AGENDA
ENGINEERING and OPERATIONS COMMITTEE
Thursday, January 7, 2021, at 9:00 am
Boardroom, 1701 North Lombard Street, Oxnard CA 93030

Meeting attendees should be aware that the meetings of the Committee are, as required by law, open to the public and the District has very limited powers to regulate who attends Committee meetings. Therefore, attendees must exercise their own judgement with respect to protecting themselves from exposure to COVID-19, as the District cannot ensure that all attendees at public meetings will be free from COVID-19.

In addition to its public Engineering and Operations Committee Meeting, people may choose to participate virtually using the Webex video conferencing application.

If you are new to Webex video conferencing, please visit this test page in advance of the meeting date and time:
https://www.webex.com/test-meeting.html

To access the meeting, click on this link:
https://unitedwaterconservationdistrict.my.webex.com/unitedwaterconservationdistrict.my/j.php?MTID=m0fec6bb5e5e8246835ed77cf5e60b32f

Meeting number: 142 485 9382 Password: EnOC (3662 from phones)
Join by phone call in to +1-408-418-9388 (toll rates apply) Access code: 142 485 9382

Call to Order – Open Session
Committee Members roll call

1. **Public Comment** (Proposed Time: 5 minutes)
   The public may comment on any matter not on the agenda within the jurisdiction of the Committee. All comments are subject to a five-minute time limit.

2. **Approval of Minutes** (Proposed Time: 5 minutes)
   The Committee will review the minutes from the December 3, 2020 Committee meeting.

3. **January 13, 2020 Board Meeting Motion Agenda Items**
   3.1 Approving the CEQA Notice of Categorical Exemption Determination for the OH Backup Generator at El Rio Booster Plant (Engineering Department) (Proposed Time: 5 minutes)
   The committee will review and consider recommending approval of the motion item to the full Board for CEQA Notice of Categorical Exemption determination for the OH Backup Generator Project at the El Rio Booster Plant.

   3.2 Execution of a Contract for the Purchase of Carryover Water from Ventura Water and Casitas Municipal Water District and Finding that the Associated State Water Project Transfer is Statutorily Exempt from CEQA (Operations Department/Environmental Services) (Proposed Time: 15 minutes)
   The committee will review and consider recommending approval of the motion item to the full Board for 1) authorizing the General Manager or his designee to execute a

contract for the purchase of carryover water from Ventura Water and Casitas Municipal Water, and 2) find that the associated single year State Water Project transfer from Ventura Water and Casitas Municipal Water to the District is exempt from CEQA and direct staff to post a Notice of Exemption consistent with applicable requirements.

3.3 Execution of a Contributed Funds Agreement for the Physical Modeling of the Freeman Diversion Rehabilitation Project with the Bureau of Reclamation.
(Operations Department) (Proposed Time: 10 minutes)
The committee will review and consider recommending approval of the motion item to the full Board authorizing the General Manager to enter into a contributed fund agreement (CFA) with the Bureau of Reclamation to perform physical modeling of the two proposed projects for the Freeman Diversion Rehabilitation Project.

3.4 Execution of a Contract Amendment with Northwest Hydraulic Consultants for the Freeman Diversion Hardened Ramp Physical Modeling Support Motion Item
(Engineering Department) **(**Proposed Time: 10 minutes)
The committee will review and consider recommending approval of the motion item to the full Board for authorizing the General Manager to execute a contract amendment with NHC to provide technical support to the District during the Hardened Ramp physical modeling.

3.5 Execution of a Contract Amendment with Stantec for the Freeman Diversion Modeling and Design of Vertical Slot Fish Ladder and Intake
(Engineering Department) **(**Proposed Time: 10 minutes)
The committee will review and consider recommending approval of the motion item to the full Board for authorizing the General Manager to execute a contract amendment with Stantec to advance the design of the Vertical Slot fish passage alternative and provide engineering support to the District during the Vertical Slot physical modeling.

4. Project Highlights

4.1 A Summary of the Activities to Prepare for the 2021 Wet Season at the Santa Felicia Project and Freeman Diversion (Environmental Services) (10 minutes)

5. Future Agenda Topics

ADJOURNMENT

Directors:
Lynn Maulhardt, Chair
Edwin T. McFadden III
Daniel C. Naumann

Staff:
Mauricio E. Guardado Jr.
Anthony Emmert
Craig Morgan
Robert Richardson
Linda Purpus
Dr. Maryam Bral
Brian Collins
Michel Kadah
Adrian Quiroz

The Americans with Disabilities Act provides that no qualified individual with a disability shall be excluded from participation in, or denied the benefits of, the District's services, programs or activities because of any disability. If you need special assistance to participate in this meeting, please contact the District Office at (805) 525-4431. Notification of at least 48 hours prior to the meeting will enable the District to make appropriate arrangements.

Approved: _____ _____

Mauricio E. Guardado Jr., General Manager Dr. Maryam Bral, Chief Engineer

_____

Brian Collins, Operations and Maintenance Manager

Posted: (date) December 30, 2020 (time) 5 p.m. (attest) ***Destiny Rubio***
At: United Water Conservation District Headquarters, 1701 Lombard Street, Oxnard CA 93030

Posted: (date) December 30, 2020 (time) 5:15p.m. (attest) ***Destiny Rubio***
At: www.unitedwater.org

MINUTES
ENGINEERING and OPERATIONS COMMITTEE MEETING
Thursday, December 3, 2020, 9:00 A.M.
Board Room
UWCD, 1701 North Lombard Street, Oxnard CA 93030

In addition to its public Engineering and Operations Committee meeting, UWCD provided virtual access to the meeting via the Webex virtual meeting platform.

COMMITTEE MEMBERS

Lynn E. Maulhardt, chair
Edwin T. McFadden III (participated via Webex)
Daniel C. Naumann

STAFF ATTENDING

Mauricio E. Guardado, general manager (participated via Webex)
Anthony Emmert, assistant general manager
Dr. Maryam Bral, chief engineer
Brian Collins, operations and maintenance manager
Joseph Jereb, chief financial officer (participated via WebEx)
Evan Lashly, assistant ecologist
Craig Morgan, senior engineer
Josh Perez, human resource manager
Zachary Plummer, IT administrator
Linda Purpus, environmental services manager (participated via Webex)
Tessa Lenz, associate environmental scientist
Robert Richardson, senior engineer (participated via Webex)

PUBLIC PRESENT

OPEN SESSION: 9:00a.m.
Chair Maulhardt called the Engineering and Operations Committee Meeting to order at 9:00a.m.

Committee Members Roll Call
Administrative Assistant Destiny Rubio commenced Roll Call. Committee members: Chair Maulhardt, Director McFadden, and Director Naumann were present.

1. **Public Comment**
   Chair Maulhardt asked if there were any public comments for the Committee. None were offered.

2. Approval of Minutes

Motion to approve the Minutes from the November 5, 2020, Engineering and Operations Committee meeting and the November 9, 2020, Special Engineering and Operations Committee meeting, Director Naumann; Second, McFadden. Roll call vote: three ayes (McFadden, Naumann, Maulhardt). None opposed. Minutes approved unanimously 3/0.

3. December 9, 2020 Board Meeting Motion Agenda Items

3.1 Pleasant Valley County Water District Supplemental Appropriation of Funds to Perform Valve Replacement Activities at the PV reservoir

Operations and Maintenance Manager Brian Collins provided an update on a requested supplemental appropriation of $225,000 of unbudgeted funds to perform valve replacement activities at the Pleasant Valley (PV) reservoir and asked the Committee to recommend approval of the motion item to the full board to support the unbudgeted maintenance activities. The committee members agreed to recommend approval of the motion item to the full Board.

3.2 Authorize the Supplemental Appropriation of Funds to Purchase the Eddy Pump Dredge attachment.

Mr. Collins provided updates on the requested supplemental appropriation of funds to purchase the Eddy Pump Dredge attachment and asked the committee to recommend approval of the motion item to the full Board for the supplemental appropriation of $80,000 to support the unbudgeted purchase of dredge equipment. Mr. Collins stated that the District was given the option to purchase the Eddy Pump at the end of the rental term and that a $40,000 credit toward the purchase of the equipment was negotiated at the beginning of the project.

Chair Maulhardt asked if a cost benefit analysis was completed for the purchase of the Eddy Pump. Mr. Collins stated that an analysis had not yet been completed; however, currently there are no other alternatives that are acceptable to the regulatory agencies. Chair Maulhardt replied that the District needs to let the public know the value of purchasing this equipment. Mr. Collins stated that Operations utilizes excavators on an ongoing basis and would like to leverage the credit that exists from renting the dredging equipment to purchase the dredge equipment which would provide future cost savings if the District owned the equipment as the channel will continue to require excavation in the future. He added that, to that end, United has also initiated a multi-year extension to the permitted dredging activity.

General Manager Mauricio E. Guardado, Jr. stated that others saved from this activity and this solution is rather inexpensive compared to the alternative which would be diverting no water. Mr. Guardado, Jr. also stated that it was difficult to obtain an Eddy Pump and without it, United would not have been able to divert water nor will United be able to divert water in the future without it.

Chief Financial Officer Joseph Jereb clarified that Brian Collins is presenting a rent versus buy scenario for the Eddy Pump and given the expense that has already been incurred from this year's work, the purchase of the Eddy Pump and associated equipment

will have paid for itself by the third dredging project, whether it be one year or two years from now. Mr. Collins added that the direction United is headed towards for the Freeman Diversion is significantly different due to regulatory oversight and this element is an additional cost but when compared to the sediment management element that is being proposed for the next year, it is much cheaper.

Director Naumann asked about the maintenance of the dredging unit. Mr. Collins stated that the information received from the vendor indicated that the equipment is capable of running eight to 10 hours a day, seven days a week for months and months without failure. He added that maintenance costs will factor into the ownership, but he does not anticipate it being a major expense. Mr. Collins also stated that utilization of the equipment at the Freeman Diversion allowed United to drop the lake level, saving $150,000 from the Santa Felicia boring program. Director McFadden asked if the District is currently renting the long reach excavator that does not have the hydraulic capabilities. Mr. Collins stated we rented an HPU from Eddy Pump and he is proposing we do not do this in the future and to purchase an excavator for District wide utilization and leverage the hydraulics on the unit to operate the pump going forward. The committee members agreed to recommend approval of the motion item to the full Board.

4. Project Highlights

4.1 Engineering Dept. Key Accomplishments (Jul-Dec 2020)

Chief Engineer Maryam Bral provided updates and slides (see attached) on key Engineering department accomplishments completed in the first half of the fiscal year. Chair Maulhardt asked if a formal request has been submitted to increase the Freeman Conveyance capacity from 350 cfs to 750 cfs. Assistant General Manager Anthony Emmert stated that the request has not been submitted, and added that United has worked closely with State Board staff and there is an environmental permitting hurdle associated with the application. United hopes to begin the application process with the support from California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service (NMFS).

Director Naumann clarified that the canal can handle the capacity, but the gates cannot. Dr. Bral confirmed this fact. Director Naumann stated that in the past when Mr. Kentosh was with the District, he was able to obtain a temporary permit to start the process which then gave him the opportunity to get the final permit down the road. Mr. Emmert stated this temporary permit is available and staff has pursued it, however, there are still restrictions. He added that none of the temporary solutions are easy to obtain because of the regulatory agencies. Mr. Guardado stated that the permit for the 750 cfs is also included in the Habitat Conservation Plan, and that United has discussed this with the National Marine Fisheries Service (NMFS) and they were in favor of it as it helps satisfy some of its criteria.

Director Naumann asked for clarification on the Iron Manganese Treatment Plant Project, specifically as to the blending facility along with treatment for iron, manganese and nitrate. He then clarified his question by asking if the nitrate is being blended with water because the District is dealing with two different systems, the upper and lower aquifers.

Dr. Bral stated this is correct, United is removing iron and manganese from the groundwater in the lower aquifer system and by removing those elements, it allows United to blend water with the upper aquifer system when necessary to manage nitrate levels below primary maximum contaminant level. Director Naumann asked if the capacity of the system is designed for the capacity delivered to the OH system. Dr. Bral stated that the District is working within the allocation. Director Naumann also asked for clarification as to whether the facility would also resolve issues with the Navy Brackish program. Dr. Bral stated the brackish facility is separate from this facility. Dr. Bral added that in terms of treatment, the water quality in that specific area and any iron and manganese issues would be addressed through the Brackish Treatment, reverse osmosis and additional pretreatment and post treatment activities.

4.2 End of Year Maintenance Activities at the Freeman Diversion Facility

Assistant Ecologist Evan Lashly provided updates and slides (see attached) on the end of season maintenance activities performed at the Freeman Diversion facility. Mr. Lashly stated that Environmental Services played a significant effort in planning and implementing the project and worked closely in consulting and coordinating with CFDW and NMFS. Mr. Lashly stated that representatives from several regulatory agencies came to observe the activities on November 16, 2020, including one special agent from the National Oceanic Atmospheric Administration (NOAA) Office of Law Enforcement, and two environmental scientists and one game warden from CDFW.

Chair Maulhardt asked if the District received any official correspondence from the regulatory agencies remarking on good or bad activities. Mr. Lashly stated that we received verbal feedback but have not received any official correspondence. Environmental Services Manager Linda Purpus stated that United does have an administrative record associated with the consultation for the activity. Mr. Guardado, Jr. stated that staff will be creating a summary report and, in the report, create an opportunity to receive some acknowledgement. Mr. Collins also provided updates and slides (see attached) on the end of season activities also performed by Operations and Maintenance in collaboration with Environmental Services.

5. Future Agenda Topics

No future agenda topics were offered.

ADJOURNMENT 10:34 a.m.

Chair Maulhardt adjourned the Engineering and Operations Committee meeting at 10:34 am.

I certify that the above is a true and correct copy of the minutes of the Engineering and Operations Committee Meeting of December 3, 2020.

ATTEST:_____

Lynn Maulhardt, Chair

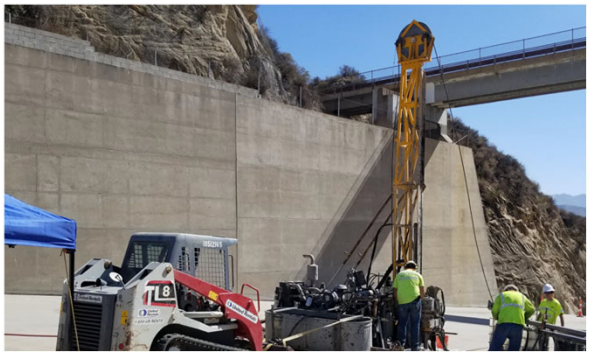
1

SFD Safety Improvement Project

Completed Drilling Program Plan

Purpose:

Design Advancement of the New Outlet Works and Spillway Modifications



"Congratulations! The program was well executed and right on schedule. Impressive effort given the scale, complexity and logistical challenges." ***Mikhail Ermakovich, P.E. Senior Engineer, Division of Safety of Dams***

2

SFD Safety Improvement Project

Federal Permitting Process

- ✓ Jul 2020 - Submitted Draft Biological Assessment Report
- ✓ Nov 2020 - Submitted 401 Water Quality Certification Application

Purpose:
Completion of NEPA Documentation

3

Santa Felicia Dam Safety and Regulatory Driven Documents

Purpose:
Maintain Regulatory Compliance

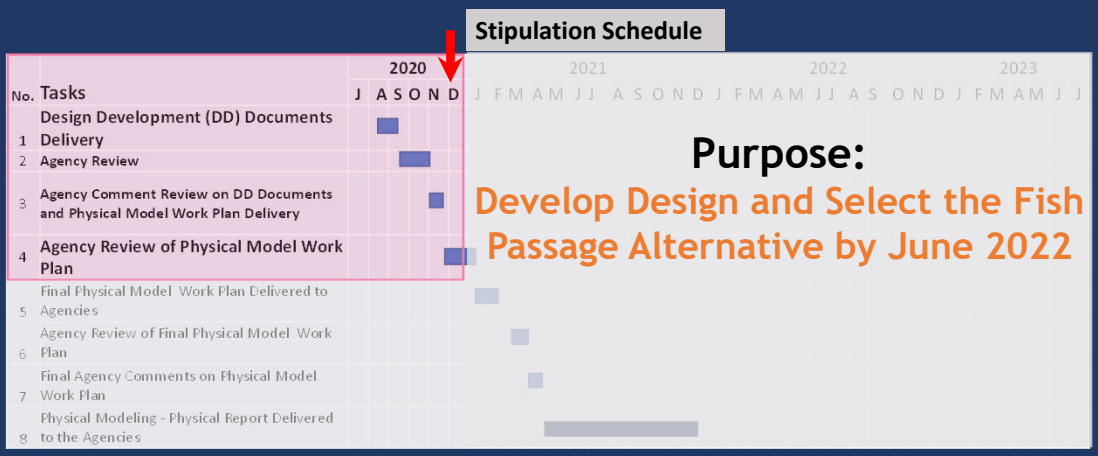
Biennial Aerial & Topographic Survey	Updated Santa Felicia Dam EAP	Owner Dam Inspection Self Reporting
2020 Bathymetric Survey	2019 STID	ODSP (Revision 7)

4

Freeman Diversion Rehabilitation

Critical Milestones Met

- Sep 18 - Submitted Design Development Reports for Fish Passage Alternatives
- Nov 23 - Submitted Physical Model Work Plan



Purpose:

Develop Design and Select the Fish Passage Alternative by June 2022

5

Freeman Diversion Conveyance Upgrades

Grand Canal Upgrades

- ✓ Finalized Engineering Design
- ✓ Purchased new Canal Headgates and Box Culverts
- ✓ Solicited Bids and Awarded Construction Contract

3-Barrel Culvert and Inverted Siphon

- ✓ Design Contract Awarded to NHC
- ✓ Developed Design Alternatives
- ✓ Completed 30% Engineering Design

Purpose:

- ❑ Removal of Hydraulic Constraints
- ❑ Conveyance Capacity Expansion to 750 cfs

6

PTP Metering Improvements

Installations

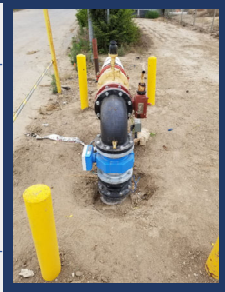
- 3 New Installations in CY 2020
- 20 Total Installations (33% completion)

Easements

- 31 Easement Deeds Processing in CY 2020
- 9 Easements Recorded (22% complete)

Funding DWR Proposition 1 Ag WUE Grant

- $635,059 Prop 1 grant awarded
- $ 65,394 Invoiced in CY 2020
- $405,551 Total Invoiced to Date ($229,508 remaining)



7

Coastal Brackish Groundwater Extraction and Treatment Plant

United Water CONSERVATION DISTRICT

Purpose:

- ❑ Seawater Intrusion Management
- ❑ Create NEW Local Water Supply

DEPARTMENT OF THE NAVY
COMMANDER NAVY REGION SOUTHWEST
750 PACIFIC HIGHWAY
SAN DIEGO CA 92132-0058

11010
Ser N00/715
November 9, 2020

Mr. Mauricio E. Guardado, Jr.,
United Water Conservation District
General Manger
1701 N. Lombard St. Suite 200
Oxnard, CA 93030

Dear Mr. Guardado:

SUBJECT: LETTER OF INTENT TO SUPPORT

As the Commander of Navy Region Southwest, I am writing in response to United Water Conservation District's (United's) request to continue supporting United's Coastal Brackish Groundwater Extraction and Treatment Project (Project) in Ventura County, California.

Upon United successfully demonstrating to California State regulators that the Project is feasible as part of United's State of California Proposition 1, Planning Grant, the Navy will consider requesting authorization to support a long-term real estate agreement with United to implement the Project at Naval Base Ventura County (NBVC), Point Mugu.

Reliability, resiliency, and accessibility of water are critical to supporting military missions at NBVC. Additionally, the Navy is committed to being a good steward of water resources to achieve groundwater sustainability. United's Project has the potential to significantly benefit both the military mission and the local community in Ventura County, and the Navy is excited for the opportunity to continue exploring this important project with United.

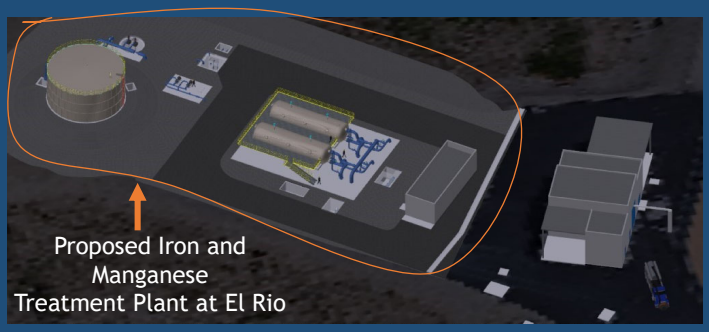
Sincerely,

B. BOLIVAR

Copy to:
The Honorable Michael Mobley, President, United Water Board of Directors
Commander Navy Installations Command (N4)
Naval Base Ventura County Point Mugu, CA
Naval Facilities Engineering Systems Command Southwest

8

Iron/ Manganese Removal Project



- 100% Design Review Meeting with DDW on Sept 30
- Review Comments on 100% Design Documents Submitted to Kennedy Jenks
- Establishing Grant Sub-agreement with Calleguas

Purpose:

Water Quality Improvement and Drinking Water Standards Compliance (Fe/ Mn/ Nitrate)

9

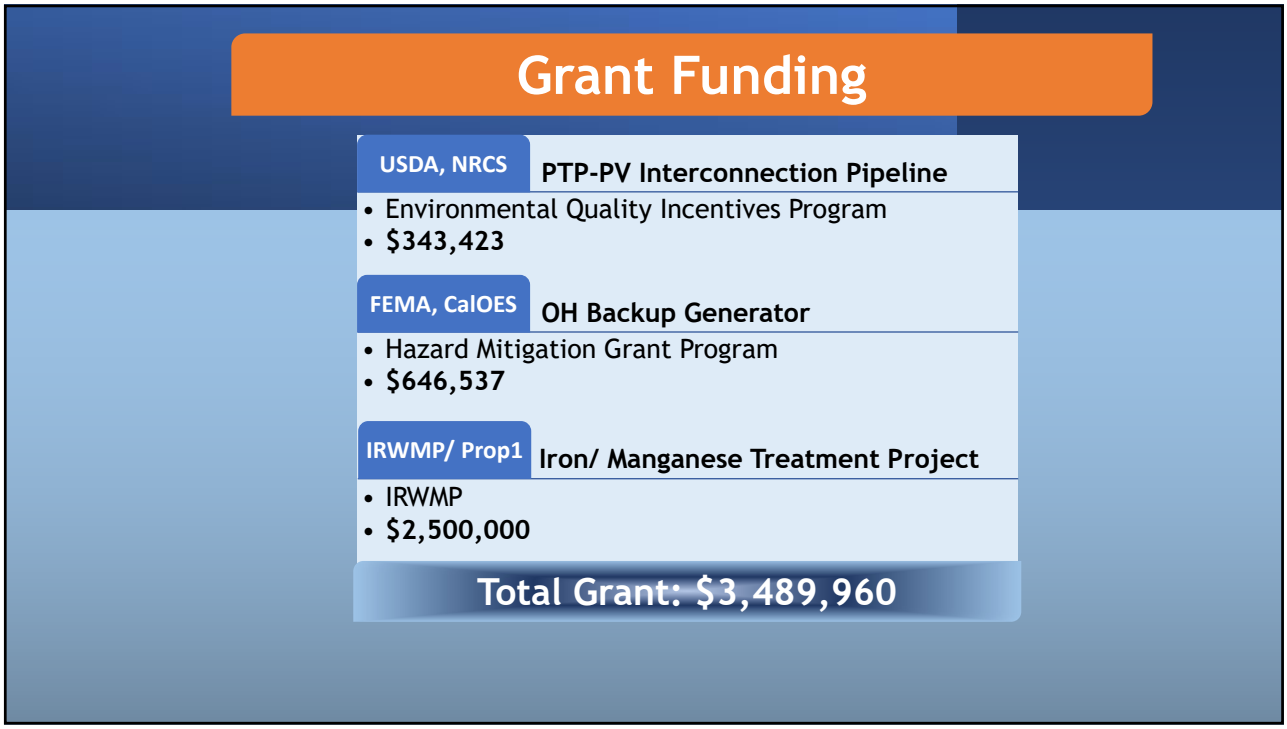
Pothole Trailhead Parking Area

- ✓ Installed a pre-fabricated restroom, signs and a gate
- ✓ Solicited bids and awarded construction contract (**lowest responsible bid under budget**)
- ✓ Started construction
- ✓ Completion by Dec 31

