This meeting is not subject to
Brown Act noticing requirements.
The agenda is subject to change.

Water Supply Planning Committee Members:
Robert S. Brower, Sr. Chair
Jeanne Byrne
Ralph Rubio

Alternate:
Andrew Clarke

Staff Contact
David J. Stoldt, General Manager

After staff reports have been distributed, if additional documents are produced by the District and provided to the Committee regarding any item on the agenda, they will be made available at 5 Harris Court, Building G, Monterey, CA during normal business hours. In addition, such documents may be posted on the District website at mpwmd.net. Documents distributed at the meeting will be made available in the same manner.

AGENDA
Water Supply Planning Committee
Of the Monterey Peninsula Water Management District
****
Tuesday, January 23, 2018, 2 pm
MPWMD Conference Room, 5 Harris Court, Bldg. G, Monterey, CA

Call to Order

Comments from Public - *The public may comment on any item within the District's jurisdiction. Please limit your comments to three minutes in length.*

Action Items – *Public comment will be received.*

1. Consider Adoption of Meeting Minutes October 17, 2017 and November 14, 2017 Committee Meeting Minutes

Discussion Items – *Public comment will be received.*

2. Update on Los Padres Dam Study

3. Update on Water Supply Projects
   a. Pure Water Monterey
   b. California American Water Desalination Project
   c. DeepWater Desal
   d. Local Water Projects

4. Update on North Monterey County Drought Contingency Plan and Salinas and Carmel Rivers Basin Study

Set Next Meeting Date

Adjournment

Upon request, MPWMD will make a reasonable effort to provide written agenda materials in appropriate alternative formats, or disability-related modification or accommodation, including auxiliary aids or services, to enable individuals with disabilities to participate in public meetings. MPWMD will also make a reasonable effort to provide translation services upon request. Please send a description of the requested materials and preferred alternative format or auxiliary aid or service by 5PM on Monday, January 22, 2018. Requests should be sent to the Board Secretary, MPWMD, P.O. Box 85, Monterey, CA, 93942. You may also fax your request to the Administrative Services Division at 831-644-9560, or call 831-658-5600.

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WATER SUPPLY PLANNING COMMITTEE

ITEM: ACTION ITEM

1. CONSIDER ADOPTION OF DRAFT COMMITTEE MEETING MINUTES OF OCTOBER 17, 2017 AND NOVEMER 14, 2017

Meeting Date: January 23, 2018

From: David J. Stoldt,
General Manager

Prepared By: Arlene Tavani

CEQA Compliance: This action does not constitute a project as defined by the California Environmental Quality Act Guidelines Section 15378.

SUMMARY: Attached as **Exhibits 1-A and 1-B**, respectively, are draft minutes of the October 17 and November 14, 2017 committee meetings.

RECOMMENDATION: The Committee should adopt the minutes by motion.

EXHIBIT

1-A Draft Minutes of the October 17, 2017 Committee Meeting
1-B Draft Minutes of the November 14, 2017 Committee Meeting

EXHIBIT 1-A

DRAFT MINUTES
Water Supply Planning Committee of the
Monterey Peninsula Water Management District
October 17, 2017

Call to Order: The meeting was called to order at 3:40 pm.

Committee members present: Robert S. Brower, Sr. - Committee Chair
Jeanne Byrne

Committee members absent: Ralph Rubio

Staff members present: David J. Stoldt, General Manager
Maureen Hamilton, Water Resources Engineer
Jonathan Lear, Senior Hydrogeologist
Arlene Tavani, Executive Assistant

District Counsel present Fran Farina

Comments from the Public: No comments were directed to the committee.

Action Items

1. Consider Adoption of Committee Meeting Minutes of September 19, 2017

On a motion by Byrne and second of Brower, this item was deferred to the next committee meeting, so that staff could review the audio recording of the meeting to determine if amendments should be made to item 3, Update on Local Water Supply Projects, Local Water Projects. The motion was approved on a vote of 2 – 0 by Brower and Bryne. Rubio was absent.

2. Consider Adoption of Reimbursement Methodology and Amendment 2 to Cost Sharing Agreement for Pure Water Monterey

On a motion by Byrne and second of Brower, the committee recommended that the Board of Directors approve Amendment 2 to the Cost Sharing Agreement with Monterey One Water (MOW). The motion was approved on a vote of 2 – 0 by Brower and Byrne. Rubio was absent.

