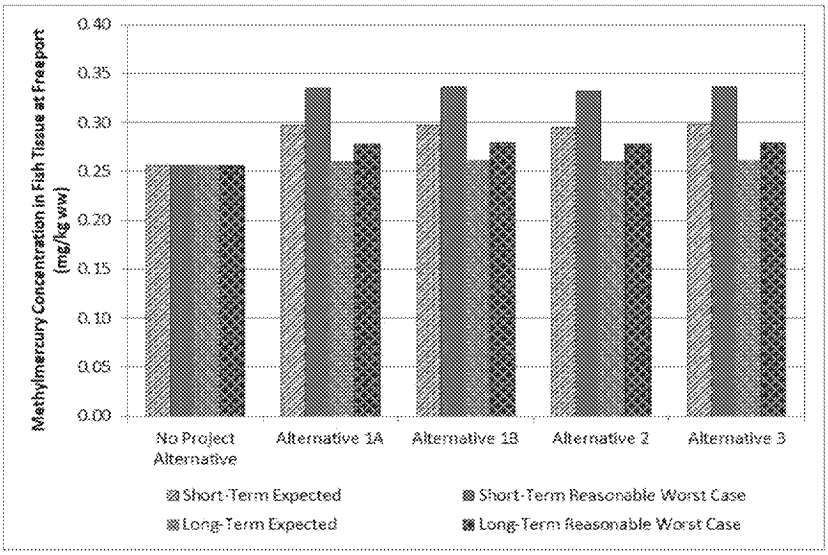
RWQCB model results for aqueous and fish tissue methylmercury concentrations

Fish Tissue Methylmercury at Freeport : Average Annual Flows



- Estimated Fish Tissue Methylmercury Concentrations at Freeport for Annual Average Flows – Long term increase of up to 6% increase over baseline

Fish Tissue Methylmercury at Freeport: Dry and Critical Years



- Estimated fish tissue methylmercury concentrations at Freeport for dry and critical years

Draft_0023439

Other Topics: Salt Pond

- Salt Pond Evaluation:
  - Not expected to have substantial water quality effects
  - Conservatively assumed no decrease in spring discharge
  - Fate of spring discharge:
    - Full mixing of 0.1 cfs for a year into a volume of 200 TAF would represent 0.04 percent of the total volume (EC increase from 130 µS/cm to between 133 – 208 µS/cm)
    - Accumulation at bottom of reservoir due to higher density (74 years to reach low-level intake)
- Reservoir Management Plan
  - Measure EC in springs before construction
  - Measure EC in reservoir after inundation

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Other Topics: Salt Pond

- Salt Pond Evaluation:

Estimated Electrical Conductivity (EC in µS/cm) of reservoir release assuming 0.1 cfs salt spring flow is continually mixed with reservoir release and that Sacramento River EC is 130 µS/cm.

Spring EC	Reservoir Release (cfs)	
(µS/cm)[a]	10 cfs	1,200 cfs
7,200	201	131
194,100	2,070	146

[a] Spring EC between these two values.

Draft_0023441

From: Molly West [mwest@colusa-nsn.gov]
Sent: 3/15/2023 5:08:40 PM
To: Janis Offermann [janis@horizonh2o.com]; Jennie Mitchum [jmitchum@colusa-nsn.gov]
CC: Execs [Execs@colusa-nsn.gov]; Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Hi Janis,

The Executive Committee would like to meet with you and your team. Our schedule is pretty busy the next couple of weeks. I would like to propose Tuesday, April 4th at 10am?

Thank you,

Molly West
Tribal Administrator
Colusa Indian Community Council
3730 Hwy 45
Colusa, CA 95932
Phone (530) 458-6517
Cell (530) 701-0379
Fax (530) 458-3866

From: Janis Offermann [mailto:janis@horizonh2o.com]
Sent: Wednesday, March 8, 2023 12:52 PM
To: Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Molly West <mwest@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Hi Jennie
I hope you are settling into your new position as Cultural Preservation Officer. I imagine you are very busy coming up to speed on everything, but I thought I would reach out to see if you had a chance to consider when there might be time when you and your tribal leadership can meet with the Site Project Authority about the Sites Reservoir Project. We would value your input regarding tribal cultural resources and establishing the Tribal Working Group.
Please feel free to contact me if you have any questions.
Thanks
Janis

Janis Offermann, MA, RPA
Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

From: Jennie Mitchum <jmitchum@colusa-nsn.gov>
Sent: Monday, February 27, 2023 5:14 PM
To: Janis Offermann <janis@horizonh2o.com>
Subject: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Good evening,
I Apologize for not responding sooner, I'm getting to know how to do things please have patience with me.

Thank you
Jennie Mitchum
Cultural Preservation Director
(530)868-8590

From: Janis Offermann <janis@horizonh2o.com>
Sent: Monday, February 27, 2023 3:19 PM
To: Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Molly West <mwest@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Hi, Jennie
I am writing on behalf of the Sites Project Authority (Authority). The Colusa Indian Community formally requested AB 52 consultation with the Authority for the Sites Project in 2017. The Authority met with tribal leaders several times prior to the pandemic, but we have not had the opportunity to meet in quite some time. With your arrival, along with changes in tribal leadership, we are hoping to resume meeting about the project. We thought that an initial meeting would be beneficial to bring you, and any of the tribal leadership who would like to attend, up to date on the status of the project and to discuss next steps for Colusa's involvement in the project.

If such a meeting is agreeable to you, please provide several available dates and times that work for you. The Authority can set up a virtual call or, if you prefer, we are happy to meet in person.
We look forward to meeting with you.

Best regards
Janis

Janis Offermann, MA, RPA
Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

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From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/15/2023 8:13:54 PM
To: Erecius, Lesa [Lesa.Erecius@icf.com]; Spranza, John [john.spranza@hdrinc.com]
CC: Huber, Anne [Anne.Huber@icf.com]; Briard, Monique [Monique.Briard@icf.com]; Harris, Melissa [Melissa.Harris@icf.com]
Subject: RE: Draft WQ PowerPoint for tomorrow.

Thanks John. Just 2 suggestions below.

Slide 12- we need a legend on the graphics for what the darker color column represents

At the start of the discharge section, we should show a map of the region and explain how water comes out and moves around. I don't think they fully appreciate that there is 40+ miles of canal, 10 miles of pipeline and then 10+ miles of the Colusa Basin Drain before this water gets into the Sacramento River. We might need to refer to this slide a few times as we kind of jump around in the discharge discussion (which I don't think we can prevent), but we need to keep orienting them to what we are talking about.

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: Erecius, Lesa <Lesa.Erecius@icf.com>
Sent: Wednesday, March 15, 2023 4:53 PM
To: Spranza, John <john.spranza@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Huber, Anne <Anne.Huber@icf.com>; Briard, Monique <Monique.Briard@icf.com>; Harris, Melissa <Melissa.Harris@icf.com>
Subject: RE: Draft WQ PowerPoint for tomorrow.

John-

I double-checked the Hg/MeHg results just in case. They all looked updated. I have left a few comments in bubbles and a few suggested revisions in highlighted red text.

-Lesa

From: Huber, Anne <Anne.Huber@icf.com>
Sent: Wednesday, March 15, 2023 4:23 PM
To: Spranza, John <John.Spranza@hdrinc.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Erecius, Lesa <Lesa.Erecius@icf.com>
Subject: RE: Draft WQ PowerPoint for tomorrow.

Hi John,

I added some comments bubbles and proposed changes in the attached file – mostly related to updating results.
Proposed changes to the slides are in yellow highlights.
Lesa will likely have separate input regarding mercury and HABs.

I will be heading out to catch the bus in 8 minutes, but can be back online later this evening if you have any questions.
Thanks,
-Anne

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Wednesday, March 15, 2023 2:56 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Erecius, Lesa <Lesa.Erecius@icf.com>; Huber, Anne <Anne.Huber@icf.com>
Subject: Draft WQ PowerPoint for tomorrow.

Hi,
Attached is the draft for tomorrow's NGO meeting, I'm still backchecking the mercury slides, but it is at 95% so please feel free to provide comments or questions on this version.
Thanks,
John

John Spranza, MS, CCN
Senior Ecologist / Regulatory Specialist
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: 3/15/2023 9:01:05 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Spranza, John [john.spranza@hdrinc.com]; Angela Bezzone [bezzone@mbkengineers.com]
Subject: Re: CDFW Group 2 Comments on the Admin Final EIR-EIS

Yes, understood. There are several more comments so just need the water rights team to review and confirm so we can provide direction to ICF.

On Mar 15, 2023, at 6:27 PM, Alicia Forsythe <aforsythe@sitesproject.org> wrote:

Laurie - we can go through these comments on a focused call. But the WAA is not part of the Final EIR/EIS. I see these comments as being really on the WAA Report. And not comments that would result in changes to the Final EIR/EIS. This may not be true of all of the state boards comments. But at least these three in your email don't result in changes to the Final EIR/EIS.

Ali

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

---

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Wednesday, March 15, 2023 9:47:20 AM
To: Spranza, John <john.spranza@hdrinc.com>; Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: CDFW Group 2 Comments on the Admin Final EIR-EIS

Hi John,

I think it may be self-evident as you look at the comments. For instance, the SWB comments include:

- Under TRR description: "If GCID max diversion is 2,000 cfs, does this 1,800 cfs constraint further limit the Sites divertible yield? If so, project yields need to be recalculated."
- Under I/O Works description: "This is well below the 2,000 + 2,200 cfs. If affecting divertible yield, these values should be updated in the WAA."
- Under Diversions to Sites Reservoir: "The WAA results for project yield are not consistent with his value after losses (WAA reflects yields at 4,200 cfs)."

We will need to resolve these issues soon to meet schedule and, I assume, meet SWB needs.

Laurie

From: Spranza, John <John.Spranza@hdrinc.com>
Sent: Tuesday, March 14, 2023 3:18 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: CDFW Group 2 Comments on the Admin Final EIR-EIS

We should probably chat about what Angela and I need to do with the comments. We have the state board ones too and I'm not sure what the next step is with these.

John Spranza

D 916.679.8858 M 818.640.2487

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, March 14, 2023 11:44 AM
To: Spranza, John <John.Spranza@hdrinc.com>; Angela Bezzone <bezzone@mbkengineers.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: FW: CDFW Group 2 Comments on the Admin Final EIR-EIS

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 Ali, Angela and John,

CDFW has uploaded their comments on the Group 2 chapters, appendices and relevant responses to comments. I've uploaded their comments to SharePoint: CDFW Group 2 Comments. These are available should you want to start revieing comments prior to live edit meetings schedule for next week.

I will be going through comments as well and will try to pull together a list of key issues raised.

Thank,

Laurie

From: Williams, Jonathan@Wildlife <Jonathan.Williams@wildlife.ca.gov>
Sent: Tuesday, March 14, 2023 11:21 AM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>; aforsythe@sitesproject.org
Cc: Davis-Fadtke, Kristal@Wildlife <Kristal.Davis-Fadtke@wildlife.ca.gov>; Miller, Kathleen A.@Wildlife <Kathleen.Miller@Wildlife.ca.gov>
Subject: CDFW Group 2 Comments

Hi Laurie,

CDFW's comments for the Group 2 Admin Draft Final EIR/EIS documents have been uploaded to the Sites sharepoint.

Thanks,
Jon

Jonathan Williams
Senior Environmental Scientist (Specialist)
California Department of Fish and Wildlife – Water Branch
1010 Riverside Parkway, West Sacramento, CA. 95605
Jonathan.williams@wildlife.ca.gov
(916) 936-5433

Maxwell Intertie 2018 v. 2022 Technical Memorandum

To:	Sites Authority
CC:	Ali Forsythe
Date:	March 15, 2023
From:	Laurie Warner Herson
Quality Review:	Henry Luu
Authority Agent Review:	Ali Forsythe
Subject:	Comparison of Key Features and Associated Environmental Impacts of the Maxwell Intertie Project in 2018 as Opposed to 2022

1.0 Introduction

In 2018 the Sites Project Authority (Authority) applied for a U.S. Department of Agriculture, Rural Development (USDA) Rural Development Community Facilities direct loan to assist in the financing of the construction of the proposed Maxwell Water Intertie (MWI) facilities, located in Colusa County, California. The proposed MWI facilities would connect the existing Tehama Colusa Canal (TC Canal), owned by the U.S. Bureau of Reclamation (Reclamation) and operated by the TCC Authority (TCCA), and the existing Glenn Colusa Irrigation District's (GCID) Main Canal to increase water management flexibility and improve water supply resiliency for Authority participants during dry years. The MWI would also increase the efficiency and reliability of water management in the western Sacramento Valley. The Authority would construct, own, and operate the MWI.

In parallel, the Authority has undertaken planning and preliminary design of the Sites Reservoir Project. This project consists of an offstream reservoir to capture excess water from major storms and store the water until it is most needed during dry periods. The Project would use existing infrastructure to divert unregulated and unappropriated flow from the Sacramento River at the TCCA Red Bluff Pumping Plant and GCID Hamilton City Pump Station and convey water to a new offstream Sites Reservoir west of the community of Maxwell, California. New and existing facilities would move water into and out of the reservoir. Releases from Sites Reservoir would ultimately return to the Sacramento River system via existing canals and a new pipeline located near Dunnigan, California. If approved and constructed, the Sites Reservoir Project would encompass the components and of the MWI.

The purpose of this technical memorandum (TM) is to compare the MWI as defined in 2018 with the MWI components that are now part of the Sites Reservoir Project. This TM also provides a comparison of the impacts and mitigation measures that have been identified in the environmental documents for the two projects.

2.0 Comparison of MWI Components

As illustrated in Figure 1, the 2018 MWI Project (USDA 2018) proposed a GCID Terminal Regulating Reservoir (TRR) Complex, including the TRR, consisting of the inundation area and the berm that would

Draft_0023449

form the reservoir; the TRR Pumping Plant; the GCID Main Canal connection to the TRR; a private bridge across the GCID Main Canal to provide access from the TRR to the MWI pipeline corridor; and the MWI pipeline and pipeline maintenance gravel access road. The TRR would be located to the east of the GCID Main Canal with the pipeline connecting to the TCC through the existing Funks Reservoir.

Figure 2 provides an overview of the 2022 conceptual design for the MWI, including a new site layout. The Project continues to propose the TRR but relocates it to the west side of the GCID Main Canal. Inlet/Outlet (I/O) Structures would connect the TRR with the GCID to the east and via a pipeline to the TCC I/O to the west. The proposed TRR Pumping Generating Plant would provide incidental power generation when water flows from the GCID Main Canal to the TCC.

Table 1. provides a comparison of the conceptual design from 2018 with the conceptual design as envisioned in 2022, illustrating both the similarity and evolution of design since 2018.

Table 1. Project Components in 2018 and 2022

Component	2018 Description	2022 Description
TRR	130 acres, 1,200 acre-feet (af) capacity	140 acres, 600 af capacity; relocated to the west side of the GCID Main Canal
TRR Pumping/Generating Plant (PGP)	900 cubic feet per second (cfs) maximum pumping capacity	1,800 cfs pumping capacity; incidental generation of hydropower; energy dissipation structure; generating plant capacity of 1,000 cfs
TRR Power Transmission Lines, Substation and PG&E Interconnection	1-acre electrical switchyard adjacent to the TRR PGP; 3.5-mi power line	Electrical substation, transmission power lines, and a point of interconnection (POI) to existing Pacific Gas and Electric (PG&E) transmission lines
Maxwell Intertie Pipeline	3.5-mile pipeline sized for 900 cfs pumped capacity and 900 cfs gravity flow capacity	3,100 foot long, 12-foot diameter pipeline between the TRR PGP and the TCC I/O structure
Connections	GCID Main Canal Connection to TRR including gated inlet control structure, short inlet channel, and concrete canal lining in the GCID Main Canal upstream and downstream of the TRR connection	Four inlet/outlet (I/O) structures, three connecting to the GCID Main Canal and one connecting to the TCC
Access	2.7-mile gravel access road parallel to pipeline	Access via the TRR Road to existing Funks Reservoir

The intended goals of the MWI Project are to (1) provide for the transfer of water between the GCID Main Canal and the TCC and (2) increase GCID system reliability by making available the storage within the existing Funks Reservoir and within the TCC prism as an additional regulating pool for GCID operations. Transfer capability would increase water supply resiliency and reliability for participating water agencies, providing a direct benefit to agriculture and an indirect benefit to rural communities (Sites Project Authority 2023).

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3.0 Environmental Process

The following provides a brief summary of the environmental review process that has taken place to date for the 2018 MWI and the Sites Reservoir Project.

3.1 2018 MWI NEPA Process

The granting of a loan from the USDA to assist in the financing of the Maxwell Water Intertie Project is a federal action, subject to the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality's (CEQ) regulations for implementing NEPA, and USDA's NEPA implementing regulations, Environmental Policies and Procedures.

In 2018, the USDA completed an independent analysis of an environmental report prepared by the Authority and its consultant and concurred with its scope and content. USDA adopted the report and issued it as the Agency's Environmental Assessment (EA) for the proposed MWI, finding it consistent with federal regulations and that it met the standards for an adequate assessment. USDA released the Draft EA for public review in August 2018. A Final EA (USDA 2018) was completed in September 2018 and includes the USDA Finding of No Significant Impact (FONSI), dated September 24, 2018.

As noted in the the FONSI, "following completion and approval of additional analyses to refine the size of the project, additional details of the financing and participation and any other details (including an analysis compliant with the California Environmental Quality Act (CEQA) and permit applications) the Authority would construct, own, and operate a water intertie between two regional canal systems."

3.2 Sites Reservoir Project CEQA and NEPA Process

In 2017, the Authority and Reclamation prepared a joint Public Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) for the Sites Reservoir Project, in compliance with CEQA and NEPA, respectively. The Sites Reservoir Project would be constructed, owned, and operated by the Authority with partial federal funding. The 2017 Draft EIR/EIS evaluated four alternatives that varied in reservoir size and conveyance facilities but generally within the same footprint. The 2017 Draft EIR/EIS was circulated for public review between The Draft EIR/EIS was initially made available for public review from August 14, 2017, to November 13, 2017. This review period was ultimately extended to January 15, 2018, to accommodate additional public review and comments.

In October 2019, the Authority initiated a value planning process to identify and evaluate additional alternatives that could make the Project more affordable while also addressing comments received on the 2017 Draft EIR/EIS. In November 2021, the Authority and Reclamation issued a Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS) to reflect changes to the Project that have occurred since the issuance of the 2017 Draft EIR/EIS and alternatives identified during the Value Planning Process. The RDEIR/SDEIS (Sites Project Authority 2021) includes a complete revision of the 2017 Draft EIR/EIS and was circulated for public review and comment between November 12, 2021, and January 28, 2022. The Authority and Reclamation are in the process of preparing the Final EIR/EIS, anticipated for release in mid-2023.

The Sites Reservoir Project as analyzed in the Draft EIR/EIS and the RDEIR/SDEIS includes the Terminal Regulating Reservoir (TRR) Complex: GCID Main Canal Modifications, GCID Main Canal Connection, TRR, TRR Pumping/Generating Plant and Electrical Switchyard, and TRR Pipeline and Road.

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3.3 Environmental Impacts and Mitigation

The 2018 MWI EA (USDA 2018) identified the following impacts associated with the future construction and operation of the MWI Project:

Land Use

Construction of the proposed project would lead to conflicts with local land use and zoning plans. The Authority will work with Colusa County to request modifications or amendments to their general plans and zoning ordinances to ensure consistency with project land uses.

Geology and Paleontological Resources

Two geologic units underlying the resource study area (RSA) have the potential to contain paleontological resources or have undetermined sensitivity for paleontological resources. If fossils are present in the project area, they could be damaged during ground-disturbing construction activities, such as excavation for foundations for the pumping plants, trenching for the pipeline, and grading for road construction.

Air Quality and Climate Variability

The primary emissions generated from construction and operation of the proposed project would include exhaust emissions from construction equipment and vehicles, as well as fugitive dust emissions from site disturbance during construction. Operation of the proposed project is anticipated to generate greenhouse gas emissions, which would represent a small fraction of state, national, and global emissions.

Water Resources

Excavation activities during construction of the proposed project have the potential to expose the groundwater table. While standing water would be pumped out of excavated areas, contamination of groundwater could result from construction activities because heavy machinery could be used in wet soils or in adjacent areas where sheet flows could carry contaminants to soils in the groundwater table. In addition, inadvertent spills or leaks of fuels, oils, and solvents could occur from machinery and vehicle use during construction or from maintenance activities and equipment use during operation. Improper handling, storage, or disposal of these materials in the vicinity of excavated areas could cause degradation of groundwater quality.

Biological Resources

Wildlife and Special-Status Species Noise and dust generated during construction could directly affect adult valley elderberry longhorn beetle (VELB) or exposed larvae or eggs within 165 feet of the project footprint. Construction of the proposed action could result in potential disturbance or mortality of California red-legged frog and permanent and temporary removal of California red-legged frog upland habitat. Disturbance or degradation of suitable aquatic habitat for giant gartersnake in or adjacent to the project footprint could occur from fuel or oil leaks or spills during construction activities. Activities could result in direct mortality, injury, or disturbance of nests of giant gartersnakes. During construction of the proposed project, temporary habitat loss, of which the majority is agriculture, annual grassland and reservoir, and permanent habitat loss, of which the majority is agriculture land, would occur.

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Vegetation and Special-Status Plants

The changes to vegetation from construction of the proposed action would include both temporary and permanent removal of vegetation. Construction would cause land disturbance that could increase the risk of the introduction of new invasive plant species or the spread of existing invasive plant populations into uninfected areas.

Wetlands

Potential jurisdictional wetlands within and immediately adjacent to the project footprint could be indirectly affected by water runoff, dust, and inadvertent release of pollutants.

Aesthetics and Visual Resources

Construction of the project would create direct long-term changes to visual resources. Construction and operation of the proposed project would affect sensitive viewers and result in the conversion of existing land uses. The project would also introduce discordant visual elements into the landscape and result in substantial degradation of existing form, line, color, and texture of the visual landscape and substantial degradation of scenic vistas and views from scenic highways.

Mitigation to reduce the impacts of the MWI Project were identified in the 2018 MWI EA and FONSI and are listed in Attachment A. The FONSI (USDA 2018) concluded that:

> The analyses in the EA determined that the proposed Project would have no direct or indirect adverse effect on cultural resources; noise; transportation; human health and safety; public services and utilities; socioeconomics; and environmental justice. The proposed project would not contribute to significant cumulative effects on any of the resources evaluated in the EA.

The FONSI also noted that the Authority is responsible for implementing the mitigation measures. Attachment A provides a comparison of the mitigation measures identified in the 2017 EA with those that are being proposed for the Sites Reservoir Project. The mitigation measures are generally consistent between the two projects and, in many cases, are the same. All have the same intent.

4.0 Conclusions

The Sites Reservoir Project encompasses the components of the MWI Project and the Authority has analyzed the potential impacts of implementing the MWI within the context of the RDEIR/SDEIS and ongoing preparation of the Final EIR/EIS. If certified, the Authority may rely on the Sites Reservoir Final EIR/EIS during the decision process for the MWI Project.

5.0 Citations

Sites Project Authority. 2023. Draft Maxwell Intertie Comparison Technical Memorandum. January.

Sites Project Authority. 2021. Sites Reservoir Project Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement. November.

U.S. Department of Agriculture. 2018. Final Environmental Assessment and Finding of No Significant Impact, Maxwell Intertie Project, Colusa County, California. September (FONSI dated September 24, 2018).

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Attachment A
Maxwell Water Intertie Project 2018 EA Mitigation Measures
Compared to Sites Reservoir Project EIR/EIS Mitigation Measures

2018 MWI EA Mitigation Measure	2021 Sites Reservoir Project RDEIR/SDEIS	Comparison
LAND USE		
LU-MM-1: Prior to the start of construction, the Authority will work with Colusa County to request modifications or amendments to their general plans and zoning ordinances to ensure consistency with project land uses.	**Addressed in Chapter 14, *Land Use*** **Section 14.4**: Coordination between the Authority and Glenn and Colusa Counties would occur regarding general plans and/or zoning ordinances.	Consistent
GEOLOGY AND PALEONTOLOGICAL RESOURCES		
PALEO-MM-1a: At least 90 days prior to the start of construction, the Authority and USDA will retain a qualified Paleontological Resource Specialist, in addition to Paleontological Resource Monitors to monitor construction activities.	**Addressed in Chapter 12, *Geology and Soils*** **Mitigation Measure GEO-7.1:** Retain a Qualified Paleontological Resource Specialist Prior to the Start of Construction	Consistent
PALEO-MM-1b: At least 30 days prior to the start of and during construction, the Authority will consult with the Paleontological Resource Specialist. The Authority will provide maps or drawings to the Paleontological Resource Specialist that show the planned construction footprint and the locations of ground disturbances affecting paleontologically sensitive sediment.	**Addressed in Chapter 12, *Geology and Soils*** **Mitigation Measure GEO-7.2:** Consultation with the Paleontological Resource Specialist Prior to and During Project Construction	Consistent
PALEO-MM-1c: The Authority will ensure that the Paleontological Resource Specialist prepares a Paleontological Resources Monitoring and Mitigation Plan (PRMMP), which will be approved prior to ground disturbance. The PRMMP will function as the formal guide for paleontological resources monitoring, collecting, and sampling activities, and as the basis for discussion when on-site decisions or changes are proposed.	**Addressed in Chapter 12, *Geology and Soils*** **Mitigation Measure GEO-7.3:** Prepare and Implement a Paleontological Resources Monitoring and Mitigation Plan	Consistent

PALEO-MM-1d: Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the Paleontological Resource Specialist will prepare, and the Authority will conduct, weekly paleontological resources awareness training for project managers, construction supervisors, forepersons, and general workers involved with or who operate ground-disturbing equipment or tools.	**Addressed in Chapter 12, *Geology and Soils*** **Section 12.3:** "BMP-33, Implementation of a Worker Environmental Awareness Program (WEAP), requires training of all construction crews and contractors on protection and avoidance of biological, cultural, archaeological, paleontological, and other sensitive resources."	Consistent
PALEO-MM-1e: During construction, the Authority will ensure that the Paleontological Resource Specialist and Paleontological Resource Monitor(s) monitor construction excavations consistent with the PRMMP in areas where potential fossil-bearing materials have been identified, both at reservoir sites and along any constructed linear facilities associated with the proposed action. The Authority and USDA will ensure that the Paleontological Resource Specialist prepares and submits monthly summaries of monitoring and other paleontological resources management activities.	**Addressed in Chapter 12, *Geology and Soils*** **Mitigation Measure GEO-7.4:** Conduct Monitoring During Project Construction and Prepare Monthly Reports	Consistent
PALEO-MM-1f: The Authority through the designated Paleontological Resource Specialist, will ensure that all components of the PRMMP are performed during construction.	**Addressed in Chapter 12, *Geology and Soils*** **Mitigation Measure GEO-7.5:** Ensure Implementation of the Paleontological Resources Monitoring and Mitigation Plan	Consistent
AIR QUALITY AND CLIMATE VARIABILITY		
AQ-MM-1: The project applicant will develop and implement a Fugitive Dust Control Plan to reduce fugitive dust and particulate matter generated during construction.	**Addressed in Appendix 2D, *Best Management Practices, Management Plans, and Technical Studies* and Chapter 20, *Air Quality*** **Section 20.3:** "BMP-28, Preparation and Implementation of Fugitive Dust Control Plans, will minimize fugitive dust emissions. The plans will outline measures to be implemented, such as the following measures that have been incorporated in the modeling analysis: using soil stabilizers or surfactants and watering exposed soil. Other measures that cannot be reliably quantified but would minimize dust emissions will also be	Consistent

	included in the plans and include washing vehicles before exiting the construction site and protecting disturbed areas following construction."	
AQ-MM-2: The project applicant will develop and implement an Exhaust Reduction Plan to reduce equipment and vehicle exhaust emissions during construction of the proposed action.	**Addressed in Appendix 2D, *Best Management Practices, Management Plans, and Technical Studies* and Section 20.3:** "BMP-27, Development and Implementation of a Construction Equipment Exhaust Reduction Plan, will minimize exhaust emissions from off-road equipment by the Authority ensuring the equipment used to construct Project facilities is equivalent to Tier 4 standards…"	Consistent
WATER RESOURCES		
WR-MM-1: The Authority or its contractor will develop and implement a Spill Prevention, Control, and Countermeasure Plan to minimize the potential for and effects from spills of hazardous, toxic, and petroleum substances during construction and operation activities. The Authority will review and approve the SPCCP before onset of construction activities and routinely inspect the construction area to verify that the measures specified in the SPCCP are properly implemented and maintained.	**Addressed in Appendix 2D, *Best Management Practices, Management Plans, and Technical Studies* and Chapter 6, *Surface Water Quality*** **Section 6.3.1:** "BMP-13, Development and Implementation of Spill Prevention and Hazardous Materials Management/Accidental Spill Prevention, Containment, and Countermeasure Plans (SPCCPs) and Response Measures, requires implementation of site-specific plans with measures to minimize or avoid hazardous materials spills during construction and operation/maintenance, procedures for the cleanup and disposal of hazardous materials spills, emergency response and spill containment training, and other related best management practices."	Consistent
WR-MM-2: An engineered No-Rise certificated completed to FEMA standards will be prepared prior to any excavation work being done in the 100 year flood plain	**Addressed in Chapter 5, *Surface Water Resources*** **Section 5.6:** "Project alternatives would not substantially increase flooding on site or off site as compared to the No Project Alternative. In addition, the Project would provide direct flood control benefits within the Stone Corral Creek and Funks Creek watersheds by reducing the size of the floodplain within the region. Construction effects of Alternatives 1, 2, and	

	3 would not be adverse and operation effects of Alternatives 1, 2, and 3 would be beneficial."	
WR-MM-3: Complete delineation of any potential wetlands in the APE will be completed by a qualified wetland expert. No construction in any wetland will be allowed that will result in the permanent loss of wetlands as restricted by the ConAct.	**Addressed in Chapter 9, *Vegetation and Wetland Resources*** **Mitigation Measure VEG-3.1:** Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities	Consistent
BIOLOGICAL RESOURCES		
BIO-MM-1: No less than 14 days prior to construction, the Authority will submit a request for USFWS approval of the project biologists. The request will include education and experience related to giant gartersnake, California red-legged frog, and valley elderberry longhorn beetle (VELB).	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D,** BMP-35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities: Biological monitors will be professional biologists selected for their knowledge of the special-status species and natural communities that may be affected by construction activities. The qualifications of the biologist(s) will be submitted to the fish and wildlife agencies for review and written approval prior to initiating construction."	Consistent
BIO-MM-2: Prior to the start of ground-disturbing work (including vegetation clearing, grading, and equipment staging), a USFWS-approved biologist will conduct a mandatory biological resources awareness training for all construction personnel. This training will cover sensitive biological resources. The training will cover the natural history, appearance (using representative photographs), and legal status of species, regulatory protections, penalties for noncompliance, benefits of compliance, as well as the avoidance and minimization measures to be implemented. Participants will be required to sign a form that states they have received and understand the training. The Sites	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D,** BMP-33, Implementation of a Worker Environmental Awareness Program (WEAP): All construction crews and contractors will attend WEAP training prior to working in the Project area. The WEAP training will include documentation and a review by qualified resource specialists of the special-status species and tribal, archaeological, historic built, paleontological, and other sensitive resources and areas within the area of disturbance for a particular facility; the locations of sensitive biological	Consistent

Authority will maintain the record of training and make it available to agencies, upon request. If new construction personnel are added to the proposed action, the contractor will ensure that the new personnel receive the mandatory training before starting work.	resources and their legal status and protections; measures to be implemented for avoidance of these sensitive resources; and review of other required environmentally related resources for all construction personnel working on site at a particular facility footprint. A record of all personnel trained will be maintained by each contractor and submitted to the Authority. The Authority will present WEAP training documentation upon request by regulating or permitting agencies."	
BIO-MM-3: Construction vehicles will observe the posted speed limit on hard-surfaced roads and a 10 mile-per-hour speed limit on unpaved roads during travel in the construction area. Construction vehicles and equipment will restrict off-road travel to the designated construction areas. Construction vehicles and equipment left on-site overnight will be thoroughly inspected each day for snakes (both underneath the vehicle and in open cabs) before they are moved. All construction equipment will be maintained to prevent leaks of fuels, lubricants, or other fluids. To prevent possible resource damage from hazardous materials such as motor oil or gasoline, construction personnel will not service or refuel vehicles, construction equipment, or motorized tools within 300 feet of potentially suitable California red-legged frog or giant garter snake aquatic habitat.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D,** BMP 35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities: On site vehicles will be limited to a speed of 15-20 miles per hour on unpaved roads. Personnel driving vehicles in the Project area will observe the posted speed limit of 20 miles per hour (mph) on paved roads. All ingress/egress at the Project site will be restricted to those routes identified in the Project plans and description. Construction vehicles and equipment will restrict off-road travel to the designated construction areas All vehicle parking will be restricted to established areas, existing roads, or other suitable areas." **Mitigation Measure WILD-1.17**: Implement California Red-legged Frog Protective Measures **Mitigation Measure WILD-1.20**: Implement Protective Measures for Giant Gartersnake	Consistent

BIO-MM-4: The Authority will follow Service-approved decontamination protocols prior to any staff, equipment, tools, or vehicles enter Project area waters or moist soils associated with waters.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D:** BMP-36, Control of Invasive Plant Species during Construction: All construction crews and contractors will be educated during the WEAP training about the importance of not spreading invasive plants. **Section 2D.3.6.1,** Invasive Aquatic Plants: "The Authority will implement actions to control the spread of nonnative invasive aquatic plants (submerged and floating) in Sites Reservoir. These actions will be consistent with existing control methods employed by the California Department of Boating and Waterways (DBW) under the Aquatic Invasive Plant Control Program (AIPCP)." **Section 2D.3.6.2:** "To minimize the potential for adverse effects of invasive aquatic invertebrates on Sites Reservoir and downstream habitats, the Authority will implement watercraft inspections at the reservoir."	
BIO-MM-5: All food-related trash will be disposed of in closed containers and removed from the construction area daily during the construction period. Construction personnel will not feed or otherwise attract fish or wildlife to the construction site.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D:** BMP 35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities: All food-related trash will be disposed of in closed containers and removed from the work area daily during the work period. Personnel will not feed or otherwise attract fish or wildlife to the work site.	Consistent
BIO-MM-6: No pets or firearms will be allowed in the construction area.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D:** BMP 35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities:	Consistent

	No firearms will be allowed on the Project site except for those carried by authorized security personnel or local, state, or federal law enforcement officials. To prevent harassment, injury, or mortality of sensitive wildlife, pets will not be permitted in the active construction area.	
BIO-MM-7: A USFWS-approved biologist will conduct a preconstruction survey for elderberry shrubs, host plant for the beetle, within 50 meters of the construction limits. All elderberry shrubs will be mapped and identified for avoidance with flagging or fencing.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D, Section 2D.7,** Land Management Plan: "The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the specific type and frequency of maintenance activities by location… The frequency, timing, and duration of wildlife surveys or monitoring, if required, and the qualifications of the biologist conducting surveys or monitoring. Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided."	Consistent
BIO-MM-8: A site assessment and field surveys for the frog will be conducted prior to the start of Project activities using the methods described in USFWS (2015a). Site assessments and field surveys will be conducted by a USFWS-approved biologist.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D, Section 2D.7,** Land Management Plan: "The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the	Consistent

	specific type and frequency of maintenance activities by location… The frequency, timing, and duration of wildlife surveys or monitoring, if required, and the qualifications of the biologist conducting surveys or monitoring. Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided." **Mitigation Measure WILD-1.17**: Implement California Red-legged Frog Protective Measures **Mitigation Measure WILD-1.18**: Compensate for Permanent and Temporary Losses of Occupied California Red-legged Frog Aquatic and Upland Habitats	
BIO-MM-9: A Service-approved biologist will conduct surveys for the snake prior to the start of Project activities, following protocols approved by the USFWS.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D, Section 2D.7:** Land Management Plan: "The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the specific type and frequency of maintenance activities by location… The frequency, timing, and duration of wildlife surveys or monitoring, if required, and the qualifications of the biologist conducting surveys or monitoring. Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were	Consistent

	avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided." **Mitigation Measure WILD-1.20**: Implement Protective Measures for Giant Gartersnake **Mitigation Measure WILD-1.21**: Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats	
BIO-MM-10: All canals and aquatic areas to be dewatered will be surveyed for the snake by the Service-approved biological monitor immediately prior to dewatering. The biological monitor will oversee the dewatering activity until the channel is fully dewatered.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources*** **Mitigation Measure WILD-1.20**: Implement Protective Measures for Giant Gartersnake **Mitigation Measure WILD-1.21**: Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats	
BIO-MM-11: If pumps are required for dewatering, intake screens will be placed on the pump intake to prevent entrainment of snakes.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources*** **Mitigation Measure WILD-1.20**: Implement Protective Measures for Giant Gartersnake **Mitigation Measure WILD-1.21**: Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats	
BIO-MM-12: An USFWS-approved biologist will be present during all ground-disturbing activities and during any activities involving heavy equipment within 200 feet of potentially suitable Giant garter snake habitat and 300 feet of potentially suitable California red-legged frog habitat. The biological monitor shall permit the frog and snake to move out of the Project area on its own. Should a frog or snake need to be moved, a biologist with a 10(a)(1)(A) permit will trap and relocate the individual to the area designated in the relocation plan for the frog.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D** **Mitigation Measure WILD-1.20**: Implement Protective Measures for Giant Gartersnake **Appendix 2D:** BMP 35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities: Qualified biologists will monitor construction activities in sensitive natural communities and in areas identified as	Consistent

	suitable habitat for special-status species. The biological monitors will have the authority to temporarily stop work in any area where a special-status species has been observed until that individual has passively or physically been moved outside of the work area, or if any measures are not functioning appropriately for the protection of fish, wildlife, or plant species."	
BIO-MM-13: Should a frog or snake move into the Project area, all personnel including the biological monitor will have the authority to stop construction activities until appropriate corrective measures have been completed or the biological monitor determines that the frog, beetle, or snake will not be harmed. Snakes, beetles, and frogs encountered during construction activities will be allowed to move away on their own.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D,** BMP 35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities: "Qualified biologists will monitor construction activities in sensitive natural communities and in areas identified as suitable habitat for special-status species. The biological monitors will have the authority to temporarily stop work in any area where a special-status species has been observed until that individual has passively or physically been moved outside of the work area, or if any measures are not functioning appropriately for the protection of fish, wildlife, or plant species."	Consistent
BIO-MM-14: To avoid entrapment of wildlife, all steep-walled holes or trenches more than one foot deep will be excavated such that one side will have a 3:1 slope (3 feet horizontal:1 foot vertical). Having one side with a 3:1 slope is anticipated to allow most wildlife that enter or fall in to leave on their own. The biological monitor will inspect any holes or trenches prior to filling.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D,** BMP 35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities: "To prevent inadvertent entrapment of wildlife during construction, all excavated, steep-walled holes, trenches, or pits more than 1 foot deep will be covered at the close of each working day with plywood or similar material. Dirt will be shoveled around all the edges of the plywood or other material to prevent animals from crawling under it. In cases where trenches or pits cannot be covered, a section of the trench or	Consistent

	pit will be partially backfilled to create an earthen ramp with a 3:1 slope. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If a special-status species is encountered during construction work, construction activities will be diverted away from the animal until it can be moved by a USFWS- or CDFW-approved biologist."	
BIO-MM-15: All construction and staging areas for the proposed action will be located at least 50 meters away from elderberry shrubs. Signs will be posted along the fencing for the duration of construction indicating the presence of beetle habitat. The biological monitor will be responsible for ensuring the buffer area fences around elderberry shrubs are maintained throughout construction. The biological monitor also will monitor the condition of shrubs (including the presence of dust). Any elderberry shrubs inside the 50-meter buffer area that become stressed or die will be reported to USFWS. Biological inspection reports will be available to the USFWS. Gravel roadways, staging areas, and other applicable areas will be sprayed with water as needed to minimize dust moving onto elderberry shrubs.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D** **Mitigation Measure WILD-1.7:** Fence Elderberry Shrubs to be Protected **Section 2D.7:** Land Management Plan "The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the specific type and frequency of maintenance activities by location… General measures and practices when working in or near habitat for special-status wildlife (e.g., ensure appropriate distance from habitat as described by state or federal protocols, restrict nighttime work, and restrict work during nesting season if work is performed near trees). Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided."	Consistent
BIO-MM-16: Construction activities will take place no closer than 200 feet from the banks of snake aquatic habitat (Funks Creek and canals that hold water May 1 through October 1).	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D**	Consistent

Heavy equipment will be confined to existing roadways when within 200 feet of snake habitat to minimize habitat disturbance. Potential snake habitat within the Project area will be flagged and designated as Environmentally Sensitive Areas. These areas will be avoided by all construction personnel. Construction activity within habitat will be conducted between May 1 and October 1. The Project area will be surveyed for snakes no more than 24 hours prior to the start of construction activities. No exclusionary fencing will be utilized for the snake. A Service-approved biologist will remain on-site during ground-disturbing activities to ensure they do not encroach closer than 200 feet from potentially suitable snake habitat.	**Mitigation Measure WILD-1.20:** Implement Protective Measures for Giant Gartersnake "When possible, all construction activity in suitable giant gartersnake aquatic habitat, and upland habitat within 200 feet of suitable aquatic habitat, will be conducted during the snake's active period (between May 1 and October 1). For work that cannot be conducted between May 1 and October 1, additional protective measures, such as installing exclusion fencing or additional biological monitoring, or other measures determined during consultation with USFWS and CDFW, will be implemented." **Section 2D.7:** Land Management Plan "The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the specific type and frequency of maintenance activities by location… The type and frequency of maintenance activities by location and whether pre-activity wildlife surveys or monitoring of work will be required. The frequency, timing, and duration of wildlife surveys or monitoring, if required, and the qualifications of the biologist conducting surveys or monitoring. General measures and practices when working in or near habitat for special-status wildlife (e.g., ensure appropriate distance from habitat as described by state or federal protocols, restrict nighttime work, and restrict work during nesting season if work is performed near trees).	

	Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided."	
BIO-MM-17: A Service-approved biologist will be present when construction activities occur within 300 feet from the banks of Funk Reservoir and 200 feet from the banks of Funks Creek.	**Addressed in Chapter 9, *Vegetation and Wetland Resources* and *Wildlife* and Chapter 10, *Resources* Mitigation Measure VEG-3.1**: Avoid and Minimize Disturbance of Wetlands and Non-Wetland Waters During Construction Activities	Consistent
BIO-MM-18: The Authority will compensate for any permanent impacts (or temporary impacts that extend beyond one season) to snake habitat using the guidelines established in USFWS 1997. Direct impacts to the frog habitat will be compensated by applying a 3:1 ratio (3 acres created: 1 acre lost) for permanent habitat loss.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* Mitigation Measure WILD-1.21:** Compensate for Permanent and Temporary Losses of Giant Gartersnake Aquatic and Upland Habitats	Consistent
BIO-MM-19: The Sites Authority must ensure compliance with the Terms and Conditions set forth in the Biological Opinion issued by the US Fish & Wildlife Service dated September 21, 2018	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* Section 10.4:** "The Authority will also implement measures specified in the biological opinion from USFWS and the incidental take permit from CDFW for the Project."	Consistent
BIO-MM-20: The Authority will implement the appropriate surveys and restrictions to avoid and minimize effects on nesting special-status and non–special-status migratory birds and raptors.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D, Section 2D.7:** Land Management Plan: "The Authority will prepare a Land Management Plan (LMP) to protect wildlife resources during management and maintenance activities on all non-recreation lands held in fee or easement (including the Project buffer) by the Authority. This plan will include management actions for buffer areas and the specific type and frequency of maintenance activities by location…	Consistent

	General measures and practices when working in or near habitat for special-status wildlife (e.g., ensure appropriate distance from habitat as described by state or federal protocols, restrict nighttime work, and restrict work during nesting season if work is performed near trees). Identification and mapping of sensitive habitats and vegetation, including special-status plant populations, sensitive natural communities, wetlands, and non-wetland waters, that were avoided during construction so that signs, fencing, or other exclusion practices are implemented during operation and maintenance activities and these areas are avoided." **Mitigation Measure WILD-1.22**: Conduct Vegetation Removal During the Non-Breeding Season of Nesting Migratory Birds **Mitigation Measure WILD-1.23**: Conduct Preconstruction Surveys for Non-Raptor Nesting Migratory Birds and Implement Protective Measures if Found **Mitigation Measure WILD-1.24**: Conduct Surveys for Western Burrowing Owl Prior to Construction and Implement Avoidance and Minimization Measures if Found **Mitigation Measure WILD-1.25**: Restore Temporarily Disturbed Habitat and Compensate for the Permanent Loss of Occupied Burrowing Owl Habitat **Mitigation Measure WILD-1.28**: Conduct Focused Surveys for Golden Eagle and Bald Eagle and Implement Protective Measures if Found **Mitigation Measure WILD-1.29:** Compensate for the Loss of Eagle Nest Trees **Mitigation Measure WILD-1.30**: Conduct Focused Surveys for Nesting Swainson's Hawk, White-tailed Kite, and Other Raptors Prior to Construction and Implement Protective Measures During Construction	

	Mitigation Measure WILD-1.31: Compensate for the Permanent Loss of Foraging Habitat for Swainson's Hawk	
BIO-MM-21: To clearly demarcate the project boundary and protect sensitive natural communities, the Authority or its contractor will install pin flags, flagging, or flagged stanchion fencing around sensitive habitat areas (e.g., riparian, active bird nests, special-status plant species) adjacent to the construction area, including staging and access roads. Before construction, the contractor will work with the USFWS-approved biologist to identify the locations for the flags or flagged stanchion fencing around the areas to be protected.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D:** BMP-35, Development and Implementation of Construction Best Management Practices and Monitoring for Fish, Wildlife, and Plant Species Habitats, and Natural Communities: "High-visibility temporary fencing, temporary signs, staking and flagging, or other visual barriers (pylons and flagging) will be used to identify sensitive biological resources and Project personnel will be advised to avoid disturbance of these areas. These areas will be identified during pre-activity surveys. Signs, staking/pylons, and flagging will be inspected by the biological monitor in accordance with permit conditions and mitigation measures and maintained as necessary."	Consistent
BIO-MM-22: The Authority will avoid and minimize the spread or introduction of invasive plant species by having a qualified biologist conduct a survey for invasive plant species with a Cal-IPC rating of High or Moderate. Locations where large infestations of these species are identified will be flagged with pin flags for avoidance. If the invasive plant species cannot be avoided, the biologist will determine the best course of action to avoiding spreading the species throughout the RSA. In addition, BMPs will be implemented during construction to avoid and minimize the spread or introduction of invasive plant species such as worker education, minimization of surface disturbance, vehicle use and management, and use of erosion control.	**Addressed in Chapter 10, Chapter 10, *Wildlife Resources* and Appendix 2D:** BMP-36, Control of Invasive Plant Species during Construction: "Localized infestations of invasive plants with a California Invasive Plant Council rating of moderate or high will be identified and mapped during the botanical surveys. These areas will be flagged and avoided during construction. If these areas cannot be avoided, vegetation will be removed and bagged for disposal at a waste facility prior to work in these areas… Appropriate methods and native plant species used to revegetate such areas will be determined on a site-specific basis in consultation with qualified biologists; site-specific characterization will include slope, soil, drainage, and exposure to determine appropriate plants."	Consistent

CULTURAL RESOURCES		
CR-MM-01: The NHPA section 106 process will need to be fully concluded prior to ground disturbing action. The agency invoked the National Programmatic Agreement (NPA) on this project. All terms and conditions of the July 2018 NPA must be complied with prior to construction. The Authority signed the NPA Awareness Certificate on 8/17/2018.	**Addressed in Chapter 22, *Cultural Resources***, the following measures are required: **Mitigation Measure CUL-1.1:** Identify Significant Built Resources **Mitigation Measure CUL-1.2:** Avoid Significant Built Resources **Mitigation Measure CUL-1.3:** Protect Significant Built Resources **Mitigation Measure CUL-1.4:** Significant Historic Built Resources Treatment **Mitigation Measure CUL-2.1**: Identify Significant Archaeological Resources **Mitigation Measure CUL-2.2**: Avoid Significant Archaeological Resources **Mitigation Measure CUL-2.3**: Protect Significant Archaeological Resources **Mitigation Measure CUL-2.4**: Significant Archaeological Resources Treatment **Section 22.3.1:** "Due to federal funding for the Project, a National Historic Preservation Act (NHPA) Section 106 cultural resources consultation process with interested tribes and the State Historic Preservation Officer (SHPO) is being undertaken. The Project's CEQA and NEPA processes parallel the NHPA Section 106 process and considerations for cultural resources."	Consistent
AESTHETICS AND VISUAL RESOURCES		
AV-MM-1: The Authority will paint built structures to recede into view. Built structures such as the pump station building, bridge, switchyard, pump facility, spillway, creek outlet, the TRR inlet and GCID flow control structure, and ancillary project	**Addressed in Chapter 24, *Visual Resources*** **Section 24.3:** "The Project design features in BMP-17, Implementation of Visual/Aesthetic Design, Construction, and	Consistent

features such as catwalks, safety guardrails, and land-based signage will be designed to allow these features to blend with the surrounding built and natural environments to complement the visual landscape.	Operation Practices, stipulate that the Project would incorporate high-quality site design that does not detract from the rural nature of the surroundings, that features complement the natural environment, and that structures are painted to recede into views."	
AV-MM-2: The Authority will apply minimum lighting standards. All artificial outdoor lighting will be limited to safety and security requirements, designed using Illuminating Engineering Society's design guidelines and in compliance with International Dark- Sky Association approved fixtures. LED lighting will avoid the use of BRWL lamps and use a correlated color temperature that is no higher than 3,000 K. Wherever possible and pragmatic, the lighting designer will select fixtures and lighting control systems that conform to International Dark-Sky Associations Fixture Seal of Approval program. In addition, LED lights will use shielding to ensure nuisance glare and that light spill does not affect sensitive residential viewers.	**Addressed in Chapter 24, *Visual Resources*** **Section 24.4:** "Project operation will incorporate design measures to minimize the number of lights that will be used, ensure that appropriate lighting types are selected for their intended use (e.g., hooded wall mounts or bollard lighting on pathways versus overhead streetlights in parking lots), and utilize shielding to prevent nuisance glare and light spill. These design features would greatly limit the potential for light pollution. Further, the Project will limit the use of LED lighting to a color temperature that is no higher than 3,000 Kelvin, and this would prevent use of blue-rich with lamps (BRWL) that can cause increased light pollution, in order to further minimize nighttime light and glare."	Consistent

SITES RESERVOIR MESSAGE PLATFORM
2023 Update

WATER FOR DRY YEARS

Sites Reservoir is a unique multi-benefit water storage project that provides a resilient and reliable supply of water for California's environment, communities, and farms during dry periods.

- Sites Reservoir captures and stores water from the Sacramento River during high flows—**after all other water rights and regulatory requirements are met**— and is made available to California's environment, communities, and farms when it's most needed – especially during times of drought.
- With a capacity of approximately **1.5 million acre-feet**, Sites can store the excess stormwater without the need to dam any major rivers.
- Sites Reservoir provides water dedicated specifically for the environment that will be managed by federal and state resource agencies – helping aquatic species and habitats **withstand dry year conditions.**

Sites Reservoir is just part of the solution; we can, are, and must utilize all the tools in our toolbox—water recycling, conservation, desalination, groundwater replenishment, and more surface water storage.

- Water agencies, cities, counties, and farmers throughout California are using and exploring innovative ways to create a resilient water future.
- Our project participants are at the forefront of efforts such as water recycling and conservation. Sites Reservoir will compliment these important water management programs across the state.

Sites Reservoir is purposely designed to adapt to California's changing climate conditions by capturing and storing water during extreme storm events for use during severe dry periods when it is needed the most.

- California's current water management system was simply not designed to accommodate our future climate realities – but Sites Reservoir does. Modeling shows that **Sites performs better under challenging climate change conditions.**
- Climate projections show most of our future precipitation will come in the form of rain and not snow. Sites Reservoir is specifically designed to capture this rain and store it for future use, particularly when it's needed in dry periods.
- Once operational, Sites Reservoir will be integrated with the State Water Project (SWP) and Central Valley Project (CVP), **improving management of California's water supply** during extremes such as flooding and drought.
- A 2023 analysis projected Sites Reservoir could have diverted and captured **120,000 acre-feet of water in just two weeks** if the reservoir had been operational from Jan. 3 through Jan. 15. A single acre-foot of

water is enough to exceed the average annual indoor and outdoor water use of one to two California households, according to the Water Education Foundation.

A COLLABORATIVE EFFORT

Sites Reservoir's participating agencies represent millions of Californians, thousands of acres of food-producing farmland, and federal and state agencies all working in collaboration to increase California's water supply resiliency while protecting and enhancing California's environment.

- The Sites Project Authority – which is leading the planning, construction and future operations of Sites Reservoir—was **formed under California law as a Joint Powers Authority** in 2010, and functions as a **public agency** made up of several public water agencies, public irrigation districts, counties, and cities across the Sacramento Valley.
- Sites Reservoir is funded **100% by local, state, and federal public dollars**.
- Participation in Sites Reservoir is **broad and diverse**— including the Bureau of Reclamation, the State of California, public irrigation districts in the Sacramento and San Joaquin Valleys, as well as urban areas in Southern California and the Bay Area.

ENVIRONMENTAL BENEFITS

Sites is a 21st century water storage system designed with both environmental values and water supply needs in mind amid our changing climate.

- The State of California – through its investment in Sites Reservoir under Proposition 1 – is creating **an environmental water asset for California**, a first of its kind, that will provide water and dedicated storage for current and future environmental needs.
- Sites is an off-stream facility that **does not dam a major river system** and **does not threaten fish** migration or spawning.
- Sites Reservoir diversions would be conducted under **highly protective operating and permit conditions** that establish when water can be diverted.
- Intakes being used for diverting water into Sites Reservoir include **state-of-the-art fish screens** that are proven to be highly effective at protecting fish.

Sites offers first-of-its-kind environmental benefits, by storing water specifically for the environment to support fish and their habitat during drought periods.

- The environment is the single largest user of water out of Sites Reservoir.
- A significant portion of Sites Reservoir's annual water supplies will be dedicated to and guaranteed for environmental uses to help **improve conditions for Delta smelt**; help **preserve cold-water pool** in Shasta Lake 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, when operated in exchanges with Shasta Lake, includes **more cold water for salmon** in the driest years when it is needed most and provides an overall net benefit to Sacramento River salmon, Delta smelt, and the Sacramento-San Joaquin Delta estuary.

OPERATIONS

Integrating Sites Reservoir into California's existing water management system will help to restore flexibility, reliability, and resiliency to our statewide water supply.

- No other storage project currently under consideration in California can positively influence the **operational efficiencies of our existing statewide water system** like Sites Reservoir.
- Sites Reservoir **complements other major components of the state and federal water projects** like Shasta Lake, Lake Oroville, and Folsom Lake. Sites could extend the functions they serve by creating flexibility to adapt to changing conditions.
- Sites Reservoir would **not compete for the water resources** stored in or conveyed through state and federal facilities, but would increase the total amount of managed water in storage.
- Sites Reservoir could **contribute to the increased fresh-water flow** into the Delta during drier periods to assist with salinity management of this critical estuary.
- **Participating agencies will receive storage space dedicated to their use along with** a proportional share of the project's diversions from the Sacramento River.
- Sites Reservoir will allow participating agencies, both north and south of the Delta, to manage their stored water how and when they need it the most – protecting communities, enhancing the environmental habitat, and promoting economic empowerment through creation of a **flexibly managed water supply**.
- Sites Reservoir will help **optimize coordinated water releases** from Northern California's existing network of reservoirs. Sites Reservoir water supplies can be used first, allowing snowmelt-fed reservoirs to reserve cold water supplies for later release when it's most beneficial for salmon runs.
- A significant portion of the canals and pipelines used to transport water from the Sacramento River into Sites Reservoir will be **existing infrastructure**, avoiding environmental impacts of constructing hundreds of miles of new conveyance facilities.

There are times when water is abundant in the Sacramento River and could provide water for Sites Reservoir while meeting all other environmental needs. .

- Snow and rain do not always come at the "right" times in the "right amounts." Sometimes it comes faster than we need it, and sometimes it doesn't come at all. This is true for the environment, people and farms.
- Sites Reservoir will operate based on in-river conditions. Meaning, if water in the Sacramento River is abundant, Sites will take a portion and store it for the environment, people and farms to use later when they need it.
- The criteria under which water would be diverted into Sites Reservoir result in diversions shaving off a small portion of these abundant flows, leaving ample water in the River and Delta for important ecological needs.

KEY ADVANCEMENTS

Sites Reservoir met several major milestones in 2022 that will take this project from the planning stage to final design and construction.

- The Sites Project Authority **submitted its water right application** to the State Water Resources Control Board. The Board responded to our water right application and we are diligently working through details of the application to stay on schedule for securing a water right permit.
- The U.S. Environmental Protection Agency (EPA) [HYPERLINK "https://sitesproject.org/wp-content/uploads/2022/03/Final-WIFIA-ReleaseMarch2022.pdf" \t "_blank"] for a **$2.2 billion low-interest loan** through the Water Infrastructure Finance and Innovation Act (WIFIA), which would bring the project significantly closer to construction and save millions of dollars for California rate payers.
- The Sites project team **updated the Environmental Impact Report (EIR)/Environmental Impact Statement (EIS)** and made it available for public comment. We expect to release the final environmental documents in Spring 2023.

Major permitting and environmental advancements for Sites Reservoir will take place in 2023, bringing us much closer to the start of construction.

- Sites Project Authority will be issuing the **final Environmental Impact Report** this year.
- The State Water Resources Control Board **will soon make a determination on the completion of Sites water right application**.
    - These two milestones together represent the culmination of careful and comprehensive research and planning that addresses the needs, interests and concerns of stakeholders, participants and our state and federal partners.

From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/16/2023 10:06:39 AM
To: Kevin Spesert [kspesert@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]
CC: Ann Newton [anewton@katzandassociates.com]; Sara M. Katz [skatz@katzandassociates.com]; Sarah Rossetto [srossetto@katzandassociates.com]
Subject: Updated Storm Data Press Release
Attachments: March Storm Diversion Data Release .docx

Hi Kevin and Ali,
Please find a press release on the updated storm diversion data attached for your review. We understand Jerry would like to send this by the end of the day.

Let us know if you have any questions!

Thanks,
Quin

K&A
KATZ & ASSOCIATES

Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

For Immediate Release:
March 16, 2023

Contact: Ann Newton
(310) 774-7639

New Analysis Finds 2023 Storms Would Have Yielded Water for Up to 2.4 Million People, Farms, and Businesses if Sites Reservoir Were Operational Today

Sacramento, CA - Today, the Sites Project Authority announced updated findings from an analysis that projected Sites Reservoir could have diverted and captured 250,000 acre-feet of water over ten weeks if the reservoir was operational, and an additional potential 244,000 acre-feet of water through April 13.

"Once again, a flood of storms in Northern California produced a significant amount of rainfall that would have been captured if Sites was operational," said Jerry Brown, Executive Director of the Sites Project Authority. "Rain will not always come at the right time, so we must be better about capturing excess storm and floodwater for future use during dry periods."

Sites Reservoir is a proposed off-stream reservoir specifically designed to divert and store water generated by storm events to increase California's water flexibility, reliability, and resiliency in drier years. The analysis, based on the California-Nevada River Forecast Center's river updated forecasts, found Sites Reservoir could have diverted 250,000 acre-feet of water from January 3 to March 13. Additionally, the forecast estimated Sites would have the potential to divert another 244,000 acre-feet of water over the next 30 days, from March 14 to April 13. A single acre-foot of water is enough to exceed the average annual indoor and outdoor water use of one to two California households, according to the Water Education Foundation.

Sites will not divert any water until all other water rights and regulatory requirements are met, but during some conditions, like California's recent storms, it could still store excess water while meeting diversion criteria that protects fisheries and the environment.

"Sites is designed with both environmental values and water supply needs in mind," said Alicia Forsythe, Environmental Planning and Permitting Manager of the Sites Project Authority. "With more extreme weather events expected in California, there are times we can safely divert water when Sacramento River flows are abundant, leaving enough water in the Delta for ecological needs."

Sites Reservoir has broad statewide support from cities, counties, water agencies, and irrigation districts throughout the Sacramento Valley, San Joaquin Valley, Bay Area, and Southern California which are working together to advance the project. The Sites Reservoir Project is locally led by the Sites Project Authority which is made up Sacramento Valley water districts, cities, and counties.

Sites is an off-stream reservoir proposed north of the Sacramento-San Joaquin Delta, where it would provide unique water supply and environmental benefits during dry periods, especially during extended drought. Additional information can be found at www.sitesproject.org or on Facebook and Twitter at @SitesProject.

DRAFT

From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/16/2023 12:35:45 PM
To: Ann Newton [anewton@katzandassociates.com]; Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Sara M. Katz [skatz@katzandassociates.com]; Sarah Rossetto [srossetto@katzandassociates.com]
Subject: RE: Updated Storm Data Press Release
Attachments: March Storm Diversion Data Release .docx

Hi all,
A clean copy of the updated press release is attached here. Please let us know if any other changes are needed!

Thank you,
Quin

Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Ann Newton <anewton@katzandassociates.com>
Sent: Thursday, March 16, 2023 10:49 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Quin La Capra <qlacapra@katzandassociates.com>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>
Subject: RE: Updated Storm Data Press Release

Thanks so much Ali. We'll make these edits in the press release and the blog as well.

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

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, March 16, 2023 10:33 AM
To: Quin La Capra <qlacapra@katzandassociates.com>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>; Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>
Subject: RE: Updated Storm Data Press Release

Some minor suggestions. Clarification, what we could have diverted is based on actual river flows. The forecasted diversions are based on CNRFC. I've made this change in the attached.

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: Quin La Capra <qlacapra@katzandassociates.com>
Sent: Thursday, March 16, 2023 10:07 AM
To: Kevin Spesert <kspesert@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>; Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>
Subject: Updated Storm Data Press Release

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Quin

K&A
KATZ&ASSOCIATES

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From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/16/2023 2:28:17 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Sara M. Katz [skatz@katzandassociates.com]; Emily Fan Michaelson [emichaelson@katzandassociates.com]; Ann Newton [anewton@katzandassociates.com]
Subject: RE: Sites EIR Video Outlines for Review
Attachments: EIR Videos Outline.docx

Hi Ali and Kevin,
I wanted to send the updated outline for the EIR videos in advance of tomorrow's meeting. Please let me know if you have any questions!

Otherwise, we will look out for an update on participation and scheduling.

Thanks so much,
Quin

K&A
KATZ & ASSOCIATES
Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Quin La Capra
Sent: Monday, March 6, 2023 3:51 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Sara M. Katz <skatz@katzandassociates.com>; Emily Fan Michaelson <emichaelson@katzandassociates.com>; Ann Newton <anewton@katzandassociates.com>
Subject: Sites EIR Video Outlines for Review

Hi Ali and Kevin,
We put together a broad outline for the Sites EIR videos we've discussed and would love your input before we move forward with scripting. Pulling from the updated 2023 messaging, we thought the two videos could center on the themes of collaboration and innovative environmental benefits.

If these outlines look good, we will move forward with building out a more robust script and storyboard for each. Please let us know if you have any questions or feedback!

Thank you,
Quin

K&A
KATZ & ASSOCIATES
Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

Sites Reservoir EIR Video Outlines

Video #1 – A Collaborative Effort

Theme: Collaboration between local, state, and federal agencies

- Sites has support across all levels of government and the project would not be possible without this collaboration
- Participation in Sites Reservoir is as broad and diverse as the communities they serve: more than 24 million Californians and more than 500,000 acres of farmland
- The project is possible thanks to continued support from state and federal partners: Prop 1 funding is possible due to the dedicated source of water for the environment and federal investment enhances these environmental benefits
- The Authority has spent over a decade engaging the public, stakeholders, and landowners to achieve a project that can increase California's water supply resiliency while protecting and enhancing California's environment

Visuals: Overview of project site, California farmland, Sacramento River/Valley, group shots of interviewees

Speakers: Jerry Brown, Rob Cooke- California Department of Water Resources, Don Bader- U.S. Bureau of Reclamation

Length: 60 seconds

Video #2 – A First of Its Kind

Theme: 21st century system designed with core value of environmental stewardship

- The environment is the single largest beneficiary of water out of Sites Reservoir
- Sites is designed with environmental values in mind: does not dam a major river system and does not threaten fish migration or spawning
- Sites is a flexible storage solution designed to adapt to future climate conditions and will improve water supply resiliency for California's environment, communities, and farms when it's most needed; Modeling shows that Sites performs better under challenging climate change conditions
- Sites creates a first-of-its-kind environmental water asset for California that will help aquatic species and habitats withstand dry year conditions

Visuals: Overview of project site, shots of salmon and other animals in the Delta ecosystem, flowing river water, natural basin filling up with water, dry/cracked earth

Speakers: Ali Forsythe, Fritz Durst- Chair/Reclamation District No. 108, Heather Dyer- San Bernadino Valley

Length: 90 seconds

Video #3 – A More Sustainable Water Supply

Theme: Innovative solutions that address our state's need for a sustainable water supply

DRAFT

- Sites Reservoir is an environmentally beneficial, innovative solution that address our state's need for a sustainable water supply, especially during extremes such as flooding and drought
- Integrating Sites Reservoir into California's existing water management system will help to restore flexibility, reliability, and resiliency to our statewide water supply
- Sites Reservoir will allow participating agencies, both north and south of the Delta, to manage their stored water how and when they need it the most – protecting communities, enhancing the environmental habitat, and promoting economic empowerment through creation of a flexibly managed water supply
- A sustainable water supply uplifts some of our most disadvantaged communities

Visuals: Dry/cracked earth, heavy rain/flooding, water basin or storage, community landmarks in Maxwell, city and rural shots throughout the state

Speakers (Voiceover only): Valerie Pryor- Zone 7 Water Agency, Zach Dennis- Tehama-Colusa Canal Authority, Hal Charter- Colusa County

Length: 90 seconds

DRAFT

From: Sites Project [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=FE3D979238CE48168411DD8F93D5A6E6-INFO00041]
Sent: 3/16/2023 4:05:18 PM
To: Sites Project [info@sitesproject.org]
CC: Ann Newton [anewton@katzandassociates.com]
BCC: john.phillips@cumulus.com; luis.segura@cumulus.com; agalert@cfbf.com; agalert@cfbf.com; williamb@timesmediainc.com; asianjournal@aol.com; snaishadam@ap.org; jdearen@ap.org; lynn@majesticcontent.la; journal@awwa.org; journaleditor@awwa.org; info@aztecanews.com; cpeterson@bakersfield.com; psmith@bakersfield.com; jcox@bakersfield.com; qlacapra@katzandassociates.com; Mariah Hugo [mhugo@katzandassociates.com]; brobins@palfreymedia.com; local@bayareanewsgroup.com; newsroom@baycitynews.com; bcwaternews@brwncald.com; info@bilingualweeklynews.com; jsondag@bloomberg.net; Tdelias@aol.com; julie@calmatters.org; ben@calmatters.org; dave@calmatters.org; dan@calmatters.org; sraymundo@picketfencemedia.com; john@capitolmr.com; csampson@capitalpress.com; nicole.nixon@capradio.org; john.howard@capitolweekly.net; kpixnewsmanagers@cbs.com; mwolcott@chicoer.com; dreidel@chicoer.com; carlos@thestarnews.com; jordan@coastnewsgroup.com; editor@bayareanewsgroup.com; jhrobinson@bayareanewsgroup.com; progers@bayareanewsgroup.com; eclendaniel@bayareanewsgroup.com; mdianda@bayareanewsgroup.com; editor@eaglenewsca.com; sara.cardine@latimes.com; carol.cormaci@latimes.com; sraymundo@picketfencemedia.com; sonate@davisenterprise.net; korendor@davisenterprise.net; champton@davidenterprise.net; aternus@davidenterprise.net; julie.makinen@desertsun.com; janet.wilson@desertsun.com; thomas.coulter@desertsun.com; dborenstein@bayareanewsgroup.com; progers@bayareanewsgroup.com; asciacca@bayareanewsgroup.com; eic@sdnnewspapers.com; scott_blair@mcgraw-hill.com; gfaison@dailyrepublic.net; thansen@dailyrepublic.net; bills@goldcountrymedia.com; echalhoub@newsvmedia.com; Robert Summa [rsumma@appealdemocrat.com]; dwilson@appealdemocrat.com; llowe@appealdemocrat.com; emartinson@eenews.net; hbindy@latimes.com; kalw@kalw.org; news@kalx.berkeley.edu; erin@kcaaradio.com; info@kcaaradio.com; kclunews@aol.com; avishay.artsy@kcrw.com; kfbknews@clearchannel.com; kfinewsdirector@kfi640.com; producers@kgoradio.com; mathers84@yahoo.com; jim.hampton@alphamediausa.com; knxnews@cbsradio.com; cliffalbert@clearchannel.com; lmantle@kpcc.org; feedback@scpr.org; pd@kpfk.org; reception@kprl.com; Gene@rrbroadcasting.com; ccabreralomeli@kqed.org; tlaurberg@KQED.org; fm@kqed.org; kedeleon@sbgtv.com; jd@kusp.org; info@kvcr.org; info@winedownmedia.com; marty@kzyx.org; clara@firebrandmediainc.com; ann@ac-la.com; bruceb@latc.com; sscauzillo@scng.com; ian.james@latimes.com; john.myers@latimes.com; louis.sahagun@latimes.com; allison.wisk@latimes.com; rosanna.xia@latimes.com; george.skelton@latimes.com; monte.morin@latimes.com; dsparrer@barareanewsgroup.com; dwyatt@mantecabulletin.com; jcampbell@mantecabulletin.com; progers@bayareanewsgroup.com; jswartz@marinij.com; whouston@marinij.com; rhalstead@marinij.com; Robert Summa [rsumma@appealdemocrat.com]; acreasey@appealdemocrat.com; maven@mavensnotebook.com; johnwhitaker@midvalleypub.com; dkellogg@montereyherald.com; mmoore@newsvmedia.com; editor@mv-voice.com; ; joe.rosato@nbc.com; aflores@americangeneralmedia.com; weitzner@ocbj.com; brennan@ocbj.com; caviles@scng.com; jfuentes@scng.com; mwisckol@ocregister.com; mwisckol@scng.com; mwolcott@chicoer.com; news@orovillemr.com; eventsandnews@dailynewsgroup.com; cwhisnand@portervillerecorder.com; silas.lyons@redding.com; damon.arthur@redding.com; jim.christie@thomsonreuters.com; carolf@goldcountrymedia.com; lkorte@sacbee.com; cnelson@sacbee.com; mbreton@sacbee.com; sacramento@bizjournals.com; bvandermeer@bizjournals.com; newsroom@sacobserver.com; macosta@scng.com; sraymundo@picketfencemedia.com; rhuard@sdbj.com; bradg@sdbj.com; mlee@sdcwa.org; kendra@sdnews.com; charles.clark@sduniontribune.com; jennifer.vangrove@sduniontribune.com; joshua.smith@sduniontribune.com; mary@sfbayview.com; sanfrancisco@bizjournals.com; sarah.libby@sfchronicle.com; kalexander@sfchronicle.com; roland.li@sfchronicle.com; emilio.garcia-ruiz@sfchronicle.com; dustin.gardiner@sfchronicle.com; pfimrite@sfchronicle.com; salrodriguez@scng.com; mangst@bayareanewsgroup.com; eclendaniel@bayareanewsgroup.com; progers@bayareanewsgroup.com; David_Houston@dailyjournal.com; jtarica@thetribunenews.com; dmason@newspress.com; info@santaclaraweekly.com; clunetta@signalscv.com; ealvarenga@signalscv.com; dsparrer@barareanewsgroup.com; editor@sunnews.org; twolverton@bizjournals.com; rfernandez@bizjournals.com; editor@scng.com; amouchard@scng.com; tsciacqua@scng.com; sgowen@scng.com; Susan@SusanShelley.com; dblount@recordnet.com; gbrookshire@recordnet.com; abreitler@recordnet.com; cvongsarath@community-newspapers.com; editor@richmondsunsetnews.com; jeffrey_goldberg@theatlantic.com; amatthews@clintreillycommunications.com; jkieta@fresnobee.com; pbowman@hanfordsentinel.com; mrankin@hanfordsentinel.com; jkieta@fresnobee.com; pguerra@modbee.com; gstapley@modbee.com; scott.lewis@voiceofsandiego.org; Susan@SusanShelley.com; jculver@usatoday.com; chayes@usatoday.com;

jbungart@timesheraldonline.com; kfu@thereporter.com; chris.bowman@vcstar.com; ewoomer@gannett.com; sromero@gannett.com; jmoore@kvpr.org; kklein@kvpr.org; jim.carlton@wsj.com; magazine@wef.org; jwolfe@endeavorb2b.com; dbryant@community-newspapers.com; joviatt@calcities.org; msprague@scng.com; susan@colusacountynews.com; jeanne@timesmediainc.com; news@dailydemocrat.com

Subject: For Immediate Release: New Analysis Finds 2023 Storms Would Have Yielded Water for Up to 2.4 Million People, Farms, and Businesses if Sites Reservoir Were Operational Today

Good afternoon,

Please see the attached news release for Sites Reservoir, and reach out with any questions.