Purpose:

Provide Public Access and Enhance Recreational Opportunities to Pothole Trailhead - Part of Compliance with FERC License Requirements

10


Grant Funding
USDA, NRCS
PTP-PV Interconnection Pipeline
• Environmental Quality Incentives Program
• $343,423
FEMA, CalOES
OH Backup Generator
• Hazard Mitigation Grant Program
• $646,537
IRWMP/ Prop1
Iron/ Manganese Treatment Project
• IRWMP
• $2,500,000
Total Grant: $3,489,960

11

ENGINEERING AND OPERATIONS COMMITTEE

DECEMBER 3, 2020

1

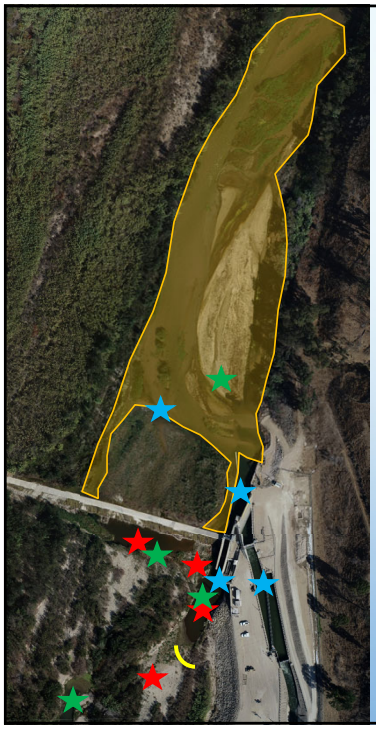
1

ENVIRONMENTAL SERVICES DEPARTMENT

CONSULTATION WITH REGULATORY AGENCIES
California Department of Fish and Wildlife and National Marine Fisheries Service

- Developed a detailed project description
- Conducted four meetings with agency staff in the months of October and November
- Collected information pertaining to:
  - Snorkel surveys/underwater inspections
  - Inundation surveys
  - Elevation survey of hydraulic controls
  - Water quality
  - Scouting potential sites for fish relocation
- Implemented the project plan

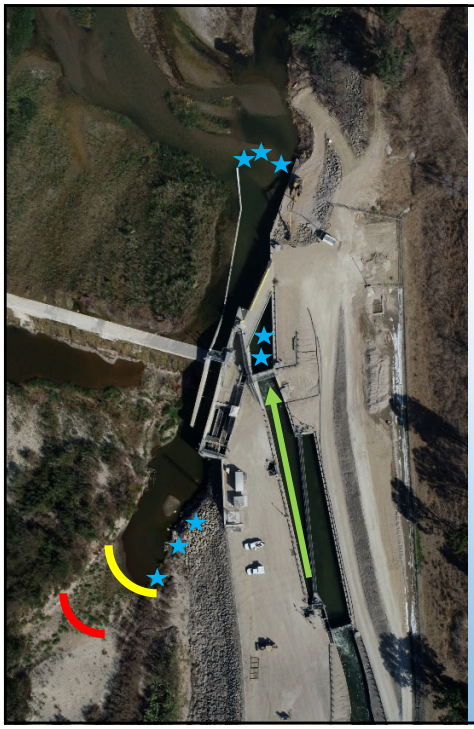
2



PRE-PROJECT ACTIVITIES

- Snorkel surveys/underwater inspections
- Inundation/Stranding surveys
- Hydraulic control surveys
- Water quality monitoring
- Place block netting downstream
  - Scout potential relocation sites
    - Santa Paula Creek
    - SCR mainstem at Willard Canyon

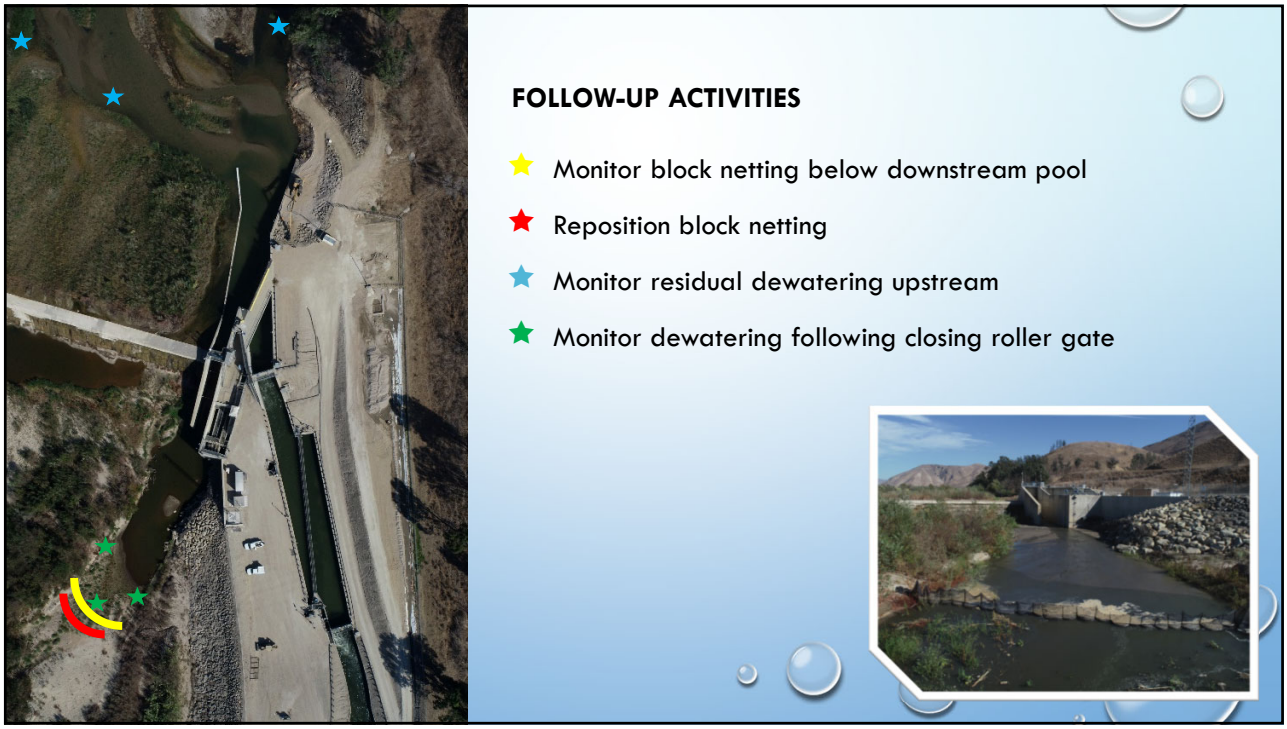
3



DAY OF ACTIVITIES

- Monitor dewatering while roller gate opens
- Monitor block netting below downstream pool
- Sweep fish screen bay
- Erect secondary block netting
  - Remove non-native fish species
  - Relocate native fish species (no O. mykiss encountered)

4


FOLLOW-UP ACTIVITIES
Monitor block netting below downstream pool
Reposition block netting
Monitor residual dewatering upstream
Monitor dewatering following closing roller gate

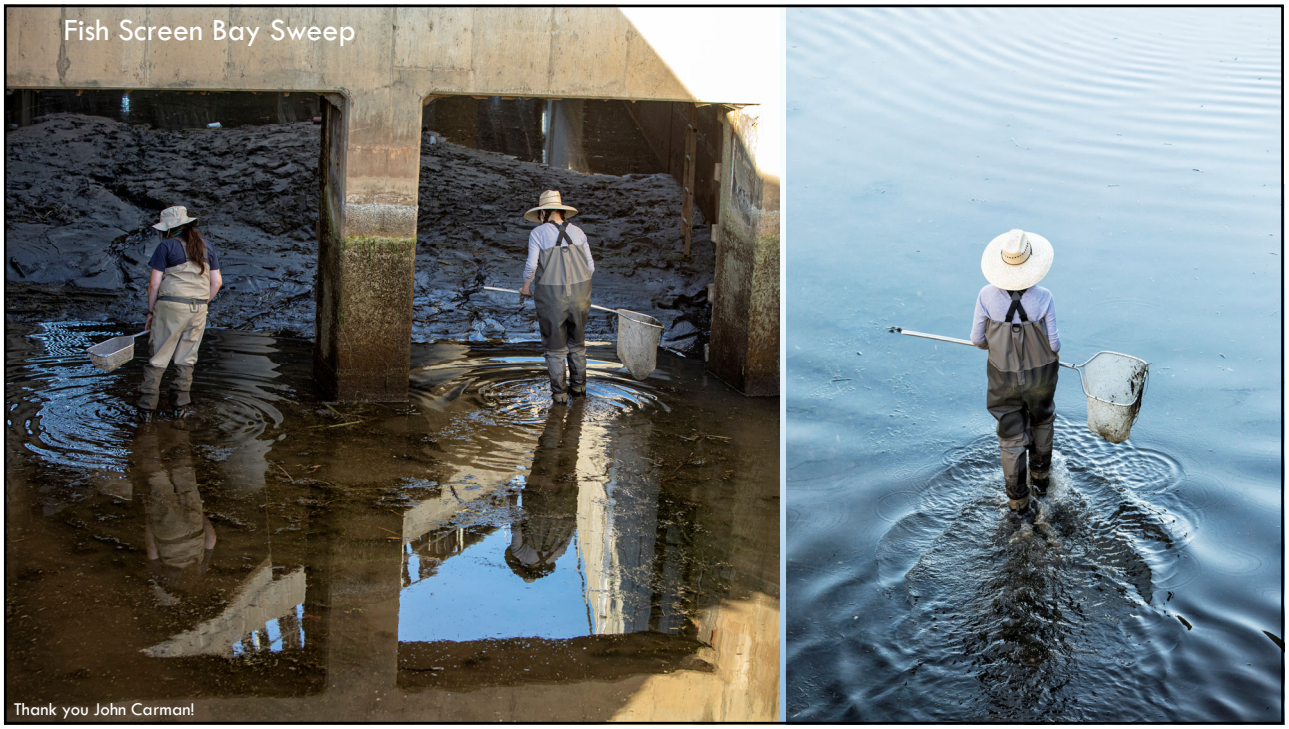
5


Inundation/Stranding Surveys

6

7

8


Fish Screen Bay Sweep
Thank you John Carman!

9


Fish Removal and Relocation
Common carp
Striped mullet

10

OPERATIONS & MAINTENANCE

- TURNED OUT DIVERSIONS FOR MAINTENANCE ACTIVITIES ON NOVEMBER 16, 2020
- PERFORMED VALVE AND AUTOMATIC ACTUATOR PREVENTATIVE AND CORRECTIVE MAINTENANCE
- REMOVED ACCUMULATED SEDIMENT IN THE FORE-BAY, CANAL AREA AND FISH SCREEN AREA
- PERFORMED FISH SCREEN MAINTENANCE ACTIVITIES
- REINITIATED DIVERSIONS NOVEMBER 20, 2020.

11

11

12

12

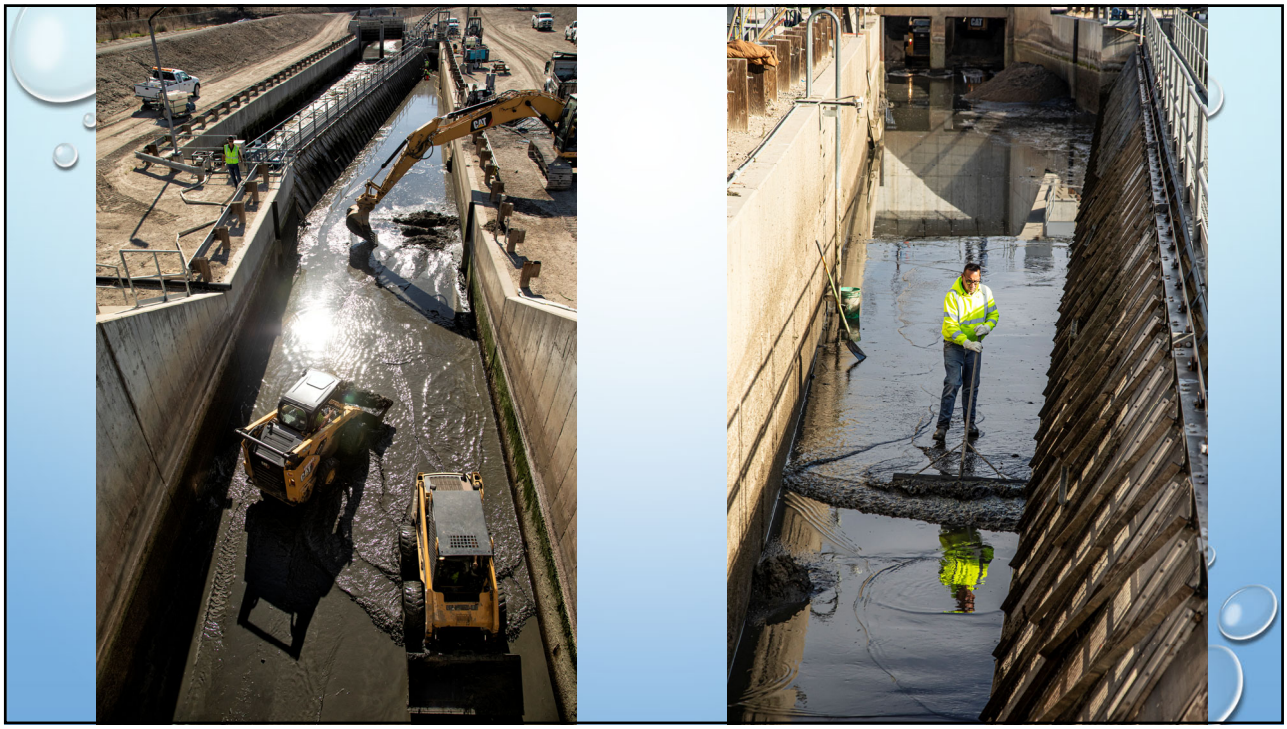
13

14

15

16

17



18

19

United Water CONSERVATION DISTRICT

Staff Report

To: Engineering and Operations Committee

Through: Mauricio E. Guardado, Jr., General Manager

From: Maryam Bral, Chief Engineer

Date: December 23, 2020 (January 7, 2021 Committee Meeting)

Agenda Item: **3.1 CEQA Notice of Categorical Exemption Determination for the OH Backup Generator Project at the El Rio Booster Plant**
Motion

Staff Recommendation:
The Engineering and Operations Committee will consider recommending to the full Board that it considers approving the California Environmental Quality Act (CEQA) Notice of categorical exemption determination for the OH Backup Generator project at the El Rio Booster Plant and allowing staff to file a Notice of Exemption (NOE) with the Ventura County Clerk and Recorder's Office.

Discussion:
The District is the lead agency for the OH Backup Generator project at the El Rio Booster Plant under CEQA. The proposed project consists of the installation of a backup diesel-powered generator at the El Rio Water Treatment and Groundwater Recharge Facility which supplies the Oxnard-Hueneme Pipeline (OH) system. The generator would automatically tum on in the event of a power outage to enable the District to continue to run the upper aquifer wells at the Wellfield thereby facilitating continued supply of the OH System to meet customer potable water needs.
The project is categorically exempt pursuant the CCR Section 15301 "Existing Facilities" Class 1 and the CCR 15302 "Replacement or Reconstruction exemption" Class 2.

Fiscal Impact:
The County Clerk and Recorder's Office filing fee for the CEQA NOE is $50.00 which is included in the Adopted Fiscal Year 2020-2021 Budget.

Attachment A – Notice of Exemption

Print Form

Notice of Exemption

Appendix E

To: Office of Planning and Research
P.O. Box 3044, Room 113
Sacramento, CA 95812-3044

County Clerk
County of: Ventura
800 South Victoria Avenue
Ventura, CA 93009

From: (Public Agency): United Water Conservation District
1701 N. Lombard Street, Suite 200
Oxnard, CA 93030
(Address)

Project Title: Oxnard-Hueneme System Generator Project

Project Applicant: United Water Conservation District

Project Location - Specific:

Generator will be installed UWCD's El Rio Facility at 3561 North Rose Avenue, Oxnard

Project Location - City: Oxnard Project Location - County: Ventura

Description of Nature, Purpose and Beneficiaries of Project:

The project consist of the installation of a new backup diesel-powered generator at UWCD's El Rio Water Treatment and Groundwater Recharge Facility which supplies UWCD's Oxnard-Hueneme (OH) system. The generator would automatically turn on in the event of a power outage to maintain supply of potable water via UWCD's OH system. An existing 750 kW diesel generator will be removed prior to installation of the new generator.

Name of Public Agency Approving Project: United Water Conservation District

Name of Person or Agency Carrying Out Project: United Water Conservation District

Exempt Status: **(check one):**

- ☐ Ministerial (Sec. 21080(b)(1); 15268);
- ☐ Declared Emergency (Sec. 21080(b)(3); 15269(a));
- ☐ Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- ☒ Categorical Exemption. State type and section number: Existing Facilities §15301, Replacement or Reconstruction §15302
- ☐ Statutory Exemptions. State code number: _____

Reasons why project is exempt:

Based on an examination of the proposed project, this project qualifies for the following exemptions under the California Environmental Quality Act:
§15301. Existing Facilities: The project, including the installation of the new generator, consists of the minor alteration of an existing facility that provides public utility services (water), involving no expansion of use beyond that currently existing.
§15302. Replacement or Reconstruction: The project consists of replacement and reconstruction of existing utility facilities, in this case replacement of an existing, inoperable generator with a new generator and related modifications at the El Rio Facility. These changes will involve no expansion of capacity.

Lead Agency Contact Person: Mauricio E. Guardado Area Code/Telephone/Extension: (805) 525-4431

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? ▪ Yes ☐ No

Signature: _____ Date: _____ Title: General Manager

▪ Signed by Lead Agency ▪ Signed by Applicant

Authority cited: Sections 21083 and 21110, Public Resources Code.
Reference: Sections 21108, 21152, and 21152.1, Public Resources Code.

Date Received for filing at OPR: _____

United Water CONSERVATION DISTRICT

Staff Report

To: Engineering and Operations Committee

Through: Mauricio E. Guardado, Jr., General Manager

From: Brian Collins, Operations & Maintenance Manager

Date: December 28, 2020 (January 7, 2021 Committee Meeting)

Agenda Item: **3.2 Authorization of a Purchase of Carryover Water from Ventura Water and Casitas Municipal Water District and Finding that the Associated State Water Project is Statutorily Exempt from CEQA**
Motion

Staff Recommendation:
The Engineering and Operations Committee will consider recommending to the full Board; 1) authorizing the General Manager or his designee to execute a contract for the purchase of carryover water from Ventura Water and/or Casitas Municipal Water District, and 2) finding that the associated single year State Water Project (SWP) transfer from Ventura Water and/or Casitas Municipal Water District to the District is exempt from the California Environmental Quality Act (CEQA) and direct staff to post a Notice of Exemption consistent with applicable requirements.

Background: The following information is provided in regard to the State of California, Department of Water Resources ("DWR") agreements related to State Water Project (SWP) water within Ventura County.

- DWR entitled Ventura County Flood Control District (VCFCD) now known as Ventura County Watershed Protection District (VCWPD) to receive up to 20,000 acre-feet of SWP water in an agreement entered into on December 2, 1963 (referred to as Table A water supply);

- VCFCD assigned its entire right of 20,000 acre-feet SWP water to Ventura River Municipal Water District, which entity later became Casitas Municipal Water District (Casitas) , in an agreement entered into on June 23, 1970;

- United Water Conservation District (United) purchased an annual entitlement of 5,000 acre-feet in an agreement entered into on July 1, 1970;

- Ventura purchased an annual entitlement of 10,000 acre-feet in an agreement entered into on July 7, 1971;

- Casitas retained an annual entitlement of 5,000 acre-feet.

- United subleased 1,850 acre-feet to the Port Hueneme Water Agency on June 12, 1996.

Ventura's remaining available 2021 carryover is 525 acre-feet. United submitted an offer to transfer 525 acre-feet of Ventura's 2021 Carryover to United in accordance with the proposed term sheet (Attachment A). United will pay Ventura $28,071 for its fixed costs and the transportation cost (estimated at $200/AF). United will take delivery of exchange water through Reach 29 of the California Aqueduct at Lake Pyramid through our facilities at Lake Piru or through Reach 30 at Castaic Lake. The project will use existing SWP facilities in this transfer.

Casitas Municipal Water's remaining available 2021 carryover is 3100 acre-feet. United submitted an offer to transfer 3100 acre-feet of Casitas' 2021 carryover to United in accordance with the proposed term sheet (Attachment A). United will pay Casitas $165,757 for its fixed costs and the transportation cost (estimated at $200/AF). United will take delivery of exchange water through Reach 29 of the California Aqueduct at Lake Pyramid through our facilities at Lake Piru or through Reach 30 at Castaic Lake. The project will use existing SWP facilities in this transfer.

The proposed agreements authorize the single year transfer of SWP water between parties authorized to receive and transfer such water under a SWP contract approved in 1963. The action taken pursuant to the SWP contract is exempt from the CEQA pursuant to Public Resources Code section 21169 and CEQA Guidelines section 15261(a) (statutory exemption for ongoing project). The transfer will use existing facilities and involves no construction or changes in land use.

The offer is consistent with United's Strategic Plan, specifically, with our strategic objective A.2 (Maximize and expand State Water Project import opportunities) of Goal A, Water Supply-Ensure Long-Term Water Supply for all users.

A copy of the term sheet is contained in Attachment A and will be used as the basis for preparation of a water transfer agreement with Ventura and Casitas. The transfer will not require approval by DWR because water will not leave the State Contractor's service area, i.e., Ventura County.

Fiscal Impact
The cost of delivery of the 3,625 AF is estimated to be $918,828 and includes the fixed cost payment of $193,828 and the estimated DWR transportation cost (est $200/AF). United has established a separate fund for water purchases which would be used to fund this purchase.

Attachment A - Proposed Term Sheet

Proposed Terms for Water Transfer
Between
United Water Conservation District
And
City of San Buenaventura
And
Casitas Municipal Water

Description

City of San Buenaventura (Ventura) agrees to transfer up to 525 acre-feet of its allocated 2020 SWP Table A Water Supply for delivery to United Water Conservation District (United). The water will be delivered by Ventura per UWCD's request and is projected to be in January and February, 2021.

Casitas Municipal Water (Casitas) agrees to transfer up to 3100 acre-feet of its allocated 2020 SWP Table A Water Supply for delivery to United Water Conservation District (United). The water will be delivered by Casitas per UWCD's request and is projected to be in January and February, 2021.

Financial Terms

United will pay Ventura $53.47/acre-foot for transferred water ($28,071) Additionally United will play all variable SWP costs to deliver water to its own service area (i.e. transportation cost).

United will pay Casitas $53.47/acre-foot for transferred water ($165,757) Additionally United will play all variable SWP costs to deliver water to its own service area (i.e. transportation cost).

DWR Coordination

No formal approval of this transfer is required by the Department of Water Resources (DWR) or Ventura County Watershed Protection District (VCWPD) as the transfer is between member units of the VCWPD, consistent with existing State Water allocation agreements between VCWPD and United; and VCWPD and United, which allow transfers if the transferred water is used within the VCWPD service area. United will coordinate the release of the transfer water with DWR.