Discussion Items

3. Update on Water Supply Projects

a. Pure Water Monterey (PWM)

Maureen Hamilton, Water Resources Engineer, reported on progress toward completion of the injection well component of the PWM project: (1) the horizontal directionally drilled pipeline has been completed that will convey source water under the Salinas River to the MOW treatment facility; (2) the piers were being installed for the Blanco pump station; (3) the UV equipment for the advanced water purification facility had been tested and should be shipped in November; (4) the reverse osmosis, advanced oxidation and ozone equipment would be tested in November; (5) the Marina Coast Water District would issue a notice to proceed with pipeline construction; and (6) the deep injection well had been sealed and would be tested to determine the injection capacity. Stoldt reported that the consulting firm

of GHD had been offered a contract as program manager to coordinate scheduling of all phases of the PWM project.

Luke Coletti addressed the committee during the public comment period on this item. He asked about the location of the Blanco drain diversion site. Stoldt responded that a pump station would direct source water to a pipeline installed under the Salinas river for diversion to the MOW facility.

b. California American Water Desalination Project

Stoldt reported that the pipeline bridge that would span one section of Highway 68 was being fabricated. He stated that evidentiary hearings would begin on September 27, 2017 on California American Water Company application 12-04-019 before the California Public Utilities Commission. The Administrative Law judge would receive testimony on desalination plant sizing and project alternatives that could meet community water needs.

Luke Coletti addressed the committee during the public comment period on this item. He noted that the EIR on the water supply project proposed planning for 500 acre-feet of water for bounce back and 1,200 acre-feet of water to provide for legal lots of record. He stated that the project would not be sized to meet 50-year growth projections, and that Cal-Am must identify other water supply solutions for the future.

c. DeepWater Desal

Stoldt reported that the project proponents were in negotiation with a Spanish company to provide equity funding. Money had been obtained for a benthic study required for the project EIR. However, completion of the EIR was behind schedule. The CPUC determined that Deep Water Desal alternatives did not merit consideration in hearings on the Monterey Peninsula Water Supply Project.

d. Local Water Projects

- Pacific Grove Local Water Project – Testing of the project had been conducted and it should be operational soon.
- City of Pacific Grove Stormwater Flow and Drywater Flow Reuse Project – No quarterly update received from the City.
- The Pebble Beach Company Del Monte Golf Course Test Well Project – Project on hold due to the pending sale of the Del Monte Hotel property.
- City of Monterey – Monterey Regional Water Recovery Study – Progress continues on the study that would enable development of a Peninsula-wide water and stormwater management plan.
- Monterey Peninsula Airport District – Feasibility Study on Use of Non-Potable Wells – The Airport District continues its efforts to identify uses for water from its two non-potable wells.

Luke Coletti addressed the committee during the public comment period on this item. He noted that the City of Pacific Grove recently received a $4 million grant for a project that involves stormwater capture at the golf course. He stated that the Aquifer Storage and Recovery Project (ASR) was the best water supply project developed on the Monterey Peninsula, as it could contribute 1,300 acre-feet of water annually to the local water supply. He asked why ASR had contributed to the water supply only four out of the last eight years. *Staff explained that four years of drought severely limited withdrawals of water from the Carmel River for ASR. During wet years, the District has water rights to divert*

approximately 29 acre-feet of water per day for ASR, but transmission facilities could accommodate diversion of only 20 acre-feet per day. The 1,300 acre-feet per year is only feasible if during wet years ASR water is banked for use as a drought reserve.

4. Update on Los Padres Dam Studies
No report.

5. Update on North Monterey County Drought Contingency Plan and Salinas and Carmel Rivers Basin Study
Stoldt reported that progress continued on development of the study.

Set Next Meeting Date: November 14, 2017 at 9:30 am.

Adjournment: The meeting was adjourned at 4:45 pm.

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EXHIBIT 1-B

DRAFT MINUTES
Water Supply Planning Committee of the
Monterey Peninsula Water Management District
November 14, 2017

Call to Order: The meeting was called to order at 9:00 am.

Committee members present: Robert S. Brower, Sr. - Committee Chair
Jeanne Byrne
Ralph Rubio (left the meeting at 9:20 am)

Committee members absent: None

Staff members present: David J. Stoldt, General Manager
Maureen Hamilton, Water Resources Engineer
Jonathan Lear, Senior Hydrogeologist
Arlene Tavani, Executive Assistant

District Counsel present David C. Laredo

Comments from the Public: No comments were directed to the committee.