For Immediate Release:
March 16, 2023

Contact: Ann Newton
(310) 774-7639

New Analysis Finds 2023 Storms Would Have Yielded Water for Up to 2.4 Million People, Farms, and Businesses if Sites Reservoir Were Operational Today

Sacramento, CA - Today, the Sites Project Authority announced updated findings from an analysis that projected Sites Reservoir could have diverted and captured 250,000 acre-feet of water as a result of the January storms if the reservoir was operational, and an additional potential 244,000 acre-feet of water as a result of the February-March storms.

"Once again, a flood of storms in Northern California produced a significant amount of rainfall that would have been captured if Sites was operational," said Jerry Brown, Executive Director of the Sites Project Authority. "Rain will not always come at the right time, so we must build Sites Reservoir to capture storm and floodwater for future use during dry periods."

Sites Reservoir is a proposed off-stream reservoir specifically designed to divert and store water generated by storm events to increase California's water flexibility, reliability, and resiliency in drier years. The analysis, based on actual river flows, found Sites Reservoir could have diverted 250,000 acre-feet of water from January 3 to March 13. Additionally, using the California-Nevada River Forecast Center's updated river flow forecasts, it is estimated that Sites would have the potential to divert another 244,000 acre-feet of water over the next 30 days, from March 14 to April 13. A single acre-foot of water is enough to exceed the average annual indoor and outdoor water use of one to two California households, according to the Water Education Foundation.

Sites will not divert any water until all other water rights and regulatory requirements are met, but during some conditions, like California's recent storms, it could still store water while meeting diversion criteria that protects fisheries and the environment.

"Sites is designed with both environmental values and water supply needs in mind," said Alicia Forsythe, Environmental Planning and Permitting Manager of the Sites Project Authority. "With more extreme weather events expected in California, there are times we can safely divert water when Sacramento River flows are abundant, leaving enough water in the River and in the Delta for ecological needs."

Sites Reservoir has broad statewide support from cities, counties, water agencies, and irrigation districts throughout the Sacramento Valley, San Joaquin Valley, Bay Area, and Southern California which are working together to advance the project. The Sites Reservoir Project is locally led by the Sites Project Authority which is made up Sacramento Valley water districts, cities, and counties.

Sites is an off-stream reservoir proposed north of the Sacramento-San Joaquin Delta, where it would provide unique water supply and environmental benefits during dry periods, especially during extended drought. Additional information can be found at www.sitesproject.org or on Facebook and Twitter at @SitesProject.

From: Sites Project [info@sitesproject.org]
Sent: 3/16/2023 4:05:18 PM
To: Sites Project [info@sitesproject.org]
CC: Ann Newton [anewton@katzandassociates.com]
Subject: [EXT] For Immediate Release: New Analysis Finds 2023 Storms Would Have Yielded Water for Up to 2.4 Million People, Farms, and Businesses if Sites Reservoir Were Operational Today

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

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From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/16/2023 4:21:15 PM
To: Ann Newton [anewton@katzandassociates.com]; Jerry Brown [jbrown@sitesproject.org]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Sara M. Katz [skatz@katzandassociates.com]
Subject: RE: Updated Storm Data Press Release
Attachments: Sites News Release_March Storm Diversion Data_FINAL 3.16.2023.pdf

Hi all,
The final PDF of the release is attached in case you would like to print it for tomorrow!

Thank you,
Quin

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Sent: Thursday, March 16, 2023 2:30 PM
To: Jerry Brown <jbrown@sitesproject.org>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Quin La Capra <qlacapra@katzandassociates.com>; Sara M. Katz <skatz@katzandassociates.com>
Subject: RE: Updated Storm Data Press Release

Thanks, Jerry. We will accept your edits and circulate to our media list and post online.

K&A
KATZ & ASSOCIATES

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

From: Jerry Brown <jbrown@sitesproject.org>
Sent: Thursday, March 16, 2023 2:12 PM
To: Ann Newton <anewton@katzandassociates.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Quin La Capra <qlacapra@katzandassociates.com>; Sara M. Katz <skatz@katzandassociates.com>
Subject: Re: Updated Storm Data Press Release

A couple of minor suggestions to consider then proceed. thanks

---

From: Ann Newton <anewton@katzandassociates.com>
Date: Thursday, March 16, 2023 at 1:51 PM
To: Jerry Brown <jbrown@sitesproject.org>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>, Kevin Spesert <kspesert@sitesproject.org>, Quin La Capra <qlacapra@katzandassociates.com>, "Sara M. Katz" <skatz@katzandassociates.com>
Subject: FW: Updated Storm Data Press Release

Jerry,

Looping you in here for final eyes and approval. This includes Ali's edits.

Ann

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

From: Quin La Capra <qlacapra@katzandassociates.com>
Sent: Thursday, March 16, 2023 12:36 PM
To: Ann Newton <anewton@katzandassociates.com>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>
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Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Ann Newton <anewton@katzandassociates.com>
Sent: Thursday, March 16, 2023 10:49 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Quin La Capra <qlacapra@katzandassociates.com>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>
Subject: RE: Updated Storm Data Press Release

Thanks so much Ali. We'll make these edits in the press release and the blog as well.

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

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Thursday, March 16, 2023 10:33 AM
To: Quin La Capra <qlacapra@katzandassociates.com>; Kevin Spesert <kspesert@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>; Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>
Subject: RE: Updated Storm Data Press Release

Some minor suggestions. Clarification, what we could have diverted is based on actual river flows. The forecasted diversions are based on CNRFC. I've made this change in the attached.

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: Quin La Capra <qlacapra@katzandassociates.com>
Sent: Thursday, March 16, 2023 10:07 AM
To: Kevin Spesert <kspesert@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Ann Newton <anewton@katzandassociates.com>; Sara M. Katz <skatz@katzandassociates.com>; Sarah Rossetto <srossetto@katzandassociates.com>
Subject: Updated Storm Data Press Release

Hi Kevin and Ali,
Please find a press release on the updated storm diversion data attached for your review. We understand Jerry would like to send this by the end of the day.

Let us know if you have any questions!

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K&A
KATZ & ASSOCIATES

Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Jerry Brown [jbrown@sitesproject.org]
Sent: 3/16/2023 5:58:40 PM
To: Sandra Yarbrough [syarbrough@sitesproject.org]; Marcia Kivett [MKivett@sitesproject.org]
Subject: Fwd: Updated Storm Data Press Release
Attachments: image001.png; image002.png; image003.png; image002.png; image003.png; Sites News Release_March Storm Diversion Data_FINAL 3.16.2023.pdf

Sent from my iPhone

Begin forwarded message:

From: Quin La Capra <qlacapra@katzandassociates.com>
Date: March 16, 2023 at 4:22:08 PM PDT
To: Ann Newton <anewton@katzandassociates.com>, Jerry Brown <jbrown@sitesproject.org>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>, Kevin Spesert <kspesert@sitesproject.org>, "Sara M. Katz" <SKatz@katzandassociates.com>
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Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Ann Newton [anewton@katzandassociates.com]
Sent: 3/16/2023 6:57:39 PM
To: Becki Robins [brobins@palfreymedia.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: FW: Updated Storm Data Press Release
Attachments: Sites News Release_March Storm Diversion Data_FINAL 3.16.2023.pdf

Becki,

You should be on our media list now and received the press release, but just in case, I'm sharing here as well.

Ann

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

Env. Water Manager Advisory Committee Agenda

Affordable Water, Sustainably Managed

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 17, 2023	**Location:**	Click here to join the meeting 1-916-53-7066 ID: 736 203 684#
Start Time:	11:00 p.m.	**Finish Time:**	12:00 p.m.
Purpose:	Get Input on Direction Being Taken by EWM Steering Committee		

Meeting Participants:

Jerry Brown, Sites	Greg Gartrell, Advisor	Mike Mayatt, EDF
Ali Forsythe, Sites	Maurice Hall, EDF	Caitrin Chappell, TNC
Don Bransford, Sites AB	Ann Hayden, EDF	Megan Cleveland, TNC
Randall Neudeck, Sites RC		

Agenda

Discussion Topic	Topic Leader	Time Allotted
1. Review Progress Since Last Mtg (1/31/23)	Jerry	5 min
2. Review of Sites Proposed PBA/AMP Language for Prop 1 Ecosystem Benefit Agreement	All	20 min
3. Making the Ecosystem Storage "untouchable by others" for the term of the agreement a. to other water users b. for uses outside of 16 ecosystem objectives	All	20 min
4. Agree on a. Next Steps b. Frequency of Future Meetings.	All	5 min
5. Sites Project Update (informational) a. Final EIR/EIS b. Water Rights Application	Ali/Jerry	10 min

Draft_0023494

From: Ann Newton [anewton@katzandassociates.com]
Sent: 3/17/2023 7:30:14 AM
To: Jerry Brown [jbrown@sitesproject.org]; Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
CC: Sara M. Katz [skatz@katzandassociates.com]; Sarah Rossetto [srossetto@katzandassociates.com]; Kim Floyd [kim@floydcommunications.com]; Quin La Capra [qlacapra@katzandassociates.com]
Subject: Storm Data Materials
Attachments: Sites News Release_March Storm Diversion Data_FINAL 3.16.2023.pdf; Latest wave of storms underscores the need for Sites Reservoir FINAL.docx

Hi Team,

Sharing the final press release (which was distributed yesterday to media) and the final blog (final and being posted this morning). In addition, our Sites e-blast is being distributed this morning and it includes these latest materials. Posts based on the approved press release and blog have also gone up on our Twitter, Instagram and Facebook pages. I'm pasting below for reference.

If you need anything additional, please let us know. Many thanks to everyone for their quick review and input on these items yesterday.

Ann

Twitter Thread

1. What a water year it has been.

If #Sites were operational, we would have diverted 250,000 acre-feet of water from the January storms for future use by farms, families, and ecosystems—and there would still be plenty of water in the Sacramento River and Delta for the environment.

2. Using the California-Nevada River Forecast Center's updated river flow forecasts, we estimate that Sites would have the potential to divert another 244,000 acre-feet of water over the next 30 days, from March 14 to April 13.

3. Rain will not always come at the right time, so we must be able to capture storm and floodwater for future use during dry periods. It's why we need to #BuildSitesNow.

Learn more on sitesproject.org:
https://bit.ly/3JNIH2v

Facebook

What a water year it has been. If Sites were operational, we would have diverted and captured enough water for 2.5 million Californians, on average, from the storms Northern California has experienced in 2023.

A new analysis found Sites Reservoir could have diverted 250,000 acre-feet of water from January 3 to March 13. Additionally, using the California-Nevada River Forecast Center's updated river flow forecasts, it is estimated that Sites would have the potential to divert another 244,000 acre-feet of water over the next 30 days, from March 14 to April 13. Rain will not always come at the right time, so we must be able to capture storm and floodwater for future use during dry periods. It's why we need to #BuildSitesNow. Learn more on sitesproject.org: https://bit.ly/3JNIH2v

Instagram

What a water year it has been. If Sites were operational, we would have diverted and captured enough water for 2.5 million Californians, on average, from the storms Northern California has experienced in 2023.

A new analysis found Sites Reservoir could have diverted 250,000 acre-feet of water from January 3 to March 13. Additionally, using the California-Nevada River Forecast Center's updated river flow forecasts, it is estimated that Sites would have the potential to divert another 244,000 acre-feet of water over the next 30 days, from March 14 to April 13.

Rain will not always come at the right time, so we must be able to capture storm and floodwater for future use during dry periods. It's why we need to #BuildSitesNow.

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

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/17/2023 9:29:40 AM
To: Thayer, Reed [Reed.Thayer@jacobs.com]
CC: Angela Bezzone [bezzone@mbkengineers.com]; steve.micko@jacobs.com; Leaf, Rob [Rob.Leaf@jacobs.com]
Subject: RE: Migration of Sites Project Operations Modeling from CalSim II to CalSim 3

Thanks Reed. I agree with all of these assumptions and statements.

Appreciate you putting this into an email as this helps make sure we had a common understanding.

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: Thayer, Reed <Reed.Thayer@jacobs.com>
Sent: Friday, March 17, 2023 8:38 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Angela Bezzone <bezzone@mbkengineers.com>; steve.micko@jacobs.com; Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: Migration of Sites Project Operations Modeling from CalSim II to CalSim 3

Ali,
We are acknowledging that on Wednesday, March 15, you gave us the following instructions:
1. We are to begin work on migrating the Sites Project operations modeling from CalSim II to CalSim 3, effective immediately
2. We will begin with existing project budget and will develop future budget requests
3. We will begin with developing a simplified CalSim II study, removing unused logic
4. We will begin the CalSim 3 model development using the DCR 2021 or DCP model as a baseline while waiting for Reclamation's 2021 LTO PA.
5. Assuming Reclamation's 2021 LTO PA CalSim 3 is published this summer, we plan to have Sites operations integrated into the 2021 LTO PA CalSim 3 model by the end of December 2023.

Please let us know if you agree with these assumptions and if you have any questions.

Reed Thayer, PE (CA) (he/him)| Jacobs | Water Resources Engineering Technologist
O: 916.286.0228 | M: 831.233.2141 | reed.thayer@jacobs.com
2485 Natomas Park Dr, Ste 600 | Sacramento, CA 95833 | USA

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From: Micko, Steve [Steve.Micko@jacobs.com]
Sent: 3/17/2023 4:36:34 PM
To: Sherrick, Robert@Wildlife [Robert.Sherrick@Wildlife.ca.gov]
CC: Angela Bezzone [bezzone@mbkengineers.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Project - Discussion of ITP Sensitivity Runs and Exchanges
Attachments: NODOS_Trend_Reporting_rev52dpcye_DV6_MultiClim_CALSIM__NAA_041222_NAA_041122_2035CT_ALT3B_041222_ALT3B_041122_2035CT.xlsm

Hi Rob,

Nice talking with you the other day! Please see attached trend reporting spreadsheet with the following CalSim II studies:

- NAA 041222 – No Action Alternative at historical climate
- NAA 041222 2035CT – No Action Alternative at 2035CT climate and 15 cm sea level rise
- ALT 3B 041222 – Alternative 3B (16% Federal participation) at historical climate
- ALT 3B 0411 2035CT – Alternative 3B (16% Federal participation) at 2035CT climate and 15 cm sea level rise

Let me know if you have any questions!
Steve

-----Original Appointment-----
From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, February 28, 2023 9:07 AM
To: Alicia Forsythe; Davis-Fadtke, Kristal@Wildlife; Uttley, Paige@Wildlife; Williams, Jonathan@Wildlife; Micko, Steve; Angela Bezzone; Spranza, John; Pitts, Adrian; Greenwood, Marin; Hassrick, Jason; Wilder, Rick; Lecky, Jim; Moderan, Julien; Clabaugh, Anna; Briard, Monique (Monique.Briard@icfi.com)
Subject: Sites Project - Discussion of ITP Sensitivity Runs and Exchanges
When: Wednesday, March 8, 2023 2:00 PM-3:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

See my February 17 email.

Apologies for the delay in getting this scheduled. If this time no longer works, please let me know.

Microsoft Teams meeting

Join on your computer, mobile app or room device
Click here to join the meeting

Meeting ID: 233 009 539 644
Passcode: qpLXQG
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+1 916-538-7066,,4731027# United States, Sacramento
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From: Angela Bezzone [bezzone@mbkengineers.com]
Sent: 3/18/2023 11:18:40 AM
To: 'Hartman, Jelena@Waterboards' [Jelena.Hartman@waterboards.ca.gov]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; WB-Sites WR Application [Sites-WR-Application@Waterboards.ca.gov]
Subject: RE: Sites Application Check-In

Hi Jelena –

I apologize for the delay in getting back to you. For some reason, your emails were getting directed to my "Other" email folder. It's meant for mass mailings, and I don't check it frequently. I'm not sure why your emails were sent there! I have it fixed now, so I will see them in my regular inbox.

There are two reasons for the differences between the diversions in the WAA Report compared to the Admin Draft Final EIR. The first, and the one resulting in larger differences, is that the WAA Report uses the water year to associate water year type with diversions; compared to the Admin Draft which assigns water year type to diversions on a calendar year. This shifts some months to different water year types, resulting in the majority of differences between the two tables. The second is that the WAA Report uses CalSim results for Alternative 3A, which is being used for the Operations Incidental Take Permit. There are only minor code differences between Alternative 3 and 3A (i.e., the assumptions used are the same), but this does end up showing slight differences in monthly diversions with the average annual difference being only 1 TAF. There is no difference in calculated water availability between the two alternatives. We are happy to discuss this with you and others in more detail if you would like. If you agree, we would like to clear this up with a simple language change in the WAA Report.

Can we meet to discuss this and follow up on the other admin items? I am available any time this Thursday (2/23) and the afternoon of next Tuesday (3/28). If these days don't work, I can provide some other days/times.

Thanks!
Angela

From: Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>
Sent: Thursday, March 2, 2023 10:03 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; WB-Sites WR Application <Sites-WR-Application@Waterboards.ca.gov>
Subject: RE: Sites Application Check-In

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

Hi Angela-

Just floating this to the top of your inbox.

Are there any updates from Wes regarding the CalSim tables in the WAA Report and in the FEIR? And, should we plan a meeting to address any ministerial cleanup for potential typos/errors in the application material?
Thanks,

Jelena

From: Hartman, Jelena@Waterboards
Sent: Friday, February 10, 2023 8:45 AM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; WB-Sites WR Application <Sites-WR-Application@Waterboards.ca.gov>
Subject: RE: Sites Application Check-In

Good morning Angela-

Thanks for finding multiple options. Tuesday at 9 works; I'll send the invite shortly.
Sorry about all the typos. I'll use the failing keyboard battery as an excuse.

Jelena

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Friday, February 10, 2023 8:39 AM
To: Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; WB-Sites WR Application <Sites-WR-Application@Waterboards.ca.gov>
Subject: RE: Sites Application Check-In

EXTERNAL:

Good morning,

Unfortunately, I am not available today. But below is my availability for early next week. Please let me know what works for you. If none of these work, we can look later in the week or I can move things around to make time.

Monday: 8-9, 11-1, 3:30-5
Tuesday: 9-10:30
Wednesday: 12-3

In regard to your CalSim question, I will get back to you soon! I have asked Wes to look at the two tables you mentioned below.

Thanks,
Angela

From: Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>
Sent: Thursday, February 9, 2023 3:12 PM
To: Angela Bezzone <bezzone@mbkengineers.com>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; WB-Sites WR Application <Sites-WR-Application@Waterboards.ca.gov>
Subject: RE: Sites Application Check-In

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

Hi Angela-

Thank you for reaching out to offer assistance with the noticing material. I will check with staff working on that if this may be of help and will let you know.

There is a short list of admin items to straighten out so that the application material is as easy to navigate as possible. Would you have time for a quick call to go over this? Please let me know if sometime tomorrow 11 am-2 pm would work, or feel free to propose some time slots next week. I anticipate we would need one hour for this.

Finally, can you help me understand the difference in the CalSim results for historical hydrology summarized in Table B-1 of the Sites WAA Report and Table 5B1-3-4c in the February 2023 admin Final EIR? There are minor differences sprinkled across year types and month, however the differences for December are substantial. The CalSim II model in the WAA Report is the one produce in support of the FEIR, so I'm wondering if there is an error in one of the table or if there is another explanation for the discrepancy.

Looking forward to connecting soon.

Best,

Jelena

Jelena Hartman
Environmental Program Manager
Division of Water Rights, Bay-Delta
California State Water Board
jelena.hartman@waterboards.ca.gov

From: Angela Bezzone <bezzone@mbkengineers.com>
Sent: Thursday, February 9, 2023 2:48 PM
To: Hartman, Jelena@Waterboards <Jelena.Hartman@waterboards.ca.gov>
Cc: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>
Subject: Sites Application Check-In

EXTERNAL:

Hi Jelena,

Based on recent conversations, it sounds like we can expect the Sites Reservoir water right application to be noticed relatively soon. I wanted to reach out to you to offer our assistance in anyway in drafting noticing materials. We have drafted a summary of the application based on a recent example of an application notice that might be of use to you. Alternatively, if there is anything you have prepared and would like our review, please feel free to send it our way, or we can set up a call to talk through things. Please let me know how we can help!

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

File Provided Natively

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/19/2023 2:52:53 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Ready for Review

By the way, what happened with MWD? I haven't see comments from them either.

From: Laurie Warner Herson
Sent: Sunday, March 19, 2023 2:48 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Ready for Review

No, I did not see comments from Jeff. He mentioned having reviewed sections and having minimal comments during the Board meeting so wondered whether you had them.

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Sunday, March 19, 2023 1:32 PM
To: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Ready for Review

Laurie, I was just going through emails and came across this one. I don't think we saw comments from Jeff on the admin Final EIR/EIS. Are you award of any?

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: Jeff Sutton <jsutton@tccanal.com>
Sent: Friday, February 24, 2023 2:38 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Ready for Review

Ali,

I have done my review. I thought things looked really good. I left my notes at home, might have a couple minor questions/edits, but not much and nothing serious, I will forward any thoughts I have if I decide worthwhile over the weekend or Monday at the latest. Compliments to yourself and the team on the effort.

I would like to participate in any meeting(s) where you discuss concerns/edits/questions of others and/or where you provide a general overview of the comments and responses.

Thanks again for the opportunity to review.

Hope your recovery is going well.

Jeffrey P. Sutton
General Manager
Tehama-Colusa Canal Authority
5513 State Highway 162
PO Box 1025
Willows, CA 95988
Office (530) 934-2125
Mobile (530) 301-1030
jsutton@tccanal.com

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Friday, February 24, 2023 2:13 PM
To: Michael Azevedo <mjazevedo@countyofcolusa.com>; Gary Evans <gevans@countyofcolusa.com>; Thad Bettner (tbettner@gcid.net) <tbettner@gcid.net>; 'Jeffrey P Sutton (jsutton@tccanal.com)' <jsutton@tccanal.com>; Greg A. Krzys <gkrzys@gcid.net>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Ready for Review

Hello all – We've had some feedback that folks could use additional time in their review. We also have a really tight schedule to finish the document, so are trying to balance these requests with the Project schedule. We've come up with the following approach:

Group 1 – Chapters, Appendices, and Responses generally NOT reliant on the new modeling will now be due on March 3. This gives a few extra days for your review and allows us to get moving on changes to these chapters relatively on schedule.

Group 2 – Chapters, Appendices and Responses generally WITH the new modeling will now be due on March 14. This gives an additional 2 weeks for your review of these heftier sections.

The attached document outlines this in more detail. Please let me know if you have any questions or concerns.

We look forward to your comments.

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: Wednesday, February 1, 2023 4:59 PM
To: Michael Azevedo <mjazevedo@countyofcolusa.com>; Gary Evans <gevans@countyofcolusa.com>; Thad Bettner (tbettner@gcid.net) <tbettner@gcid.net>; 'Jeffrey P Sutton (jsutton@tccanal.com)' <jsutton@tccanal.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Sites Reservoir Project - Admin Final EIR/EIS Ready for Review around February 1

Hello all! Attached is the presentation that I ran through quickly today. Its mostly just for your reference if anything comes up.

If you haven't gotten notification of SharePoint access, you should get a notification in the next couple of days. A number of files are already posted and ready for review.

And as always, don't panic or get frustrated. Reach out to Laurie or myself. We're happy to help!

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: Friday, January 20, 2023 4:03 PM
To: Michael Azevedo <mjazevedo@countyofcolusa.com>; Gary Evans <gevans@countyofcolusa.com>; Thad Bettner (tbettner@gcid.net) <tbettner@gcid.net>; 'Jeffrey P Sutton (jsutton@tccanal.com)' <jsutton@tccanal.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: Sites Reservoir Project - Admin Final EIR/EIS Ready for Review around February 1

Hello Jeff, Thad, Mike and Gary, I wanted to give you all a heads up on this and forgot to mention this today when I saw you all --

We are in the final landing pattern for the admin Final EIR/EIS for the Sites Reservoir Project. We expect to have Volume 1 of the admin Final ready for review around February 1. Volumes 2 and 3 are expected to be ready for review around February 10. The different volumes consist of the following:

Volume 1 – main document (changes in track changes)
Volume 2 – appendices (changes in track changes)
Volume 3 – response to comments

All comments would be due on February 28.

We are happy to schedule a call to provide an overview of the document and how it will "look" when released to the public to help your review. I am substantially time constrained as I'm having foot surgery on 2/2 that is expected to take me out for a few days. So please let me know your availability for the following dates/times for this overview presentation:

Wednesday, February 1 – anytime from 12:30 PM to 5 PM
Thursday, February 9 – anytime from 9 am to noon
Friday, February 10 - anytime

Thanks all!

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: Sherrick, Robert@Wildlife [Robert.Sherrick@Wildlife.ca.gov]
Sent: 3/20/2023 8:26:52 AM
To: steve.micko@jacobs.com
CC: Angela Bezzone [bezzone@mbkengineers.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Sites Project - Discussion of ITP Sensitivity Runs and Exchanges

Thank you Steve!

Rob Sherrick, PE
(916) 516-4233

From: Micko, Steve <Steve.Micko@jacobs.com>
Sent: Friday, March 17, 2023 4:37 PM
To: Sherrick, Robert@Wildlife <Robert.Sherrick@Wildlife.ca.gov>
Cc: Angela Bezzone <bezzone@mbkengineers.com>; Alicia Forsythe <aforsythe@sitesproject.org>
Subject: RE: Sites Project - Discussion of ITP Sensitivity Runs and Exchanges

WARNING: This message is from an external source. Verify the sender and exercise caution when clicking links or opening attachments.

Hi Rob,

Nice talking with you the other day! Please see attached trend reporting spreadsheet with the following CalSim II studies:

- NAA 041222 – No Action Alternative at historical climate
- NAA 041222 2035CT – No Action Alternative at 2035CT climate and 15 cm sea level rise
- ALT 3B 041222 – Alternative 3B (16% Federal participation) at historical climate
- ALT 3B 0411 2035CT – Alternative 3B (16% Federal participation) at 2035CT climate and 15 cm sea level rise

Let me know if you have any questions!
Steve

-----Original Appointment-----
From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, February 28, 2023 9:07 AM
To: Alicia Forsythe; Davis-Fadtke, Kristal@Wildlife; Uttley, Paige@Wildlife; Williams, Jonathan@Wildlife; Micko, Steve; Angela Bezzone; Spranza, John; Pitts, Adrian; Greenwood, Marin; Hassrick, Jason; Wilder, Rick; Lecky, Jim; Moderan, Julien; Clabaugh, Anna; Briard, Monique (Monique.Briard@icfi.com)
Subject: Sites Project - Discussion of ITP Sensitivity Runs and Exchanges
When: Wednesday, March 8, 2023 2:00 PM-3:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

See my February 17 email.

Apologies for the delay in getting this scheduled. If this time no longer works, please let me know.

Microsoft Teams meeting

Join on your computer, mobile app or room device
Click here to join the meeting

Meeting ID: 233 009 539 644
Passcode: qpLXQG
Download Teams | Join on the web

Or call in (audio only)
+1 916-538-7066,,4731027# United States, Sacramento
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Sites
Program Management Team

Concept Road Alignments Meeting

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	March 20, 2023
From:	Jeffrey Wisniewski, P.E., G.E.; Mike Smith, P.E., G.E.
Subject:	Notes from Concept Road Alignments Meeting

A meeting regarding the Sites concept road alignments was held on Wednesday March 1, 2023, virtually via Microsoft Teams. The objective of the meeting was to address the status of the Sites road alignments. Participants include individuals representing Sites Project Authority, HDR, AECOM, and Jacobs.

Participants:

Henry Luu	HDR	Howard Michael	AECOM
JP Robinette	Sites Project Authority	Mike Smith	AECOM
Kevin Spesert	Sites Project Authority	Jeffrey Wisniewski	AECOM
Connor McDonald	Sites Project Authority	Mike Forrest	AECOM
Jeff Matthews	Sites Project Authority	Ron Valdez	AECOM
Pete Rude	Jacobs	Vanessa Doctolero	AECOM

The Project team discussed technical materials relating to the status of roads and road alignments.

Key decisions:

- Authority wants to craft land use agreements that benefit both the project and the landowner.
- SLR is preferable alternative for the balance of design speed and real estate impacts.
    - Kevin prefers the pink (magenta) alignment (Alt. West 03) that accommodates 45 mph speed, which is less straight than Alt. West 02 that accommodates 45 mph speed with greater earthwork, and straighter than the most curvilinear Alt. West 01 that accommodates 25 mph speed with similar earthwork).
    - Each alternative should be presented to Colusa County and the First Responders for confirmation of the alignment to be advanced through design.
- Southerly project access
    - Dirks Construction Access Road

- Selected as best alternative over McDermott/Maxwell Sites/Sutton/Wadleigh/Old 99.
- Cease further consideration of McDermott/Maxwell Sites/Sutton/Wadleigh/Old 99 other than to complete the impact analysis at a high-level for the section of McDermott that shifts through close/tight reversing curves to align immediately adjacent the GCID Main Canal in preparation for presentation to Colusa County and for further justification for the selection of Dirks Road Alternative.

- Selected Alignment
  - Each should be presented to the Colusa County and the First Responders for confirmation of the alignment to be advanced through design.
- All agree to criteria as presented during the meeting for Valley Roads, Dirks Road, and SL Road.
- Current target of mid-April for Board/County meeting.

Action items:

1. In anticipation of meeting with Colusa County, AECOM will provide a summary of illustrated impacts that could be avoided with the use of Dirks Road as the access alternative. This analysis will further develop the layout (plan view) at the short limit of McDermott directly along the canal (between reversing curves as was presented during the meeting) to better illustrate impacts based on: refined layout of ROW per topo features (fences, etc.) and field observations, and GIS depicted ROW width. We will also prepare two cross sections for discussion's sake and to complete our due diligence to define impacts and justify avoiding McDermott and other county roads. This work will be kept to a fairly high level will summarize impacts of paving up to the toe of the canal bank and the improve the roadway from this control point (least impacting), and another section where the existing EP would be the control point for improving the roadway (greatest impact). Both would illustrate impacts that would be completely avoided with the Dirks Road access alternative.
2. AECOM to verify need for 6-foot shoulders on SLR realignment from westerly recreational area to easterly recreational area. This will be revisited with Colusa County for final confirmation to plan for bike lanes.
3. AECOM to consider a 100-foot buffer with SLR Alts 1, 2 and 3 and adjust as needed to accommodate and to verify that 100-foot buffer is a project requirement first.
4. Confirm with GCID if they would accept utility poles relocated into GCID canal embankment. (Given the direction during this meeting to no longer develop roadway improvements along McDermott and other roads in the farming community, and instead focus on a new access route along Dirks Road, the action to meet with GCID may be deemed unnecessary. However, there may be value in documenting any concerns that the GCID might have regarding avoiding any roadway improvements that would impact their facilities, as further justification for abandoning the concept of McDermott roadway improvements and instead plan on access from Dirks Road. The Authority is to advise on meeting with GCID or not).

5. Kevin to set up meeting with Glenn County to discuss alternatives – approximately three weeks out (from meeting date).
6. Kevin to set up meeting with first responders to discuss alignments on SKR realignment.
7. Kevin to set up meeting with Colusa County – approximately six weeks out (from meeting date).

Sites

January 12, 2023

Colusa Indian Community Council
Mr. Daniel Gomez, Tribal Chairman
3730 Highway 45
Colusa, CA 95932

Subject: Invitation to Participate in a Tribal Working Group; Sites Reservoir Project in Glenn, Colusa, Tehama, and Yolo Counties, California

Dear Honorable Chairperson Gomez:

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P.O. Box 517
Maxwell, CA 95955
530.438.2309

Sites

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Sincerely,

Fritz Durst

Fritz Durst
Chair

P.O. Box 517
Maxwell, CA 95955
530.438.2309

Cc: Oscar Serrano, P.E.
Colusa Indian Community Council
3730 Highway 45
Colusa, CA 95932

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530.438.2309

Sites

January 12, 2023

Colusa Indian Community Council
Mr. Daniel Gomez, Tribal Chairman
3730 Highway 45
Colusa, CA 95932

Subject: Invitation to Participate in a Tribal Working Group; Sites Reservoir Project in Glenn, Colusa, Tehama, and Yolo Counties, California

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Colusa Indian Community Council
3730 Highway 45
Colusa, CA 95932

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530.438.2309

Sites

January 18, 2023

Colusa Indian Community Council
Mr. Wayne Mitchum Jr., Tribal Chairman
3730 Highway 45
Colusa, CA 95932

Subject: Invitation to Participate in a Tribal Working Group; Sites Reservoir Project in Glenn, Colusa, Tehama, and Yolo Counties, California

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Fritz Durst

Fritz Durst
Chair

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Sites

Cc: Ms. Melissa Mitchum
Director of Tribal Preservation
Colusa Indian Community Council
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Colusa, CA 95932

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Colusa, CA 95932

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From: Micko, Steve [Steve.Micko@jacobs.com]
Sent: 3/21/2023 8:15:32 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Angela Bezzone [bezzone@mbkengineers.com]; Leaf, Rob [Rob.Leaf@jacobs.com]
Subject: Response to NGO Requests: Sites Seepage
Attachments: RDEIR-SDEIS-App08B-Groundwater-Modeling.pdf

Hi Ali,

Appendix 8B of the Sites RDEIR/SDEIS is attached.
On pdf pages 3 through 13, seepage modeling approach and results are presented for the 2017 DEIR alternatives.
The maximum seepage is estimated to be 2,150 gpm (or about 3.5 TAF/yr).

Hope this helps!

Thanks,
Steve

Steve Micko, PE (he/him) | Jacobs | Project Manager and Water Group Leader
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: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/21/2023 8:15:47 AM
To: Obegi, Doug [dobegi@nrdc.org]
CC: Spranza, John [john.spranza@hdrinc.com]
Subject: RE: Winter-run life cycle model results for Sites Reservoir
Attachments: Heatmaps_Sites_2035_collated_20220921.pdf; WRLCMreportMultiScenSitesAlt3AMod_Alt3BMod 2023_02_27.pdf; WRLCM_Sites_ModelDescription_20230315.pdf

Hi Doug – Attached are the results that we received from UC Santa Cruz/NMFS Science Center.

We had original runs completed in fall 2022. These didn't fully account for the reductions in flows in the Sacramento River due to the Sites Project. A modelling person would have to explain this better, but as I understand it, the input nodes for the different segments in the model were above our diversions (above Red Bluff) and then below our diversions. So the upper nodes didn't "see" our diversions while the lower nodes did. We worked with Noble and Jacobs and adjusted the input in the upper nodes to account for Sites diversions so the model "saw" those reductions in flows and then applied the flow/survival curve for that reach of the model. So it is my understanding that the model does account for a flow/survival relationship – at least to some extent. You know that I am not a modeler, so I cant explain how detailed this is, but accounting for our diversions and applying loss factors based on the flow/survival relationship was the reason we re-ran the model. And we saw different results with this – lower benefits we we re-ran it.

We're happy to set up a meeting with the UC Santa Cruz/NMFS Science Center and you to chat about this. We're also thinking of setting up a briefing with the NGO small group that we've been working with and UC Santa Cruz/NMFS Science Center to go over the results too.

Hope this helps! We're happy to chat about these, but the detailed modeling questions are best for UC Santa Cruz/NMFS Science Center.

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: Obegi, Doug <dobegi@nrdc.org>
Sent: Monday, March 20, 2023 2:43 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Winter-run life cycle model results for Sites Reservoir

Hi Ali,

Hope you're staying dry! I noticed that the Sites Board of Directors received an update on the results of NMFS' winter-run life cycle model earlier this month (https://sitesproject.org/wp-content/uploads/2023/03/03-02-Winter-Run-Life-Cycle-Model-Results.pdf). Would you please share those model results with me?

I was also confused about the statement in the Board update that asserts that the life cycle model accounts for water diversions by the Project. The publicly available version of NMFS' winter-run life cycle model does not account for the flow: survival relationship in the Sacramento River, and thus would not account for these proposed water diversions. Was the life model specifically updated to include a flow:survival term, and if so, what assumptions were used for that flow:survival relationship?

Thanks,
Doug

DOUG OBEGI
*Senior Attorney**
Water Program

NATURAL RESOURCES DEFENSE COUNCIL

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SAN FRANCISCO, CA 94104
T 415.875.6100
DOBEGI@NRDC.ORG
NRDC.ORG

Please save paper.
Think before printing.

** Admitted to practice in California*

Model Description for the Sacramento River Winter-run Chinook Salmon Life Cycle Model: an implementation for the Sites Reservoir Project

Noble Hendrix[1]
Ann-Marie K. Osterback[2,3]
Vamsi Sridharan[2,3]
Doug Jackson[1]
Sara John[2,3]
Miles Daniels[2,3]
Eric Danner[2,3]
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Seattle, WA 98112-2097

March 15, 2023

Draft_0023530

I. Background and Model Structure

Given the goals of improving the reliability of water supply and improving the ecosystem health in California's Central Valley, NMFS-SWFSC is developing simulation models to evaluate the potential effects of water project operations and habitat restoration on the dynamics of Chinook salmon populations in the Central Valley. These life cycle models (LCMs) couple water planning models (CALSIM II), physical models (HEC-RAS, DSM2, DSM2-PTM, USBR river temperature model, etc.) and Chinook salmon life cycle models to predict how various salmon populations will respond to suites of management actions, including changes to flow and export regimes, modification of water extraction facilities, and large-scale habitat restoration. In this document, we describe a winter-run Chinook salmon life cycle model (WRLCM). In the following sections, we provide the general model structure, the transition equations that define the movement and survival throughout the life cycle, the life cycle model inputs that are calculated by external models for capacity and smolt survival, and the steps to calibrate the WRLCM.

Winter-run Life Cycle Model (WRLCM)

The WRLCM is structured spatially to include several habitats for each of the life history stages of spawning, rearing, smoltification (physiological and behavioral process of preparing for seaward migration as a smolt), outmigration, and ocean residency. We use discrete geographic regions of Upper River, Lower River, Floodplain, Delta, Bay, and Ocean (Figure 1). The temporal structure of winter-run Chinook is somewhat unique, with spawning occurring in the late spring and summer, the eggs incubating over the summer, emerging in the fall, rearing through the winter and outmigrating in the following spring (Figure 2). We capture these life-history stages within the WRLCM by using developmental stages of eggs, fry, smolts, ocean sub-adults, and mature adults (spawners). The goal of the WRLCM is consistent with that of Hendrix et al. (2014); that is, to quantitatively evaluate how Federal Central Valley Project (CVP) and California State Water Project (SWP) management actions affect Central Valley Chinook salmon populations.

In 2015, the WRLCM was reviewed by the Center for Independent Experts (CIE). In response to recommendations from the CIE, the following modifications were implemented in the WRLCM: 1) divided the River habitat to encompass above Red Bluff Diversion Dam (Upper River) and below Red Bluff Diversion Dam (Lower River); 2) incorporated hatchery fish into the WRLCM; 3) used 95% of observed density as an upper bound for calculation of habitat capacity; 4) re-parameterized the Beverton-Holt function; 5) used appropriate spawner sex-ratios for model calibration to account for bias in Keswick trap capture; 6) modified the WRLCM to a state-space form to incorporate measurement error and process noise; and 7) designed metrics and simulation studies to evaluate model performance. In addition, Hendrix et al. (2014) indicated that future work would use DSM2's enhanced particle tracking model to track salmon survival, which has now been implemented.

Additional comments received in the CIE review that have not been incorporated yet include: 1) expanding spatial structure for spring and fall-run; 2) tracking additional categories of juveniles (e.g., yearling) for applying an LCM to spring-run Chinook; 3) implementing shared capacity for fall and spring-run Chinook; 5) tracking monthly cohorts through the model; and 6) evaluating multiple model structural forms. We are actively working on improving the WRLCM and developing the spring-run LCM (SRLCM) and fall-run LCM (FRLCM). Many of the CIE recommendations will be implemented with subsequent versions of these models.

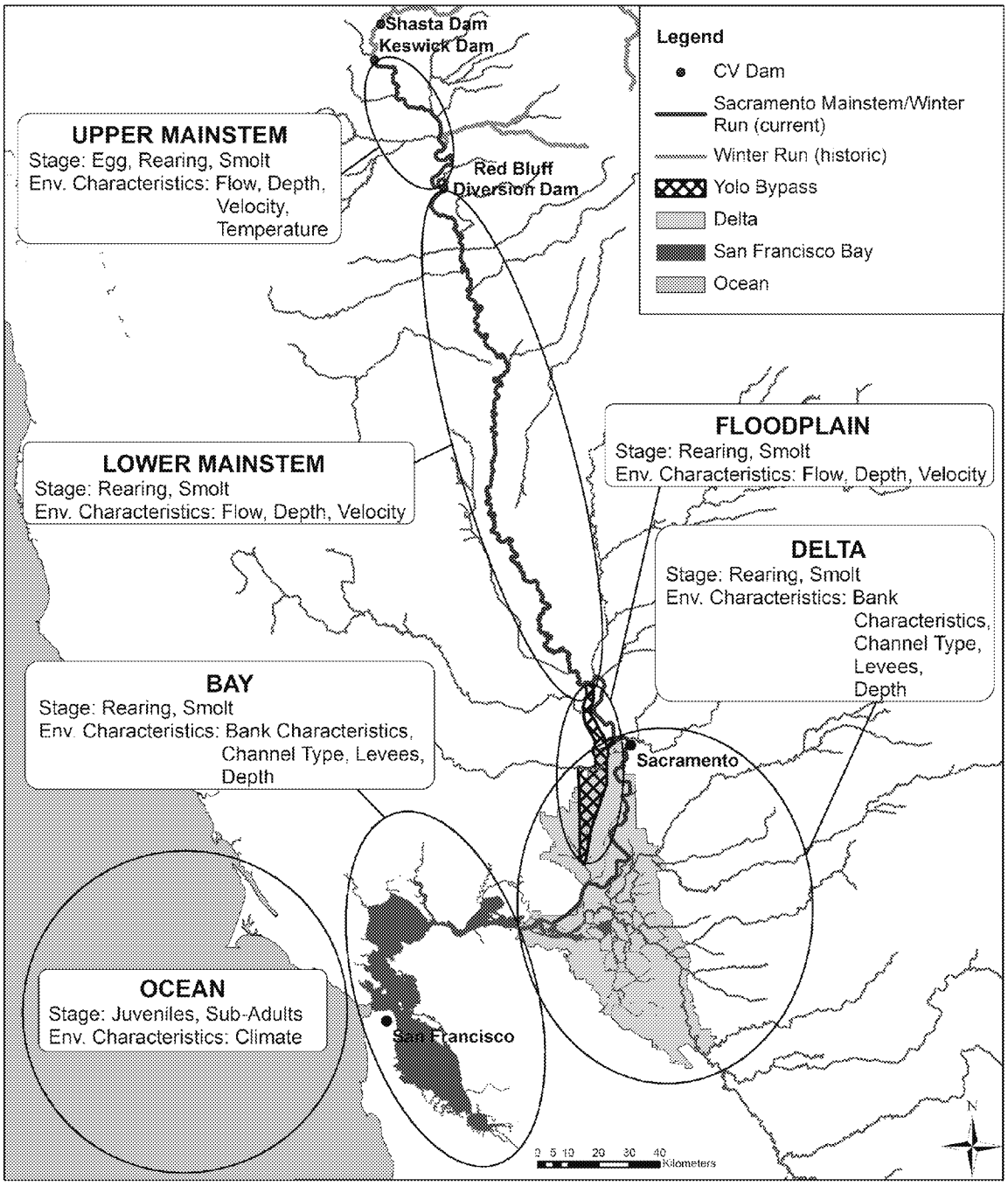

Figure 1. Geographic distribution of Chinook life stages and examples of environmental characteristics that influence survival.

The quantity and quality of rearing and migratory habitat are viewed as key drivers of reproduction, survival, and migration of freshwater life stages. Various life stages have velocity, depth, and temperature preferences and tolerances, and these factors are influenced by water project operations and climate.

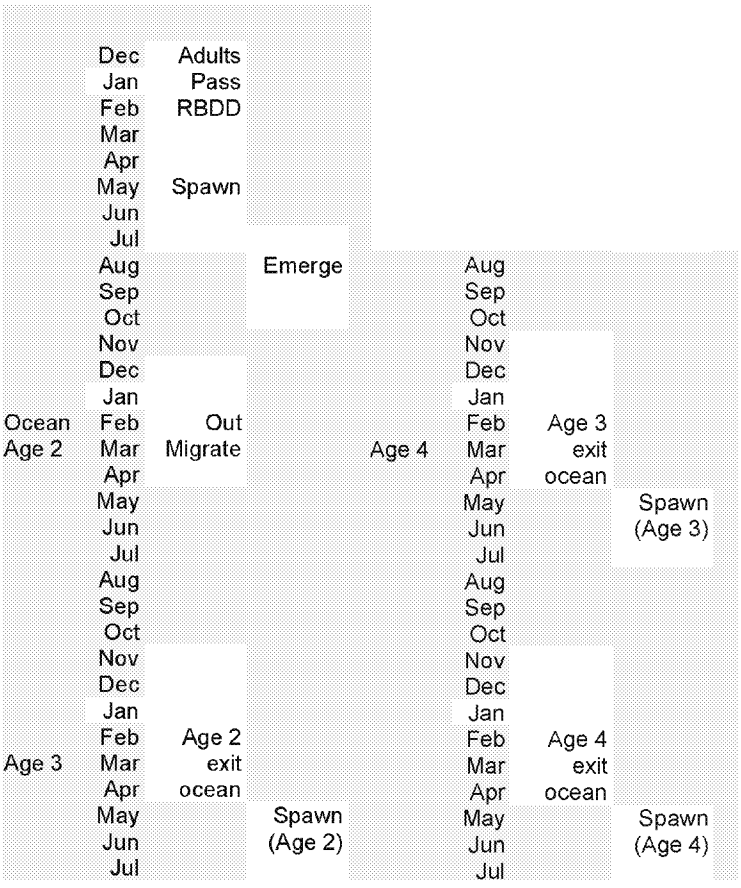

Figure 2. Temporal structure of the winter-run Chinook salmon. Each cohort begins in March of the brood year. Figure from Grover et al. (2004).

Hydrology (the amount and timing of flows) is modeled with the California Simulation Model II (CALSIM II). Hydraulics (depth and velocity) and water quality is modeled with the Delta Simulation Model II (DSM2) and its water quality sub-model QUAL, the Hydrologic Engineering Centers River Analysis System (HEC-RAS), the U.S. Bureau of Reclamation's (USBR) Sacramento River Water Quality Model (SRWQM), and other temperature models. The enhanced particle tracking model (ePTM) makes use of many of these DSM2 related products to calculate survival of outmigrating smolts originating from Lower River, Delta, and Floodplain habitats. Many of the stage transition equations describing the salmon life cycle are directly or indirectly functions of water quality, depth, or velocity, thereby linking management actions to the salmon life cycle. The combination of models and the linkages among them form a framework for analyzing alternative management scenarios (Figure 3).

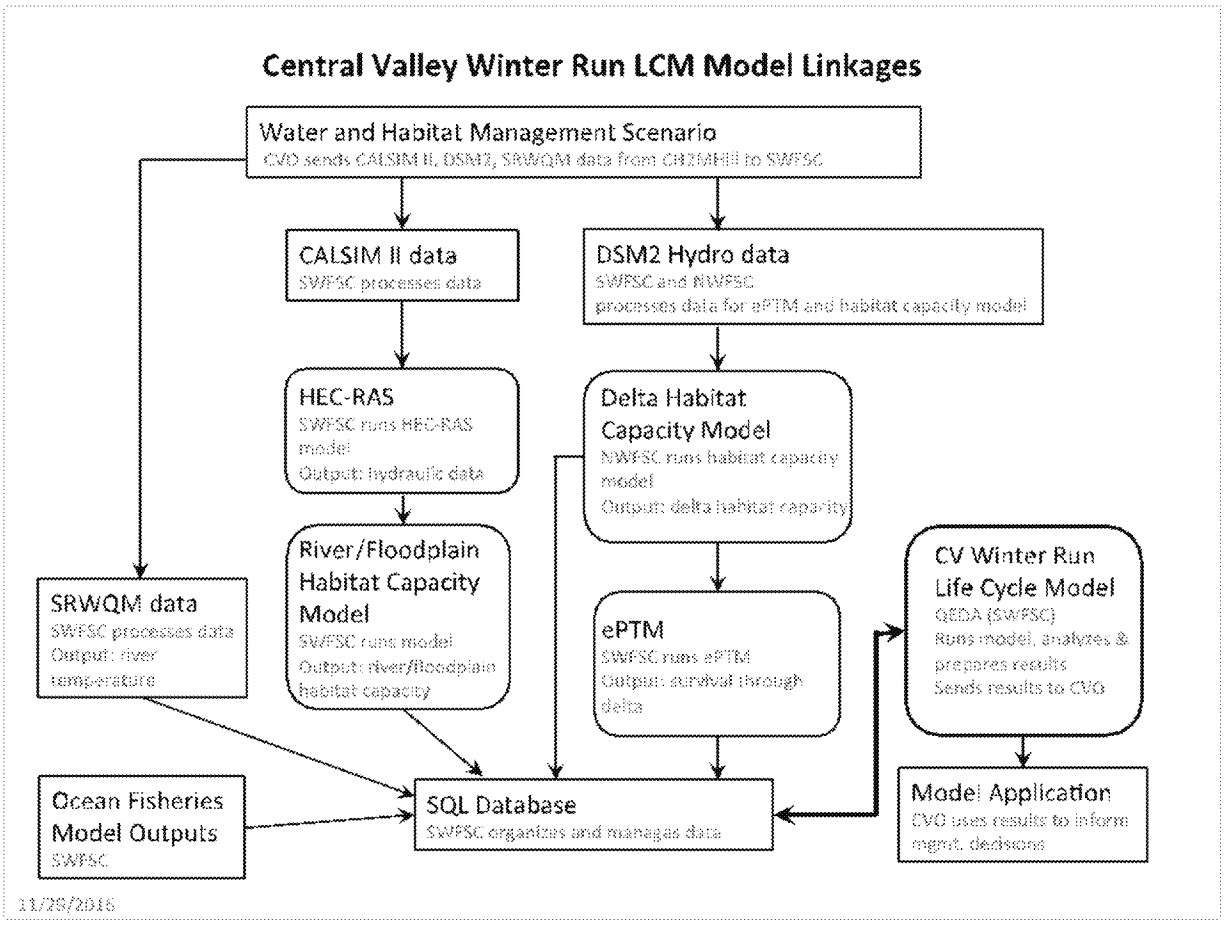

Figure 3. Submodels that support and provide parameter inputs that feed into the life cycle model.

The life cycle model is a stage-structured, stochastic life cycle model. Stages are defined by development and geography (Figure 1), and each stage transition is assigned a unique number (Figure 4).

II. Model Transition Equations

This section is divided into two parts. In the first part, we explain each of the transitions for the natural origin winter-run Chinook, which are described by the life cycle diagram (Figure 4). In the second part, we explain the transitions for hatchery origin fish. The transitions are described for an annual cohort; however, in most cases we have not included a subscript for the cohort brood year to simplify the equations. For those transitions in which there are multiple cohorts, such as the production of eggs in transition 22, a subscript to distinguish cohort is included in the equation.

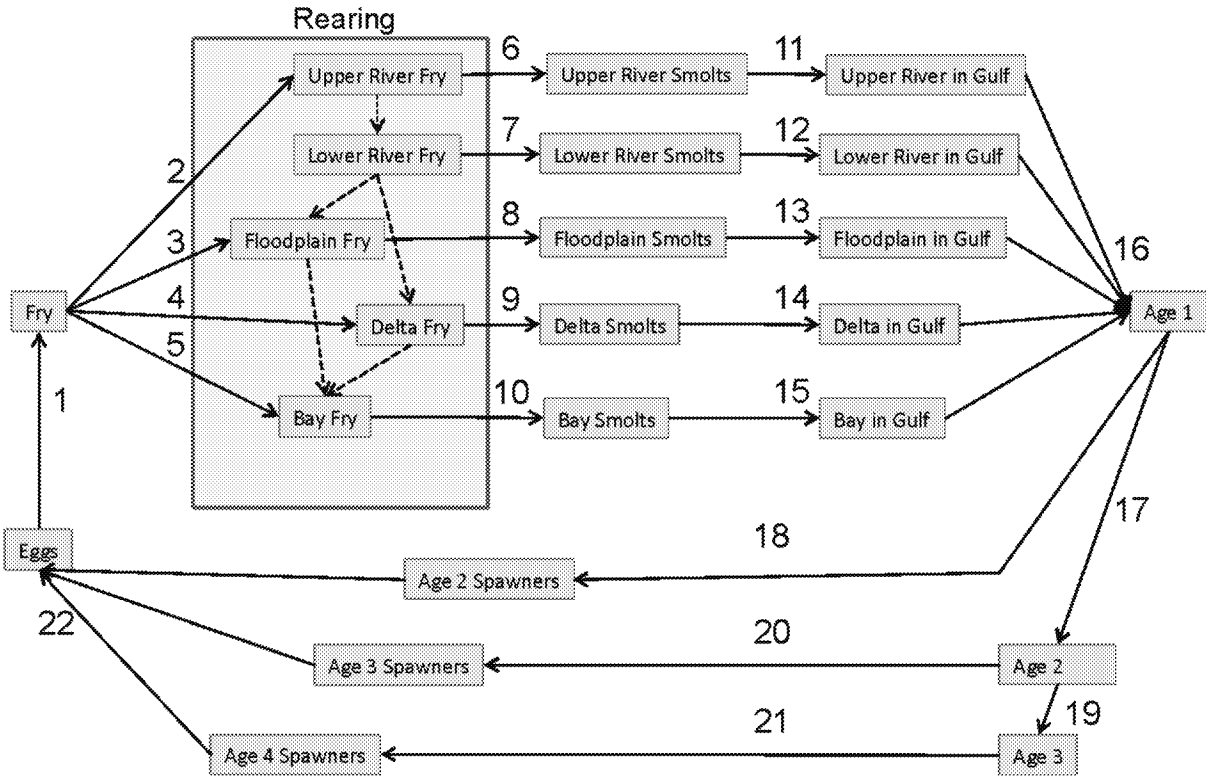

Figure 4. Central Valley Chinook transition stages. Each number represents a transition equation through which we can compute the survival probability of Chinook salmon moving from one life stage in a particular geographic area to another life stage in another geographic area.

Natural Origin Chinook

Transition 1

Definition: Survival from Egg to Fry

$Fry_{m+2} = Eggs_m * S_{eggs,\,m}$

$$logit(S_{eggs,m}) = \begin{cases} B0_1, & TEMP \leq t.crit \\ B0_1 + B1_1(TEMP_m - t.crit), & TEMP > t.crit \end{cases}$$

where $S_{eggs,m}$ is the survival rate of fry as a function of the coefficients $B0_1$, $B1_1$ and *t.crit* (model parameter representing the critical temperature at which egg survival begins to be decline), logit(x) = log(x/[1-x]) is a function that ensures that the survival rate is within the interval [0,1], for months m = (2, …, 6) corresponding to April to August (Figure 5).

Factors affecting baseline survival $B0_1$

$B0_1 = B0a + B1a * \mathrm{X1}$

Where B0a is the intercept and B1a is the slope of the regression relating the covariate X1 to the background survival rate. This formulation provides the ability to incorporate the influence of Thiamine deficiency, for example, which may affect the survival of eggs. In addition, this term could also be used to reflect density dependent mortality of eggs, which was identified as a possible factor

in Martin et al. (2017). The covariate $TEMP_m$ is defined as the equally weighted average of the month of spawning m and the following 2 months.

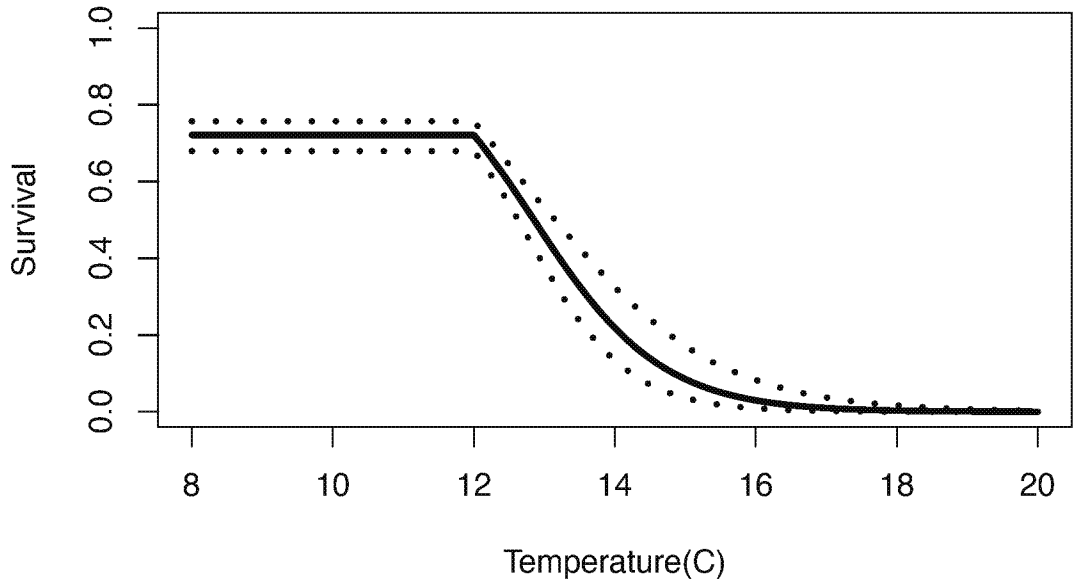

Figure 5. The relationship of egg to fry survival as a function of temperature below Keswick Dam. The solid line represents the median survival rate and the dotted lines represent the 95% CI from 1000 combinations of parameter estimates.

Transitions 2 - 5

Definition: Dispersal from fry in the natal reaches as tidal fry to the h habitats = Lower River (LR), Floodplain (FP), Delta (DE), and Bay (BA) in months m = (5, ..., 10) corresponding to July to December. Fry that remain (in contrast to those that are tidal fry) rear in the Upper River (UR).

Tidal Fry and Upper River Rearing Fry (Transition 2)

$$TidalFry_{m,} = P_{TF,} * Fry_m$$

$$RearFry_{UR,m} = (1 - P_{TF}) * Fry_m$$

where P_{TF} is the proportion of fry moving out of the Upper River as tidal fry, and $RearFry_{UR,m}$ are the number remaining in the Upper River habitat (UR) as rearing fry.

Floodplain Tidal Fry (Transition 3)

Whenever there are flows into the Yolo Bypass, a proportion of the Tidal Fry move into the floodplain habitat:

$$TidalFry_{FP,m} = S_{TF,FP} * TidalFry_m * P_{FP,m}$$

where $P_{FP,\,m}$ is the proportion of fry that move into the Floodplain habitat, and $S_{TF,FP}$ is the monthly survival of tidal fry in the floodplain.

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For the 2035 climate scenario evaluation, the $P_{FP,m}$ is modeled as a function of the expected flow onto the Floodplain habitat due to proposed modifications of the Fremont Weir.

$$P_{FP,m} = \begin{cases} min.p, & y.flow_m < 100 \\ min.p + \dfrac{(y.flow_m - 100) * (0.5 - min.p)}{5900}, & 100 \leq y.flow_m \leq 6000 \\ inv.logit\left(\dfrac{p.rate * (y.flow_m - 6000)}{1000}\right), & y.flow_m > 6000 \end{cases}$$

where $P_{FP,m}$ is the proportion of fry moving into the Floodplain as a function of the coefficients $min.p$ (0.05) and $p.rate$ (1.1), and the covariate $y.flow_m$. The function inv.logit(x) = $e^x/(1+ e^x)$ ensures that the proportion of fry moving into the Floodplain is within the interval [0,1]. The covariate $y.flow_m$ represents the monthly average flow rate (cfs) at the entrance to Yolo Bypass (CALSIM node D160). The relationship between $P_{FP,m}$ and flow is depicted in Figure 6.

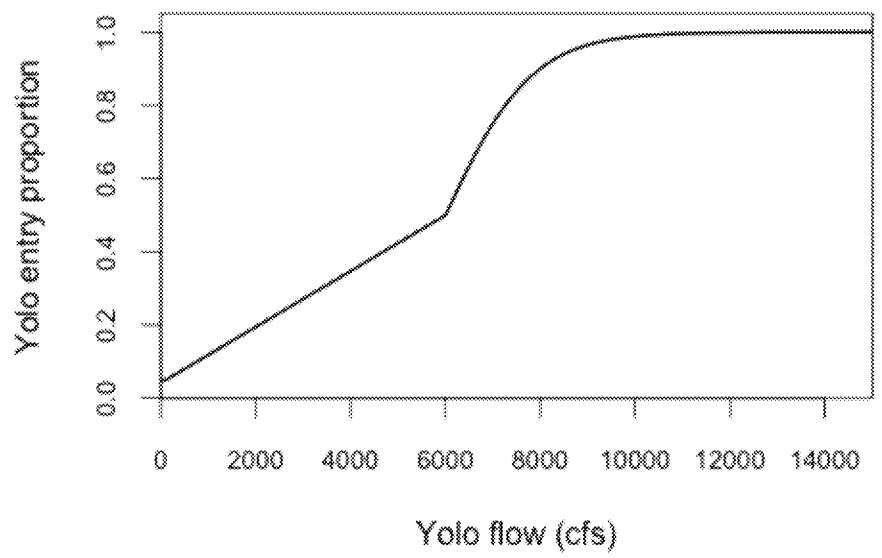

Figure 6. The relationship of Floodplain entry (Yolo bypass) entry proportion (P_{FP}) as a function of Yolo flow.

Delta and Bay Tidal Fry (Transition 4 and 5)

$TidalFry_{DE,m} = TidalFry_m * (1- P_{FP,m}) * (1 - P_{TF,BA,m}) * S_{TF,DE,m}$

$TidalFry_{BA,m} = TidalFry_m * (1- P_{FP,m}) * P_{TF,BA,m} * S_{TF,DE,m} * S_{TF,DE-BA}$

where $S_{TF,DE,m}$ is the survival to the Delta by Tidal Fry.

$\text{logit}(S_{TF,DE,m}) = B0_4 + B1_4 * DCC_m$

where $B0_4$ and $B1_4$ are model parameters, and DCC_m is the proportion of the transition month that the DCC gate is open.

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$P_{TF,Bay,m}$ is the proportion of fish moving to the Bay from the Delta

$$\text{logit}(P_{TF,Bay,m}) = B0_5 + B1_5 * Q_{RioVista,m}$$

where $B0_5$ and $B1_5$ are model parameters, and $Q_{RioVista,m}$ is the flow anomaly (subtract mean and divide by standard deviation). The mean and standard deviation were calculated from 1970-2014 data at Rio Vista (mean = 11,360, standard deviation = 12166.73).

Rearing

Definition: Fry rear among Upper River, Lower River, Floodplain, Delta, and Bay habitats according to a density dependent movement function in months m = (5, ..., 10) corresponding to July to December.

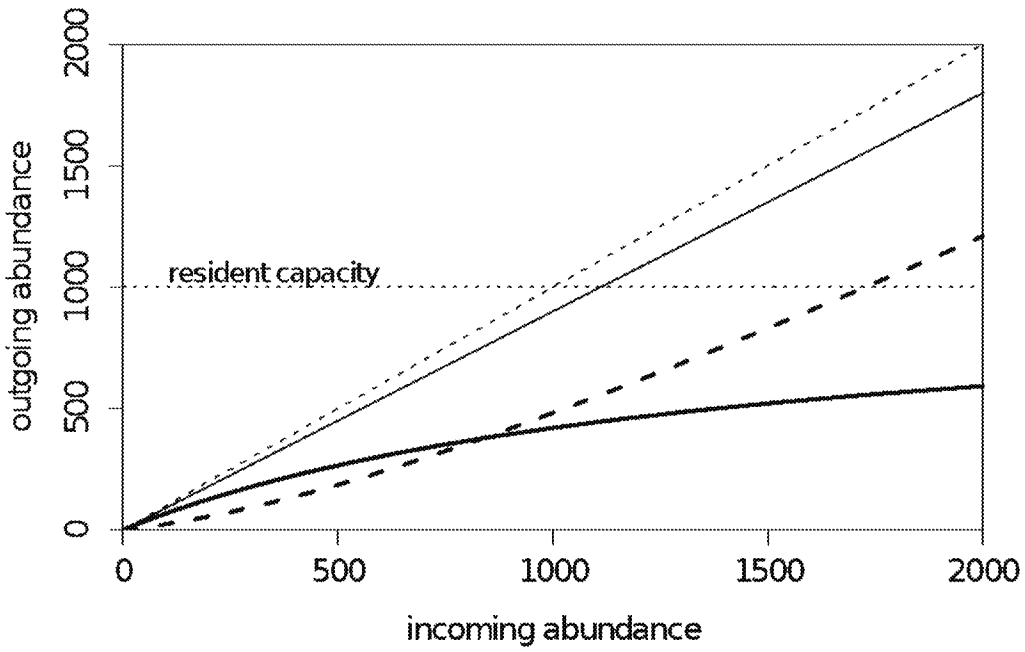

Figure 7. Example of the Beverton-Holt movement function in which the outgoing abundance (thin solid black line) is split between migrants (thick dashed line) and residents (solid dark line), that are affected by the resident capacity (thin dotted line). The 1:1 line (thin dashed line) is also plotted for reference. Parameter values used in the plotted relationship are survival, *S* = 0.90; migration, *m* = 0.2; and capacity, *K*= 1000.

The number fry that remain as residents in the month is calculated from the following equation (Figure 7):

$$Residents_{h,m} = S_{FRY,h,m} * (1 - mig_{h,m}) * N_{h,m} / (1 + S_{FRY,h,m} * [1 - mig_{h,m}] * N_{h,m}/K_{h,m})$$

$$Migrants_{h,m} = S_{FRY,h,m} * N_{h,m} - Residents_{h,m}$$

where $S_{FRY,h,m}$ is the survival rate in the absence of density dependence, $N_{h,m}$ is the pre-transition abundance composed of *Migrants* from upstream habitats in m-1 and *Residents* from the current

habitat (Figure 7) in m-1, $K_{h,m}$ is the capacity for habitat type h and $mig_{h,m}$ is the migration rate in the absence of density dependence in month m.

The migration rate in the Upper River, $mig_{UR,m}$, is unique and is estimated by using the temporal patterns in fry abundance estimated at Red Bluff Diversion Dam (Poytress et al. 2014).

The migration rate in the Lower River, $mig_{LR,m}$, is modeled as a function of a flow threshold at Wilkins Slough

$$\text{logit}(mig_{LR,m}) = B0_M + B1_M * I(Q_{Wilkins,\,m} > 400\ m^3s^{-1})$$

whereas in all other habitats and months the migration rate $mig_{h,m}$ is a constant value (e.g., movement from the floodplain to the delta, the delta to the bay, and the bay to the gulf).

Survival of fry

Survival of resident and migrant fry $S_{FRY,h,m}$ are modeled as a function of a covariate $X_{h,m}$ that can vary for each habitat and month. The monthly survival rate of fry in habitat h and month m is modeled as

$$\text{logit}(S_{FRY,h,y,m}) = B0_F + B1_{F,h} * X_{h,y,m}$$

Smolting

Transitions 6 - 10

Definition: Smolting of *Residents* in the Upper River, Lower River, Floodplain, Delta, and Bay rearing habitats in months m = (11, ... ,17) corresponding to January to July in the calendar year after spawning.

$$Smolts_{h,m} = P_{SM,m} * Residents_{h,m-1}$$

where $P_{SM,m}$ is the probability of smolting in month m which is assumed to be the same across habitats, by the *Residents* from the previous month (m-1) in that habitat.

The probability of smolting is modeled as a proportion ordered logistic regression model of the form:

$$\text{logit}(P_{SM,\,m}) = Z_k$$

where $-\infty < Z_1 < Z_2 ... < Z_k < \infty$ are the monthly rates of smoltification based on photoperiod (k = 1, ..., 7 encompassing January to July).

The model performs the following steps during the months in which smoltification occurs:

1. Smoltification of Resident fry
2. Accumulation of the Migrant fry from the upstream habitats and Resident fry from the current habitat remaining from the previous month that did not smolt (Figure 8 shows connectivity among habitats)
3. Survival and movement of the fry calculated in step 2

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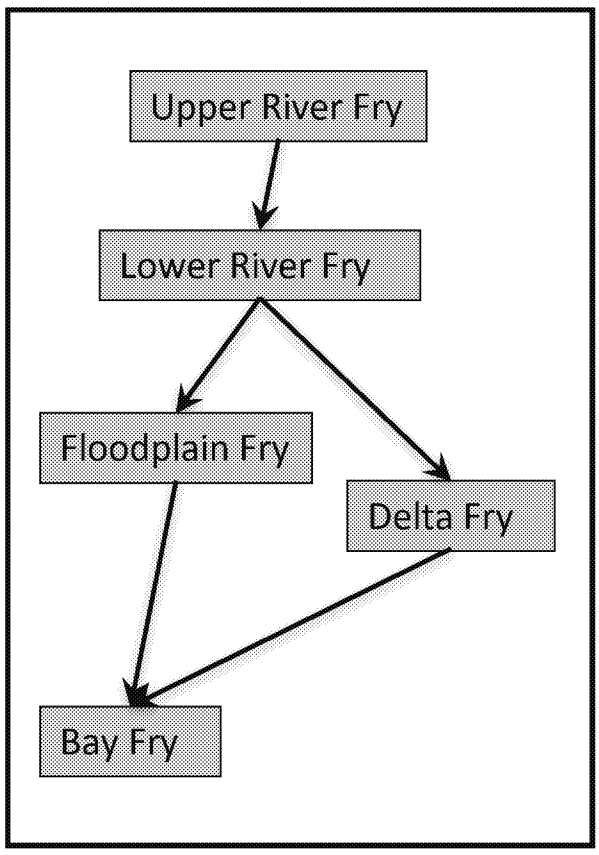

Figure 8. Connectivity among habitats for winter-run Chinook fry. Connections between the Lower River and Floodplain occur due to flooding of the Yolo bypass and are thus ephemeral.

Transitions 11 – 14

These transitions use a Smolt Survival Model (SSM) to calculate the smolt survival through the delta portion of their outmigration. Different models may be used to calculate this survival including Newman (2003) based on an analysis of coded wire tag recoveries, estimates of acoustically tagged survival rates analyzed by Perry et al. (2018) and given the name STARS, and an enhanced particle tracking model (ePTM version 2) that simulates smolt movement at fine temporal (15 min) and spatial (DSM2 8.2 grid structure) resolution. We have described the transition equations generically to be able to use the survival estimates in month *m* and habitat *h* from any of the above survival models using the acronym $SSM_{h,m}$ in the descriptions below.

Transitions 11 & 12

Definition: Smolts that reared in the Upper River and Lower River habitats migrate to the Golden Gate and thus end the freshwater phase of their life cycle in months m = (12, … ,18) corresponding to February to August.

Upper River smolt outmigration (Transition 11)

$$Gate_{UR,m} = S_{11,UR,m-1} * Smolts_{UR,m-1}$$

Lower River smolt outmigration (Transition 12)

$Gate_{LR,m} = S_{12,LR,m-1} * Smolts_{LR,m-1}$

where survival $S_{T,h,m}$ is the smolt survival rate from transition T (11, ..., 15) in habitat h (*UR, LR, FP, DE, BA*) in month m. The rates $S_{11.UR,m}$ and $S_{12,LR,m}$ are composed of three components: A) survival rate from the Upper or Lower River to the Sacramento River near Sacramento (Figure 9); B) survival through the Delta to Chipps Island; and C) survival from Chipps Island to Golden Gate.