Delivery

The water will be delivered using existing SWP facilities and as scheduled with, and approved by DWR.

United Water CONSERVATION DISTRICT

Staff Report

To: Engineering and Operations Committee

Through: Mauricio E. Guardado, Jr., General Manager

From: Brian Collins, Operations & Maintenance Manager

Date: December 28, 2020 (January 7, 2021 Committee Meeting)

Agenda Item: **3.3 Execution of a Contributed Funds Agreement for the Physical Modeling of the Freeman Diversion Rehabilitation Project with the Bureau of Reclamation.**
Motion

Staff Recommendation:
The Engineering and Operations Committee will consider recommending to the full Board that the Board authorize the General Manager or his designee to execute a contributed funds agreement (CFA) with the Bureau of Reclamation (Bureau) for the physical modeling of the two proposed project alternatives for the Freeman Diversion Rehabilitation Project, currently under engineering design by Stantec and Northwest Hydraulic Consultants.

Discussion:
District and Bureau staff have worked to develop a physical modeling plan to hydraulically model both the hardened ramp and the vertical slot project proposals within the Bureau's Technical Service Center (TSC) in Denver, Colorado.

In accordance with the court ordered stipulation, the District submitted the proposed Physical Modeling Plan and are currently awaiting formal feedback comments from National Marine Fisheries Services (NMFS) and California Department of Fish and Wildlife (CDFW) for District consideration and potential inclusion within the finalized Physical Modeling Work Plan, which is due by February 8, 2021.

The current schedule timeline within the Physical Modeling Plan proposes to initiate work on the hardened ramp on February 15, 2021 and to conclude the vertical slot modeling by February 15, 2022. Due to Bureau fiscal requirements, the Bureau is not permitted to initiate work until the funds identified within the proposed CFA have been received by the Bureau.

Fiscal Impact:
Approval of this item would result in a budgeted expenditure of up to $1,850,000. These proposed activities were included within Fiscal Year 2020-21 Budget (421-400-81020 Project 8001) and sufficient funds are currently available.

3.3 **Execution of a Contributed Funds Agreement for the Physical Modeling of the Freeman Diversion Rehabilitation Project with the Bureau of Reclamation.**
Motion

Attachment A - Physical Modeling Plan DRAFT

BUREAU OF RECLAMATION

DRAFT - Physical Hydraulic Modeling Plan for Fish Passage at Vern Freeman Diversion Dam

Background

United Water Conservation District (United Water) contacted the Bureau of Reclamation's (Reclamation) Hydraulics Laboratory to establish a qualified path to accomplish court-mandated physical hydraulic modeling of two proposed fish passage alternatives for the Vern Freeman Diversion Dam (Freeman Dam) facility. Freeman Dam is a 28-ft-high, 1,200-ft-long roller compacted concrete gravity structure with an existing Denil fish ladder and diversion facilities. United Water currently diverts up to 375 cfs, but it plans to file for a water right to divert up to 750 cfs from the Santa Clara River. The goal of both fishway designs is to provide for successful upstream passage of adult steelhead during river flows of 45 to 6,000 cfs with little or no delay at Freeman Dam. It is desired to also provide successful passage of adult Pacific lamprey. This physical model test plan is based on Northwest Hydraulic Consultants' Design Development Reports for the 30% design of a hardened ramp fishway and Stantec's Design Development Report for the 30% design of a vertical slot fishway.

The hardened ramp is designed to provide continuous upstream fish passage for steelhead and Pacific lamprey at river flows of 45 to 6,000 cfs without shutdown for sediment flushing operations. The 90-ft-wide and 420-ft-long hardened ramp is designed at a 5% slope with an asymmetric cross section to provide fish passage at acceptable water depths and velocities over a range of flow conditions. A 30-ft-wide triangular roughened low-flow section contains rocks approximately 1-2 ft with larger 3-ft rocks placed every 20 ft. The 60-ft-wide baffled ramp on a 30:1 cross slope contains 5-ft-wide V-shaped sloped steel baffle plates with a 2.5-ft slot width. Four crest gates control flow into the hardened ramp. The design also contains a 15-ft-wide sediment flushing channel and a 1.5-ft-deep fixed ogee-shaped notch in the dam over 400 ft length to the right of the hardened ramp. More detailed information and drawings on the hardened ramp design can be found in Northwest Hydraulic Consultants' Design Development Report.

The vertical slot fishway alternative includes construction of a vertical slot fish ladder, north and south fish ladder entrances, an auxiliary water system and associated fish screens, and crest gates. The fish ladder is designed to pass 34 cfs at the design upstream water level of 161.5 ft. The fish ladder flow ranges from 34-37 cfs over the design flow range. The auxiliary water system is designed to pass up to 570 cfs for a total of 600 cfs of attraction flow to the fishway entrance, which is 10 percent of the design river flow of 6,000 cfs. The dam will be notched about 10 ft deep and 73 ft long to accommodate new rubber bladder-style crest gates designed to control the forebay elevation and concentrate spill over the diversion crest to improve attraction to the ladder entrance. The downstream face of the dam below the crest gate will contain a fish transport tunnel which allows

fish entering the north entrances to move into the fish ladder. The existing 15-ft-wide sediment flushing channel will be maintained from the existing features. More detailed information and drawings on the vertical slot fish ladder can be found in Stantec's Design Development Report.

Construction and testing of a separate physical hydraulic model is recommended for each alternative in this test plan with the primary goals of assessing overall hydraulic performance of the proposed design, measuring and observing hydraulic conditions in and around the proposed features, and identifying issues related to sediment and debris movement and accumulation. The model plan and test matrix outlined in this document are subject to modification as modeling progresses. The modeling team may note that certain operational scenarios are inconsequential while other operational scenarios appear to be more significant. The modeling team will communicate these recommended modifications to United Water and a path forward will be identified.

Hardened Ramp Fishway Physical Model

Model Objectives

1.) Measure water depths and velocities and observe flow patterns within and around the hardened ramp including areas upstream and downstream of the hardened ramp.
2.) Observe recirculation zones or other adverse hydraulic conditions that may impact to attraction flow to the hardened ramp.
3.) Observe baffle performance and interaction of roughened low-flow channel with sloped baffle portion of the ramp.
4.) Observe sediment deposition and erosion patterns within and around the hardened ramp. If deposition occurs, determine how hydraulic conditions for fish passage are impacted.
5.) Determine if sediment can be flushed from the ramp under certain flow conditions or with modified gate operations.
6.) Determine hydraulics and sediment deposition in and around the flushing channel. Assess conditions with and without construction of a flushing channel.
7.) Determine if baffles in upstream fishway exit (top 5 rows) should be modified to optimize hydraulic performance.
8.) Determine flow patterns related to notch in dam during hardened ramp operation to identify nuisance attraction flow. Modify notch as needed.
9.) Observe debris collection or accumulation within and around the hardened ramp.

Modeling Approach

A physical hydraulic model at a Froude-scale of approximately 1:12 is recommended to incorporate relevant project features and best meet the model objectives. The model scale may change slightly based on laboratory floor space and sediment availability. The selected model scale is a tradeoff between model objectives and available floor space and pump capacity. The model was scaled with a focus on assessing overall hydraulic, sediment, and debris performance of structures and interaction between project features. A physical model at a smaller scale would provide more detailed information about hydraulics within the ramp, particularly at lower flows, but the model would not adequately represent the surrounding features needed to address the primary model objectives.

The physical model extents will include approximately 490 ft upstream of the dam, 400 ft downstream of the dam, and 170 ft of the dam to the right of the hardened ramp (Figure 1). The

model will have a fixed bed with movable bed sections upstream of the hardened ramp and canal intake and downstream of hardened ramp (Figure 2). Model features will include the hardened ramp with low-flow roughened section and baffle section, control structure crest gates, 170 ft of the dam to the right of the hardened ramp (with 1.5-ft-deep notch), flushing channel, canal headgates (piers and trashrack). All baffles on the hardened ramp will be included. The most upstream 5 rows of baffles will be adjustable to accommodate potential design modifications and the remaining rows of baffles will be fixed. The canal fish screens and associated sediment jetting system will not be included.

The maximum total discharge in the model is approximately 10,000 cfs prototype (20 cfs model) in the modeled section of the left side of the river which represents to total river discharge of approximately 18,900 cfs (equivalent to a 2- to 5-year return period). The hardened ramp will be able to pass river flows from 45-6,000 cfs, but low flow conditions may not be represented well at a 1:12 scale due to shallow depths in the hardened ramp. It will not be possible to obtain detailed hydraulic data such as local velocities behind baffles at low flows such as 45 cfs. A flow rate of 150 cfs prototype (0.3 cfs model), with a corresponding model water depth of approximately 1 inch, is the minimum flow that can be passed through the hardened ramp without experiencing scale effects due to low Reynolds number. Canal diversions of up to 750 cfs will be modeled.

Model topography and bathymetry will be provided by the design consultant. The same bathymetric configuration will be used for both the hardened ramp fishway and vertical slot fishway alternatives as a baseline condition. Boundary condition hydraulics (flow rate and water surface elevations) and sediment loading for the selected model extents will be based on numerical modeling provided by the design consultant to ensure that the modeled section experiences appropriate inflow conditions.

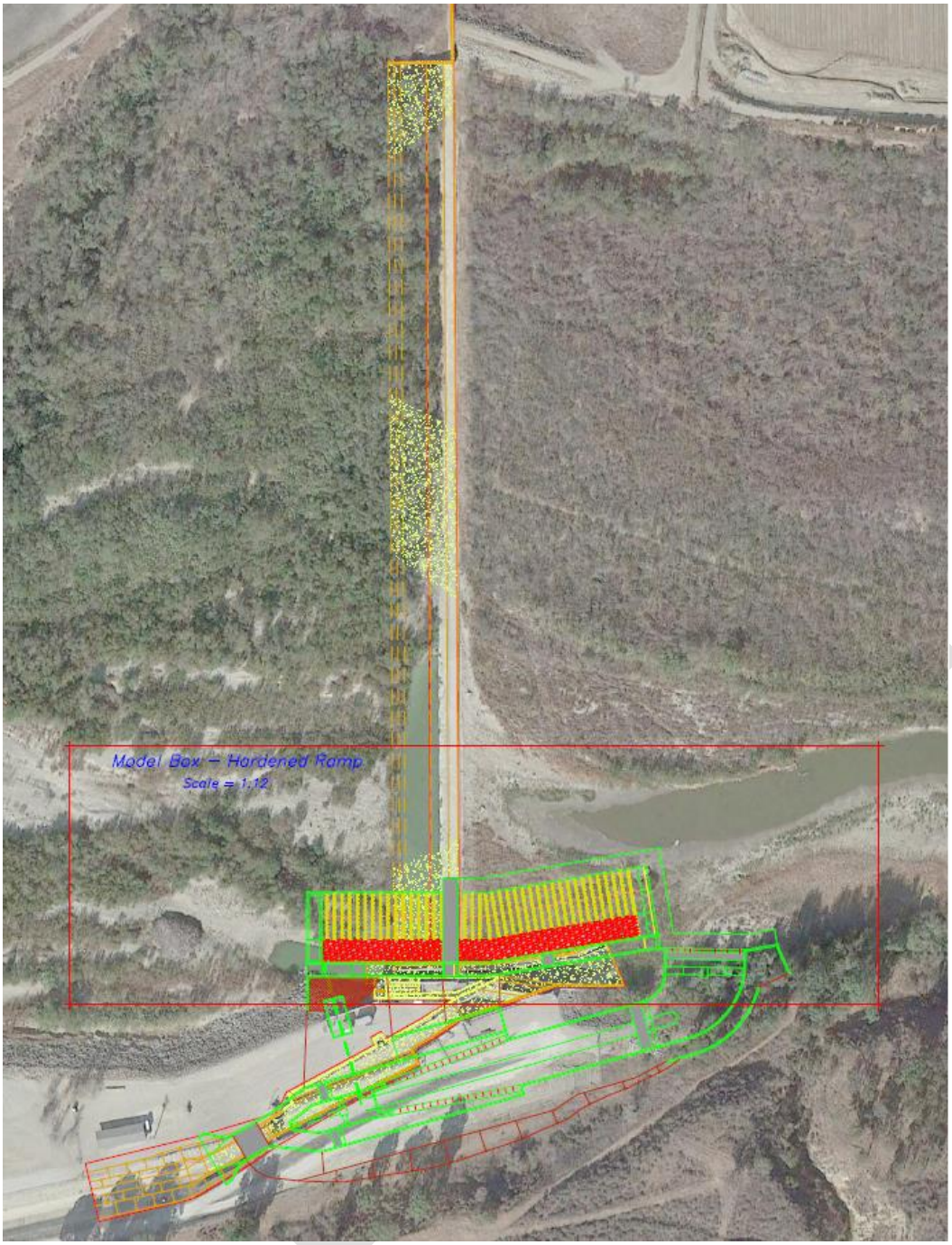


Figure 1. Extents of proposed 1:12 scale physical hydraulic model for 30% design of the hardened ramp fishway alternative.

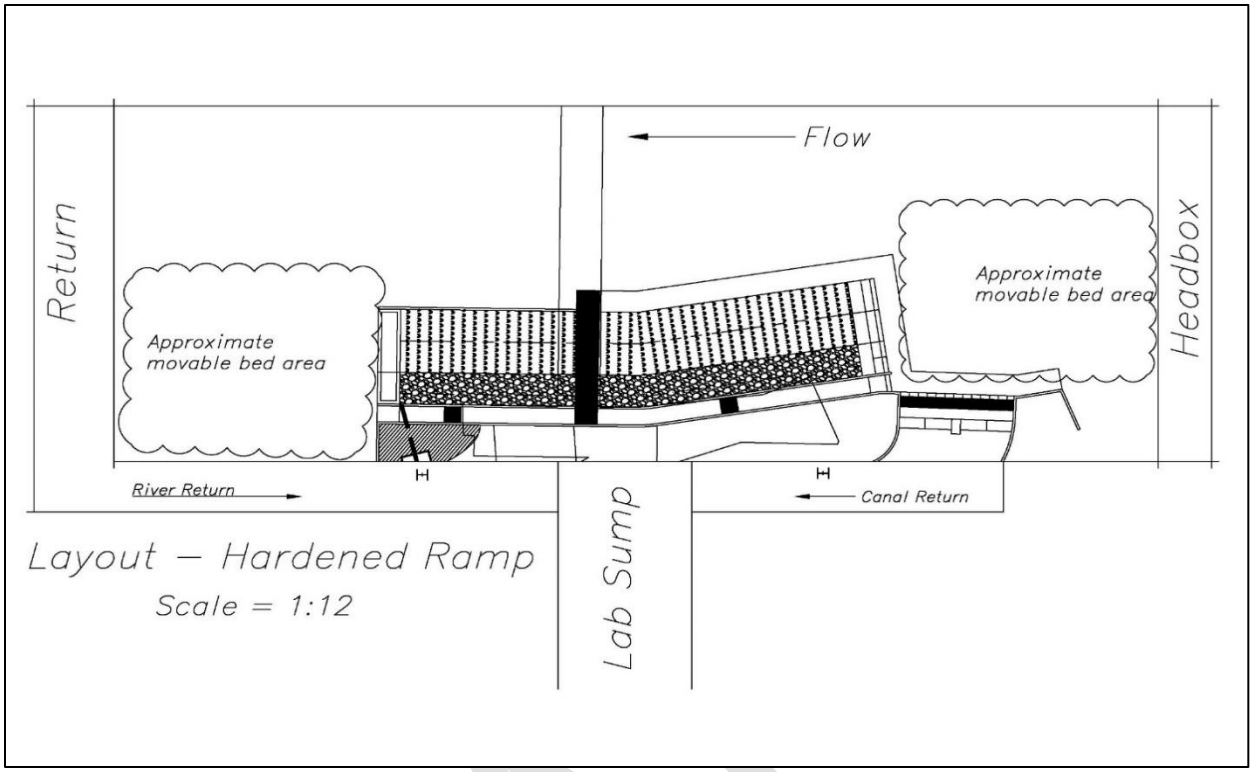


Figure 2. Proposed simplified layout and features of the hardened ramp fishway alternative within the model box, showing the headbox and return channel. Approximate movable bed areas are indicated. The remainder of the topography will be constructed as a fixed concrete bed. Model topography and bathymetry are not presented here, but will be represented in the physical model.

Sediment Modeling

Bedload and suspended sediment will be incorporated into the model flow during sediment tests. Sediment scaling for the average field gradation greater than about the d_5 material size meets cohesion and fall velocity scaling requirements and can thus be scaled geometrically at a 1:12 scale. Incipient motion of prototype and modeled particles will be compared to ensure that sediment movement is appropriately simulated. Although exact representation of the entire gradation is not expected, key sediment sizes (i.e. d_{80}, d_{50}, and d_5) will be scaled and incorporated in the model (Figure *3*). Actual sediment for the model will be selected based on availability of local quarries. Alternate model materials such as coal or ground walnut shells are not proposed for use in this model in order to complete more test scenarios. The model is expected to produce qualitative trends, patterns, and locations of deposition or degradation in the field but not accurately represent actual quantities.

For sediment test runs, material will be located in the movable bed sections according to Figure 2. Additional sediment will be inserted into the model flow via a conveyor or hopper system at the inlet to the model box, or via a closed loop system of recirculated sediment laden flow depending on material size.

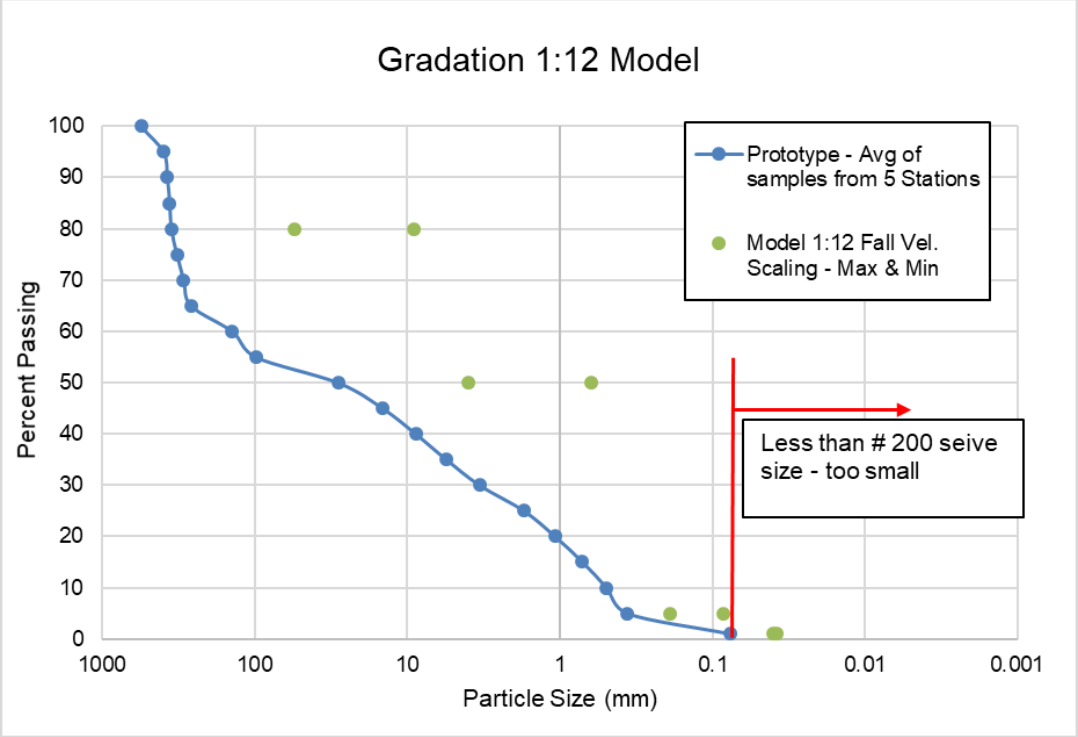


Figure 3 Sediment gradation curves representing the prototype (average of 5 river station samples from AECOM Sediment Transport Analysis-Santa Clara River at Freeman Diversion, 2014) in blue. The green dots represent the range of acceptable sediment sizes at d80, d50, and d5 that meet fall velocity scaling requirements at the proposed model scale of 1:12.

Debris Modeling

For debris test runs, scaled debris will be inserted at the upstream end of the model to assess areas of accumulation. Debris type, size, composition (floating versus waterlogged), and quantity will be provided by United Water for specific river conditions. Debris elements may be natural material or artificial material depending on material properties. Debris will be manually loaded into the model as individual pieces or in integrated mats.

Test Matrix

Testing will be completed over a range of relevant flow rates and operational conditions for the selected model scale (Table 1). Testing will be conducted during steady state flow conditions.

Testing will be conducted with the existing dam crest and a flushing channel adjacent to the canal intake structure. Testing will also be conducted with a 1.5-ft ogee crest-shaped dam notch over the dam section to the right of the hardened ramp and no flushing channel (Table 1). When the flushing channel is not constructed, the canal intake entrance structure will be moved out into the river and the flushing channel will be blocked off.

The hardened ramp test matrix may be modified as testing progresses based on model results. If certain flow or operational scenarios are less consequential than expected and other operational scenarios appear to be more significant, recommendations for changes to the test matrix will be submitted to United Water.

Table 1. Initial test matrix for hardened ramp fishway physical model. Hydraulic measurements will be collected for all scenarios. Flow scenarios with sediment and debris input are indicated. For hardened ramp flows less than 150 cfs, observations will be made, but no data will be collected due to model scale effects.

River Flow (cfs)	Ramp Flow Estimated (cfs)	Diversion Flow (cfs)	Flushing Channel Flow (cfs)	Dam Crest Flow (cfs)	Modified Cutout Flow (cfs)	Scenarios with Sediment Input	Scenarios with Debris Input
250	200	50				Sediment	
410	45	375				Sediment	
575	200	375					
950	200	750				Sediment	
1500	1125	375					
1500	750	750				Sediment	Debris
3000	1787.5	750	462.5				Debris
3000	1787.5	750					Debris
6000	2900	750	0		2350	Sediment	Debris
6000	3030	750	1745	475		Sediment	Debris
6000	3600	750	0	1650	0		Debris
18900	5000	0	0	13900		Sediment	Debris
17500	4800	0	0		12700	Sediment	Debris
18900	5000	0	2000	11900		Sediment	Debris

Data Collection

The following data will be collected during testing:

- Water surface elevation upstream and downstream of the dam (headwater, tailwater)
- Water surface elevations at top and bottom of hardened ramp
- Water surface elevation in the canal diversion entrance
- Water surface elevations and point velocities around fishway baffles to assess performance and identify resting zones
- Point velocities in front of the canal intake structure
- Point velocities upstream and downstream of hardened ramp
- Surface velocity maps of key flow conditions, if required
- Total model flow rate, canal diversion flow rate, fish bypass flow rate, and calculated fishway and dam crest flow rate.
- Observations of hydraulic conditions inside the hardened ramp
- Observations of hydraulic conditions upstream and downstream of hardened ramp
- Observations of hydraulic conditions downstream of dam notch to assess nuisance attraction flow
- Observations of sediment behavior and operational strategies to limit adverse impacts
- Mapped locations of sediment deposition and erosion with approximate lateral extents and depths
- Observations of debris movement and accumulation and operational strategies to limit adverse impacts

Instrumentation

The following instrumentation is planned for physical measurements during testing. Final instrument selection will be completed during the model design process. Modifications to measurement methods and/or instrumentation may be required during shakedown testing as determined by the modeling team.

Water Surface Elevations – Water depths will be measured with down-looking ultrasonic meters with an accuracy to within ±0.25%.

Model Flow Rate – Measurements will be acquired using the laboratory flow measurement system (Venturi meters) calibrated to within ±0.5%.

Feature Flow Rates – The canal diversion and fish bypass flow rate will be measured with in-line flowmeters or open channel flow measurement structures. Flow through the hardened ramp, flushing channel, and over the dam will not be measured directly.