Action Items

1. Consider Adoption of Revised Draft Committee Meeting Minutes of September 19, 2017
On a motion by Byrne and second of Rubio, minutes of the September 19, 2017 committee meeting were approved on a vote of 3 – 0 by Byrne, Rubio and Brower.

Discussion Items

2. Update on Water Supply Projects

a. Pure Water Monterey (PWM)
In response to a question from General Manager Stoldt, **David Chardavoyne**, General Manager of the Monterey County Water Resources Agency (Agency), stated that the growers have concerns about limitations on new well construction that the Agency is proposing due to implementation of the Groundwater Sustainability Act. These developments have also raised the growers' concerns about the cost of source water for PWM, and their commitment to providing water to the Monterey Peninsula. Chardavoyne noted that the growers have an agreement on source water, and that their concerns should be allayed once they see the result of studies that are underway by the Agency and Monterey One Water. He noted that the growers can decide not to participate in future phases of PWM. **Paul Scuito**, General Manager of Monterey One Water, stated that the growers will benefit due to lower costs related to groundwater pumping, and that sourcewater reliability can be demonstrated. **Ralph Rubio left the meeting at 9:20 am.**

b. California American Water Desalination Project
No discussion.

c. DeepWater Desal
No discussion.

d. Local Water Projects

- Pacific Grove Local Water Project
There was no discussion by the committee. Under public comment, Luke Coletti a resident of Pacific Grove, thanked the committee for approving the amended minutes of the September 19, 2017 meeting. He stated that the Odello entitlement is different from Cal-Am's entitlement to water from the Pacific Grove Local Water Project. He explained that Condition 4.B of the financing agreement for the Local Water Project limits the distribution of freed-up water from the project until the Executive Director of the State Water Control Board (SWRCB) approves its use. Mr. Coletti stated this could be interpreted to mean "when the CDO is lifted." He said that MPWMD Ordinance No. 168 would allow the project's entitlement water to be used after the Cal-Am irrigation water is permanently suspended from use. Mr. Coletti disagreed that there would be a permanent disconnection from Cal-Am. Mr. Coletti said that he and the Sierra Club would oppose any action to utilize the water entitlement before the SWRCB authorizes it.

3. Update on Los Padres Dam Studies

Hampson reviewed information provided in the staff report regarding the studies that will inform water resource planning efforts on the Carmel River and regionally. He stated that the **Carmel River Basin Hydrologic Model** has been completed and that the United States Geological Survey is currently calibrating the model. Completion of the **Instream Flow Incremental Method Study of the Carmel River** will be important when the District applies to the State Water Resources Control Board to utilize the remainder of water rights Permit No. 20808B. The information in the study will be critical to setting instream flow requirements for withdrawals from the Carmel River during the winter months. This information could also have a bearing on modifications to California American Water Table 13 water rights. Hampson explained that new information has been uncovered related to the **Los Padres Dam and Reservoir Alternative Study.** It was recently discovered that in 1946 when the original water right of 3,030 acre-feet was determined, that number was based on incorrect reservoir topography that overstated the reservoir volume by 10 percent. The volume was approximately 2,700 acre-feet and not 3,030 acre-feet estimated at the time. Cal-Am currently has a right to divert 2,200 acre-feet based on a 1984 survey of the reservoir volume at Los Padres. The reservoir volume is currently less than 1,700 acre-feet. If the dredging alternative is pursued, the SWRCB may only authorize an increase of 500 acre-feet. A previous study estimated it could cost $100 million for 500 acre-feet of new supply, which would be very costly. Hampson presented a Powerpoint titled Review of Preliminary Alternatives for Further Evaluation that outlined Los Padres Dam and Reservoir alternatives. The Powerpoint is on file at the District office and can be viewed on the MPWMD website.

5. Update on North Monterey County Drought Contingency Plan and Salinas and Carmel Rivers Basin Study

No discussion.

Set Next Meeting Date: No date was scheduled.

Adjournment: The meeting was adjourned at 10:20 am.

WATER SUPPLY PLANNING COMMITTEE

ITEM: DISCUSSION

2. UPDATE ON LOS PADRES DAM ALTERNATIVES STUDY

Meeting Date: **January 23, 2017**

From: **Dave Stoldt,**
General Manager

Prepared By: **Larry Hampson**

SUMMARY: The California Department of Fish and Wildlife (CDFW) and the National Marine Fisheries Service (NMFS) recently provided comments on the proposed set of alternatives for Los Padres Dam (LPD) (see attached **Exhibits 2-A** and **2-B** for comments and **Exhibit 2-C** for a description of the alternatives). There are some key statements from the agencies that staff wish to discuss with the Committee including the following.