$S_{11.UR,m} = {}^{A}S_{11,UR,m} * {}^{B}S_{12,LR,m} * {}^{C}S_{11}$
$S_{12,LR,m} = {}^{A}S_{12,LR,m} * {}^{B}S_{12,LR,m} * {}^{C}S_{11}$

The first smolt survival component is modeled as a function of flow at Bend Bridge

$\text{logit}({}^{A}S_{11,UR,m}) = B0_{11,UR} + B1_{11} * q.bb_mod_m$
$\text{logit}({}^{A}S_{12,LR,m}) = B0_{12,LR} + B1_{11} * q.bb_mod_m$

where $B0_{11,UR}$, $B0_{12,LR}$ and $B1_{11}$ are model parameters, and $q.bb_mod_m$ is modified monthly flow at Bend Bridge which is the closest station to the Red Bluff Diversion Dam standardized relative to historic Bend Bridge flows from 1970-2014 (mean = 14593.96, standard deviation = 10984.20). To estimate riverine smolt survival rate for the implementation for the Sites Reservoir Project, flow at Bend Bridge ($q.bb_m$) was modified to account for the two Sites diversions located between Bend Bridge and Sacramento (River Mile [RM] 58): the Red Bluff Intake (RM 243) and the Hamilton City Intake (RM 205). To account for potential diversion effects on smolt survival, we used the following formula to modify Bend Bridge flow:

$q.bb_mod_m = q.bb_m - q.bb_RBI_m - (((205-58)/(243-58)) * q.bb_HCI_m)$

where $q.bb_m$ is monthly flow at Bend Bridge, $q.bb_RBI_m$ represents flow at the Red Bluff Intake Diversion, and $q.bb_HCI_m$ represents flow at the Hamilton City Intake Diversion. The latter term accounts for the Hamilton City Intake being 79% (i.e., 147/(243-58)) of the distance to Sacramento from Red Bluff. In the baseline scenario $q.bb_mod_m = q.bb_m$; that is, there is no alteration to flow at Bend Bridge.

${}^{B}S_{12.LR,m} = SSM_{LR,m}$

where $SSM_{LR,m}$ is a survival rate for smolts originating from the Sacramento River through the Delta to Chipps Island as calculated by the Smolt Survival Model. The value ${}^{C}S_{11}$ is a model parameter representing survival from Chipps Island to Golden Gate, and it was applied to smolts originating from all habitats.

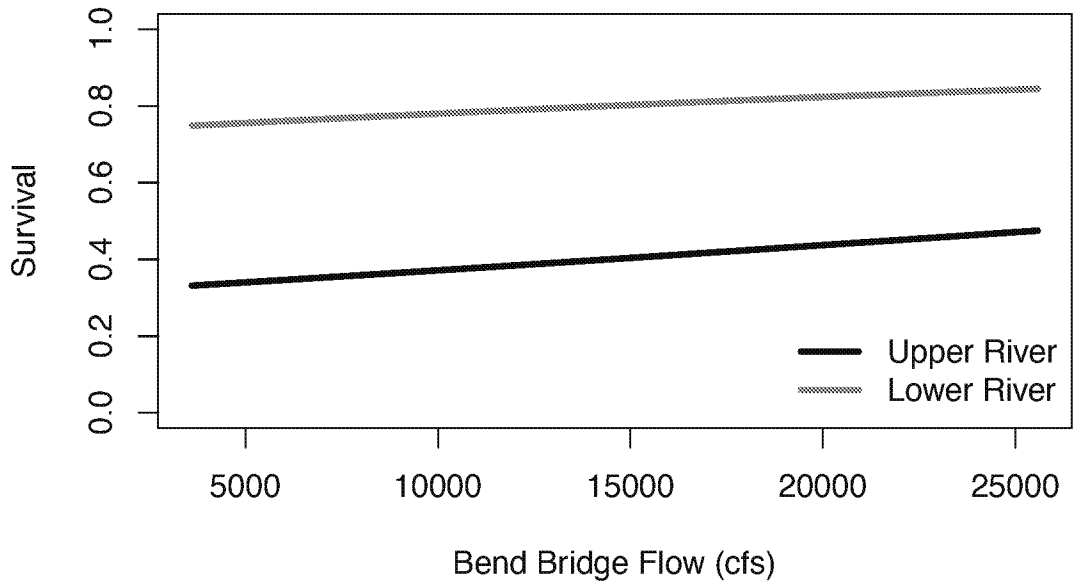

Figure 9. The relationship of smolt survival in the mainstem Sacramento for smolts originating from the Upper River or Lower River as a function of flow at Bend Bridge.

Transition 13

Definition: Smolts that reared in the Floodplain migrate to the Golden Gate arriving in months m = (12, … ,18) corresponding to February to August.

$$Gate_{FP,m} = S_{13,FP,m-1}\, Smolts_{FP,m-1}$$

The rate $S_{13,FP,m}$ is composed of three components: A) survival rate through the Floodplain to the Delta; B) survival through the Delta to Chipps Island; and C) survival from Chipps Island to Golden Gate.

$$S_{13,FP,m} = {}^{A}S_{13,FP,m} * {}^{B}S_{13,FP,m} * {}^{C}S_{11}$$

where ${}^{A}S_{12,FP,m}$ is survival in the Floodplain until the Smolt Survival Model estimate is applied for survival through the Delta.

$${}^{B}S_{13.FP,m} = SSM_{FP,m}$$

Transition 14

Definition: Smolts that reared in the Delta migrate to the Golden Gate arriving in months m = (12, … ,18) corresponding to February to August.

$$Gate_{DE,m} = S_{14,DE,m-1} * Smolts_{DE,m-1}$$

The rate $S_{14,DE,m}$ is composed of two components: survival through the Delta to Chipps Island (${}^{A}S_{14,DE,m}$) and survival from Chipps Island to Golden Gate (${}^{C}S_{11}$).

$$S_{14,DE,m} = {}^{A}S_{14,DE,m} * {}^{C}S_{11}$$

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where ${}^{A}S_{14,DE,m} = SSM_{DE,m}$

Transition 15

Definition: Smolts that reared in the Bay migrate to the Golden Gate with an associated migration survival in months m = (12, … ,18) corresponding to February to August.

$Gate_{BA,m} = S_{15,BA} * Smolts_{BA,m-1}$

where $S_{15,BA}$ is the survival from the Bay habitat to the Golden Gate.

Transition 16

Definition: Smolts that reach the Golden Gate transition to the Gulf of the Farallones and the numbers in each month accumulate as a combination of the smolts in the Gulf the previous month and smolts that passed the Golden Gate in months m = (12, … ,20) corresponding to February to September.

$Gulf_{h,,m} = Gate_{h,m-1} * S_{ENTRY,\ m-1} + Gulf_{h,m-1} * S_{GULE,\ m-1}$

Where the survival rate $S_{ENTRY,\ m}$ is the survival rate during the month of ocean entry in the Gulf of the Farallones and the survival rate $S_{GULF,m}$ is the subsequent survival rate in month m after ocean entry.

The period of ocean entry can be a critical period of transition for salmonids and lack of available resources can have strong detrimental effects on the year class (Lindley et al. 2009). We therefore model the survival at ocean entry by using an indicator of ocean productivity as

$$\text{logit}(S_{ENTRY,m}) = B0_{ENTRY} + B1_{ENTRY} * OPI_{,m}$$

where $B0_{ENTRY}$ is a parameter describing the average survival rate , $OPI_{,m}$ is the ocean productivity index, and $B1_{ENTRY}$ is the coefficient describing the strength of the ocean productivity effect on ocean entry survival.

Finally, the transition to the ocean from all habitats includes a random effect term ε_y that is specific to each year y and is distributed as a normal random variable, that is $\varepsilon_y \sim N(0, \sigma_\varepsilon^2)$. The formulation used here is a biased-corrected form so the expected value of the random effects equals 0.

The total number of Age 1 fish entering the Gulf of the Farallones from all habitats arriving in a given month can be calculated by summing across each of the individual rearing areas. Furthermore, earlier arriving fish are retained in the Age 1 stage and an ocean survival rate is applied to those fish that were already in the Age 1 stage in the previous month. Fish arrive into the Age 1 stage in months m = (12, …, 20) corresponding to February through October.

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$$Age1_{m} = Gulf_{UR,m} + Gulf_{LR,m} + Gulf_{FP,m} + Gulf_{DE,m} + Gulf_{BA,m} + Age1_{m-1} * S_{17}^{1/4}$$

Transition 17

Definition: Survival in the ocean from Age 1 to Age 2 (for Chinook that remain in the ocean)

$$Age2 = Age1_{m=21} * (1 - M_2) * S_{17}$$

where S_{17} is a model parameter representing the survival rate of Age 1 fish in the ocean to Age 2 and M_2 is a model parameter representing the maturation rate that leads to 2-year old spawners. The model transitions from a monthly time step (used for months 1 through 20) to an annual time step (used for Age 2, Age 3 and Age 4 fish) in this transition, thus the S_{17} survival represents a 4-month survival rate from 21 months to 24 months (November to February).

Transition 18

Definition: Maturation and migration for Age 2 males and females that will spawn as 2-year olds

$$Sp_{2,F} = Age1_{m=21} * S_{17} * M_2 * Fem_{Age2} * S_{sp2}$$
$$Sp_{2,M} = Age1_{m=21} * S_{17} * M_2 * (1 - Fem_{Age2}) * S_{sp2}$$

where S_{17} and M_2 are model parameters for maturation and survival as described in Transition 17. Fem_{Age2} is a model parameter representing the proportion of Age 2 spawners that are female, and S_{sp2} is a model parameter representing the natural survival rate of Age 2 spawners from the ocean to the spawning grounds.

Transition 19

Definition: Survival in the ocean from Age 2 to Age 3 (for Chinook that remain in the ocean)

$$Age3 = Age2 * (1 - I_3) * S_{19} * (1 - M_3)$$

where I_3 is the fishery impact rate for Age 3 fish, S_{19} is a model parameter representing natural survival rate for fish between Age 2 and Age 3, and M_3 is a model parameter representing maturation rate of Age 3 fish.

Transition 20

Definition: Maturation and migration for Age 3 males and females that will spawn as 3-year olds

$$Sp_{3,F} = Age2 * (1 - I_3) * S_{19} * M_3 * Fem_{Age3} * S_{sp3}$$
$$Sp_{3,M} = Age2 * (1 - I_3) * S_{19} * M_3 * (1 - Fem_{Age3}) * S_{sp3}$$

where I_3 is the Age 3 fishery impact rate, and M_3 and S_{19} are the Age 3 maturation and survival rates as described in Transition 19. Fem_{Age3} is a model parameter representing the proportion of Age 3 and 4 spawners that are female, and S_{sp3} is a model parameter representing the natural survival rate of Age 3 spawners from the ocean to the spawning grounds.

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Transition 21

Definition: Maturation and migration for Age 3 males and females that will spawn as 4-year olds

$Sp_{4,F} = Age3 * (1- I_4) * S_{21} * Fem_{Age3} * S_{sp4}$
$Sp_{4,M} = Age3 * (1- I_4) * S_{21} * (1 - Fem_{Age3}) * S_{sp4}$

where I_4 is the Age 4 fishery impact rate, S_{21} is a model parameter representing survival rate from Age 3 to Age 4, Fem_{Age3} is a model parameter representing the proportion of Age 3 and 4 spawners that are female, and S_{sp4} is a model parameter representing the natural survival rate of Age 4 spawners from the ocean to the spawning grounds.

Transition 22

Definition: Number of eggs produced by spawners of Ages 2 – 4 in months m = (2, ..., 6) corresponding to April to August.

$$Eggs_m = \frac{\sum_{j=2}^{4}(TSp_{j,F} - hat.f_j)P_{SP,m}V_{eggs,j}}{1 + \frac{\sum_{j=2}^{4}(TSp_{j,F} - hat.f_j)\,P_{SP,m}V_{eggs,j}}{K_{Sp,m}}}$$

where TSp_j are the total number of female spawners of age j = 2, 3, 4 (composed of both natural and hatchery origin), $V_{eggs,j}$ is the number of eggs per spawner of age j = 2, 3, 4, $K_{Sp,m}$ is the capacity of eggs in the spawning grounds per month, and $P_{SP,m}$ is the proportion of spawning that occurs in month m and is a function of April average temperature at Keswick Dam. Because the April temperature can vary among years, the monthly distribution varies as well to reflect observed patterns in spawn timing among the years from 1999 to 2012. Please see Appendix A for description of the analysis of historical patterns in spawn timing.

$TSp_{2,F} = Sp_{2,F}$

$TSp_{3,F} = Sp_{3,F} - hat.f$

$TSp_{4,F} = Sp_{4,F}$

$hat.f_j = 0.15 * Sp_3 \quad (\min = 10; \max = 60)$

where $hat.f$ is the number of age-3 spawning females removed for use as hatchery broodstock, and $Sp_{j,Hatchery}$ for j = (2,3,4) is the spawners of age j hatchery origin, which are described below in the *Hatchery Origin Chinook* section.

Hatchery Origin Chinook

Transition 1H

Definition: Survival of hatchery fish from eggs to Age 2

$Age2_{Hatchery} = hat.f * 3000 * H_{S1}$

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$H_{S1} = 2.3 * Age2_{Natural} / Fry_{Natural}$

where H_{S1} is the hatchery-origin survival rate from pre-smolt at release to Age 2 in the ocean, $Age2_{Natural}$ is the number of natural-origin Chinook that survived to Age 2 and remained in the ocean, and $Fry_{Natural}$ is the number of natural origin emerging Fry (see Transition 1 for Natural Origin Chinook). The multiplier of 3000 hatchery smolts per spawner was obtained from Winship et al. (2014). The multiplier of 2.3 was used to equate hatchery origin survival to the end of age 2 to natural origin survival to the end of age 2 as described in Winship et al. (2014).

Transition 2H

Definition: Maturation and spawning for hatchery origin Age 2

$Sp_{2,F,Hatchery} = Age2_{Hatchery} * M_2 * Fem_{Age2} * S_{sp2}$
$Sp_{2,M,Hatchery} = Age2_{Hatchery} * M_2 * (1 - Fem_{Age2}) * S_{sp2}$

where the coefficients are described under Transition 18.

Transition 3H

Definition: Survival of hatchery origin fish in the ocean from Age 2 to Age 3 (for Chinook that remain in the ocean)

$Age3_{Hatchery} = Age2_{Hatchery} * (1 - I_3) * S_{19} * (1 - M_3)$

where the coefficients are described under Transition 19.

Transition 4H

Definition: Maturation and spawning for hatchery origin Age 3

$Sp_{3,F,Hatchery} = Age2_{Hatchery} * (1 - I_3) * S_{19} * M_3 * Fem_{Age3} * S_{sp3}$
$Sp_{3,M,Hatchery} = Age2_{Hatchery} * (1 - I_3) * S_{19} * M_3 * (1 - Fem_{Age3}) * S_{sp3}$

where the coefficients are described under Transition 20.

Transition 5H

Definition: Survival and maturation rate for hatchery origin Age 4

$Sp_{4,F,Hatchery} = Age3_{Hatchery} * (1 - I_4) * S_{21} * Fem_{Age3} * S_{sp4}$
$Sp_{4,M,Hatchery} = Age_{Hatchery}\,3\ (1 - I_4) * S_{21} * (1 - Fem_{Age3}) * S_{sp4}$

where the coefficients are described under Transition 21.

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Fishery Dynamics

To simulate the winter-run population dynamics under alternative hydrologic scenarios, we include fishery dynamics that are consistent with a NMFS fishery control rule (NMFS 2012) (Figure 10). For each year of the simulation, the impact rate for age 3 (I_3) was calculated from the control rule by obtaining the 3-year trailing geometric average of spawner abundance. The age-4 impact rate (I_4) in that year was calculated as double the instantaneous age-3 impact rate (Winship et al. 2014).

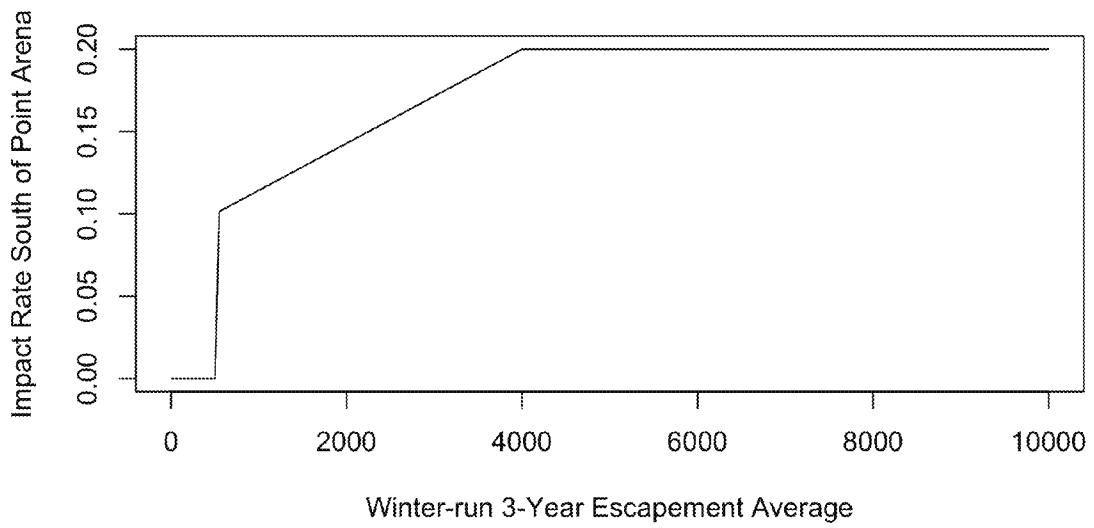

Figure 10. Fishery control rule determining the level of Age 3 impact rate as a function of trailing 3-year geometric mean in winter-run escapement.

III. Inputs to the Winter-run life-cycle model

Water Temperature

The life cycle model (LCM) incorporates monthly average temperature below Keswick Dam into the definition of egg to fry survival. The water temperature can be obtained from water quality gages on the Sacramento River (for model calibration) or from a forecasted water temperature model, such as the the Sacramento River Water Quality Model (SRWQM).

Fisheries

Estimates of impact rates on vulnerable age classes of Chinook salmon are computed as part of the Pacific Fisheries Management Council (PFMC) annual forecast of harvest rates and review of previous years' observed catch rates. For runs that are not actively targeted, such as winter-run and spring-run Chinook, analyses of coded wire tag (CWT) groups are used to infer impact rates for these races (e.g., O'Farrell et al. 2012).

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Habitat Capacity

Juvenile salmonids rear in the mainstem Sacramento River, delta, floodplain, and bay habitats (Figure 1). The model incorporates the dynamics of rearing by using density-dependent movement out of habitats as a function of capacity for juvenile Chinook. The capacities of each of the habitats are calculated in each month using a series of habitat-specific models that relate habitat quality to a spatial capacity estimate for rearing juvenile Chinook salmon. Habitat quality is defined uniquely for each habitat type (mainstem, delta, etc.) with the goal of reflecting the unique habitat attributes in that specific habitat type. For example, the mainstem habitat quality is a function of velocity and depth (Beechie et al. 2005). Areas with vegetated cover along banks are preferred in other systems by Chinook salmon (Beamer et al. 2005, Semmens 2008), and areas associated with cover in the delta were assumed to be higher quality habitats because they provide protection from predators (Semmens 2008) and offer subsidies of terrestrial insect prey. In the bay, salinity is a factor that predicts suitable habitat, as fish monitoring data in both Skagit River and San Francisco Bay have shown high likelihood of fry presence in water with salinity less than 10 ppt. Higher quality habitats are capable of supporting higher densities of rearing Chinook salmon, with the range of densities being determined from studies in the Central Valley and in river systems in the Pacific Northwest where appropriate. Note, the current version of the model uses densities from the Skagit River, Washington, which are shown in Figure 11.

Defining habitat capacity. For each habitat type (mainstem, delta, and bay), capacity was calculated each month as:

$$K_i = \sum_{j=1}^{n} A_j d_j$$

where K_i is the capacity for a given habitat type i, n is the total number of categories describing habitat variation, A_j is the total habitat area for a particular category, and d_j is the maximum density attributable to a habitat of a specific category. Three variables were determined for each habitat, the ranges of each were divided into high and low quality, and all combinations were examined, resulting in a total of eight categories (2 x 2 x 2) of habitat quality for each habitat type (Table 1). The exception was mainstem habitats (Upper River, Lower River, and Yolo Bypass), which were subdivided into 4 (2x2) bins of habitat quality. Ranges of high and low habitat quality were based on published studies of habitat use by Chinook salmon fry across their range and examination of data collected by USFWS within the Sacramento-San Joaquin Delta and San Francisco Bay.

Defining maximum densities. Determining maximum densities for each combination of habitat variables is complicated by the fact that most river systems in the Central Valley are now hatchery-dominated with fish primed for outmigration. In addition, the Central Valley river system is at historically low natural abundance levels compared to expected or potential density levels. Because of this deficiency in the Central Valley system, salmon fry density data from the Skagit River system were used, which in contrast has very low hatchery inputs, has been monitored in mainstem, delta, and bay habitats, and exhibits evidence of reaching maximum density in years of high abundance (Greene et al. 2005; Beamer et al. 2005). These data from the Skagit River were compared with Central Valley density estimates calculated by USFWS. For each of these data sets, the upper 95

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percentile levels of density defined a range of maximum density levels, assuming that the highest five percentile of density levels were sampling outliers. The comparison indicated that Skagit River values represented conservative estimates of maximum density (Figure 11).

Table 1. Habitat variables influencing capacity for each habitat type.

Habitat type	Variable	Habitat quality	Variable range
Mainstem & Bypass	Velocity	High	<= 0.15 m/s
		Low	> 0.15 m/s
	Depth	High	> 0.2 m, <= 1 m
		Low	<= 0.2 m, > 1 m
Delta	Channel type	High	Blind channels
		Low	Mainstem, distributaries, open water
	Depth	High	> 0.2 m, <= 1.5 m
		Low	<= 0.2 m, > 1.5 m
	Cover	High	Vegetated
		Low	Not vegetated
Bay	Shoreline type	High	Beaches, marshes, vegetated banks, tidal flats
		Low	Riprap, structures, rocky shores, exposed habitats
	Depth	High	> 0.2 m, <= 1.5 m
		Low	<= 0.2 m, > 1.5 m
	Salinity	High	< 10 ppt

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Habitat type	Variable	Habitat quality	Variable range
		Low	>= 10 ppt

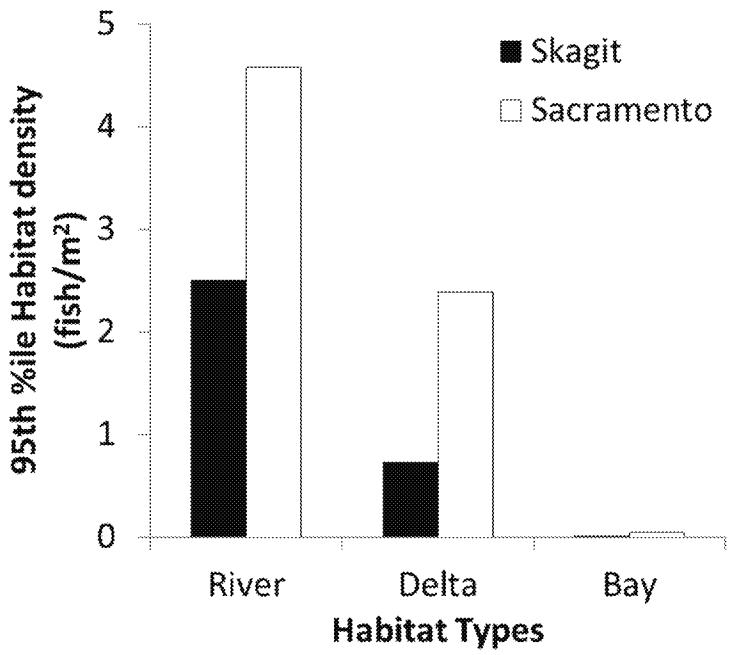

Figure 11. 95th percentile values of densities in river, delta, and bay habitats in the Skagit and Sacramento Rivers. Skagit data are based on electroshocking in mainstems and beach seining in delta and bay habitats (Beamer et al. 2005), while Sacramento data are based on beach seining across all habitat types (USFWS 2007).

Determining habitat areas. Two approaches were used to map the spatial extents of different combinations of habitat variables. To estimate river and Yolo Bypass capacities based on channel velocity and depth, a suite of HEC-RAS models at varying discharge values (2,000-200,000 ft^3/sec) were simulated on the Sacramento River and Yolo Bypass. The HEC-RAS geometry was based on a series of cross-sections that define locations surveyed in the mid-1990s at longitudinal intervals of approximately 500m. From the HEC-RAS output, the cross-sectional width of a given river reach was broken up into 45 lateral sections (i.e., cells), with the main channel composed of 25 cells and the banks composed of 20 cells (10 left and 10 right bank; example shown in Figure 12). Main channel and bank stations are defined in the original HEC-RAS model and denoted in Figure 12 with red cross-section stations. To estimate depth and velocity in each cell, we used the flow distribution methods outlined by HEC, which can be found at: https://www.hec.usace.army.mil/confluence/rasdocs/ras1dtechref/latest/overview-of-optional-capabilities/flow-distribution-calculations

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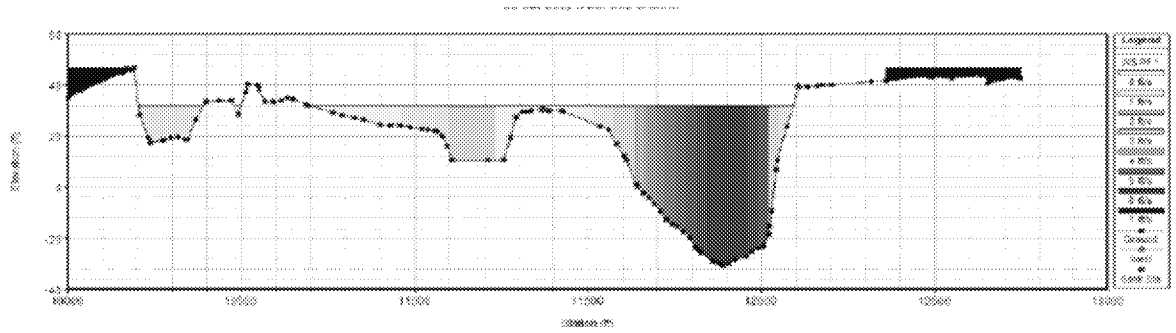

Figure 12: Example of method used to split up a HEC-RAS cross-sectional output into 45 lateral sections. Note that main channel locations are within the red cross-sections stations and bank locations are outside of the red cross-sections stations

At each lateral cell, the HEC-RAS simulated channel depth and velocity were grouped into one of the four habitat capacity categories described above. Each cell in the cross-section has a depth and velocity, and altering the flow changes the depth and velocity of a particular cell. The area of each cell that corresponded to a specific combination of velocity and depth category was tabulated for each mean monthly flow (extracted from CalSim results) associated with a cross-section. The appropriate density of Chinook salmon for each of the four categories was applied to each lateral cell by taking the product of area for a given preference and the 95th percentile density estimate for that preference. To arrive at a monthly capacity estimate for the Sacramento River and Yolo Bypass habitats, we summed the capacity estimates for each lateral and longitudinal cell in each habitat. Figure 13 shows how habitat capacity changes as a function of flow for the Sacramento River and Yolo Bypass.

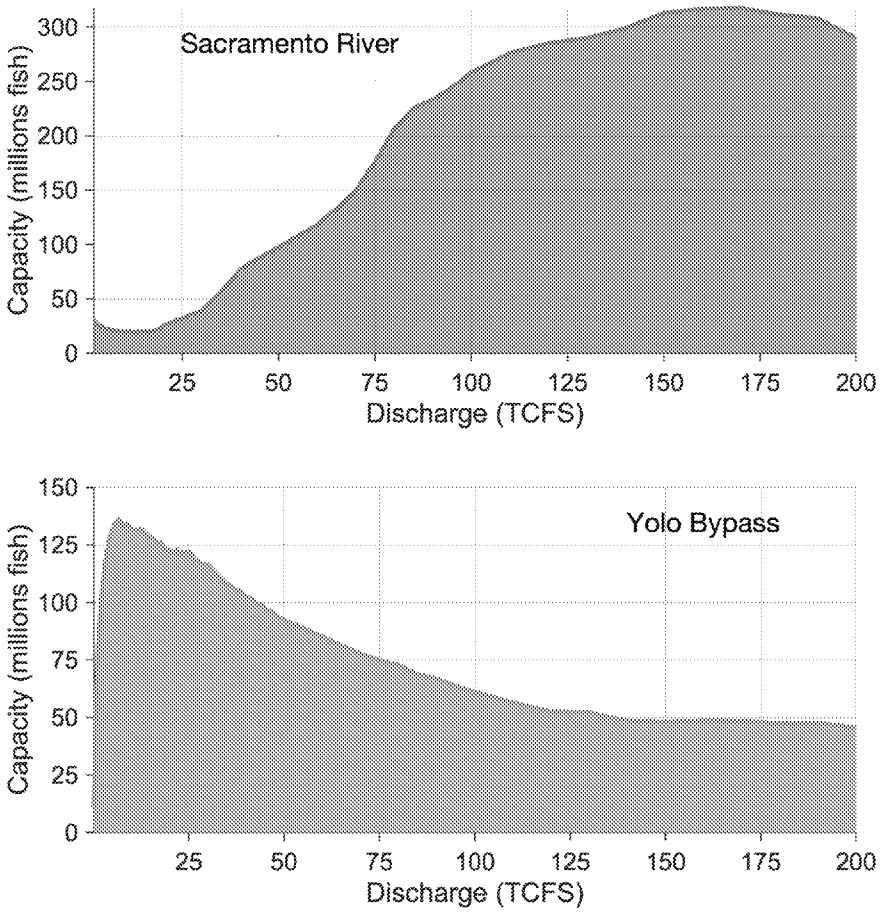

Figure 13: Habitat capacity to flow (thousand cfs) relationship for the Sacramento River and Yolo Bypass under the 95th percentile density estimate.

For the delta and bay, geographic data products were used to map habitat variables, including cover, shoreline type, salinity, and depth. Vector GIS files were converted to raster, and all habitat variables were mapped onto a common $10m^2$ grid. To obtain the spatial extent of channels and wetlands, National Wetland Inventory (NWI) data (USFWS 2006) were used in the delta, and Bay Area Aquatic Resource Inventory (BAARI) v 2.1 data (SFEI ASC 2017) were used in the bay. A geographic buffer was applied where required to ensure that the full extent of the channels were included, and a levee file (DWR 2018) was utilized to ensure that no inaccessible areas were included. For each cell, the habitat variables listed in Table 1 above were determined to be of high or low quality. Cover data were obtained from the Coastal Change Analysis Program (C-CAP) (NOAA OCM 2017). Areas that had vegetation (forested areas, scrub/shrub area, etc.) were considered high quality cover, and cells within 30 meters were marked as high-quality cover. Shoreline data were obtained from BAARI v 2.1 (SFEI ASC 2017) and the Environmental Sensitivity Index (NOAA OR&R 2017). Cells within marshes, tidal flats, and vegetated areas, and cells within 30 meters were marked as high quality, whereas areas near rip-rap, rocky areas, and exposed areas were marked as low quality.

For salinity, monthly X2 values, representing the distance from the Golden Gate Bridge to the 2 ppt isohaline position (Jassby et al. 1995), were obtained from CalSim simulations. X10 values were calculated as 75% of X2 values (Monismith et al. 2002, Jassby et al. 1995). Distance to the Golden Gate was mapped, and cells upstream of the X10 value were marked as high quality.

Water depth was calculated from bathymetric data (Wang et al. 2018) and water level from DSM2 simulations. Each cell was assigned to its corresponding DSM2 channel, and for each DSM2 channel, monthly median water level was calculated. This value was subtracted from the bathymetric measurement in order to obtain monthly water depth for each cell.

Blind tidal channels within wetland areas were not able to be mapped directly with the available data. Therefore, we estimated these areas using allometric relationships between tidal wetland areas and blind tidal channel areas. We tested allometric equations developed in the Skagit River by Beamer et al. (2005) and Hood (2007) to determine which equations were best suited to apply to the Central Valley and chose an allometric equation that returned conservative estimation results:

$$A_{btc} = 0.0024 * {A_w}^{1.56}$$

where A_{btc} is blind tidal channel area in hectares and A_w is wetland area in hectares. We also applied the minimum area requirement (0.94 ha) to form blind tidal channels in a wetland from Hood (2007). To ensure that habitat area was not double counted in wetland areas through the previously described mapping methods and the blind tidal channel calculation, the habitat area of each cell in tidal wetlands was reduced by the proportion of the area of the wetland that is blind tidal channel. Finally, the habitat areas from all cells, along with the habitat area from blind tidal channels, was summed in order to get the total monthly habitat areas for each of the eight habitat quality categories.

Enhanced Particle Tracking Model

The survival rate of juvenile Chinook salmon within and migrating through the Delta is modeled using the Enhanced Particle Tracking Model (ePTM) version 2.0 (Hereafter, ePTM v2). This rate is defined as the survival at Chipps Island of simulated juvenile salmon released at any location within the Delta. The ePTM v2 survival computation includes movement, orientation, holding and routing behaviors and predation mortality (Sridharan et al., in prep.). The ePTM v2 is based on the Delta Simulation Model II Particle Tracking Model (DSM2 PTM) developed by the Department of Water Resources (DWR), California. Model code and documentation for the ePTM v2 is hosted at https://github.com/cvclcm/ePTM_v2.

DSM2

The DSM2 PTM transports particles on a one-dimensional network representation of the Delta, driven by the flows computed by HYDRO, the hydrodynamic module of DSM2 written in FORTRAN (Anderson and Mierzwa, 2002). The DSM2 HYDRO module computes the flow and stage at different locations in the Delta by solving the cross-sectionally averaged one-dimensional shallow water wave equations on a network of links, continuously stirred tank reactors (CSTR) and nodes which respectively represent channels, flooded and leveed islands, floodplains and forebays, and channel junctions (Figure 14). River inflows and in-delta consumptive use flows are estimated from CALSIM, a water budget model for California. Gate operations are provided by DWR. Details of the numerical solution method can be found in DeLong et al. (1997) and a peer review of the model can be found in Sridharan et al. (2018). DSM2 HYDRO is typically run with a time step of 15 minutes to one hour.

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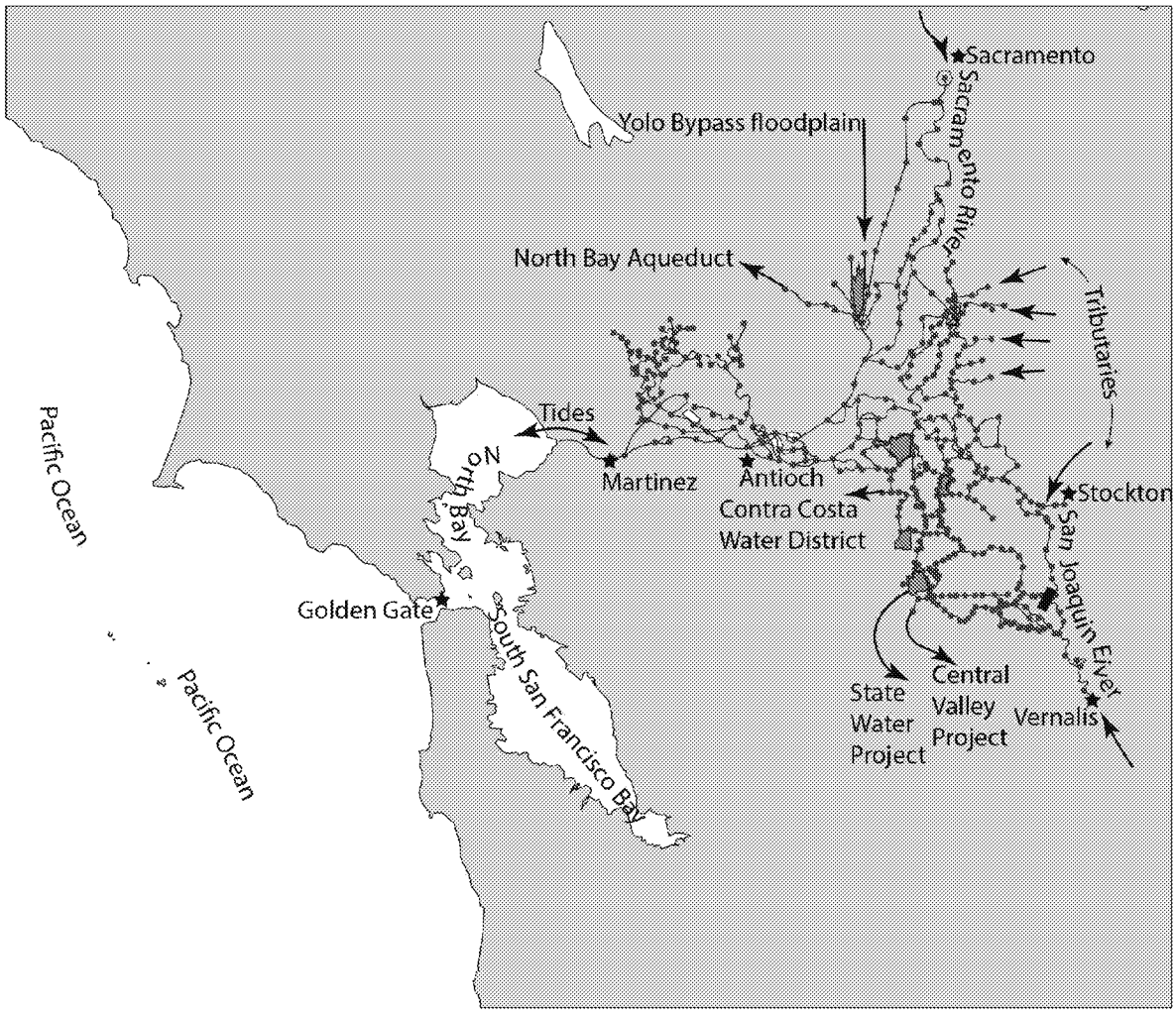

Figure 14. The Sacramento-San Joaquin Delta and the DSM2 grid. Arrows represent inflows and outflows. Grey lines, dark grey shaded regions and red dots respectively represent DSM2 channels, reservoirs and nodes. The Hatched box, crossed out circle and solid box respectively represent the Delta Cross Channel, the salinity control gate in Montezuma Slough and the temporary salmon passage barrier in Mossdale. The blue boxes represent nodes in which fry rearing in the Sacramento River and the Yolo Bypass floodplain are seeded as simulated smolts into the ePTM v2. Simulated smolt seeded in all other nodes represent fry rearing within the Delta.

The DSM2 PTM module, written in JAVA, is a pseudo three-dimensional model with a turbulent law of the wall logarithmic vertical velocity (Prandlt 1935) and a fourth order polynomial transverse velocity profile (Wilbur 2000) imposed onto the solved mean flows through a cross-section. The links are represented as rectangular prismoids whose cross-sections preserve the hydraulic radii and water column depth in the channels they represent. It uses constant cross-sectional eddy diffusivities in a zeroth-order turbulence closure to move particles laterally and vertically. Particles are advected in the streamwise direction with the hydrodynamic velocity at their locations and moved randomly in the lateral and vertical direction with the diffusivities at their locations using Forward Euler numerical integration. DSM2 PTM is capable of modeling about 5,000 particles (Kimmerer and Nobriga, 2008). It does not have any temporal interpolation of hydrodynamic quantities between DSM2 HYDRO time steps, and randomizes particles arriving at nodes and assigns them to new links based on the flow splits at the nodes. Their new cross-sectional positions are also

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randomized. ePTM v2 builds on the basic framework of the DSM2 PTM by adopting conceptual and performance updates described in Sridharan et al. (2017) and adds behavior to simulated particles.

ePTM v2

The ePTM v2 adds juvenile salmon swimming behavior and predation mortality to the DSM2 PTM (Sridharan et al. in prep.). Apart from these additions, the ePTM v2 linearly interpolates all hydraulic and hydrodynamic quantities between DSM2 HYDRO time steps to account for simulated salmon movement within an ePTM v2 time substep. Broadly, the scope of the ePTM v2 can be summarized into its representation of the hydrodynamics, the fish behavior, and the mortality of simulated salmon.

Hydrodynamics

Simulated smolt trajectories are given by (Visser 1997)

$$\frac{dx}{dt} = u + u_S;\ \frac{dy}{dt} = R_y\sqrt{\frac{2}{r}\frac{\varepsilon_H}{\Delta t}} + \frac{d\varepsilon_H}{dy};\frac{dz}{dt} = R_z\sqrt{\frac{2}{r}\frac{\varepsilon_V}{\Delta t}} + \frac{d\varepsilon_V}{dz}$$

where u is the hydrodynamic velocity at the particle position, u_s is the swimming velocity, ε_H and ε_V are the lateral and vertical eddy diffusivities, Δt is the ePTM v2 timestep, R_Y and R_Z are uniform random variables between -1 and 1, r is the variance of a standard normal distribution and is equal to 1. In order to realistically represent fish movements, channel curvature has been included in ePTM v2.

The curvature of a channel is determined by fitting both a Theil-Sen robust linear regressor (Gilbert 1987), as well as a Chernov-Lesort robust circular regressor (Chernov, 2010). If the Pearson correlation coefficient value of the linear fit exceeds that of the circular fit, or if the estimated radius of curvature exceeds 10 Km, the channel is assumed as straight. The bend angle is computed as the ratio of the total distance along the river and the radius of curvature. Meanders occurring on a scale smaller than the channel length can be incorporated by refining the DSM2 model grid as needed.

For straight channels, we have (DWR, 1998):

$$u = Uf_Vf_H$$

$$f_V = 1 + \left(\frac{0.1}{\kappa}\right)\left[1 + ln\left(\frac{z}{H}\right)\right];\frac{z}{H} \geq 0.01 \text{ and } f_V = 0;\frac{z}{H} < 0.01$$

$$f_H = A + B\left(\frac{2y}{W}\right)^2 + C\left(\frac{2y}{W}\right)^4$$

where f_V and f_H are the water velocity profiles in the lateral and vertical dimensions, W and H are respectively the width and depth of the channel, U is the mean streamwise velocity, A, B and C are constants that can vary with the river, κ=0.41 is von Karman's constant, and the diffusion coefficients in the lateral and vertical dimension are

$$\varepsilon_H = C_THu^*;\ u^* = 0.1U$$

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$$\varepsilon_V = \kappa \frac{z}{H}\left(1 - \frac{z}{H}\right)$$

$$\frac{d\varepsilon_V}{dz} = \frac{\kappa}{H}\left(1 - 2\frac{z}{H}\right)$$

where C_T=0.6 is a constant and u^* is the friction velocity.

For curved channels, the experimental results of Gandhi et al. (2016) of turbulent open rectangular channel flow in around bends of varying curvature from a straight channel to up to 90° are used. For angles beyond 90°, we assume that the flow adjustment will not be significantly different (Blanckaert and De Vriend, 2004), and so we use the distribution at 90° itself. We use the best-fit regression of Gandhi et al. (2016) to their data to generate the flow profiles. Using the force balance between the turbulent eddy diffusivity and the shear stress by assuming a linear decay of the shear stress from its peak value at the channel banks to zero at the lateral position of peak flow defined from the left bank, y_{Max} (and similarly for the right bank),

$$\varepsilon_H \frac{du}{dy} = u^{*2}\left(1 - 2\frac{y}{y_{Max}}\right)$$

where $\frac{du}{dy}$ is obtained from the data, and smoothing the resulting profile of ε_H to remove spurious discontinuities, we get profiles of the flow and mixing terms. A mixed layer is implemented near the channel banks that is 20% of the width of the channel (Ross and Sharples 2004).

Time substeps are chosen to be 20 seconds. A simulated salmon leaves a given channel through its upstream or downstream end when its streamwise displacement during a time step exceeds the distance between its current position and the end of the channel. The channel bottom, banks and free surface are treated as fully reflecting boundaries.

Simulated salmon that enter reservoirs or flooded islands are held there over a random period between 0 and 24 hours and subsequently randomly released depending on the flow into a connecting channel.

Behavior

ePTM v2 is a spatially explicit model, in that behaviors of fish are allowed to vary spatially through the Delta domain. Such spatial variability is supported by numerous reports from the literature, and observations within the Delta that migrating smolts vary their behavior as they move closer to the ocean (McCleave 1978; Solomon 1978; Healey 1980; Moser et al. 1991; Lacroix and McCurdy 1996; McCormick et al. 1998; Moore et al. 1998; Miller and Sadro 2003; Lacroix et al. 2005; Hedger et al. 2008; Kelly and Klimley 2012; Chapman et al. 2013; DWR 2015; DWR 2016). The ePTM v2 incorporates five behaviors based on literature reviews and observations in the data (Sridharan et al. In prep) that include:

(i) active swimming,

(ii) orientation towards or away from the ocean,

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(iii) Holding against the flow,

(iv) routing at channel junctions, and

(v) mortality due to predation.

All these behaviors are allowed to vary at the scale of the regions defined in Figure 15.

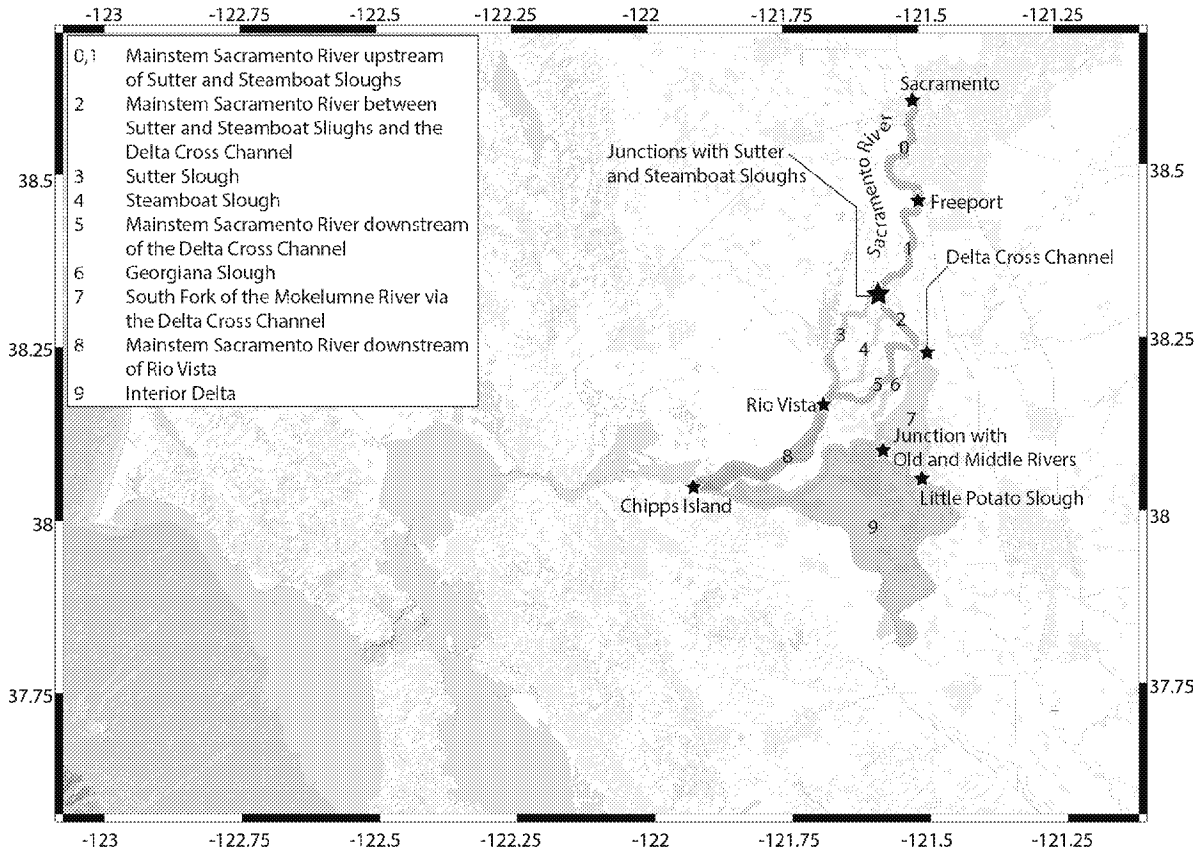

Figure 15. Calibration regions for ePTM v2 behaviors. Colors uniquely identify the different calibration regions. All blue colored regions indicate the mainstem Sacramento River.

Active swimming

A biological swimming velocity is added to the water velocity at the location of the simulated salmon at each time step. Simulated salmon can swim in the along stream direction with swimming speeds that are drawn from a lognormal distribution $lnN(\mu, \sigma)$ in which

$$\mu = 2ln(U_S) - \frac{1}{2}ln(\sigma_s^2 + U_S^2) \text{ and } \sigma = \sqrt{ln(\sigma_s^2 + U_S^2) - 2ln(U_S)}.$$

Here, the mean and standard deviation of observed swimming speeds are respectively U_S and σ_s. To ensure that randomly drawn swimming speeds remain within the range of biologically plausible speeds, the log-normal distribution is truncated at the 95th percentile and rescaled appropriately.

Orientation

In the *ePTM v2*, a probabilistic swimming direction rule determines each simulated salmon's swimming direction at each timestep. The swimming direction is influenced by the migrant's previous swimming direction, as well as the flow it experiences as follows. If a Bernoulli draw to determine persistence results in a zero, the fish's swimming direction is determined by a stochastic decision based on the flow it experiences, $\frac{|u|}{|U|}$, during the current timestep as

$$p_{SWF} = 0.5 + (p_{Rheo} - 0.5)\left[\frac{1}{1 + e^{-\left(c + b\ln\frac{|u|}{|U|}\right)}}\right]$$

Here, U is the mean flow observed in the Delta from 1962 to 2014, and is used to simply normalize the values of u. There is no assumption that the fish somehow knows what U is. p_{SWF} is the probability of orienting with the flow, and p_{Rheo}, c and b are calibration constants.

For positive values of c and small values of b, fish response to flow signals is sluggish in that only at very strong water speeds will fish make decisions that are not random. For negative values of c and large values of b, fish responses to small changes in the flow will be very sharp, i.e., decisions will be nonrandom even for weak flows. The p_{Rheo} parameter determines if the fish is likely to orient with or against the flow. If $p_{Rheo} \approx 0$, then as flows become stronger, fish will have a tendency to orient against the flow. If $p_{Rheo} \approx 0.5$, orientation decisions will be random. If 1, then as flows become stronger, fish will have a tendency to orient with the flow.

Holding Position Relative to Flow

The simulated salmon also holds position via Selective Tidal-Stream Transport (STST) (Gibson 2003), a hypothesis for optimal energy expenditure while achieving average travel speeds greater than the average flow velocity in tidal regions. During the ebb phase of the tide, the simulated salmon allow themselves to be advected. On a flood tide, when the upstream flow exceeds some threshold, they hold position with a certain probability (Liao, 2007). The ePTM v2 also parameterizes diel swimming behavior (Chapman et al. 2013) by assigning a probability of swimming during the light hours.

Routing at Channel Junctions

Anadromous salmonids often make decisions on which route to adopt (Gleichauf et al. 2014; Perry et al. 2014; Hance et al. 2021). Sridharan et al. (2017) demonstrated the importance of correctly representing the movement of simulated fish through channel junctions. In the ePTM v2, we allow fish to move into downstream channels at junctions depending on their lateral position relative to the critical streakline (Perry et al. 2014), also known as the bifurcating streamline.

When a simulated migrant reaches the end of a channel within a sub-timestep, the routing process is invoked, and it is moved into a downstream channel or open water body. Subsequently, the remaining trajectory computation is completed for that sub-timestep in the new channel beginning from a random cross-sectional position in the new channel. If the fish enters an open water body, it waits for a random length of time between zero seconds and one day and then leaves the open water body

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randomly into a connecting downstream channel. This mechanism ensures that fish move through the system in a manner consistent with the critical streakline hypothesis, while allowing for random lateral and vertical movements to occur within the time taken to move through the junction.

When a simulated fish reaches a channel junction, it is assigned to one channel or the other based on its lateral location relative to the location of the critical streakline (see Perry et a. 2018 or Sridharan et al. 2017 for an explanation of how the location of the critical streakline is calculated). Thus, the routing module does not contain any fitted free parameters. When there are junctions with more than three channels, a tree-search algorithm is implemented in which the junction is dynamically deconstructed into a sequence of bifurcations with two downstream channels from the point of view of the channel from which the fish enters the junction. Recently, nonphysical barriers and fish guidance mechanisms such as bubble curtains and strobe lights have been investigated to steer fish into favorable migration routes in the Delta (Perry et al. 2014; DWR 2015; DWR 2016). Such mechanisms can be represented in the model as a "particle filter," which restricts a fraction of fish from entering a specific waterbody. Any number of filters can be applied at any junction in the system domain with specified efficiencies. Such filters will simply divert the fraction of fish into the next nearest downstream channel that does not have a filter.

Predation Mortality

The ePTM v2 adds predator-induced mortality according to the XT model (Anderson et al. 2005). The probability of a simulated salmon surviving passage through a region, S, is as follows:

$$S = e^{-\left(\frac{1}{\lambda}\sqrt{x^2+\omega^2 t^2}\right)}$$

where x is the distance traveled and t is the travel time. The mean free path, λ, is

$$\lambda = \frac{1}{\rho \pi r^2}$$

where ρ is the density of predators and r is the encounter distance. The term ω is the random component of prey speed. The implementation of the XT model in the ePTM v2 involves recording the x and t for each channel that a simulated salmon traverses in a given 15-minute time step. A survival probability for each of these sub time steps is then calculated using the λ values for the individual channels. The overall probability that the simulated salmon survives the 15-minute time step is the product of the survival probabilities of the sub time steps, i.e.:

$$S = \prod_{i=1}^{n} e^{-\left(\frac{1}{\lambda_i}\sqrt{x_i^2+\omega_i^2 t_i^2}\right)}$$

where n is the number of channels that the simulated salmon traversed during the time step, x_i is the distance traveled in channel i, t_i is the time spent in channel i, and λ_i and ω_i are the channel-specific mortality parameters. In the ePTM v2, only the parameters λ_i and ω_i are specified explicitly (Table 2).

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Model Calibration and Validation

The parameters of the ePTM v2 were estimated from tagging studies of late Fall-run Chinook salmon (2006-2010) released in the Sacramento River and passing through the Delta (Perry et al. 2010). This tagging study included a total of 1,591 tagged late-Fall juveniles that were released in the Sacramento River in eight release groups over the five year period. These fish were tagged with VEMCO V5 acoustic tags and were tracked through the system at hydroacoustic receiver arrays (Figure 15). By tracking fish through these receiver arrays, their passage through the Delta could be naturally quantified along the nine regions connected by key river junctions (Figure 15). A Cormack-Jolly-Seber (CJS) mark-recapture model was fit within a hierarchical Bayesian framework to concurrently estimate detection, routing and survival probabilities through the different regions (Perry et al. 2010; Perry et al. 2018). In addition to the region-scale survival estimates, the data was also processed (Russ Perry, personal communication) to include fist detection times for each fish whenever it was detected at a receiver array.

To estimate all 99 ePTM v2 parameters (11 parameters in each of the nine calibration regions) from the calibration data described above, the following steps were applied. First, for each parameter, bounds were identified on the permissible range of parameter values to constrain the parameter search space. These bounds were set based on a thorough review of the literature including laboratory experiments and field data, and reasonable biological expectations when insights could not be gained from the literature. Then, a four-stage calibration process was incorporated. In this process, first, it was determined that the movement (swimming, orientation and holding) parameters could be fit independently of the survival parameters (Sridharan et al. In prep.). Second, a coarse grid search on a large number of movement parameter values was performed to narrow in on the best local optima defined within a multiobjective optimization framework. Third, the parameter space was zoomed into in the neighborhoods of the best local optima to perform a fine grid search using the multiobjective optimization framework to identify the global optimum movement parameter values. Fourth, the movement parameters were held at their optimum values and performed a grid search over the survival parameters to find the optimum values of these parameters. These values are listed in Table 2. In lieu of an uncertainty analysis, a sensitivity analysis was performed on the parameters (Sridharan et al. In prep.). The calibrated model was also validated with out-of-sample data using Juvenile Salmon Acoustic Telemetry System (JSATS) tagged Chinook smolts (see Sridharan et al. In prep.). Both the calibration and validation results are archived in the ePTM v2 GitHub repository.

Table 2. ePTM v2 model parameters

Behavior	Description	Parameter	Search bounds	Optimal value	Evidence
Swimming	Mean swimming speed	U_S	[0,0.5m/s]	region 1: 0.50 m/s region 2: 0.37 m/s region 3: 0.32 m/s region 4: 0.43 m/s region 5: 0.50 m/s region 6: 0.15 m/s region 7: 0.35 m/s	Swimming speeds observed by Dougan 1993; Anglea et al. 2004; Brown et al. 2006;

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Behavior	Description	Parameter	Search bounds	Optimal value	Evidence
				region 8: 0.39 m/s region 9: 0.33 m/s	Walker et al. 2016; Lehman et al. 2017
	Standard deviation of swimming speed	σ_S	[0,0.5m/s]	region 1: 0.16 m/s region 2: 0.47 m/s region 3: 0.45 m/s region 4: 0.43 m/s region 5: 0.01 m/s region 6: 0.32 m/s region 7: 0.01 m/s region 8: 0.43 m/s region 9: 0.44 m/s	Swimming speeds observed by Dougan 1993; Anglea et al. 2004; Brown et al. 2006; Walker et al. 2016; Lehman et al. 2017
Orientation	Probability of memory persistence	$p_{Persistence}$	[0,1]	region 1: 0.81 region 2: 0.97 region 3: 0.86 region 4: 0.78 region 5: 0.61 region 6: 0.87 region 7: 0.37 region 8: 0.32 region 9: 0.71	Normal probability range
	Probability of rheotaxis	p_{Rheo}	[0,1]	region 1: 0.38 region 2: 0.15 region 3: 0.05 region 4: 0.17 region 5: 0.03 region 6: 0.40 region 7: 0.11 region 8: 0.90 region 9: 0.41	Normal probability range
	Half-saturation point of logistic function	c	[-10,10]	region 1: 7.55 region 2: 5.91 region 3: 2.09 region 4: 8.19 region 5: -0.19 region 6: 0.91 region 7: 2.68 region 8: -2.53 region 9: -0.55	Encompassing various shapes of logistic curve for 95% of flows observed in the Delta
	Slope of logistic function	b	[0,10]	region 1: 5.89 region 2: 5.34 region 3: 0.88 region 4: 6.40	Encompassing various shapes of logistic curve for 95%

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Behavior	Description	Parameter	Search bounds	Optimal value	Evidence
				region 5: 5.77 region 6: 6.02 region 7: 4.47 region 8: 7.16 region 9: 8.56	of flows observed in the Delta
Holding	Landward holding threshold water velocity	u_H	[0,1.5m/s]	region 1: 0.70 m/s region 2: 1.44 m/s region 3: 1.17 m/s region 4: 1.26 m/s region 5: 0.70 m/s region 6: 0.67 m/s region 7: 1.48 m/s region 8: 1.13 m/s region 9: 1.14 m/s	0 to peak tidal water velocity computed by DSM2 between 1962 and 2014
	Holding probability	p_H	[0,1]	region 1: 0.80 region 2: 0.58 region 3: 0.65 region 4: 0.33 region 5: 0.60 region 6: 0.66 region 7: 0.96 region 8: 0.73 region 9: 0.32	Normal probability range
	Daytime swimming probability	p_{DS}	[0,1]	region 1: 0.63 region 2: 0.11 region 3: 0.62 region 4: 0.01 region 5: 0.70 region 6: 0.00 region 7: 0.16 region 8: 0.62 region 9: 0.68	Probabilities reported in Chapman et al. (2013)
Mortality	Mean free path length	λ	[10,1000Km]	region 1: 753 Km region 2: 629 Km region 3: 1000 Km region 4: 876 Km region 5: 1000 Km region 6: 794 Km region 7: 711 Km region 8: 918 Km region 9: 753 Km	Synthetic survival model predictions encompassing range of survivals predicted in Perry et al. (2018)
	Random prey speed	ω	[0,2m/s]	region 1: 0.58 m/s region 2: 0.92 m/s region 3: 1.42 m/s	Synthetic survival model predictions

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Behavior	Description	Parameter	Search bounds	Optimal value	Evidence
				region 4: 0.08 m/s region 5: 0.08 m/s region 6: 0.75 m/s region 7: 0.50 m/s region 8: 0.00 m/s region 9: 0.00 m/s	encompassing range of survivals predicted in Perry et al. (2018)

Spatial Patterns in Calibrated Model Parameters

A detailed analysis of the spatial patterns in the calibrated behaviors will be presented in Sridharan et al. (In prep.); here we merely present a synopsis.

For the active swimming component of the model, in the North Delta regions upstream of Rio Vista (regions 1 to 5) and the confluence of Georgiana Slough with the San Joaquin River (region 6), simulated salmon actively swim against strong non-reversing riverine flows. In the more tidally reversing Central (region 7), Western (region 8) and South Delta (region 9), fish execute either movements that are directed weakly with or against the flow. Together, these parameters result in actions by the fish that increase migration rate and dispersion with increasing proximity to the ocean, as is observed in the acoustic telemetry datasets.

The orientation and holding parameters allow simulated fish to hold position against the flow, and even swim against the flow during the landward flood phase of the tide. In the regions where the oceanward flow does not reverse, the net effect is to orient fish against the flow much more often than with the flow. In the parts of the system where the flow reverses tidally, fish orientations are more likely to switch between with and against the flow. During strong landward flow reversals, fish approximately maintain position relative to the flow. The probability of swimming during the day is consistent with the values obtained in this region from acoustic telemetry experiments reported in Chapman et al. (2013).

The mean-free path length and random prey speed result in an overall increasing likelihood of survival through the downstream regions of the system. In the Delta, predator densities are generally higher in the fresh Sacramento and San Joaquin River waters than in the Western, more salty parts of the system (Michel 2020). The spatial distribution of the mortality parameters thus mirror a lower likelihood of predation in the Western Delta than in the Eastern Delta.

ePTM v2 Application

For a given climate change, water operations or restoration scenario, ePTM v2 is used in conjunction with the habitat capacity model, and the USGS juvenile Chinook beach seine abundance model (Perry et al. 2016) to predict mean and variance in monthly survivals for fish rearing in the Sacramento River, the Yolo Bypass floodplain, and in the interior Delta. In a multi-year scenario, 50 simulated salmon are released uniformly over the first month of each simulation at each DSM2 node East of Chipps Island and the survivals estimated from each of these releases is bootstrapped into 1,000 survival samples. Each ePTM v2 simulation for fish released in a given month is run for three

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months to allow fish to reach their ultimate fate, and survival is reported based on fish that arrive at Chipps Island. River- and floodplain-rearing smolt survivals are reported as the survivals estimated by releasing fish at the relevant nodes (Figure 14), while Delta-rearing smolt survivals are reported by reweighting the survivals in the target month estimated from in-Delta node releases using the carrying capacity associated with each Delta node three months prior to the release month. The carrying capacities are estimated three months prior to the release month to reflect the fact that rearing juveniles would have selected a habitat patch to rear based on the conditions at the time that they arrived there. This reweighting assumes an ideal free distribution of fish in the Delta. The reweighting is done as follows:

First, the density of smolt abundance per unit area in four different regions representing the Delta [regions 2 through 5 in Figure 16 adapted from an United States Fish and Wildlife Service memo (Barnard 2019)] are estimated using the USGS abundance model for each month in each year between 2000 and 2020.

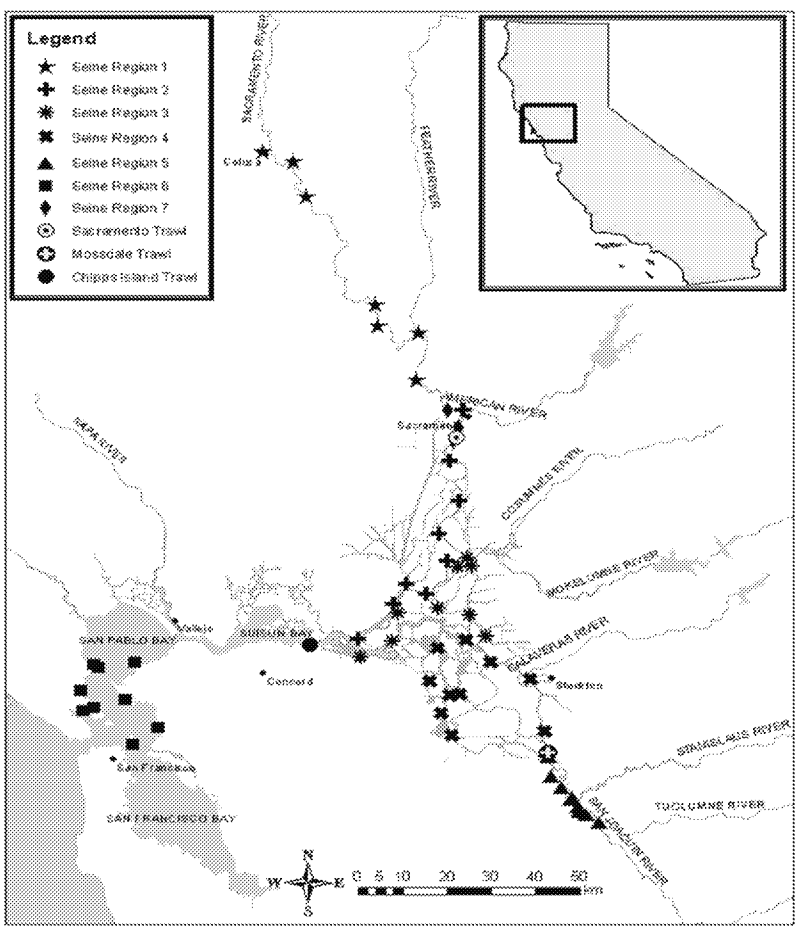

Figure 16. Beach-seine based abundance density model regions. Regions 2, 3, 4 and 5 are used in the habitat capacity-based reweighting scheme. From Barnard 2019.

Then, for each month in each year in the scenario that is being evaluated, the density in each region is estimated by using a K-nearest neighbors model which sets the abundance in a given month as

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$$d_{m,r} = \frac{\sum_{j=1}^{K} d_{j,Historical,i}}{K}$$

where $d_{m,i}$ is the density in region r in month m of the scenario, $d_{j,Historical,i}$ is the density in that region in the jth month of K months within the historical period that are within the cluster of months closest to the mth month hydrologically. The hydrological similarity index used to cluster historical months is given by the Euclidean distance between the hydrologic conditions representative of a given region, which are

Region 1 based on Sacramento River flow: $\sqrt{(Q_{Sac,m} - Q_{Sac,j})^2}$

Region 2 based on Sacramento River flow and Delta Cross Channel operation:
$\sqrt{(Q_{Sac,m} - Q_{Sac,j})^2 + (Q_{DCC,m} - Q_{DCC,j})^2}$

Region 3 based on Sacramento River flow and Delta Cross Channel operation:
$\sqrt{(Q_{Sac,m} - Q_{Sac,j})^2 + (Q_{DCC,m} - Q_{DCC,j})^2}$

Region 4 based on San Joaquin River flow: $\sqrt{(Q_{SJR,m} - Q_{SJR,j})^2}$

and, w_j is the inverse Euclidean distance between the hydrologic conditions representative of a given region within the cluster of points closest to the month m. The number of clusters is dynamically determined by minimizing the sum of squared errors obtained by successively leaving one month out of the historical dataset. These errors are the sum of the Euclidean separation between a training point and the sum of other points in a cluster weighted by the inverse Euclidean separation between those points and the training point.

Second, the area within each of the eight habitat classes, c, associated with a node, i, with l connecting channels is given by

$$a_{i,c} = \frac{1}{2}\sum_{j=1}^{l} a_{i,c}$$

The density associated with each habitat class is given by d_c.

Third, the weight associated with each region in the Delta is estimated as

$$w_r = \frac{\sum_{c=1}^{8} d_c(\sum_{i=1}^{n} a_{i,c})}{\sum_{r=1}^{4} w_r}$$

This formula ensures that regions with predominantly poor habitats are weighted lower as locations where fish would likely rear. As the USGS density model collapses beach seine data into the four regions depicted in Figure 16 and finer resolution is not possible, the assumption here is that the carrying capacity associated with each node within a given region is identical.

Fourth, the carrying capacity (K) of each region is then given by

$$K_{m,r} = w_r d_{m,r}$$

Finally, the reweighted survival from a given DSM2 node i in month m is given as

$$S_{m,i,Reweighted} = \frac{K_{m-3,r}}{\sum_{r=1}^{4} K_{m-3,r}} S_{m,i}$$

Caveats

Currently, the ePTM v2 can represent either the current geomorphology and hydrology of the Delta (Current), a historic representation of the Delta before Liberty Island flooded (Historic), or any other configuration representing restoration actions or other water operations. We note that in order to investigate these alternate configurations, some effort would be required to set up the overarching CALSIM simulations and the Delta hydrodynamics DSM2 model. The development of these models for specific scenarios is currently beyond the scope of the LCM team. The ePTM v2 results are based on a simplified one-dimensional network representation of the Delta, and hence do not account for complex geo-morphological and hydrodynamic transport and mixing phenomena such as tide induced chaotic dispersion, wind generated transport and gravitational circulation. The ePTM v2 results do not include the effects of environmental stressors such as water quality, temperature, nutrients, channel scale, temporal variability in predation dynamics, and foraging behavior or energy management dynamics. There is a significant data gap in addressing more complex spatio-temporal patterns in biological behavior and habitat interactions, as well as a need for easy model deployment and speed, so the ePTM v2 parameterizes only simple hypotheses about these effects.

Cloud-based Implementation of ePTM v2 for Tractable Scenario Evaluation

In a typical application of the WRLCM for evaluation of a proposed project or water management scenario, the ePTM v2 is used to generate monthly survival estimates across multiple decades. The resampling procedure described above requires survival estimates for smolts originating throughout the Delta for every year and month, which implies that a large number of ePTM v2 simulations are required for a single scenario evaluation.

For example, a typical scenario evaluation could span 90 years and eight months per year, for a total of 720 year-month combinations. The exact number of ePTM v2 insertion nodes depends on the DSM2 grid, which may vary by scenario, but there are approximately 370 relevant insertion nodes east of Chipps Island. Therefore, the example scenario evaluation would require approximately 266,400 simulations (90 years x 8 months x 370 simulations/year-month). A single ePTM v2 simulation with 50 SJS requires on the order of one minute to complete. Performing all of the required simulations on a single machine would take approximately 1.65 X 10^7 seconds, or 190 days.

Given that the elapsed real time required to complete these ePTM v2 simulations on a single machine would be prohibitive, we have deployed the ePTM v2 on the Amazon Web Services (AWS) cloud computing platform to allow for massively parallel computation. Using AWS, we are able to distribute the ePTM v2 simulations across hundreds of instances (virtual machines), allowing completion of a scenario evaluation in less than a day of elapsed real time.

We employed three primary components of AWS to implement the cloud-based ePTM v2 workflow. Simulations are performed using Elastic Cloud Compute (EC2) instances. Communication between a local machine and the EC2 instances (e.g., for scheduling jobs and downloading metadata for the

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completed jobs) is implemented via the Simple Queue Service (SQS). ePTM v2 outputs from the EC2 instances are stored using Simple Storage Service (S3) buckets.

Creating virtual machines on EC2 requires an Amazon Machine Image (AMI), which is essentially a template that can be used to spawn one or more EC2 instances. It can be thought of as an image of a single computer that can be copied any number of times to create multiple, identical, virtual computers running in the cloud. The AMI specifies the operating system, all of the installed software, and other software configuration details. The same AMI can be used to launch EC2 instances with a variety of hardware configurations, meaning that a more or less powerful hardware configuration can be selected as needed at runtime.

For the ePTM v2, we created a custom AMI based on Windows and the x86_64 platform with the ePTM v2 and all required supporting software installed. The AMI was configured to automatically log in and begin polling SQS for available jobs upon launch, and to automatically terminate after a set period of time with no new jobs. For typical applications, we use the c5.large EC2 instance type, which is a compute-optimized instance with 2 virtual CPUs (vCPUs) and 4 GiB of memory.

We used a series of Python scripts, running on both a local machine and the cloud instances, to implement the workflow. The workflow includes scheduling the jobs from the local machine, polling the job queues on the cloud instances, downloading the ePTM v2 outputs to the local machine, and post-processing the results. Interaction with AWS is accomplished using the Boto3 AWS Software Development Kit (SDK) for Python.

Each ePTM v2 simulation provides a survival estimate for SJS inserted into a particular DSM2 node for a given year and month. To obtain survival estimates representing the entire month, we insert 50 SJS with insertion dates and times distributed uniformly throughout the specified month. For each SJS, the ePTM v2 calculates a survival probability in each time step, so the cumulative survival probability from the insertion location to the Delta exit at Chipps Island is the product of the survival probabilities for the individual time steps. Survival probabilities for SJS that did not pass Chipps Island are assumed to be zero.

Summarizing, the standard workflow for running the ePTM v2 on AWS includes the following steps:

- use a Python script on a local machine to post jobs on SQS for all years, months, and insertion nodes required for the scenario evaluation

- launch up to hundreds of c5.large EC2 instances using a custom Windows-based AMI configured to automatically log in, poll the SQS job queue, claim a particular job, perform the ePTM v2 simulation, save the run metadata to the SQS queue, and save the raw ePTM v2 outputs to an S3 bucket

- after all scheduled simulations are complete, use a Python script to download the raw ePTM v2 outputs to a local machine for post-processing

- run a Python post-processing script to quality assure (QA) the ePTM v2 outputs and perform bootstrap resampling

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IV. Model Calibration

The WRLCM framework is flexible in that it may be used to generate many different trajectories of abundance and spatial patterns of habitat use by varying the parameters of the model. The WRLCM should reflect historical trends and spatial patterns in abundance, however. As a result, we calibrated the WRLCM to multiple winter-run abundance indices by fixing some model parameters and estimating other parameters with a statistical fitting algorithm.