Velocities – Point velocities will be measured within the water column using acoustic Doppler velocity meters (ADV). Surface velocities will be measured with particle tracking using large-scale particle image velocimetry (LSPIV) as needed.

Gate Position – Crest gate position will be determined using templates or string position sensors to set proper gate openings.

Flow Patterns – Flow patterns and recirculation zones will be observed using dye tracing or surface tracking particles. Results will be documented with photographs and videos.

Sedimentation – Sedimentation patterns and trends will be observed using physical measurements of lateral extents and depths, photographs and videos, photogrammetry, or sediment concentration probes (using ratios for relative performance between operational scenarios).

Overall Observations – All model runs will be documented using photographs and videos.

Exclusions

It is assumed that the hardened ramp geometry in cross-section and alignment are fixed and will not be modified in the model. It is assumed that the baffle size, shape, and configuration are fixed and will not be modified aside from upstream 5 rows of baffles. A full rating curve for the hardened ramp during various diversion scenarios is not planned since the model will not represent low flows less than 150 cfs through the ramp accurately. The canal fish screen will not be modeled. Impact forces on the baffles or other structures will not be measured in the model and damage assessment will not be conducted. Evaluation of sediment deposition and areas of debris accumulation can be used as an indicator of potential locations where damage may occur. Sparger systems will not be represented in the model due to low expected discharges; however, locations where sparger systems may be needed will be identified based on sediment accumulation. Flow rates greater than 10,000 cfs in the modeled river section (approximate river flow 18,900 cfs) should not be expected due to laboratory facility limitations, however slightly higher model flow rates may be possible. Simulation of sediment and debris movement during river flows above the maximum model discharge will not be possible. However, sediment can be placed in locations where deposits are expected to occur and the model can be run to identify strategies for mobilizing sediment to enhance hydraulic performance.

Vertical Slot Fishway Physical Model

Model Objectives

1.) Measure attraction flow conditions to north and south fish entrances with and without crest gate spill.
2.) Measure hydraulics within and downstream of auxiliary water system (e.g. stilling area, diffuser) to determine if adverse impacts such as eddies occur in the south fishway entrance pool and to assess the probable zone of passage from the entrance gates and tunnel to the ladder.
3.) Observe hydraulics in the north fish entrance pool and in the tunnel to the north fish entrance.
4.) Observe qualitative sediment deposition and erosion downstream of the fishway near the south entrance and on the apron adjacent to the entrance structure. Observe if sediment deposits can be resuspended and flushed away from south fishway entrances.

5.) Observe qualitative sediment deposition in front of and within north fishway entrance.
6.) Observe sediment erosion upstream of crest gates to the mouth of the approach channel.
7.) Observe sediment deposition in the fishway exit channel, within the auxiliary water system, and in the canal entrance channel between the trashrack and auxiliary water system and canal control gates.
8.) Determine if fishway operation can be maintained during flushing channel operations. Determine how flushing channel operations impact downstream flow conditions.
9.) Evaluate strategic operation of crest gates by opening and closing specified gates to minimize impacts on sediment deposition and attraction flows.

Modeling Approach

A physical hydraulic model at a Froude-scale of approximately 1:10 is recommended to incorporate relevant project features and best meet the model objectives. The model scale may change slightly based on laboratory floor space and sediment availability. The model was scaled with a focus on assessing overall hydraulic performance of structures and interaction between project features, but not detailed hydraulics in the vertical slot fishway.

The physical model extents will include approximately 310 ft upstream of the dam, 380 ft downstream of the dam, and 80 ft to the right of the crest gates (Figure 4). The model will have a fixed bed with movable bed sections directly upstream of the crest gates and canal intake and downstream of the fish entrances and spillway apron (Figure 5).

Model features will include the vertical slot fishway and control structure, north fishway entrance and tunnel, south fishway entrances, auxiliary water system, crest gates, flushing channel, canal headgates (piers and trashrack), and independently operated auxiliary water and canal control gates. If possible, the crest gate spillway and tunnel will be modeled in clear plastic to allow for visual observations. The canal and auxiliary fish screens and associated sediment jetting systems will not be included. Only vertical slot elements at the upstream and downstream ends of the fishway will be modeled. The vertical slot elements will not be represented in full.

The maximum total model discharge in the model is approximately 6,300 cfs prototype (20 cfs model) in the modeled section of the left side of the river which is approximately equivalent to the total river discharge (less than 2 year return period). The vertical slot fishway will be able to pass 34-37 cfs, but flow conditions may not be represented well at a 1:10 scale due to shallow depths in the vertical slot. It will not be possible to obtain detailed hydraulic data such as local velocities in the vertical slot. Scale effects due to low Reynolds number will occur for flow rates less than 150 cfs prototype (0.5 cfs model). Canal diversions of up to 750 cfs will be modeled and the canal diversion to the auxiliary water system screen and ladder entrance will be up to 594 cfs.

Model topography and bathymetry will be provided by the design consultant. The same bathymetric configuration will be used for both the vertical slot fishway and hardened ramp alternatives as a baseline condition. Boundary condition hydraulics (flow rate and water surface elevations) and sediment loading for the selected model extents will be based on numerical modeling provided by the design consultant to ensure that the modeled section experiences appropriate inflow conditions.

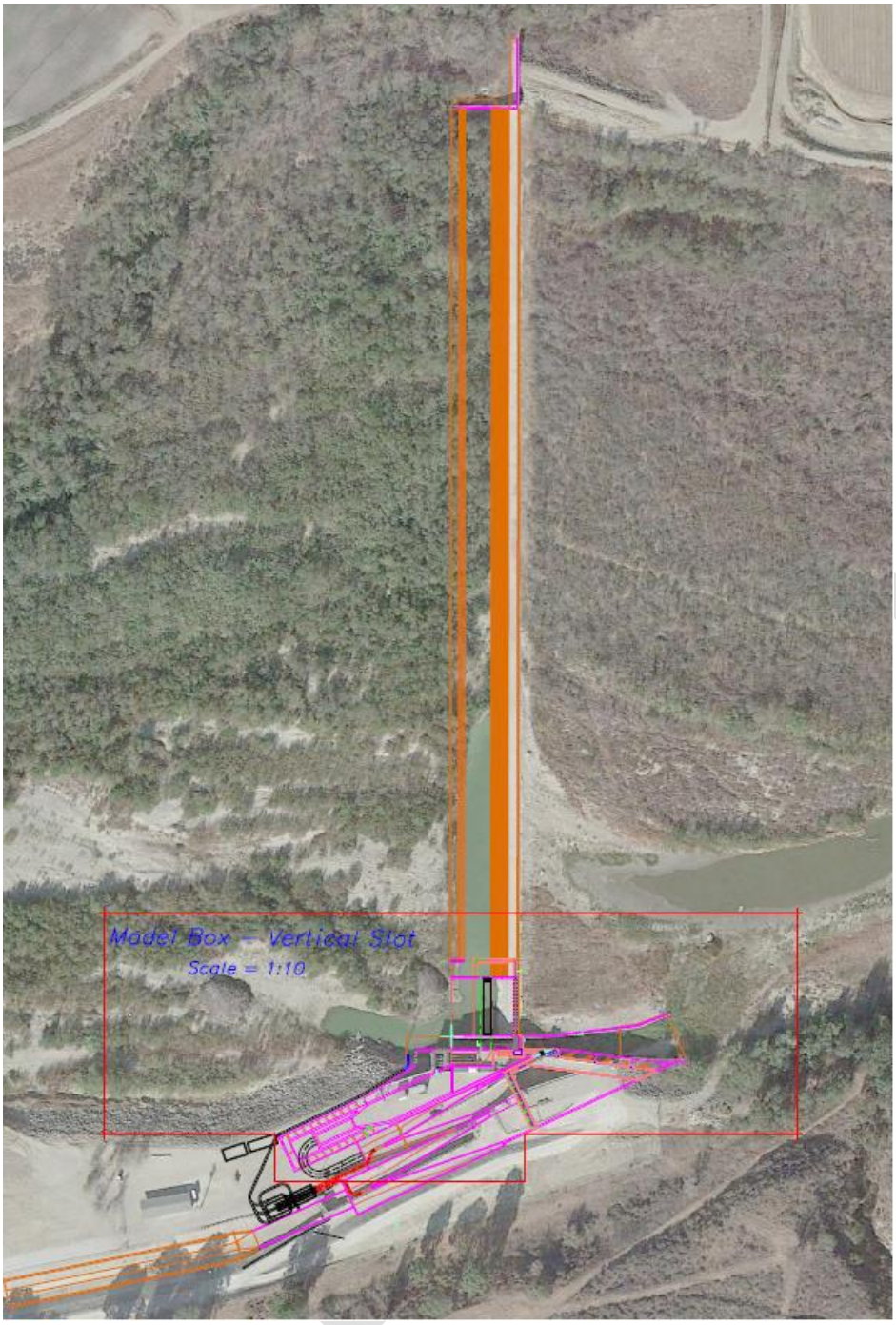


Figure 4. Extents of proposed 1:10 scale physical hydraulic model for 30% design of the vertical slot fishway alternative.

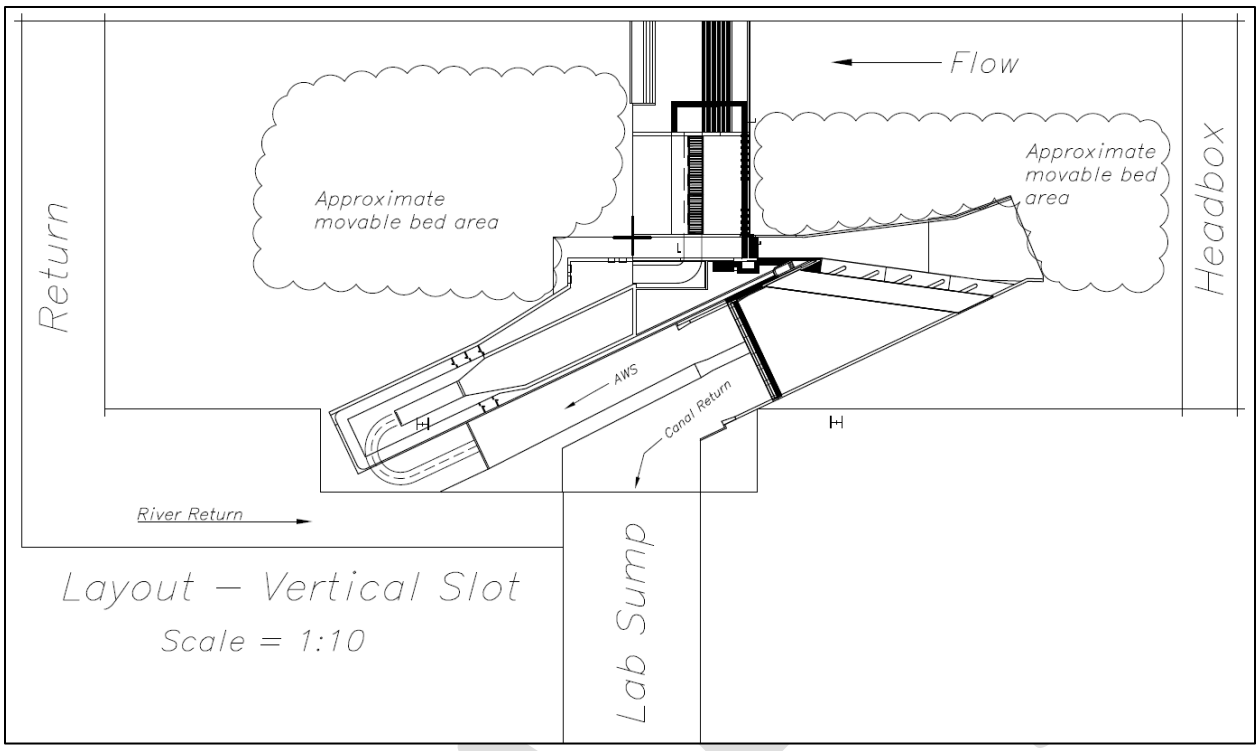


Figure 5. Proposed simplified layout and features of the vertical slot fishway alternative within the model box, showing the headbox and return channel. Approximate movable bed areas are indicated. The remainder of the topography will be constructed as a fixed concrete bed. Model topography and bathymetry are not presented here, but will be represented in the physical model.

Sediment Modeling

Bedload and suspended sediment will be incorporated into the inflow water during sediment tests. Sediment scaling for the average field gradation greater than about the d_5 material size meets cohesion and fall velocity scaling requirements and can thus be scaled geometrically at a 1:10 scale. Incipient motion of prototype and modeled particles will be compared to ensure that sediment movement is appropriately simulated. Although exact representation of the entire field gradation is not expected, key sediment sizes (i.e. d_{80}, d_{50}, and d_5) will be scaled and incorporated in the model (Figure 6). Actual sediment for the model will be selected based on availability of local quarries. Alternate model materials such as coal or ground walnut shells are not proposed for use in this model in order to complete more test scenarios. The model is expected to produce qualitative trends, patterns, and locations of deposition or degradation in the field but not accurately represent actual quantities.

For sediment test runs, material will be located in the movable bed sections according to Figure 5. Additional sediment will be inserted into the model flow via a conveyor or hopper system at the inlet to the model box, or via a closed loop system of recirculated sediment laden flow depending on material size.

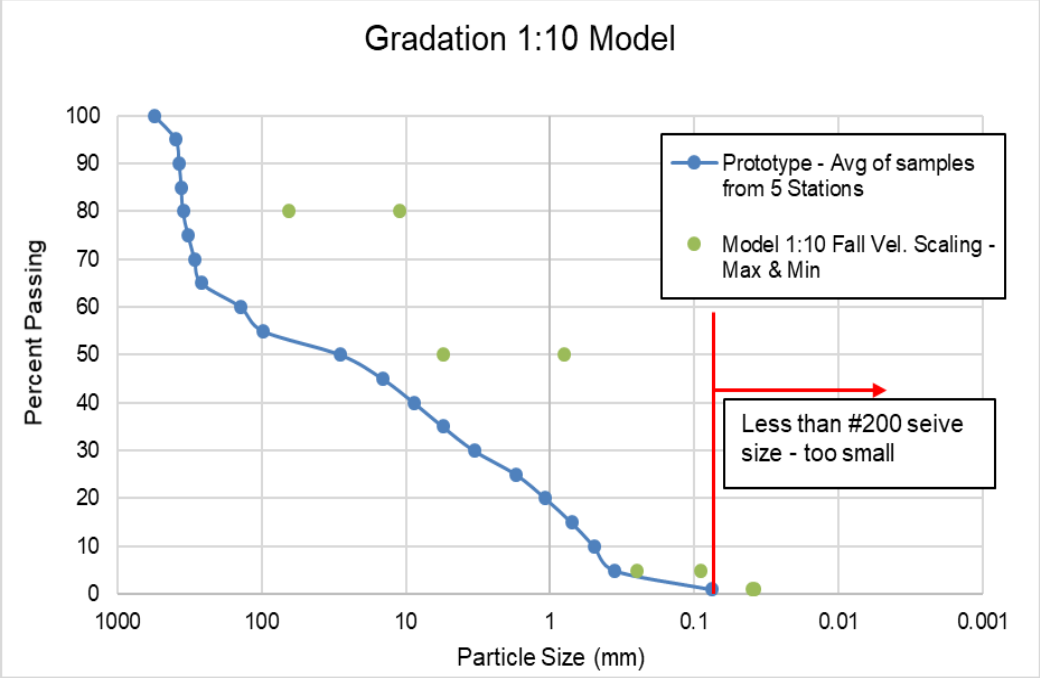


Figure 6. Sediment gradation curves representing the prototype (average of 5 river station samples from AECOM Sediment Transport Analysis-Santa Clara River at Freeman Diversion, 2014) in blue. The green dots represent the range of acceptable sediment sizes at d80, d50, and d5 that meet fall velocity scaling requirements at the proposed model scale of 1:10.

Test Matrix

Testing will be completed over a range of relevant flow rates and operational conditions for the selected model scale (Table 2). Testing will be conducted during steady state flow conditions.

Testing will be conducted with and without operation of the flushing channel as indicated in Table 2. The flushing channel gates will simply be closed during testing without the flushing channel. Variable gate operation for the crest gates will be completed, although details of the gate operation have not yet been determined. Baseline testing will also be conducted to examine regulatory compliance without the north fish entrance and tunnel as specified in Table 3.

The vertical slot fishway test matrix may be modified as testing progresses based on model results. If certain flow or operational scenarios are less consequential than expected and other operational scenarios appear to be more significant, recommendations for changes to the test matrix will be submitted to United Water.

Table 2. Initial test matrix for vertical slot fishway physical model. Hydraulic measurements will be collected for all scenarios. Flow scenarios with sediment input are indicated. Debris testing is not included because debris loading is limited at simulated model flow rates.

River Flow (cfs)	Fish Ladder Flow (cfs)	Diversion Flow (cfs)	Canal Fish Bypass Flow (cfs)	Auxiliary Water System Flow (cfs)	Auxiliary Water Fish Bypass Flow (cfs)	Crest Gate Flow (cfs)	River Flow Downstream (cfs)	Notes	Scenarios with Sediment Input
200	34	40	24	0	102	0	160	Test entrance gates in combination and separately	
800	34	0	24	570	24	148	800	Adjust crest flows by reducing auxiliary water	
800	34	375	24	343	24	0	425		
1500	34	750	24	168	24	500	750		Sediment
1500	0	0	0	0	0	0	0	1500 cfs flushing channel	Sediment
1500	34	375	24	168	24	875	1125		
3000	34	750	24	570	24	1598	2250		
3000	34	375	24	570	24	1973	2625		
3000	34	750	24	300	24	1868	2250		Sediment
6000	34	750	24	570	24	4598	5250		Sediment

Table 3. Initial test matrix for vertical slot fishway physical model without the north fish entrance and tunnel. The maximum auxiliary flow rate is 270 cfs. Hydraulic measurements will be collected for all scenarios. One flow scenario with sediment input is indicated.

River Flow (cfs)	Fish Ladder Flow (cfs)	Diversion Flow (cfs)	Canal Fish Bypass Flow (cfs)	Auxiliary Water Sytem Flow (cfs)	Auxiliary Water Fish Bypass Flow (cfs)	Crest Gate Flow (cfs)	River Flow Downstream (cfs)	Notes	Scenarios with Sediment Input
800	34	375	24	270	24	73	425		
1500	34	750	24	168	24	500	750		
1500	34	0	24	270	24	1148	1500		
1500	34	375	24	270	24	773	1125		
2000	34	375	24	270	24	1273	1625		Sediment
2000	34	750	24	270	24	898	1250		
3000	34	750	24	270	24	1898	2250		
3000	34	375	24	270	24	2273	2625		
3000	34	750	24	270	24	1898	2250		
6000	34	750	24	270	24	4898	5250		

Data Collection

The following data will be collected during testing:

- Water surface elevation upstream and downstream of the dam (headwater, tailwater)
- Water surface elevations upstream and downstream of vertical slot fishway and inside fishway entrance and exit.
- Water surface elevation in the canal diversion entrance
- Point velocities in front of the canal intake structure
- Point velocities upstream and downstream of the vertical slot fishway
- Point velocities at fishway entrance at auxiliary water system diffuser
- Surface velocity maps during key flow conditions, if required
- Total flow rate entering the model box, through the auxiliary water system, through the fish bypass, and through the canal diversion
- Observations of hydraulic conditions inside auxiliary water system stilling area and through the auxiliary water system diffuser
- Observations of hydraulic conditions in north fishway entrance and tunnel
- Observations of flow patterns, eddying, or adverse hydraulic conditions downstream of crest gates during operation and the associated impact on approach conditions to the north and south fish entrances. Remedial options to improve attraction flows during crest gate operation will be explored.
- Observations of sediment behavior and operational strategies to limit adverse impacts
- Mapped locations of sediment deposition and erosion with approximate lateral extents and depths
- Observations of debris movement and accumulation and operational strategies to limit adverse impacts

Instrumentation

The following instrumentation is planned for physical measurements during testing. Final instrument selection will be completed during the model design process. Modifications to measurement methods and/or instrumentation may be required during shakedown testing as determined by the modeling team.

Water Surface Elevations – Water depths will be measured with down-looking ultrasonic meters with an accuracy to within ±0.25%.

Model Flow Rate – Measurements will be acquired using the laboratory flow measurement system (Venturi meters) calibrated to within ±0.5%.

Feature Flow Rates – The auxiliary water system flow rate and canal diversion flow rate will be measured with in-line flowmeters. Flow through the crest gates and flushing channel will not be measured directly.

Velocities – Point velocities will be measured within the water column using acoustic Doppler velocity meters (ADV). Surface velocities will be measured with particle tracking using large-scale particle image velocimetry (LSPIV) as needed.

Gate Position – Crest gate position will be determined using templates or string position sensors to set proper gate openings.

Flow Patterns – Flow patterns and recirculation zones will be observed using dye tracing or surface tracking particles. Results will be documented with photographs and videos.

Sedimentation – Sedimentation patterns and trends will be observed using physical measurements of lateral extents and depths, photographs and videos, photogrammetry, or sediment concentration probes (using ratios for relative performance between operational scenarios).

Overall Observations – All model runs will be documented using photographs and videos.

Exclusions

Fishway ladder hydraulics will not be assessed, since this information is well documented in literature. Only the most upstream and downstream vertical slot elements will be constructed in the model. The canal fish screens and auxiliary water system fish screens will not be modeled; therefore, associated velocities and water depths will not be measured. Impact forces will not be measured in the model and damage assessment will not be conducted. Evaluation of sediment deposition and areas of debris accumulation can be used as an indicator of potential locations where damage may occur. A single excavation plan for the structures and surrounding areas will be constructed in the model. Flow rates greater than 6,300 cfs in the modeled river section should not be expected due to laboratory facility limitations, however slightly higher model flow rates may be possible. Simulation of sediment and debris movement during river flows above the maximum model discharge will not be possible. However, sediment can be placed in locations where deposits are expected to occur and the model can be run to identify strategies for mobilizing sediment to enhance hydraulic performance.

Major Model Limitations

Sedimentation

Suspended sediment will be added to the model inflow water during sediment tests. Sediment results will provide qualitative information about erosive and depositional zones and transport patterns near modeled features and can provide comparative data between different flow configurations and operational scenarios. Results from sediment tests are not quantitative and cannot be used to predict the depth of sediment erosion or deposition. Due to scaling limitations, armoring and sediment sorting processes are unlikely to be seen in the model.

Predictions of the amount of time required to flush sediment from in front of the canal headworks would require information about exact sediment quantities that deposit in this location. Since the

physical model can only provide qualitative information about sediment deposition, relative flushing channel timing can be assessed, but exact sluiceway operational duration will not be determined.

Geomorphological Changes

The physical hydraulic model will contain a fixed bed with mobile bed sections constructed upstream and downstream of key project features. Long-term channel evolution and simulation of channel-forming flows will not be assessed with the proposed models. Geomorphological assessments can be conducted in physical models that fully represent the physical extents of the river over a range of high flows. It is likely that a physical model of the full width of the river with a river length on the order of miles would be required to have confidence in observed bed changes.

Attempting to simulate channel-forming flows with partial-width river models may not provide suitable results given the uncertainty in modeled boundary conditions. Estimating the general form of the river bed and then creating selected section of mobile bed seems like an appropriate balance to allow for assessment of project features and local scour and deposition without trying to predict the entire river morphology.

Structural Assessment

Impact forces will not be measured in the physical model and damage assessment will not be conducted. Structural assessment requires appropriate representation of materials and material properties at model scale. Evaluation of sediment deposition and areas of debris accumulation can be used as an indicator of potential damage locations.

Preliminary Physical Model Schedule

According to the stipulation to modify the injunction, a final physical modeling work plan will be submitted by United Water Conservation District to National Marine Fisheries Service and California Department of Fish and Wildlife on February 8, 2021 after initial incorporation of comments by regulatory agencies. It is assumed that any subsequent changes to the model plan will be minor and preliminary modeling work can begin at this time, such as creating model drawings and ordering materials. Physical modeling efforts will begin by March 22, 2021 as specified by the stipulation.