CDFW states:

> "Alternative 4a [dam raise] – this causes a sustained loss of upstream habitat, has less operational flexibility, is likely to have greater fish passage difficulties and is more expensive."
>
> Alternative 4c & 4d [new dam downstream] – These eliminate additional spawning and rearing habitat, cause additional downstream and upstream passage problems and come at a high cost. Department will not permit nor contribute funds to a new dam."

NMFS states:

"We … request that alternatives 4a, 4c, and 4d be removed from further consideration."

RECOMMENDATION: The Committee should review comments by the two agencies and consider providing direction to staff.

DISCUSSION:

As part of the scope of work to develop a long-term plan for management of Los Padres Dam, the Water Supply Committee had requested that a dam raise and an expanded reservoir be included in the alternatives to be analyzed. Alternative 4a and 4b are similar with Alternative 4a being a permanent dam raise of about 10 feet and Alternative 4b being installation of a 10-foot high rubber dam. Both alternatives would result in an estimated increase in storage capacity of just under 600 acre-feet (AF). The rubber dam is favored by both agencies over a permanent dam raise because

of the operational flexibility for raising and lowering the water surface. This would reduce impacts to spawning and fish passage as compared to a permanent dam raise.

The Committee had also directed staff to include an alternative to build a larger reservoir. Alternatives 4c and 4d involve building a new dam about 2,600 feet downstream of the existing dam at the same site as the proposed New Los Padres Dam. Depending on what elevation the spillway is set at, a new dam could result in a storage capacity ranging from 3,000 AF to a little over 7,500 AF.

Both CDFW and NMFS strongly object to including an alternative that would result in a new dam on the river.

Attached as **Exhibit 2-D** is a new agreement between California American Water, NMFS, and the State Coastal Conservancy regarding a set of activities Cal-Am must carry out while SWRCB Cease and Desist Order 2016-0016 remains in effect. Several of the activities involve work at Los Padres Dam, including completing the dam alternatives study.

EXHIBITS

2-A CDFW comments
2-B NMFS comments
2-C Draft Alternatives Descriptions
2-D MOA between CAW, NMFS, and Conservancy

EXHIBIT 2-A

John Roadifer, P.E.
Project Engineer
Water Resources Engineering
Dams and Reservoirs
AECOM
300 Lakeside Drive, Suite 400
Oakland, CA 94612, USA

John,

Introduction

On December 1, 2017 you transmitted the Draft Alternative Descriptions Technical Memorandum for the Los Padres Dam and Reservoir Alternatives and Sediment Management Study (TM) to the Technical Review Committee (TRC) with a request for comments by Jan 3. 2018 in preparation for TRC meeting on the same later in January. Due to the holidays, CDFW committee members requested a revised comment date of January 12. The focus of the request and upcoming meeting is to narrow the field of alternatives for the project to about five alternatives.

Therefore, the focus of the below is CDFW committee members comments are what alternatives we feel should remain in the field and why. In naming these alternatives, we will refer to Table 4.1 near the end of the TM. While we have more detailed comments on many sections of the TM, it is inefficient to bring them up at this time as, though the winnow of alternatives, they may become moot. At this point, we are also compelled to comment on the overall decision-making process for the future operation and configuration of the Los Padres Dam site.

The comments below represent the combined input of CDFW staff reviewing this document.

Preferred Alternatives for Los Padres Dam Site

General - The planning horizon for choosing between alternatives was 60 years. While this may have already been explained, please (re)state the rationale for that planning timeframe.

Preferred Alternatives (no preferential order):

Alternative 4b Rubber Dam in LPD Spillway with SM2/SM3 - CDFW staff see this alternative as a possibility for providing adequate in-stream flow insurance for steelhead below LPD while also providing for utilization of the habitat upstream of the dam for appropriate lifestages at a low cost and level of effort. CDFW also notes that this configuration imposes several hardships on the resource that need to be mitigated.

Caveats:

1. The increased water supply provided by raising the dam crest and/or dredging must be managed for the benefit of the fisheries and other natural resources. It is acknowledged that municipal water uses, may, at times, be appended to this operation but natural resources must have primacy.
2. The increased water supply will be targeted at optimal, not minimal, flows for the fishery.
3. Upstream and downstream fish passage for all appropriate lifestages will be upgraded to current standard facilities and practices for new dam facilities. It is noted that some of this fish passage

upgrade could proceed on an accelerated timeline while DSOD permits for the dam modifications are in process.
4. Removed sediment will be separated and the coarser fraction staged for replenishing the sediment supply downstream.