One goal of the WRLCM was to construct a model that was sensitive to alternative hydro management actions in the Central Valley; thus the model was structured such that it is sensitive to hydrologic drivers. An unintended consequence of this approach is that the statistical properties of the model are not optimal. In particular, some model parameters are not uniquely identifiable; that is, the same abundance can occur through several different parameter combinations. Because this property of the LCM makes statistical estimation difficult, the values of some parameters must be constrained using biological information, previous studies, or expert opinion, so that other parameters can be estimated. We provide the parameters that were constrained and provide justification for their values before moving to the statistical estimation of the remaining parameters.

Fixed Parameters and Their Justifications

Spawn Timing Parameters

Historically, the spawning of winter-run Chinook has not been uniform among the months April to August. Instead, higher proportions of winter-run spawned in June and July relative to April, May, and August. In addition, the proportions of winter-run that spawned in each month were not constant across years, but instead varied yearly. We analyzed the historical proportion of spawning among each month from 2003 – 2014 using carcass counts (assuming a 2 week period between spawning and senescence), and estimated the proportion of winter-run spawning in each month as a function of April temperatures at Keswick (Appendix A). We compared this model to one that used a static proportion among years, and found that the model based on April temperatures outperformed the static model. The general relationship identified through this multinomial regression model was that hotter April temperatures caused later initiation of spawning in winter-run Chinook. This may be explained mechanistically if the female spawners were laying their eggs to target an emergence time. Hotter temperatures in April indicated that a shorter incubation window was needed, whereas cooler temperatures indicated a longer incubation window. Please see Appendix A for additional information on this analysis.

These equations provided a method of shifting spawning distribution among months as a function of April temperatures (Table 3 and Appendix A). The April water temperatures were standardized in the analysis and thus need to be standardized for use in the simulation model (mean = 10.00 C, standard deviation = 0.70).

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Table 3. Parameter values related to monthly spawn timing (SD = standard deviation).

Parameter	Mean	SD	Description
$B0_{Apr}$	-4.145	0.060	Intercept for proportion of spawners in April
$B1_{Apr}$	0.0538	0.062	Effect of temperature on proportion of spawners in April
$B0_{May}$	-1.796	0.020	Intercept for proportion of spawners in May
$B1_{May}$	-0.2031	0.020	Effect of temperature on proportion of spawners in May
$B0_{Jul}$	-0.332	0.012	Intercept for proportion of spawners in July
$B1_{Jul}$	0.3852	0.012	Effect of temperature on proportion of spawners in July
$B0_{Aug}$	-3.443	0.044	Intercept for proportion of spawners in August
$B1_{Aug}$	0.7921	0.045	Effect of temperature on proportion of spawners in August

Tidal Fry and Fry Related Parameters

Winter-run Chinook generally have not had a high tidal fry proportion (on the order of less than 5%). Furthermore, the location of tidal fry has varied among years, and they have been susceptible to movement downstream in the Sacramento River under high flow conditions (Pat Brandes, USFWS *personal communication*). The WRLCM parameters for the tidal fry and fry stages reflected these assumptions (Table 4).

Table 4. Fixed parameter values related to the tidal fry and fry stage.

Parameter	Value	Description
$t.crit$	12.0	Temperature at which thermal morality initiates in the egg to emerging fry survival in Transition 1. Value of 12.0 obtained from Martin et al. (2017).
$B1_A$	0.0	Effect of covariate on background survival in egg to emerging fry survival in Transition 1. A value of 0 indicates no annual variability in background survival.
$P_{TF,m}$	0.047	Proportion tidal fry
$S_{TF,FP}$	0.731	Survival tidal fry in floodplain
$P_{FP,m}$	0.88	Proportion entering Floodplain if flooding (Pope et al. 2018)
$B0_4$	0.5	Average survival tidal fry to delta intercept
$B1_4$	-1.0	Effect of DCC gate (value is in logit space)*
$B0_5$	0.5	Average proportion of tidal fry to bay intercept
$B1_5$	2.0	Effect of Rio Vista flow (value is in logit space)*

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Parameter	Value	Description
$B0_M$	0.003	Proportion of fry moving from the Lower River to the Delta in the absence of density dependence when Wilkins Slough Flows are < 400 cms.
$B1_M$	0.377	Proportion of fry moving from the Lower River to the Delta in the absence of density dependence when Wilkins Slough Flows are ≥ 400 cms.

Smoltification Timing Parameters

The timing of smoltification of winter-run Chinook salmon historically begins in January with a majority of winter-run sized smolts outmigrating by March (delRosario et al. 2013). In the WRLCM, all fry are assumed to have smolted by April and migrated in May (Table 5). The timing of smoltification in the WRLCM has been parameterized to coincide with winter-run sized Chinook salmon in Chipps Island trawl data (delRosario et al. 2013) and by using Chipps Island abundance indices as described below in the *Parameter Estimation* section.

Table 5. Smoltification timing parameters for winter-run Chinook.

Parameter	Value	Description
Z_1	0.269	January smolt probability
Z_2	0.5	February smolt probability
Z_3	0.953	March smolt probability
Z_4	0.999	April smolt probability
Z_5	1	May smolt probability
Z_6	1	June smolt probability
Z_7	1	July smolt probability

Maturation Rate Probabilities

The age-specific maturation probabilities for winter-run Chinook salmon were fixed to values based on analysis of coded wire tagged hatchery fish (Grover et al. 2004). The probability of maturation of age 2 fish was 0.10 (M_2), the conditional probability of maturation at age 3 was 0.90 (M_3), and the conditional probability of maturation at age 4 was 1.0.

Age-specific sex ratios were applied to obtain age and sex specific escapement values. Males dominate age-2 escapement, thus the female sex ratio for age-2 fish (Fem_{Age2}) was set at 0.01. Estimates of the proportion of age-3 female spawners (Fem_{Age3}) may vary among years, and we accounted for this historical annual variability by using an annual sex spawner ratio value calculated from Keswick trap counts 2001 – 2014 (mean = 0.595, sd = 0.077). These values were also used in the annual calculation of natural origin escapement from carcass surveys over the period 2001 –

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2014 (Doug Killam, CDFW Redding, CA, *personal communication*). In the absence of an estimate of the age-3 sex ratio, a value of 0.5 was assumed for 1970 – 2000.

Egg production per age-2 female ($V_{eggs,2}$) was 3000 for age 2 females (3200 reported in Newman and Lindley, 2006) and production per age-3 and age-4 female ($V_{eggs,3}$ and $V_{eggs,4}$) was 5000 (Winship et al. 2014).

Smolt Survival

The ePTM v2 calculates month and year-specific smolt survival probabilities; however, some survival probabilities were needed to move the smolts from their areas of rearing to the location in which the ePTM v2 survival rates were applied. Smolt survival from the Lower River to the Delta ($BO_{11,LR}$) was fixed at 0.8 (estimates of survival ranged from 0.73 - 0.875 Colusa to Sacramento in the 2012-2015 WR acoustic tag data, Arnold Ammann, SWFSC NMFS Santa Cruz *personal communication*). Smolt survival from the Upper River to the Delta ($BO_{10,UR}$) was fixed at 0.4 (estimates of survival averaged 0.456 from release to Sacramento in the 2012-2015 WR acoustic tag data, Arnold Ammann, SWFSC NMFS Santa Cruz *personal communication*). Smolt survival from the Yolo bypass to insertion into the DSM2 grid for incorporation into the ePTM v2 ($^{A}S_{13,FP}$) was assumed to be 1.0 per month.

Survival of smolts from Chipps Island to the Golden Gate bridge ($^{c}S_{11}$) was incorporated into the survival during early ocean survival (described below) and therefore assumed to be 1.0. Survival of smolts that reared in the Bay to the Golden Gate bridge ($S_{15,BA}$) was assumed to be 0.8.

Ocean Survival

Survival of smolts that reared in the Upper River, Lower River, Delta, Yolo, and Bay habitats (S_{G1}) have the same gulf survival, which was estimated through statistical fitting (see below in the *Parameter Estimation* section).

Survival during the first four months in the ocean (S_{17}) was assumed to have a rate of 0.79, which equates to an annual survival of 0.5, whereas annual survival in the ocean for age-3 and age-4 (S_{19} and S_{21}) was assumed to be 0.8. These annual natural survival rates are consistent with winter-run reconstruction conducted annually as part of the fishery management of Sacramento River salmon (Grover et al. 2004, O'Farrell et al. 2012).

Statistical Estimation

One of our objectives is to ensure that the WRLCM can reflect the historical patterns in winter-run Chinook population dynamics in the Sacramento River. In order to meet this objective, we calibrated the LCM to observe winter-run indices of abundance throughout the life cycle (Table 6). Not all indices of abundance were available for the entire period of model calibration of 1970-2014. This data limitation is not a problem for fitting the WRLCM, however. The WRLCM can be fitted to the specific indices of abundance for the period over which they were available by pairing observed indices of abundance with WRLCM predictions over the appropriate period. Then, the sampling

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distribution provided a likelihood function by which the model predictions were statistically evaluated given the observed data (Hilborn and Mangel 1997).

This type of model, in which multiple data sources are used to inform multiple life-history stages, is called an integrated population model and has notable advantages over piecewise model composition (Newman et al. 2014). In particular, the model parameter estimates can utilize all of the available data simultaneously, which can improve the parameter estimates by allowing the model to "fill in the gaps" over portions of the life cycle that are unobserved (Newman et al. 2014).

Table 6. Indices of abundance used to calibrate the winter-run life cycle model.

Data	Date	Standard Deviation	Sampling Distribution	Data time step
Natural	1970-2002	0.25	lognormal	Annual
Escapement				
Escapement by sex and jack/jill vs adult	2003-2016	0.25	lognormal	Annual
RBDD monthly juvenile counts	1996-1999, 2002-2016	0.8	lognormal	Monthly
Chipps Island monthly juvenile abundance	2008 - 2011	0.9	lognormal	Monthly

Modification of the WRLCM for Estimating Parameters

Annual impact rates of age-3 (I_3) and age-4 (I_4) were obtained from estimated harvest rates over the 1970- 2014 period (O'Farrell and Satterthwaite 2015). Survival of age-2 (S_{sp2}), age-3 (S_{sp3}), and age-4 (S_{sp4}) through the freshwater prior to spawning is assumed to be 0.9 to incorporate in-river harvest, which historically included levels of approximately 7 percent (Grover et al. 2004) and pre-spawn mortality.

To reflect the historical dynamics of access to the Floodplain habitat (Yolo bypass), the following transition equation was used to describe the proportion of Tidal Fry that enter the floodplain habitat ($P_{FP,m}$)

$$P_{FP,m} = B1_{FP} * \mathrm{I}(Q_{Verona,m} > 991.1 \text{ m}^3\text{s}^{-1})$$

where $Q_{Verona,m}$ was the Sacramento River flow at Verona in month m, $\mathrm{I}(\,)$ is an indicator function that equates to 1 when the condition in the parenthesis is met, and $B1_{FP}$ is the proportion of fry that enter the Yolo under flooding conditions, which was 0.8.

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Bayesian Estimation

Given the fixed parameter values described above, the remaining parameters were estimated in a Bayesian statistical fitting framework. An initial evaluation of model complexity (not shown) indicated that approximately 10 parameters were identifiable in the mechanistic portion of the model, depending upon which parameters were chosen. We estimated 8 parameters in addition to 45 annual random effects (i.e, the ε_y) in the model calibration.

These parameters were estimated by sampling from the posterior distribution (the combination of the likelihood specified by the sampling distribution and the prior distribution for model parameters) of observing the winter-run abundance indices (Hilborn and Mangel 1997, Gelman et al. 2013). That is, parameter combinations can be used to make predictions on the escapement in each year, the number of juveniles passing RBDD in each month, and monthly abundance estimates at Chipps Island (Table 6). Some parameter combinations provide predictions that are closer to the observed abundance indices than others. The parameter combinations that provide the closest fit to the observed indices are retained in the Markov Chain Monte Carlo (MCMC) sampling algorithm, leading to a set of samples from the posterior distribution of the model parameters. The MCMC algorithm also provides estimates of the state variables, which include the abundance at each sampling location at the appropriate time scale (Table 6) for comparison of the model predictions to the observed abundance data.

Model parameters were estimated by implementing the Bayesian statistical fitting in the programming language NIMBLE (de Valpine et al. 2017, deValpine et al. 2022a). In order to implement the MCMC algorithm, the WRLCM had to be written into the NIMBLE language as NIMBLE uses a specific syntax that it subsequently converts to C++ code so that the MCMC algorithm can be implemented in a fast computational environment. All life stages of the WRLCM were coded into the NIMBLE version of the WRLCM with the exception of tidal fry. Tidal fry compose a small portion of the overall dynamics of winter-run (~5.0%) and field data have not been collected for this life stage. As a result, the NIMBLE model has no observations on which to evaluate this life stage, and therefore tidal fry were not included in the NIMBLE code; however, their dynamics were included in the evaluation of the projects using the fixed parameter values described above. More details on the NIMBLE programming language can be found at de Valpine et al. (2022b).

Fits to Abundance Indices

Fits to the abundance indices generally followed patterns in the observed data. Annual patterns in natural origin escapement were well estimated by the model (Figure 17), as were monthly patterns in juvenile abundance estimates at RBDD (Figure 18).

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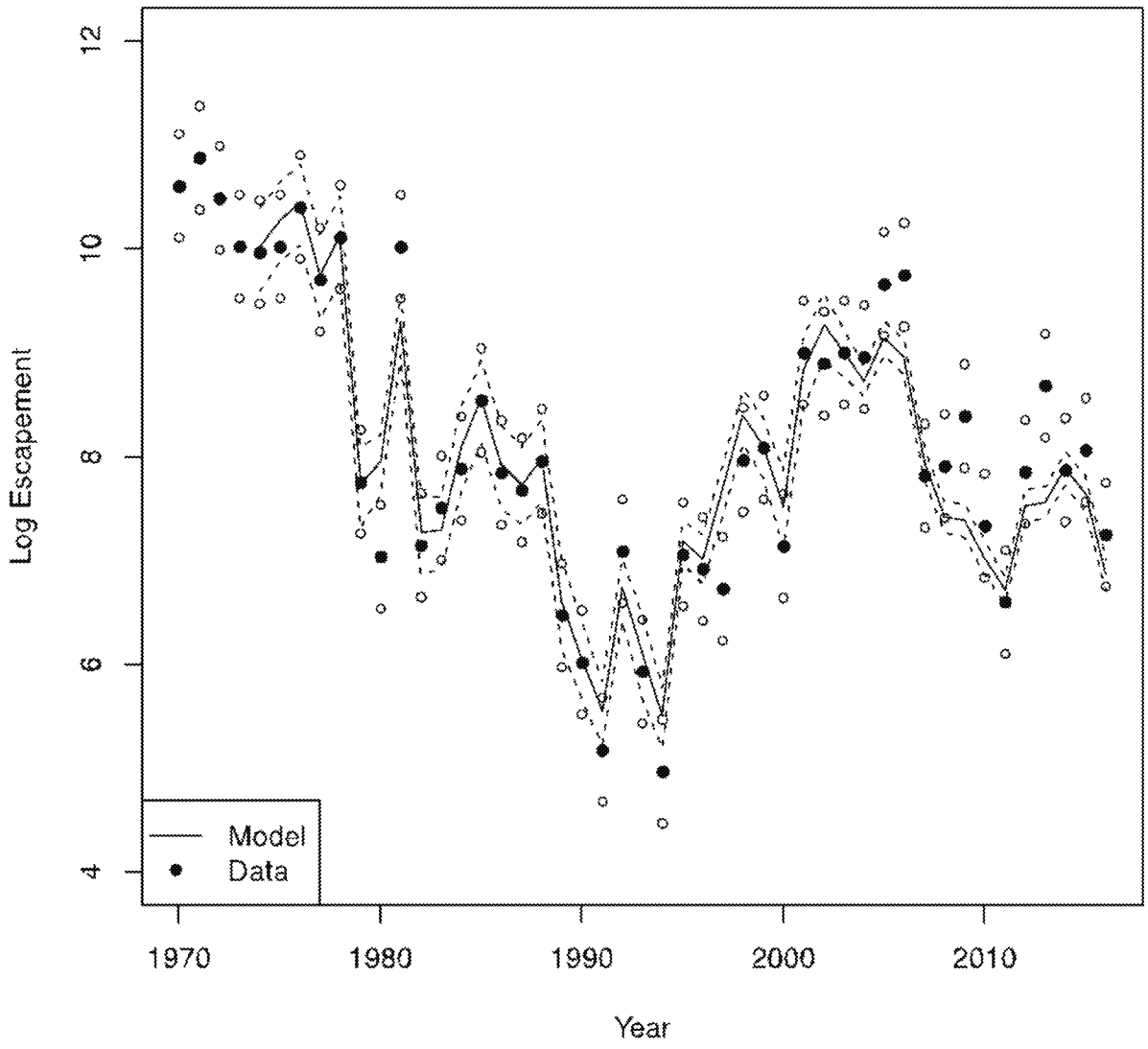

Figure 17. Model fit (line) with 95% credible intervals on model predictions (dashed line) to log natural origin escapement data (solid circles) with 95% interval on measurement error (open circles).

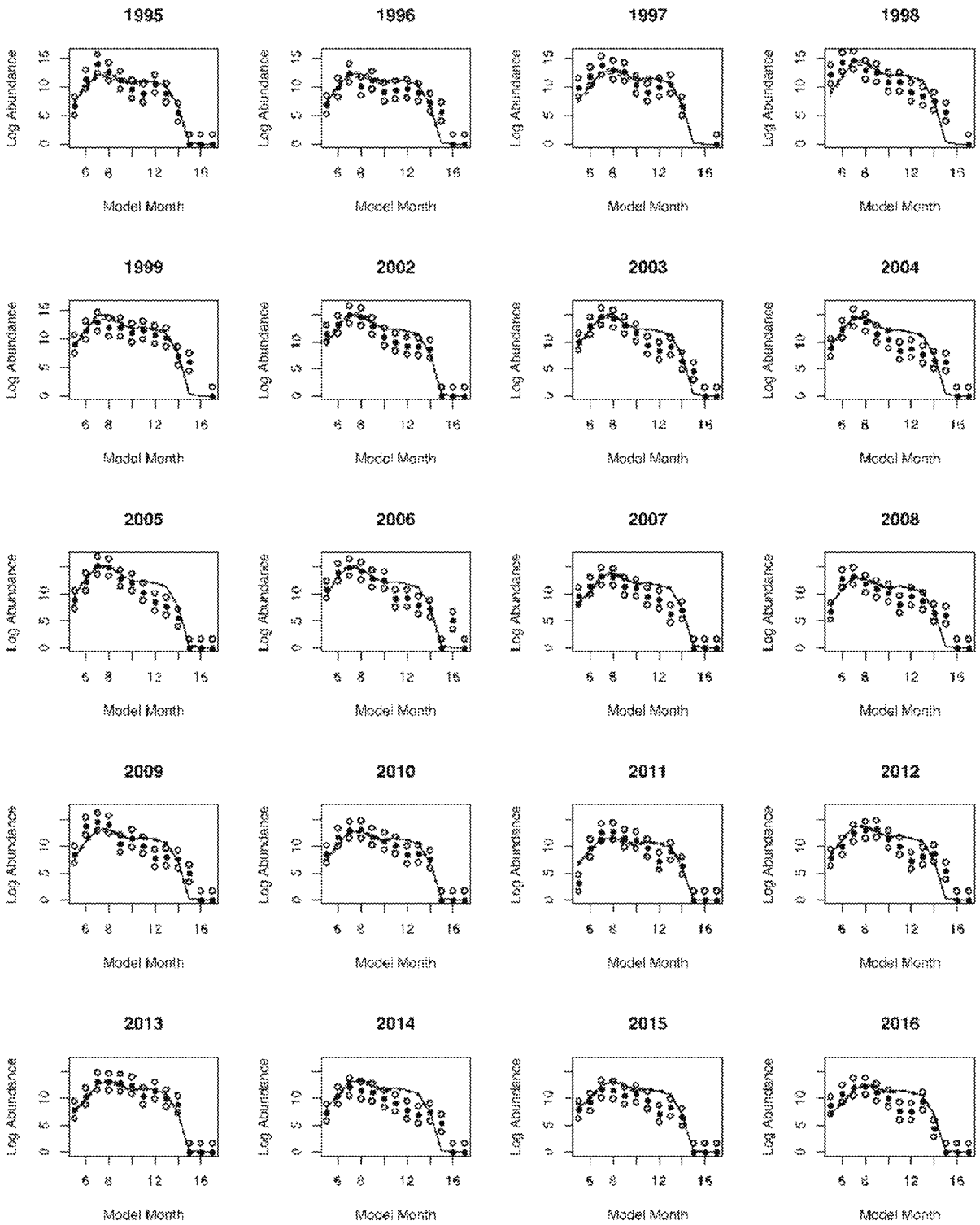

Figure 18. Model fit (line) with 95% credible intervals on model predictions (dashed line) to log juvenile abundance at Red Bluff Diversion Dam (solid circles) with 95% interval on measurement error (open circles).

Finally, the WRLCM was able to capture the monthly patterns in Chipps Island abundance trends from 2008 – 2011, reflecting the outmigration patterns of winter-run from each of the rearing habitats (Figure 19).

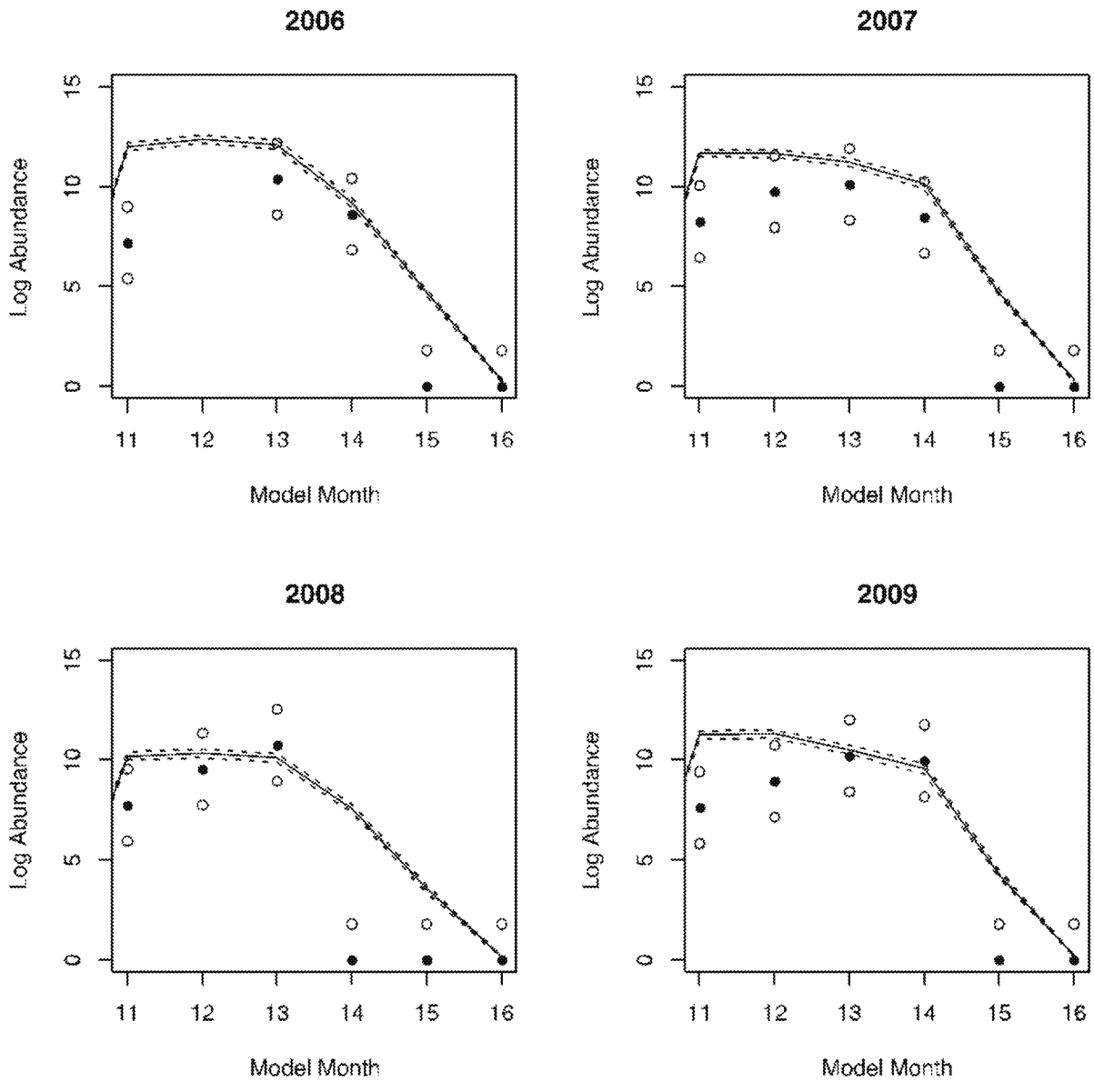

Figure 19. Model fit (line) with 95% credible intervals on model predictions (dashed line) to log juvenile abundance at Chipps Island (solid circles) with 95% interval on measurement error (open circles).

The estimated parameter values from the MCMC algorithm are provided in Table 7. The table provides the parameter estimate, the standard deviation of the estimate (SD), a transformed value of the parameter estimate, and a note defining the parameter. We attempted to estimate all parameters of the survival of egg to fry as a function of temperature (Transition 1); however, there was strong correlation among the three parameters that caused problems with parameter identifiability. We assumed that the critical temperature at which thermal mortality starts to affect egg to fry survival was 12.0 C, which is the value determined from an analysis of egg to fry survival by Martin et al. (2017). The survival of egg to fry below this critical temperature was a value (logit($B0_1$)) for the 3-month period, whereas above this threshold the survival was reduced for every degree above the critical temperature.

mig_m is a constant value (e.g., movement from the floodplain to the delta, the delta to the bay, and the bay to the gulf).

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The other parameter value that was set was the variance on the random effect in process noise (σ_{ε}^2), and it was set to have a value of 1. This variance allowed the model to estimate the annual random effect parameters (ε_y) to have values of approximately $\pm$ 2. These parameter values corresponded to a range in annual variability in survival of (0.17, 7.4) due to the lognormal structure of the random effects.

Table 7. WRLCM parameter estimates from the model calibration to winter-run indices of abundance (Table 6).

Parameter	mean	sd	2.50%	97.50%	Rhat	Description
$B0_A$	0.95	0.096	0.764	1.139	1.00	Survival below critical temperature value (logit space)
$B1_1$	-1.11	0.144	-1.412	-0.847	1.09	Rate of reduction in egg to fry survival (logit space)
S_{FRY}	0.872	0.062	0.758	0.997	1.00	Winter run fry survival (logit space)
mig_m	0.224	0.126	0.017	0.486	1.00	Proportion migrating per month from floodplain, delta, and bay in absence of density dependence
$mig_{UR,m}$	0.128	0.012	0.105	0.153	1.00	Proportion of fry in upper river migrating to lower river per month in absence of density dependence
S_{G0}	-3.165	0.297	-3.723	-2.557	1.02	Average survival during gulf entry (logit space)
S_{G1}	-0.338	0.233	-0.786	0.144	1.04	Effect of upwelling index on survival during gulf entry (logit space)
σ_{ε}	1.645	0.194	1.255	1.974	1.01	Standard deviation of random effects during gulf entry

Using 1500 samples from the posterior, we calculated the correlation among estimated model parameters (Table 8). In general, the absolute value in correlations among parameters was less than 0.6. Parameters with absolute correlations greater than 0.5 included the standard deviation in the random effects (σ_{ε}) and the average ocean entry survival (S_{G0}), which were negatively related, and the effect of thermal mortality ($B1_1$) and the ocean entry average ocean entry survival (S_{G0}), which was also negatively related. These negative correlations reflect the lack of observations on winter-run between Chipps Island (in a few years) and spawner escapement. As a result, the observed patterns in abundance can be explained by having high thermal mortality and low gulf entry survival (and vice versa). Likewise, the abundance data can be explained by allowing the annual variability in gulf survival to be more variable if the thermal mortality rate is low and less variable if the thermal mortality rate is high. These correlations reflect unknown relationships due to limited data; that is, we do not have data sets that can determine the specific rates and thus multiple combinations of these parameters can produce the same patterns in abundance. This is an important aspect to the model fitting in that the correlations in posterior draws can be passed to the evaluation of the project effects.

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Table 8. Correlation matrix for estimated parameters in the WRLCM calibration.

	mig_m	$mig_{UR,m}$	S_{G0}	S_{G1}	$B0_A$	S_{FRY}	$B1_1$	σ_ε
mig_m	1	0.152	-0.08	-0.009	0.083	0.279	0.023	-0.09
$mig_{UR,m}$	0.152	1	-0.102	-0.062	-0.228	0.442	-0.01	-0.014
S_{G0}	-0.08	-0.102	1	0.172	-0.081	-0.232	-0.564	0.353
S_{G1}	-0.009	-0.062	0.172	1	0.024	-0.091	-0.259	0.262
$B0_A$	0.083	-0.228	-0.081	0.024	1	-0.25	-0.035	-0.063
S_{FRY}	0.279	0.442	-0.232	-0.091	-0.25	1	-0.071	-0.031
$B1_1$	0.023	-0.01	-0.564	-0.259	-0.035	-0.071	1	-0.564
σ_ε	-0.09	-0.014	0.353	0.262	-0.063	-0.031	-0.564	1

Incorporating Uncertainty in the Analysis of Hydrologic Alternatives

Our goal is to be able to account for multiple sources of uncertainty in the analysis of the proposed alternatives relative to the existing condition (or baseline). We incorporated three forms of uncertainty in the DCP analysis: 1) parameter uncertainty, 2) natural variability in cohort productivity, and 3) model uncertainty in the smolt survival function (ePTMv2). We then used Monte Carlo simulation to incorporate all three sources of uncertainty in the WRLCM outputs.

To incorporate parameter uncertainty, we used 1000 posterior samples from the parameters estimated via MCMC. With two exceptions, we used the draws that were defined by the posterior credible intervals described in Table 7. The two parameters that used different values were the standard deviation in the random effects (σ_ε) and the ocean entry survival (S_{G0}). The ocean entry survival was fixed at a value of 0.12 for gulf entry survival (corresponding to an inverse logit transformed value of -2), because the estimated value of 0.043 (corresponding to an inverse logit transformed value of -3.1) was leading to extremely low population sizes given the survival rates in the other parts of the life cycle. We also fixed the standard deviation in the random effects (σ_ε) to its mean value (1.645).

To incorporate natural variability in cohort productivity, we incorporated a unique random effect for each cohort in the 81-year time series. We repeated this 81-year series over 1000 iterations to simulate a set of 1000 x 81 random effects that corresponded to 1000 iterations and 81 years of the time series. The random effects were bias corrected random variables (to ensure that when they were exponentiated they retained a mean of 1) from a normal distribution with mean = 0 and standard deviation = 1.645.

Finally, to incorporate uncertainty in the smolt survival model (ePTMv2), we used 1000 bootstrapped samples of survival rates estimated for each model month 11 to 17 (January to July) and the Lower River, Floodplain, and Delta rearing habitats. These 1000 samples by month and habitat were calculated for each alternative and the baseline existing condition. Within each scenario, we ordered the survival estimates within each month and rearing habitat such that the first value was the lowest survival rate for that month and habitat and the last value was the highest survival rate for that month and habitat. We then used the ordered smolt survival rates in the effects analysis, which ensured that the lowest monthly survival for a given habitat under the existing condition was being paired with the lowest monthly survival for the same habitat under the

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alternative. This ordering also ensured that this comparison was made for the second lowest survival and through to the highest survival.

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Draft_0023586

Appendix A. Analysis of winter-run monthly spawn timing

To estimate the proportion of winter-run spawning among the months of April to August, we conducted an analysis of the numbers of winter-run carcasses detected in each of the months April to August. We were interested in understanding whether the proportions spawning among months were static across all years, or alternatively, whether the proportions varied among years due to the environmental conditions in that year. That is, whether there were some environmental conditions that caused shifts to earlier spawning in some years.

Data

Winter-run carcass observations by date were shifted two weeks earlier to generate "observed" number of fish spawning by date. These spawning numbers by date were coalesced by month to form $N.spawn_{m,t}$ the observed (based on carcass counts) number of winter-run Chinook spawning in month m in year t.

To evaluate annual variability in the proportion spawning in a given month, we calculated a spawning proportion anomaly as the standardized proportion of fish spawning each month ($SPr_{m,t}$). For example, the values of the standardized April values were

$$SP_{Apr,t} = \frac{P.spawn_{Apr,t} - mean(P.spawn_{Apr})}{std\ dev(P.spawn_{Apr})}$$

where the proportion spawning in each month for a given year t (subscript suppressed) was calculated as

$$P.spawn_m = \frac{N.spawn_m}{\sum_m N.spawn_m}.$$

To understand how these annual anomalies varied as a function of water temperature, we calculated the Pearson's correlation coefficient between mean monthly temperature below Keswick Dam between January and June and the standardized proportions (Figure A1).

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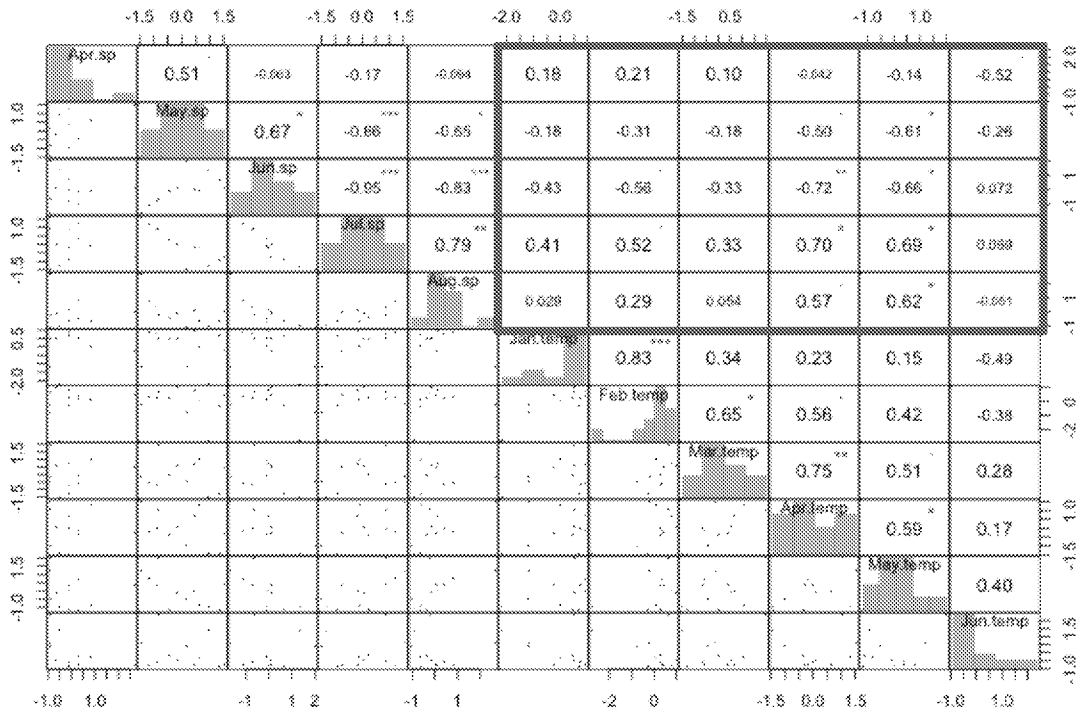

Figure A1. Pearson correlation coefficients (upper triangle), histograms (diagonal) and scatter plots (lower triangle) for all combinations of monthly spawning proportion anomalies and Keswick water temperatures. The red box indicates the month by temperature correlations, and red asterisks indicate significant correlation coefficients.

Statistical Analysis

We fit a multinomial logistic regression using the *multinom* function from the *nnet* package in R to the number of winter-run Chinook spawning in each month, $N.spawn_{m,t}$. We evaluated the ability of April Keswick temperatures to explain annual variability in the spawning timing. We focused on April temperatures because April is the first month of spawning, and April would allow this physical variable to be used as a predictor of spawn timing for future years. The monthly average April temperatures at Keswick were standardized (subtracted mean and divided by standard deviation) for use in the multinomial model.

We fit a base model without the April temperature effect and we fit the model with the April effect and used Akaike Information Criterion (AIC) to compare the models. The AIC value for the base multinomial model was 75822, whereas the value for the multinomial model including April temperature as a covariate was 74209. The difference in AIC was 1613, providing strong support for the model with the April temperature covariate.

The model coefficients for the multinomial model with April covariate indicated increasing spawning in July and August (positive coefficient values) when April temperatures increased (Table A1 and Figure A2). The model coefficients (Table A1) can thus be used for making predictions of spawning proportions using standardized April temperatures as displayed in Figure A2.

Table A1. Coefficient estimates of the multinomial model including April covariate. The effect of the April covariate is reflected in the B1 coefficient estimate.

	Estimate		Standard Error	
Month	B0	B1	B0	B1
Apr	-4.145	0.054	0.06	0.062
May	-1.796	-0.203	0.02	0.02
Jul	-0.332	0.385	0.012	0.012
Aug	-3.443	0.792	0.044	0.045

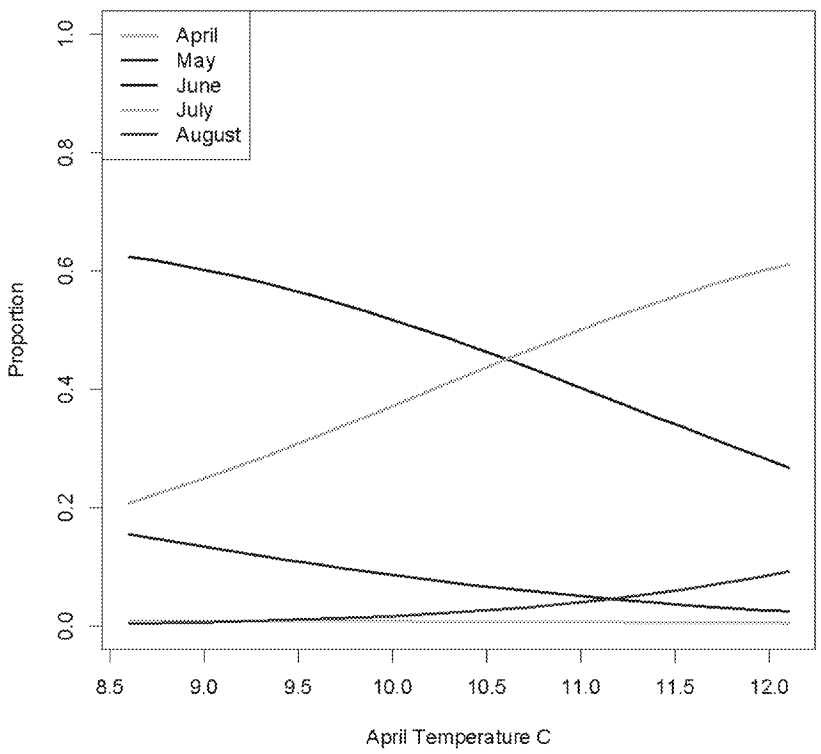

Figure A2. Predictions of the proportion of winter-run Chinook spawning from the multinomial regression model using April temperatures at Keswick Dam as a predictor variable.

Appendix B. Table of parameter values for WRLCM

Table B1. Parameter values, standard deviation (SD), transformed values, transition numbers in which parameters are found and brief description of parameters.

Name	Value	SD*	Transformed Value	Transition	Description
t.crit	12.0	0	12.0	1	Critical temperature (C) at which egg to fry survival is reduced
BO_1	0.95	0.096	0.72	1	Survival below critical temperature value (logit space)
$B1_1$	-1.11	0.144	NA	1	Rate of reduction in egg to fry survival (logit space)
$P_{TF,m}$	-3	0	0.047	2	Proportion tidal fry
$S_{TF,FP}$	1	0	0.731	3	Survival tidal fry in floodplain
min.p	0.05	0	0.05	3	Minimum proportion entering Yolo bypass under flow < 100 cfs under modified design
p.rate	1.1	0	NA	3	Rate of increase in proportion entering Yolo bypass for flows > 6000 cfs under modified design
BO_4	0	0	0.5	4	Average survival tidal fry to delta intercept
$B1_4$	-1	0	NA	4	Effect of DCC gate (value is in logit space)*
BO_5	0	0	0.5	5	Average proportion of tidal fry to bay intercept
$B1_5$	2	0	NA	5	Proportion tidal fry to bay - flow at Rio Vista effect
$S_{TF,DE-BA}$	-1	0	0.269	5	Survival of tidal fry from delta to bay
S_{FRY}	0.872	0.062	0.705	Rearing	Winter run fry survival
$mig_{UR,m}$	0.128	0.012	0.128	Rearing	Proportion of fry in upper river migrating from upper river to lower river per month
BO_M	-6.0	0	0.002	Rearing	Wilkins slough movement without trigger (value is in logit space)

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Name	Value	SD*	Transformed Value	Transition	Description
$B1_M$	5.5	0	0.377	Rearing	Wilkins slough movement with flow trigger (value is in logit space), movement rate under flow trigger is 0.377
mig_m	0.224	0.126	0.224	Rearing	Probability of migration from habitats
$S_{FRY,BA}$	-7	0	0.001	Rearing	Survival of bay rearing fry pushed to gulf
Z_1	-1	0	0.269	11 to 15	January smolt probability
Z_2	0	0	0.5	11 to 15	February smolt probability
Z_3	3	0	0.953	11 to 15	March smolt probability
Z_4	8	0	1	11 to 15	April smolt probability
Z_5	10	0	1	11 to 15	May smolt probability
Z_6	10	0	1	11 to 15	June smolt probability
Z_7	10	0	1	11 to 15	July smolt probability
$BO_{11,LR}$	1.39	0	0.801	12	Smolt survival lower river to delta
$BO_{10,UR}$	-0.4	0	0.401	11	Survival of upper river fish to lower river
$B1_{10}$	0.3	0.053	NA	11,12	River smolt survival from flow effect
$C_{S_{11}}$	12	0	0.999	11 to 14	Survival smolt chipps to ocean – survival captured in gulf survival
$A_{S_{13,FP,m}}$	12	0	0.999	13	survival from Yolo until Delta, assume 0.999 since Yolo nodes being captured in ePTMv2
$S_{15,BA}$	0	0	0.5	15	Survival of smolts bay to ocean

Draft_0023591

Name	Value	SD*	Transformed Value	Transition	Description
S_{G0}	-2.0	0	0.12	16	Average survival of smolts entering the gulf
S_{G1}	-0.338	0.233	0.157	11, 12, 13	Gulf entry covariate effect (PCUI) for all rearing areas in logit space
σ_{ε}	1.6	0	1	16	Standard deviation of annual random effects in process noise
S_{17}	1.35	0	0.794	17, 18	Probability of survival age 1 to age 2 over 4 months
M_2	-2.2	0	0.1	17,18	Probability of maturation age 2
S_{sp2}	2.2	0	0.9	18	Survival ocean exit to spawning ground age 2
S_{19}	1.4	0	0.802	19	Probability of survival age 2 to age 3
M_3	2.2	0	0.9	19, 20	Conditional probability of maturation at age 3
S_{sp3}	2.2	0	0.9	20	Survival ocean exit to spawning ground age 3
S_{21}	1.4	0	0.802	21	Survival age 3 to age 4
S_{sp4}	2.2	0	0.9	21	Survival ocean exit to spawning ground age 4
$V_{eggs,2}$	3000	0	3000	22	Eggs per spawner age 2
$V_{eggs,3}$	5000	0	5000	22	Eggs per spawner age 3
$V_{eggs,4}$	5000	0	5000	22	Eggs per spawner age 4
$B0_{Apr}$	-4.145	0.060	NA	22	Intercept for proportion of spawners in April
$B1_{Apr}$	0.0538	0.062	NA	22	Effect of temperature on proportion of spawners in April
$B0_{May}$	-1.796	0.020	NA	22	Intercept for proportion of spawners in May

Draft_0023592

Name	Value	SD*	Transformed Value	Transition	Description
$B1_{May}$	-0.2031	0.020	NA	22	Effect of temperature on proportion of spawners in May
$B0_{Jul}$	-0.332	0.012	NA	22	Intercept for proportion of spawners in July
$B1_{Jul}$	0.3852	0.012	NA	22	Effect of temperature on proportion of spawners in July
$B0_{Aug}$	-3.443	0.044	NA	22	Intercept for proportion of spawners in August
$B1_{Aug}$	0.7921	0.045	NA	22	Effect of temperature on proportion of spawners in August
Fem_{Age2}	0.01	0	0.01	18	Proportion of age 2 spawners that are female
Fem_{Age3}	0.5	0	0.5	20	Proportion of age 3 and 4 that are female
$K_{Sp,m}$	9000	0	9000	22	Capacity of female age -3 spawners in the spawning reaches by month

*Estimated parameter values have associated standard deviations (SD)

Draft_0023593

From: Obegi, Doug [dobegi@nrdc.org]
Sent: 3/21/2023 8:43:14 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]
CC: Spranza, John [john.spranza@hdrinc.com]
Subject: RE: Winter-run life cycle model results for Sites Reservoir

Thanks Ali. I'll take a closer look.

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 21, 2023 8:16 AM
To: Obegi, Doug <dobegi@nrdc.org>
Cc: Spranza, John <john.spranza@hdrinc.com>
Subject: RE: Winter-run life cycle model results for Sites Reservoir

Hi Doug – Attached are the results that we received from UC Santa Cruz/NMFS Science Center.

We had original runs completed in fall 2022. These didn't fully account for the reductions in flows in the Sacramento River due to the Sites Project. A modelling person would have to explain this better, but as I understand it, the input nodes for the different segments in the model were above our diversions (above Red Bluff) and then below our diversions. So the upper nodes didn't "see" our diversions while the lower nodes did. We worked with Noble and Jacobs and adjusted the input in the upper nodes to account for Sites diversions so the model "saw" those reductions in flows and then applied the flow/survival curve for that reach of the model. So it is my understanding that the model does account for a flow/survival relationship – at least to some extent. You know that I am not a modeler, so I cant explain how detailed this is, but accounting for our diversions and applying loss factors based on the flow/survival relationship was the reason we re-ran the model. And we saw different results with this – lower benefits we we re-ran it.

We're happy to set up a meeting with the UC Santa Cruz/NMFS Science Center and you to chat about this. We're also thinking of setting up a briefing with the NGO small group that we've been working with and UC Santa Cruz/NMFS Science Center to go over the results too.

Hope this helps! We're happy to chat about these, but the detailed modeling questions are best for UC Santa Cruz/NMFS Science Center.

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: Obegi, Doug <dobegi@nrdc.org>
Sent: Monday, March 20, 2023 2:43 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Winter-run life cycle model results for Sites Reservoir

Hi Ali,

Hope you're staying dry! I noticed that the Sites Board of Directors received an update on the results of NMFS' winter-run life cycle model earlier this month (https://sitesproject.org/wp-content/uploads/2023/03/03-02-Winter-Run-Life-Cycle-Model-Results.pdf). Would you please share those model results with me?

I was also confused about the statement in the Board update that asserts that the life cycle model accounts for water diversions by the Project. The publicly available version of NMFS' winter-run life cycle model does not account for the flow: survival relationship in the Sacramento River, and thus would not account for these proposed water diversions. Was the life model specifically updated to include a flow:survival term, and if so, what assumptions were used for that flow:survival relationship?

Thanks,
Doug

DOUG OBEGI
*Senior Attorney**
Water Program

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** Admitted to practice in California*

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 3/21/2023 8:57:55 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; Noble Hendrix [noble@qedaconsulting.com]; Lecky, Jim [jim.lecky@icf.com]; Wilder, Rick [Rick.Wilder@icf.com]; Greenwood, Marin [Marin.Greenwood@icf.com]; Clabaugh, Anna [Anna.Clabaugh@hdrinc.com]; Hassrick, Jason (Jason.Hassrick@icf.com) [jason.hassrick@icf.com]; Pitts, Adrian [Adrian.Pitts@icf.com]; Hendrick, Mike [mike.hendrick@icf.com]; Briard, Monique (Monique.Briard@icfi.com) [Monique.Briard@icfi.com]; steve.micko@jacobs.com; Davis-Fadtke, Kristal@Wildlife [kristal.davis-fadtke@wildlife.ca.gov]; Paige.Uttley@wildlife.ca.gov; Stephen Maurano - NOAA Federal [stephen.maurano@noaa.gov]; Amanda Cranford - NOAA Federal [amanda.cranford@noaa.gov]; Brick, David A [dbrick@usbr.gov]; Hunt, Shane D [shunt@usbr.gov]; Jacobson, Allison M [ajacobson@usbr.gov]; Buttermore, Elissa N [ebuttermore@usbr.gov]; Williams, Jonathan@Wildlife [jonathan.williams@wildlife.ca.gov]; Burson, Skyler@Wildlife [Skyler.Burson@wildlife.ca.gov]
CC: O'Donnell, Daniel@Wildlife [Daniel.Odonnell@Wildlife.ca.gov]; Paccassi, Michael@Wildlife [Michael.Paccassi@Wildlife.ca.gov]; Johnson, Matt@Wildlife [Matt.Johnson@wildlife.ca.gov]; Zhao, Gang(Gary)@Wildlife [Gang.Zhao@Wildlife.ca.gov]; Schoenberg, Steven [steven_schoenberg@fws.gov]; simoneolivetti.eng@gmail.com
Subject: RE: WRLCM Results Briefing for Sites Project
Attachments: WRLCM_Sites_ModelDescription_20230315.pdf

Sorry, I sent the wrong attachment, this one is correct.

John Spranza

D 916.679.8858 M 818.640.2487

From: Spranza, John
Sent: Tuesday, March 21, 2023 8:34 AM
To: aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Noble Hendrix <noble@qedaconsulting.com>; jim.lecky@icf.com; Wilder, Rick <Rick.Wilder@icf.com>; Greenwood, Marin <Marin.Greenwood@icf.com>; Clabaugh, Anna <Anna.Clabaugh@hdrinc.com>; Hassrick, Jason (Jason.Hassrick@icf.com) <jason.hassrick@icf.com>; Pitts, Adrian <Adrian.Pitts@icf.com>; Hendrick, Mike (Mike.Hendrick@icf.com) <mike.hendrick@icf.com>; Briard, Monique (Monique.Briard@icfi.com) <Monique.Briard@icfi.com>; Micko, Steve/SAC (Steve.Micko@jacobs.com) <steve.micko@jacobs.com>; Davis-Fadtke, Kristal@Wildlife <kristal.davis-fadtke@wildlife.ca.gov>; Paige.Uttley@wildlife.ca.gov; Stephen Maurano - NOAA Federal <stephen.maurano@noaa.gov>; Amanda Cranford - NOAA Federal <amanda.cranford@noaa.gov>; Brick, David A <dbrick@usbr.gov>; shunt@usbr.gov; Jacobson, Allison M <ajacobson@usbr.gov>; Buttermore, Elissa N <ebuttermore@usbr.gov>; Williams, Jonathan@Wildlife <jonathan.williams@wildlife.ca.gov>; Burson, Skyler@Wildlife <Skyler.Burson@wildlife.ca.gov>; Barb Byrne <barbara.byrne@noaa.gov>
Cc: O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Johnson, Matt@Wildlife <Matt.Johnson@wildlife.ca.gov>; Zhao, Gang(Gary)@Wildlife <Gang.Zhao@Wildlife.ca.gov>; Schoenberg, Steven <steven_schoenberg@fws.gov>; simoneolivetti.eng@gmail.com
Subject: RE: WRLCM Results Briefing for Sites Project

Good Morning,
Attached is the updated model description that includes the modified bend bridge flow methodology. Key modifications include:

- New Figure 5: Temp Dependent Mortality relationship
- Revised description of the flow-survival relationship, now including modified flow at Bend Bridge (p. 12)
- New Figure 9: smolt survival ~ flow at Bend Bridge

Please let me know if you have any questions.
John

John Spranza

D 916.679.8858 M 818.640.2487

From: Spranza, John
Sent: Tuesday, March 14, 2023 8:56 AM
To: Ann Marie Osterback - NOAA Affiliate <annmarie.osterback@noaa.gov>; aforsythe (aforsythe@sitesproject.org) <aforsythe@sitesproject.org>; Angela Bezzone <bezzone@mbkengineers.com>; Eric Danner - NOAA Federal <eric.danner@noaa.gov>; Noble Hendrix <noble@qedaconsulting.com>; jim.lecky@icf.com; Wilder, Rick <Rick.Wilder@icf.com>; Greenwood, Marin <Marin.Greenwood@icf.com>; Clabaugh, Anna <Anna.Clabaugh@hdrinc.com>; Hassrick, Jason (Jason.Hassrick@icf.com) <jason.hassrick@icf.com>; Pitts, Adrian <Adrian.Pitts@icf.com>; Hendrick, Mike (Mike.Hendrick@icf.com) <mike.hendrick@icf.com>; Briard, Monique (Monique.Briard@icfi.com) <Monique.Briard@icfi.com>; Micko, Steve/SAC (Steve.Micko@jacobs.com) <steve.micko@jacobs.com>; Davis-Fadtke, Kristal@Wildlife <kristal.davis-fadtke@wildlife.ca.gov>; Paige.Uttley@wildlife.ca.gov; Stephen Maurano - NOAA Federal <stephen.maurano@noaa.gov>; Amanda Cranford - NOAA Federal <amanda.cranford@noaa.gov>; Brick, David A <dbrick@usbr.gov>; shunt@usbr.gov; Jacobson, Allison M <ajacobson@usbr.gov>; Buttermore, Elissa N <ebuttermore@usbr.gov>; Williams, Jonathan@Wildlife <jonathan.williams@wildlife.ca.gov>; Burson, Skyler@Wildlife <Skyler.Burson@wildlife.ca.gov>; Barb Byrne <barbara.byrne@noaa.gov>
Cc: O'Donnell, Daniel@Wildlife <Daniel.Odonnell@Wildlife.ca.gov>; Paccassi, Michael@Wildlife <Michael.Paccassi@Wildlife.ca.gov>; Johnson, Matt@Wildlife <Matt.Johnson@wildlife.ca.gov>; Zhao, Gang(Gary)@Wildlife <Gang.Zhao@Wildlife.ca.gov>; Schoenberg, Steven <steven_schoenberg@fws.gov>; simoneolivetti.eng@gmail.com
Subject: RE: WRLCM Results Briefing for Sites Project

Hello,
Attached is the current WRLCM results package. The Science Center is working up the model methodology document that has a formal description of the Bend Bridge flow adjustment that was used to address the issue of riverine flow-survival and consideration of potential Sites diversion effects description. In the meantime, I have also provided the general concept below.

Bend Bridge flow adjustment under the assumption that the focal area for capturing Sites flow-survival effects is from Red Bluff to Sacramento (I Street Bridge) and that all smolts start at Red Bluff.

1. Sacramento (I Street Bridge) is at RM 58
2. Sites diversions are at Red Bluff intake (RM 243) and Hamilton City intake (RM 205): distance to Sacramento = 185 miles (Red Bluff) and 147 miles (Hamilton City)
3. To account for potential diversion effects, use the following formula to modify Bend Bridge flow:

a. Modified Bend Bridge flow = Bend Bridge flow minus (Sites diversions at Red Bluff intake) minus (147/185)*(Sites diversions at Hamilton City intake)

i. The latter term accounts for the Hamilton City intake being 79% (i.e., 147/185) of the distance to Sacramento from Red Bluff

We will be sending the modeled abundances with confidence intervals for the presented results when available from the WRLCM team.

Please let me know if you have any questions.

John

John Spranza

D 916.679.8858 M 818.640.2487

-----Original Appointment-----
From: Spranza, John
Sent: Wednesday, March 1, 2023 8:29 AM
To: Spranza, John; Ann Marie Osterback - NOAA Affiliate; aforsythe (aforsythe@sitesproject.org); Angela Bezzone; Eric Danner - NOAA Federal; Noble Hendrix; jim.lecky@icf.com; Wilder, Rick; Greenwood, Marin; Clabaugh, Anna; Hassrick, Jason (Jason.Hassrick@icf.com); Pitts, Adrian; Hendrick, Mike (Mike.Hendrick@icf.com); Briard, Monique (Monique.Briard@icfi.com); Micko, Steve/SAC (Steve.Micko@jacobs.com); Davis-Fadtke, Kristal@Wildlife; Paige.Uttley@wildlife.ca.gov; Stephen Maurano - NOAA Federal; Amanda Cranford - NOAA Federal; Brick, David A; shunt@usbr.gov; Jacobson, Allison M; Buttermore, Elissa N; Williams, Jonathan@Wildlife; Burson, Skyler@Wildlife; Barb Byrne
Cc: O'Donnell, Daniel@Wildlife; Paccassi, Michael@Wildlife; Johnson, Matt@Wildlife; Zhao, Gang(Gary)@Wildlife; Schoenberg, Steven; simoneolivetti.eng@gmail.com
Subject: WRLCM Results Briefing for Sites Project
When: Wednesday, March 8, 2023 11:30 AM-1:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: webex

Updating time to the 90 minute slot

The WRLCM team will prove an overview of the methods and results of the current model run which can be discussed with this group. We will forward the modeling methods and results prior to the meeting. Apologies to those who can't make this time, it was a difficult matrix of availability to navigate.

Regards,
John

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From: Zarchi, Idit [Idit.Zarchi@aecom.com]
Sent: 3/21/2023 9:30:23 AM
To: Luu, Henry [Henry.Luu@hdrinc.com]; JP Robinette [jrobinette@sitesproject.org]
CC: Ohlin, Wayne [Wayne.Ohlin@jacobs.com]; Smith, Michael (orange) [michael.g.smith@aecom.com]; Aldridge, Benjamin [Benjamin.Aldridge@aecom.com]; Davis, Bill [Bill.Davis@aecom.com]; Rude, Pete [Pete.Rude@jacobs.com]
Subject: Sites HR: Cost Savings for a 10 day Emergency Drawdown
Attachments: INT-QC Review form Sites TO04.pdf; Sites - 7 to 10 Day Drawdown - ROM Cost Estimate - 20230321.pdf

Hi Henry and JP,

Please find attached our order of magnitude estimate on cost savings should DSOD allow the Authority 10 days to draw down the upper 10% of reservoir storage in an emergency. The total savings for both outlets under the jurisdiction of DSOD would be in the range of $34-57 million. This includes the savings to the conveyance system that Pete sent on 3/10/23 (see email chain below).

Let me know if you have any questions or concerns.

Cheers!

Idit Zarchi
Water Resources Engineer, PE
C 1-424-220-0431
Idit.Zarchi@aecom.com

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From: Rude, Pete <Pete.Rude@jacobs.com>
Sent: Friday, March 10, 2023 4:40 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>
Cc: Ohlin, Wayne <Wayne.Ohlin@jacobs.com>; Zarchi, Idit <Idit.Zarchi@aecom.com>; Smith, Michael (orange) <michael.g.smith@aecom.com>; Wisniewski, Jeffrey <jeffrey.wisniewski@aecom.com>
Subject: Sites HC: Cost Comparison for Energy Dissipation Between 7 and 10 day Emergency Drawdown

HI Henry,

At our meeting in Sacramento on March 1, you requested a back of the envelop cost estimate on the cost differential on Facilities between a 7 day and 10 day emergency drawdown of Sites Reservoir. For HC, the pipe size would not change. What would change is the number of energy dissipation valves/structures to handle the flow.

The costs are based on the 10% design costs developed in June 2021. The cost differential is about $8 million. See below assumptions.

Thanks

Peter H. Rude, PE (*CA, OR, HI, CO*) /Jacobs/ Civil Engineer & Principal Project Manager
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From: Ohlin, Wayne <Wayne.Ohlin@jacobs.com>
Sent: Thursday, March 09, 2023 3:11 PM
To: Rude, Pete <Pete.Rude@jacobs.com>
Subject: Sites: Cost Comparison for Energy Dissipation Between 7 and 10 day Emergency Drawdown

Pete- I have completed a high level comparison of costs between dissipating 7 day emergency drawdown flows and 10 day emergency drawdown flows. Below are my assumptions followed by the costs derived from these assumptions:

- To be conservative the original flow split of 77% Inlet/Outlet Facitlites/23% Sites Dam was used, these flows from AECOM's Emergency Drawdown TM are:
  - 7 Day Drawdown 22,485 CFS
  - 10 Day Drawdown 15,740 CFS
- Cost developed for the 10% Feasiblity Design have been used
  - Each Dissipating Structure (60-inch Cone Valve) can dissipate 1714 CFS at drawdown heads
  - Cost for each structure was $1.9 mil

- To dissipate the 10 day drawdown flow we will need a total of 10 structures (15740/1714=9.2)
  - Cost= 10*1.9= $19 million

- To dissipate the 7 day drawdown flow we will need a total of 14 structures (22485/1714=13.1)
  - Cost= 14*1.9=$26.6 million

Through this comparison the difference in dissipation costs for the 7 day and 10 day emergency drawdown would be $7.6 million ($26.6mil-$19mil)

Thanks,
Wayne

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Memorandum
Rough Order of Magnitude Estimate of Cost Savings Associated with a 10-day Drawdown

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	March 21, 2023
From:	Bill Davis, Idit Zarchi, P.E. (AECOM)
Quality Review:	Mike Forrest, P.E. (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Sites Reservoir, Cost Estimate for 10-day Drawdown, Task HR39.01

The Sites Authority has requested a rough order of magnitude (ROM) estimate of the cost savings that could be achieved should DSOD allow the Authority 10 days (instead of 7 days) to drawdown the upper 10% of reservoir storage in an emergency scenario. DSOD's emergency drawdown requirements and how they impact infrastructure sizing at Sites Reservoir are described in the Outlet Size Optimization TM, dated February 13, 2023.

The following conditions were assumed to develop this ROM estimate:

- The allocation of drawdown flows between the reservoir's main inlet/outlet works and Sites outlet is 77%/23%.
- The outlet tunnels are steel lined, allowing velocities of 50 ft/s.
- The following tunnel diameters were considered:

Tunnel Diameter [ft]	Drawdown time frame	
	7-day	10-day
I/O Works	21.0	18.0
Sites Outlet	11.5	10

The estimate methodology for each project component is outlined below.

1. Sites outlet
    a. Inlet and outlet structures
        i. The basis of cost was the May 2021 Sites Reservoir cost estimate.
        ii. Structures and valves were factored based on the 7 to 10 day flow ratio, with the six-tenth rule[1] applied to costs.

[1] The rule of six-tenths is a rule of thumb developed over the years by cost estimators. Approximate costs can be obtained if the cost of a similar item of different size of capacity is known.

b. Tunnel
    i. Costs were taken from tunnel projects that are currently under construction in California (Newell Creek Dam and Anderson Dam).

2. Main Inlet/Outlet Works
    a. Inlet structure
        i. The basis of cost was the May 2021 Sites Reservoir cost estimate.
        ii. Structures valves, and gates were factored based on the 7 to 10 day flow ratio, with the six-tenth rule applied to costs.
    b. Tunnel – costs were taken from tunnel projects that are currently under construction in California (Newell Creek Dam and Anderson Dam).

3. Conveyance System
    a. The cost estimate for the savings to the conveyance system was provided by Jacobs in an email dated March 10, 2023.

The ROM estimate (attached) shows a range of $34 to $57 million in cost savings to the Sites reservoir outlet infrastructure if DSOD allows the Authority 10 days, instead of 7 days, to draw down the upper 10% of reservoir storage in an emergency event.

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 memorandum 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.

Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Estimate Summary

WBS	Total Cost - 7 Day	Total Cost - 10 Day	Change ($)	Change (%)
22. - Sites Dam	**$ 68,800,000**	**$ 60,500,000**	**$ (8,300,000)**	**-12%**
26. - Main I/O	**$ 219,100,000**	**$ 189,500,000**	**$ (29,600,000)**	**-14%**
x. - Water Conveyance (Jacobs)	**$ 26,600,000**	**$ 19,000,000**	**$ (7,600,000)**	**-29%**
Grand Total	**$ 314,500,000**	**$ 269,000,000**	**$ (45,500,000)**	**-14%**
Range				
Low - (25%)	$ 235,875,000	$ 201,750,000	$ (34,125,000)	
High - 25%	$ 393,125,000	$ 336,250,000	$ (56,875,000)	

	Low	High
Expected Cost Saving from 7 to 10 Day Drawdown	**$ (34,000,000)**	**$ (57,000,000)**
Range	-25%	25%

Reference Figures	Flow (CFS)	Tunnel Diameter (FT)
Sites - 7 Day Flow	5,175	11.5
Sites - 10 Day Flow	3,634	10
Sites % Reduction	-30%	-13%
Main I/O - 7 Day Flow	17,325	21
Main I/O - 10 Day Flow	12,166	18
Main I/O % Reduction	-30%	-14%

Estimate Methodology

The May 2021 TM was reviewed for cost elements that would be effected by increasing the drawdown time from 7 days to 10 days
The Estimate is in 2021 dollars. Cost input sources ranged from Oct. 2020 to June 2021
Sites included inlet and outlet structures, tunnel, and mechanical scope
Main I/O included the roller gates, tunnel, sloping intake, and vertical shaft
Water Conveyance (Jacobs) - The conveyance facilities include the dissipation structures and valves downstream of the I/O tunnel
The cost delta was arrived at in two ways
1) Capacity Factoring
1A) Structures, valves, gates, and intakes were factored based on flow with the 6/10th rule
Reference DOE Publication DEO G 430.1-1 for 6/10th rule
1B) Dissipation structures were factored based on the count of structures with a linear cost curve
2) Tunnel estimates were prepared for both options and the cost delta has been reflected.
The tunnel estimates are based on the average bid and estimate of a dam under construction

Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Estimate Details - Factoring

WBS	Sub item	Description		Total Cost - 7 Day	7 Day	10 Day	Unit	Exponent		Total Cost - 10 Day		Change ($)	Change (%)
22. - Sites Dam	**10.019**	Inlet and Outlet Valve Structures	$	4,830,607	5,175	3,634	CFS	0.60	$	3,907,387	$	(923,220)	-19%
	10.030	Tunnel Estimate - Steel Lined	$	44,274,150	11.5	10	FT Dia	Buildup	$	40,687,239	$	(3,586,911)	-8%
	10.034	Mechanical, Valves, Trash rack, and Metals	$	19,646,010	5,175	3,634	CFS	0.60	$	15,891,288	$	(3,754,722)	-19%
22. - Sites Dam Total			**$**	**68,750,767**					**$**	**60,485,914**	**$**	**(8,264,853)**	**-12%**
26. - Main I/O	**13.040**	Roller Gates with hydraulic cylinders and lines	$	12,985,465	17,325	12,166	CFS	0.60	$	10,503,699	$	(2,481,767)	-19%
	13.044	12 ft x 30 ft inlet tunnel roller gate	$	5,314,936	17,325	12,166	CFS	0.60	$	4,299,152	$	(1,015,784)	-19%
	13.045	12 ft x 25 ft outlet tunnel roller gates	$	9,059,096	17,325	12,166	CFS	0.60	$	7,327,732	$	(1,731,363)	-19%
	13.052	Tunnel Estimate - Steel Lined	$	177,144,041	21	18	FT Dia	Buildup	$	155,524,946	$	(21,619,095)	-12%
	13.070	Sloping intake	$	10,160,984	17,325	12,166	CFS	0.60	$	8,219,029	$	(1,941,955)	-19%
	13.086	Vertical shaft	$	4,478,538	17,325	12,166	CFS	0.60	$	3,622,605	$	(855,933)	-19%
26. - Main I/O Total			**$**	**219,143,060**					**$**	**189,497,162**	**$**	**(29,645,897)**	**-14%**
	x	Water Conveyance - Dissipation Valve Structures	$	26,600,000	14	10	Each	1.00	$	19,000,000	$	(7,600,000)	-29%
x. - Water Conveyance (Jacobs)			**$**	**26,600,000**					**$**	**19,000,000**	**$**	**(7,600,000)**	**-29%**
Grand Total			**$**	**314,493,826**					**$**	**268,983,076**	**$**	**(45,510,750)**	**-14%**

Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Key Quantities

		Sites			Main I/O		
		10 Day	7 Day		10 Day	7 Day	
Key Qty	**Unit**	**Sites - 10 Foot Dia**	**Sites - 11.5 Foot Dia**	**% Red**	**I/O - 18 Foot Dia**	**I/O - 21 Foot Dia**	**% Red**
Length	LF	1,125	1,125	0%	2,856	2,856	0%
Excavation Neat	CY	9,520	11,363	-16%	54,514	68,746	-21%
Excavation Bulk	CY	16,184	19,317	-16%	92,674	116,868	-21%
Shotcrete	CY	1,129	1,279	-12%	4,444	5,042	-12%
Rockbolts	EA	1,350	1,356	0%	4,570	4,576	0%
Concrete Liner	CY	0	0		0	0	
Concrete Rebar	Ton	0	0		0	0	
Steel Liner	Ton	722	830	-13%	3,297	3,847	-14%
Flowfill	CY	5,120	5,758	-11%	23,166	27,085	-14%
Cost	**$M**	**40.7**	**44.3**	**-8%**	**155.5**	**177.1**	**-12%**
Savings	$M		3.6			21.6	
Savings	%		9%			14%	
Tunnel Excavated Area	SF	201	240	-16%	452	572	-21%
Tunnel Steel Circumference	LF	31	36	-13%	57	66	-14%

Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Sites Tunnel

Sites Diversion	10 Day	7 Day
Diameter (Feet)	**10**	**11.5**
Tunnel 1 - Excavation - Class 3	$ 1,602,603	$ 1,828,282
Tunnel 1 - Excavation - Class 4	$ 4,561,478	$ 5,190,837
Fiber-reinforced Shotcrete	$ 1,014,687	$ 1,143,361
#8 Rock Dowels	$ 1,074,600	$ 1,079,376
Tunnel 1 - Steel Liner and Concrete Backfill within Tunnel	$ 9,886,250	$ 11,301,451
Probing Within Rock Tunnel	$ 255,938	$ 255,938
Tunnel Drainage	$ 1,305,777	$ 1,485,935
Geodrain	$ 350,434	$ 350,434
Tunneling Standby	$ 2,312,727	$ 2,312,727
Pre-excavation Drilling Within Rock Tunnel, Direct Cost including Pre-Support Temporary Works	$ 4,516,411	$ 4,535,234
Pre-excavation Drilling and Grouting Within Rock	$ 818,182	$ 818,182
Pre-excavation Grouting Within Rock Tunnel, Materials	$ 1,823,645	$ 1,823,645
Total Direct Cost	**$ 29,522,732**	**$ 32,125,401**
Total Project Cost	**$ 40,687,239**	**$ 44,274,150**
Sites - Cost ($M)	**$ 40.7**	**$ 44.3**
% Savings		**9%**

Scope - Cost/LF	10 Day	7 Day
Sites - Diameter	10	11.5
Sites - Cost ($/LF)	**$36,166**	**$39,355**

Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Sites 10' Steel Liner Summary - 10 Day

Ref No	Bid No	Description	Qty	Unit		Unit Cost		Total
1		**Tunnel Excavation and Lining**					**$**	**29,522,732**
1.01		**Tunnel 1 - Excavation - Class 3**					**$**	**1,602,603**
		Mobilization and demobilization	15%	LS	$	1,393,568	$	209,035
		Allow for working platform and safety measure	281	LF	$	900	$	253,125
		Allow for ventilation, temporary light, temporary water in tunnel working environment	281	LF	$	450	$	126,563
		Tunnel excavation in class 3 material (allow 30%), this material is the hardest to excavate	2,380	CY	$	330	$	785,400
		Muck conveyance equipment	2,380	CY	$	62	$	147,560
		Hauling of excavated materials to temporary disposal on site	4,046	CY	$	20	$	80,920
1.02		**Tunnel 1 - Excavation - Class 4**					**$**	**4,561,478**
		Mobilization and demobilization	15%	LS	$	3,966,503	$	594,975
		Allow for working platform and safety measure	844	LF	$	900	$	759,375
		Allow for ventilation, temporary light, temporary water in tunnel working environment	844	LF	$	450	$	379,688
		Tunnel excavation in class 4 material (allow 50%), this material is medium hardness to excavate	7,140	CY	$	300	$	2,142,000
		Muck conveyance equipment	7,140	CY	$	62	$	442,680
		Hauling of excavated materials to temporary disposal on site	12,138	CY	$	20	$	242,760
1.07		**Fiber-reinforced Shotcrete**					$	1,014,687
		Mobilization and demobilization	15%	LS	$	882,337	$	132,350
		Working platform and safety measure	0	LF	$	900		w/ Tunnel
		Ventilation, temporary light, temporary water	0	LF	$	450		w/ Tunnel
		Shotcrete to crown and walls 9" - 12" in tunnels	817	CY	$	660	$	539,000
		Steel trowel finish shotcrete wall	46,260	SF	$	2	$	111,024
		Concrete fill at tunnel invert	313	CY	$	630	$	196,875
		Steel trowel finish shotcrete slab	16,875	SF	$	2	$	35,438
1.10		**#8 Rock Dowels**					$	1,074,600
		Drill 2" diameter hole for #8 rock dowels	16,200	LF	$	22	$	356,400
		Install #8 dowels, 10 ft long in rock	1,350	EA	$	210	$	283,500
		Pressure grout rock dowels	16,200	LF	$	16	$	259,200
		Bearing plate, washers & nuts	1,350	EA	$	130	$	175,500
1.13		**Tunnel 1 - Steel Liner and Concrete Backfill within Tunnel**					$	9,886,250
		Carrier Pipe X' Diameter Pipe, 1" Thick	1,443,150	LB	$	5	$	6,927,120
		Special Coating to Pipe Surface	35,325	SF	$	8	$	296,730
		Lean Concrete Around Pipe	5,120	CY	$	520	$	2,662,400
1.16		**Probing Within Rock Tunnel**					$	255,938
		For Diversion Tunnel	3,375	LF	$	65	$	219,375
		Allow for verification hole x 50 ft deep	563	LF	$	65	$	36,563
1.17		**Waterproofing Membrane and Drainage Collection**					$	1,305,777
		at tunnel	35,325	SF	$	34	$	1,201,050
		Drainage angle	1,636	LF	$	18	$	29,455
		Drainage gravel and 5" PVC pipes	1,636	LF	$	16	$	26,182
		6" wide Geodrains between steel sets	1,636	LF	$	30	$	49,091
1.18		**Geodrain**					$	350,434
		at tunnel	14,017	SF	$	25	$	350,434
1.2		**Tunneling Standby**					$	2,312,727
		Allowance for Standby Time	218	HR	$	10,600	$	2,312,727
1.21		**Pre-excavation Drilling Within Rock Tunnel, Direct Cost including Pre-Support Temporary Works**					$	4,516,411
		Mobilization & Set up equipment	1	LS	$	65,200	$	65,200
		Grout hole drilling 1-1/2" holes - primary x 100ft	9,886	LF	$	45	$	444,886
		Demobilization and clean up	1	LS	$	39,700	$	39,700
		Contractor Engineering & Design Fee	4%	LS	$	3,832,488	$	134,137
		Advanced grouted fore poling -1-1/2" hole x 15ft	58,377	LF	$	38	$	2,218,336
		Apply pressure grouting	58,377	LF	$	20	$	1,167,545
		Face sealing shotcrete layer 3" thick	333	CY	$	590	$	196,606
		Ground water control allowance inside tunnel	1	LS	$	250,000	$	250,000
1.22		**Pre-excavation Drilling and Grouting Within Rock**					$	818,182
		Indirect cost for standby cost during pre-excavation drilling and grouting	273	HR	$	3,000	$	818,182
1.23		**Pre-excavation Grouting Within Rock Tunnel, Materials**					$	1,823,645
		Mobilization & Set up equipment	1	LS	$	191,260	$	191,260
		Demob and Clean Up	1	LS	$	191,260	$	191,260
		Allow for Portland Cement - Allow 1 Sack 94'lb every 2' of 2" Holes	3,938	Sack	$	250	$	984,375
		Allow 40% of Tunnel Requiring Microfine Cement	1,575	Sack	$	290	$	456,750

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Sites Reservoir | **Cost Estimate**
10 to 7 Day Cost Analysis | **ROM**
Sites, CA | **March 21, 2023**

Sites 11.5 Steel Liner Summary - 7 Day

Ref No	Bid No	Description	Qty	Unit		Unit Cost		Total
1		**Tunnel Excavation and Lining**					**$**	**32,125,401**
1.01		**Tunnel 1 - Excavation - Class 3**					**$**	**1,828,282**
		Mobilization and demobilization	15%	LS	$	1,589,810	$	238,472
		Allow for working platform and safety measure	281	LF	$	900	$	253,125
		Allow for ventilation, temporary light, temporary water in tunnel working environment	281	LF	$	450	$	126,563
		Tunnel excavation in class 3 material (allow 30%), this material is the hardest to excavate	2,841	CY	$	330	$	937,419
		Muck conveyance equipment	2,841	CY	$	62	$	176,121
		Hauling of excavated materials to temporary disposal on site	4,829	CY	$	20	$	96,583
1.02		**Tunnel 1 - Excavation - Class 4**					**$**	**5,190,837**
		Mobilization and demobilization	15%	LS	$	4,513,771	$	677,066
		Allow for working platform and safety measure	844	LF	$	900	$	759,375
		Allow for ventilation, temporary light, temporary water in tunnel working environment	844	LF	$	450	$	379,688
		Tunnel excavation in class 4 material (allow 50%), this material is medium hardness to excavate	8,522	CY	$	300	$	2,556,597
		Muck conveyance equipment	8,522	CY	$	62	$	528,363
		Hauling of excavated materials to temporary disposal on site	14,487	CY	$	20	$	289,748
1.07		**Fiber-reinforced Shotcrete**					$	1,143,361
		Mobilization and demobilization	15%	LS	$	994,227	$	149,134
		Working platform and safety measure	0	LF	$	900		w/ Tunnel
		Ventilation, temporary light, temporary water	0	LF	$	450		w/ Tunnel
		Shotcrete to crown and walls 9" - 12" in tunnels	936	CY	$	660	$	617,700
		Steel trowel finish shotcrete wall	50,539	SF	$	2	$	121,294
		Concrete fill at tunnel invert	343	CY	$	630	$	216,300
		Steel trowel finish shotcrete slab	18,540	SF	$	2	$	38,934
1.10		**#8 Rock Dowels**					$	1,079,376
		Drill 2" diameter hole for #8 rock dowels	16,272	LF	$	22	$	357,984
		Install #8 dowels, 10 ft long in rock	1,356	EA	$	210	$	284,760
		Pressure grout rock dowels	16,272	LF	$	16	$	260,352
		Bearing plate, washers & nuts	1,356	EA	$	130	$	176,280
1.13		**Tunnel 1 - Steel Liner and Concrete Backfill within Tunnel**					$	11,301,451
		Carrier Pipe X' Diameter Pipe, 1" Thick	1,659,623	LB	$	5	$	7,966,188
		Special Coating to Pipe Surface	40,624	SF	$	8	$	341,240
		Lean Concrete Around Pipe	5,758	CY	$	520	$	2,994,023
1.16		**Probing Within Rock Tunnel**					$	255,938
		For Diversion Tunnel	3,375	LF	$	65	$	219,375
		Allow for verification hole x 50 ft deep	563	LF	$	65	$	36,563
1.17		**Waterproofing Membrane and Drainage Collection**					$	1,485,935
		at tunnel	40,624	SF	$	34	$	1,381,208
		Drainage angle	1,636	LF	$	18	$	29,455
		Drainage gravel and 5" PVC pipes	1,636	LF	$	16	$	26,182
		6" wide Geodrains between steel sets	1,636	LF	$	30	$	49,091
1.18		**Geodrain**					$	350,434
		at tunnel	14,017	SF	$	25	$	350,434
1.2		**Tunneling Standby**					$	2,312,727
		Allowance for Standby Time	218	HR	$	10,600	$	2,312,727
1.21		**Pre-excavation Drilling Within Rock Tunnel, Direct Cost including Pre-Support Temporary Works**					$	4,535,234
		Mobilization & Set up equipment	1	LS	$	65,200	$	65,200
		Grout hole drilling 1-1/2" holes - primary x 100ft	9,886	LF	$	45	$	444,886
		Demobilization and clean up	1	LS	$	39,700	$	39,700
		Contractor Engineering & Design Fee	4%	LS	$	3,850,674	$	134,774
		Advanced grouted fore poling -1-1/2" hole x 15ft	58,377	LF	$	38	$	2,218,336
		Apply pressure grouting	58,377	LF	$	20	$	1,167,545
		Face sealing shotcrete layer 3" thick	364	CY	$	590	$	214,792
		Ground water control allowance inside tunnel	1	LS	$	250,000	$	250,000
1.22		**Pre-excavation Drilling and Grouting Within Rock**					$	818,182
		Indirect cost for standby cost during pre-excavation drilling and grouting	273	HR	$	3,000	$	818,182
1.23		**Pre-excavation Grouting Within Rock Tunnel, Materials**					$	1,823,645
		Mobilization & Set up equipment	1	LS	$	191,260	$	191,260
		Demob and Clean Up	1	LS	$	191,260	$	191,260
		Allow for Portland Cement - Allow 1 Sack 94'lb every 2' of 2" Holes	3,938	Sack	$	250	$	984,375
		Allow 40% of Tunnel Requiring Microfine Cement	1,575	Sack	$	290	$	456,750

Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Main I/O Tunnel

Main I/O	10 Day	7 Day
Diameter (Feet)	**18**	**21**
Tunnel 1 - Excavation - Class 3	$ 7,785,120	$ 9,528,153
Tunnel 1 - Excavation - Class 4	$ 21,944,804	$ 26,805,655
Fiber-reinforced Shotcrete	$ 3,976,846	$ 4,505,537
#8 Rock Dowels	$ 3,637,402	$ 3,642,178
Tunnel 1 - Steel Liner and Concrete Backfill within Tunnel	$ 45,056,662	$ 52,596,037
Probing Within Rock Tunnel	$ 649,740	$ 649,740
Tunnel Drainage	$ 5,754,186	$ 6,668,905
Geodrain	$ 889,636	$ 889,636
Tunneling Standby	$ 5,871,244	$ 5,871,244
Pre-excavation Drilling Within Rock Tunnel, Direct Cost including Pre-Support Temporary Works	$ 11,165,388	$ 11,260,796
Pre-excavation Drilling and Grouting Within Rock	$ 2,077,091	$ 2,077,091
Pre-excavation Grouting Within Rock Tunnel, Materials	$ 4,041,056	$ 4,041,056
Total Direct Cost	**$ 112,849,174**	**$ 128,536,028**
Total Project Cost	**$ 155,524,946**	**$ 177,144,041**
Sites - Cost ($M)	**$ 155.5**	**$ 177.1**
% Savings		**14%**

Scope - Cost/LF	10 Day	7 Day
Sites - Diameter	18	21
Sites - Cost ($/LF)	**$54,456**	**$62,025**

Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Main I/O 18" Steel Liner Summary - 7 Day

Ref No	Bid No	Description	Qty	Unit		Unit Cost		Total
1		**Tunnel Excavation and Lining**					**$**	**112,849,174**
1.01		**Tunnel 1 - Excavation - Class 3**					**$**	**7,785,120**
		Mobilization and demobilization	15%	LS	$	6,769,670	$	1,015,450
		Allow for working platform and safety measure	714	LF	$	900	$	642,600
		Allow for ventilation, temporary light, temporary water in tunnel working environment	714	LF	$	450	$	321,300
		Tunnel excavation in class 3 material (allow 30%), this material is the hardest to excavate	13,629	CY	$	330	$	4,497,427
		Muck conveyance equipment	13,629	CY	$	62	$	844,971
		Hauling of excavated materials to temporary disposal on site	23,169	CY	$	20	$	463,371
1.02		**Tunnel 1 - Excavation - Class 4**					**$**	**21,944,804**
		Mobilization and demobilization	15%	LS	$	19,082,438	$	2,862,366
		Allow for working platform and safety measure	2,142	LF	$	900	$	1,927,800
		Allow for ventilation, temporary light, temporary water in tunnel working environment	2,142	LF	$	450	$	963,900
		Tunnel excavation in class 4 material (allow 50%), this material is medium hardness to excavate	40,886	CY	$	300	$	12,265,711
		Muck conveyance equipment	40,886	CY	$	62	$	2,534,914
		Hauling of excavated materials to temporary disposal on site	69,506	CY	$	20	$	1,390,114
1.07		**Fiber-reinforced Shotcrete**					$	3,976,846
		Mobilization and demobilization	15%	LS	$	3,458,127	$	518,719
		Working platform and safety measure	0	LF	$	900		w/ Tunnel
		Ventilation, temporary light, temporary water	0	LF	$	450		w/ Tunnel
		Shotcrete to crown and walls 9" - 12" in tunnels	3,226	CY	$	660	$	2,129,335
		Steel trowel finish shotcrete wall	176,378	SF	$	2	$	423,308
		Concrete fill at tunnel invert	1,218	CY	$	630	$	767,360
		Steel trowel finish shotcrete slab	65,774	SF	$	2	$	138,125
1.10		**#8 Rock Dowels**					$	3,637,402
		Drill 2" diameter hole for #8 rock dowels	54,835	LF	$	22	$	1,206,374
		Install #8 dowels, 10 ft long in rock	4,570	EA	$	210	$	959,616
		Pressure grout rock dowels	54,835	LF	$	16	$	877,363
		Bearing plate, washers & nuts	4,570	EA	$	130	$	594,048
1.13		**Tunnel 1 - Steel Liner and Concrete Backfill within Tunnel**					$	45,056,662
		Carrier Pipe X' Diameter Pipe, 1" Thick	6,594,618	LB	$	5	$	31,654,168
		Special Coating to Pipe Surface	161,421	SF	$	8	$	1,355,937
		Lean Concrete Around Pipe	23,166	CY	$	520	$	12,046,557
1.16		**Probing Within Rock Tunnel**					$	649,740
		For Diversion Tunnel	8,568	LF	$	65	$	556,920
		Allow for verification hole x 50 ft deep	1,428	LF	$	65	$	92,820
1.17		**Waterproofing Membrane and Drainage Collection**					$	5,754,186
		at tunnel	161,421	SF	$	34	$	5,488,318
		Drainage angle	4,154	LF	$	18	$	74,775
		Drainage gravel and 5" PVC pipes	4,154	LF	$	16	$	66,467
		6" wide Geodrains between steel sets	4,154	LF	$	30	$	124,625
1.18		**Geodrain**					$	889,636
		at tunnel	35,585	SF	$	25	$	889,636
1.2		**Tunneling Standby**					$	5,871,244
		Allowance for Standby Time	554	HR	$	10,600	$	5,871,244
1.21		**Pre-excavation Drilling Within Rock Tunnel, Direct Cost including Pre-Support Temporary Works**					$	11,165,388
		Mobilization & Set up equipment	1	LS	$	65,200	$	65,200
		Grout hole drilling 1-1/2" holes - primary x 100ft	25,098	LF	$	45	$	1,129,418
		Demobilization and clean up	1	LS	$	39,700	$	39,700
		Contractor Engineering & Design Fee	4%	LS	$	9,595,237	$	335,833
		Advanced grouted fore poling -1-1/2" hole x 15ft	148,200	LF	$	38	$	5,631,617
		Apply pressure grouting	148,200	LF	$	20	$	2,964,009
		Face sealing shotcrete layer 3" thick	1,271	CY	$	590	$	749,612
		Ground water control allowance inside tunnel	1	LS	$	250,000	$	250,000
1.22		**Pre-excavation Drilling and Grouting Within Rock**					$	2,077,091
		Indirect cost for standby cost during pre-excavation drilling and grouting	692	HR	$	3,000	$	2,077,091
1.23		**Pre-excavation Grouting Within Rock Tunnel, Materials**					$	4,041,056
		Mobilization & Set up equipment	1	LS	$	191,260	$	191,260
		Demob and Clean Up	1	LS	$	191,260	$	191,260
		Allow for Portland Cement - Allow 1 Sack 94'lb every 2' of 2" Holes	9,996	Sack	$	250	$	2,499,000
		Allow 40% of Tunnel Requiring Microfine Cement	3,998	Sack	$	290	$	1,159,536

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Sites Reservoir
10 to 7 Day Cost Analysis
Sites, CA

Cost Estimate
ROM
March 21, 2023

Main I/O 21' Steel Liner Summary - 10 Day

Ref No	Bid No	Description	Qty	Unit		Unit Cost		Total
1		**Tunnel Excavation and Lining**					**$**	**128,536,028**
1.01		**Tunnel 1 - Excavation - Class 3**					**$**	**9,528,153**
		Mobilization and demobilization	15%	LS	$	8,285,350	$	1,242,803
		Allow for working platform and safety measure	714	LF	$	900	$	642,600
		Allow for ventilation, temporary light, temporary water in tunnel working environment	714	LF	$	450	$	321,300
		Tunnel excavation in class 3 material (allow 30%), this material is the hardest to excavate	17,187	CY	$	330	$	5,671,546
		Muck conveyance equipment	17,187	CY	$	62	$	1,065,563
		Hauling of excavated materials to temporary disposal on site	29,217	CY	$	20	$	584,341
1.02		**Tunnel 1 - Excavation - Class 4**					**$**	**26,805,655**
		Mobilization and demobilization	15%	LS	$	23,309,266	$	3,496,390
		Allow for working platform and safety measure	2,142	LF	$	900	$	1,927,800
		Allow for ventilation, temporary light, temporary water in tunnel working environment	2,142	LF	$	450	$	963,900
		Tunnel excavation in class 4 material (allow 50%), this material is medium hardness to excavate	51,560	CY	$	300	$	15,467,853
		Muck conveyance equipment	51,560	CY	$	62	$	3,196,690
		Hauling of excavated materials to temporary disposal on site	87,651	CY	$	20	$	1,753,023
1.07		**Fiber-reinforced Shotcrete**					$	4,505,537
		Mobilization and demobilization	15%	LS	$	3,917,858	$	587,679
		Working platform and safety measure	0	LF	$	900		w/ Tunnel
		Ventilation, temporary light, temporary water	0	LF	$	450		w/ Tunnel
		Shotcrete to crown and walls 9" - 12" in tunnels	3,668	CY	$	660	$	2,420,828
		Steel trowel finish shotcrete wall	198,068	SF	$	2	$	475,363
		Concrete fill at tunnel invert	1,374	CY	$	630	$	865,820
		Steel trowel finish shotcrete slab	74,213	SF	$	2	$	155,848
1.10		**#8 Rock Dowels**					$	3,642,178
		Drill 2" diameter hole for #8 rock dowels	54,907	LF	$	22	$	1,207,958
		Install #8 dowels, 10 ft long in rock	4,576	EA	$	210	$	960,876
		Pressure grout rock dowels	54,907	LF	$	16	$	878,515
		Bearing plate, washers & nuts	4,576	EA	$	130	$	594,828
1.13		**Tunnel 1 - Steel Liner and Concrete Backfill within Tunnel**					$	52,596,037
		Carrier Pipe X' Diameter Pipe, 1" Thick	7,693,721	LB	$	5	$	36,929,862
		Special Coating to Pipe Surface	188,325	SF	$	8	$	1,581,927
		Lean Concrete Around Pipe	27,085	CY	$	520	$	14,084,248
1.16		**Probing Within Rock Tunnel**					$	649,740
		For Diversion Tunnel	8,568	LF	$	65	$	556,920
		Allow for verification hole x 50 ft deep	1,428	LF	$	65	$	92,820
1.17		**Waterproofing Membrane and Drainage Collection**					$	6,668,905
		at tunnel	188,325	SF	$	34	$	6,403,038
		Drainage angle	4,154	LF	$	18	$	74,775
		Drainage gravel and 5" PVC pipes	4,154	LF	$	16	$	66,467
		6" wide Geodrains between steel sets	4,154	LF	$	30	$	124,625
1.18		**Geodrain**					$	889,636
		at tunnel	35,585	SF	$	25	$	889,636
1.2		**Tunneling Standby**					$	5,871,244
		Allowance for Standby Time	554	HR	$	10,600	$	5,871,244
1.21		**Pre-excavation Drilling Within Rock Tunnel, Direct Cost including Pre-Support Temporary Works**					$	11,260,796
		Mobilization & Set up equipment	1	LS	$	65,200	$	65,200
		Grout hole drilling 1-1/2" holes - primary x 100ft	25,098	LF	$	45	$	1,129,418
		Demobilization and clean up	1	LS	$	39,700	$	39,700
		Contractor Engineering & Design Fee	4%	LS	$	9,687,418	$	339,060
		Advanced grouted fore poling -1-1/2" hole x 15ft	148,200	LF	$	38	$	5,631,617
		Apply pressure grouting	148,200	LF	$	20	$	2,964,009
		Face sealing shotcrete layer 3" thick	1,427	CY	$	590	$	841,792
		Ground water control allowance inside tunnel	1	LS	$	250,000	$	250,000
1.22		**Pre-excavation Drilling and Grouting Within Rock**					$	2,077,091
		Indirect cost for standby cost during pre-excavation drilling and grouting	692	HR	$	3,000	$	2,077,091
1.23		**Pre-excavation Grouting Within Rock Tunnel, Materials**					$	4,041,056
		Mobilization & Set up equipment	1	LS	$	191,260	$	191,260
		Demob and Clean Up	1	LS	$	191,260	$	191,260
		Allow for Portland Cement - Allow 1 Sack 94'lb every 2' of 2" Holes	9,996	Sack	$	250	$	2,499,000
		Allow 40% of Tunnel Requiring Microfine Cement	3,998	Sack	$	290	$	1,159,536

Draft_0023612

File Provided Natively

From: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Sent: 3/21/2023 2:09:13 PM
To: Spranza, John [john.spranza@hdrinc.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: WQ Comment from CDFW

John,

After you left the live edit meeting yesterday, ICF asked for direction on how to respond to the following comment from CDFW:

In late summer/early fall when HABs are at their worst Sites' water level will also be at its lowest. Cyanobacteria do not always form surface scums, sometimes they are integrated into the water column and have subsurface maximal concentrations. Sites' low water intake may not be low enough to avoid releasing water with cyanotoxins. Will this lead to withholding outflow? This has previously been an issue at San Luis reservoir.

I asked ICF if there were any regulatory restrictions that would require withholding releases and the only thing they came up with was to maintain fish in good condition consistent with California Fish and Game Code Section 5937.

Do you have any suggestions on how to respond to this comment? Would the Authority withhold releases? If so, would this be based on water quality sampling or wait until there is evidence of the declining condition of fish? I assume this is something that you are addressing in the Reservoir Management Plan?

We have a long way to go on water quality.

Thanks,

Laurie

Laurie Warner Herson
Principal/Owner

Phenix
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/

STATEMENT OF WORK

Project Title: Developing Survival Models and Telemetry Studies in Support of Sites Reservoir Evaluations

Commented [PRW1]: We can fine tune this if need be.

Project Leader: Russell W. Perry
Research Fishery Biologist
U.S. Geological Survey
Columbia River Research Laboratory
5501A Cook-Underwood Road Cook, WA 98605
509-538-2942; fax 509-538-2843

Submitted to: Jason Hassrick
ICF Fish and Aquatic Science
Team
xxxxxxx, CA 95240
628-895-6716

Administrative Contact: Michael Kelley
U.S. Geological Survey
Western Fisheries Research Center
6505 NE 65th St
Seattle, WA 98115
206-526-6287
DUNS# 093685584
ALC# 14-08-0001

Performance Period: Date of signing - March 30, 2025

Date of Submission: March xxx, 2023

Background

The Sites Reservoir is a planned off-channel reservoir in the upper Sacramento River valley. Plans call for the Sites Reservoir to pump water from the mainstem Sacramento River during periods of high river flows. Diversion of water will utilize two existing facilities: 1) the Red Bluff Pumping Plant and 2) the Hamilton City Pumping Plant and GCID main canal. The effect of current water diversion and proposed increased diversion on migrating and rearing juvenile Chinook Salmon is not well characterized. The purpose of this statement of work is to outline activities, tasks, and budgets for analysis of existing telemetry data on smolt movement and survival and the development of a study design to evaluate fry movement and survival in the vicinity of these two water diversion facilities.

Commented [SJ2]: We will need TC and GC input

Summary of Activities

The principal focus of USGS's role will be to evaluate survival of Chinook salmon in the vicinity of RBPP and GCID. USGS will evaluate existing acoustic telemetry (AT) data collected over the previous 10 years (2013-2023) to estimate survival and migration timing for Chinook salmon smolts in the upper mainstem Sacramento River. If estimable under existing AT telemetry array design, survival in the mainstem will be compared to survival in the diversion channel of GCID. At a minimum, AT-tagged hatchery winter-run Chinook salmon will be investigated, but data from other runs will be incorporated as needed. Based on preliminary analysis, USGS will develop an analysis plan for existing data as well as propose study designs for possible future investigations that have potential to overcome any shortcomings identified in existing data for the purpose of assessing fish behavior and survival in the vicinity of the RBPP and GCID. These study designs will include both potential alterations to existing AT networks and techniques (i.e. "one-dimensional" AT) and more focused two-dimensional.

Commented [SJ3]: We will need to loop in GCID

Commented [SJ4]: So this is something that "could" be done, we are not proposing it "will" be done, right?

USGS tasks include:

(1) Develop study designs to 1) model survival and migration dynamics based adding additional presence/absence AT receivers to existing network 2) collect and model two-dimensional AT to evaluate cross-stream position of migrating fish, routing probabilities, and effects of any resulting screen exposure on survival.
(2) Using a variant of the USGS developed temporally stratified multistate mark-recapture model (TSMSMR, Hance et al. 2022), relate and migration timing and survival in upper Sacramento (e.g. from above Red Bluff to above Tisdale) to covariate relationships (e.g., release group, fish size, flow, flow split etc). If estimable under existing AT telemetry array design, survival in the mainstem will be compared to survival in the diversion channel of GCID.
(3) Develop simulation-based decision support tools to evaluate covariate scenarios (e.g. Delta STARS model).
(4) Complete reports, peer-reviewed manuscripts, and other deliverables (e.g., model code).

Deliverables include a report with study design recommendations in 2023 and a manuscript in 2023.

Commented [SJ5]: Do you mean 2024?

Budget: $ ~ 200K (in development)

Timeline for tasks and deliverables:

Task	Completion
(1) Study design	November 2023

(2a) Process existing AT data from 2013-2023 and design model structure. Process, QA/QC, and summary of data to be used and initial analysis.	January 2024
(2b) Temporally stratified multi-state model	June 2024
(3) Simulation-based decision support tool	September 2024
(4) Submission of final report to ICF and submission to peer-reviewed journal	December 2024

Commented [SJ6]: Would the Authority get a draft to review? We would want one.

Equipment: Title to all property acquired with funds provided under this interagency agreement shall be vested in Servicing Agency. Should the Requesting Agency wish to take unrestricted title to any property acquired, such transactions shall be governed by Federal Property Management Regulations.

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 3/21/2023 2:11:41 PM
To: Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
CC: Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: WQ Comment from CDFW

This was one of the items that we went over on yesterday morning's call. We can discuss it on this afternoon's call.

John Spranza

D 916.679.8858 M 818.640.2487

From: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Sent: Tuesday, March 21, 2023 2:09 PM
To: Spranza, John <John.Spranza@hdrinc.com>
Cc: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: WQ Comment from 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.

John,

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We have a long way to go on water quality.

Thanks,

Laurie

Laurie Warner Herson
Principal/Owner
Phenix
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/

From: Spranza, John [John.Spranza@hdrinc.com]
Sent: 3/21/2023 3:19:45 PM
To: Arsenijevic, Jelica [jelica.arsenijevic@hdrinc.com]; Alicia Forsythe [aforsythe@sitesproject.org]
Subject: RE: Alternative Alluvial (Zone 1 Core Borrow) Areas at Golden Gate and Sites Dams

Thanks. I'm still a bit skeptical about the "need" for this. I'm not an engineer, but a bigger pipe(s) and maybe a mobile 1,000 gpm backup pump or two seems like a much less costly alternative to this process.

John Spranza

D 916.679.8858 M 818.640.2487

From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Tuesday, March 21, 2023 2:43 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <John.Spranza@hdrinc.com>
Subject: FW: Alternative Alluvial (Zone 1 Core Borrow) Areas at Golden Gate and Sites Dams

FYI

A little more insight . We can discuss during the workshop…I'll schedule tomorrow when I get the remainder of responses from folks ☺

Jelica Arsenijevic
Environmental Project Manager

HDR
2379 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833
D 916-679-8854
M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Smith, Michael (orange) <michael.g.smith@aecom.com>
Sent: Tuesday, March 21, 2023 2:41 PM
To: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Luu, Henry <henry.luu@hdrinc.com>; Jeriann Alexander (jalexander@fugro.com) <jalexander@fugro.com>
Cc: Zarchi, Idit <Idit.Zarchi@aecom.com>; Aldridge, Benjamin <Benjamin.Aldridge@aecom.com>; Forrest, Mike <michael.forrest@aecom.com>
Subject: RE: Alternative Alluvial (Zone 1 Core Borrow) Areas at Golden Gate and Sites Dams

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Jelica

The alluvial borrow areas will be used during construction. They are the source of the dam embankment core material. We need to perform geotechnical investigations to get samples for engineering property testing. This is needed for the dam design and confirm that the material can be used.

Flows will be diverted via the diversion pipes. There is a limitation to the flows they can accommodate though. The smaller flows/storms will flow without backing up and causing inundation. The large storm flows will back up and temporarily inundate an area behind the diversion berms. Once the storms are over the water will drain out over several days. The reason we are moving the alluvial borrow out of these areas is that the temporary inundation would saturate a portion of the borrow.

Thank you,

Michael Smith, PE, GE
Principal Engineer
US West Region Water
D 1-714-567-2791 C 1-714-697-5239
Michael.g.smith@aecom.com

AECOM
999 Town and Country Road
Orange, CA 92868
www.aecom.com

From: Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>
Sent: Tuesday, March 21, 2023 1:45 PM
To: Smith, Michael (orange) <michael.g.smith@aecom.com>; Luu, Henry <henry.luu@hdrinc.com>; Jeriann Alexander (jalexander@fugro.com) <jalexander@fugro.com>
Cc: Zarchi, Idit <Idit.Zarchi@aecom.com>; Aldridge, Benjamin <Benjamin.Aldridge@aecom.com>; Forrest, Mike <michael.forrest@aecom.com>
Subject: RE: Alternative Alluvial (Zone 1 Core Borrow) Areas at Golden Gate and Sites Dams

Thanks Mike
Please provide a brief write up. My understanding is that this is during construction? During the workshop (which I'm still seeking availalbity input from you and others) environmental will be there...it was our understanding that all the water would be diverted during construction via pipe, so there is some confusion as to why this is going to be inundated during construction.

Jelica Arsenijevic
Environmental Project Manager

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Sacramento, CA 95833
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M 209-329-6897

Jelica.Arsenijevic@hdrinc.com

hdrinc.com/follow-us

From: Smith, Michael (orange) <michael.g.smith@aecom.com>
Sent: Monday, March 20, 2023 12:34 PM
To: Luu, Henry <Henry.Luu@hdrinc.com>; Arsenijevic, Jelica <Jelica.Arsenijevic@hdrinc.com>; Jeriann Alexander (jalexander@fugro.com) <jalexander@fugro.com>
Cc: Zarchi, Idit <Idit.Zarchi@aecom.com>; Aldridge, Benjamin <Benjamin.Aldridge@aecom.com>; Forrest, Mike

<michael.forrest@aecom.com>
Subject: Alternative Alluvial (Zone 1 Core Borrow) Areas at Golden Gate and Sites Dams

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.

All:

What I shared on my screen at the meeting today. Please note this is draft. I will send a kmz later this week of the areas we are considering as alternative alluvial borrow areas.

Thank you,

Michael Smith, PE, GE
Principal Engineer
US West Region Water
D 1-714-567-2791 C 1-714-697-5239
Michael.g.smith@aecom.com

AECOM
999 Town and Country Road
Orange, CA 92868
www.aecom.com

From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/21/2023 5:08:34 PM
To: Kevin Spesert [kspesert@sitesproject.org]; Sara M. Katz [skatz@katzandassociates.com]; Ann Newton [anewton@katzandassociates.com]; Sarah Rossetto [srossetto@katzandassociates.com]; kim@floydcommunications.com; Emily Fan Michaelson [emichaelson@katzandassociates.com]
Subject: Sites 9AM Call Agenda

1. Kevin Update
2. Community Working Group meeting
3. EIR Communications
- Video participants and filming scheduling
4. Virtual Tour
- Ann to present video outline
5. Water Right Application Comms
- Kevin/Ali to review draft press release
- Ali to review FAQs
- Other uses for stakeholder letters
6. CA-NV AWWA Conference Presentation
7. Other
- Q1/Q2 communications plan

K&A
KATZ & ASSOCIATES
Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

Sites Virtual Tour

VIRTUAL TOUR VIDEO OUTLINE

Maxwell/Community Intro

- An ideal reservoir location, Maxwell represents the rural farming communities that are so critical to California—communities that need this water to sustain our food supply.

Visuals: Maxwell sign, Sites JPA office door, community images, farming, family eating dinner, b-roll of local community services (police, education etc.), animation

On Camera Narrator:

Sites Reservoir: The Big Picture

- Uniquely situated as a natural bowl in the earth. Off-river reservoir makes for the perfect location to store extra water for dry years.
- Sites works well because we are able to use existing infrastructure
- Efficient engineering (zoom in on locations of GCID, Funks, Sites/Golden gate dams)
- Sites does not dam a river but the project will include construction of small dams to help hold water supplies in the reservoir and allow for controlled released in and out of the reservoir.
- Critical entry points on the east side of the reservoir, allows us to manage water coming into Sites
- Saddle dams are small dams/dykes to top off the ridges that allows us to hold the water at the level we need. Built to help hold the water in the reservoir where the topography is lower.
- Environmentally sound/protections and enhancements in place
- Standing at the bottom of the reservoir, we would be 250 feet underwater
- The reservoir will hold up to 1.5 million acre-feet of water
- It stretches xx long and xx wide
- This is also the future site of new recreation opportunities—boating, waterskiing, fishing, camping, hiking. Sites Reservoir is a value add for residents throughout the Sac Valley.

Visuals: Reservoir aerial view, animated overview renderings and how the reservoir would look when built out and how the infrastructure ties together (water going into TC and GCID canals, Funks and TRR reservoirs, released into Sites, back out to water users etc.), animated rendering of bridge, recreation, visitors center (if possible)

Spotlight on GCID Canal; TRR Reservoir (could be pulled out of main video and used as standalone)

- History on GCID canal—built in the 1920's, runs about 100 or so miles, critical infrastructure that stands the test of time, pulls water from Sac River
- Unique opportunity for Sites to utilize existing infrastructure
- How it will operate - Water moves in and out of the river through this canal

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- Water from this canal will go into the TRR—a forebay for the Sites project. To get the volume we need, we need TRR. Water is then pumped 3.5 miles from TRR into Sites.
- Water from Sac River – pumped into TRR – pumped into Sites. When it's released from Sites, it is pumped back into TRR from pipeline and then into the canal to be sent to water users south of GCI location.
- We can use the canal when it is not being used for delivery to GCID customers
- This infrastructure allows us to control how much and when we move water.
- Fish screens provide crucial environmental protection
- Why GCID is involved in Sites

On Camera Narrator: Thad Bettner

Visuals: GCID canal, fish screens, map of GCID canal location in relation to Sites reservoir

Spotlight on Funks Reservoir/ TC Canal (could be pulled out of main video and used as standalone)

- History of TC – how it operates, water moves in and out; another example of utilizing existing infrastructure
- How it ties into TRR and TC system, how water flows in and out of the reservoir, state of the art fish screen.
- TC is the longer of the two canals—greater capacity. Water comes thru the fish screens, pumped into Sites Reservoir from the canal. Siphoned all the way down to Dunnigan Pipeline and then back into the Sac River at Knight's Landing.
- What Funks is going to look like
- Overview of construction,
- Why they are involved in Sites.

On Camera Narrator: Jeff Sutton

Visuals: TC Canal, Funks Reservoir view, map of location in relation to Sites, potential animation showing TC and TRR, fish screens, footage of farms

Spotlight on Dunnigan pipeline/Colusa Basin Drain (could be pulled out of main video and used as standalone)

- Overview of how the water comes out from the reservoir, down Dunnigan pipeline and back into the river for delivery to south of delta participants
- Portion of the environmental water will be delivered thru the pipeline

On Camera Narrator: **Valerie Pryor**

Visuals: Dunnigan pipeline/CB drain location, Sacramento River, urban and environmental b-roll

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Technical Memorandum
Sites Reservoir Emergency Drawdown Analysis

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	February 3, 2022
From:	Shanna Inouye, Idit Zarchi, P.E. (AECOM)
Quality Review:	Joe Barnes, P.E. (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Reserv, Task HR39

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3.0 References 6

Appendices

Appendix A – Storage vs. Elevation Curve
Appendix B – Storage vs. Elevation Data

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Acronyms and Abbreviations

AF	Acre-Foot
Authority	Sites Project Authority
cfs	cubic feet per second
DSOD	State of California Department of Water Resources, Division of Safety of Dams
DWR	California Department of Water Resources
El.	Elevation
ft	feet
MAF	million-acre-foot
NAVD88	North American Vertical Datum of 1988
PMF	Probable Maximum Flood
TM	technical memorandum
WSE	Nornal operating water surface elevation

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1.0 Introduction

1.1 Project Overview

The Sites Project Authority (Authority) is in the preliminary design phase for the proposed Sites Reservoir, a 1.5-million-acre-foot (MAF) reservoir located at a site studied previously by the California Department of Water Resources, Division of Engineering (DWR) and the U. S. Bureau of Reclamation (Reclamation).

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 Technical Memorandum) (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 Average Drawdown Calculations

In an email on June 14, 2022, the California Department of Water Resources Division of Safety of Dam (DSOD) requested the following information for use in beginning an evaluation to establish appropriate emergency reservoir drawdown requirements for Sites Reservoir:

1. The outlet discharge rating curves for the 7-day and 10-day outlet sizes. A chart that shows reservoir elevation vs. time would be helpful.
2. The reservoir area/storage capacity curve.

A preliminary drawdown analysis for the reservoir was conducted by AECOM for DSOD in June 2022 based on elevation-storage data provided by DWR in an appendix to their Sites Reservoir Probable Maximum Flood (PMF) Analysis (DWR, 2004). The original potential storage data is provided in 20 ft increments for the elevation range considered for the reservoir.

In 2022, R.E.Y. Engineers, Inc. conducted a LiDAR survey for the Sites Reservoir area. AECOM extrapolated new storage elevation data from the survey. Storage data was provided in 1 ft increments between El. 241 ft NAVD88[1] and El. 517 ft (AECOM, 2022). The new storage elevation curves and data are presented in Appendix A and Appendix B, respectively.

A simplified analysis is presented below to support the discussion of the emergency reservoir drawdown for the currently envisioned Sites Reservoir. The guidelines for emergency drawdown for new dams contain two components:

1. Reduce the maximum storage depth of water in the reservoir by 10 percent within 7 days, or alternatively, 10 days. Refer to Table 1. Storage depth is defined as the elevation difference between the maximum normal operating water surface elevation (WSE, El. 498 ft) and the lowest point in the reservoir that would result in hydrostatic loading on the dams. Given the elevations of the upstream toes of the Golden Gate dam and Sites dam, this is assumed to be El. 250 ft.

[1] All elevations in this report and analyses are in the North American Vertical Datum of 1988 (NAVD88) unless stated otherwise

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2. Drain the reservoir to dead pool (El. 300 ft) within 90 days, or alternatively, 120 days. Refer to Table 3.

Calculations for the first emergency drawdown requirement are as follows:

Table 1. Emergency Drawdown Requirement #1: 10% of Maximum Storage Depth

Description	Elevation / Storage
Maximum WSE	El. 498 ft / 1,472,030 AF
Lowest point in reservoir	El. 250 ft / 18 AF
Maximum storage depth	248 ft
10% of maximum storage depth	24.8 ft
WSE at 10% reduction in storage depth	El. 473.2 ft / 1,159,841 AF
Volume to be released during 10% reduction in storage depth	312,189 AF

Note: AF = Acre Foot

Given the data in Table 1, the average drawdown requirement for the first emergency drawdown component is shown in Table 2 below.

Table 2. Emergency Drawdown Requirement #1: Drawdown Rates

7-day Drawdown Rate [cfs]	10-day Drawdown Rate [cfs]
22,485	15,740

Note that the average drawdown rates for the 7 and 10-day drawdown have been updated since the June 2022 submittal to DSOD. The previously submitted drawdown rates were calculated using the 2004 elevation storage data (DWR, 2004) and by assuming that the maximum storage depth was the difference between the maximum normal operating water surface elevation and Deadpool elevation. The drawdown rates shown in Table 2 were calculated using elevation storage data derived from the 2022 LiDAR survey and by assuming that the maximum storage depth of the reservoir is the elevation difference between the maximum operating water surface and the upstream toe of the dams (i.e. the depth of water resulting in hydrostatic loading to the dams).

Calculations for the second emergency drawdown requirement are as follows:

Table 3. Emergency Drawdown Requirement #2: To Deadpool

Description	Elevation / Storage
Maximum WSE	El. 498 ft / 1,472,030 AF
Lowest intake elevation (top of deadpool)	El. 300 ft / 11,251 AF
Volume to be released	1,460,779 AF

Given the data in Table 3, the average drawdown requirement during the second emergency drawdown component is shown in Table 4 below.

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Table 4. Emergency Drawdown Requirement #2: Drawdown Rates

Drawdown time for 10% of Hydraulic Head	90-day Drawdown Rate [cfs]	120-day Drawdown Rate [cfs]
7 days	7,045	5,175
10 days	7,309	5,316

Emergency drawdown flows will be split between two outlets, the primary Inlet/Outlet works south of Golden Gate Dam and a second in the left abutment of Sites Dam. The split of flows and the initial peak release flow will be determined in the upcoming design phases. The inlet/outlet works sizing will be governed by the 7-day or 10-day emergency drawdown flow rate because the normal operating flow will be significantly lower (3,900 cfs).

The governing design component for sizing the outlet works will be the higher flows necessary to meet the first emergency drawdown requirement. As shown in Table 1, in order to meet a 10% drawdown requirement over 7 days, the outlet facility would need to be sized to pass almost 7,000 cfs more than one sized for this drawdown to occur over 10 days. There are also flooding impacts downstream of the reservoir that will be considered in the upcoming design phase.

Once design has progressed, AECOM will provide an emergency drawdown analysis of the proposed outlet works, including drawdown curves and a chart showing reservoir elevation vs time.

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3.0 References

AECOM (2020a). Reservoir Operating Elevations and Emergency Release Management. August 18.

AECOM (2020b). Design Criteria Basis of Feasibility Design TM, Task Order No. 1. August. Revised June 24, 2021

AECOM (2022). Technical Memorandum, Sites Reservoir Storage-Elevation Curve Analysis. October 21.

DWR (2004). Department of Water Resources, Memorandum, Sites Reservoir PMF Analysis. August 12.

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Appendix A
Elevation vs. Storage Curve

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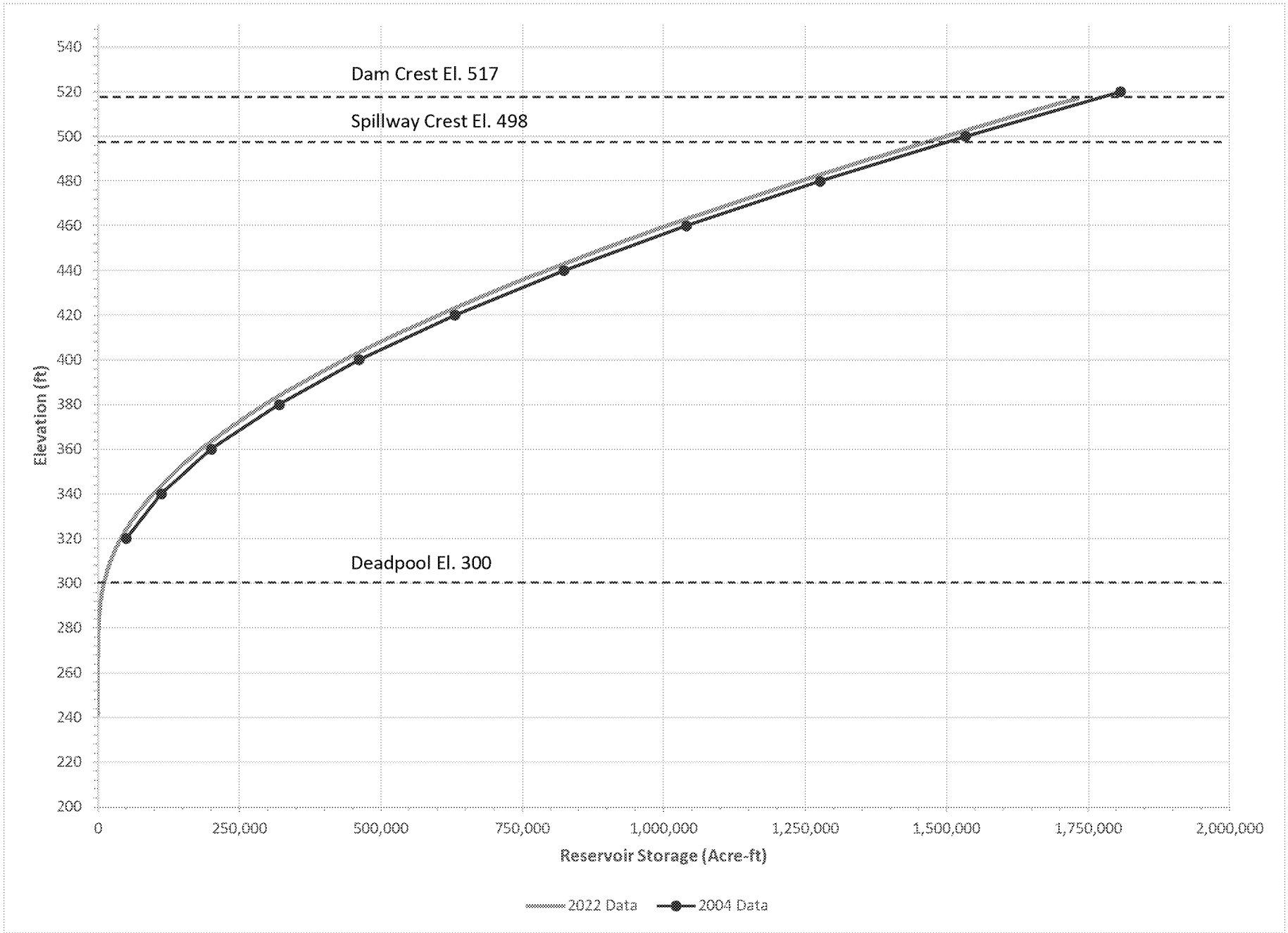
Sites Reservoir Storage Curve



Appendix B
Elevation vs. Storage Data

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Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
241	2466	0	0.00	0.0	0	**0.0**	**0.1**
242	6561	1	4,514	0.1	0	**0**	**0.2**
243	15318	1	10,940	0.3	0	**0**	**0.4**
244	38394	1	26,856	0.6	1	**1**	**0.9**
245	56709	1	47,552	1.1	1	**2**	**1.3**
246	92619	1	74,664	1.7	2	**4**	**2.1**
247	116910	1	104,765	2.4	2	**6**	**2.7**
248	143496	1	130,203	3.0	3	**9**	**3.3**
249	189135	1	166,316	3.8	4	**13**	**4.3**
250	246357	1	217,746	5.0	5	**18**	**5.7**
251	316989	1	281,673	6.5	6	**24**	**7.3**
252	353835	1	335,412	7.7	8	**32**	**8.1**
253	396288	1	375,062	8.6	9	**41**	**9.1**
254	419184	1	407,736	9.4	9	**50**	**9.6**
255	437751	1	428,468	9.8	10	**60**	**10.0**
256	453726	1	445,739	10.2	10	**70**	**10.4**
257	486747	1	470,237	10.8	11	**81**	**11.2**
258	518499	1	502,623	11.5	12	**93**	**11.9**
259	540576	1	529,538	12.2	12	**105**	**12.4**
260	563616	1	552,096	12.7	13	**117**	**12.9**
261	588681	1	576,149	13.2	13	**131**	**13.5**
262	616626	1	602,654	13.8	14	**144**	**14.2**
263	663948	1	640,287	14.7	15	**159**	**15.2**
264	709182	1	686,565	15.8	16	**175**	**16.3**
265	759141	1	734,162	16.9	17	**192**	**17.4**
266	829773	1	794,457	18.2	18	**210**	**19.0**
267	891135	1	860,454	19.8	20	**230**	**20.5**
268	964089	1	927,612	21.3	21	**251**	**22.1**
269	1096056	1	1,030,073	23.6	24	275	25.2
270	1406691	1	1,251,374	28.7	29	**303**	**32.3**
271	1915317	1	1,661,004	38.1	38	**342**	**44.0**
272	2593917	1	2,254,617	51.8	52	**393**	**59.5**
273	3149928	1	2,871,923	65.9	66	**459**	**72.3**
274	3603186	1	3,376,557	77.5	78	**537**	**82.7**
275	3993012	1	3,798,099	87.2	87	**624**	**91.7**
276	4426281	1	4,209,647	96.6	97	**721**	**101.6**
277	4932972	1	4,679,627	107.4	107	**828**	**113.2**
278	5471622	1	5,202,297	119.4	119	**947**	**125.6**
279	6108786	1	5,790,204	132.9	133	**1,080**	**140.2**
280	6910452	1	6,509,619	149.4	149	**1,230**	**158.6**
281	7901478	1	7,405,965	170.0	170	**1,400**	**181.4**
282	9024606	1	8,463,042	194.3	194	**1,594**	**207.2**
283	10180611	1	9,602,609	220.4	220	**1,815**	**233.7**
284	11530917	1	10,855,764	249.2	249	**2,064**	**264.7**

https://aecom.sharepoint.com/sites/SitesTO03/Shared Documents/General/400_Technical/430_Technical_Working_Documents/HR34.06 Hydraulics Outlet Works/Storage Elevation Curve/Storage Elevation Curve.xlsx

Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
285	13136850	1	12,333,884	283.1	283	**2,347**	**301.6**
286	14739534	1	13,938,192	320.0	320	**2,667**	**338.4**
287	16240572	1	15,490,053	355.6	356	**3,022**	**372.8**
288	17649891	1	16,945,232	389.0	389	**3,411**	**405.2**
289	19111446	1	18,380,669	422.0	422	**3,833**	**438.7**
290	20484882	1	19,798,164	454.5	455	**4,288**	**470.3**
291	21896136	1	21,190,509	486.5	486	**4,774**	**502.7**
292	23668317	1	22,782,227	523.0	523	**5,297**	**543.3**
293	25733475	1	24,700,896	567.1	567	**5,864**	**590.8**
294	27895437	1	26,814,456	615.6	616	**6,480**	**640.4**
295	30423762	1	29,159,600	669.4	669	**7,149**	**698.4**
296	32773329	1	31,598,546	725.4	725	**7,875**	**752.4**
297	34867395	1	33,820,362	776.4	776	**8,651**	**800.4**
298	36797796	1	35,832,596	822.6	823	**9,474**	**844.8**
299	38636235	1	37,717,016	865.9	866	**10,340**	**887.0**
300	40714920	1	39,675,578	910.8	911	**11,251**	**934.7**
301	42761268	1	41,738,094	958.2	958	**12,209**	**981.7**
302	44853480	1	43,807,374	1,005.7	1,006	**13,214**	**1,029.7**
303	46907055	1	45,880,268	1,053.3	1,053	**14,268**	**1,076.8**
304	48981690	1	47,944,373	1,100.7	1,101	**15,368**	**1,124.5**
305	51202269	1	50,091,980	1,150.0	1,150	**16,518**	**1,175.4**
306	53461710	1	52,331,990	1,201.4	1,201	**17,720**	**1,227.3**
307	55798839	1	54,630,275	1,254.1	1,254	**18,974**	**1,281.0**
308	58358205	1	57,078,522	1,310.3	1,310	**20,284**	**1,339.7**
309	61018758	1	59,688,482	1,370.3	1,370	**21,654**	**1,400.8**
310	63789255	1	62,404,007	1,432.6	1,433	**23,087**	**1,464.4**
311	66446991	1	65,118,123	1,494.9	1,495	**24,582**	**1,525.4**
312	68998932	1	67,722,962	1,554.7	1,555	**26,137**	**1,584.0**
313	71766207	1	70,382,570	1,615.8	1,616	**27,752**	**1,647.5**
314	74689884	1	73,228,046	1,681.1	1,681	**29,433**	**1,714.6**
315	77920146	1	76,305,015	1,751.7	1,752	**31,185**	**1,788.8**
316	81021429	1	79,470,788	1,824.4	1,824	**33,010**	**1,860.0**
317	84120219	1	82,570,824	1,895.6	1,896	**34,905**	**1,931.1**
318	87559830	1	85,840,025	1,970.6	1,971	**36,876**	**2,010.1**
319	91572723	1	89,566,277	2,056.2	2,056	**38,932**	**2,102.2**
320	95094945	1	93,333,834	2,142.7	2,143	**41,075**	**2,183.1**
321	98274510	1	96,684,728	2,219.6	2,220	**43,294**	**2,256.1**
322	101275632	1	99,775,071	2,290.5	2,291	**45,585**	**2,325.0**
323	104310378	1	102,793,005	2,359.8	2,360	**47,944**	**2,394.6**
324	107279109	1	105,794,744	2,428.7	2,429	**50,373**	**2,462.8**
325	110321127	1	108,800,118	2,497.7	2,498	**52,871**	**2,532.6**
326	113231853	1	111,776,490	2,566.0	2,566	**55,437**	**2,599.4**
327	116138772	1	114,685,313	2,632.8	2,633	**58,070**	**2,666.2**
328	118983474	1	117,561,123	2,698.8	2,699	**60,769**	**2,731.5**

https://aecom.sharepoint.com/sites/SitesTO03/Shared Documents/General/400_Technical/430_Technical_Working_Documents/HR34.06 Hydraulics Outlet Works/Storage Elevation Curve/Storage Elevation Curve.xlsx

Elevation Vs. Area and Storage Data
2022 LiDAR Data

10/17/2022

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
329	121924449	1	120,453,962	2,765.2	2,765	**63,534**	**2,799.0**
330	124989156	1	123,456,803	2,834.2	2,834	**66,368**	**2,869.4**
331	128106171	1	126,547,664	2,905.1	2,905	**69,273**	**2,940.9**
332	131213394	1	129,659,783	2,976.6	2,977	**72,250**	**3,012.2**
333	134371404	1	132,792,399	3,048.5	3,048	**75,298**	**3,084.7**
334	137321334	1	135,846,369	3,118.6	3,119	**78,417**	**3,152.5**
335	140276070	1	138,798,702	3,186.4	3,186	**81,603**	**3,220.3**
336	143171712	1	141,723,891	3,253.5	3,254	**84,857**	**3,286.8**
337	146119140	1	144,645,426	3,320.6	3,321	**88,177**	**3,354.4**
338	149087628	1	147,603,384	3,388.5	3,389	**91,566**	**3,422.6**
339	152072244	1	150,579,936	3,456.8	3,457	**95,023**	**3,491.1**
340	155018925	1	153,545,585	3,524.9	3,525	**98,548**	**3,558.7**
341	158037453	1	156,528,189	3,593.4	3,593	**102,141**	**3,628.0**
342	161048466	1	159,542,960	3,662.6	3,663	**105,804**	**3,697.2**
343	163989081	1	162,518,774	3,730.9	3,731	**109,535**	**3,764.7**
344	167018373	1	165,503,727	3,799.4	3,799	**113,334**	**3,834.2**
345	169999641	1	168,509,007	3,868.4	3,868	**117,202**	**3,902.7**
346	172893330	1	171,446,486	3,935.9	3,936	**121,138**	**3,969.1**
347	175783374	1	174,338,352	4,002.3	4,002	**125,141**	**4,035.4**
348	178661871	1	177,222,623	4,068.5	4,068	**129,209**	**4,101.5**
349	181534401	1	180,098,136	4,134.5	4,134	**133,343**	**4,167.5**
350	184442103	1	182,988,252	4,200.8	4,201	**137,544**	**4,234.2**
351	187313454	1	185,877,779	4,267.2	4,267	**141,811**	**4,300.1**
352	190170963	1	188,742,209	4,332.9	4,333	**146,144**	**4,365.7**
353	193036050	1	191,603,507	4,398.6	4,399	**150,543**	**4,431.5**
354	195940602	1	194,488,326	4,464.8	4,465	**155,008**	**4,498.2**
355	198923715	1	197,432,159	4,532.4	4,532	**159,540**	**4,566.7**
356	202031415	1	200,477,565	4,602.3	4,602	**164,143**	**4,638.0**
357	205187490	1	203,609,453	4,674.2	4,674	**168,817**	**4,710.5**
358	208448352	1	206,817,921	4,747.9	4,748	**173,565**	**4,785.3**
359	211795569	1	210,121,961	4,823.7	4,824	**178,388**	**4,862.2**
360	215000190	1	213,397,880	4,898.9	4,899	**183,287**	**4,935.7**
361	218227635	1	216,613,913	4,972.8	4,973	**188,260**	**5,009.8**
362	221567130	1	219,897,383	5,048.1	5,048	**193,308**	**5,086.5**
363	224761473	1	223,164,302	5,123.1	5,123	**198,431**	**5,159.8**
364	227826693	1	226,294,083	5,195.0	5,195	**203,626**	**5,230.2**
365	230863374	1	229,345,034	5,265.0	5,265	**208,891**	**5,299.9**
366	233929971	1	232,396,673	5,335.1	5,335	**214,227**	**5,370.3**
367	236982924	1	235,456,448	5,405.3	5,405	**219,632**	**5,440.4**
368	240004584	1	238,493,754	5,475.1	5,475	**225,107**	**5,509.7**
369	243027513	1	241,516,049	5,544.4	5,544	**230,651**	**5,579.1**
370	246005082	1	244,516,298	5,613.3	5,613	**236,265**	**5,647.5**
371	248871483	1	247,438,283	5,680.4	5,680	**241,945**	**5,713.3**
372	251735022	1	250,303,253	5,746.2	5,746	**247,691**	**5,779.0**

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Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
373	254572875	1	253,153,949	5,811.6	5,812	**253,503**	**5,844.2**
374	257428782	1	256,000,829	5,877.0	5,877	**259,380**	**5,909.8**
375	260364519	1	258,896,651	5,943.4	5,943	**265,323**	**5,977.1**
376	263230956	1	261,797,738	6,010.0	6,010	**271,333**	**6,043.0**
377	266131026	1	264,680,991	6,076.2	6,076	**277,410**	**6,109.5**
378	269021772	1	267,576,399	6,142.7	6,143	**283,552**	**6,175.9**
379	271912284	1	270,467,028	6,209.1	6,209	**289,761**	**6,242.2**
380	274849722	1	273,381,003	6,276.0	6,276	**296,037**	**6,309.7**
381	277824690	1	276,337,206	6,343.8	6,344	**302,381**	**6,378.0**
382	280932390	1	279,378,540	6,413.6	6,414	**308,795**	**6,449.3**
383	284096691	1	282,514,541	6,485.6	6,486	**315,281**	**6,522.0**
384	287195319	1	285,646,005	6,557.5	6,558	**321,838**	**6,593.1**
385	290421675	1	288,808,497	6,630.1	6,630	**328,468**	**6,667.2**
386	293630823	1	292,026,249	6,704.0	6,704	**335,172**	**6,740.8**
387	296823105	1	295,226,964	6,777.5	6,777	**341,950**	**6,814.1**
388	299891781	1	298,357,443	6,849.3	6,849	**348,799**	**6,884.6**
389	302926104	1	301,408,943	6,919.4	6,919	**355,718**	**6,954.2**
390	306066402	1	304,496,253	6,990.3	6,990	**362,709**	**7,026.3**
391	309174309	1	307,620,356	7,062.0	7,062	**369,771**	**7,097.7**
392	312223680	1	310,698,995	7,132.7	7,133	**376,903**	**7,167.7**
393	315220653	1	313,722,167	7,202.1	7,202	**384,105**	**7,236.5**
394	318112974	1	316,666,814	7,269.7	7,270	**391,375**	**7,302.9**
395	321136641	1	319,624,808	7,337.6	7,338	**398,713**	**7,372.3**
396	324112275	1	322,624,458	7,406.4	7,406	**406,119**	**7,440.6**
397	327034746	1	325,573,511	7,474.1	7,474	**413,593**	**7,507.7**
398	329914575	1	328,474,661	7,540.7	7,541	**421,134**	**7,573.8**
399	332815491	1	331,365,033	7,607.1	7,607	**428,741**	**7,640.4**
400	335679219	1	334,247,355	7,673.3	7,673	**436,414**	**7,706.1**
401	338479785	1	337,079,502	7,738.3	7,738	**444,153**	**7,770.4**
402	341179587	1	339,829,686	7,801.4	7,801	**451,954**	**7,832.4**
403	343888191	1	342,533,889	7,863.5	7,863	**459,818**	**7,894.6**
404	346621257	1	345,254,724	7,926.0	7,926	**467,743**	**7,957.3**
405	349365555	1	347,993,406	7,988.8	7,989	**475,732**	**8,020.3**
406	352072269	1	350,718,912	8,051.4	8,051	**483,784**	**8,082.5**
407	354749985	1	353,411,127	8,113.2	8,113	**491,897**	**8,143.9**
408	357340149	1	356,045,067	8,173.7	8,174	**500,071**	**8,203.4**
409	359906166	1	358,623,158	8,232.9	8,233	**508,303**	**8,262.3**
410	362485116	1	361,195,641	8,291.9	8,292	**516,595**	**8,321.5**
411	365108067	1	363,796,592	8,351.6	8,352	**524,947**	**8,381.7**
412	367748064	1	366,428,066	8,412.0	8,412	**533,359**	**8,442.3**
413	370327383	1	369,037,724	8,471.9	8,472	**541,831**	**8,501.5**
414	372994497	1	371,660,940	8,532.2	8,532	**550,363**	**8,562.8**
415	375647580	1	374,321,039	8,593.2	8,593	**558,956**	**8,623.7**
416	378255789	1	376,951,685	8,653.6	8,654	**567,610**	**8,683.6**

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Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
417	380883249	1	379,569,519	8,713.7	8,714	**576,324**	**8,743.9**
418	383551452	1	382,217,351	8,774.5	8,775	**585,098**	**8,805.1**
419	386220330	1	384,885,891	8,835.8	8,836	**593,934**	**8,866.4**
420	388853712	1	387,537,021	8,896.6	8,897	**602,831**	**8,926.9**
421	391516389	1	390,185,051	8,957.4	8,957	**611,788**	**8,988.0**
422	394209693	1	392,863,041	9,018.9	9,019	**620,807**	**9,049.8**
423	396848070	1	395,528,882	9,080.1	9,080	**629,887**	**9,110.4**
424	399468069	1	398,158,070	9,140.5	9,140	**639,027**	**9,170.5**
425	402112116	1	400,790,093	9,200.9	9,201	**648,228**	**9,231.2**
426	404751528	1	403,431,822	9,261.5	9,262	**657,490**	**9,291.8**
427	407386521	1	406,069,025	9,322.1	9,322	**666,812**	**9,352.3**
428	410001183	1	408,693,852	9,382.3	9,382	**676,194**	**9,412.3**
429	412596459	1	411,298,821	9,442.1	9,442	**685,636**	**9,471.9**
430	415133415	1	413,864,937	9,501.0	9,501	**695,137**	**9,530.2**
431	417646944	1	416,390,180	9,559.0	9,559	**704,696**	**9,587.9**
432	420130440	1	418,888,692	9,616.4	9,616	**714,313**	**9,644.9**
433	422608752	1	421,369,596	9,673.3	9,673	**723,986**	**9,701.8**
434	425044305	1	423,826,529	9,729.7	9,730	**733,716**	**9,757.7**
435	427480434	1	426,262,370	9,785.6	9,786	**743,501**	**9,813.6**
436	429918912	1	428,699,673	9,841.6	9,842	**753,343**	**9,869.6**
437	432376173	1	431,147,543	9,897.8	9,898	**763,241**	**9,926.0**
438	434914299	1	433,645,236	9,955.1	9,955	**773,196**	**9,984.3**
439	437436171	1	436,175,235	10,013.2	10,013	**783,209**	**10,042.2**
440	439917516	1	438,676,844	10,070.6	10,071	**793,280**	**10,099.1**
441	442382211	1	441,149,864	10,127.4	10,127	**803,407**	**10,155.7**
442	444827673	1	443,604,942	10,183.8	10,184	**813,591**	**10,211.8**
443	447244218	1	446,035,946	10,239.6	10,240	**823,830**	**10,267.3**
444	449655975	1	448,450,097	10,295.0	10,295	**834,125**	**10,322.7**
445	452068803	1	450,862,389	10,350.4	10,350	**844,476**	**10,378.1**
446	454495842	1	453,282,323	10,405.9	10,406	**854,882**	**10,433.8**
447	456957288	1	455,726,565	10,462.0	10,462	**865,344**	**10,490.3**
448	459493767	1	458,225,528	10,519.4	10,519	**875,863**	**10,548.5**
449	462103560	1	460,798,664	10,578.5	10,578	**886,442**	**10,608.4**
450	464695920	1	463,399,740	10,638.2	10,638	**897,080**	**10,668.0**
451	467244090	1	465,970,005	10,697.2	10,697	**907,777**	**10,726.4**
452	469754235	1	468,499,163	10,755.3	10,755	**918,532**	**10,784.1**
453	472256046	1	471,005,141	10,812.8	10,813	**929,345**	**10,841.5**
454	474714819	1	473,485,433	10,869.7	10,870	**940,215**	**10,898.0**
455	477139077	1	475,926,948	10,925.8	10,926	**951,141**	**10,953.6**
456	479584413	1	478,361,745	10,981.7	10,982	**962,122**	**11,009.7**
457	482129388	1	480,856,901	11,039.0	11,039	**973,161**	**11,068.2**
458	484638579	1	483,383,984	11,097.0	11,097	**984,258**	**11,125.8**
459	487119681	1	485,879,130	11,154.3	11,154	**995,412**	**11,182.7**
460	489585717	1	488,352,699	11,211.0	11,211	**1,006,624**	**11,239.3**

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Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
461	492151104	1	490,868,411	11,268.8	11,269	**1,017,892**	**11,298.2**
462	494661996	1	493,406,550	11,327.1	11,327	**1,029,219**	**11,355.9**
463	497150028	1	495,906,012	11,384.4	11,384	**1,040,604**	**11,413.0**
464	499592466	1	498,371,247	11,441.0	11,441	**1,052,045**	**11,469.1**
465	501974289	1	500,783,378	11,496.4	11,496	**1,063,541**	**11,523.7**
466	504331812	1	503,153,051	11,550.8	11,551	**1,075,092**	**11,577.9**
467	506676330	1	505,504,071	11,604.8	11,605	**1,086,697**	**11,631.7**
468	509000202	1	507,838,266	11,658.4	11,658	**1,098,355**	**11,685.0**
469	511345521	1	510,172,862	11,712.0	11,712	**1,110,067**	**11,738.9**
470	513669222	1	512,507,372	11,765.6	11,766	**1,121,833**	**11,792.2**
471	515969856	1	514,819,539	11,818.6	11,819	**1,133,651**	**11,845.0**
472	518257557	1	517,113,707	11,871.3	11,871	**1,145,523**	**11,897.6**
473	520534404	1	519,395,981	11,923.7	11,924	**1,157,446**	**11,949.8**
474	522818721	1	521,676,563	11,976.0	11,976	**1,169,422**	**12,002.3**
475	525099600	1	523,959,161	12,028.4	12,028	**1,181,451**	**12,054.6**
476	527351679	1	526,225,640	12,080.5	12,080	**1,193,531**	**12,106.3**
477	529597161	1	528,474,420	12,132.1	12,132	**1,205,663**	**12,157.9**
478	531822951	1	530,710,056	12,183.4	12,183	**1,217,847**	**12,209.0**
479	534024729	1	532,923,840	12,234.2	12,234	**1,230,081**	**12,259.5**
480	536240853	1	535,132,791	12,285.0	12,285	**1,242,366**	**12,310.4**
481	538458003	1	537,349,428	12,335.8	12,336	**1,254,702**	**12,361.3**
482	540647802	1	539,552,903	12,386.4	12,386	**1,267,088**	**12,411.6**
483	542827557	1	541,737,680	12,436.6	12,437	**1,279,525**	**12,461.6**
484	545027256	1	543,927,407	12,486.9	12,487	**1,292,012**	**12,512.1**
485	547232742	1	546,129,999	12,537.4	12,537	**1,304,549**	**12,562.7**
486	549419760	1	548,326,251	12,587.8	12,588	**1,317,137**	**12,612.9**
487	551599416	1	550,509,588	12,638.0	12,638	**1,329,775**	**12,663.0**
488	553776372	1	552,687,894	12,688.0	12,688	**1,342,463**	**12,713.0**
489	555939018	1	554,857,695	12,737.8	12,738	**1,355,201**	**12,762.6**
490	558073224	1	557,006,121	12,787.1	12,787	**1,367,988**	**12,811.6**
491	560198070	1	559,135,647	12,836.0	12,836	**1,380,824**	**12,860.4**
492	562295700	1	561,246,885	12,884.5	12,884	**1,393,708**	**12,908.5**
493	564394104	1	563,344,902	12,932.6	12,933	**1,406,641**	**12,956.7**
494	566502930	1	565,448,517	12,980.9	12,981	**1,419,622**	**13,005.1**
495	568624401	1	567,563,666	13,029.5	13,029	**1,432,651**	**13,053.8**
496	570734253	1	569,679,327	13,078.0	13,078	**1,445,729**	**13,102.3**
497	572832945	1	571,783,599	13,126.3	13,126	**1,458,856**	**13,150.4**
498	**574910604**	**1**	**573,871,775**	**13,174.3**	**13,174**	**1,472,030**	**13,198.1**
499	576989775	1	575,950,190	13,222.0	13,222	**1,485,252**	**13,245.9**
500	579047535	1	578,018,655	13,269.5	13,269	**1,498,521**	**13,293.1**
501	581098941	1	580,073,238	13,316.6	13,317	**1,511,838**	**13,340.2**
502	583161444	1	582,130,193	13,363.9	13,364	**1,525,202**	**13,387.5**
503	585239814	1	584,200,629	13,411.4	13,411	**1,538,613**	**13,435.3**
504	587336175	1	586,287,995	13,459.3	13,459	**1,552,073**	**13,483.4**

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Technical Memorandum
Sites Reservoir
Storage-Elevation Curve Analysis

To:	Sites Project Authority
CC:	Henry Luu, P.E. (HDR)
Date:	October 21, 2022
From:	Shanna Inouye, Idit Zarchi, P.E. (AECOM)
Quality Review:	Joe Barnes, P.E. (AECOM)
Authority Agent Review:	Henry Luu, P.E. (HDR)
Subject:	Reservoir Storage-Elevation Curve, Task HR34

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Appendices

Appendix A – Elevation vs. Area and Storage Curves
Appendix B – Elevation vs. Area and Storage Data
Appendix C – Extents of 2022 LiDAR

Acronyms and Abbreviations

AF	Acre-feet
DWR	California Department of Water Resources
ft	feet
LiDAR	Light Detection and Ranging
MAF	million-acre-foot
TM	technical memorandum

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1.0 Introduction

1.1 Project Overview

The Sites Project Authority (Authority) is in the preliminary design phase for the proposed Sites Reservoir, a 1.5-million-acre-foot (MAF) reservoir located at a site in Glenn and Colusa Counties, California' studied previously by the California Department of Water Resources, Division of Engineering (DWR) and the U. S. Bureau of Reclamation.

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 Technical Memorandum (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.

1.3 Background and Purpose

DWR conducted a feasibility study for Sites Reservoir in 2004. This study included storage-elevation data for the reservoir generated from available topography developed by DWR with 20-foot elevation intervals. This topography was used by DWR to evaluate reservoir storage elevations for different capacity reservoirs, and to complete probable maximum flood studies.

Documentation for the original DWR survey work is limited. In 2022 R.E.Y. Engineers, Inc. conducted a Light Detection and Ranging (LiDAR) survey for the Sites Reservoir project area. New storage elevation data was extrapolated from the 2022 survey data for comparison with the storage elevation data previously developed by DWR.

The 2022 R.E.Y. survey has the following horizontal and vertical datum:

- Horizontal datum: NSRS 2011, CA Zone II, US Survey Foot
- Vertical datum NAVD88

2.0 Methodology

A 2022 LiDAR survey dataset was used to render an ArcGIS Digital Elevation Model. The source LiDAR data files, in "LAS" format, were assembled and processed in ArcPro version 2.6 into an Esri LAS Dataset, which was exported to a raster surface at 1-foot cell size. This was converted to a more manageable, smaller, dataset by aggregating the values into 3-foot cells and was used as the basis for the storage elevation calculations and in the generation of the water surface elevation contour at 498 feet. The storage elevation calculation was performed by finding the surface 2D area at sequential 1-foot intervals. The cumulative volume is obtained with the average end area method, multiplying the mean area by the change in elevation at each step (See Appendix B). The elevation range was from the low point in the reservoir, at roughly 241 ft to the proposed dam crest elevation at 517 ft.

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2.1 Assumptions and Model Limitations

Sites Reservoir is still in the early design phases and not all components within the reservoir boundary have been developed. Several assumptions and limitations were considered when extrapolating storage elevation data.