The hardened ramp fishway model will be constructed first. Once construction is complete, the vertical slot fishway alternative will be constructed. As currently proposed, approximately ten months is required to complete construction, testing, and documentation for each model. The final modeling report for the hardened ramp fishway and the vertical slot fishway alternatives will be submitted to United Water by December 15, 2021 and March 15, 2022, respectively (Tables 4-5).

Model testing of each alternative will occur over twelve-week period. Shakedown of physical model instrumentation, components, and test procedures will occur during the first two weeks after model construction. Clear-water tests will be run to measure hydraulic conditions in the model, followed by sediment testing and debris testing. During the test period, a site visit will be planned for each fish passage model alternative for United Water and stakeholders to view the physical models either in person or via remote streaming.

This preliminary model schedule will be revised as the model plan and test matrix are refined.

Table 4. Proposed schedule for a physical model of the hardened ramp fishway alternative.

Physical Model Study Tasks	Start Date	End Date	Approximate Duration
Model Design Drawings and Order Materials	2/15/2021	4/1/2021	45 days
Review of Model Design Drawings by United Water	4/1/2021	4/15/2021	15 days
Hardened Ramp Option: Model Construction	4/15/2021	7/15/2021	90 days
Hardened Ramp Option: Model Shakedown and Testing	7/15/2021	10/15/2021	90 days
Draft Report	10/15/2021	11/15/2021	30 days
Submit Draft Report to United Water for Comment	11/15/2021	11/31/2021	15 days
Finalize Report	11/31/2021	12/15/2021	15 days
Submit Final Report to United Water	12/15/2021		

Table 5. Proposed schedule for a physical model for the vertical slot fishway alternative.

Physical Model Study Tasks	Start Date	End Date	Approximate Duration
Model Design Drawings and Order Materials	5/1/2021	7/1/2021	45 days
Review of Model Design Drawings by United Water	7/1/2021	7/15/2021	14 days
Vertical Slot Fishway Option: Model Construction	7/15/2021	10/15/2021	90 days
Vertical Slot Fishway Option: Model Shakedown and Testing	10/15/2021	1/15/2021	90 days
Draft Report	1/15/2022	2/15/2022	30 days
Submit Draft Report to United Water for Comment	2/15/2022	2/28/2022	15 days
Finalize Report	2/28/2022	3/15/2022	15 days
Submit Final Report to United Water	3/15/2022		

Risk Register for Physical Model Schedule

The risk register shows anticipated risks to project schedule along with potential ways to manage risk.

Table 6. Risk Register for physical modeling projects.

Risk	Risk Description & Potential Impacts	Severity (H, M, L)	Probability (H, M, L)	Risk Mitigation
Building Closure or Staff Illness Due to COVID-19 Pandemic	Temporary laboratory closure or limitation of the number of staff allowed on-site due to COVID-19 restrictions would impact schedule. Significant loss of key staff due to illness would impact schedule.	H	M	There is no way to mitigate a building closure due to mandatory orders. If this situation arises, communication with the client will occur immediately and updates will be provided on a time frame for re-opening, as available. There will be redundancy in qualified staff where possible to limit staff-related impacts due to illness.
Late Changes to Model Test Plan	Model schedule assumes that model planning can begin on February 9, 2021. Late changes to the model scale, extents, major features, and test plan by regulatory agencies could impact model drawings or ordered materials.	H	L	Communicate with regulatory agencies regarding the need to solidify major features of the model study after the first round of comments. Comments from first round reviews of the physical model plan will be incorporated. If late changes to the test plan occur, a Change Order to adjust schedule and budget will be required.
Material Availability	Availability of model materials and sediment depends on current stock and delivery times.	M	L	Materials will be ordered in February after the first round of regulatory agency comments to provide substantial time for delivery.

Deliverables

A peer-reviewed model report will be completed for each physical model separately. The draft reports will be submitted to United Water for review and comment. Edits and comments will be incorporated, or if not incorporated, a rebuttal will be provided to describe why changes were not made. A final peer-reviewed model report will be submitted to United Water. All collected data including spreadsheets, text documents, photographs, and videos will be delivered to United Water. The overall period of performance for the project will include time to support United Water in responding to comments received from regulatory agencies on the model findings and reports.

Points of Contact

Connie Svoboda, Project Manager
Bureau of Reclamation, Technical Service Center
Hydraulic Investigations and Laboratory Services
303-445-2152
csvoboda@usbr.gov

Josh Mortensen, Technical Lead
Bureau of Reclamation, Technical Service Center
Hydraulic Investigations and Laboratory Services
303-445-2156
jmortensen@usbr.gov

Bob Einhellig, Group Manager
Bureau of Reclamation, Technical Service Center
Hydraulic Investigations and Laboratory Services
303-445-2142
reinhellig@usbr.gov

United Water CONSERVATION DISTRICT

Staff Report

To: Engineering and Operations Committee

Through: Mauricio E. Guardado, Jr., General Manager

From: Maryam Bral, Chief Engineer
Craig Morgan, Senior Engineer

Date: December 22, 2020 (January 7, 2021 Committee Meeting)

Agenda Item: **3.4. Contract Amendment with Northwest Hydraulic Consultants for the Freeman Diversion Hardened Ramp Physical Modeling Support**
Motion

Staff Recommendation:
The Engineering and Operations Committee will consider recommending to the full Board that it considers authorizing the General Manager to execute an amendment to the professional services agreement with Northwest Hydraulic Consultants (NHC) in the amount of $125,595 to provide further analysis and support for the physical modeling of the Hardened Ramp as a Freeman Diversion Fish Passage Facility alternative.

Discussion:
As the Hardened Ramp moves into the physical modeling phase there will be continued need for NHC's technical support. This technical support will include providing support with the design, construction, and implementation of alternative configurations, as necessary. NHC will continue to participate in meetings with the Bureau of Reclamation (Bureau), National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW).

At the completion of the physical modeling NHC will provide United a detailed comment letter summarizing NHC's observations of the physical modeling activities and how the results relate to the findings in the design development report.

Staff recommends the Board authorize the General Manager to execute a contract amendment with NHC to provide further analysis and support for the physical modeling of the Hardened Ramp as an alternative Fish Passage Facility at the Freeman Diversion.

Fiscal Impact:
The physical modeling support, hydraulic design and analysis of the Freeman Diversion Fish Passage Facility is included in the Fiscal Year 2020-21 Budget (421-400-81020 Project 8001), and sufficient funds are available to provide for the $125,595 contract amendment in addition to the previously authorized amount of $682,859.

Attachment A – NHC's Physical Model Support Letter

Attachment B – Contract Amendment No. 3

---

200 S. Los Robles Avenue, Suite 405| Pasadena, CA 91101 | 626.440.0080 | www.nhcweb.com

nhc
northwest hydraulic consultants

18 December 2020

United Water Conservation District
1701 Lombard Street
Oxnard, CA 93030

Attn: Craig Morgan, P.E.

Subject: Hardened Ramp Physical Model Support

Dear Mr. Morgan:

NHC completed the draft Design Development Report for the Hardened Ramp in September 2020. Comments from National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) were received in early November 2020 and NHC prepared an initial comment resolution table. NHC and United Water Conservation District (United) are in the process of providing supplemental information for further discussion of the CDFW and NMFS comments on the draft DDR, and NHC is assisting United in review and discussion of the draft physical modeling plan prepared by the US Bureau of Reclamation (Reclamation). Physical modeling is expected to begin in March 2021 and continue through November 2021. United has requested that NHC prepare a brief scope and budget for engineering review and hydraulic design services to support the physical modeling effort. This letter proposal briefly outlines the services to be performed.

Model Review

NHC will provide review and advice during design, construction, initial testing, design development testing, and final testing and documentation of the physical modeling effort. In design and construction, NHC can review and provide advice on materials selection, approach for mobile bed modeling, instrumentation, modular construction to facilitate investigation of alternate configurations, or other subjects as requested by United and Reclamation. During design development testing, NHC will review model results and participate in discussions with United, Reclamation, CDFW, and NMFS to evaluate performance and consider potential modifications for improvement of fish passage, hydraulic, and sediment performance. The initial testing and design development phases are assumed to include model demonstrations, and NHC would participate in the demonstration tests virtually or in person (to the extent feasible considering public health considerations). Two trips for one NHC specialist have been assumed in the budget. Tests with and without a flushing channel are expected to be performed, and NHC will assist in interpretation of these results in terms of fish passage and sediment performance.

NHC will also review final testing and model documentation and provide a detailed comment letter to United summarizing NHC observations through the physical modeling process, including a section describing consequences for detailed design, expected performance for fish passage and diversions, and any remaining uncertainties to be addressed in design or development of operations and maintenance plans.

Hydraulic Design – Alternate Configurations

It is expected that the physical model will be used to refine the Hardened Ramp design to improve performance for multiple objectives. NHC has investigated several alternate configurations for the ramp, dam crest

modifications, sediment management, and intake configuration that can inform the physical modeling process. NHC will provide interpretation of previous numerical modeling results in discussion of potential refinements, and if requested by United, will support investigation of alternate configurations with hydraulic design and development of 3-dimensional drawings in AutoCAD format that can be used by Reclamation for design and construction of refinements in the model. Based on previous numerical results, alternate configurations may be considered for the exit section of the ramp; baffle size, shape, and spacing; intake alignment and configuration; sediment management features such as the flushing channel and interior sluice; and dam crest modifications. For budgeting purposes, up to four alternate configurations are assumed to require hydraulic design and drafting support. The alternates are assumed to be modifications of the geometry or configuration for specific features, with no fundamental changes to ramp size, location, or slope.

Meetings and Coordination

NHC will participate in regular coordination calls and progress review with United, Reclamation, NMFS, and CDFW. A 12-month coordination period is assumed, extending slightly beyond the expected modeling period tp address follow-up questions and comments on the physical modeling process and implications for next steps in design. Meetings are expected to be conducted virtually, with an average frequency of one to two meetings per month.

Costs

The services will be performed as-needed, and NHC will invoice on a time and expense basis for services requested by United. The expected costs for the three tasks outlined above are as follows:

Task 1. Model Review – $53,832
Task 2. Hydraulic Design Support – $44,753
Task 3. Meetings and Coordination – $27,010
Total - $125,595

Thank you for the opportunity to continue working with United, NMFS, CDFW, and Reclamation in this important step of the design process for the Hardened Ramp. Please contact me for any additional information needed.

Sincerely,
Northwest Hydraulic Consultants Inc.

Edward E. Wallace, P.E.
Principal

Attachment: Task Breakdown Budget

L:Projects\6004761\PM

NHC COST PROPOSAL - TASK BREAKDOWN BUDGET

PROJECT: Vern Freeman Diversion Hardened Ramp Physical Modeling
PROJECT NO: 6004761
CLIENT: United Water Conservation District
DATE: 18 Dec 2020
BY: eew

Task No	Task Description	NHC Personnel pe2 ew 248.19	pe2 bmc 248.19	pe2 kc 248.19	pe2 jpv 248.19	e1 dm 136.96	set tvs 138.14	Labor Cost	Subcons Cost	Direct Cost	Task Cost
1	**Physical Model Review**										
	Construction	4	4	12				$4,964		$0	$4,964
	Demonstration	12	12	32	4			$14,891		$1,601	$16,492
	Design Development	16	32	8	16			$17,870		$1,601	$19,470
	Final Testing and Reporting	16	16	16	4			$12,906	$0	$0	$12,906
2	**Hydraulic Design Support - Alt Configurations**										
	Intake	8	8		12	12	16	$10,803	$0	$0	$10,803
	Ramp	8	8		12	12	16	$10,803	$0	$0	$10,803
	Flushing	8	8		16	16	16	$12,344	$0	$0	$12,344
	Dam Crest	8	8		12	12	16	$10,803	$0	$0	$10,803
3	**Meetings and Coordination (12 mos)**	36	24	24	16	16		$27,010	$0	$0	$27,010
	Totals	*116*	*120*	*92*	*92*	*68*	*64*	*$122,394*	*$0*	*$3,201*	*$125,595*

NHC Rates (Jan 2020 CB)

Symbol	Classification	Hourly Rate*
pe2	principal engineer 2	$248.19
pe3	principal engineer 3	$230.46
spe	senior project engineer	$205.40
se1	senior engineer/scientist 1	$181.49
se2	senior engineer/scientist 2	$155.50
e1	engineer/scientist 1	$136.96
e2	engineer/scientist 2	$120.07
je	junior engineer/scientist	$109.80
gis1	gis analyst 1	$133.56
gis2	gis analyst 2	$105.35
set	senior engineering technician	$138.14
et	engineering technician	$106.19
jet	junior engineering technician	$79.81
sca	senior contract administrator	$163.09
ste	senior technical editor	$142.77
te	technical editor	$110.04
oa	office administrator	$88.13

2020 CB Rates

Direct Costs Mark-up for direct costs 0.1

Task	Travel	Lodging	Repro	Comm	Field	Subtotal	Mark-up	Total
1						$0.00	$0.00	$0.00
2	$750.00	705				$1,455.00	$145.50	$1,600.50
3	$750.00	705				$1,455.00	$145.50	$1,600.50
4						$0.00	$0.00	$0.00
5						$0.00	$0.00	$0.00
6						$0.00	$0.00	$0.00
7						$0.00	$0.00	$0.00

Subconsultant Costs Mark-up for subconsultants 0.1

Task	Sub1	Sub2	Sub3	Sub4	Sub5	Subtotal	Mark-up	Total
1						$0.00	$0.00	$0.00
2						$0.00	$0.00	$0.00
3						$0.00	$0.00	$0.00
4						$0.00	$0.00	$0.00
5						$0.00	$0.00	$0.00
6						$0.00	$0.00	$0.00
7						$0.00	$0.00	$0.00

Assumptions:

1 No travel to USBR lab - virtual review of model performance
2 Drawing production for up to 4 alternative configurations for model testing
3 No major changes in basic ramp and intake layout
4 Communication in monthly or bi-monthly meetings
5 Model completion in 2021
6 No work on screen bay and fish bypass
7 No work on year round multi-species passage design
8 Two trips to Reclamation's lab for 1 person - 3 days per trip

THIRD AMENDMENT TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES

This Amendment to the Agreement for Professional Consulting Services is entered into as of January 14, 2021, by and between **United Water Conservation District** (UNITED), a public entity, and **Northwest Hydraulic Consultants** (CONSULTANT) with reference to the following terms and conditions:

WITNESSETH

WHEREAS, on March 21, 2019, UNITED and CONSULTANT entered into a Professional Consulting Services and;

WHEREAS, UNITED and CONSULTANT have discussed and agreed to amend certain terms and conditions of the AGREEMENT involving term of agreement as specified in this Amendment dated January 14, 2021.

NOW, THEREFORE, based on the covenants and considerations set forth, UNITED and CONSULTANT mutually agree as follows:

1. The AGREEMENT amount is increased by $125,595 equaling to an AGREEMENT total of $808,454.
2. The term of the AGREEMENT is extended to January 31, 2022.
3. Each and all other provisions of said AGREEMENT remain in full force and effect and apply to all services and payments made under this THIRD AMENDMENT.

UNITED WATER CONSERVATION DISTRICT

By_____
Mauricio E. Guardado, Jr., General Manager

NORTHWEST HYDRAULIC CONSULTANTS INC.

By_____
(Name and Title)

ATTACHMENT "A"
THIRD AMENDMENT TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES

Revised Fee Schedule

200 S. Los Robles Avenue, Suite 405| Pasadena, CA 91101 | 626.440.0080 | www.nhcweb.com

nhc
northwest hydraulic consultants

18 December 2020

United Water Conservation District
1701 Lombard Street
Oxnard, CA 93030

Attn: Craig Morgan, P.E.

Subject: Hardened Ramp Physical Model Support

Dear Mr. Morgan:

NHC completed the draft Design Development Report for the Hardened Ramp in September 2020. Comments from National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) were received in early November 2020 and NHC prepared an initial comment resolution table. NHC and United Water Conservation District (United) are in the process of providing supplemental information for further discussion of the CDFW and NMFS comments on the draft DDR, and NHC is assisting United in review and discussion of the draft physical modeling plan prepared by the US Bureau of Reclamation (Reclamation). Physical modeling is expected to begin in March 2021 and continue through November 2021. United has requested that NHC prepare a brief scope and budget for engineering review and hydraulic design services to support the physical modeling effort. This letter proposal briefly outlines the services to be performed.

Model Review

NHC will provide review and advice during design, construction, initial testing, design development testing, and final testing and documentation of the physical modeling effort. In design and construction, NHC can review and provide advice on materials selection, approach for mobile bed modeling, instrumentation, modular construction to facilitate investigation of alternate configurations, or other subjects as requested by United and Reclamation. During design development testing, NHC will review model results and participate in discussions with United, Reclamation, CDFW, and NMFS to evaluate performance and consider potential modifications for improvement of fish passage, hydraulic, and sediment performance. The initial testing and design development phases are assumed to include model demonstrations, and NHC would participate in the demonstration tests virtually or in person (to the extent feasible considering public health considerations). Two trips for one NHC specialist have been assumed in the budget. Tests with and without a flushing channel are expected to be performed, and NHC will assist in interpretation of these results in terms of fish passage and sediment performance.

NHC will also review final testing and model documentation and provide a detailed comment letter to United summarizing NHC observations through the physical modeling process, including a section describing consequences for detailed design, expected performance for fish passage and diversions, and any remaining uncertainties to be addressed in design or development of operations and maintenance plans.

Hydraulic Design – Alternate Configurations

It is expected that the physical model will be used to refine the Hardened Ramp design to improve performance for multiple objectives. NHC has investigated several alternate configurations for the ramp, dam crest

modifications, sediment management, and intake configuration that can inform the physical modeling process. NHC will provide interpretation of previous numerical modeling results in discussion of potential refinements, and if requested by United, will support investigation of alternate configurations with hydraulic design and development of 3-dimensional drawings in AutoCAD format that can be used by Reclamation for design and construction of refinements in the model. Based on previous numerical results, alternate configurations may be considered for the exit section of the ramp; baffle size, shape, and spacing; intake alignment and configuration; sediment management features such as the flushing channel and interior sluice; and dam crest modifications. For budgeting purposes, up to four alternate configurations are assumed to require hydraulic design and drafting support. The alternates are assumed to be modifications of the geometry or configuration for specific features, with no fundamental changes to ramp size, location, or slope.

Meetings and Coordination

NHC will participate in regular coordination calls and progress review with United, Reclamation, NMFS, and CDFW. A 12-month coordination period is assumed, extending slightly beyond the expected modeling period tp address follow-up questions and comments on the physical modeling process and implications for next steps in design. Meetings are expected to be conducted virtually, with an average frequency of one to two meetings per month.

Costs

The services will be performed as-needed, and NHC will invoice on a time and expense basis for services requested by United. The expected costs for the three tasks outlined above are as follows:

Task 1. Model Review – $53,832
Task 2. Hydraulic Design Support – $44,753
Task 3. Meetings and Coordination – $27,010
Total - $125,595

Thank you for the opportunity to continue working with United, NMFS, CDFW, and Reclamation in this important step of the design process for the Hardened Ramp. Please contact me for any additional information needed.

Sincerely,
Northwest Hydraulic Consultants Inc.

Edward E. Wallace, P.E.
Principal

Attachment: Task Breakdown Budget

L:Projects\6004761\PM

NHC COST PROPOSAL - TASK BREAKDOWN BUDGET

PROJECT: Vern Freeman Diversion Hardened Ramp Physical Modeling
PROJECT NO: 6004761
CLIENT: United Water Conservation District
DATE: 18 Dec 2020
BY: eew

Task No	Task Description	NHC Personnel pe2 ew 248.19	pe2 bmc 248.19	pe2 kc 248.19	pe2 jpv 248.19	e1 dm 136.96	set tvs 138.14	Labor Cost	Subcons Cost	Direct Cost	Task Cost
1	**Physical Model Review**										
	Construction	4	4	12				$4,964		$0	$4,964
	Demonstration	12	12	32	4			$14,891		$1,601	$16,492
	Design Development	16	32	8	16			$17,870		$1,601	$19,470
	Final Testing and Reporting	16	16	16	4			$12,906	$0	$0	$12,906
2	**Hydraulic Design Support - Alt Configurations**										
	Intake	8	8		12	12	16	$10,803	$0	$0	$10,803
	Ramp	8	8		12	12	16	$10,803	$0	$0	$10,803
	Flushing	8	8		16	16	16	$12,344	$0	$0	$12,344
	Dam Crest	8	8		12	12	16	$10,803	$0	$0	$10,803
3	**Meetings and Coordination (12 mos)**	36	24	24	16	16		$27,010	$0	$0	$27,010
	Totals	*116*	*120*	*92*	*92*	*68*	*64*	*$122,394*	*$0*	*$3,201*	*$125,595*

NHC Rates (Jan 2020 CB)

Symbol	Classification	Hourly Rate*
pe2	principal engineer 2	$248.19
pe3	principal engineer 3	$230.46
spe	senior project engineer	$205.40
se1	senior engineer/scientist 1	$181.49
se2	senior engineer/scientist 2	$155.50
e1	engineer/scientist 1	$136.96
e2	engineer/scientist 2	$120.07
je	junior engineer/scientist	$109.80
gis1	gis analyst 1	$133.56
gis2	gis analyst 2	$105.35
set	senior engineering technician	$138.14
et	engineering technician	$106.19
jet	junior engineering technician	$79.81
sca	senior contract administrator	$163.09
ste	senior technical editor	$142.77
te	technical editor	$110.04
oa	office administrator	$88.13

2020 CB Rates

Direct Costs Mark-up for direct costs 0.1

Task	Travel	Lodging	Repro	Comm	Field	Subtotal	Mark-up	Total
1						$0.00	$0.00	$0.00
2	$750.00	705				$1,455.00	$145.50	$1,600.50
3	$750.00	705				$1,455.00	$145.50	$1,600.50
4						$0.00	$0.00	$0.00
5						$0.00	$0.00	$0.00
6						$0.00	$0.00	$0.00
7						$0.00	$0.00	$0.00

Subconsultant Costs Mark-up for subconsultants 0.1

Task	Sub1	Sub2	Sub3	Sub4	Sub5	Subtotal	Mark-up	Total
1						$0.00	$0.00	$0.00
2						$0.00	$0.00	$0.00
3						$0.00	$0.00	$0.00
4						$0.00	$0.00	$0.00
5						$0.00	$0.00	$0.00
6						$0.00	$0.00	$0.00
7						$0.00	$0.00	$0.00

Assumptions:

1 No travel to USBR lab - virtual review of model performance
2 Drawing production for up to 4 alternative configurations for model testing
3 No major changes in basic ramp and intake layout
4 Communication in monthly or bi-monthly meetings
5 Model completion in 2021
6 No work on screen bay and fish bypass
7 No work on year round multi-species passage design
8 Two trips to Reclamation's lab for 1 person - 3 days per trip

United Water
CONSERVATION DISTRICT

Staff Report

To: Engineering and Operations Committee

Through: Mauricio E. Guardado, Jr., General Manager

From: Maryam Bral, Chief Engineer
Craig Morgan, Senior Engineer

Date: December 22, 2020 (January 7, 2021 Committee Meeting)

Agenda Item: **3.5 Contract Amendment with Stantec for the Freeman Diversion Modeling and Design of Vertical Slot Fish Ladder and Intake**
Motion

Staff Recommendation:
The Engineering and Operations Committee will consider recommending to the full Board that it considers authorizing the General Manager to execute an amendment to the professional services agreement with Stantec in the amount of $403,879 to provide further analysis and support of the physical modeling of the Vertical Slot as a Freeman Diversion Fish Passage Facility alternative.

Discussion:
This contract amendment will include tasks that will take the Vertical Slot design through physical modeling, Computational Fluid Dynamics (CFD) modeling and geotechnical investigations necessary to inform the engineering design.

Stantec shall provide engineering support during the Bureau of Reclamation's design, construction, and implementation of the physical model of the Vertical Slot. At the conclusion of the physical modeling activities, Stantec will review and provide comments on the physical model report.

Two remaining sections of the CFD modeling plan, Model 3 - Canal Model and Model 4 – Auxiliary Water System (AWS) Model, will be modeled. Model 3 will assess flow patterns in the approach channel, trash screens, canal inlet, and part of AWS and primary canal screen channels. This model will be used for evaluating hydraulic losses through the trash rack and sediment deposition in the canal inlet. Model 4 will be used for evaluating whether velocity on AWS diffusers is uniform and evaluating hydraulic conditions in AWS stilling basin and fish resting area before entering the fish ladder. Based on the CFD modeling findings, Stantec will prepare and deliver a technical memorandum.

Stantec will conduct subsurface investigations and geotechnical analysis at the Vern Freeman Diversion site to develop recommendations for the analysis and design of the Vertical Slot fish passage facility. At the completion of the investigations and analysis Stantec will prepare and submit a Geotechnical Report to the District.

3.5 Contract Amendment with Stantec for the Freeman Diversion Modeling and Design of Vertical Slot Fish Ladder and Intake
Motion

Staff recommends that the Board authorize the General Manager to execute a contract amendment with Stantec to provide support and analysis for the physical modeling, continued CFD modeling and perform a geotechnical analysis for the Vertical Slot as an alternative fish passage facility at the Freeman Diversion.

Fiscal Impact:
The hydraulic design and analysis of the Freeman Diversion Fish Passage Facility is included in the Fiscal Year 2020-21 Budget (421-400-81020 Project 8001), and sufficient funds are available to provide for the $403,879 contract amendment in addition to the previously authorized amount of $370,182.

Attachment A – Stantec's Proposal for Phase 3 Design Letter

Attachment B – Contract Amendment No. 2

Stantec Consulting Services Inc.
1687 114th Avenue SE Suite 100, Bellevue WA 98440

December 22, 2020

Attention: Mr. Craig Morgan
United Water Conservation District
106 North 8th Street
Santa Paula, CA 93060

Reference: Freeman Diversion Dam,
Change Order 3 – Proposal for Phase 3 Design of Fish Ladder and Intake Modifications

Dear Craig,

Thank you for the opportunity to submit this proposal to United Water Conservation District (UWCD) to further develop and assess the feasibility of constructing a 'criteria' fish ladder at the Freeman Diversion Dam (FDD). Stantec Consulting Services Inc. (Stantec) has prepared the following scope and budget estimate for your consideration based on our conversation and understanding of the project. This proposal incorporates the Scope of Services as contracted between UWCD and Stantec on February 21, 2019 (Exhibit "A"), while clarifying and removing certain tasks that have been initiated and/or completed between project NTP and present, as noted herein.

These remaining project tasks have been defined to allow execution in phases recognizing UWCD will be presenting the vertical slot fish ladder as an alternate to the passage system currently defined in the court decision. For budgeting purposes the duration of this scope assumes the project will progress through the physical modeling. Stantec understands that the project tasks may be authorized in phases based on UWCD presentation of the alternate design to the parties of the litigation, and approval to proceed with the alternate vertical slot fish ladder design for fish passage. Prior to authorization of subsequent tasks UWCD and Stantec will review and amend the scope, budget, and assumptions to be consistent with identified changes to the scope of the project.

SCOPE OF SERVICES

Task 1 Project Management and Meetings

Project management and administration of the contract will be conducted throughout the duration of the work under this amendment to prepare construction documents suitable for public bidding to a general contractor. Bid support and construction services will be addressed under subsequent proposals and authorizations.

1.1 Project Management and Administration

Project management consists of work associated with organizing, controlling, monitoring, scheduling, invoicing, reporting and similar activities inherent with management of the work. Project management activities consist of the following:

- Project Setup. Set up the initial job work breakdown structure, files, agreements, and internal systems necessary to monitor and control the activities of the work.
- Prepare invoices along with a brief, one-page status summary each month.
- Update and maintain a project specific Health and Safety Plan.
- Review and monitor budget and manage resources to meet project objectives.
- Review and monitor scope of work and develop potential change notice (PCN) log.
- Develop and maintain a project schedule with UWCD.

1.2 Project Meetings

Hold or attend project coordination meetings. For budgeting the following meetings and Stantec attendance have been assumed:

- Kickoff Meeting. Up to four Stantec staff will attend a design phase kickoff virtual meeting. The meeting purpose is to discuss the approach to the design and interactions with the agencies. Review and update criteria or operational changes following the Modeling and direction from the Court.
- Bi-weekly Project Coordination Meetings with UWCD via web conference (1+ up to 2 additional staff depending on topics).
- Additional review meetings and presentations are included as defined in tasks below.

1.3 Agency/External Meetings

Attend agency, legal, or other external meetings as requested and invited by UWCD. These include:

- Agency meetings. Stantec will attend a single, one-half day virtual agency design comment review meetings to present the fish ladder and screen designs to the resource agencies following the 30% and DDR Update submittal. This meeting will be held following UWCD's review and comment. Design phase agency review meetings, focused on the selected designs, will be facilitated by UWCD and supported by Stantec. The meeting will be attended by no more than three members of the design team. Prior to the agency meeting UWCD and Stantec will review the agenda and determine a consensus strategy for the agency presentation. Stantec, with UWCD input, will prepare meeting agendas for distribution prior to the meetings. Meeting summary notes will be developed jointly by UWCD and Stantec.
- Bi-weekly agency conference calls will be attended for coordination with agency review team and to present design progress. 12, one-hour calls for four engineers are budgeted for virtual meetings.

Task 1 Deliverables:

- Monthly Invoices with one-page status summary and PCN log
- Project Milestone Schedule and updates to reflect agreed upon changes
- Meeting agenda and summary notes

Task 2 Preliminary Design

This task was initiated under previous authorizations producing the Hydraulic Basis of Design report (HBOD dated 8/15/2019 and updated 12/6/2019) and the Design Development Report (DDR) dated 9/18/2020. These preliminary design documents were developed and submitted to show the progress of the design concepts and to reflect changes suggested by the agencies in their reviews. The DDR submittal presents the ladder configuration that will be evaluated in the initial physical model of the vertical slot fish ladder. Under this Change Order, this task provides updates to the DDR as the design progresses through the CFD and physical modeling so set the basis of design. One update to the report is assumed at each of the milestone design review submittal stages (30%, for this authorization) to describe and document the basis of the design and narratives for anticipated operation. The budget assumes one round of compiled edits to be provided by UWCD and addressed by Stantec for each submittal stage. All report submittals will be provided in electronic format.

This DDR replaces the previous Basis of Design Report under Task 4.

Task 2 Deliverables:

- 30% Draft DDR (60% and 90% Draft DDR will be included under future authorization(s))

Task 3 Geotechnical Investigation and Hydraulic Modeling

3.1 Geotechnical Investigation

Stantec will conduct subsurface investigations and geotechnical analysis at the FDD site to develop recommendations for the analysis and design of the new facility. Three previous studies, one for initial diversion construction (GTC, 1983) and two for the fish ramp design (NV5, 2013 and 2016) will be considered and supplemented in this analysis.

3.1.1 Subsurface Exploration and Analysis

Stantec will coordinate with UWCD regarding advancing subsurface explorations at specific locations at the site.

- Literature Review. Review available and published geological and hydrogeological reports/ maps that include the site and site area. The purpose of this element of the study is to establish and evaluate the geologic framework of the site.

- Review of previous geotechnical explorations.
- Screening Level Slope Stability Evaluation. Since the new plans cut into the toe of the rock slope to the southeast of the fish ladder location, we will have a geologist/geotechnical engineer look over the slope and provide thoughts and recommendations for additional analysis as appropriate. This will specifically include:
  - Two people spending one day traveling to and walking over the site and reviewing the slope conditions.
  - Time for review of available information and to prepare recommendations for additional studies/analyses, if warranted.
- Perform a site visit to locate the proposed explorations in the field. Coordinate the location of utilities at the exploration locations by contacting the "One-Call" utility locating service.
- Subsurface Explorations. Complete subsurface exploration program to include up to 4 borings under 50 ft in depth. All borings are assumed to be located within the driveable parking or roadway areas of the intake site accessible by a highway legal truck mounted drill rig. Stantec has identified local drilling firm ABC Drilling to perform this work.
- Laboratory Testing. Complete laboratory testing on soil samples collected from the subsurface explorations. Selected soil samples will be tested for grain-size determinations, moisture-density and fines content, and direct shears.
- Develop Geotechnical Recommendations and Opinions. Develop geotechnical recommendations for the project site based on the results of the subsurface explorations and review of data provided by others. The geotechnical investigations, recommendations, and report shall comply with the requirements of the 2015 IBC, Section 1803 and other applicable Building Department or local agency requirements. Recommendations will be provided on site conditions, seismicity, groundwater, site preparation and design parameters, limited soil corrosivity information, groundwater, and foundation recommendations.

3.1.2 Geotechnical Report

Present geotechnical recommendations and opinions in a preliminary geotechnical report for the project. Prepare draft and final reports summarizing the results of the study including recommendations subsurface exploration records, logs and figures. Draft report will be provided to UWCD for review and comment. The final report will incorporate mutually agreed upon revisions. The budget assumes one round of compiled comments will be provided by UWCD and incorporated by Stantec.

Assumptions:

- Access rights and permits for borings on UWCD property (if required) and easements to be provided by UWCD.

- No field investigation or analysis is included for any in-river work.
- Dewatering recommendations will be limited to general characteristics for construction contractor use but will not include specific pumping or production recommendations.
- It will not be necessary to pay field crews Prevailing Wage rates.
- Collection (drums) and disposal off site of drill cuttings and/or drilling mud will NOT be the responsibility of Stantec or our drilling subcontractor.
- Stantec will apply for (and pay for) a Ventura County exploratory drilling permit.
- If any other drilling permit(s) is/are required from any jurisdiction(s), it will be obtained by others
- No project specific environmental permits or procedures will be required
- No hazardous materials will be encountered
- Free access will be provided to the site with NO special coordination or scheduling with different owners, entities, etc.
- There will be no limitations on days or hours of field work.
- Evaluation and/or mitigation of surface fault rupture seismic hazards are not included in the scope of work.
- No construction period support services are included.

Task 3.1 Deliverables:

- Draft Geotechnical Report (electronic)
- Final Geotechnical Report (electronic)

3.2 CFD Modeling

CFD Modeling of the vertical slot fish ladder passage alternative was initiated under a subsequent Professional Consulting Services Agreement executed March 12, 2020 (Change Order 1) as amended November 10, 2020 (Change Order 2). Four CFD Models were proposed, with the first two models focused on in-river hydraulic conditions that were completed under the March 12, 2020 Agreement. Under this Change Order, this task would complete the final two models focusing on internal hydraulics at the intake area and within the fish ladder entrance pool.

Hydraulic modeling is required to support and inform the design and to demonstrate to resource agencies that operating conditions within the fishways are conducive for fish passage under specified operating flow ranges. Stantec proposes to develop the final two CFD models for the FDD fish ladder project using the state-of-the-art CFD software, ANSYS FLUENT. The completion of CFD Modeling will be directed and supervised by Dr. Fangbiao Lin and will consist of the following two models.

- **Model 3 – Canal Model.** The modeling extent of the Model 3 boundary will include the approach channel downstream to the flushing gate, trashrack, canal inlet through the Canal gates and terminating upstream of the fish screens about 40 ft downstream of the Canal Gate. This model will assess flow patterns in the approach channel, trash screens, canal inlet, and part of AWS and primary canal screen channels. This model will be used for evaluating hydraulic losses through the trash rack and sediment deposition in the canal inlet. A total of six (6) CFD runs will be included.
- **Model 4 – AWS Model.** The modeling extent of the Model 4 starts at the AWS control gate, AWS pipe and stilling basin, diffuser panels, ladder entrance pool and south entrance gates and a portion of the SAWS tunnel to the north entrance gates. This model will be used for evaluating whether velocity on AWS diffusers are uniform and evaluating hydraulic conditions in AWS stilling basin and fish resting area before entering the fish ladder. It is estimated that six (6) CFD runs will be included for this model.

The models described above focus on discrete areas and may be done independently or in combination. The preliminary design and requirements from the resource agencies will review the information needed and the objective of the modeling. Modeling will be based on survey base map information and structural models provided under previous Preliminary Design and CFD Modeling efforts. Physical modeling will be performed under separate contract with UWCD by the U.S. Bureau of Reclamation (USBR).

At the conclusion of the Model 3 and 4 runs a draft technical memorandum will be prepared that defines the model and summarizes the results. This memorandum will be submitted to UWCD for review and comment and then an updated version will be submitted for agency review. The budget assumes one round of compiled comments from UWCD will be provided to Stantec prior to finalizing for agency review. The memorandum content may be added to the DDR (Task 2) document as a new section for consistency and to provide responses to agency comments on previous work. A presentation will be made at one of the regular agency coordination meetings to present the methodology, input, and results from each model and to address the NMFS areas of concern. The meeting will also be used to develop an agreed-upon list of structural changes or post-processing of the models.

Assumptions:

- The level of effort assumes a single set of boundary conditions for each model (i.e. design flow and range).
- Physical modeling is not part of this scope item, see Task 3.3.

Task 3.2 Deliverables:

- CFD Modeling Technical Memorandum, draft and final (electronic)

3.3 Physical Modeling Observation and Integration

Physical modeling of the vertical slot design will be conducted by the USBR at their lab in Colorado under direct contract to UWCD. Stantec will work with UWCD to provide input to the USBR modeling team in the formation of the physical modeling plan and to address agency comments made on that plan. Two, two-hour coordination calls are assumed prior to the start of modeling. Stantec will review and comment on model design plans and approach within the allowed two-week review period. Two Stantec staff will attend weekly update phone calls with the USBR modeling team to hear progress and to provide direction for continued modeling and trails. Three trips are assumed to allow two Stantec engineers to observe the model in-person. Each trip is assumed to last 3 days including travel and 2 days in the lab. Stantec will review the draft modeling report and provide written comments within the two-week review window. Design changes will be documented for the drawings that were included in the September 2020 DDR for review by UWCD and the agencies. Design changes will be incorporated into the 30% designs as approved by UWCD. The physical modeling report is projected to be completed by the USBR by the end of March 2022.

Assumptions and Support Required from UWCD

In preparing this proposal we made the following assumptions. Changes to the assumptions below and in the scope of work above will result in changes to the scope, schedule, and budget.

- UWCD will furnish to Stantec as required for the performance of the Services hereunder the following:
  - (1) Reports of explorations and tests of surface and subsurface conditions at or contiguous to the site, and reports of explorations and tests of the conditions at the site (both surface and subsurface) with respect to the presences or absence of hazardous waste or similar materials (such as, but not limited to, asbestos, polychlorinated biphenyls (PCBs), petroleum and radioactive materials), all of such reports and drawings to be based on appropriate borings, probings, examinations, surveys, tests, and samplings of the conditions involved, to be prepared by qualified persons, and to be accompanied by appropriate professional interpretations of all of the findings;
  - (2) Environmental assessments and impact statements.
  - (3) Property boundary, easement, right-of-way, topographical and utility surveys.
  - (4) Property descriptions; and
  - (5) Zoning, deed and other land use restrictions
- Wetland or other jurisdictional critical areas wetlands on the project site will be flagged by others prior to field surveying.
- LIMITED SCOPE: The reported condition of the facility is based on observations of field conditions made under normal operating conditions and water levels at the time of

inspection, along with data available to the inspection team as of the date of this writing. It is critical to note that the condition of the facility depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present condition of the facility will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected. Stantec disclaims any liability for any latent defects or deficiencies which are not reasonably discoverable under generally accepted industry standards or that should reasonably have been identified pursuant to other applicable inspection criteria. Any assessments of the facilities are limited in terms of accuracy to the time, scope and purpose for which the assessment was prepared.

- UWCD will establish requirements for operation, reliability and required design life.
- UWCD will provide cost data for labor, power, and other known O&M activities.
- All coordination and communication with the resource agencies (NMFS, CDFW) will be by UWCD unless specifically authorized by UWCD.
- No allowance for expert testimony is included and would require separate authorization.
- Future Task 4 (Final Design), Task 5 (Cost Opinion) and Task 6 (Permitting Support), as well as a continuation of Task 1 (Project Management) and the completion of Task 2 (DDR), will proceed under future authorization(s).
- For budgeting purposes this proposal assumes the project will progress through physical modeling of the vertical slot ladder, the new 600 cfs auxiliary water system (AWS), and 750 cfs replacement canal fish screen on the schedule as presented herein. Stantec understands that the project tasks may be authorized in phases based on UWCD presentation of the alternate design to the parties of the litigation, and approval to proceed with the alternate vertical slot fish ladder design for fish passage. Prior to authorization of subsequent tasks UWCD and Stantec will review and amend the scope, budget, and assumptions to be consistent with any changes to the scope of the project.

BASIS OF COMPENSATION AND BUDGET

Compensation for these Scope of Services shall be in accordance with the methods and specific amounts described herein.

1. Rate Schedule. Compensation shall be on an hourly rate basis as presented on the attached 2021Rate Sheet.
2. Other Direct Cost. Stantec will bill Other Direct Costs for travel, materials, equipment, or consumable supplies related to this project, including outside printing/scans of full-size drawings or subconsultants at actual costs plus 12%.

3. Flat Rate Disbursement at the rate of $11.00 per labor hour for each hour incurred by Stantec employees for Direct Labor as described herein. Flat Rate Disbursement charge shall include computer equipment and usage, telecommunications, routine copying, printing of draft and final documents, information sharing platform (SharePoint), and Computer Aided Drafting (CAD). This charge will appear on invoices as "Flat Rate Disbursement."
4. Mileage for use of employee personal vehicles will be reimbursed at a per mile value equal to rates established by the Federal government at the time that travel is incurred.

The estimate to complete the work described in Scope of Services is $403,879. The budget breakdown by phase and major task is provided below in Table 1. Services will be billed on an hourly rate basis based on the attached 2021 Rate Sheet for actual work completed. Should the work extend beyond 2021, the billing rates will be increased January 1 of each year by 3%.

Table 1 Budget Summary Table

Task		Estimated Labor Hours	Estimated Budget
Phase 3 – Complete Final Design			
1	**Project Management and Meetings**	**264**	**$55,121**
1.1	1.1 PM and Administration	196	$37,990
1.2	1.2 Project Meetings	26	$6,357
1.3	1.3 Agency/External Meetings	42	$10,774
2	**Preliminary Design (Design Development Report)**	**105**	**$23,758**
3	**Geotechnical Investigation and Hydraulic Modeling**	**1274**	**$325,000**
	3.1 Geotechnical	588	$163,990
	3.2 CFD Modeling (2 models)	686	$161,010
	Total Phase 3	**1,643**	**$403,879**

PRELIMINARY SCHEDULE

The project will generally be conducted in accordance with the Milestone Target Dates presented below based on an assumed Notice to Proceed conservatively three weeks following the Board Meeting. UWCD review times are assumed to be two weeks and agency reviews are assumed to be one month unless otherwise defined in the Court Order. Interim dates are subject to change based on mutual agreement between Stantec and UWCD provided the changes do not conflict with the stipulated dates in the Court Order.

December 22, 2020

Key Milestone Target Dates:

- Notice to Proceed with Final Design..... 1/18/2021
- Submit Field drilling plan for review..... 2/02/2021
- Finalize Concept Changes from Physical model recommendations..... 2/11/2022
- Submit Design Update (~30%) and DDR Update..... 2/11/2022
- Return Comments to United on the Draft Physical Modeling Report..... 2/28/2022
- Amendment Scope Complete..... 4/01/2022

Regards,

STANTEC CONSULTING SERVICES INC.

Heidi Wahto
Project Manager
Phone: (425) 602-3514
heidi.wahto@stantec.com

Aaron Burns
Vice President
Phone: (303) 291-2235
aaron.burns@stantec.com

Attachment: Schedule of Billing Rates 2021
Table 1 Preliminary List of Drawings
Preliminary Schedule Update – 12.22.2020

SCHEDULE OF BILLING RATES – 2021

Billing Level	Hourly Rate	Description
3 4 5	$111 $116 $132	**Junior Level position** ❑ Independently carries out assignments of limited scope using standard procedures, methods and techniques ❑ Assists senior staff in carrying out more advanced procedures ❑ Completed work is reviewed for feasibility and soundness of judgment ❑ Graduate from an appropriate post-secondary program or equivalent ❑ Generally, one to three years experience
6 7 8	$136 $147 $153	**Fully Qualified Professional Position** ❑ Carries out assignments requiring general familiarity within a broad field of the respective profession ❑ Makes decisions by using a combination of standard methods and techniques ❑ Actively participates in planning to ensure the achievement of objectives ❑ Works independently to interpret information and resolve difficulties ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, three to six years experience
9 10 11	$164 $170 $181	**First Level Supervisor or first complete Level of Specialization** ❑ Provides applied professional knowledge and initiative in planning and coordinating work programs ❑ Adapts established guidelines as necessary to address unusual issues ❑ Decisions accepted as technically accurate, however may on occasion be reviewed for soundness of judgment ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, five to nine years experience
12 13 14	$191 $199 $215	**Highly Specialized Technical Professional or Supervisor of groups of professionals** ❑ Provides multi-discipline knowledge to deliver innovative solutions in related field of expertise ❑ Participates in short- and long-range planning to ensure the achievement of objectives ❑ Makes responsible decisions on all matters, including policy recommendations, work methods, and financial controls associated with large expenditures ❑ Reviews and evaluates technical work ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, ten to fifteen years experience with extensive, broad experience
15 16 17 18	$226 $241 $249 $251	**Senior Level Consultant or Management** ❑ Recognized as an authority in a specific field with qualifications of significant value ❑ Provides multidiscipline knowledge to deliver innovative solutions in related field of expertise ❑ Independently conceives programs and problems for investigation ❑ Participates in discussions to ensure the achievement of program and/or project objectives ❑ Makes responsible decisions on expenditures, including large sums or implementation of major programs and/or projects ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, more than twelve years experience with extensive experience

Note: Rates subject to escalation at end of calendar year.