1. The downstream geometry for Golden Gate Dam was modeled in ArcGIS (See Figure 2-1).
2. Dam geometries for the project site had previously been developed using the 2004 topography. While the general geometry of the dams was retained, some adjustments were made to fit the 2022 topography (i.e. to ensure the dams 'seal' the reservoir).
3. Saddle dams and dikes not previously modeled were also modeled in ArcGIS using the dam geometry information (such as dam crest width, embankment slope etc.).
4. Some additional dike locations were identified with the 2022 topography. These dikes were modeled with geometries similar to those of the other saddle dams and dikes. See Figure 2-2.
5. The following quantities were considered negligible relative to the overall volume of the reservoir and were not modeled:
    a. Excavations from anticipated borrow areas within the reservoir.
    b. Spoils piles within the reservoir.
    c. Embankments for the Sites Lodoga Bridge.
6. The 2022 LiDAR survey excluded a few small areas along the western side of the reservoir. The areas cut off were all above El. 498 (See Appendix C) and would make a negligible difference to the overall reservoir volume.

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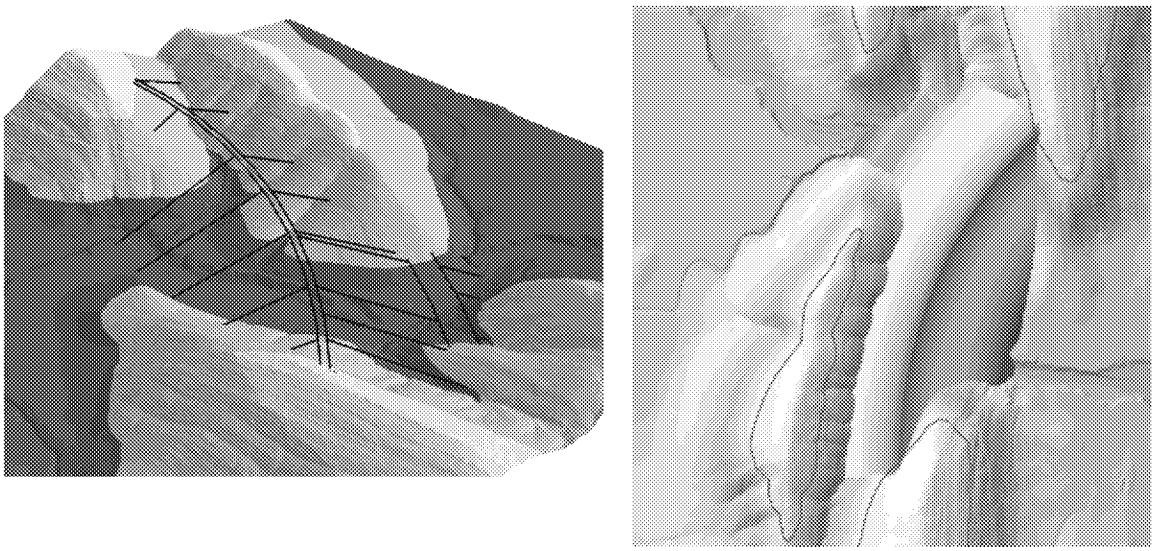

Figure 2-1: Modeling the downstream Golden Gate Dam Option in ArcGIS

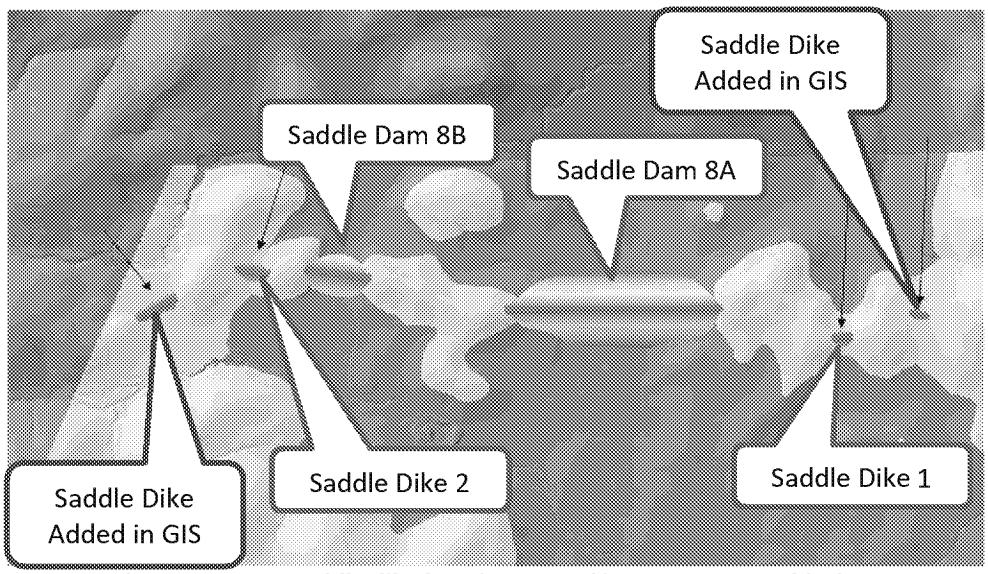

Figure 2-2: New saddle dike locations noted in 2022 topographic data

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3.0 Results

A data set including cross sectional areas and volumes in elevation increments of 1 foot was generated for the reservoir. Elevation area and storage curves were created form this data set (see Appendices A and B). The following storage volumes were calculated at key elevations:

Elevation (feet)	Description	Volume (acre-feet)
517	Dam crest	1,731,344
498	Maximum operating water surface (spillway crest)	1,472,030
300	Top of deadpool	11,251

3.1 Comparison to 2004 Data

Assuming the 2004 data was based on the same NAVD88 datum used when developing the 2022 LiDAR data, the overall reservoir storage at El. 498 ft is about 2% less than what was estimated in 2004. Most of the deviation between the 2004 and 2022 data lies in the areas below El. 400 ft (see Table 3-1).

The 2022 LiDAR survey had a more enhanced resolution than the topographic data available in 2004, which had elevation intervals of 20 feet. It is likely that topographic features from the bottom and sides of the valley, such as portions of the top 20 feet of mounds and ridges, were not captured in the 2004 20-foot contours and thus were not included in the analysis.

Table 3-1: Comparison between 2004 and 2022 area and storage data

	2004 Data		2022 Data		2022/2004 Data (%)	
Reservoir Elevation (ft)	Area (Acre)	Storage (Acre-Feet)	Area (Acre)	Storage (Acre-Feet)	Area	Storage
320	2,390	50,078	2,183	41,075	91%	82%
340	3,830	112,359	3,559	98,548	93%	88%
360	5,260	200,601	4,936	183,287	94%	91%
380	6,510	320,833	6,310	296,037	97%	92%
400	7,700	462,053	7,706	436,414	100%	94%
420	9,120	631,450	8,927	602,831	98%	95%
440	10,060	824,033	10,099	793,280	100%	96%
460	11,320	1,040,446	11,239	1,006,624	99%	97%
480	12,330	1,276,899	12,310	1,242,366	100%	97%
500	13,250	1,533,618	13,293	1,498,521	100%	98%
517	-	1,766,405*	14,094	1,731,344	-	98%

*The volume at El. 517 in the 2004 data set is interpolated

4.0 References

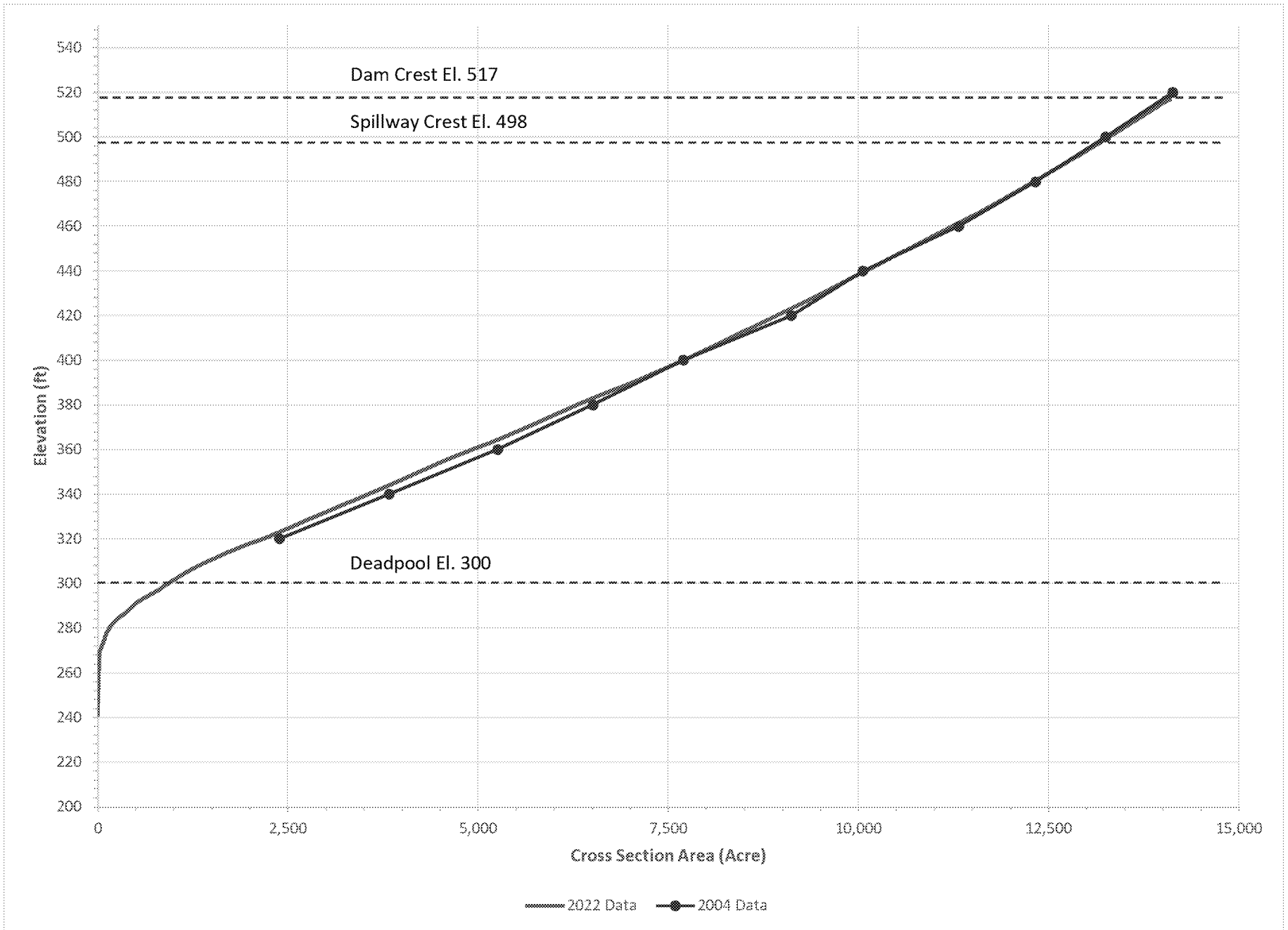
DWR (2004). Department of Water Resources, Memorandum, Sites Reservoir PMF Analysis. August 12.

Draft_0023645

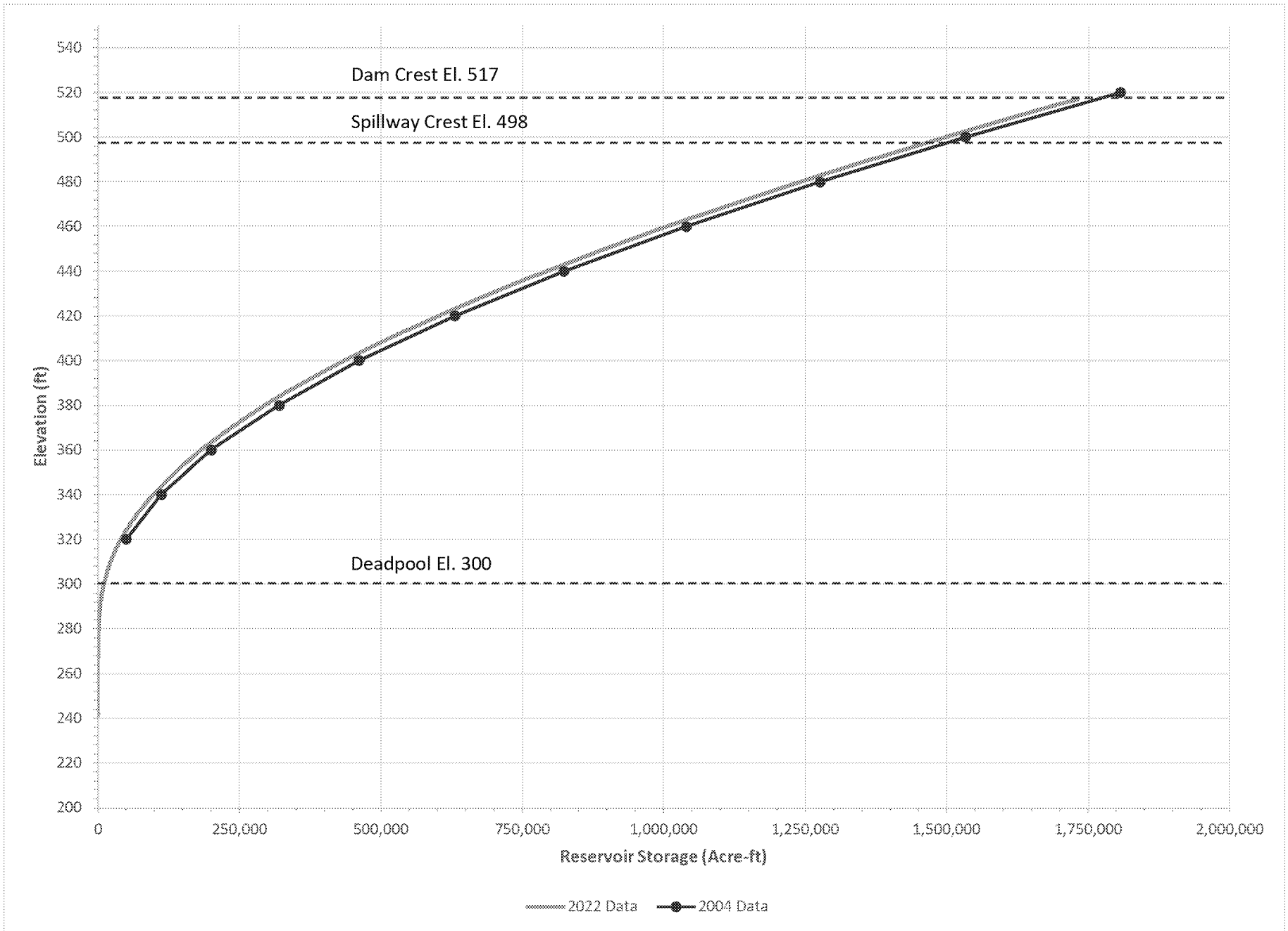
Appendix A
Elevation vs. Area and Storage Curves

Draft_0023646

Sites Reservoir Area Curve



Sites Reservoir Storage Curve



Appendix B
Elevation vs. Area Storage Data

Draft_0023649

Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
241	2466	0	0.00	0.0	0	**0.0**	**0.1**
242	6561	1	4,514	0.1	0	**0**	**0.2**
243	15318	1	10,940	0.3	0	**0**	**0.4**
244	38394	1	26,856	0.6	1	**1**	**0.9**
245	56709	1	47,552	1.1	1	**2**	**1.3**
246	92619	1	74,664	1.7	2	**4**	**2.1**
247	116910	1	104,765	2.4	2	**6**	**2.7**
248	143496	1	130,203	3.0	3	**9**	**3.3**
249	189135	1	166,316	3.8	4	**13**	**4.3**
250	246357	1	217,746	5.0	5	**18**	**5.7**
251	316989	1	281,673	6.5	6	**24**	**7.3**
252	353835	1	335,412	7.7	8	**32**	**8.1**
253	396288	1	375,062	8.6	9	**41**	**9.1**
254	419184	1	407,736	9.4	9	**50**	**9.6**
255	437751	1	428,468	9.8	10	**60**	**10.0**
256	453726	1	445,739	10.2	10	**70**	**10.4**
257	486747	1	470,237	10.8	11	**81**	**11.2**
258	518499	1	502,623	11.5	12	**93**	**11.9**
259	540576	1	529,538	12.2	12	**105**	**12.4**
260	563616	1	552,096	12.7	13	**117**	**12.9**
261	588681	1	576,149	13.2	13	**131**	**13.5**
262	616626	1	602,654	13.8	14	**144**	**14.2**
263	663948	1	640,287	14.7	15	**159**	**15.2**
264	709182	1	686,565	15.8	16	**175**	**16.3**
265	759141	1	734,162	16.9	17	**192**	**17.4**
266	829773	1	794,457	18.2	18	**210**	**19.0**
267	891135	1	860,454	19.8	20	**230**	**20.5**
268	964089	1	927,612	21.3	21	**251**	**22.1**
269	1096056	1	1,030,073	23.6	24	275	25.2
270	1406691	1	1,251,374	28.7	29	**303**	**32.3**
271	1915317	1	1,661,004	38.1	38	**342**	**44.0**
272	2593917	1	2,254,617	51.8	52	**393**	**59.5**
273	3149928	1	2,871,923	65.9	66	**459**	**72.3**
274	3603186	1	3,376,557	77.5	78	**537**	**82.7**
275	3993012	1	3,798,099	87.2	87	**624**	**91.7**
276	4426281	1	4,209,647	96.6	97	**721**	**101.6**
277	4932972	1	4,679,627	107.4	107	**828**	**113.2**
278	5471622	1	5,202,297	119.4	119	**947**	**125.6**
279	6108786	1	5,790,204	132.9	133	**1,080**	**140.2**
280	6910452	1	6,509,619	149.4	149	**1,230**	**158.6**
281	7901478	1	7,405,965	170.0	170	**1,400**	**181.4**
282	9024606	1	8,463,042	194.3	194	**1,594**	**207.2**
283	10180611	1	9,602,609	220.4	220	**1,815**	**233.7**
284	11530917	1	10,855,764	249.2	249	**2,064**	**264.7**

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Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
285	13136850	1	12,333,884	283.1	283	**2,347**	**301.6**
286	14739534	1	13,938,192	320.0	320	**2,667**	**338.4**
287	16240572	1	15,490,053	355.6	356	**3,022**	**372.8**
288	17649891	1	16,945,232	389.0	389	**3,411**	**405.2**
289	19111446	1	18,380,669	422.0	422	**3,833**	**438.7**
290	20484882	1	19,798,164	454.5	455	**4,288**	**470.3**
291	21896136	1	21,190,509	486.5	486	**4,774**	**502.7**
292	23668317	1	22,782,227	523.0	523	**5,297**	**543.3**
293	25733475	1	24,700,896	567.1	567	**5,864**	**590.8**
294	27895437	1	26,814,456	615.6	616	**6,480**	**640.4**
295	30423762	1	29,159,600	669.4	669	**7,149**	**698.4**
296	32773329	1	31,598,546	725.4	725	**7,875**	**752.4**
297	34867395	1	33,820,362	776.4	776	**8,651**	**800.4**
298	36797796	1	35,832,596	822.6	823	**9,474**	**844.8**
299	38636235	1	37,717,016	865.9	866	**10,340**	**887.0**
300	40714920	1	39,675,578	910.8	911	**11,251**	**934.7**
301	42761268	1	41,738,094	958.2	958	**12,209**	**981.7**
302	44853480	1	43,807,374	1,005.7	1,006	**13,214**	**1,029.7**
303	46907055	1	45,880,268	1,053.3	1,053	**14,268**	**1,076.8**
304	48981690	1	47,944,373	1,100.7	1,101	**15,368**	**1,124.5**
305	51202269	1	50,091,980	1,150.0	1,150	**16,518**	**1,175.4**
306	53461710	1	52,331,990	1,201.4	1,201	**17,720**	**1,227.3**
307	55798839	1	54,630,275	1,254.1	1,254	**18,974**	**1,281.0**
308	58358205	1	57,078,522	1,310.3	1,310	**20,284**	**1,339.7**
309	61018758	1	59,688,482	1,370.3	1,370	**21,654**	**1,400.8**
310	63789255	1	62,404,007	1,432.6	1,433	**23,087**	**1,464.4**
311	66446991	1	65,118,123	1,494.9	1,495	**24,582**	**1,525.4**
312	68998932	1	67,722,962	1,554.7	1,555	**26,137**	**1,584.0**
313	71766207	1	70,382,570	1,615.8	1,616	**27,752**	**1,647.5**
314	74689884	1	73,228,046	1,681.1	1,681	**29,433**	**1,714.6**
315	77920146	1	76,305,015	1,751.7	1,752	**31,185**	**1,788.8**
316	81021429	1	79,470,788	1,824.4	1,824	**33,010**	**1,860.0**
317	84120219	1	82,570,824	1,895.6	1,896	**34,905**	**1,931.1**
318	87559830	1	85,840,025	1,970.6	1,971	**36,876**	**2,010.1**
319	91572723	1	89,566,277	2,056.2	2,056	**38,932**	**2,102.2**
320	95094945	1	93,333,834	2,142.7	2,143	**41,075**	**2,183.1**
321	98274510	1	96,684,728	2,219.6	2,220	**43,294**	**2,256.1**
322	101275632	1	99,775,071	2,290.5	2,291	**45,585**	**2,325.0**
323	104310378	1	102,793,005	2,359.8	2,360	**47,944**	**2,394.6**
324	107279109	1	105,794,744	2,428.7	2,429	**50,373**	**2,462.8**
325	110321127	1	108,800,118	2,497.7	2,498	**52,871**	**2,532.6**
326	113231853	1	111,776,490	2,566.0	2,566	**55,437**	**2,599.4**
327	116138772	1	114,685,313	2,632.8	2,633	**58,070**	**2,666.2**
328	118983474	1	117,561,123	2,698.8	2,699	**60,769**	**2,731.5**

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Elevation Vs. Area and Storage Data
2022 LiDAR Data

10/17/2022

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
329	121924449	1	120,453,962	2,765.2	2,765	**63,534**	**2,799.0**
330	124989156	1	123,456,803	2,834.2	2,834	**66,368**	**2,869.4**
331	128106171	1	126,547,664	2,905.1	2,905	**69,273**	**2,940.9**
332	131213394	1	129,659,783	2,976.6	2,977	**72,250**	**3,012.2**
333	134371404	1	132,792,399	3,048.5	3,048	**75,298**	**3,084.7**
334	137321334	1	135,846,369	3,118.6	3,119	**78,417**	**3,152.5**
335	140276070	1	138,798,702	3,186.4	3,186	**81,603**	**3,220.3**
336	143171712	1	141,723,891	3,253.5	3,254	**84,857**	**3,286.8**
337	146119140	1	144,645,426	3,320.6	3,321	**88,177**	**3,354.4**
338	149087628	1	147,603,384	3,388.5	3,389	**91,566**	**3,422.6**
339	152072244	1	150,579,936	3,456.8	3,457	**95,023**	**3,491.1**
340	155018925	1	153,545,585	3,524.9	3,525	**98,548**	**3,558.7**
341	158037453	1	156,528,189	3,593.4	3,593	**102,141**	**3,628.0**
342	161048466	1	159,542,960	3,662.6	3,663	**105,804**	**3,697.2**
343	163989081	1	162,518,774	3,730.9	3,731	**109,535**	**3,764.7**
344	167018373	1	165,503,727	3,799.4	3,799	**113,334**	**3,834.2**
345	169999641	1	168,509,007	3,868.4	3,868	**117,202**	**3,902.7**
346	172893330	1	171,446,486	3,935.9	3,936	**121,138**	**3,969.1**
347	175783374	1	174,338,352	4,002.3	4,002	**125,141**	**4,035.4**
348	178661871	1	177,222,623	4,068.5	4,068	**129,209**	**4,101.5**
349	181534401	1	180,098,136	4,134.5	4,134	**133,343**	**4,167.5**
350	184442103	1	182,988,252	4,200.8	4,201	**137,544**	**4,234.2**
351	187313454	1	185,877,779	4,267.2	4,267	**141,811**	**4,300.1**
352	190170963	1	188,742,209	4,332.9	4,333	**146,144**	**4,365.7**
353	193036050	1	191,603,507	4,398.6	4,399	**150,543**	**4,431.5**
354	195940602	1	194,488,326	4,464.8	4,465	**155,008**	**4,498.2**
355	198923715	1	197,432,159	4,532.4	4,532	**159,540**	**4,566.7**
356	202031415	1	200,477,565	4,602.3	4,602	**164,143**	**4,638.0**
357	205187490	1	203,609,453	4,674.2	4,674	**168,817**	**4,710.5**
358	208448352	1	206,817,921	4,747.9	4,748	**173,565**	**4,785.3**
359	211795569	1	210,121,961	4,823.7	4,824	**178,388**	**4,862.2**
360	215000190	1	213,397,880	4,898.9	4,899	**183,287**	**4,935.7**
361	218227635	1	216,613,913	4,972.8	4,973	**188,260**	**5,009.8**
362	221567130	1	219,897,383	5,048.1	5,048	**193,308**	**5,086.5**
363	224761473	1	223,164,302	5,123.1	5,123	**198,431**	**5,159.8**
364	227826693	1	226,294,083	5,195.0	5,195	**203,626**	**5,230.2**
365	230863374	1	229,345,034	5,265.0	5,265	**208,891**	**5,299.9**
366	233929971	1	232,396,673	5,335.1	5,335	**214,227**	**5,370.3**
367	236982924	1	235,456,448	5,405.3	5,405	**219,632**	**5,440.4**
368	240004584	1	238,493,754	5,475.1	5,475	**225,107**	**5,509.7**
369	243027513	1	241,516,049	5,544.4	5,544	**230,651**	**5,579.1**
370	246005082	1	244,516,298	5,613.3	5,613	**236,265**	**5,647.5**
371	248871483	1	247,438,283	5,680.4	5,680	**241,945**	**5,713.3**
372	251735022	1	250,303,253	5,746.2	5,746	**247,691**	**5,779.0**

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Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
373	254572875	1	253,153,949	5,811.6	5,812	**253,503**	**5,844.2**
374	257428782	1	256,000,829	5,877.0	5,877	**259,380**	**5,909.8**
375	260364519	1	258,896,651	5,943.4	5,943	**265,323**	**5,977.1**
376	263230956	1	261,797,738	6,010.0	6,010	**271,333**	**6,043.0**
377	266131026	1	264,680,991	6,076.2	6,076	**277,410**	**6,109.5**
378	269021772	1	267,576,399	6,142.7	6,143	**283,552**	**6,175.9**
379	271912284	1	270,467,028	6,209.1	6,209	**289,761**	**6,242.2**
380	274849722	1	273,381,003	6,276.0	6,276	**296,037**	**6,309.7**
381	277824690	1	276,337,206	6,343.8	6,344	**302,381**	**6,378.0**
382	280932390	1	279,378,540	6,413.6	6,414	**308,795**	**6,449.3**
383	284096691	1	282,514,541	6,485.6	6,486	**315,281**	**6,522.0**
384	287195319	1	285,646,005	6,557.5	6,558	**321,838**	**6,593.1**
385	290421675	1	288,808,497	6,630.1	6,630	**328,468**	**6,667.2**
386	293630823	1	292,026,249	6,704.0	6,704	**335,172**	**6,740.8**
387	296823105	1	295,226,964	6,777.5	6,777	**341,950**	**6,814.1**
388	299891781	1	298,357,443	6,849.3	6,849	**348,799**	**6,884.6**
389	302926104	1	301,408,943	6,919.4	6,919	**355,718**	**6,954.2**
390	306066402	1	304,496,253	6,990.3	6,990	**362,709**	**7,026.3**
391	309174309	1	307,620,356	7,062.0	7,062	**369,771**	**7,097.7**
392	312223680	1	310,698,995	7,132.7	7,133	**376,903**	**7,167.7**
393	315220653	1	313,722,167	7,202.1	7,202	**384,105**	**7,236.5**
394	318112974	1	316,666,814	7,269.7	7,270	**391,375**	**7,302.9**
395	321136641	1	319,624,808	7,337.6	7,338	**398,713**	**7,372.3**
396	324112275	1	322,624,458	7,406.4	7,406	**406,119**	**7,440.6**
397	327034746	1	325,573,511	7,474.1	7,474	**413,593**	**7,507.7**
398	329914575	1	328,474,661	7,540.7	7,541	**421,134**	**7,573.8**
399	332815491	1	331,365,033	7,607.1	7,607	**428,741**	**7,640.4**
400	335679219	1	334,247,355	7,673.3	7,673	**436,414**	**7,706.1**
401	338479785	1	337,079,502	7,738.3	7,738	**444,153**	**7,770.4**
402	341179587	1	339,829,686	7,801.4	7,801	**451,954**	**7,832.4**
403	343888191	1	342,533,889	7,863.5	7,863	**459,818**	**7,894.6**
404	346621257	1	345,254,724	7,926.0	7,926	**467,743**	**7,957.3**
405	349365555	1	347,993,406	7,988.8	7,989	**475,732**	**8,020.3**
406	352072269	1	350,718,912	8,051.4	8,051	**483,784**	**8,082.5**
407	354749985	1	353,411,127	8,113.2	8,113	**491,897**	**8,143.9**
408	357340149	1	356,045,067	8,173.7	8,174	**500,071**	**8,203.4**
409	359906166	1	358,623,158	8,232.9	8,233	**508,303**	**8,262.3**
410	362485116	1	361,195,641	8,291.9	8,292	**516,595**	**8,321.5**
411	365108067	1	363,796,592	8,351.6	8,352	**524,947**	**8,381.7**
412	367748064	1	366,428,066	8,412.0	8,412	**533,359**	**8,442.3**
413	370327383	1	369,037,724	8,471.9	8,472	**541,831**	**8,501.5**
414	372994497	1	371,660,940	8,532.2	8,532	**550,363**	**8,562.8**
415	375647580	1	374,321,039	8,593.2	8,593	**558,956**	**8,623.7**
416	378255789	1	376,951,685	8,653.6	8,654	**567,610**	**8,683.6**

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Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
417	380883249	1	379,569,519	8,713.7	8,714	**576,324**	**8,743.9**
418	383551452	1	382,217,351	8,774.5	8,775	**585,098**	**8,805.1**
419	386220330	1	384,885,891	8,835.8	8,836	**593,934**	**8,866.4**
420	388853712	1	387,537,021	8,896.6	8,897	**602,831**	**8,926.9**
421	391516389	1	390,185,051	8,957.4	8,957	**611,788**	**8,988.0**
422	394209693	1	392,863,041	9,018.9	9,019	**620,807**	**9,049.8**
423	396848070	1	395,528,882	9,080.1	9,080	**629,887**	**9,110.4**
424	399468069	1	398,158,070	9,140.5	9,140	**639,027**	**9,170.5**
425	402112116	1	400,790,093	9,200.9	9,201	**648,228**	**9,231.2**
426	404751528	1	403,431,822	9,261.5	9,262	**657,490**	**9,291.8**
427	407386521	1	406,069,025	9,322.1	9,322	**666,812**	**9,352.3**
428	410001183	1	408,693,852	9,382.3	9,382	**676,194**	**9,412.3**
429	412596459	1	411,298,821	9,442.1	9,442	**685,636**	**9,471.9**
430	415133415	1	413,864,937	9,501.0	9,501	**695,137**	**9,530.2**
431	417646944	1	416,390,180	9,559.0	9,559	**704,696**	**9,587.9**
432	420130440	1	418,888,692	9,616.4	9,616	**714,313**	**9,644.9**
433	422608752	1	421,369,596	9,673.3	9,673	**723,986**	**9,701.8**
434	425044305	1	423,826,529	9,729.7	9,730	**733,716**	**9,757.7**
435	427480434	1	426,262,370	9,785.6	9,786	**743,501**	**9,813.6**
436	429918912	1	428,699,673	9,841.6	9,842	**753,343**	**9,869.6**
437	432376173	1	431,147,543	9,897.8	9,898	**763,241**	**9,926.0**
438	434914299	1	433,645,236	9,955.1	9,955	**773,196**	**9,984.3**
439	437436171	1	436,175,235	10,013.2	10,013	**783,209**	**10,042.2**
440	439917516	1	438,676,844	10,070.6	10,071	**793,280**	**10,099.1**
441	442382211	1	441,149,864	10,127.4	10,127	**803,407**	**10,155.7**
442	444827673	1	443,604,942	10,183.8	10,184	**813,591**	**10,211.8**
443	447244218	1	446,035,946	10,239.6	10,240	**823,830**	**10,267.3**
444	449655975	1	448,450,097	10,295.0	10,295	**834,125**	**10,322.7**
445	452068803	1	450,862,389	10,350.4	10,350	**844,476**	**10,378.1**
446	454495842	1	453,282,323	10,405.9	10,406	**854,882**	**10,433.8**
447	456957288	1	455,726,565	10,462.0	10,462	**865,344**	**10,490.3**
448	459493767	1	458,225,528	10,519.4	10,519	**875,863**	**10,548.5**
449	462103560	1	460,798,664	10,578.5	10,578	**886,442**	**10,608.4**
450	464695920	1	463,399,740	10,638.2	10,638	**897,080**	**10,668.0**
451	467244090	1	465,970,005	10,697.2	10,697	**907,777**	**10,726.4**
452	469754235	1	468,499,163	10,755.3	10,755	**918,532**	**10,784.1**
453	472256046	1	471,005,141	10,812.8	10,813	**929,345**	**10,841.5**
454	474714819	1	473,485,433	10,869.7	10,870	**940,215**	**10,898.0**
455	477139077	1	475,926,948	10,925.8	10,926	**951,141**	**10,953.6**
456	479584413	1	478,361,745	10,981.7	10,982	**962,122**	**11,009.7**
457	482129388	1	480,856,901	11,039.0	11,039	**973,161**	**11,068.2**
458	484638579	1	483,383,984	11,097.0	11,097	**984,258**	**11,125.8**
459	487119681	1	485,879,130	11,154.3	11,154	**995,412**	**11,182.7**
460	489585717	1	488,352,699	11,211.0	11,211	**1,006,624**	**11,239.3**

https://aecom.sharepoint.com/sites/SitesTO03/Shared Documents/General/400_Technical/430_Technical_Working_Documents/HR34.06 Hydraulics Outlet Works/Storage Elevation Curve/Storage Elevation Curve.xlsx

Elevation Vs. Area and Storage Data 10/17/2022

2022 LiDAR Data

Elev (ft)	Area (ft2)	Delta Elev (ft)	Mean Area (ft2)	Mean Area (acres)	Vol by Area (AF) (incremental)	Volume (AF) (cumulative)	Area (acres)
461	492151104	1	490,868,411	11,268.8	11,269	**1,017,892**	**11,298.2**
462	494661996	1	493,406,550	11,327.1	11,327	**1,029,219**	**11,355.9**
463	497150028	1	495,906,012	11,384.4	11,384	**1,040,604**	**11,413.0**
464	499592466	1	498,371,247	11,441.0	11,441	**1,052,045**	**11,469.1**
465	501974289	1	500,783,378	11,496.4	11,496	**1,063,541**	**11,523.7**
466	504331812	1	503,153,051	11,550.8	11,551	**1,075,092**	**11,577.9**
467	506676330	1	505,504,071	11,604.8	11,605	**1,086,697**	**11,631.7**
468	509000202	1	507,838,266	11,658.4	11,658	**1,098,355**	**11,685.0**
469	511345521	1	510,172,862	11,712.0	11,712	**1,110,067**	**11,738.9**
470	513669222	1	512,507,372	11,765.6	11,766	**1,121,833**	**11,792.2**
471	515969856	1	514,819,539	11,818.6	11,819	**1,133,651**	**11,845.0**
472	518257557	1	517,113,707	11,871.3	11,871	**1,145,523**	**11,897.6**
473	520534404	1	519,395,981	11,923.7	11,924	**1,157,446**	**11,949.8**
474	522818721	1	521,676,563	11,976.0	11,976	**1,169,422**	**12,002.3**
475	525099600	1	523,959,161	12,028.4	12,028	**1,181,451**	**12,054.6**
476	527351679	1	526,225,640	12,080.5	12,080	**1,193,531**	**12,106.3**
477	529597161	1	528,474,420	12,132.1	12,132	**1,205,663**	**12,157.9**
478	531822951	1	530,710,056	12,183.4	12,183	**1,217,847**	**12,209.0**
479	534024729	1	532,923,840	12,234.2	12,234	**1,230,081**	**12,259.5**
480	536240853	1	535,132,791	12,285.0	12,285	**1,242,366**	**12,310.4**
481	538458003	1	537,349,428	12,335.8	12,336	**1,254,702**	**12,361.3**
482	540647802	1	539,552,903	12,386.4	12,386	**1,267,088**	**12,411.6**
483	542827557	1	541,737,680	12,436.6	12,437	**1,279,525**	**12,461.6**
484	545027256	1	543,927,407	12,486.9	12,487	**1,292,012**	**12,512.1**
485	547232742	1	546,129,999	12,537.4	12,537	**1,304,549**	**12,562.7**
486	549419760	1	548,326,251	12,587.8	12,588	**1,317,137**	**12,612.9**
487	551599416	1	550,509,588	12,638.0	12,638	**1,329,775**	**12,663.0**
488	553776372	1	552,687,894	12,688.0	12,688	**1,342,463**	**12,713.0**
489	555939018	1	554,857,695	12,737.8	12,738	**1,355,201**	**12,762.6**
490	558073224	1	557,006,121	12,787.1	12,787	**1,367,988**	**12,811.6**
491	560198070	1	559,135,647	12,836.0	12,836	**1,380,824**	**12,860.4**
492	562295700	1	561,246,885	12,884.5	12,884	**1,393,708**	**12,908.5**
493	564394104	1	563,344,902	12,932.6	12,933	**1,406,641**	**12,956.7**
494	566502930	1	565,448,517	12,980.9	12,981	**1,419,622**	**13,005.1**
495	568624401	1	567,563,666	13,029.5	13,029	**1,432,651**	**13,053.8**
496	570734253	1	569,679,327	13,078.0	13,078	**1,445,729**	**13,102.3**
497	572832945	1	571,783,599	13,126.3	13,126	**1,458,856**	**13,150.4**
498	**574910604**	**1**	**573,871,775**	**13,174.3**	**13,174**	**1,472,030**	**13,198.1**
499	576989775	1	575,950,190	13,222.0	13,222	**1,485,252**	**13,245.9**
500	579047535	1	578,018,655	13,269.5	13,269	**1,498,521**	**13,293.1**
501	581098941	1	580,073,238	13,316.6	13,317	**1,511,838**	**13,340.2**
502	583161444	1	582,130,193	13,363.9	13,364	**1,525,202**	**13,387.5**
503	585239814	1	584,200,629	13,411.4	13,411	**1,538,613**	**13,435.3**
504	587336175	1	586,287,995	13,459.3	13,459	**1,552,073**	**13,483.4**

https://aecom.sharepoint.com/sites/SitesTO03/Shared Documents/General/400_Technical/430_Technical_Working_Documents/HR34.06 Hydraulics Outlet Works/Storage Elevation Curve/Storage Elevation Curve.xlsx

Appendix C
Locations with Missing LiDAR

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2022 LiDAR Survey – Areas not surveyed

In 2022 R.E.Y. Engineers, Inc. conducted a Light Detection and Ranging (LiDAR) survey for the Sites Reservoir project area. The figures in this appendix highlight a few small areas along the western side of the reservoir that were cut off in the survey. These areas would be dry during typical operations but could be inundated during a storm or over-pumping event.

In the images below the darker colors outside the 2020 LiDAR survey signify the location of the 2018 USGS Wildfire Survey LiDAR. Blue areas are at El. 498 and lower.

The 2018 LiDAR data appears to be of good quality, especially at the interfaces highlighted below. It is recommended that the 2018 and 2022 LiDAR data be stitched together to provide a complete surface.

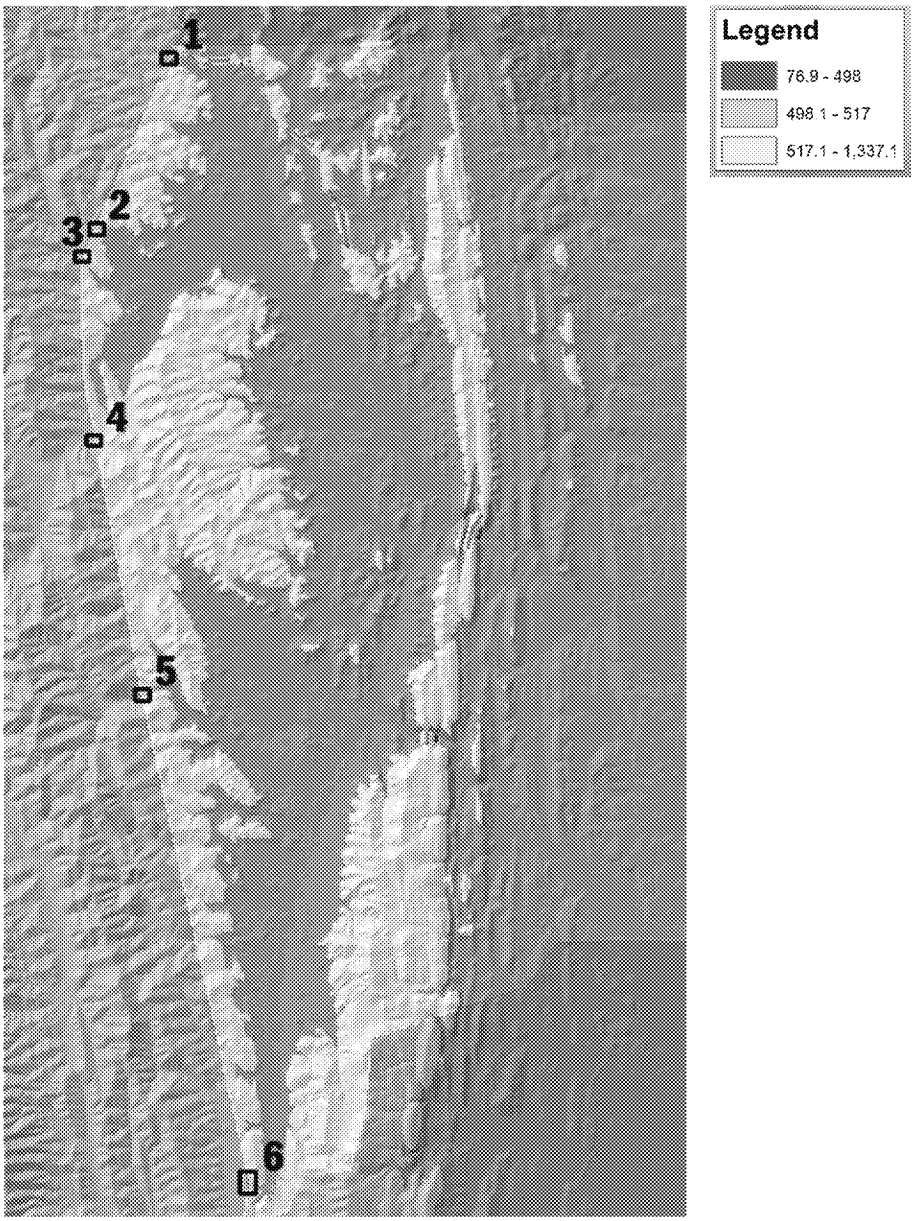
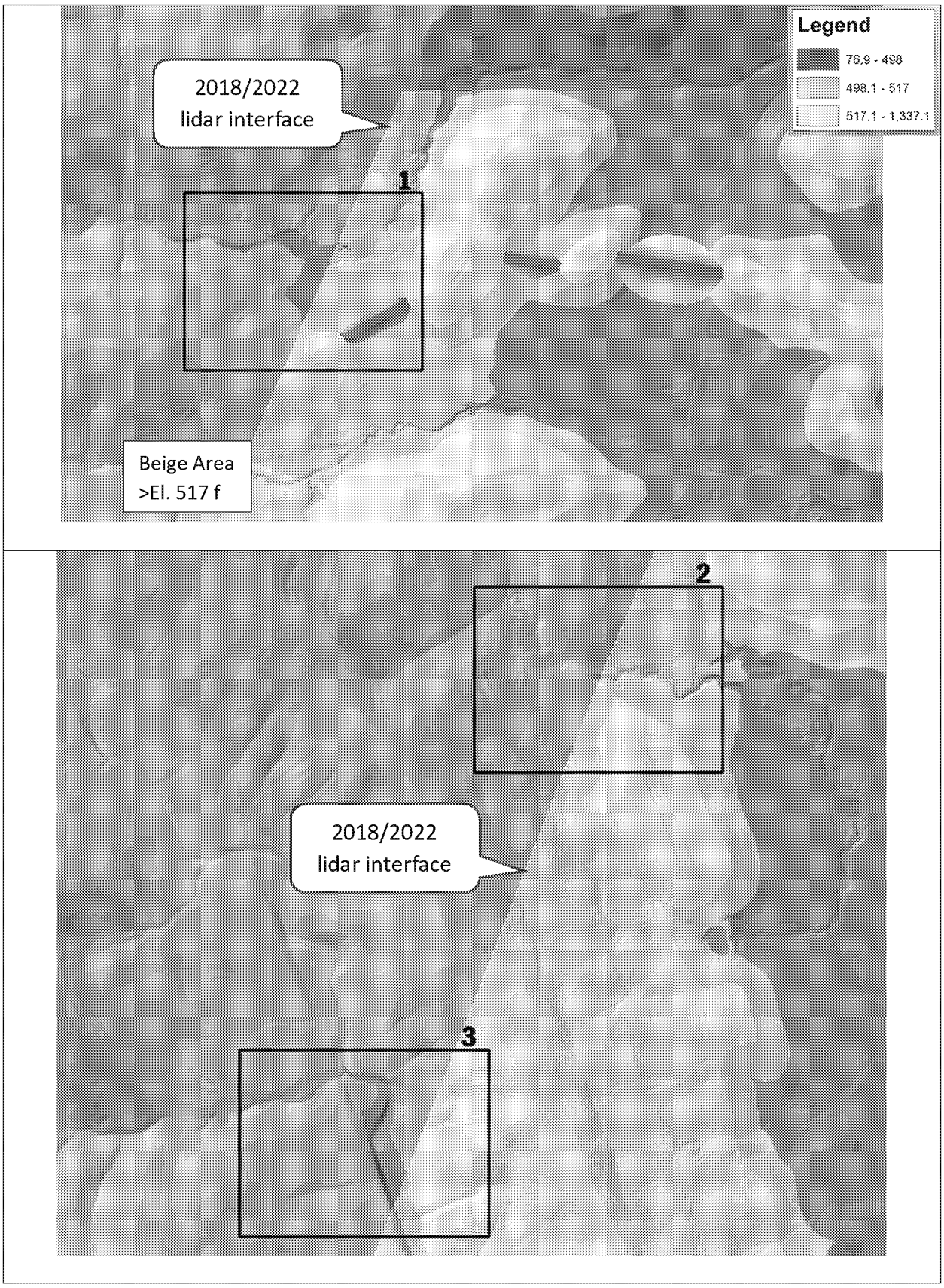
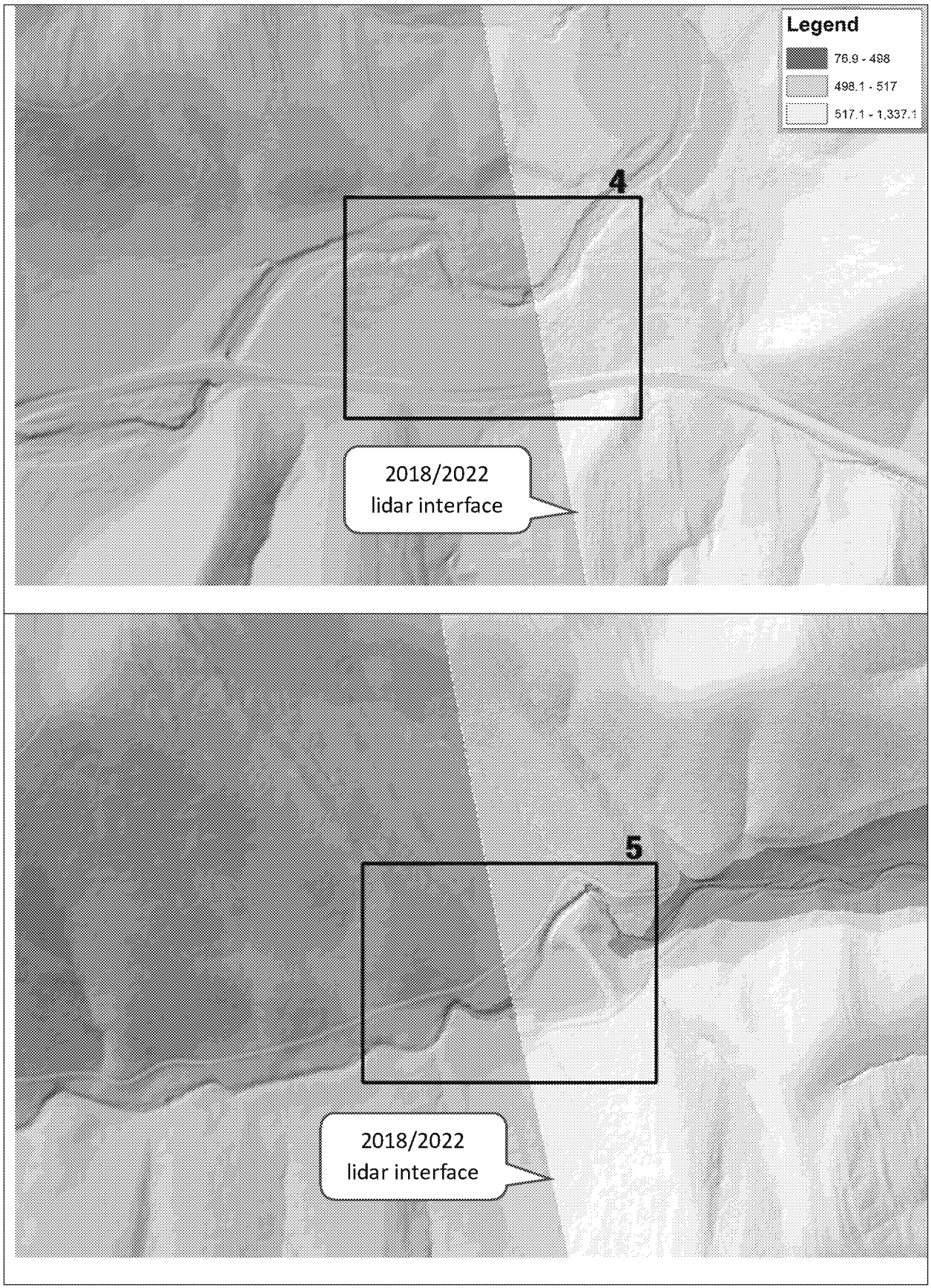


Figure 1: Plan of Sites Reservoir. Areas not covered by the 2022 LiDAR survey are called out with black boxes.

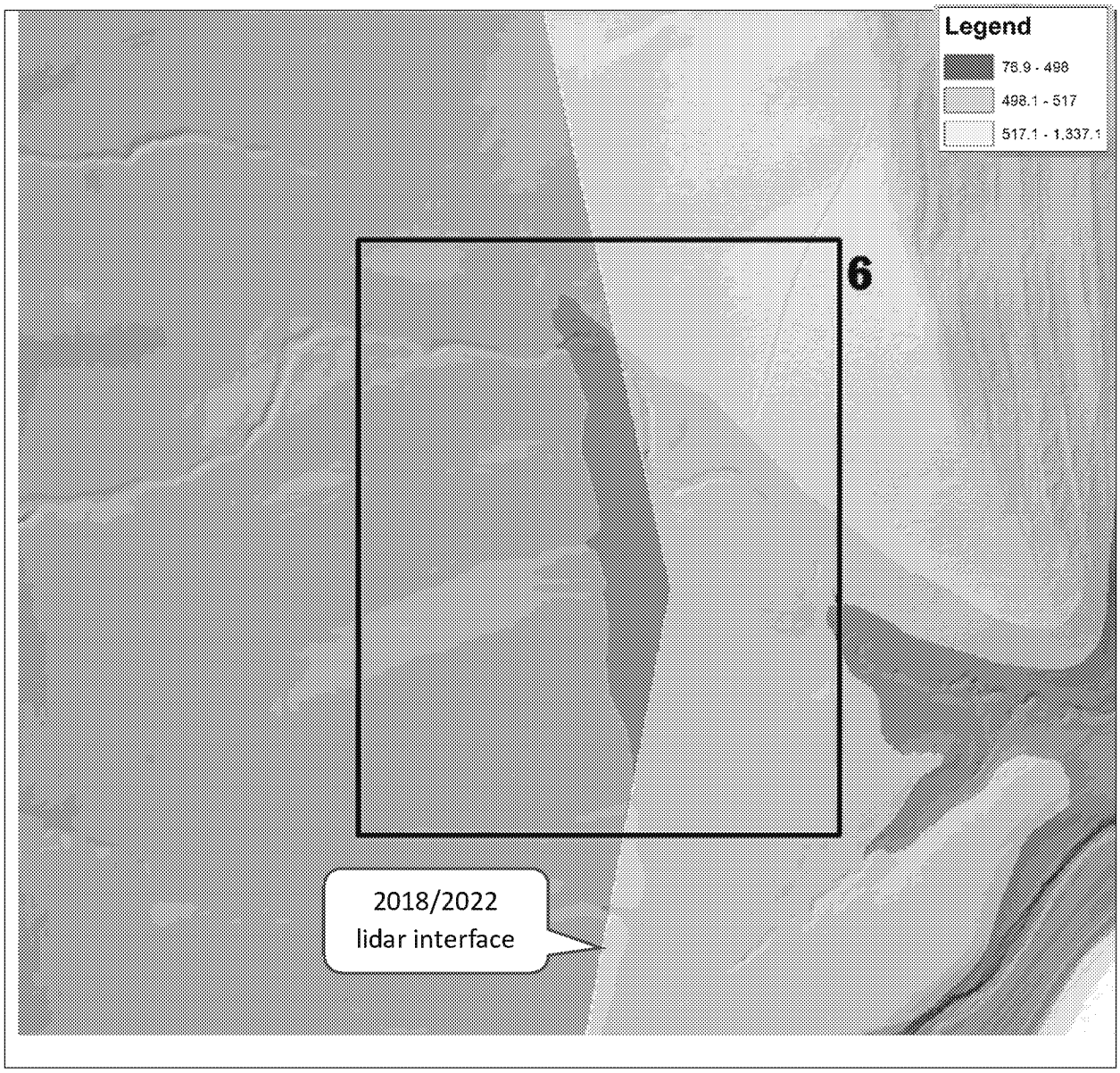
2022 LiDAR Survey – Areas not surveyed



2022 LiDAR Survey – Areas not surveyed



2022 LiDAR Survey – Areas not surveyed



Sites DSOD Briefing

April 6, 2023

Sites

Agenda

- Seismic Source Model Characterization
- PMF Study and Spillway
- Emergency Drawdown

Sites

Seismic Source Model Characterization

Jeffrey R. Unruh, Ph.D. CEG PG

Lettis Consultants International Inc.

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Seismic Hazard Analysis, Sites Complex

- Perform deterministic seismic hazard analysis (DSHA) for design of Sites dam and key appurtenant structures
  - Evaluate proximal earthquake sources
  - Select scenario earthquakes with magnitudes and site-source distances
  - Evaluate slip rates of scenario EQs to determine appropriate level of conservatism for ground motion evaluation
- Perform probabilistic seismic hazard analysis (PSHA) to compare Uniform Hazard Spectra for selected return periods with deterministic spectra

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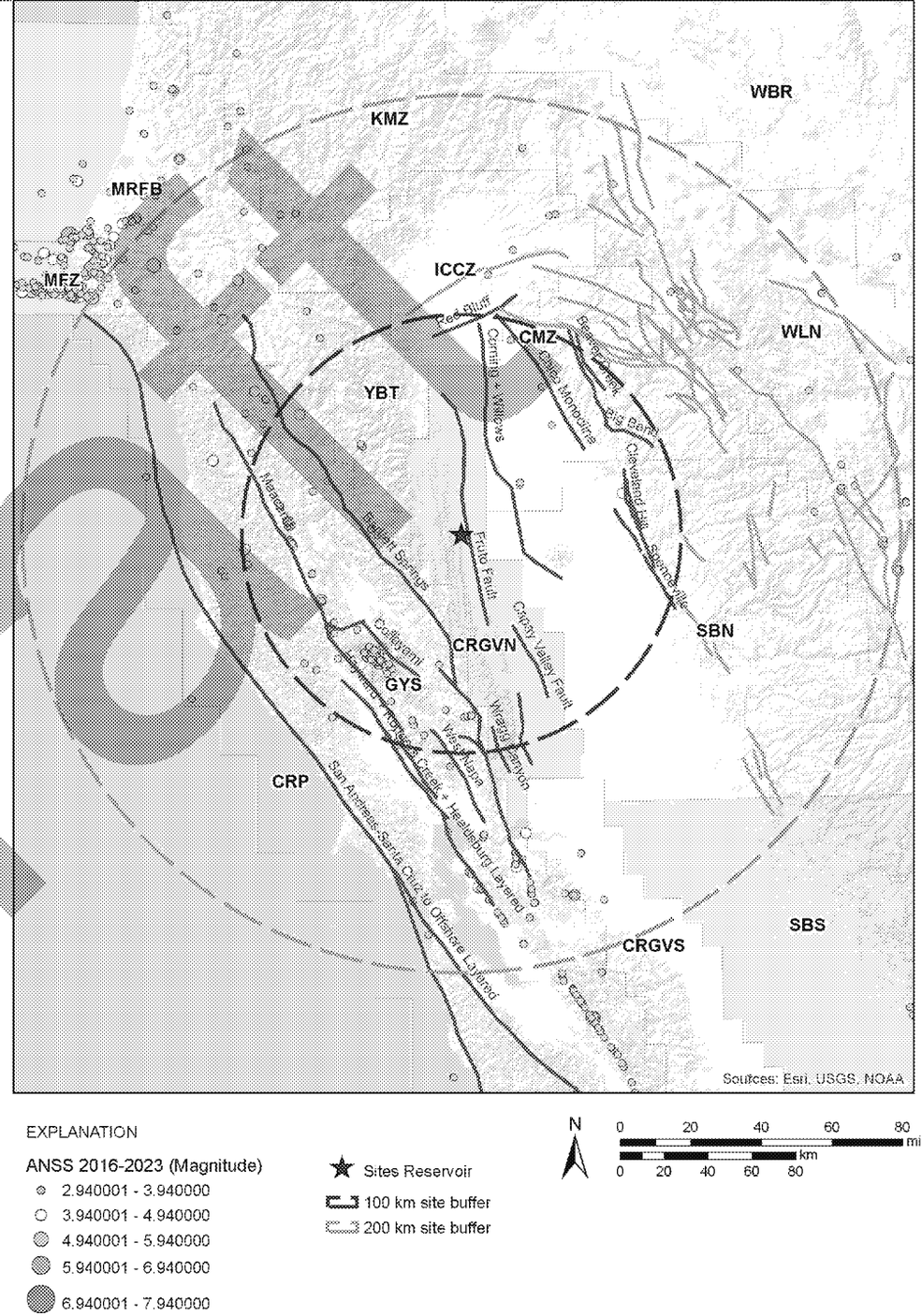
Fault sources (blue lines) and areal/background sources in the Sites Complex seismic source model

→ Sites Complex is located along the physiographic boundary between the northern Coast Ranges and the Sacramento Valley

→ Oblique convergence ("transpression") across the western CA plate boundary is accommodated by strike-slip faults of the San Andreas system in the Coast Ranges, and the Great Valley fault zone of blind thrust faults beneath the western Sacramento Valley

→ Cascadia subduction zone north of the Mendocino fracture zone (MFZ) is a potential source of great (**M**9) earthquakes



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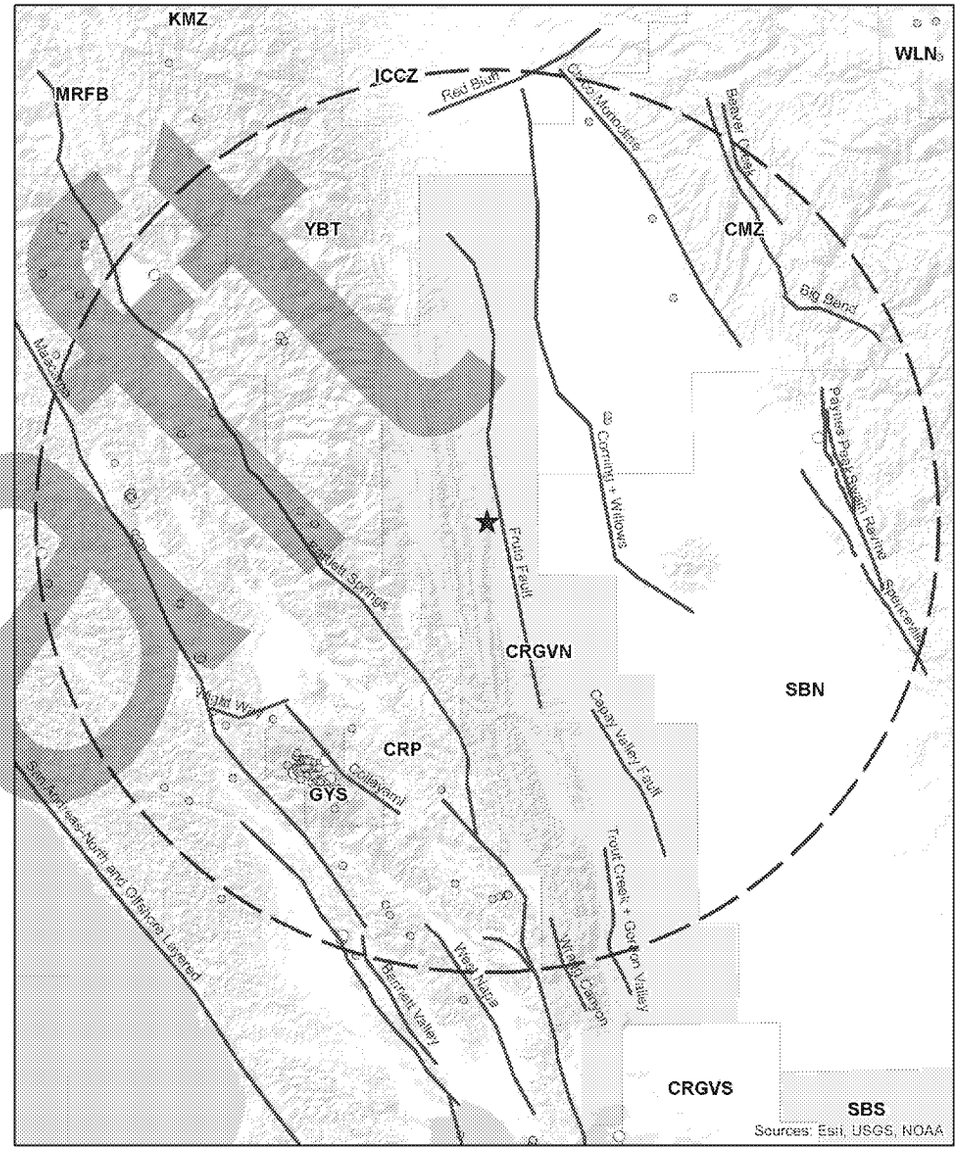
Major Fault Sources and Background Source Zones Within the 100 km Study Radius

→ Great Valley thrust fault zone directly underlies the Sites Complex; likely candidate for DSHA scenario EQ

→ Other proximal sources include the Bartlett Springs fault (to west) and Corning-Willows fault (to east)

→ San Andreas fault (source of frequent **M**8 earthquakes) lies just outside the 100 km radius; will be considered in the DSHA



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Great Valley Fault Zone: Candidate Source for DSHA Scenario EQ

- GVFZ = tectonically active blind thrust faults responsible for Quaternary uplift, tilting and folding along the eastern Coast Ranges piedmont
  - Likely source of the ~M6.5 1892 Winters-Vacaville EQ, approximately 100 km south of the Sites Complex
- "Fruto fault" = Local reach of the GVFZ beneath the Sites Complex
  - Investigated by WLA (2002): positive evidence for late (?) Quaternary activity
- Model Fruto fault source is a 30° west-dipping thrust fault; top is at a depth of ~6 km beneath the Sites Complex
  - Sites Complex is in the hanging wall
- Secondary deformation in the hanging wall above the Fruto fault source includes folding of the Sites anticline, reverse slip on east-dipping, bedding-parallel faults (i.e., Salt Lake fault, S-3), and possible right-lateral slip on NE-striking faults at the southern termination of Sites anticline

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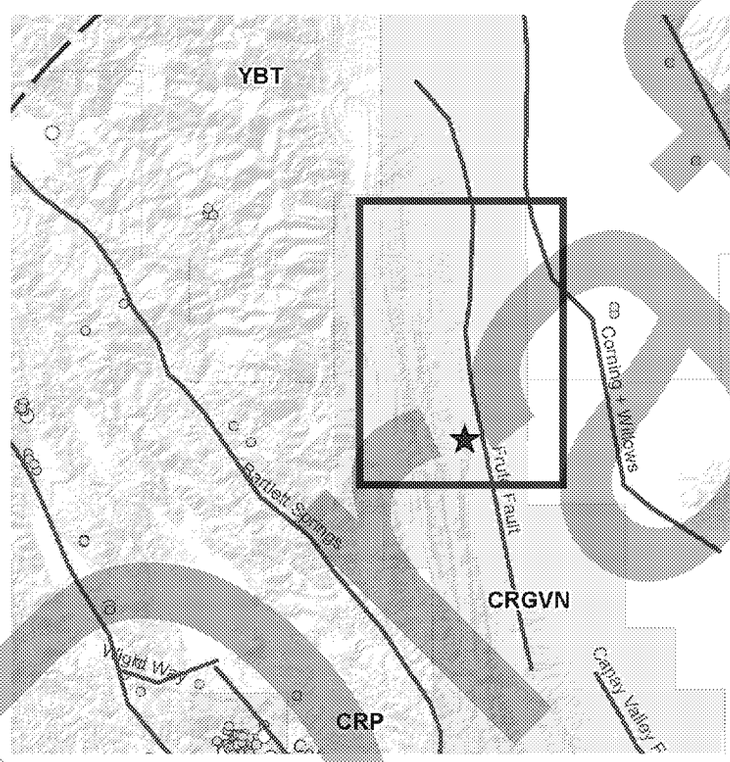
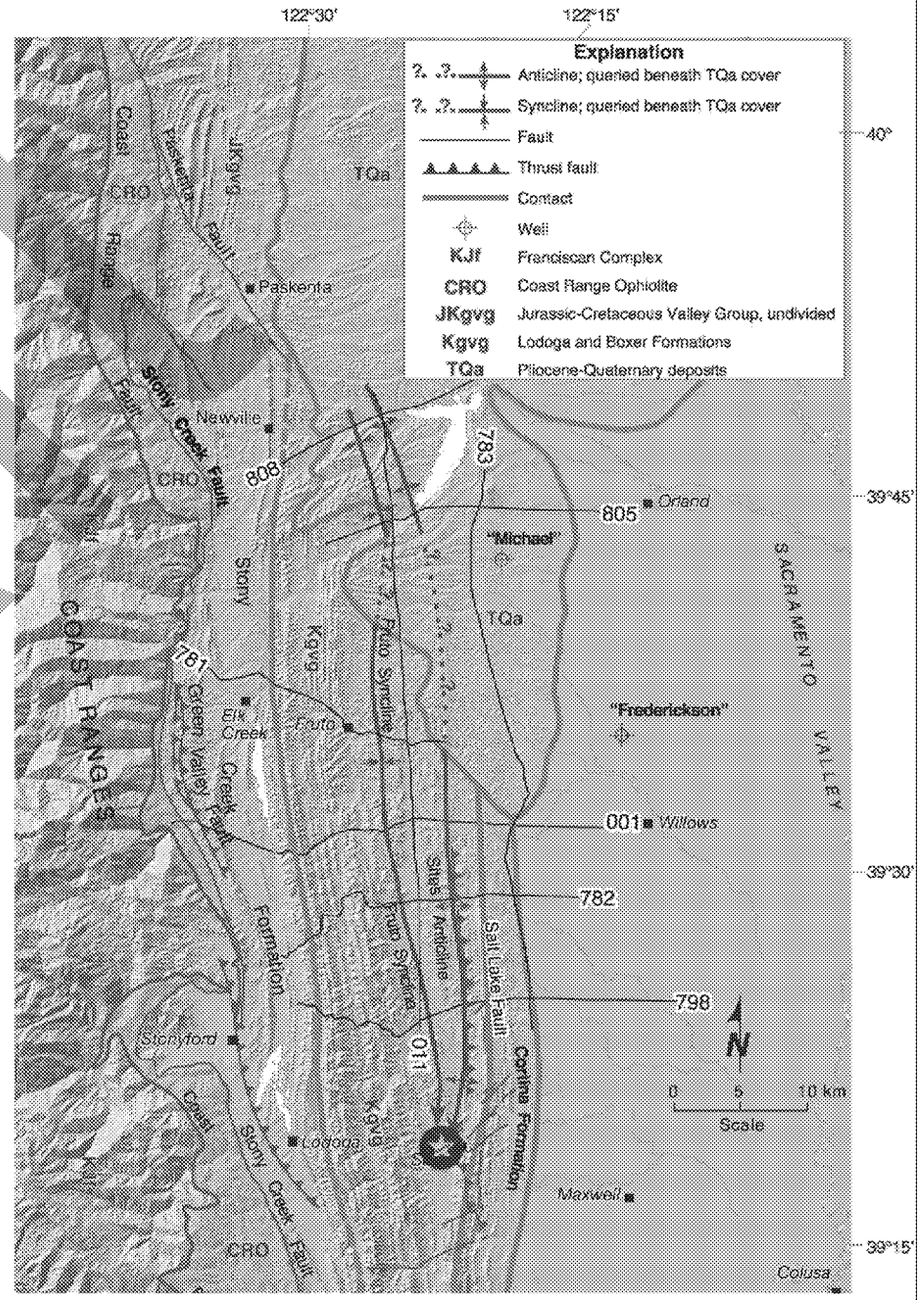
Fruto Fault Source

→ West-dipping thrust fault that underlies the Fruto syncline and Sites anticline, and extends south approximately to latitude of Cache Creek (total length ~109 km)

→ Top of modeled fault rupture plane is about 6 km below Sites Complex



Box shows approximate location of map to right



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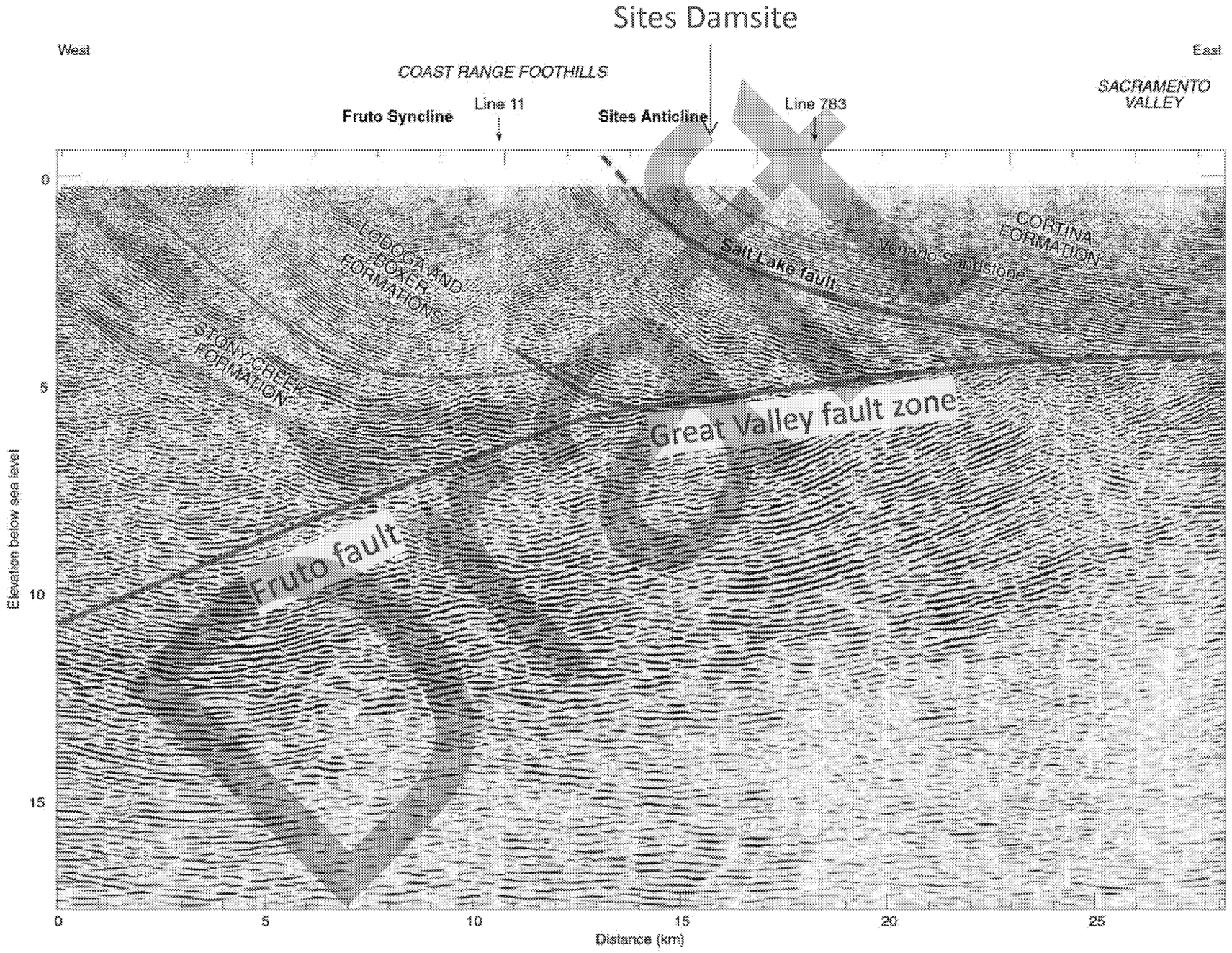