TABLE 1 PRELIMINARY LIST OF DRAWINGS
Vern Freeman Diversion Fish Passage

Area Designation:
No Designation = General Site
1 = Weir and Crest Gate
2 = Fish Ladder
3 = Canal and Fish Screen
4 = Appurtenant Facilities & Buildings

	Drawing No.		Drawing Name	PreDesign Figures
GENERAL				
	1	G-1	Cover Sheet	
	2	G-2	Location and Vicinity Map	
	3	G-3	Drawing Index	
	4	G-4	Symbols and Abbreviations	
	5	G-5	Existing Site Plan	X
	6	G-6	Hydraulic Profile and Design Criteria - Fish Ladder	X
	7	G-7	Hydraulic Profile and Design Criteria - Screen and Bypass	X
	8	G-8	Equipment and Piping Schedules	
x				
EROSION AND SEDIMENT CONTROL				
	1	ES-1	Erosion, Sediment and Water Control Plan (1:40)	
	2	ES-2	Details -2	
	3	ES-3	Details -3	
x				
DEMOLITION				
	1	1D-1	Weir and Stilling Basin Demolition Plan	
	2	1D-2	Weir and Stilling Basin Demolition Sections & Details	
	1	2D-1	Fish Ladder Demolition Plan	
	2	2D-2	Fish Ladder Demolition Sections & Details	
	3	2D-3	Fish Ladder Electrical Demolition Details	
	1	3D-1	Canal and Screen Demolition Plan	
	2	3D-2	Canal and Screen Demolition Sections & Details	
	3	3D-3	Canal and Screen Demolition Sections & Details	
	4	3D-4	Canal and Screen Electrical Demolition Details	
	1	4D-1	Control Building Demolition Plan and Details	
	2	4D-2	Storage Building Demolition Plan and Details	
x				
CIVIL				
	1	GC-1	General Civil Notes and Details -1	
	2	GC-2	General Civil Details -2	
	3	GC-3	General Civil Details -3	
	4	GC-4	General Civil Details -4	
x				
	1	C-1	Site Plan	X
	2	C-2	Horizontal Control Plan (1:40)	
	3	C-3	Grading and Drainage Plan-1 (west)(1:20)	
	4	C-4	Grading and Drainage Plan-2 (east)(1:20)	
	5	C-5	Road Profiles	
	6	C-6	Yard Piping Plan (1:20)	X
	7	C-7	Yard Piping Profiles-1 (aws & sediment)	
	8	C-8	Yard Piping Profiles-2 (sediment)	
	9	C-9	Yard Piping Profiles-3 (fish return & discharge section)	
	10	C-10	Civil Sections-1 (global)	X
	11	C-11	Civil Sections-2 (global)	
	12	C-12	Civil Sections-3 (global)	
	13	C-13	Civil Sections-4 (small area slopes and ditches)	
	14	C-14	Civil Sections-5 (small area slopes and ditches)	
	15	C-15	Civil Sections-6 (riprap & channel)	
	16	C-16	Civil Sections-7 (riprap & channel)	
x				
ARCHITECTURE				
	1	GA-1	Architectural General Notes and Standard Details	
	2	GA-2	Architectural Standard Details	
	1	3A-1	Evaluation Building Floor and Roof Plan	
	2	3A-2	Evaluation Building Elevations	
	3	3A-3	Evaluation Building Details	
	4	3A-4	Evaluation Building Details	
	1	4A-1	Control Building Floor and Roof Plan	
	2	4A-2	Control Building Elevations	
	3	4A-3	Control Building Details	
	4	4A-4	Storage Building Floor and Roof Plan	
	5	4A-5	Storage Building Elevations	
x				

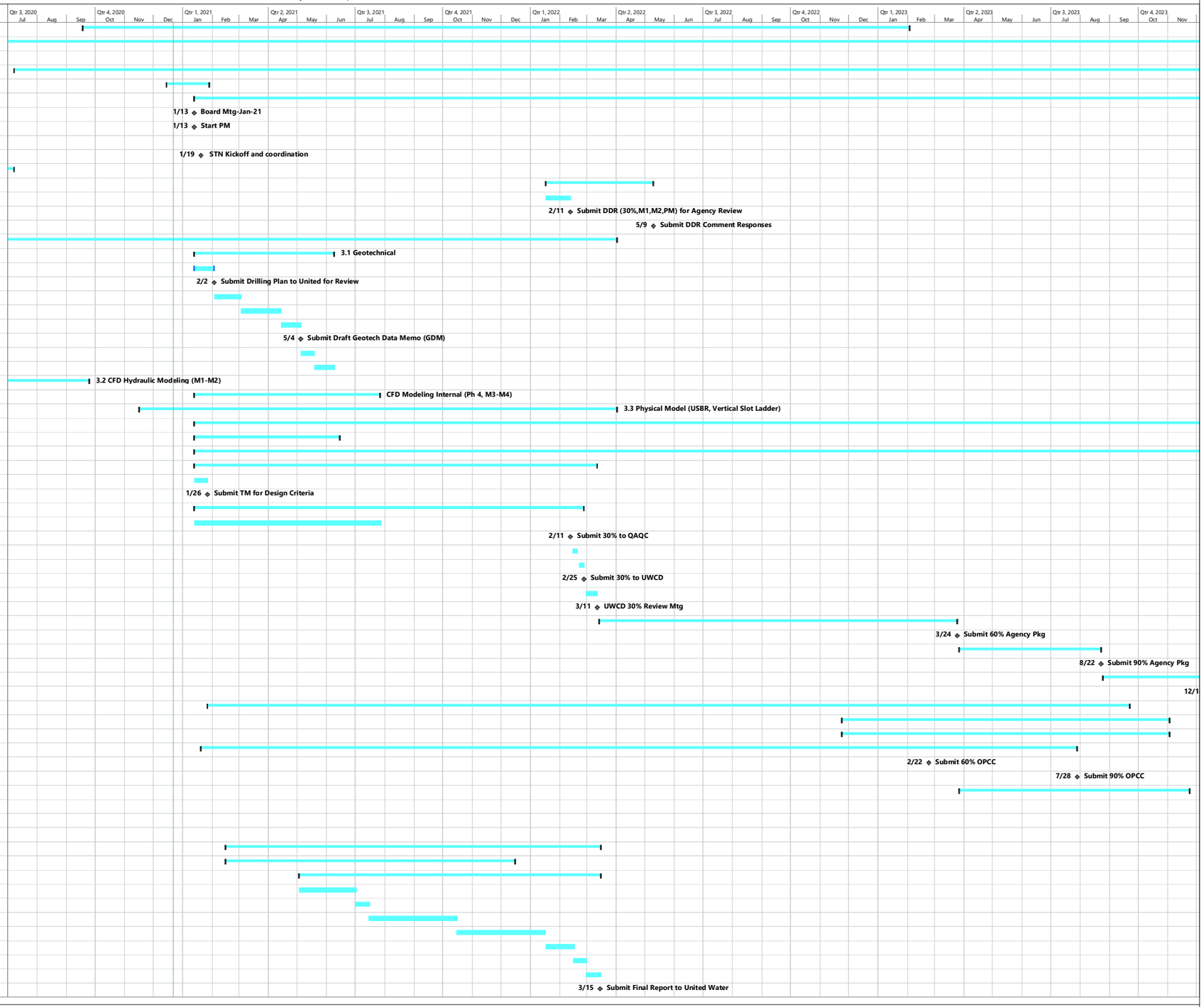
Drawing No.			Drawing Name	PreDesign Figures
STRUCTURAL				
	1	GS-1	Structural General Notes and Standard Details	
	2	GS-2	Structural Standard Details II	
	3	GS-3	Structural Standard Details III	
	4	GS-4	Structural Standard Details IV	
	5	GS-5	Structural Standard Details V	
	6	GS-6	Structural Standard Details VI	
	7	GS-7	Structural Standard Details VII	
x				
	1	1S-1	Weir and Stilling Basin Plan (1/4 or 3/16:1) (incl at grade slab near entrance)	X
	2	1S-2	Weir and Stilling Basin Sections (3/8":1') -1	X
	3	1S-3	Weir and Stilling Basin Sections (3/8":1') -2	
	4	1S-4	Weir and Stilling Basin Sections (3/8":1') -3	
	5	1S-5	Weir and Stilling Basin Sections (3/8":1') -4	
x				
	6	2S-6	Fish Ladder Entrance Foundation Plan (1/4"=1')	
	7	2S-7	Fish Ladder Entrance Intermediate Plan (1/4"=1')	
	8	2S-8	Fish Ladder Entrance Top Plan (1/4"=1')	X
	9	2S-9	Fish Ladder Entrance Sections (3/8"=1') -1	
	10	2S-10	Fish Ladder Entrance Sections (3/8"=1') -2	
	11	2S-11	Fish Ladder Entrance Sections (3/8"=1') -3	
	12	2S-12	Fish Ladder Middle Foundation Plan (1/4"=1')	
	13	2S-13	Fish Ladder Middle Top Plan (1/4"=1')	X
	14	2S-14	Fish Ladder Middle Sections (3/8"=1') -1 profile w/ detail	
	15	2S-15	Fish Ladder Middle Sections (3/8"=1') -2 profile w/ detail	
	16	2S-16	Fish Ladder Middle Sections (3/8"=1') -3 perpendicular	
	17	2S-17	Fish Ladder Middle Sections and Details (3/8"=1') -4 access	
	18	2S-18	Fish Ladder Exit Foundation Plan (1/4"=1')	
	19	2S-19	Fish Ladder Exit Top Plan (1/4"=1')	X
	20	2S-20	Fish Ladder Exit Sections(3/8"=1') -1	
	21	2S-21	Fish Ladder Exit Sections(3/8"=1') -2	
	22	2S-22	Fish Ladder Exit Sections(3/8"=1') -3	
	23	2S-23	Fish Ladder Exit Sections & Details (3/8"=1') -4	
	24	2S-24	Fish Ladder Exit Sections & Details (3/8"=1') -5	
x				
	1	3S-1	Fish Screen Key Plan and Control	X
	2	3S-2	Foundation Plan - 1 (1/4")	
	2	3S-2	Foundation Plan - 2	
	3	3S-3	Foundation Plan - 3	
	3	3S-3	Foundation Plan - 4	
	4	3S-4	Top Plan - 1	
	4	3S-4	Top Plan - 2	
	5	3S-5	Top Plan - 3	
	5	3S-5	Top Plan - 4	
	6	3S-6	Screen Sections - 1	
	6	3S-6	Screen Sections - 2	
	7	3S-7	Screen Sections - 3	
	7	3S-7	Screen Sections - 4	
	8	3S-8	Screen Sections - 5	
	8	3S-8	Screen Sections - 6	
	9	3S-9	Screen Sections - 7	
	9	3S-9	Screen Sections - 8	
	10	3S-10	Screen Sections - 9	
	10	3S-10	Screen Sections - 10	
	11	3S-11	Evaluation Station Section & Details - 1	X
	11	3S-11	Evaluation Station Section & Details - 2	
	12	3S-12	Evaluation Station Section & Details - 3	
	13	3S-13	Miscellaneous Screen Area Details -1	
	14	3S-14	Miscellaneous Screen Area Details -2	
	15	3S-15	Miscellaneous Screen Area Details -3	
	16	3S-16	Miscellaneous Screen Area Details -4	
	17	3S-17	Miscellaneous Screen Area Details -5	
x				
	1	4S-1	Control Building Plans	X
	2	4S-2	Control Building Sections	
	3	4S-3	Storage Building Floor and Roof Plan	X
	4	4S-4	Storage Building Sections	
	5	4S-5	Miscellaneous Site Structures Details -1	
	6	4S-6	Miscellaneous Site Structures Details -2	
	7	4S-7	Miscellaneous Site Structures Details -3	
	8	4S-8	Miscellaneous Site Structures Details -4	
x				

Drawing No.			Drawing Name	PreDesign Figures
MECHANICAL				
	1	GM-1	Mechanical Key Plan	
	2	GM-2	Mechanical Standard Details 1	
	3	GM-3	Mechanical Standard Details 2	
	4	GM-4	Mechanical Standard Details 3	
	5	GM-5	Mechanical Standard Details 4	
x				
	1	1M-1	Crest Gate Plan and Details	X
	2	1M-2	Crest Gate Details -1	
	3	1M-3	Crest Gate Details -2	
x				
	1	3M-1	Fish Ladder Entrance Mechanical Plan	X
	2	3M-2	Fish Ladder Exit Mechanical Plan	
	3	3M-3	Fish Ladder Entrance Mechanical and Gate Sections -1	
	4	3M-4	Fish Ladder Entrance Mechanical and Gate Sections -2	
	5	3M-5	Fish Ladder Exit Mechanical and Gate Sections -1	
	6	3M-6	Fish Ladder Exit Mechanical and Gate Sections -2	
	7	3M-7	Counting Weir Mechanical	
	8	3M-8	Misc Mechanical Detail -1	
	9	3M-9	Misc Mechanical Detail -2	
x				
	1	3M-1	Screen Mechanical Plan -1 (match stru top plan)	X
	2	3M-2	Screen Mechanical Plan -2	
	3	3M-3	Screen Mechanical Plan -3	
	4	3M-4	Screen Mechanical Plan -4	
	5	3M-5	Area Plan Canal Secondary Screen	
	6	3M-6	Screen Mechanical Sections - 1 (long aws)	
	7	3M-7	Screen Mechanical Sections - 2 (long primary)	
	8	3M-8	Screen Mechanical Sections - 3	
	9	3M-9	Screen Mechanical Sections - 4	
	10	3M-10	Screen Mechanical Sections - 5	
	11	3M-11	Primary Cleaner Details -1	
	12	3M-12	Primary Cleaner Details -2	
	13	3M-13	Primary Cleaner Details -3	
	14	3M-14	Primary Cleaner Details -4	
	15	3M-15	Secondary Cleaner Details -1	
	16	3M-16	Secondary Cleaner Details -2	
	17	3M-17	AWS Screen Cleaner Details -1	
	18	3M-18	AWS Screen Cleaner Details -2	
	19	3M-19	AWS Screen Cleaner Details -3	
	20	3M-20	Finishing Screen Details - 1	
	21	3M-21	Finishing Screen Details - 2	
	22	3M-22	Primary Screen Panel Details	
	23	3M-23	Primary Baffles Details	
	24	3M-24	Secondary Screen Panel Details	
	25	3M-25	Secondary Baffle Details	
	26	3M-26	AWS & Finishing Screen Panel Details	
	27	3M-27	Screen Connection Details	
	28	3M-28	Fish Bypass Gate Details -1	
	29	3M-29	Fish Bypass Gate Details -2	
	30	3M-30	Fish Bypass Gate Details -3	
	31	3M-31	Valve and Gate Details-1 (aws)	
	32	3M-32	Valve and Gate Details-2 (misc)	
	33	3M-33	Valve and Gate Details-3 (sed valves)	
	34	3M-34	Sediment Control Pump-AWS Plan and Section	
	35	3M-35	Sediment Control Pump-Canal Screen Plan and Section	
	36	3M-36	Sediment Control System Details -1	
	37	3M-37	Sediment Control System Details -2	
	38	3M-38	Evaluation Facility Mechanical Plan and Details	
	39	3M-39	Evaluation Facility Mechanical Details-1	
	40	3M-40	Evaluation Facility Mechanical Details-2	
	41	3M-41	Misc Mechanical & Piping Details -1	
	42	3M-42	Misc Mechanical & Piping Details -2	
x				
	1	4M-1	Control Building Mechanical Plan and Details (incl air compressor)	
	2	4M-2	Control Building Sections	
	3	4M-3	Storage Building Mechanical Plan and Details	
x				

Drawing No.			Drawing Name	PreDesign Figures
ELECTRICAL				
	1	GE-1	Electrical Symbols & Abbreviations	
	2	GE-2	Power One Line Diagram -1	X
	3	GE-3	Power One Line Diagram -2	
	4	GE-4	Power One Line Diagram -3	
	5	GE-5	Equipment Elevations - 1	
	6	GE-6	Equipment Elevations - 2	
	7	GE-7	Control Schematics -1	
	8	GE-8	Control Schematics -2	
	9	GE-9	Control Schematics -3	
	10	GE-10	Control Schematics -4	
	11	GE-11	Control Schematics -5	
	12	GE-12	Control Schematics -6	
	13	GE-13	Control Schematics -7	
	14	GE-14	Control Schematics -8	
	15	GE-15	Panel Schedules -1	
	16	GE-16	Panel Schedules -2	
	17	GE-17	Lighting Schedules & Details	
	18	GE-18	Control/Monitor Network One line	
	19	GE-19	Process Flow diagram _ fish Ladder	
	20	GE-20	Process Flow diagram _ Screen	
	21	GE-21	Electrical Site Plan - west (1"=20'))	
	22	GE-22	Electrical Site Plan - east (1"=20'))	
x				
	1	1E-1	Electrical Plan - Weir & Crest Gate (limit switches and lighting)	
	2	1E-2	Electrical Sections and Details - Weir & Crest Gate	
x				
	1	2E-1	Electrical Plan - Ladder -1 (stru plan ref at 1.4"/ft)	
	2	2E-2	Electrical Plan - Ladder -2	
	3	2E-3	Electrical Plan - Ladder -3	
	4	2E-4	Electrical Sections & Details - Sheet 1	
	5	2E-5	Electrical Sections & Details - Sheet 2	
	6	2E-6	Electrical Sections & Details - Sheet 3	
	7	2E-7	Control Panel Arrangements & Details - Sheet 1	
	8	2E-8	Control Panel Arrangements & Details - Sheet 2	
x				
	1	3E-1	Electrical Plan - Fish Screen -1	
	2	3E-2	Electrical Plan - Fish Screen -2	
	3	3E-3	Electrical Plan - Fish Screen -3	
	4	3E-4	Electrical Plan - Fish Screen -4	
	5	3E-5	Electrical Plan - Evaluation Building Area	
	6	3E-6	Electrical Power & Control Plan - Evaluation Building	
	7	3E-7	Electrical Lighting Plan - Evaluation Building	
	8	3E-8	Electrical Sections & Details - Sheet 1	
	9	3E-9	Electrical Sections & Details - Sheet 2	
	10	3E-10	Electrical Sections & Details - Sheet 3	
	11	3E-11	Control Panel Arrangements & Details - Sheet 1	
	12	3E-12	Control Panel Arrangements & Details - Sheet 2	
	13	3E-13	Control Panel Arrangements & Details - Sheet 3	
	1	4E-1	Control Building-electrical Power & Control Plan	
	2	4E-2	Control Building-Electrical Lighting Plan	
	3	4E-3	Storage Building-electrical Power & Control Plan	
	4	4E-4	Storage Building-Electrical Lighting Plan	
x				
INSTRUMENTATION				
	1	GI-1	General Instrumentation Symbols & Abbreviations	
	2	GI-2	Network Block Diagram	X
	3	GI-3	Instrumentation Details -1	
	4	GI-4	Instrumentation Details -2	
	1	I-1	Crest Gate P&ID	
	2	I-2	Fish Ladder & AWS P&ID	
	3	I-3	Fish Screen and Canal P&ID	
	4	I-4	Sediment Control System P&ID	
x				
			Total Number of Drawings PreDesign	20
			Total Number of Drawings for Complete Final Design	239

Vern Freeman Diversion Dam - Vertical Slot Fish Ladder Design
Preliminary Schedule Update - 12-22-2020

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Physical % Complete
1		**COURT ORDER DATES**	**620 days**	**Fri 9/18/20**	**Thu 2/2/23**		**0%**
26		**Stantec Design and Construction Documents**	**1307 days**	**Wed 1/9/19**	**Thu 1/11/24**		**0%**
27		**1 Project Management -Phase 1**	**157 days**	**Wed 1/9/19**	**Thu 8/15/19**		**0%**
36		**1 Project Management -Phase 2**	**917 days**	**Wed 7/8/20**	**Thu 1/11/24**		**0%**
41		**1 Project Management -Phase 3**	**33 days**	**Tue 12/15/20**	**Fri 1/29/21**		**0%**
47		**1 Project Management -Phase 4**	**782 days**	**Wed 1/13/21**	**Thu 1/11/24**		**0%**
48		Board Mtg-Jan-21	0 days	Wed 1/13/21	Wed 1/13/21		0%
49		Start PM	0 days	Wed 1/13/21	Wed 1/13/21	48	0%
50		End PM	0 days	Thu 1/11/24	Thu 1/11/24	223	0%
51		STN Kickoff and coordination	0 days	Tue 1/19/21	Tue 1/19/21	49FS+5 days	0%
52		**2. Preliminary Design**	**373 days**	**Fri 2/1/19**	**Wed 7/8/20**		**0%**
83		**DDR (task 3.2 +T2 amend)**	**81 days**	**Mon 1/17/22**	**Mon 5/9/22**		**0%**
84		Prepare Update to DDR	20 days	Mon 1/17/22	Fri 2/11/22	239	0%
85		Submit DDR (30%,M1,M2,PM) for Agency Review	0 days	Fri 2/11/22	Fri 2/11/22	2,84	0%
86		Submit DDR Comment Responses	0 days	Mon 5/9/22	Mon 5/9/22	85FS+46 days,19	0%
87		**3. Geotechnical and Modeling**	**471 days**	**Fri 6/12/20**	**Fri 4/1/22**		**0%**
88		**3.1 Geotechnical**	**105 days**	**Wed 1/13/21**	**Tue 6/8/21**		**0%**
89		3.1.1 Review Geotech Data - Develop Drilling Plan	15 days	Wed 1/13/21	Tue 2/2/21	97,48	0%
90		Submit Drilling Plan to United for Review	0 days	Tue 2/2/21	Tue 2/2/21	89	0%
91		Subcontract and schedule drilling company	20 days	Wed 2/3/21	Tue 3/2/21	89,48	0%
92		3.1.1 Subsurface Exploration	30 days	Wed 3/3/21	Tue 4/13/21	90FS+10 days,91	0%
93		3.1.2 Geotech Design Memo (GDM) Draft	15 days	Wed 4/14/21	Tue 5/4/21	92	0%
94		Submit Draft Geotech Data Memo (GDM)	0 days	Tue 5/4/21	Tue 5/4/21	93	0%
95		GDM Review (Stantec, United)	10 days	Wed 5/5/21	Tue 5/18/21	93	0%
96		GDM Final	15 days	Wed 5/19/21	Tue 6/8/21	95	0%
97		**3.2 CFD Hydraulic Modeling (M1-M2)**	**75 days**	**Fri 6/12/20**	**Thu 9/24/20**		**0%**
105		**CFD Modeling Internal (Ph 4, M3-M4)**	**139 days**	**Wed 1/13/21**	**Mon 7/26/21**		**0%**
124		**3.3 Physical Model (USBR, Vertical Slot Ladder)**	**360 days**	**Mon 11/16/20**	**Fri 4/1/22**		**0%**
132		**4. Final Design**	**762 days**	**Wed 1/13/21**	**Thu 12/14/23**		**0%**
133		**4.1 Hydraulic Design**	**109 days**	**Wed 1/13/21**	**Mon 6/14/21**		**0%**
140		**4.2 Detailed Design**	**762 days**	**Wed 1/13/21**	**Thu 12/14/23**		**0%**
141		**30% Design Development**	**303 days**	**Wed 1/13/21**	**Fri 3/11/22**		**0%**
142		Design Criteria TM	2 wks	Wed 1/13/21	Tue 1/26/21	48	0%
143		Submit TM for Design Criteria	0 days	Tue 1/26/21	Tue 1/26/21	142	0%
144		**30% Design Plans and Specifications**	**293 days**	**Wed 1/13/21**	**Fri 2/25/22**		**0%**
145		30% Design Development	140 days	Wed 1/13/21	Tue 7/27/21	48	0%
146		Submit 30% to QAQC	0 days	Fri 2/11/22	Fri 2/11/22	145,84	0%
147		QAQC Review	5 days	Mon 2/14/22	Fri 2/18/22	146	0%
148		Address Comments	5 days	Mon 2/21/22	Fri 2/25/22	147	0%
149		Submit 30% to UWCD	0 days	Fri 2/25/22	Fri 2/25/22	148	0%
150		UWCD Review	10 days	Mon 2/28/22	Fri 3/11/22	149	0%
151		UWCD 30% Review Mtg	0 days	Fri 3/11/22	Fri 3/11/22	150	0%
152		**60% Design Development**	**270 days**	**Mon 3/14/22**	**Fri 3/24/23**		**0%**
165		Submit 60% Agency Pkg	0 days	Fri 3/24/23	Fri 3/24/23	164	0%
166		**90% Design Development**	**107 days**	**Mon 3/27/23**	**Tue 8/22/23**		**0%**
179		Submit 90% Agency Pkg	0 days	Tue 8/22/23	Tue 8/22/23	178	0%
180		**100% Design Development**	**80 days**	**Fri 8/25/23**	**Thu 12/14/23**		**0%**
187		**Design Complete-Bid Ready Documents**	**0 days**	**Thu 12/14/23**	**Thu 12/14/23**	**186**	**0%**
188		**4.3 Agency Presentation-Consultation**	**692 days**	**Wed 1/27/21**	**Thu 9/21/23**		**0%**
200		**4.4 Basis of Design Report**	**246 days**	**Thu 11/24/22**	**Thu 11/2/23**		**0%**
204		**4.5 Operation and Maintenance Plan**	**246 days**	**Thu 11/24/22**	**Thu 11/2/23**		**0%**
208		**5. Cost Opinion**	**658 days**	**Tue 1/19/21**	**Fri 7/28/23**		**0%**
215		Submit 60% OPCC	0 days	Wed 2/22/23	Wed 2/22/23	160FS+5 days	0%
216		Submit 90% OPCC	0 days	Fri 7/28/23	Fri 7/28/23	174FS+5 days	0%
217		**6. Permitting Support (permits by others)**	**174 days**	**Mon 3/27/23**	**Thu 11/23/23**		**0%**
222		Closeout and Final Invoice	20 days	Fri 12/15/23	Thu 1/11/24	187	0%
223		Contract Closeout	0 days	Thu 1/11/24	Thu 1/11/24	222	0%
224							
225		**Physical Model Schedule(USBR-11-19-2020)**	**282 days?**	**Mon 2/15/21**	**Tue 3/15/22**		**0%**
226		**Hardened Ramp**	**218 days?**	**Mon 2/15/21**	**Wed 12/15/21**		**0%**
235		**Vertical Slot Ladder Model**	**227 days**	**Mon 5/3/21**	**Tue 3/15/22**		**0%**
236		Model Design Drawings and Order Materials	44 days	Mon 5/3/21	Thu 7/1/21		0%
237		Review of Model Design Drawings by United Water	11 days	Thu 7/1/21	Thu 7/15/21		0%
238		Vertical Slot Fishway Option: Model Construction	67 days	Thu 7/15/21	Fri 10/15/21		0%
239		Vertical Slot Fishway Option: Model Shakedown and Testing	66 days	Fri 10/15/21	Sat 1/15/22		0%
240		Draft Report	22 days	Mon 1/17/22	Tue 2/15/22		0%
241		Submit Draft Report to United Water for Comment	10 days	Tue 2/15/22	Mon 2/28/22		0%
242		Finalize Report	12 days	Mon 2/28/22	Tue 3/15/22		0%
243		Submit Final Report to United Water	0 days	Tue 3/15/22	Tue 3/15/22		0%



Project: sch_VFDD_design-phas
Date: Tue 12/22/20

Task | Milestone | Summary | Inactive Task | Inactive Summary | Duration-only | Manual Summary | Finish-only | External Milestone | Progress | Task
Split | Milestone COMPLETE | Project Summary | Inactive Milestone | Manual Task | Manual Summary Rollup | Start-only | External Tasks | Deadline | Manual Progress

printed--Tue 12/22/20

SECOND AMENDMENT TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES

This Amendment to the Agreement for Professional Consulting Services is entered into as of January 14, 2021, by and between **United Water Conservation District** (UNITED), a public entity, and **Stantec Consulting Services Inc.** (CONSULTANT) with reference to the following terms and conditions:

WITNESSETH

WHEREAS, on March 12, 2020, UNITED and CONSULTANT entered into a Professional Consulting Services and;

WHEREAS, UNITED and CONSULTANT have discussed and agreed to amend certain terms and conditions of the AGREEMENT involving term of agreement as specified in this Amendment dated January 14, 2021.

NOW, THEREFORE, based on the covenants and considerations set forth, UNITED and CONSULTANT mutually agree as follows:

1. The AGREEMENT amount is increased by $403,879 equaling to an AGREEMENT total of $774,061
2. The term of the AGREEMENT is extended to April 1, 2022.
3. Each and all other provisions of said AGREEMENT remain in full force and effect and apply to all services and payments made under this SECOND AMENDMENT.

UNITED WATER CONSERVATION DISTRICT

By_____
Mauricio E. Guardado, Jr., General Manager

STANTEC CONSULTING SERVICES INC.

By_____
(Name and Title)

ATTACHMENT "A"
SECOND AMENDMENT TO
AGREEMENT FOR PROFESSIONAL CONSULTING SERVICES

Revised Fee Schedule

Stantec Consulting Services Inc.
1687 114th Avenue SE Suite 100, Bellevue WA 98440

December 22, 2020

Attention: Mr. Craig Morgan
United Water Conservation District
106 North 8th Street
Santa Paula, CA 93060

Reference: Freeman Diversion Dam,
Change Order 3 – Proposal for Phase 3 Design of Fish Ladder and Intake Modifications

Dear Craig,

Thank you for the opportunity to submit this proposal to United Water Conservation District (UWCD) to further develop and assess the feasibility of constructing a 'criteria' fish ladder at the Freeman Diversion Dam (FDD). Stantec Consulting Services Inc. (Stantec) has prepared the following scope and budget estimate for your consideration based on our conversation and understanding of the project. This proposal incorporates the Scope of Services as contracted between UWCD and Stantec on February 21, 2019 (Exhibit "A"), while clarifying and removing certain tasks that have been initiated and/or completed between project NTP and present, as noted herein.

These remaining project tasks have been defined to allow execution in phases recognizing UWCD will be presenting the vertical slot fish ladder as an alternate to the passage system currently defined in the court decision. For budgeting purposes the duration of this scope assumes the project will progress through the physical modeling. Stantec understands that the project tasks may be authorized in phases based on UWCD presentation of the alternate design to the parties of the litigation, and approval to proceed with the alternate vertical slot fish ladder design for fish passage. Prior to authorization of subsequent tasks UWCD and Stantec will review and amend the scope, budget, and assumptions to be consistent with identified changes to the scope of the project.

SCOPE OF SERVICES

Task 1 Project Management and Meetings

Project management and administration of the contract will be conducted throughout the duration of the work under this amendment to prepare construction documents suitable for public bidding to a general contractor. Bid support and construction services will be addressed under subsequent proposals and authorizations.

1.1 Project Management and Administration

Project management consists of work associated with organizing, controlling, monitoring, scheduling, invoicing, reporting and similar activities inherent with management of the work. Project management activities consist of the following:

- Project Setup. Set up the initial job work breakdown structure, files, agreements, and internal systems necessary to monitor and control the activities of the work.
- Prepare invoices along with a brief, one-page status summary each month.
- Update and maintain a project specific Health and Safety Plan.
- Review and monitor budget and manage resources to meet project objectives.
- Review and monitor scope of work and develop potential change notice (PCN) log.
- Develop and maintain a project schedule with UWCD.

1.2 Project Meetings

Hold or attend project coordination meetings. For budgeting the following meetings and Stantec attendance have been assumed:

- Kickoff Meeting. Up to four Stantec staff will attend a design phase kickoff virtual meeting. The meeting purpose is to discuss the approach to the design and interactions with the agencies. Review and update criteria or operational changes following the Modeling and direction from the Court.
- Bi-weekly Project Coordination Meetings with UWCD via web conference (1+ up to 2 additional staff depending on topics).
- Additional review meetings and presentations are included as defined in tasks below.

1.3 Agency/External Meetings

Attend agency, legal, or other external meetings as requested and invited by UWCD. These include:

- Agency meetings. Stantec will attend a single, one-half day virtual agency design comment review meetings to present the fish ladder and screen designs to the resource agencies following the 30% and DDR Update submittal. This meeting will be held following UWCD's review and comment. Design phase agency review meetings, focused on the selected designs, will be facilitated by UWCD and supported by Stantec. The meeting will be attended by no more than three members of the design team. Prior to the agency meeting UWCD and Stantec will review the agenda and determine a consensus strategy for the agency presentation. Stantec, with UWCD input, will prepare meeting agendas for distribution prior to the meetings. Meeting summary notes will be developed jointly by UWCD and Stantec.
- Bi-weekly agency conference calls will be attended for coordination with agency review team and to present design progress. 12, one-hour calls for four engineers are budgeted for virtual meetings.

Task 1 Deliverables:

- Monthly Invoices with one-page status summary and PCN log
- Project Milestone Schedule and updates to reflect agreed upon changes
- Meeting agenda and summary notes

Task 2 Preliminary Design

This task was initiated under previous authorizations producing the Hydraulic Basis of Design report (HBOD dated 8/15/2019 and updated 12/6/2019) and the Design Development Report (DDR) dated 9/18/2020. These preliminary design documents were developed and submitted to show the progress of the design concepts and to reflect changes suggested by the agencies in their reviews. The DDR submittal presents the ladder configuration that will be evaluated in the initial physical model of the vertical slot fish ladder. Under this Change Order, this task provides updates to the DDR as the design progresses through the CFD and physical modeling so set the basis of design. One update to the report is assumed at each of the milestone design review submittal stages (30%, for this authorization) to describe and document the basis of the design and narratives for anticipated operation. The budget assumes one round of compiled edits to be provided by UWCD and addressed by Stantec for each submittal stage. All report submittals will be provided in electronic format.

This DDR replaces the previous Basis of Design Report under Task 4.

Task 2 Deliverables:

- 30% Draft DDR (60% and 90% Draft DDR will be included under future authorization(s))

Task 3 Geotechnical Investigation and Hydraulic Modeling

3.1 Geotechnical Investigation

Stantec will conduct subsurface investigations and geotechnical analysis at the FDD site to develop recommendations for the analysis and design of the new facility. Three previous studies, one for initial diversion construction (GTC, 1983) and two for the fish ramp design (NV5, 2013 and 2016) will be considered and supplemented in this analysis.

3.1.1 Subsurface Exploration and Analysis

Stantec will coordinate with UWCD regarding advancing subsurface explorations at specific locations at the site.

- Literature Review. Review available and published geological and hydrogeological reports/ maps that include the site and site area. The purpose of this element of the study is to establish and evaluate the geologic framework of the site.

- Review of previous geotechnical explorations.
- Screening Level Slope Stability Evaluation. Since the new plans cut into the toe of the rock slope to the southeast of the fish ladder location, we will have a geologist/geotechnical engineer look over the slope and provide thoughts and recommendations for additional analysis as appropriate. This will specifically include:
  - Two people spending one day traveling to and walking over the site and reviewing the slope conditions.
  - Time for review of available information and to prepare recommendations for additional studies/analyses, if warranted.
- Perform a site visit to locate the proposed explorations in the field. Coordinate the location of utilities at the exploration locations by contacting the "One-Call" utility locating service.
- Subsurface Explorations. Complete subsurface exploration program to include up to 4 borings under 50 ft in depth. All borings are assumed to be located within the driveable parking or roadway areas of the intake site accessible by a highway legal truck mounted drill rig. Stantec has identified local drilling firm ABC Drilling to perform this work.
- Laboratory Testing. Complete laboratory testing on soil samples collected from the subsurface explorations. Selected soil samples will be tested for grain-size determinations, moisture-density and fines content, and direct shears.
- Develop Geotechnical Recommendations and Opinions. Develop geotechnical recommendations for the project site based on the results of the subsurface explorations and review of data provided by others. The geotechnical investigations, recommendations, and report shall comply with the requirements of the 2015 IBC, Section 1803 and other applicable Building Department or local agency requirements. Recommendations will be provided on site conditions, seismicity, groundwater, site preparation and design parameters, limited soil corrosivity information, groundwater, and foundation recommendations.

3.1.2 Geotechnical Report

Present geotechnical recommendations and opinions in a preliminary geotechnical report for the project. Prepare draft and final reports summarizing the results of the study including recommendations subsurface exploration records, logs and figures. Draft report will be provided to UWCD for review and comment. The final report will incorporate mutually agreed upon revisions. The budget assumes one round of compiled comments will be provided by UWCD and incorporated by Stantec.

Assumptions:

- Access rights and permits for borings on UWCD property (if required) and easements to be provided by UWCD.

- No field investigation or analysis is included for any in-river work.
- Dewatering recommendations will be limited to general characteristics for construction contractor use but will not include specific pumping or production recommendations.
- It will not be necessary to pay field crews Prevailing Wage rates.
- Collection (drums) and disposal off site of drill cuttings and/or drilling mud will NOT be the responsibility of Stantec or our drilling subcontractor.
- Stantec will apply for (and pay for) a Ventura County exploratory drilling permit.
- If any other drilling permit(s) is/are required from any jurisdiction(s), it will be obtained by others
- No project specific environmental permits or procedures will be required
- No hazardous materials will be encountered
- Free access will be provided to the site with NO special coordination or scheduling with different owners, entities, etc.
- There will be no limitations on days or hours of field work.
- Evaluation and/or mitigation of surface fault rupture seismic hazards are not included in the scope of work.
- No construction period support services are included.

Task 3.1 Deliverables:

- Draft Geotechnical Report (electronic)
- Final Geotechnical Report (electronic)

3.2 CFD Modeling

CFD Modeling of the vertical slot fish ladder passage alternative was initiated under a subsequent Professional Consulting Services Agreement executed March 12, 2020 (Change Order 1) as amended November 10, 2020 (Change Order 2). Four CFD Models were proposed, with the first two models focused on in-river hydraulic conditions that were completed under the March 12, 2020 Agreement. Under this Change Order, this task would complete the final two models focusing on internal hydraulics at the intake area and within the fish ladder entrance pool.

Hydraulic modeling is required to support and inform the design and to demonstrate to resource agencies that operating conditions within the fishways are conducive for fish passage under specified operating flow ranges. Stantec proposes to develop the final two CFD models for the FDD fish ladder project using the state-of-the-art CFD software, ANSYS FLUENT. The completion of CFD Modeling will be directed and supervised by Dr. Fangbiao Lin and will consist of the following two models.

- **Model 3 – Canal Model.** The modeling extent of the Model 3 boundary will include the approach channel downstream to the flushing gate, trashrack, canal inlet through the Canal gates and terminating upstream of the fish screens about 40 ft downstream of the Canal Gate. This model will assess flow patterns in the approach channel, trash screens, canal inlet, and part of AWS and primary canal screen channels. This model will be used for evaluating hydraulic losses through the trash rack and sediment deposition in the canal inlet. A total of six (6) CFD runs will be included.
- **Model 4 – AWS Model.** The modeling extent of the Model 4 starts at the AWS control gate, AWS pipe and stilling basin, diffuser panels, ladder entrance pool and south entrance gates and a portion of the SAWS tunnel to the north entrance gates. This model will be used for evaluating whether velocity on AWS diffusers are uniform and evaluating hydraulic conditions in AWS stilling basin and fish resting area before entering the fish ladder. It is estimated that six (6) CFD runs will be included for this model.

The models described above focus on discrete areas and may be done independently or in combination. The preliminary design and requirements from the resource agencies will review the information needed and the objective of the modeling. Modeling will be based on survey base map information and structural models provided under previous Preliminary Design and CFD Modeling efforts. Physical modeling will be performed under separate contract with UWCD by the U.S. Bureau of Reclamation (USBR).

At the conclusion of the Model 3 and 4 runs a draft technical memorandum will be prepared that defines the model and summarizes the results. This memorandum will be submitted to UWCD for review and comment and then an updated version will be submitted for agency review. The budget assumes one round of compiled comments from UWCD will be provided to Stantec prior to finalizing for agency review. The memorandum content may be added to the DDR (Task 2) document as a new section for consistency and to provide responses to agency comments on previous work. A presentation will be made at one of the regular agency coordination meetings to present the methodology, input, and results from each model and to address the NMFS areas of concern. The meeting will also be used to develop an agreed-upon list of structural changes or post-processing of the models.

Assumptions:

- The level of effort assumes a single set of boundary conditions for each model (i.e. design flow and range).
- Physical modeling is not part of this scope item, see Task 3.3.

Task 3.2 Deliverables:

- CFD Modeling Technical Memorandum, draft and final (electronic)

3.3 Physical Modeling Observation and Integration

Physical modeling of the vertical slot design will be conducted by the USBR at their lab in Colorado under direct contract to UWCD. Stantec will work with UWCD to provide input to the USBR modeling team in the formation of the physical modeling plan and to address agency comments made on that plan. Two, two-hour coordination calls are assumed prior to the start of modeling. Stantec will review and comment on model design plans and approach within the allowed two-week review period. Two Stantec staff will attend weekly update phone calls with the USBR modeling team to hear progress and to provide direction for continued modeling and trails. Three trips are assumed to allow two Stantec engineers to observe the model in-person. Each trip is assumed to last 3 days including travel and 2 days in the lab. Stantec will review the draft modeling report and provide written comments within the two-week review window. Design changes will be documented for the drawings that were included in the September 2020 DDR for review by UWCD and the agencies. Design changes will be incorporated into the 30% designs as approved by UWCD. The physical modeling report is projected to be completed by the USBR by the end of March 2022.

Assumptions and Support Required from UWCD

In preparing this proposal we made the following assumptions. Changes to the assumptions below and in the scope of work above will result in changes to the scope, schedule, and budget.

- UWCD will furnish to Stantec as required for the performance of the Services hereunder the following:
  - (1) Reports of explorations and tests of surface and subsurface conditions at or contiguous to the site, and reports of explorations and tests of the conditions at the site (both surface and subsurface) with respect to the presences or absence of hazardous waste or similar materials (such as, but not limited to, asbestos, polychlorinated biphenyls (PCBs), petroleum and radioactive materials), all of such reports and drawings to be based on appropriate borings, probings, examinations, surveys, tests, and samplings of the conditions involved, to be prepared by qualified persons, and to be accompanied by appropriate professional interpretations of all of the findings;
  - (2) Environmental assessments and impact statements.
  - (3) Property boundary, easement, right-of-way, topographical and utility surveys.
  - (4) Property descriptions; and
  - (5) Zoning, deed and other land use restrictions
- Wetland or other jurisdictional critical areas wetlands on the project site will be flagged by others prior to field surveying.
- LIMITED SCOPE: The reported condition of the facility is based on observations of field conditions made under normal operating conditions and water levels at the time of

inspection, along with data available to the inspection team as of the date of this writing. It is critical to note that the condition of the facility depends on numerous and constantly changing internal and external conditions and is evolutionary in nature. It would be incorrect to assume that the present condition of the facility will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected. Stantec disclaims any liability for any latent defects or deficiencies which are not reasonably discoverable under generally accepted industry standards or that should reasonably have been identified pursuant to other applicable inspection criteria. Any assessments of the facilities are limited in terms of accuracy to the time, scope and purpose for which the assessment was prepared.

- UWCD will establish requirements for operation, reliability and required design life.
- UWCD will provide cost data for labor, power, and other known O&M activities.
- All coordination and communication with the resource agencies (NMFS, CDFW) will be by UWCD unless specifically authorized by UWCD.
- No allowance for expert testimony is included and would require separate authorization.
- Future Task 4 (Final Design), Task 5 (Cost Opinion) and Task 6 (Permitting Support), as well as a continuation of Task 1 (Project Management) and the completion of Task 2 (DDR), will proceed under future authorization(s).
- For budgeting purposes this proposal assumes the project will progress through physical modeling of the vertical slot ladder, the new 600 cfs auxiliary water system (AWS), and 750 cfs replacement canal fish screen on the schedule as presented herein. Stantec understands that the project tasks may be authorized in phases based on UWCD presentation of the alternate design to the parties of the litigation, and approval to proceed with the alternate vertical slot fish ladder design for fish passage. Prior to authorization of subsequent tasks UWCD and Stantec will review and amend the scope, budget, and assumptions to be consistent with any changes to the scope of the project.

BASIS OF COMPENSATION AND BUDGET

Compensation for these Scope of Services shall be in accordance with the methods and specific amounts described herein.

1. Rate Schedule. Compensation shall be on an hourly rate basis as presented on the attached 2021Rate Sheet.
2. Other Direct Cost. Stantec will bill Other Direct Costs for travel, materials, equipment, or consumable supplies related to this project, including outside printing/scans of full-size drawings or subconsultants at actual costs plus 12%.

3. Flat Rate Disbursement at the rate of $11.00 per labor hour for each hour incurred by Stantec employees for Direct Labor as described herein. Flat Rate Disbursement charge shall include computer equipment and usage, telecommunications, routine copying, printing of draft and final documents, information sharing platform (SharePoint), and Computer Aided Drafting (CAD). This charge will appear on invoices as "Flat Rate Disbursement."
4. Mileage for use of employee personal vehicles will be reimbursed at a per mile value equal to rates established by the Federal government at the time that travel is incurred.

The estimate to complete the work described in Scope of Services is $403,879. The budget breakdown by phase and major task is provided below in Table 1. Services will be billed on an hourly rate basis based on the attached 2021 Rate Sheet for actual work completed. Should the work extend beyond 2021, the billing rates will be increased January 1 of each year by 3%.

Table 1 Budget Summary Table

Task		Estimated Labor Hours	Estimated Budget
Phase 3 – Complete Final Design			
1	**Project Management and Meetings**	**264**	**$55,121**
1.1	1.1 PM and Administration	196	$37,990
1.2	1.2 Project Meetings	26	$6,357
1.3	1.3 Agency/External Meetings	42	$10,774
2	**Preliminary Design (Design Development Report)**	**105**	**$23,758**
3	**Geotechnical Investigation and Hydraulic Modeling**	**1274**	**$325,000**
	3.1 Geotechnical	588	$163,990
	3.2 CFD Modeling (2 models)	686	$161,010
	Total Phase 3	**1,643**	**$403,879**

PRELIMINARY SCHEDULE

The project will generally be conducted in accordance with the Milestone Target Dates presented below based on an assumed Notice to Proceed conservatively three weeks following the Board Meeting. UWCD review times are assumed to be two weeks and agency reviews are assumed to be one month unless otherwise defined in the Court Order. Interim dates are subject to change based on mutual agreement between Stantec and UWCD provided the changes do not conflict with the stipulated dates in the Court Order.

December 22, 2020

Key Milestone Target Dates:

- Notice to Proceed with Final Design..... 1/18/2021
- Submit Field drilling plan for review..... 2/02/2021
- Finalize Concept Changes from Physical model recommendations..... 2/11/2022
- Submit Design Update (~30%) and DDR Update..... 2/11/2022
- Return Comments to United on the Draft Physical Modeling Report..... 2/28/2022
- Amendment Scope Complete..... 4/01/2022

Regards,

STANTEC CONSULTING SERVICES INC.

Heidi Wahto
Project Manager
Phone: (425) 602-3514
heidi.wahto@stantec.com

Aaron Burns
Vice President
Phone: (303) 291-2235
aaron.burns@stantec.com

Attachment: Schedule of Billing Rates 2021
Table 1 Preliminary List of Drawings
Preliminary Schedule Update – 12.22.2020

SCHEDULE OF BILLING RATES – 2021

Billing Level	Hourly Rate	Description
3 4 5	$111 $116 $132	**Junior Level position** ❑ Independently carries out assignments of limited scope using standard procedures, methods and techniques ❑ Assists senior staff in carrying out more advanced procedures ❑ Completed work is reviewed for feasibility and soundness of judgment ❑ Graduate from an appropriate post-secondary program or equivalent ❑ Generally, one to three years experience
6 7 8	$136 $147 $153	**Fully Qualified Professional Position** ❑ Carries out assignments requiring general familiarity within a broad field of the respective profession ❑ Makes decisions by using a combination of standard methods and techniques ❑ Actively participates in planning to ensure the achievement of objectives ❑ Works independently to interpret information and resolve difficulties ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, three to six years experience
9 10 11	$164 $170 $181	**First Level Supervisor or first complete Level of Specialization** ❑ Provides applied professional knowledge and initiative in planning and coordinating work programs ❑ Adapts established guidelines as necessary to address unusual issues ❑ Decisions accepted as technically accurate, however may on occasion be reviewed for soundness of judgment ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, five to nine years experience
12 13 14	$191 $199 $215	**Highly Specialized Technical Professional or Supervisor of groups of professionals** ❑ Provides multi-discipline knowledge to deliver innovative solutions in related field of expertise ❑ Participates in short- and long-range planning to ensure the achievement of objectives ❑ Makes responsible decisions on all matters, including policy recommendations, work methods, and financial controls associated with large expenditures ❑ Reviews and evaluates technical work ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, ten to fifteen years experience with extensive, broad experience
15 16 17 18	$226 $241 $249 $251	**Senior Level Consultant or Management** ❑ Recognized as an authority in a specific field with qualifications of significant value ❑ Provides multidiscipline knowledge to deliver innovative solutions in related field of expertise ❑ Independently conceives programs and problems for investigation ❑ Participates in discussions to ensure the achievement of program and/or project objectives ❑ Makes responsible decisions on expenditures, including large sums or implementation of major programs and/or projects ❑ Graduate from an appropriate post-secondary program, with credentials or equivalent ❑ Generally, more than twelve years experience with extensive experience

Note: Rates subject to escalation at end of calendar year.