Seismic Line 798
(WLA, 2002)

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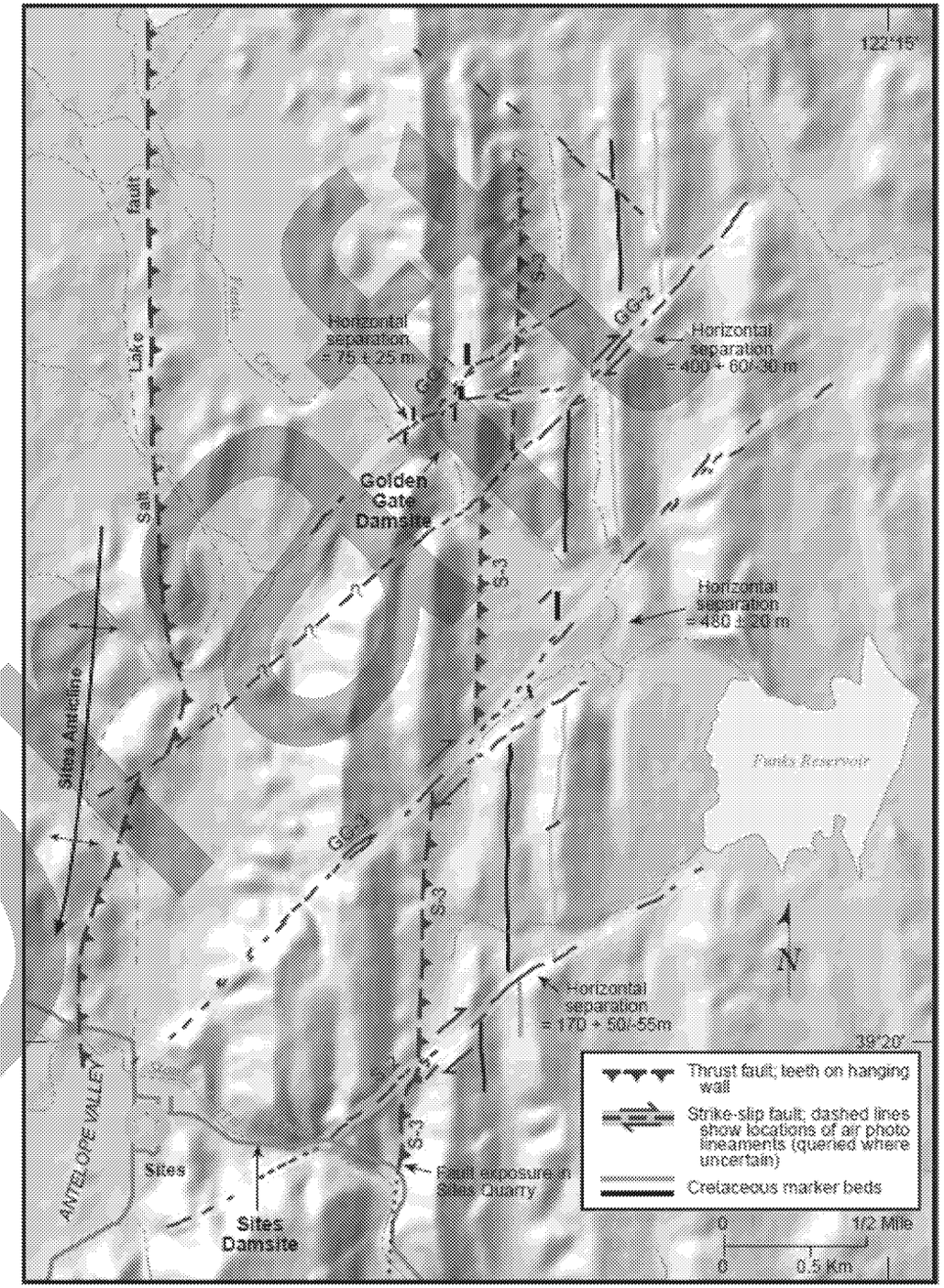
Northeast-striking transverse faults at the southern end of the Sites anticline and Fruto syncline

→ Consistent right-lateral displacement of bedding related to growth of Sites anticline
→ Subsidiary structures with small offset
→ Interpreted to be confined to the hanging wall of the Fruto fault (i.e., upper 5-6 km)
→ Not independent sources of moderate magnitude earthquakes



WLA (2002)

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Evaluating EQ Rupture Dimensions, Fruto Fault

- WLA (2002) interpreted that the GVFZ at the latitude of Sites Complex is subdivided into numerous, relatively short (15 km - 25 km) blind thrust fault segments that rupture independently in moderate-magnitude earthquakes

- UCERF3 (Field et al., 2013) source model for GVFZ relaxed segmentation boundaries, allowing for longer ruptures and larger earthquake magnitudes

- Based on review of available data for Sites Complex, we conclude that the UCERF3 modeling approach is more appropriate for evaluating potential rupture dimensions than the complex segmentation model in WLA (2002)
  - Implies potentially larger, "floating" earthquakes than interpreted by WLA (2002)

- Use empirical scaling relations to derive rupture lengths and rupture areas associated with interpreted downdip rupture width of the Fruto fault

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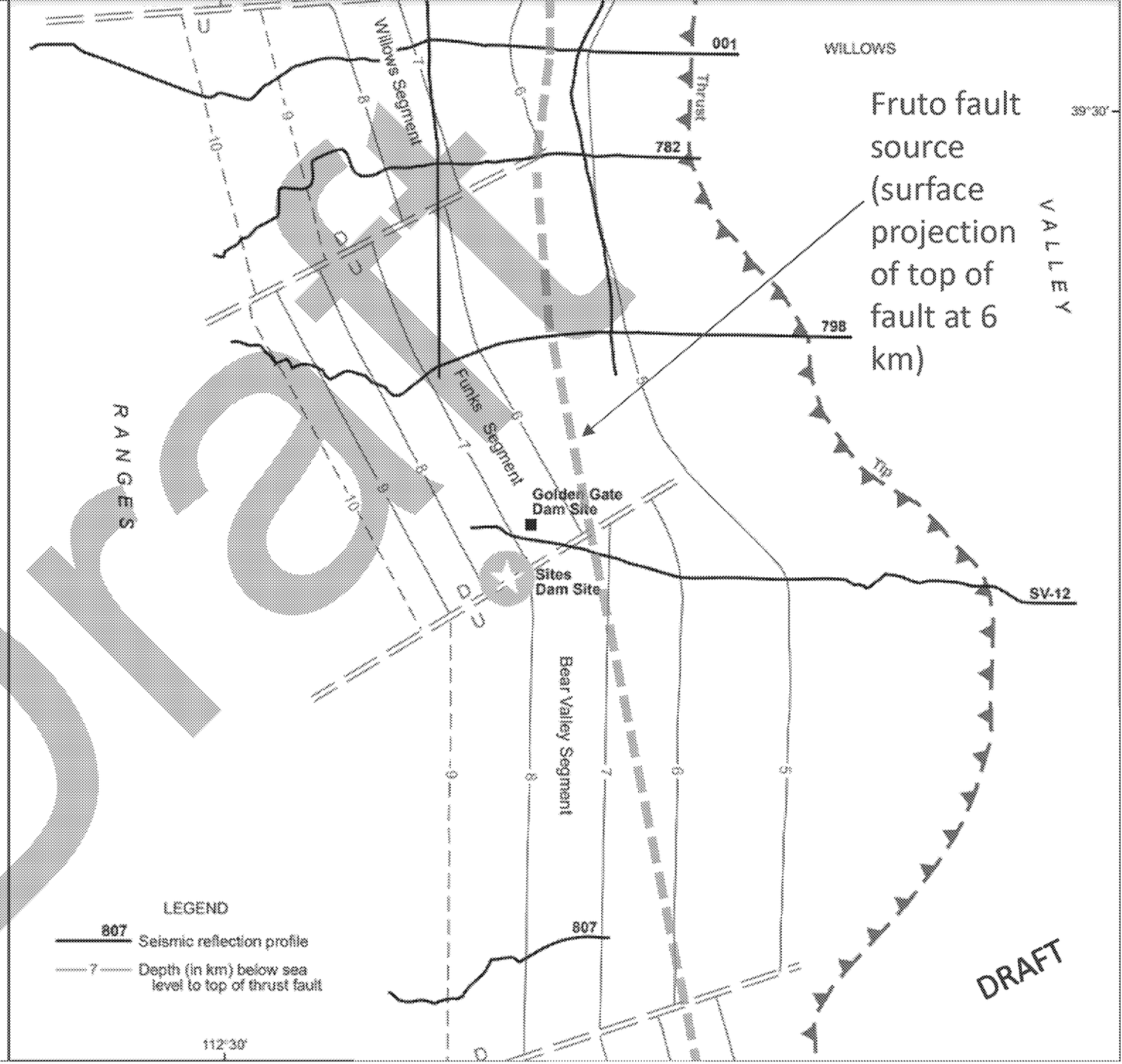
Fruto fault source for Sites Complex DSHA (dashed blue line) combines multiple fault segments in WLA (2002) source model (green lines)

→ Consistent with lateral continuity of Sites anticline and Fruto syncline fold axes for ~60 km



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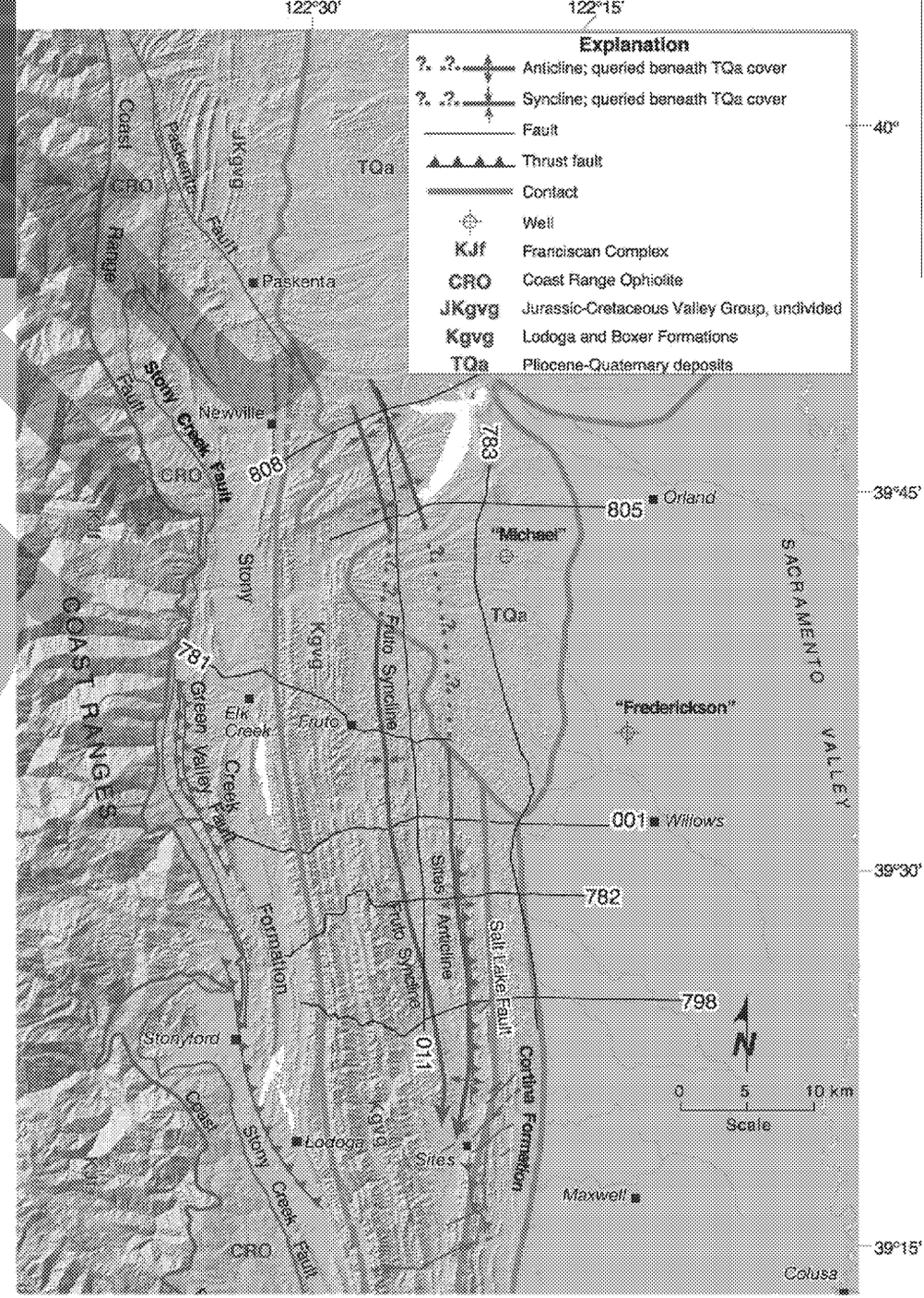
Fruto Fault Source Geometry

- *Total fault length*: **109 km**
- *Fault dip*: **30° west** preferred (range 20° - 40°)
- *Top of fault/top of rupture*: **6 km**
- *Thickness of seismogenic crust*: **17 km** preferred (range 14 km – 20 km)
- *Rupture thickness (RT):* **11 km** preferred (range 8 km – 14 km)
- *Rupture width (RW):* **22 km** preferred (range 12.5 km – 41 km)

- From scaling relations in Leonard (2010), maximum rupture length associated with preferred 22 km rupture width is **45 km**
  - Approximately equivalent to distance between Maxwell and Orland

- *Preferred rupture area* is **22 km** RW x **45 km** RL = **990 km²**



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Scenario DSHA Magnitude for Fruto Fault

- Preferred scaling relations for deriving DSHA scenario magnitude are magnitude vs. rupture area

- For 990 km^2 scenario rupture area, various scaling relations give:
  - **M**7, Wells and Coppersmith (1994)
  - **M**7, Leonard (2010)
  - **M**6.9, Thingbaijam et al. (2017)
  - **M**7.1, weighted sum of magnitudes from three recommended relations in Shaw (2023)

- Preferred rupture dimensions for the Fruto fault scenario event have rupture-aspect ratio of ~2; consistent with data plotted in WLA (2002) on rupture-aspect ratios for ~**M**7 earthquakes

- For comparison, scenario DSHA for Sites dam in WLA (2002) was **M**6.8 event

Draft

Other Potential DSHA Scenario Events

- Proximity of scenario ~M7 EQ at 6 km on the Fruto fault likely to dominate deterministic hazard relative to other closest sources:
  - Bartlett Springs fault: M7.4 at 32 km to west
  - Corning-Willows fault: M6.8 at 32 km to east
  - San Andreas fault: M8 at ~115 km to west

- WLA (2002) compared deterministic response spectra for M6.8 on GVFZ (Fruto fault) and M9 on Cascadia subduction zone (160 km site-source distance). Found that GVFZ EQ motions exceed Cascadia event at all frequencies (without considering duration).

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Fruto Fault Slip Rate

- Fruto blind thrust fault not exposed; slip rate estimated indirectly from uplift rate of the hanging wall block
- Uplift rates estimated from incision rates of Hunters Creek and North Stony Creek (WLA, 1997; 2002) imply fault slip rate between **0.1-0.4 mm/yr**
  - Caveat: age constraints are poor
- Four new geodetic deformation models for 2023 NSHM update give slip rates for GVFZ at latitude of Sites Complex ranging 0-1.4 mm/yr (extreme range)
  - Average of four mean values is **0.25 mm/yr**
- Given range of estimates and their uncertainty, Fruto fault probably falls in "Moderate Slip Rate" category in the DSOD Consequence-Hazard matrix

Draft

Summary

- Preliminary scenario earthquake for DSHA at Sites Complex is ~M7 event on the "Fruto fault" reach of Great Valley fault zone, with a site-source distance of ~6 km
  - Sites Complex is in the hanging wall of the fault
- Slip rate on Fruto fault is estimated to be about 0.1-0.4 mm/y, with caveat that available age constraints are poor
  - Fruto fault probably falls in "Moderate Slip Rate" category in the DSOD Consequence-Hazard matrix
- PSHA will be performed to determine the approximate return period of the deterministic ground motions and provide an estimate of conservatism in the range of statistical levels (i.e., median and 84th percentiles)

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PMF Study and Spillway

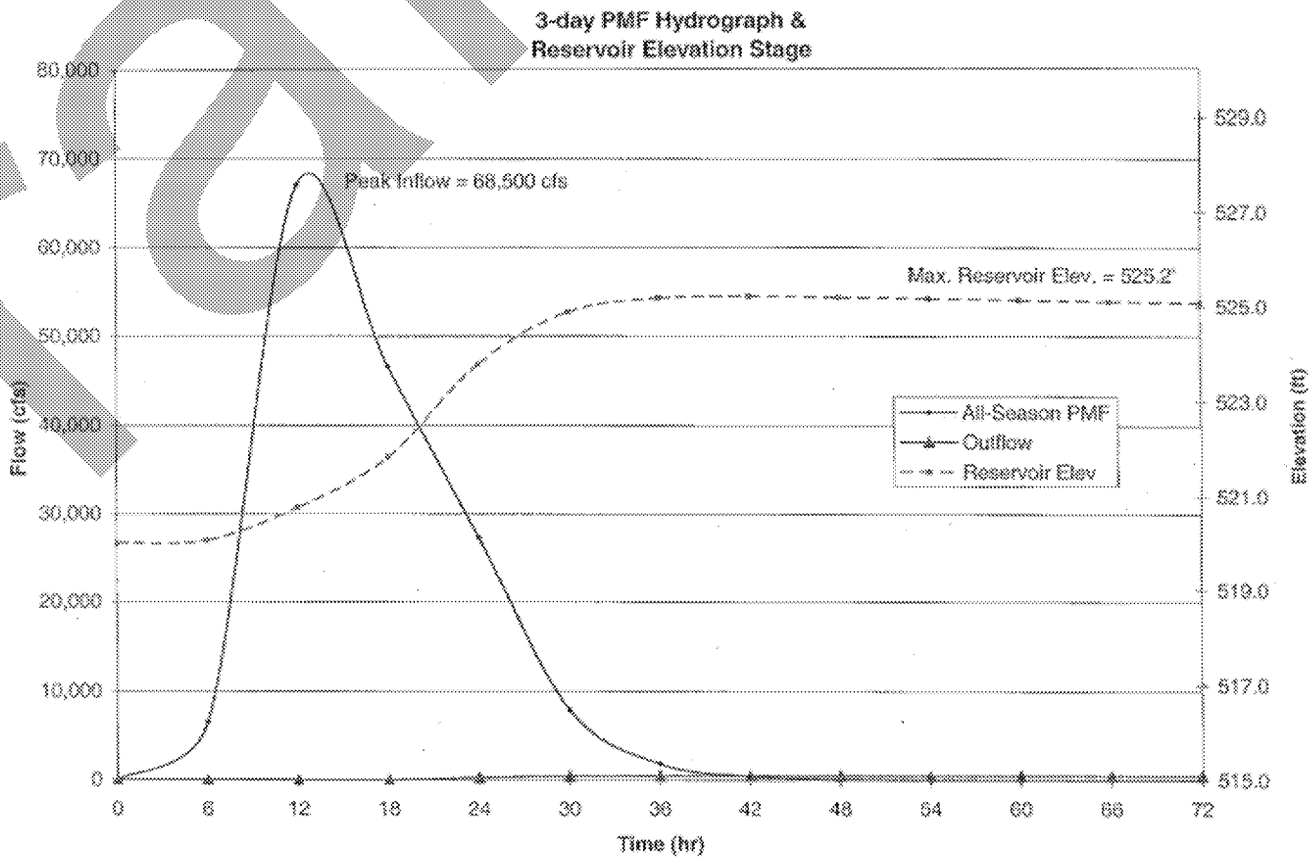
Idit Zarchi, PE

AECOM

Sites

Previous PMF Study

- Carried out in 2004 by California Department of Water Resources (DWR)
- Parameters
  - 1.8 MAF Sites Reservoir
  - Spillway at Sites Dam
  - Older stage-storage data
- PMF results:
  - Peak inflow: 68,500 cfs
  - Total volume influx: 78,400 acre-ft



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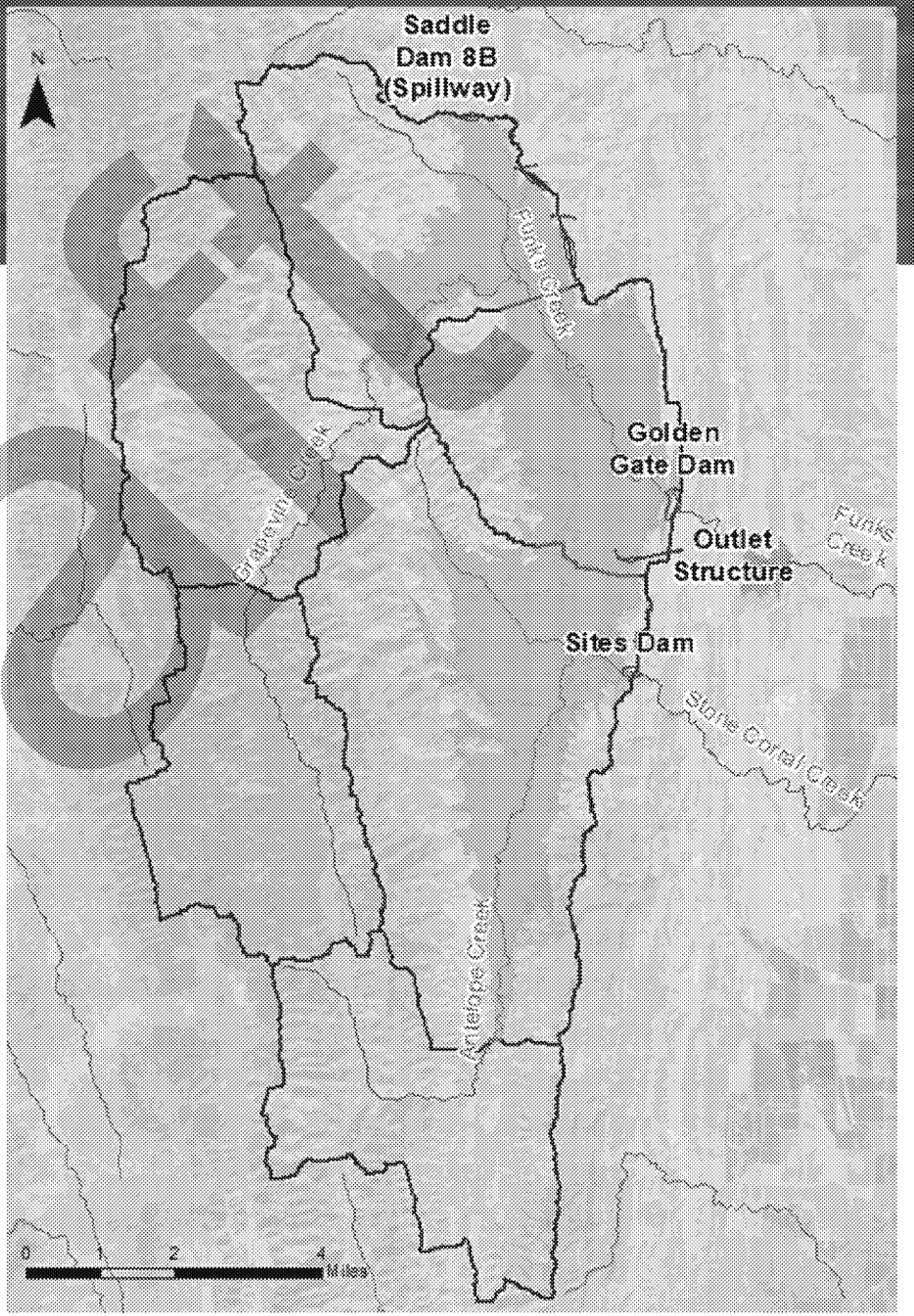
Current PMF Study

- Currently underway (2023)
- Parameters
  - 1.5 MAF Sites Reservoir
  - Spillway at Saddle Dam 8B
  - New stage-storage data based on 2022 LIDAR
- Spillway to provide minimum of 3,900 cfs capacity for over pumping with adequate residual freeboard



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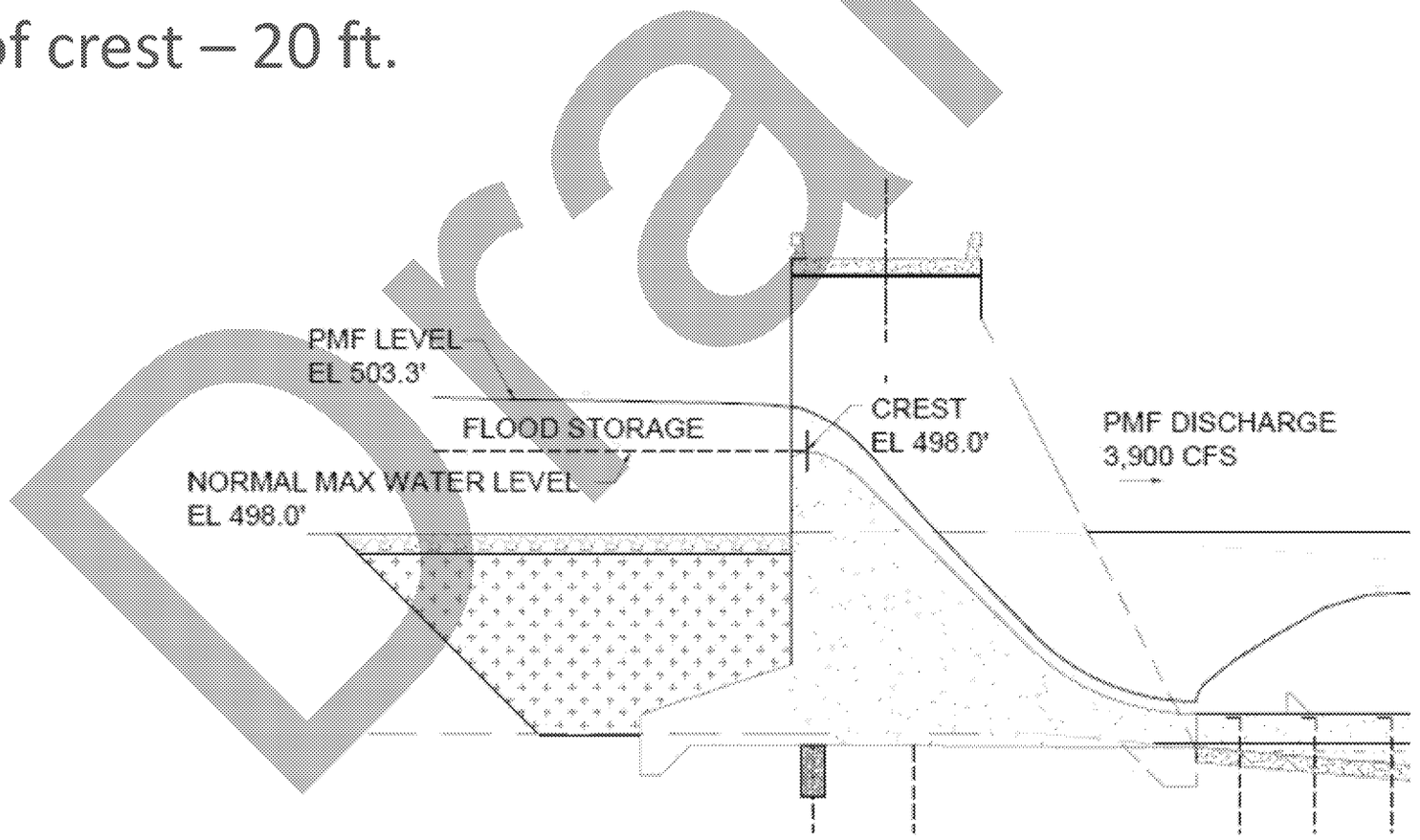
Spillway Option 1 – Spillway at NMWL

- Spillway at Normal Max Water Level (NMWL) of El. 498 ft
- Approx. length of crest – 20 ft.



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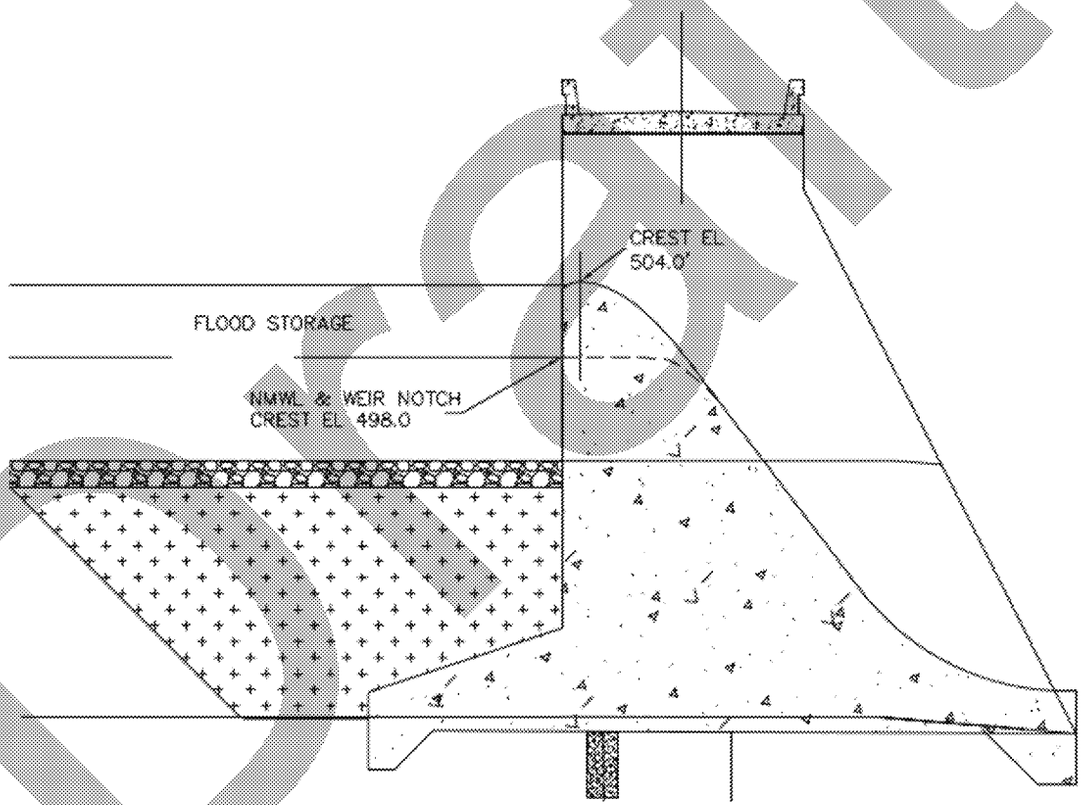
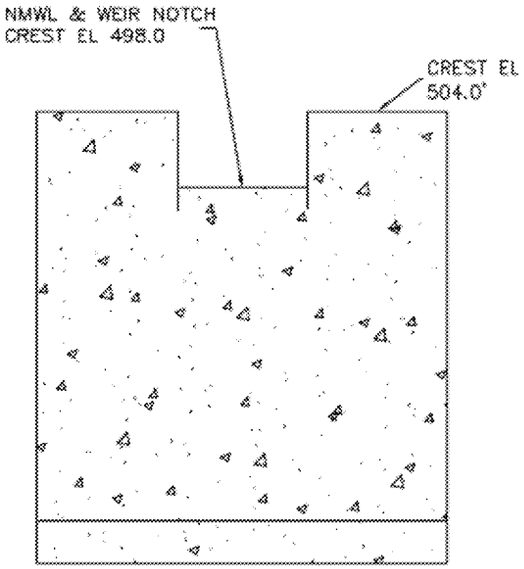
Spillway Option 2 – "Notched" Spillway

- "Notched" Spillway:
  - Low Level Spillway "Notch" at NMWL
  - High Level Spillway at PMF max water level
- Approx total length - 35 ft.





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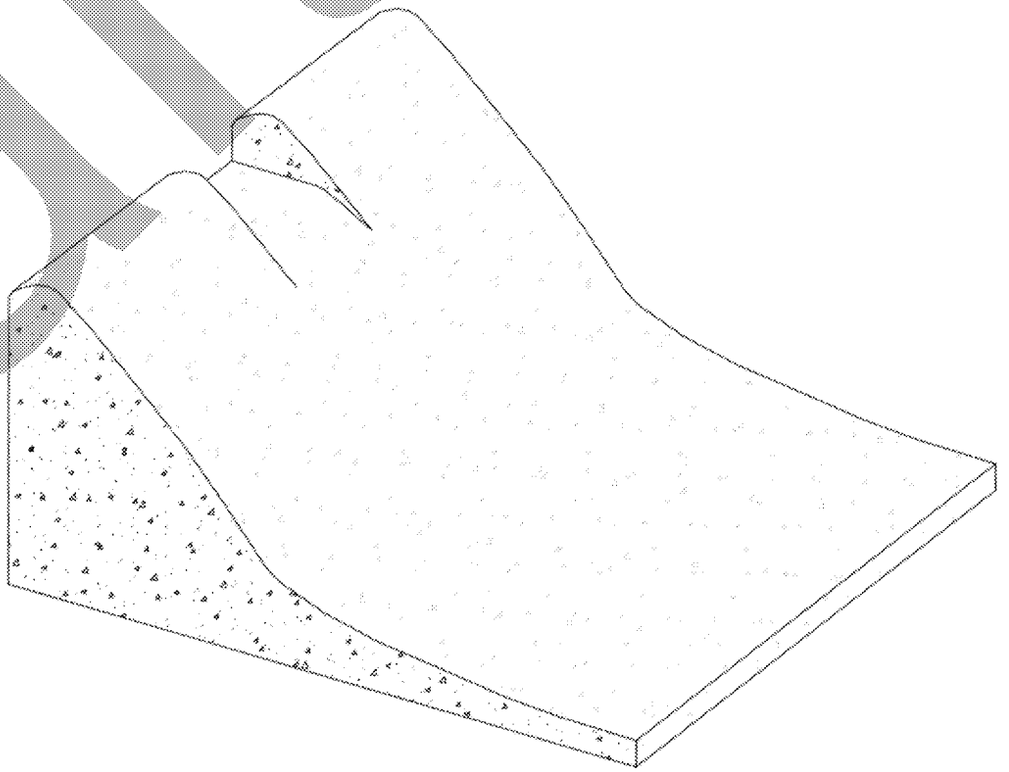
Spillway Option 2

- Reasons to consider a notched spillway:
  - Less flood impacts downstream of spillway
  - Increased duration of flood storage

- Comparison considerations
  - Construction costs
  - Operational benefits
  - Downstream impacts



Draft

Emergency Drawdown

Idit Zarchi, PE

AECOM

Sites

Emergency Drawdown

- Storage-Elevation Curve
- Average Emergency Drawdown Flows
- Flow Allocation Between Outlets
- Drawdown Guidelines for Sites Reservoir

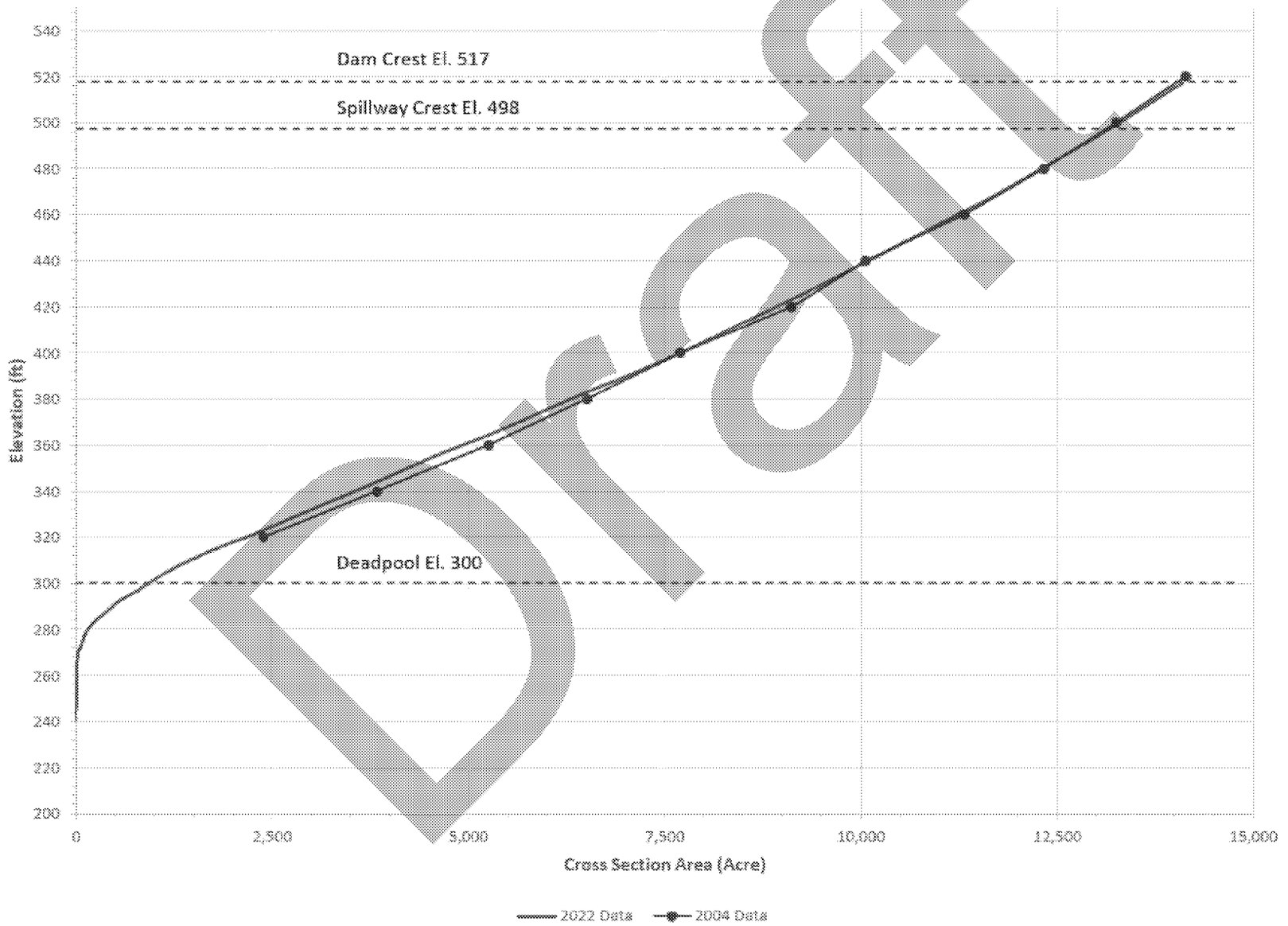
Draft

Reservoir Storage Elevation Curve

- 2022 LiDAR survey (previous data from 2004)
- Data processed in ArcGIS
  - 2D Area of reservoir taken in 1 foot increments
  - Average end area method

Draft

Reservoir Area Elevation Curve



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DSOD Dewatering Requirements

For reservoirs that impound over 5,000 acre-feet of water, the outlet system should be capable of lowering the ***maximum storage depth by 10 percent within 7 or 10 days and draining its full contents within 90 or 120 days****, respectively, depending on factors such as downstream and seismic hazard, dam construction methods and age, known deficiencies, and type of dam; as determined by the Division.*

- Storage depth - the elevation difference between the maximum normal operating water surface elevation (WSE, El. 498 ft) and the lowest point in the reservoir that would result in hydrostatic loading on the dams.
- Considered upstream toes of the Golden Gate dam and Sites dam (El. 250 ft).

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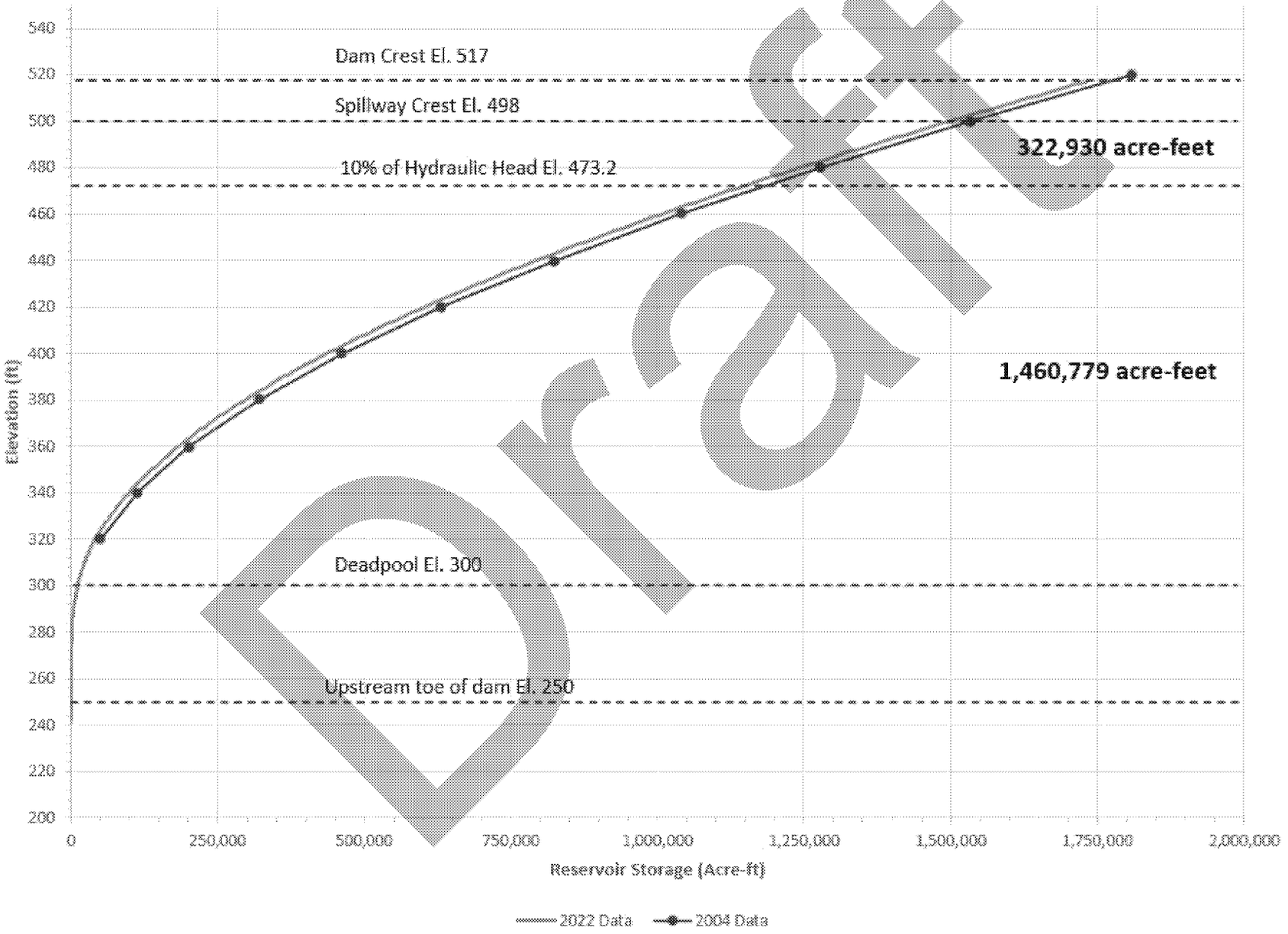
Reservoir Storage Elevation Curve



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Discharges to meet DSOD requirements

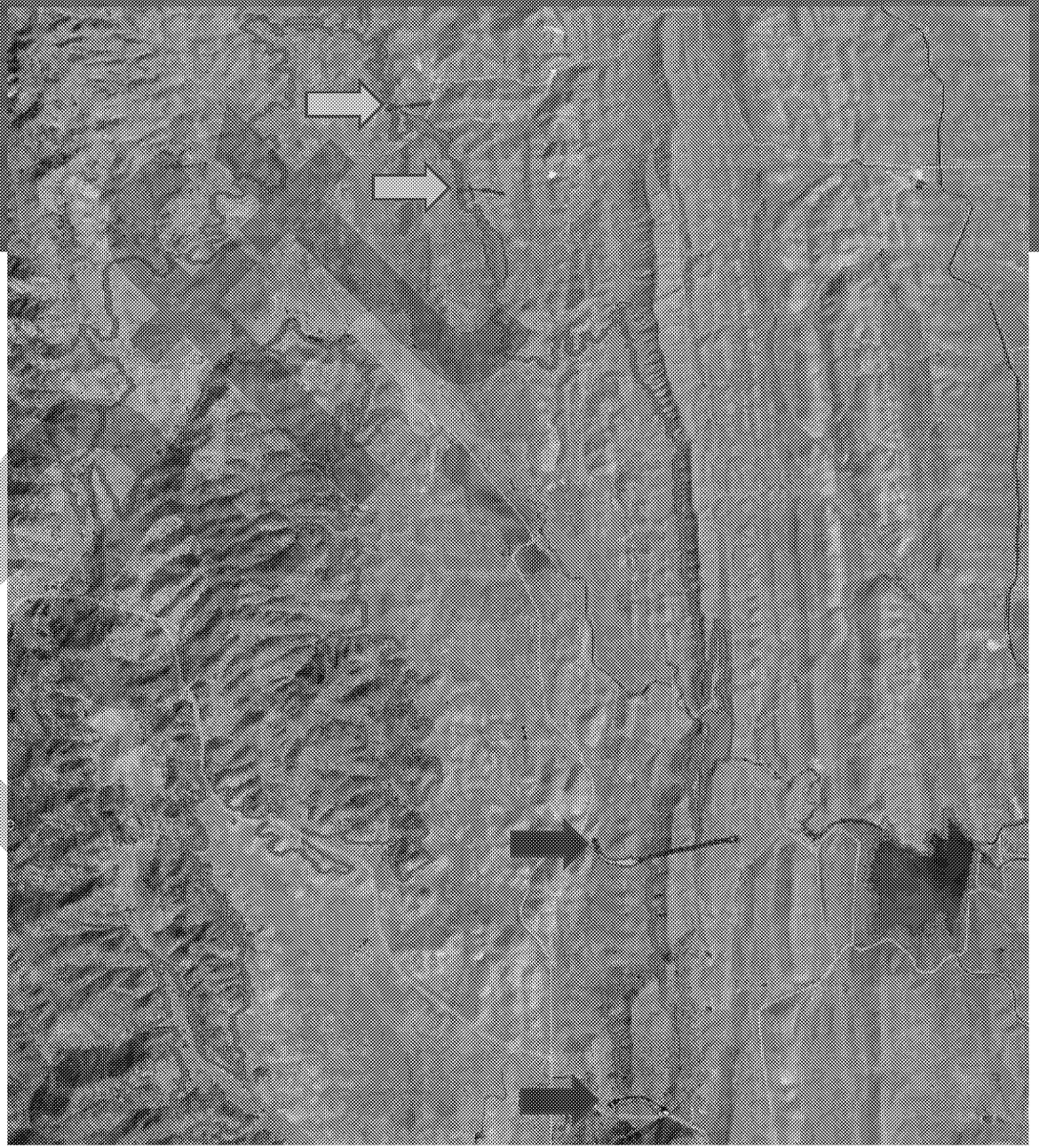
Drawdown Criteria	Average Discharge (cfs)
10% of Hydraulic Head in **7 days**	22,485
10% of Hydraulic Head in **10 days**	15,740
Drawdown to Deadpool in **90 days**	7,045 – 7,309
Drawdown to Deadpool in **120 days**	5,175 – 5,316

- Max operational flows – 3,900 cfs
- Having a requirement for 7 days (instead of 10) requires a capacity to continuously release an additional 6,700 cfs.

Draft

Flow Allocation

- Outlets
  - I/O Works
  - Sites
  - High level emergency releases (HLERs, previously considered)
- 10% Design
  - I/O Works – 16,000 cfs (77%)
  - Sites – 4,700 cfs (23%)
- Flooding Concerns



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Drawdown Guidelines for Sites Reservoir

- Impacts downstream flooding of communities and potentially impacts levees and communities downstream on the Sacramento River.
- Reduction in hydrostatic head vs. flooding impacts

	Drawdown Rate [cfs]	Water surface after 7 days [ft]	Depth below dam crest at El. 517 [ft]
7-day	22,500	473.2	43.8
10-day	15,800	481	36
Differential	**6,700**	**7.8**	

- All dams and structures are being designed to stringent seismic requirements.
- All dams will be founded on rock with conservatively designed filters and drains.
- Preliminary operational modeling of the reservoir shows that water levels will be below El. 473.2 ~70% of the time

DRAFT

Questions?
Sites

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/22/2023 2:05:18 PM
To: Jerry Brown [jbrown@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]
Subject: RE: Recreation - Local Community Working Group

Sounds good Jerry. I can talk about #1. Our principles are pretty broad, but I can get the key ones in throughout the discussion.

I added another side for limitations on water based recreation. Theres the fishing, mercury exceeding human health levels, and boat inspections.

Including Kevin so he knows I added a slide.

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: Jerry Brown <jbrown@sitesproject.org>
Sent: Tuesday, March 21, 2023 5:19 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: Recreation - Local Community Working Group

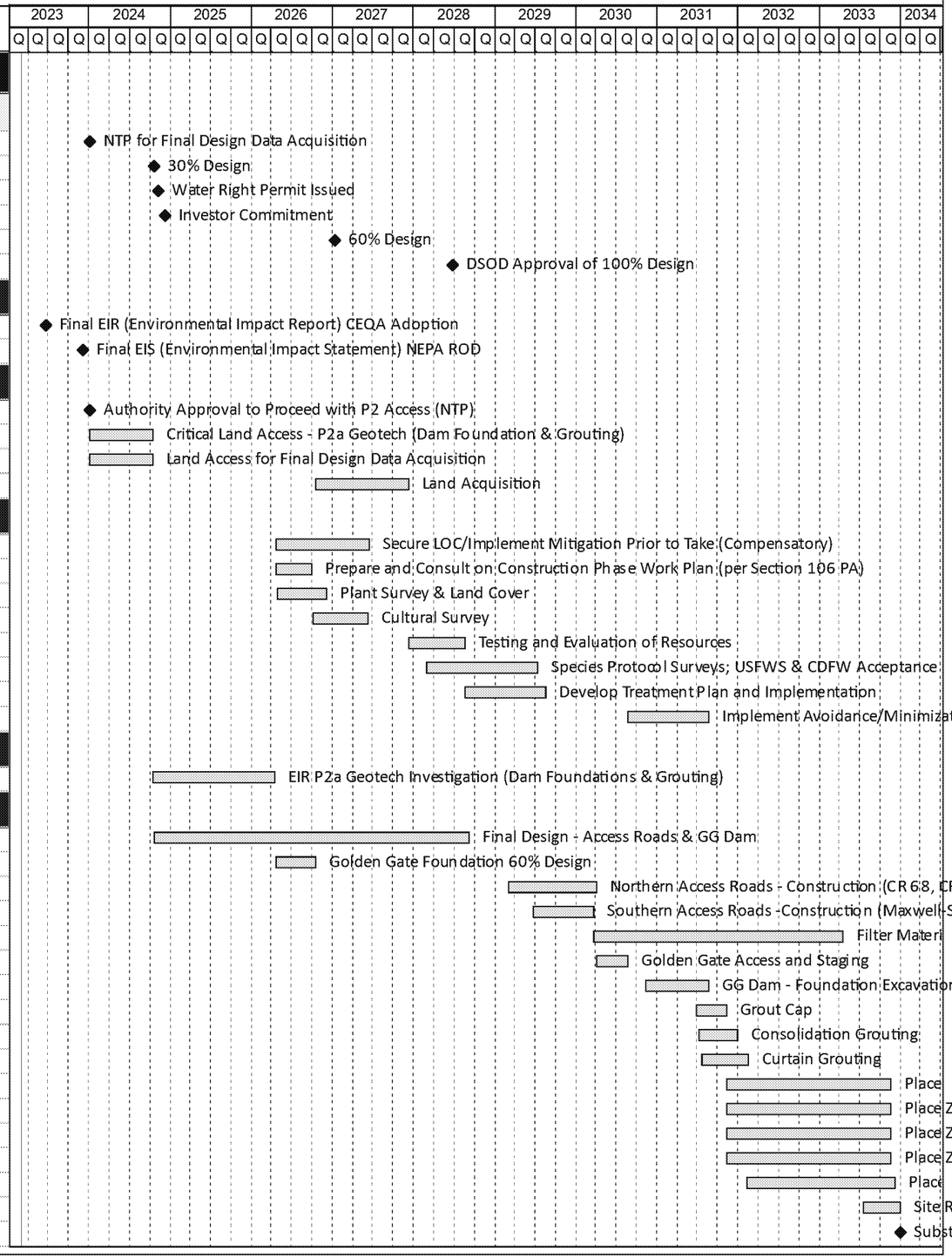
On the recreation piece, I like where going with this and have a couple of suggestions for you to consider:

1. Just want to confirm that you're keeping the discussion to that which affects our negotiation of the PBA for recreation. Consider getting the LCWG to concur with our Board's principles of negotiation (not explicitly because these are confidential, but you can hit on them in a round-about way). If the LCWG has other concerns, then we could go back to our board and see if they wish to authorize the LCWG items as part of what they want to negotiate for. This process would create a nice full circle and would reassure our board they are in lock step with the LCWG.
2. I heard the other day in our water quality meeting that a possible mitigation measure for mercury is no fishing/fish plants for 10 years. This is something you don't want the LC to be surprised by later. Consider reviewing with LCWG all of the possible mitigation measures that would affect recreation. Get a gauge from them of what the priorities should be and then we could reflect the priorities in the final EIR/EIS.

Sites Reservoir Project

Schedule

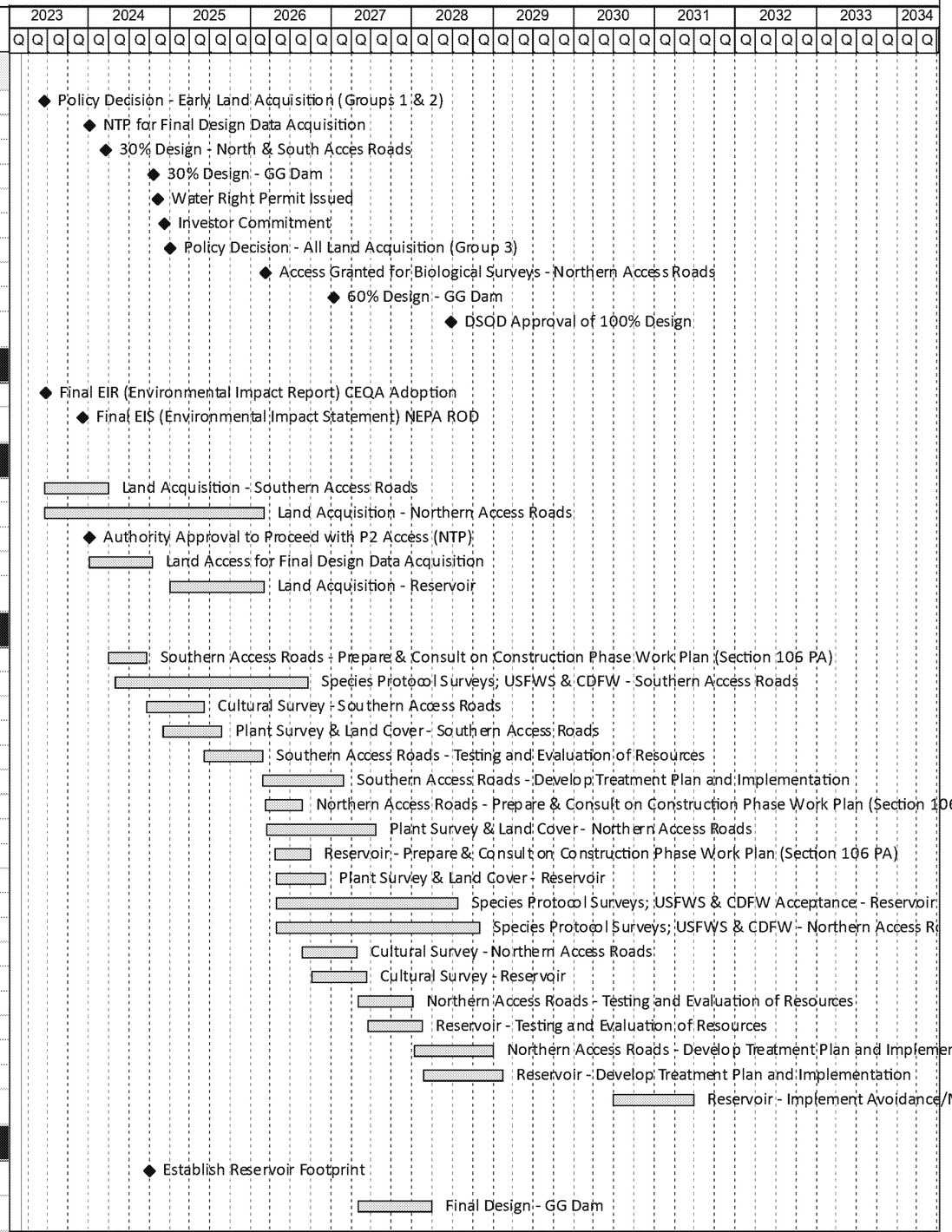
#	Activity ID	Activity Name	Duration	Start	Finish
1	**Sites Reservoir Project: April 2023**		2729	16-Jun-23	30-Dec-33
2	**Sites Reservoir Construction Package**		2723	23-Jun-23	30-Dec-33
3	26.OE1	NTP for Final Design Data Acquisition	0		05-Jan-24
4	85.OE1	30% Design	0		23-Oct-24
5	5a.OE1	Water Right Permit Issued	0		07-Nov-24
6	5b.OE1	Investor Commitment	0		09-Dec-24
7	89d.OE1	60% Design	0		15-Jan-27
8	89c.OE1	DSOD Approval of 100% Design	0		23-Jun-28
9	**Final EIR / EIS**		114	23-Jun-23	06-Dec-23
10	3.OE1	Final EIR (Environmental Impact Report) CEQA Adoption	0		23-Jun-23
11	4.OE1	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
12	**Real Estate**		1010	08-Jan-24	10-Dec-27
13	12.OE1	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
14	16.OE1	Critical Land Access - P2a Geotech (Dam Foundation & Grouting)	200	08-Jan-24	16-Oct-24
15	12a.OE1	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
16	12b.OE1	Land Acquisition	300	19-Oct-26	10-Dec-27
17	**Sites Reservoir Permitting, Mitigation and Cultural Work**		1394	20-Apr-26	21-Aug-31
18	73.OE1	Secure LOC/Implement Mitigation Prior to Take (Compensatory)	305	20-Apr-26	18-Jun-27
19	75.OE1	Prepare and Consult on Construction Phase Work Plan (per Section 106 PA)	120	20-Apr-26	02-Oct-26
20	32.a.OE1	Plant Survey & Land Cover	158	29-Apr-26	04-Dec-26
21	76.OE1	Cultural Survey	180	05-Oct-26	11-Jun-27
22	77.OE1	Testing and Evaluation of Resources	180	13-Dec-27	18-Aug-28
23	39.9.OE1	Species Protocol Surveys; USFWS & CDFW Acceptance	358	01-Mar-28	13-Jul-29
24	78.OE1	Develop Treatment Plan and Implementation	260	21-Aug-28	17-Aug-29
25	79.OE1	Implement Avoidance/Minimization Activities During Construction	260	23-Aug-30	21-Aug-31
26	**P1 / P2 Geotech Investigations**		380	17-Oct-24	17-Apr-26
27	82.OE1	EIR P2a Geotech Investigation (Dam Foundations & Grouting)	380	17-Oct-24	17-Apr-26
28	**Reservoir Facilities**		2385	24-Oct-24	30-Dec-33
29	89a.OE1	Final Design - Access Roads & GG Dam	1000	24-Oct-24	08-Sep-28
30	92.OE1	Golden Gate Foundation 60% Design	130	20-Apr-26	16-Oct-26
31	182.OE1	Northern Access Roads - Construction (CR 68, CR 69, N. Rd)	284	05-Mar-29	04-Apr-30
32	192.OE1	Southern Access Roads -Construction (Maxwell-Sites, Shoo-fly, A-1)	195	25-Jun-29	22-Mar-30
33	211.OE1	Filter Material Haul to Stockpile	800	25-Mar-30	15-Apr-33
34	321.OE1	Golden Gate Access and Staging	100	05-Apr-30	22-Aug-30
35	325.OE1	GG Dam - Foundation Excavation (Some Dbl Shift)	200	15-Nov-30	21-Aug-31
36	330.OE1	Grout Cap	100	27-Jun-31	13-Nov-31
37	331.OE1	Consolidation Grouting	125	11-Jul-31	01-Jan-32
38	332.OE1	Curtain Grouting	150	25-Jul-31	19-Feb-32
39	336.OE1	Place Zone 1 - Core	525	14-Nov-31	17-Nov-33
40	337.OE1	Place Zone 2A & 2B - Filters, Drains and Transitions	525	14-Nov-31	17-Nov-33
41	338.OE1	Place Zone 3 - Rockfill (Some Dbl Shift)	525	14-Nov-31	17-Nov-33
42	339.OE1	Place Zone 4 - Random (Some Dbl Shift)	525	14-Nov-31	17-Nov-33
43	340.OE1	Place Rip Rap	475	13-Feb-32	08-Dec-33
44	341.OE1	Site Reclamation and Topsoil Replacement	120	18-Jul-33	30-Dec-33
45	342.OE1	Substantial Completion - Dams Ready for Commissioning	0		30-Dec-33



Sites Reservoir Project

Schedule

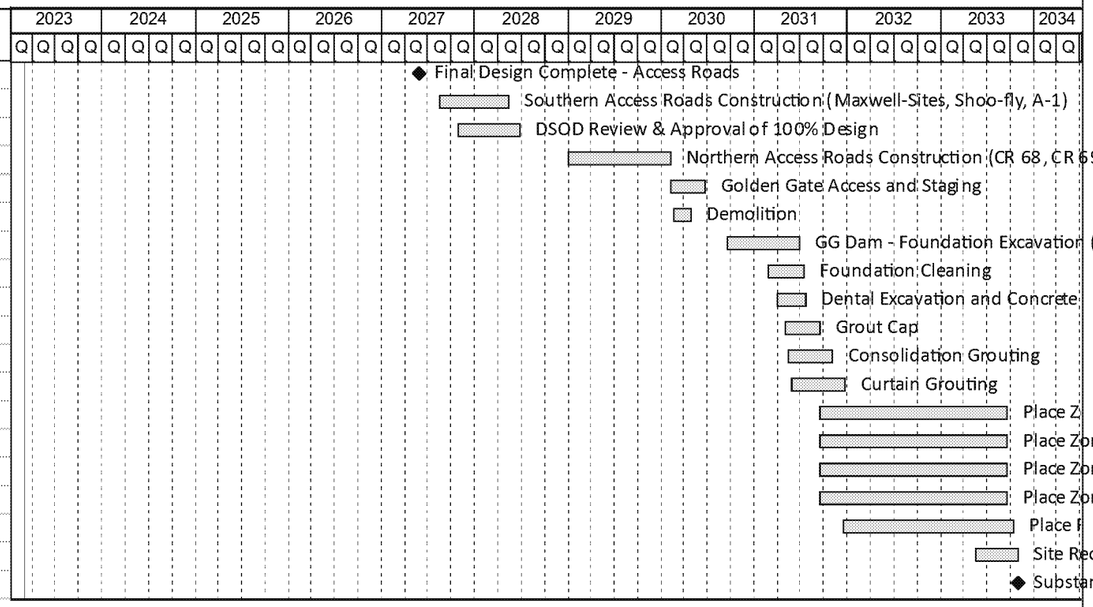
#	Activity ID	Activity Name	Duration	Start	Finish
47	**Sites Reservoir Construction Package Accelerated**		2688	16-Jun-23	03-Nov-33
48	X309.OE2	Policy Decision - Early Land Acquisition (Groups 1 & 2)	0	16-Jun-23*	
49	X299.OE2	NTP for Final Design Data Acquisition	0		05-Jan-24
50	X307.OE2	30% Design - North & South Acces Roads	0		20-Mar-24
51	X297.OE2	30% Design - GG Dam	0		23-Oct-24
52	X289.OE2	Water Right Permit Issued	0		07-Nov-24
53	X7.OE2	Investor Commitment	0		09-Dec-24
54	X319.OE2	Policy Decision - All Land Acquisition (Group 3)	0	02-Jan-25*	
55	X809.OE2	Access Granted for Biological Surveys - Northern Access Roads	0	09-Mar-26	
56	X300.OE2	60% Design - GG Dam	0		15-Jan-27
57	X298.OE2	DSOD Approval of 100% Design	0		23-Jun-28
58	**Final EIR / EIS**		114	23-Jun-23	06-Dec-23
59	X1.OE2	Final EIR (Environmental Impact Report) CEQA Adoption	0		23-Jun-23
60	X2.OE2	Final EIS (Environmental Impact Statement) NEPA ROD	0		06-Dec-23
61	**Real Estate**		689	16-Jun-23	06-Mar-26
62	X15.e.OE2	Land Acquisition - Southern Access Roads	200	16-Jun-23	01-Apr-24
63	X15.f.OE2	Land Acquisition - Northern Access Roads	689	16-Jun-23	06-Mar-26
64	X8.OE2	Authority Approval to Proceed with P2 Access (NTP)	0	08-Jan-24	
65	X291.OE2	Land Access for Final Design Data Acquisition	200	08-Jan-24	16-Oct-24
66	X292.OE2	Land Acquisition - Reservoir	300	02-Jan-25	06-Mar-26
67	**Sites Reservoir Permitting, Mitigation and Cultural Work**		1872	02-Apr-24	25-Jun-31
68	X1239.OE2	Southern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	02-Apr-24	19-Sep-24
69	X1229.OE2	Species Protocol Surveys; USFWS & CDFW - Southern Access Roads	607	30-Apr-24	16-Sep-26
70	X1249.OE2	Cultural Survey - Southern Access Roads	180	20-Sep-24	06-Jun-25
71	X1219.OE2	Plant Survey & Land Cover - Southern Access Roads	187	02-Dec-24	26-Aug-25
72	X1259.OE2	Southern Access Roads - Testing and Evaluation of Resources	180	09-Jun-25	23-Feb-26
73	X1269.OE2	Southern Access Roads - Develop Treatment Plan and Implementation	260	24-Feb-26	22-Feb-27
74	X329.OE2	Northern Access Roads - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	09-Mar-26	21-Aug-26
75	X779.OE2	Plant Survey & Land Cover - Northern Access Roads	352	16-Mar-26	20-Jul-27
76	X63.OE2	Reservoir - Prepare & Consult on Construction Phase Work Plan (Section 106 PA)	120	20-Apr-26	02-Oct-26
77	X301.OE2	Plant Survey & Land Cover - Reservoir	158	29-Apr-26	04-Dec-26
78	X302.OE2	Species Protocol Surveys; USFWS & CDFW Acceptance - Reservoir	587	30-Apr-26	28-Jul-28
79	X789.OE2	Species Protocol Surveys; USFWS & CDFW - Northern Access Roads	656	30-Apr-26	02-Nov-28
80	X339.OE2	Cultural Survey - Northern Access Roads	180	24-Aug-26	30-Apr-27
81	X64.OE2	Cultural Survey - Reservoir	180	05-Oct-26	11-Jun-27
82	X349.OE2	Northern Access Roads - Testing and Evaluation of Resources	180	03-May-27	07-Jan-28
83	X65.OE2	Reservoir - Testing and Evaluation of Resources	180	14-Jun-27	18-Feb-28
84	X359.OE2	Northern Access Roads - Develop Treatment Plan and Implementation	260	10-Jan-28	05-Jan-29
85	X66.OE2	Reservoir - Develop Treatment Plan and Implementation	260	21-Feb-28	16-Feb-29
86	X67.OE2	Reservoir - Implement Avoidance/Minimization Activities During Construction	260	27-Jun-30	25-Jun-31
87	**Reservoir Facilities**		2359	02-Oct-24	03-Nov-33
88	X305.OE2	Establish Reservoir Footprint	0		02-Oct-24
89	X799.OE2	Final Design - GG Dam	240	03-May-27	31-Mar-28



Sites Reservoir Project

Schedule

#	Activity ID	Activity Name	Duration	Start	Finish
90	X294.OE2	Final Design Complete - Access Roads	0		28-May-27
91	X163.OE2	Southern Access Roads Construction (Maxwell-Sites, Shoo-fly, A-1)	195	18-Aug-27	16-May-28
92	X295.OE2	DSOD Review & Approval of 100% Design	170	01-Nov-27	23-Jun-28
93	X155.OE2	Northern Access Roads Construction (CR 68, CR 69, N. Rd)	284	05-Jan-29	06-Feb-30
94	X267.OE2	Golden Gate Access and Staging	100	07-Feb-30	26-Jun-30
95	X270.OE2	Demolition	50	21-Feb-30	01-May-30
96	X271.OE2	GG Dam - Foundation Excavation (Some Dbl Shift)	200	19-Sep-30	25-Jun-31
97	X273.OE2	Foundation Cleaning	100	27-Feb-31	16-Jul-31
98	X274.OE2	Dental Excavation and Concrete	80	03-Apr-31	23-Jul-31
99	X275.OE2	Grout Cap	100	01-May-31	17-Sep-31
100	X276.OE2	Consolidation Grouting	125	15-May-31	05-Nov-31
101	X277.OE2	Curtain Grouting	150	29-May-31	24-Dec-31
102	X280.OE2	Place Zone 1 - Core	525	18-Sep-31	21-Sep-33
103	X281.OE2	Place Zone 2A & 2B - Filters, Drains and Transitions	525	18-Sep-31	21-Sep-33
104	X282.OE2	Place Zone 3 - Rockfill (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
105	X283.OE2	Place Zone 4 - Random (Some Dbl Shift)	525	18-Sep-31	21-Sep-33
106	X284.OE2	Place Rip Rap	475	18-Dec-31	12-Oct-33
107	X285.OE2	Site Reclamation and Topsoil Replacement	120	20-May-33	03-Nov-33
108	X286.OE2	Substantial Completion - Dams Ready for Commissioning	0		03-Nov-33



Remaining Level of Effort
Actual Level of Effort
Actual Work
Remaining Work
Critical Remaining Work
Milestone

Project ID: Sites Apr-2023 / Project Name: Sites Reservoir Project: April 2023
Layout Name: Sites Reservoir Critical / TASK filter: Activity ID Contains.
Data Date: 01-Mar-23 / Print Date: 23-Mar-23

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From: Kevin Spesert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=DEF2E3FB8FBE4310BB65B7A20F658C0F-KSPESERT000]
Sent: 3/24/2023 10:30:19 AM
To: john.ferrera@asm.ca.gov
CC: Keith Dunn (keithdunn@me.com) [keithdunn@me.com]; Jerry Brown [jbrown@sitesproject.org]; Fritz Durst (fritz.durst@gmail.com) [fritz.durst@gmail.com]; Bob Tincher [bobt@sbvmwd.com]
Subject: SItes Project follow-up on Cachil Dehe Tribe engagement
Attachments: Consultation Timeline Cachil Dehe Band of Wintun Indians_24March2023.pdf

Hi John,

We would like to thank Assemblymember Aguiar-Curry and your team for meeting with us on Monday. We really appreciated the time and the very good discission regarding the Sites Reservoir Project and look forward to working with the Assemblymember and your team to advance this critical project for California.

We also greatly appreciated your feedback regarding the Sites Project's engagement with Cachil Dehe Tribe. We put together the attached chronology of the Sites Project's engagement with the Cachil Dehe Tribe since 2017 for your reference. As I mentioned in the meeting on Monday, we will be meeting with Chairman Mitchum and Vice-Chairwoman Ragudo on April 18th. We will continue to coordinate with your team on future engagement activities with the Cachil Dehe Tribe as we work to advance the project.

Thanks again for your time and support of the project. Please feel free to touch base if you have any questions or concerns.

Thanks!

Kevin

Kevin Spesert
External Affairs Manager
Sites Project Authority
Phone: 530.632.4071
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Maxwell, CA 95955

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Timeline of AB 52 Consultation between the Sites Project Authority and the Cachil Dehe Band of Wintun Indians (Colusa Indian Community Council)

- January 3, 2017: The Cachil Dehe Band of Wintun Indians (Cachil Dehe) submitted to the Sites Project Authority (Authority) a written request for formal notice of and information on proposed projects for which the Authority will serve as lead CEQA agency pursuant to Cal. Pub. Res. Code § 21080.3.1(b) (Assembly Bill 52).
- February 10, 2017: Project notification letter sent from the Authority to the Cachil Dehe pursuant to Cal. Pub. Res. Code 21080.3.1(d).
- February 6, 2017: Letter from Cachil Dehe to the Authority requesting consultation on the Sites Project. [It is unclear why this letter is dated February 6, which is prior to the date of the project notification letter. It is possible that it is a typo (and should read 16), or they may have proactively written the letter after receiving word from the Authority that the letter was imminent.]
- March 6, 2017: Letter from the Authority to Cachil Dehe acknowledging their request for consultation and noting that they would be in touch to set up a meeting to discuss the project.
- January 4, 2018: Colusa Indian Community Council Comments on the Draft Environmental Impact Report/Environmental Impact Statement.
- March 25, 2019: Meeting at Tribal office to restart project and discuss upcoming geotechnical work. Provided Cachil Dehe with GIS data for proposed geotechnical work and cultural resources, and copies of cultural resources reports, to date.
- August 29, 2019. Meeting at Tribal office to discuss geotechnical studies and arranging for Tribal monitoring of work. Provided Cachil Dehe with updated GIS data for geotechnical studies.
- October 22, 2020. Conference call to provide update on the project description and status of the environmental document. Provided updated project description, GIS data for cultural resources and draft archaeological report.
- November 13, 2020. Updated project notification letter sent from the Authority to the Cachil Dehe pursuant to Cal. Pub. Res. Code 21080.3.1(d).
- December 7, 2020. Email from Cachil Dehe in response to November 13 letter, stating that they would like to continue consultation on the project.
- March 17, 2021. Email to Cachil Dehe, providing revised preliminary project description.
- January 25, 2022: Authority sent the confidential cultural report that is an appendix to the revised EIR.
- February 4, 2022: Sites 2022-2024 Geotechnical Investigations project notification letter sent from the Authority to the Cachil Dehe pursuant to Cal. Pub. Res. Code 21080.3.1(d).
- February 28, 2022: Letter from Cachil Dehe saying that they are deferring consultation and communication to Yocha Dehe.
- March 29, 2022: Authority sent link to access the 2022-2024 Geotechnical Investigations cultural resources sensitivity analysis report.
- April 20, 2022: Authority sent revised 2022-2024 Geotechnical Investigations cultural resources sensitivity analysis report.
- August 4, 2022: Sites 2023-2024 Test Pits, Fault Studies, and Quarry Studies project notification letter sent from the Authority to the Cachil Dehe pursuant to Cal. Pub. Res. Code 21080.3.1(d).

- January 12, 2023: Authority sent letter inviting the Tribe to participate in a Tribal Working Group.
- January 18, 2023: Tribal Working Group letter resent when it was realized that the Tribal leadership had changed.
- January 19, 2023: Email response from Cachil Dehe that they are interested in participating in the Tribal Working Group
- January 25, 2023: Authority sent a copy of the Post Review Discovery Plan, Archaeological Monitoring Plan, and Burial Treatment Plan for the 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations Project report.
- February 24, 2023: Provided copy of the Post-Investigation Cultural Resources Monitoring Report Summary for Work Package 1 of the 2022-2024 Sites Reservoir Geologic, Geophysical, and Geotechnical Investigations report.
- February 27, 2023: Email to Cachil Dehe's new Cultural Preservation Director, Jennie Mitchum, suggesting to meet for introductions and provide updated information about the Sites Reservoir Project.
- March 8, 2023: Follow-up email to Jennie Mitchum regarding a meeting with the Tribe.
- April 18, 2023: Scheduled meeting to bring the Tribe up do date on the project and discuss future participation.

From: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/27/2023 10:46:11 AM
To: Angela Bezzone [bezzone@mbkengineers.com]
Subject: Sites Project - Water Quality on Low Reservoir Elevations

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 will develop a procedure to release water as requested by members based in proportion to the amount of water remaining in storage.

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: 3/27/2023 11:05:04 AM
To: steve.micko@jacobs.com; Angela Bezzone [bezzone@mbkengineers.com]
Subject: Sites Project - Nearing Dead Pool

Hi Steve – We are gearing up for a discussion with the members on losses and what happens when we are nearing deadpool.

Can you provide for us the number of times that we hit a reservoir storage level of 200,000 AF, 120,000 AF, and 60,000 AF in all three of historic hydrology, 2035 hydrology, and 2070 CT assuming Alternative 3 or 3B, where appropriate? I am thinking of something like this table.

	# of Times at or Below 200,000 AF	# of Times at or Below 120,000 AF	# of Times at or Below 60,000 AF
Historic Hydrology (Alt 3; 25% Reclamation Investment)			
2035 Hydrology (Alt 3B; 16% Reclamation Investment)			
2070 CT Hydrology (Alt 3B; 16% Reclamation Investment)			

We just want to get a sense of how often we hit low reservoir elevations – is this a frequent occurrence or relatively infrequent.

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: 3/27/2023 12:01:45 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Bradshaw,Dee [VBradshaw@mwdh2o.com]
Subject: RE: Comment on Sites Final EIR

Sounds good – thank you !

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 27, 2023 12:00 PM
To: Bradshaw,Dee <VBradshaw@mwdh2o.com>
Cc: Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: Comment on Sites Final EIR

Wonderful! Thank you Dee!

Laurie, please see below. We can think about how to include this in MR 5 and maybe some in Chapter 11.

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: Bradshaw,Dee <VBradshaw@mwdh2o.com>
Sent: Monday, March 27, 2023 10:59 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>
Subject: FW: Comment on Sites Final EIR

Ali,
Please find Metropolitan's final comment on Sites Admin Final EIR. Thank you for the opportunity to review.

Dee

From: Sheehan,Rebecca D <RSheehan@mwdh2o.com>
Sent: Monday, March 27, 2023 10:51 AM
To: Bradshaw,Dee <VBradshaw@mwdh2o.com>
Subject: Comment on Sites Final EIR

Dee:
I did complete some of the review of the final Sites EIR. I looked at water quality and the aquatics response to comments. I did not have any water quality comments. Could you please convey the following comment:

MWD continues to urge Sites to make a clear distinction between SWP operations, and the permits required thereto, and Sites operations and associated permits. For example, we recommend that Sites make clear in Master Response 5 on aquatics that the SWP operations in the southern Delta and all diversions at Banks Pumping Plant of water originating

from Sites Reservoir are permitted by the biological opinions for the CVP-SWP, the CESA section 2081 permit for SWP Long-Term Operations, and related EIR and EIS. It would be helpful if the Sites Master Response further concluded that the effects of diversions of water from Sites Reservoir are well within the operations permitted by the associated BiOps and CESA permit.

Thank you,
Becky

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From: Micko, Steve [Steve.Micko@jacobs.com]
Sent: 3/27/2023 5:11:42 PM
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: RE: Sites Project - Nearing Dead Pool

Hi Ali,

You'll see the following three tables below:

- Frequency of Near Deadpool in All Months
  - Provides number of months (and percent of all months) during which Sites is at or below 200 TAF, 120 TAF, or 60 TAF
- Frequency of Nearing Deadpool in May (near end of fill season)
  - Provides number of Mays (and percent of all Mays) during which Sites is at or below 200 TAF, 120 TAF, or 60 TAF
- Frequency of Nearing Deadpool in September (near end of release season)
  - Provides number of Septembers (and percent of all Septembers) during which Sites is at or below 200 TAF, 120 TAF, or 60 TAF

I have Alt 3 at all three hydrologies; Alt 3B is only presented for 2035CT.

I have a couple of takeaways from this table:

- We see a significantly higher modeled frequency of "near deadpool" conditions at the end of the release period.
  - Aside from a few periods of repeated dry hydrology, Sites is able to divert *some* water by the end of the diversion season
- Activity increases with climate change
  - As we move further into the future, the modeled frequency of deadpool increases
- In future climate hydrologies, Sites does not experience true deadpool
  - With warmer winters, more and more precipitation results in runoff instead of being stored as snowpack. This leads to higher runoff events from which Sites may divert.
- Alt 3 is more active than Alt 3B. So Alt 3 nears deadpool more frequently than Alt 3B

Let me know if you have any questions.

Thanks!
Steve

Frequency of Near Deadpool in All Months

	# of Times at or Below 200,000 AF	# of Times at or Below 120,000 AF	# of Times at or Below 60,000 AF
Historical Hydrology (Alt 3; 25% Reclamation Investment)	173 (18%)	129 (13%)	32 (3%)
2035CT Hydrology (Alt 3B; 16% Reclamation Investment)	164 (17%)	84 (9%)	8 (1%)
2035CT Hydrology (Alt 3; 25% Reclamation Investment)	191 (19%)	130 (13%)	12 (1%)
2070 Hydrology (Alt 3; 25% Reclamation Investment)	203 (21%)	134 (14%)	21 (2%)

Frequency of Nearing Deadpool in May (near end of fill season)

	# of Mays at or Below 200,000 AF	# of Mays at or Below 120,000 AF	# of Mays at or Below 60,000 AF
Historical Hydrology (Alt 3; 25% Reclamation Investment)	8 (10%)	6 (7%)	3 (4%)
2035CT Hydrology (Alt 3B; 16% Reclamation Investment)	7 (9%)	4 (5%)	0 (%)
2035CT Hydrology (Alt 3; 25% Reclamation Investment)	9 (11%)	6 (7%)	0 (%)
2070 Hydrology (Alt 3; 25% Reclamation Investment)	10 (12%)	6 (7%)	0 (%)

Frequency of Nearing Deadpool in September (near end of release season)

	# of Septembers at or Below 200,000 AF	# of Septembers at or Below 120,000 AF	# of Septembers at or Below 60,000 AF
Historical Hydrology (Alt 3; 25% Reclamation Investment)	21 (26%)	15 (18%)	3 (4%)
2035CT Hydrology (Alt 3B; 16% Reclamation Investment)	20 (24%)	10 (12%)	1 (1%)
2035CT Hydrology (Alt 3; 25% Reclamation Investment)	24 (29%)	13 (16%)	2 (2%)
2070 Hydrology (Alt 3; 25% Reclamation Investment)	25 (30%)	16 (20%)	3 (4%)

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Monday, March 27, 2023 11:05 AM
To: Micko, Steve <Steve.Micko@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>
Subject: [EXTERNAL] Sites Project - Nearing Dead Pool

Hi Steve – We are gearing up for a discussion with the members on losses and what happens when we are nearing deadpool.

Can you provide for us the number of times that we hit a reservoir storage level of 200,000 AF, 120,000 AF, and 60,000 AF in all three of historic hydrology, 2035 hydrology, and 2070 CT assuming Alternative 3 or 3B, where appropriate? I am thinking of something like this table.

	# of Times at or Below 200,000 AF	# of Times at or Below 120,000 AF	# of Times at or Below 60,000 AF
Historic Hydrology (Alt 3; 25% Reclamation Investment)			
2035 Hydrology (Alt 3B; 16% Reclamation Investment)			

2070 CT Hydrology (Alt 3B; 16% Reclamation Investment)			

We just want to get a sense of how often we hit low reservoir elevations – is this a frequent occurrence or relatively infrequent.

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: 3/28/2023 8:01:46 AM
To: Micko, Steve [Steve.Micko@jacobs.com]
CC: Angela Bezzone [bezzone@mbkengineers.com]; Leaf, Rob [Rob.Leaf@jacobs.com]
Subject: RE: Response to NGO Requests: Sites Seepage

Thanks much Steve!

See my draft email to the group below. Let me know what you think of the response to the CALSIM modeling question.

Hello NGO Group – I wanted to follow up from our March 9 CALSIM modeling meeting. Attached is the presentation from the meeting. We also had 2 action items/follow up items as noted below.

1. CALSIM II modeling doesn't preserve mass balance. It creates 200,000 af of water that isn't there in dry and critically dry years. –

This was a comment in the chat that we talked a little bit about on the call, but committed to close the loop more on this. After the call, our modeling team let me know that we did look into this a number of years ago and ran some sensitivity runs to see how this might be affecting the Project's analysis. In these sensitivity runs, we didn't see a big change in the Project when lowering the hydrology in these dry and critically dry years. As we discussed on the call, we don't divert much in these years and are focused more on moving water out of the reservoir. These sensitivity runs were conducted using our old diversion criteria and the Project as it was envisioned in 2017. Although the Project has changed substantially since 2017, we've made it more protective of flows in the river (we now have high bypass flow criteria prior to diversions), so we would expect similar results to the prior sensitivity runs – meaning our more protective diversion criteria have us diverting little water in these drier years and thus, the overestimation of the CALSIM II model in dry and critically dry years isn't likely affecting our results. We realize this is a very nuanced modeling question and are happy to set up a small group call with the modeling team for anyone who would like to chat about this in more detail.

2. Do we know the reason the seepage loss estimate is so low? Soil/geo characteristics?

Seepages losses from the reservoir were calculated as part of the 2017 Draft EIR/EIS. The alternatives considered in 2017 were generally bigger reservoir footprints (up to 1.8 MAF) and a larger Funks Reservoir (an existing reservoir that we would have enlarged in the 2017 alternatives and renamed Holthouse Reservoir). For the 2019 RDEIR/SDEIS, we used the same calculation and analysis as was done for these previous alternatives. The seepage values were low and fairly insignificant, so we did not recalculate those as the loss are expected to be minimal. The loss calculation is included in Appendix 8B of the Sites RDEIR/SDEIS (which is attached). The maximum seepage is estimated to be 2,150 gpm (or about 3.5 TAF/yr).

Hope this helps. We look forward to our next discussion.

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: Heydinger, Erin [Erin.Heydinger@hdrinc.com]
Sent: 5/27/2022 9:25:18 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)
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	4.3%	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

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

Sent: 3/28/2023 2:12:45 PM
To: steve.micko@jacobs.com; Angela Bezzone [bezzone@mbkengineers.com]
Subject: FW: Sites Modeling Follow-Up

Steve –

Katherine with Valley Water contacted me today with the following:

We have a Board committee meeting tomorrow where we'll be giving updates on several storage projects. While Sites isn't the topic of the meeting, it may come up as part of the discussion. I'm filling out some information on Sites to prepare for the meeting using the information that Erin Heydinger provided us with last spring, which includes the modeled long-term average annual yield and the dry/critical year yield for our participation level. She also gave us the average annual yield for the entire project (234 TAF under historical hydrology/ 253 TAF under 2030 hydrology), but I was wondering if one of you could tell me the expected annual yield in dry/critical years for the entire project?

I asked her to send me the numbers to we could make sure we were comparing apples to apples and she sent me the email chain below. From the 2030 and 2070, I thought these numbers came from the Feasibility report. But I cant find them in here. They also don't appear to come from the BA modeling. I feel like May was too early for the Final EIR/EIS modeling. I think the 234 KAF comes from the Draft EIR/EIS, but my records of

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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
O 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.

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	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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*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: Alicia Forsythe [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=A6CDF06A7E904B65BAA21702A82AD329-AFORSYTHE]
Sent: 3/28/2023 2:51:00 PM
To: Katherine Maher [KMaher@valleywater.org]; JP Robinette [jrobinette@sitesproject.org]
CC: Cindy Kao [CKao@valleywater.org]
Subject: RE: Sites dry and critical year yield

I'm glad that you sent that email over as we now have a lot of modeling runs, so the info and the date helped me track this down. Here it is.

Historic Hydrology
234 TAF, long-term average
404 TAF, Dry and Critically Dry years

2030 Climate Change (WSIP hydrology)
253 TAF, long-term average
401 TAF, Dry and Critically Dry years

2070 Climate change (WSIP hydrology)
259 TAF, long-term average
384 TAF, Dry and Critically Dry years

Let me know if you need anything else.

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: Tuesday, March 28, 2023 2:19 PM
To: Katherine Maher <KMaher@valleywater.org>; JP Robinette <jrobinette@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: RE: Sites dry and critical year yield

Awesome. I am working on this now.

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: Tuesday, March 28, 2023 1:48 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; JP Robinette <jrobinette@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: RE: Sites dry and critical year yield

Hi Ali,

I've attached the email that we received from Erin showing the model results.

Thanks,

Katherine

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 28, 2023 1:43 PM
To: Katherine Maher <KMaher@valleywater.org>; JP Robinette <jrobinette@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: RE: Sites dry and critical year yield

***** 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. *****

Sure Katherine. Can you send me what Erin sent you? Or any more details of what you have?

I ask to make sure that I am comparing apples to apples as we have a number of model runs with different hydrology assumptions and Reclamation participation assumptions.

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: Tuesday, March 28, 2023 12:20 PM
To: JP Robinette <jrobinette@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: Sites dry and critical year yield

Hi JP & Ali,

We have a Board committee meeting tomorrow where we'll be giving updates on several storage projects. While Sites isn't the topic of the meeting, it may come up as part of the discussion. I'm filling out some information on Sites to prepare for the meeting using the information that Erin Heydinger provided us with last spring, which includes the modeled long-term average annual yield and the dry/critical year yield for our participation level. She also gave us the average annual yield for the entire project (234 TAF under historical hydrology/ 253 TAF under 2030 hydrology), but I was wondering if one of you could tell me the expected annual yield in dry/critical years for the entire project?

Thanks,

KATHERINE MAHER, PE
SENIOR ENGINEER
Imported Water Unit
Tel. (408) 630-2238 Cell (408) 472-8099

Valley Water

Clean Water • Healthy Environment • Flood Protection

5750 Almaden Expressway, San Jose CA 95118
www.valleywater.org

From: Quin La Capra [qlacapra@katzandassociates.com]
Sent: 3/28/2023 3:14:10 PM
To: Kevin Spesert [kspesert@sitesproject.org]; Sara M. Katz [skatz@katzandassociates.com]; Ann Newton [anewton@katzandassociates.com]; Sarah Rossetto [srossetto@katzandassociates.com]; Emily Fan Michaelson [emichaelson@katzandassociates.com]; kim@floydcommunications.com
Subject: Sites 3/29 Agenda

1. Kevin Update
2. Update from Community Working Group Meeting
3. EIR Communications
- Video participants/filming scheduling and filming location recommendations from Kevin
- Update on final certification timing?
4. Messaging – Did Jerry send this to Board Members as discussed?
5. CA-NV AWWA Conference Presentation
6. ACWA Conference in Monterey
7. Virtual Tour
- Update from walk through with Jerry and JP?
8. Water Right Application Comms
- Coalition letters
- Comms materials: Press release; FAQ; Other
- Outline for blog?
9. Other
- Q1/Q2 communications plan

K&A
KATZ & ASSOCIATES

Quin La Capra
Senior Account Executive
San Diego · Los Angeles · San Francisco

From: Katherine Maher [KMaher@valleywater.org]
Sent: 3/28/2023 4:49:02 PM
To: Alicia Forsythe [aforsythe@sitesproject.org]; JP Robinette [jrobinette@sitesproject.org]
CC: Cindy Kao [CKao@valleywater.org]
Subject: RE: Sites dry and critical year yield

Thanks, Ali! This is exactly what I was looking for.

Katherine

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 28, 2023 2:51 PM
To: Katherine Maher <KMaher@valleywater.org>; JP Robinette <jrobinette@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: RE: Sites dry and critical year yield

***** 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. *****

I'm glad that you sent that email over as we now have a lot of modeling runs, so the info and the date helped me track this down. Here it is.

Historic Hydrology
234 TAF, long-term average
404 TAF, Dry and Critically Dry years

2030 Climate Change (WSIP hydrology)
253 TAF, long-term average
401 TAF, Dry and Critically Dry years

2070 Climate change (WSIP hydrology)
259 TAF, long-term average
384 TAF, Dry and Critically Dry years

Let me know if you need anything else.

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: Tuesday, March 28, 2023 2:19 PM
To: Katherine Maher <KMaher@valleywater.org>; JP Robinette <jrobinette@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: RE: Sites dry and critical year yield

Awesome. I am working on this now.

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: Tuesday, March 28, 2023 1:48 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; JP Robinette <jrobinette@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: RE: Sites dry and critical year yield

Hi Ali,

I've attached the email that we received from Erin showing the model results.

Thanks,

Katherine

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 28, 2023 1:43 PM
To: Katherine Maher <KMaher@valleywater.org>; JP Robinette <jrobinette@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: RE: Sites dry and critical year yield

***** 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. *****

Sure Katherine. Can you send me what Erin sent you? Or any more details of what you have?

I ask to make sure that I am comparing apples to apples as we have a number of model runs with different hydrology assumptions and Reclamation participation assumptions.

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: Tuesday, March 28, 2023 12:20 PM
To: JP Robinette <jrobinette@sitesproject.org>; Alicia Forsythe <aforsythe@sitesproject.org>
Cc: Cindy Kao <CKao@valleywater.org>
Subject: Sites dry and critical year yield

Hi JP & Ali,

We have a Board committee meeting tomorrow where we'll be giving updates on several storage projects. While Sites isn't the topic of the meeting, it may come up as part of the discussion. I'm filling out some information on Sites to prepare for the meeting using the information that Erin Heydinger provided us with last spring, which includes the modeled long-term average annual yield and the dry/critical year yield for our participation level. She also gave us the average annual yield for the entire project (234 TAF under historical hydrology/ 253 TAF under 2030 hydrology), but I was wondering if one of you could tell me the expected annual yield in dry/critical years for the entire project?

Thanks,

KATHERINE MAHER, PE
SENIOR ENGINEER
Imported Water Unit
Tel. (408) 630-2238 Cell (408) 472-8099

Valley Water

Clean Water • Healthy Environment • Flood Protection

5750 Almaden Expressway, San Jose CA 95118
www.valleywater.org

Agenda: 2023 Operations Permitting Coordination

Meeting Information:			
Date:	March 29, 2023	**Location:**	Microsoft Teams use link in invite Or call in (audio only) (833) 255-2803,,12321815# United States (Toll-free)
Start Time:	2:00 p.m.	**Finish Time:**	3:30 p.m.
Purpose:	Continuing Operations Permitting Coordination on Common Issues		

Meeting Invitees:

CDFW	NMFS	USFWS
Reclamation	Sites Authority	ICF, MBK, Jacobs, HDR

Agenda:

Discussion Topic	Topic Leader	Time Allotted
1. Review of Previous Action Items a. Pulse protection	John	5 min
2. Red Bluff and Hamilton City Bypass Flow	John	TBD min
3. Fremont Weir Big Notch Initial Discussion a. Actions to date b. Identify agency concerns	Ali	TBD min
4. Aquatic Study Plan – Overview	John	TBD min
5. Review Action Items and Adjourn	John	5 min

Future Topics

1. Fremont Weir Big Notch continuing discussion
2. Isolation of Sites operational effects from those of Reclamation (i.e., exchanges)
3. Lifecycle model
4. Water quality – in river/delta
5. Water quality – in reservoir
6. Water quality effects to sturgeon
7. New daily model
8. Pulse Flow Protection

a. Mainstem vs Tribs Trigger Frequency
b. Ascending Limb Only

9. Schedule

From: Martinez, Josh@DWR [Joshua.Martinez@water.ca.gov]
Sent: 3/29/2023 10:00:51 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; Angela Bezzone [bezzone@mbkengineers.com]; steve.micko@jacobs.com
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Hi Ali,

I apologize for the delay. CBEC is still looking into it. I think HDR did most of the model development and CBEC did the QC, hence the delay. I'll ping them again.

Thanks,

-Josh

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, March 29, 2023 9:48 AM
To: Martinez, Josh@DWR <Joshua.Martinez@water.ca.gov>; Angela Bezzone <bezzone@mbkengineers.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Hi Josh – Just wanted to check in on this. I think we're ready to send information over. Just wanted to confirm the boundary conditions.

I am out next week (April 4 to April 11, returning April 12), but Angela and Steve can work with you to get the modeling inputs.

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: Martinez, Josh@DWR <Joshua.Martinez@water.ca.gov>
Sent: Thursday, March 23, 2023 4:03 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; steve.micko@jacobs.com; Angela Bezzone <bezzone@mbkengineers.com>; Heydinger, Erin@DWR <Erin.Heydinger@water.ca.gov>; Pitts, Adrian <adrian.pitts@icf.com>; Hassrick, Jason@ICF <jason.hassrick@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>
Cc: McCalvin, Catherine@DWR <Catherine.McCalvin@water.ca.gov>; Vasquez, Elizabeth@DWR <Elizabeth.Vasquez@water.ca.gov>; Okita, David@DWR <David.Okita@water.ca.gov>
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Hi Ali,

I heard from the modeling team earlier this morning. It sounds like they will have a list of specific model inputs we will need from your team sometime tomorrow or early next week.

Also, please ignore my question re: baseline modeling from my previous email. Erin and I spoke and it would be best to have a baseline run with consistent inputs to improve our confidence in model results.

I'll be in touch soon. Thanks again.

-Josh

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, March 22, 2023 10:04 AM
To: Martinez, Josh@DWR <Joshua.Martinez@water.ca.gov>; Spranza, John <john.spranza@hdrinc.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>; Heydinger, Erin@DWR <Erin.Heydinger@water.ca.gov>; Pitts, Adrian <adrian.pitts@icf.com>; Hassrick, Jason@ICF <jason.hassrick@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>
Cc: McCalvin, Catherine@DWR <Catherine.McCalvin@water.ca.gov>; Vasquez, Elizabeth@DWR <Elizabeth.Vasquez@water.ca.gov>
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Hi Josh – We're honing in on this and expect to wrap up our part here shortly. Did you have a chance to check in with modeling team on the boundary conditions? Also, what is the baseline in TuFLow? Is this gage data?

If it make sense to have a quick call on these items to wrap these up, let me know and I can work to get something scheduled.

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: Martinez, Josh@DWR <Joshua.Martinez@water.ca.gov>
Sent: Friday, March 10, 2023 10:42 AM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; steve.micko@jacobs.com; Angela Bezzone <bezzone@mbkengineers.com>; Heydinger, Erin@DWR <Erin.Heydinger@water.ca.gov>; Pitts, Adrian <adrian.pitts@icf.com>; Hassrick, Jason@ICF <jason.hassrick@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>
Cc: McCalvin, Catherine@DWR <Catherine.McCalvin@water.ca.gov>; Vasquez, Elizabeth@DWR <Elizabeth.Vasquez@water.ca.gov>
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Hi Ali,

Thanks for the update, Erin and I just connected on this issue yesterday. I'm glad to see your team is making progress. I'll reach out to our modeling team to get the exact inputs that we would need to run our models.

Regarding the No Action data, wouldn't that simply be the existing TUFLOW dataset we have already modeled (i.e., our existing Big Notch flow model already excludes Sites operations)? I want to make sure I am understanding this request.

Thanks again, and have a safe weekend all.

-Josh

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Friday, March 10, 2023 10:26 AM
To: Martinez, Josh@DWR <Joshua.Martinez@water.ca.gov>; Spranza, John <john.spranza@hdrinc.com>; Micko, Steve/SAC <Steve.Micko@jacobs.com>; Angela Bezzone <bezzone@mbkengineers.com>; Heydinger, Erin@DWR <Erin.Heydinger@water.ca.gov>; Pitts, Adrian <adrian.pitts@icf.com>; Hassrick, Jason@ICF <jason.hassrick@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>
Cc: McCalvin, Catherine@DWR <Catherine.McCalvin@water.ca.gov>; Vasquez, Elizabeth@DWR <Elizabeth.Vasquez@water.ca.gov>
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Hi Josh – I just realized that I talked with the team earlier this week and then completely forgot to close the loop with you. Apologies.

We're working on a few last items on both the Daily Divertible Tool and the Historical Analysis. We expect to finish these up early next week and then have an internal call scheduled next Wednesday to compare the results of the two and decide which one to use. And we expect to get you input data by next Friday, March 17.

Can you confirm the boundary conditions/input data that the team would need to run TuFlow? We want to make sure we're getting you want the team needs.

Also, we were planning to provide both a No Action and With Sites Project input data. Can both be run through TuFlow? We just want to make sure that we're comparing a with and without on the same baseline to assess the potential changes of the Sites Project.

Hope everyone has a good weekend and stays safe in all this crazy weather!

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: Saturday, February 25, 2023 3:29 PM
To: Martinez, Josh@DWR <Joshua.Martinez@water.ca.gov>; Spranza, John <john.spranza@hdrinc.com>; steve.micko@jacobs.com; Angela Bezzone <bezzone@mbkengineers.com>; Heydinger, Erin@DWR <Erin.Heydinger@water.ca.gov>; Pitts, Adrian <adrian.pitts@icf.com>; Hassrick, Jason@ICF <jason.hassrick@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>

Cc: McCalvin, Catherine@DWR <Catherine.McCalvin@water.ca.gov>; Vasquez, Elizabeth@DWR <Elizabeth.Vasquez@water.ca.gov>
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Thanks Josh. Super helpful! I'll talk with the team next week and we will get back to you ASAP but no later than March 8 (and hopefully sooner).

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: Martinez, Josh@DWR <Joshua.Martinez@water.ca.gov>
Sent: Friday, February 24, 2023 3:53 PM
To: Alicia Forsythe <aforsythe@sitesproject.org>; Spranza, John <john.spranza@hdrinc.com>; steve.micko@jacobs.com; Angela Bezzone <bezzone@mbkengineers.com>; Heydinger, Erin@DWR <Erin.Heydinger@water.ca.gov>; Pitts, Adrian <adrian.pitts@icf.com>; Hassrick, Jason@ICF <jason.hassrick@icf.com>; Hendrick, Mike <Mike.Hendrick@icf.com>; Lecky, Jim <Jim.Lecky@icf.com>
Cc: McCalvin, Catherine@DWR <Catherine.McCalvin@water.ca.gov>; Vasquez, Elizabeth@DWR <Elizabeth.Vasquez@water.ca.gov>
Subject: RE: Sites and Big Notch Project - Modeling Discussion

Hi all,

The DWR team just met with our modeling team to discuss options for this latest flow analysis, and it turns out they recently expanded our modeled period of record by five additional years. Rather than ending in 2012, our updated period of record is 1996-2017. We now have more options than we originally discussed in today's meeting.

Given your familiarity with the various Sites flow datasets, which of the following approaches would the Sites team have the most confidence in?

1. Expand our 2009-2012 analysis to 2009-2017 using the latest protective measures. This allows us to use Sites Daily Divertible Tool, with higher confidence in Sites diversions.
2. Proceed with the option we settled on in our meeting of using the Sites Historical Analysis data as bookends, using the expanded 2000-2017 analysis (as opposed to our previously agreed upon 2000-2012 period). While this would cover a broader period of record, it sounds like there may be lower confidence with the Historical Analysis diversion data compared to the Daily Divertible Tool used in Option 1.

The DWR team is comfortable with either approach and our modelers expect a similar turnaround time for both options. Our current estimate is having results no later than the end of April. Please let us know how you would like to proceed.

Thank you again for a productive meeting this morning. I hope you all have a dry weekend!

-Josh

Joshua Martinez
Restoration Ecology Unit Manager
Division of Integrated Science and Engineering
Office: (916) 376-9725
Mobile: (916) 835-8778
Joshua.Martinez@water.ca.gov

-----Original Appointment-----
From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Wednesday, February 22, 2023 8:43 AM
To: Alicia Forsythe; Spranza, John; Micko, Steve/SAC; Angela Bezzone; Martinez, Josh@DWR; Heydinger, Erin@DWR; Pitts, Adrian; Hassrick, Jason@ICF; Hendrick, Mike; Lecky, Jim
Subject: Sites and Big Notch Project - Modeling Discussion
When: Friday, February 24, 2023 10:00 AM-11:00 AM (UTC-08:00) Pacific Time (US & Canada).
Where: Microsoft Teams Meeting

We'll focus on modeling and the best Sites tool/Big Notch tool to update the modeling with the Sites recent diversion criteria

---

Microsoft Teams meeting

Join on your computer, mobile app or room device
Click here to join the meeting

Meeting ID: 229 028 116 612
Passcode: SvgU2R
Download Teams | Join on the web

Or call in (audio only)
+1 916-538-7066,,917981187# United States, Sacramento
Phone Conference ID: 917 981 187#
Find a local number | Reset PIN

Learn More | Meeting options

From: Leaf, Rob [Rob.Leaf@jacobs.com]
Sent: 3/29/2023 11:01:34 AM
To: Alicia Forsythe [aforsythe@sitesproject.org]; steve.micko@jacobs.com
CC: Angela Bezzone [bezzone@mbkengineers.com]
Subject: RE: Response to NGO Requests: Sites Seepage

Ali,

For #1, the sensitivity analysis I recall doing was on a model that pre-dated the 2017 WSIP.
I am guessing it was back in 2006 when we were testing out the new Sites/Colusa-Basin module during some of the first runs we did with the CalSim II model.
The CalSim II peer-review findings were a hot topic in the day and we were trying to verify the availability of flows for diversion to Sites.
I don't have any of the modeling that we did.
But I remember we essentially zeroed out any GW seepage to the river to test it's significance to the overall operation of the project.

I think your comment is on target. Maybe just note that the analysis we did previously predated even the WSIP 2017 report.

Rob

From: Alicia Forsythe <aforsythe@sitesproject.org>
Sent: Tuesday, March 28, 2023 8:02 AM
To: Micko, Steve <Steve.Micko@jacobs.com>
Cc: Angela Bezzone <bezzone@mbkengineers.com>; Leaf, Rob <Rob.Leaf@jacobs.com>
Subject: [EXTERNAL] RE: Response to NGO Requests: Sites Seepage

Thanks much Steve!

See my draft email to the group below. Let me know what you think of the response to the CALSIM modeling question.

Hello NGO Group – I wanted to follow up from our March 9 CALSIM modeling meeting. Attached is the presentation from the meeting. We also had 2 action items/follow up items as noted below.

1. CALSIM II modeling doesn't preserve mass balance. It creates 200,000 af of water that isn't there in dry and critically dry years. –

This was a comment in the chat that we talked a little bit about on the call, but committed to close the loop more on this. After the call, our modeling team let me know that we did look into this a number of years ago and ran some sensitivity runs to see how this might be affecting the Project's analysis. In these sensitivity runs, we didn't see a big change in the Project when lowering the hydrology in these dry and critically dry years. As we discussed on the call, we don't divert much in these years and are focused more on moving water out of the reservoir. These sensitivity runs were conducted using our old diversion criteria and the Project as it was envisioned in 2017. Although the Project has changed substantially since 2017, we've made it more protective of flows in the river (we now have high bypass flow criteria prior to diversions), so we would expect similar results to the prior sensitivity runs – meaning our more protective diversion criteria have us diverting

little water in these drier years and thus, the overestimation of the CALSIM II model in dry and critically dry years isn't likely affecting our results. We realize this is a very nuanced modeling question and are happy to set up a small group call with the modeling team for anyone who would like to chat about this in more detail.

2. Do we know the reason the seepage loss estimate is so low? Soil/geo characteristics?

Seepages losses from the reservoir were calculated as part of the 2017 Draft EIR/EIS. The alternatives considered in 2017 were generally bigger reservoir footprints (up to 1.8 MAF) and a larger Funks Reservoir (an existing reservoir that we would have enlarged in the 2017 alternatives and renamed Holthouse Reservoir). For the 2019 RDEIR/SDEIS, we used the same calculation and analysis as was done for these previous alternatives. The seepage values were low and fairly insignificant, so we did not recalculate those as the loss are expected to be minimal. The loss calculation is included in Appendix 8B of the Sites RDEIR/SDEIS (which is attached). The maximum seepage is estimated to be 2,150 gpm (or about 3.5 TAF/yr).

Hope this helps. We look forward to our next discussion.

Ali

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

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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	Cheyanne 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 Acquistion 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	Cheyanne 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
Pleaceholder - 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		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
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	Cheyanne 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	

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	Cheyanne 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 Acquistion 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	Cheyanne 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
Pleaceholder - TROE/Acquisition Update	Kevin Spesert	Land Management Committee
Federal/State Legislative Update	Kevin Spesert	Legislative & Outreach Committee
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June 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
Action Items		
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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
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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	

Sites Reservoir EIR Video Outlines

Video #1 – A Collaborative Effort

Theme: Collaboration between local, state, and federal agencies

- Sites has support across all levels of government and the project would not be possible without this collaboration
- Participation in Sites Reservoir is as broad and diverse as the communities they serve: more than 24 million Californians and more than 500,000 acres of farmland
- The project is possible thanks to continued support from state and federal partners: Prop 1 funding is possible due to the dedicated source of water for the environment and federal investment enhances these environmental benefits
- The Authority has spent over a decade engaging the public, stakeholders, and landowners to achieve a project that can increase California's water supply resiliency while protecting and enhancing California's environment

Visuals: Overview of project site, California farmland, Sacramento River/Valley, group shots of interviewees

Speakers: Jerry Brown, Rob Cooke- California Department of Water Resources, Don Bader- U.S. Bureau of Reclamation

Length: 60 seconds

Video #2 – A First of Its Kind

Theme: 21st century system designed with core value of environmental stewardship

- The environment is the single largest beneficiary of water out of Sites Reservoir
- Sites is designed with environmental values in mind: does not dam a major river system and does not threaten fish migration or spawning
- Sites is a flexible storage solution designed to adapt to future climate conditions and will improve water supply resiliency for California's environment, communities, and farms when it's most needed; Modeling shows that Sites performs better under challenging climate change conditions
- Sites creates a first-of-its-kind environmental water asset for California that will help aquatic species and habitats withstand dry year conditions

Visuals: Overview of project site, shots of salmon and other animals in the Delta ecosystem, flowing river water, natural basin filling up with water, dry/cracked earth

Speakers: Ali Forsythe, Fritz Durst- Chair/Reclamation District No. 108, Heather Dyer- San Bernadino Valley

Length: 90 seconds

DRAFT

Video #3 – A More Sustainable Water Supply

Theme: Innovative solutions that address our state's need for a sustainable water supply

- Sites Reservoir is an environmentally beneficial, innovative solution that address our state's need for a sustainable water supply, especially during extremes such as flooding and drought
- Integrating Sites Reservoir into California's existing water management system will help to restore flexibility, reliability, and resiliency to our statewide water supply
- Sites Reservoir will allow participating agencies, both north and south of the Delta, to manage their stored water how and when they need it the most – protecting communities, enhancing the environmental habitat, and promoting economic empowerment through creation of a flexibly managed water supply
- A sustainable water supply uplifts some of our most disadvantaged communities

Visuals: Dry/cracked earth, heavy rain/flooding, water basin or storage, community landmarks in Maxwell, city and rural shots throughout the state

Speakers: Valerie Pryor- Zone 7 Water Agency, Zach Dennis- Tehama-Colusa Canal Authority, Hal Charter- Colusa County

Length: 90 seconds

DRAFT

From: Janis Offermann [janis@horizonh2o.com]
Sent: 3/30/2023 1:39:43 PM
To: Molly West [mwest@colusa-nsn.gov]; Jennie Mitchum [jmitchum@colusa-nsn.gov]; Execs [Execs@colusa-nsn.gov]
CC: Alicia Forsythe [aforsythe@sitesproject.org]; Kevin Spesert [kspesert@sitesproject.org]; Laurie Warner Herson [laurie.warner.herson@phenixenv.com]
Subject: RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting
Attachments: Draft_MOA brief_10182022.pdf

Good afternoon, all
I am writing on behalf of the Sites Project Authority (Authority), with reference to our upcoming meeting with you at your Administration offices on Tuesday, April 18, where we hope to bring you up to date on the status of the Sites Reservoir Project and hear about any concerns you might have.

Of particular note, we are wondering if you have any comments on the Project's Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement (RDEIR/SDEIS), which was made available for public review on November 12, 2021. To date, the Authority has not received any formal comments from you. The comment period for the RDEIR/SDEIS ended on January 28, 2022, but we are able to receive comments for a short while longer. Please note that we will need any comments very soon, as the Authority is planning to publish the final document in June. For your convenience, the RDEIR/SDEIS is available at Environmental Review - Sites Reservoir (sitesproject.org). We are happy to discuss this more at the upcoming meeting.

We would also like to introduce you to the possible use of a Memorandum of Agreement (MOA) that would allow the Authority to continue to work with the you on assessing and protecting tribal cultural resources following finalization of the RDEIR/SDEIS. It would allow consultations to move forward without rushing, but would allow the Authority to state that AB 52 consultation was completed under CEQA. The MOA would also identify ways that local tribes could participate in future project planning and implementation. A MOA conceptual brief is attached for your consideration.

We look forward to meeting with you in a few weeks.

Best regards
Janis

Janis Offermann, M.A., RPA
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

From: Molly West <mwest@colusa-nsn.gov>
Sent: Thursday, March 16, 2023 9:12 AM
To: Janis Offermann <janis@horizonh2o.com>; Jennie Mitchum <jmitchum@colusa-nsn.gov>

Cc: Execs <Execs@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Thank you! We can meet in our Administration building located at 3730 Hwy 45.

Thank you,

Molly West
Tribal Administrator
Colusa Indian Community Council
3730 Hwy 45
Colusa, CA 95932
Phone (530) 458-6517
Cell (530) 701-0379
Fax (530) 458-3866

From: Janis Offermann [mailto:janis@horizonh2o.com]
Sent: Thursday, March 16, 2023 9:00 AM
To: Molly West <mwest@colusa-nsn.gov>; Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Hi, Molly
That day and time work great. We will send out a meeting invitation from our end.
Thank you!
janis

From: Molly West <mwest@colusa-nsn.gov>
Sent: Thursday, March 16, 2023 8:18 AM
To: Janis Offermann <janis@horizonh2o.com>; Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Good Morning Janis,

No problem at all. How about Tuesday, April 18th at 10am?

Thank you,

Molly West
Tribal Administrator
Colusa Indian Community Council
3730 Hwy 45
Colusa, CA 95932
Phone (530) 458-6517
Cell (530) 701-0379
Fax (530) 458-3866

From: Janis Offermann [mailto:janis@horizonh2o.com]
Sent: Thursday, March 16, 2023 7:00 AM
To: Molly West <mwest@colusa-nsn.gov>; Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Good morning, Molly.
We are so pleased that the Executive Committee would like to meet with the team. Unfortunately, that date does not work for us, as Ali Forsythe, the Authority's Environmental Manager, will be taking off for a well-earned vacation that day. Can we please schedule something for after she has returned on April 13th ?

Many thanks
Janis

Janis Offermann, MA, RPA
Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

From: Molly West <mwest@colusa-nsn.gov>
Sent: Wednesday, March 15, 2023 5:09 PM
To: Janis Offermann <janis@horizonh2o.com>; Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: RE: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

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Hi Janis,

The Executive Committee would like to meet with you and your team. Our schedule is pretty busy the next couple of weeks. I would like to propose Tuesday, April 4th at 10am?

Thank you,

Molly West
Tribal Administrator
Colusa Indian Community Council
3730 Hwy 45
Colusa, CA 95932
Phone (530) 458-6517
Cell (530) 701-0379
Fax (530) 458-3866

From: Janis Offermann [mailto:janis@horizonh2o.com]
Sent: Wednesday, March 8, 2023 12:52 PM
To: Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Molly West <mwest@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: [WARNING: UNSCANNABLE EXTRACTION FAILED]RE: [EXTERNAL] RE: Sites Reservoir introduction meeting

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Hi Jennie
I hope you are settling into your new position as Cultural Preservation Officer. I imagine you are very busy coming up to speed on everything, but I thought I would reach out to see if you had a chance to consider when there might be time when you and your tribal leadership can meet with the Site Project Authority about the Sites Reservoir Project. We would value your input regarding tribal cultural resources and establishing the Tribal Working Group.
Please feel free to contact me if you have any questions.
Thanks
Janis

Janis Offermann, MA, RPA
Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

From: Jennie Mitchum <jmitchum@colusa-nsn.gov>
Sent: Monday, February 27, 2023 5:14 PM
To: Janis Offermann <janis@horizonh2o.com>
Subject: [EXTERNAL] RE: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Good evening,
I Apologize for not responding sooner, I'm getting to know how to do things please have patience with me.

Thank you
Jennie Mitchum
Cultural Preservation Director
(530)868-8590

From: Janis Offermann <janis@horizonh2o.com>
Sent: Monday, February 27, 2023 3:19 PM
To: Jennie Mitchum <jmitchum@colusa-nsn.gov>
Cc: Execs <Execs@colusa-nsn.gov>; Molly West <mwest@colusa-nsn.gov>; Alicia Forsythe <aforsythe@sitesproject.org>; Kevin Spesert <kspesert@sitesproject.org>; Laurie Warner Herson <laurie.warner.herson@phenixenv.com>
Subject: Sites Reservoir introduction meeting

EXTERNAL MESSAGE: **Do not click any links or open any attachments unless you trust the sender and know the content is safe.**

Hi, Jennie
I am writing on behalf of the Sites Project Authority (Authority). The Colusa Indian Community formally requested AB 52 consultation with the Authority for the Sites Project in 2017. The Authority met with tribal leaders several times prior to the pandemic, but we have not had the opportunity to meet in quite some time. With your arrival, along with changes in tribal leadership, we are hoping to resume meeting about the project. We thought that an initial meeting would be beneficial to bring you, and any of the tribal leadership who would like to attend, up to date on the status of the project and to discuss next steps for Colusa's involvement in the project.

If such a meeting is agreeable to you, please provide several available dates and times that work for you. The Authority can set up a virtual call or, if you prefer, we are happy to meet in person.
We look forward to meeting with you.

Best regards
Janis

Janis Offermann, MA, RPA
Cultural Resources Practice Lead
Horizon Water and Environment
1801 7th Street, Suite 100
Sacramento, CA 95811
530.220.4918

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DRAFT

Brief Outline on Development of a Memorandum of Agreement between the Sites Project Authority and Native American Tribes Consulting on the Sites Reservoir Project under AB52

October 18, 2022

Purpose and Need

Mitigation measures for addressing significant impacts to tribal cultural resources by the Sites Reservoir Project (Project) have been identified but need to be refined and further developed through consultations between tribes formally consulting on the Project pursuant to AB 52 (the Yocha Dehe Wintun Nation [Yocha Dehe] and Cachil Dehe Band of Wintun Indians [Cachil Dehe]) and the Sites Project Authority (Authority). Although the Authority and Yocha Dehe have been working diligently on consultation efforts, activities have taken longer than expected for a variety of reasons including delays in getting agreement from DWR to release data, formatting data for use by the tribe, tribal access to Project lands to review areas of cultural significance, and the overall challenges of workload balancing during COVID restrictions. The Authority is proposing to complete the Final Environmental Impact Report for the Project in May 2023, and it is recognized by all parties that identification of tribal cultural resources within the Project footprint and preparation of appropriate mitigation and treatment measures cannot be concluded by that time.

Preparation of a Memorandum of Agreement (MOA) would formalize the collaborative partnership between the Authority, Yocha Dehe, Cachil Dehe, and the additional three tribes that are traditionally or culturally affiliated with the Project area to continue to work together to identify tribal cultural resources, and methods to mitigate impacts to and manage tribal cultural resources. The partnership defined by the MOA would allow conclusion of consultation under AB 52, while providing a framework for continued collaboration between the Authority and the tribes during Project planning, implementation, and operations.

Potential MOA Preamble topics:

- Identification of participants in the MOA
    - Yocha Dehe
    - Cachil Dehe
    - Authority
    - Invite Kletsel Dehe (Cortina Rancheria Band of Wintun Indians), Paskenta Band of Nomlaki Indians, and Grindstone Indian Rancheria of Wintun-Wailaki Indians
- Mitigation Measures in the EIR
- Acknowledgement that participation in the MOA by Yocha Dehe and other tribes does not imply their approval of the project
- Formalization of collaborative partnership

Potential MOA Stipulations topics:

- Continuing consultation/engagement with Tribal partners
- Confidentiality of information provided by the Tribes
- Continue tribal cultural resources identification

- Various administration stipulations

Potential identification topics for discussion

- Interests/concerns of the Tribes
- Compensation plan/agreements
- Confidentiality
- Ethnographic Study
    - Work with tribal elders to document locations of significance
    - Compensation for informants
    - Hiring tribal members to assist with elder interviews and research

Potential topics for avoidance, minimization and mitigation discussion

- Interests/concerns of the Tribes
- Treatment of burials within the Project footprint, including identification of permanent, private and secure areas for reburial of human remains in perpetuity
- Participation in future archaeological studies (survey, testing, data recovery)
    - Monitoring
    - Hiring tribal members as archaeological trainees
- Curation of recovered materials during archaeological studies
- Ethnobotanical studies (could be included under Ethnographic study)
- Tribal participation in developing trails, interpretive signage, etc. for recreation
- Tribal participation in developing a museum/visitor center, if one is developed

Water Association of Kern County - Annual Water Summit - March 24, 2023

"To Build or Not to Build: Cost and Benefit Infrastructure Comparison"

SITES RESERVOIR PROJECT

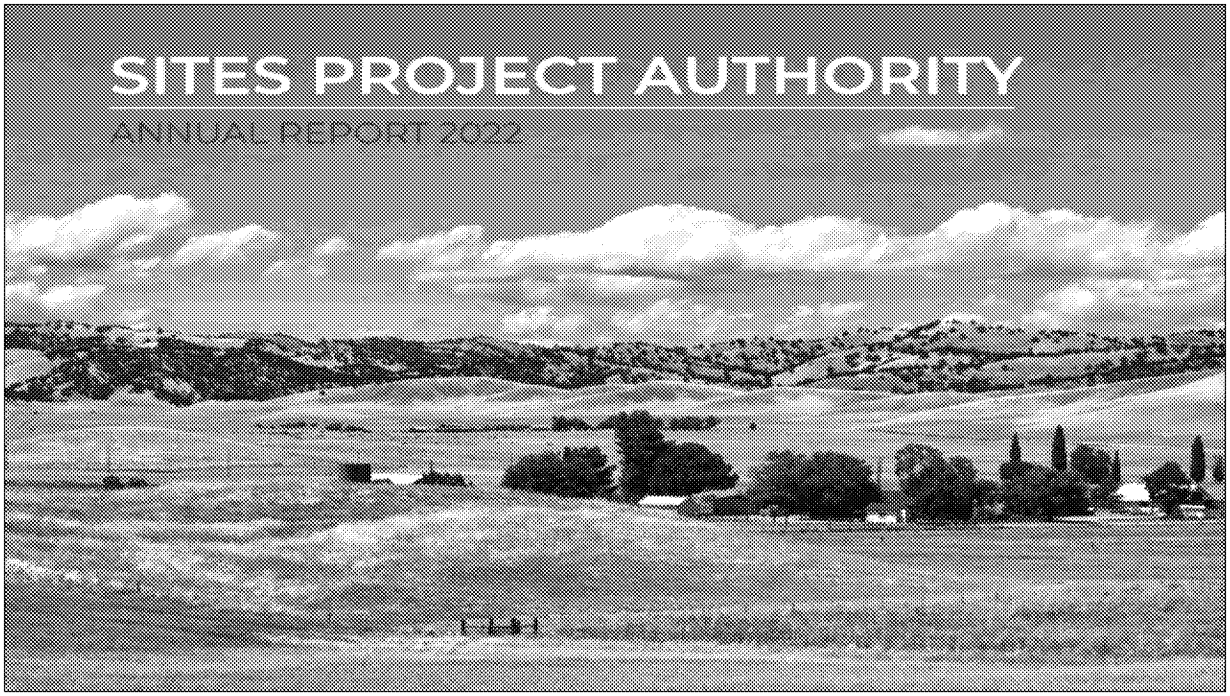
Robert J. Kunde, P.E.
Wheeler Ridge-Maricopa Water Storage District
Member, Sites Reservoir Project Committee

Although much of this material was developed by the Sites Project Authority, the presenter has made numerous edits, and the views expressed herein are those of the presenter and have not been reviewed or endorsed by the Sites Project Authority

Sites

SITES PROJECT AUTHORITY

ANNUAL REPORT 2022



Sites Reservoir

Sites Reservoir will be an off-stream reservoir storage facility located 10 miles west of the town of Maxwell, California in rural Colusa and Glenn Counties. Maxwell is about 70 miles north of Sacramento on Interstate 5. The Reservoir will be owned and operated by the Sites Project Authority – a public Joint Powers Agency authorized under California law.

It is funded by California's Water Storage Investment Program (Proposition 1 of 2014), the U.S. Bureau of Reclamation, and 29 public water agencies.

"Sites Reservoir brings together all interests in California, including agriculture, urban, northern, southern, environmental, inland, and coastal regions. With the urgency of climate change and drought, creating a new long-term, sustainable water supply is more important than ever before."

- Jerry Brown, Sites Project Authority Executive Director

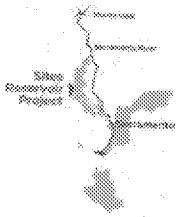
Sites

	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			

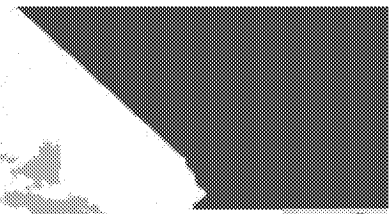
Sites

Sites Reservoir depends on participants and support from communities

Our participants are as diverse as the communities they serve, each bringing unique perspectives, solutions, and ideas in support of Sites Reservoir.



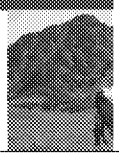
29 participants
span California



Participants include:

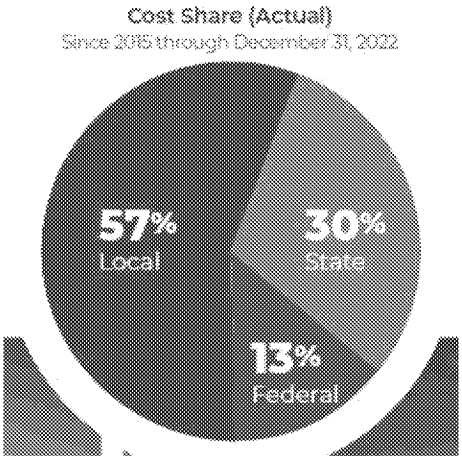
9 Sacramento Valley governing agencies

22 Reservoir Committee members



Sites

Sites Reservoir



Sites

Diverse Statewide Support for Sites Reservoir

Colusa County Water District | Cortina Water District
Davis Water District | LaGrande Water District

Sites

SITES RESERVOIR INFRASTRUCTURE – SITES VALLEY

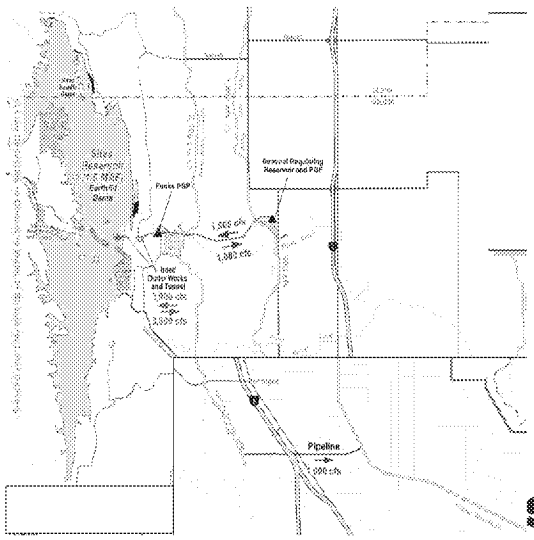
Sites

Sites 1.5 MAF Reservoir Project Map

1.5 million acre-feet

Utilizes the existing **Glenn-Colusa Irrigation District** and **Tehama-Colusa Canal Authority** canals to convey water to Sites Reservoir from the Sacramento River through state-of-the-art fish screens

Delivers water back to the Sacramento River through the **Tehama-Colusa Canal** and through the **Colusa Basin Drain** for participant deliveries and for the environment



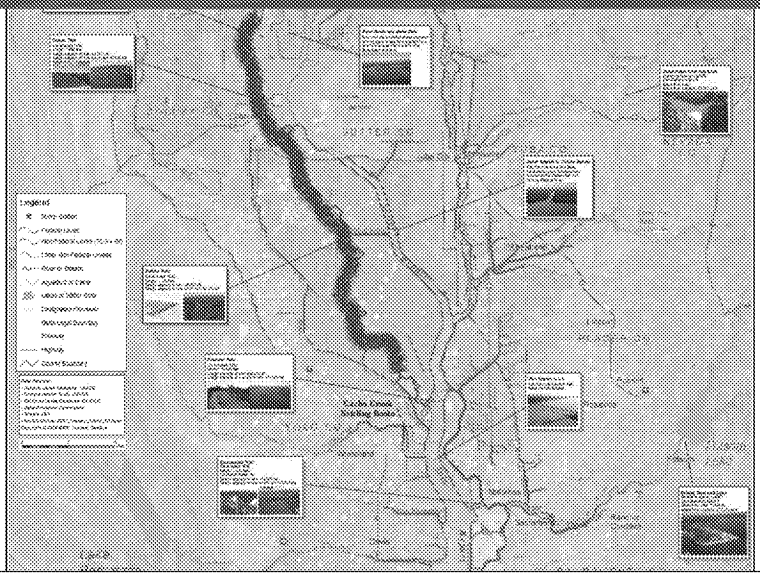
Sites

How does Sites Reservoir fit into California's water infrastructure?

Sites

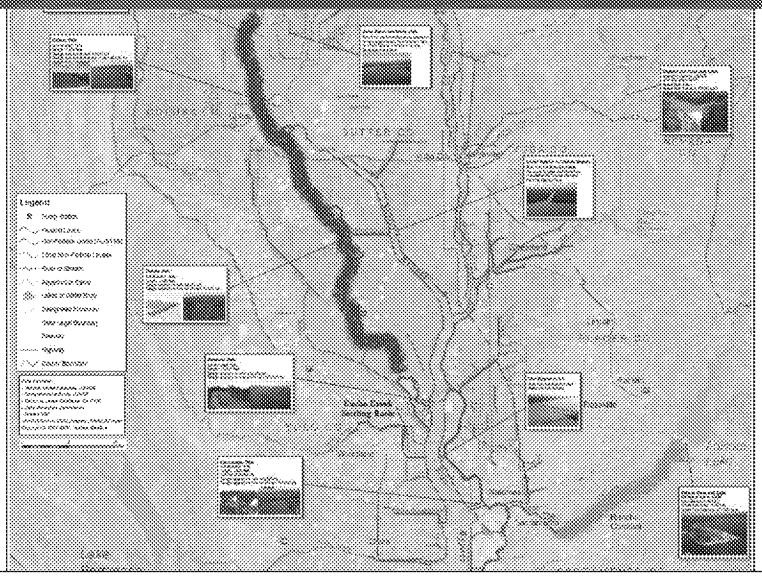
Infrastructure Coordination of Reservoir Releases

Infrastructure Coordination of Reservoir Releases from Shasta



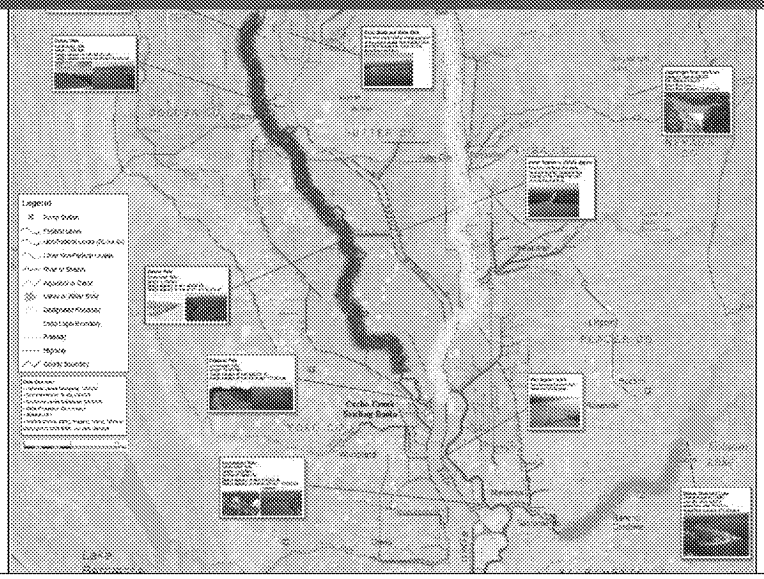
Sites

Infrastructure Coordination of Reservoir Releases from Shasta+Folsom



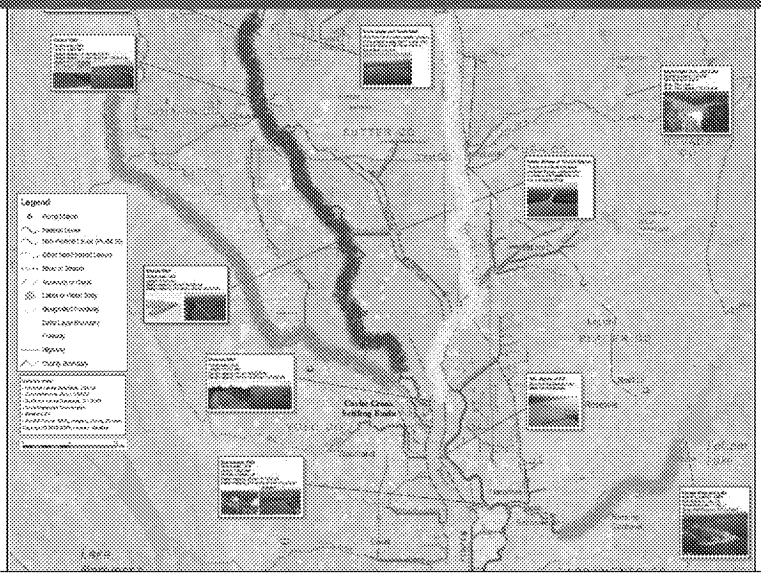
Sites

Infrastructure Coordination of Reservoir Releases from Shasta+Folsom+Oroville

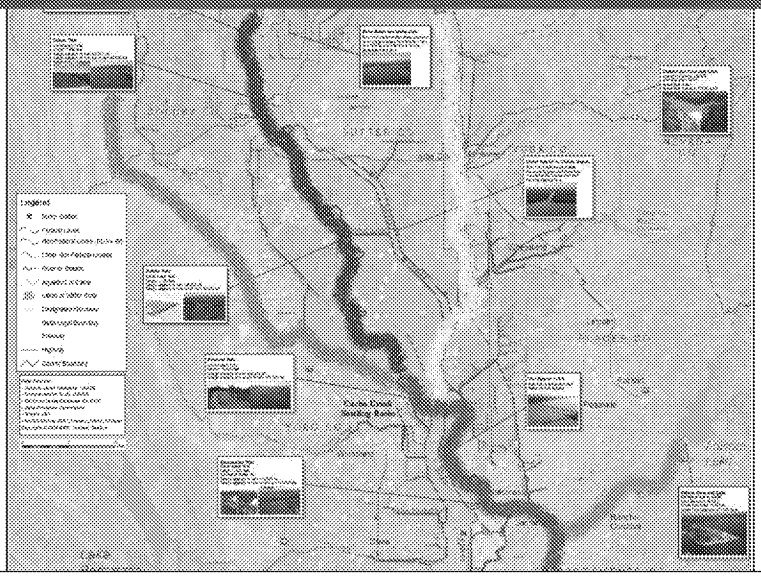


Sites

Infrastructure Coordination of Reservoir Releases from Shasta+Folsom+Oroville+Sites



Infrastructure Coordination of Reservoir Releases Combined to the Delta



Sites

What will water from Sites Reservoir cost?

Sites

Total Sites Project Cost, Yield, and Unit Rates for Water

Caution: Values shown are Deceptively Precise, but are Estimates 1/19/2022

Project Cost Estimate - 2021

$ 3,930,000,000 in 2021$ including cash calls
in future (nominal)$ including cash calls

1.5 MAF

Best Case	243,000 AF NOD =	199,260 AF SOD^ at 18% carriage loss
Worst Case	213,000 AF NOD =	181,050 AF SOD^ at 15% carriage loss

2011-2022 average carriage loss was 27%

Unit Rates for Sites Water - 2021$ - for alternative VP7 @ $3.9B

Below shows the effect of yield variation from a $3.9B capital cost Project
All calculations below INCLUDE costs from 2016 to 2031. All values in 2021$

Avg Annual Yield	NOD 2016 to 2062	SOD 2016 to 2062 18% carriage loss	SOD 2016 to 2062 25% carriage loss
243 TAF NOD	$ 669 /AF NOD	$ 635 /AF SOD^	$ 746 /AF SOD^
213 TAF NOD	$ 838 /AF NOD	$ 725 /AF SOD^	$ 851 /AF SOD^

Does not include cost to pump water to Kern County

Above unit costs based on accumulated costs / accumulated deliveries from 2016 to 2062
Above INCLUDES Hydropower Revenues
Above EXCLUDES WRM administrative costs for 2018-2024
Above uses model result of 2600 AF AAY for WRM at 243 TAF NOD
Above uses 5% interest rate, 3.5% WIFIA loan for $600M

If $600M WIFIA loan not available, increases unit rates by about $20/AF NOD
If exclude electrical generation value, increase unit rates by $12/AF in 2032 decreasing over time

If Sac River pipeline needed, increases units by up to 6%
^SOD = South of Delta at intake to Banks Pumping Plant

Sites

Notes on Sites Costs

1. Sites water is NOT paid for by $/acre-foot.
2. 85% of the annual cost is for fixed debt payment which must be paid regardless of deliveries.
3. The above cost analysis assumed Sites eligibility for a $600 million WIFIA loan. Current eligibility is for a WIFIA loan up to $2.2 billion which would lower financing costs.
4. Cost estimate to be updated in 2024. There are upward cost pressures.

Sites

Q: How can farmers afford that very high water cost?

A1: Sites provides drought year water supplies to keep permanent crops productive.

A2: By combining Sites water with a portfolio of lower cost supplies.

Sites

What are Sites Project benefits to California generally?

Sites

Sites Reservoir Provides Statewide Benefits for Generations to Come

Off-stream Storage

Does not create a barrier to native fish migration

Federal and State Agencies Manage Environmental Water

Adaptable to current and future conditions and priorities

Local Leadership and Cooperation

Aligns with Sacramento Valley's values and fosters regional and statewide collaboration

Cooperative Operation

Increases effectiveness and efficiency of existing water storage infrastructure

Adaptable to Climate Change

Contributes to system reliability and performance with climate change

Dry Year Water Supply

Reliable dry year water supply for California communities, farms and businesses

Recreational Opportunities

Provides northern Sacramento Valley with additional opportunities for recreation

Environmental Support

Provides environmental water in drier periods for native fish, and habitat for native species and birds

Sites

What are Sites Project benefits to Kern County?

Kern County – District Specific Benefits

Farms in Wheeler Ridge-Maricopa Water Storage District:

- receive (with 25% carriage loss) about:
  - 0 ac-ft per year in Above Normal and Wet years (22 out of 40 years)
  - 800 avg ac-ft per year in Below Normal years (2 out of 40 years)
  - 4800 avg ac-ft per year in Dry and Critically Dry years (18 out of 40 years)
  - (1900 ac-ft avg per year over 40 years)
- Access to a broader water market via purchases from other Sites participants.
- Ability to sell water or storage space to others in the event of financial difficulties.

Farms in Rosedale-Rio Bravo Water Storage District receive 17% of the water quantities above.

Sites

Kern County – General Benefits

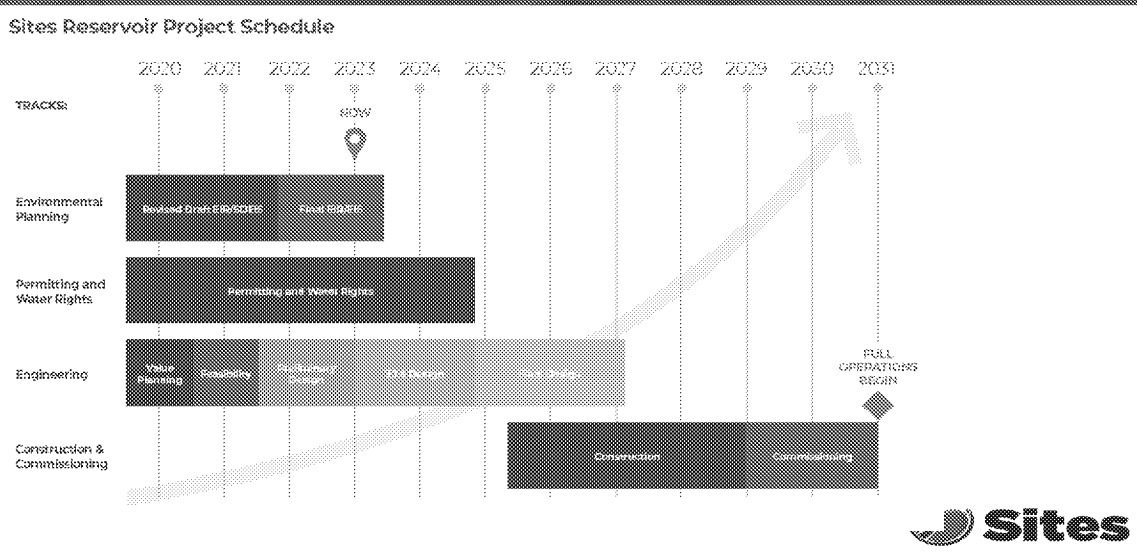
Kern County receives:

- Additional water supplies described above, and
- Improved conditions for Delta-dependent native fisheries which could improve SWP water supplies.

There are opportunities for some water supplies in Above Normal and Wet years not shown in the modeling results described above.

Sites

When will Sites Reservoir be operational?



Caution Regarding Schedule

Mega Projects are prone to schedule delays. The schedule shown is aggressive. One year of delay increases costs by $100 million so Sites is actively seeking ways to shorten the schedule.

Sites

Proposition 1 passed in 2014.

No water storage projects have started construction.

Why is it taking so long?

Sites

The Sites Project Chronology, or why it takes a long time to construct

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

1962-2008: Various efforts to develop the Project are not successful.

2010: The Sites Project Authority – a Joint Powers Agency comprised of Sacramento River watershed water agencies and counties - is formed.

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

2016: The Sites Reservoir Project Committee of the Sites Project Authority is formed. Wheeler Ridge and 20 other public water agencies join the Project.

- **Released** a Draft Environmental Impact Report/Environmental Impact Statement (Draft EIR/EIS) in partnership with the Bureau of Reclamation for a 1.5 MAF reservoir.

2018: After a competitive process, the California Water Commission awards Proposition 1 funds to eight storage projects. The Sites Project is **awarded $816 million in state investment** - the **largest** award given to any storage project.

2019-2020: The California Department of Fish and Wildlife advises it is unlikely to grant a permit for the level of diversions required for a 1.8 MAF reservoir. Public comments on the EIR identify several concerns. Reduced diversions make the Project unaffordable for agriculture. A Value Planning effort results in rightsizing - a reduction in Project facilities, environmental impacts and costs to make the Project more affordable. This requires a new EIR for a 1.5 MAF reservoir.

2020: Sites Reservoir is **specifically named as one of only two priority projects** in the Governor's **2019 Water Portfolio**—a plan to provide reliability and resiliency to statewide water supplies

Sites

The Sites Project Chronology, or why it takes a long time to construct

2018-2024: Phase 2 of the Project is the Planning and Permitting Phase. This includes preparation of two EIRs, one EIS, one supplemental EIS including receipt of public comments and responses thereto, revisions to the Project to address reasonable public comments, preparation of a Federal Feasibility Study, adoption of the EIR and EIS, submission of a Water Rights Application to the State Water Resources Control Board, granting of a water rights permit, discussion of permitting parameters and applications for state and federal Endangered Species Act permits for construction and operation from the California Department of Fish and Wildlife, the United States Fish and Wildlife Service, and the National Marine Fisheries Service, granting of such permits, consultations with Tribal Nations regarding the Project, preliminary engineering design and cost estimates, acquisition of temporary rights-of-way for land access, field surveys for biota and geotechnical information, preparation of financing documents and the form of Benefits and Obligations contracts, etc.

2022-2023: The Governor establishes a task force to expedite implementation of the state's Water Resiliency Portfolio which includes the Sites Project and many of the processes described above.

Summary: All of this takes so long because that is the way we, as a democratic society, wanted it to be. Our state and federal governments have passed laws and regulations to prescribe the requirements for construction of new infrastructure. For mega projects like Site Reservoir and the other WSIP projects, it takes a long time and a lot of money.

In addition, human and funding resource limitations both at the Sites Project and at permitting agencies contribute to the long lead times for planning and permitting.

2025 forward: Much of the above provides opportunities for parties dissatisfied with the Project to litigate their concerns. Sites is not yet at that stage.

Sites

THE

END

(is only the beginning)