Data Gaps:
1. What is the frequency, spacial and temporal extent of the flow releases for the benefit of steelhead currently and how would that improve with the added reservoir capacity?
2. What is the optimal flow release schedule over the course of various water year types and what is the best initial operation schedule for the inflatable dam crest? How might this improve with the knowledge base of on-going operations and improved hydrologic record?
3. Where will the usable fraction of the sediment be staged?

Alternative 2b with SM3 Partial Dam Removal and Sluicing Tunnel - CDFW staff see this alterative as returning the fisheries, stream processes and watershed to it most natural state. It would alieve all concerned parties of ongoing management and operations while restoring natural flow and sediment transport and reverting the reservoir area to its original condition for a moderate initial cost. CDFW recognizes that other actions may be needed outside of the LPD footprint to compensate for the flows now afforded by the dam for low water conditions.

Caveat:
1. Impacts from water diversion downstream of the dam will be fully mitigated. This will likely require the authority and action of agencies beyond CDFW.

Data Gaps:
1. What is the frequency, spacial and temporal extent of the flow releases for the benefit of steelhead from current operations? How is that likely to change during the time between now and project implementation?
2. Of the benefits provided by the current flow releases, what proportion of them are mitigating for other diversions in the watershed and what proportion are in response to natural surface and subsurface flows? In the subset countering natural flows, how would removing those benefits be different from conditions that the steelhead co-evolved with?

Eliminated options – CDFW recommends removal the following options in the current task of narrowing the field.

Alternative 4a – this causes a sustained loss of upstream habitat, has less operational flexibility, is likely to have greater fish passage difficulties and is more expensive.

Alternative 4c & 4d – These eliminate additional spawning and rearing habitat, cause additional downstream and upstream passage problems and come at a high cost. Department will not permit nor contribute funds to a new dam.

Decision Making Process for LPD site

For several months, CDFW has been concerned that the decision-making process for the long-term future of the LPD site is flawed and could be leading to a suboptimal conclusion. We realize that many of

the contributing factors are not the result of AECOM, or even the larger TRC actions, but we are compelled to raise them so that this effort meets its ultimate goal.

There are several on-going studies in the watershed as has been reviewed, at times, by MPWMD and others. Some of these studies, within the next year or two, will be providing valuable pieces of information that could have a profound influence on Department's view of the field of alternatives under consideration. In that regard, the current suite of studies is mistimed and miscoordinated. CDFW is willing to discuss the particulars of these malfunctions in the appropriate venue.

In addition, splitting the fish passage alternatives study and the dam and reservoir alternative studies into two different efforts is not working well. While we appreciate the appeal of this reductionist approach to a complicated problem, the matters are inextricably linked, as indicated in our comments above. It is unclear to us how these two studies will be brought together at the end of this process. In the meantime, the current course leaves us without a means to fairly and clearly compare future configurations of the dam site to each other. We are concerned that this will lead to erroneous judgements and conclusions. Again, CDFW stands ready to discuss particular examples and work with the Committee to improve this decision making process.

EXHIBIT 2-B

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
777 Sonoma Avenue, Room 325
Santa Rosa, California 95404-4731

January 12, 2018 **Refer to NMFS No.:** WCR-2017-7369

John Roadifer, P.E.
Project Engineer
AECOM
300 Lakeside Drive, Suite 400
Oakland, California 94612

Re: NMFS' Comments on the Los Padres Dam and Reservoir Alternatives and Sediment Management Study Draft Alternatives Descriptions Technical Memorandum

Dear Mr. Roadifer:

This letter is in response to AECOM's December 1, 2017 request for comments on the Los Padres Dam and Reservoir Alternatives and Sediment Management Study Draft Alternatives Descriptions Technical Memorandum (TM) to be submitted by January 12, 2018. This letter provides a background on the January 10, 2018, Memorandum of Agreement (MOA) between California American Water Company (CAW), the California Coastal Conservancy (Conservancy) and NOAA's National Marine Fisheries Service (NMFS), which dictates many of the deadlines and deliverables for the Los Padres Dam Feasibility Study. We also provide a brief statement of our position regarding the future of Los Padres Dam and Reservoir. The accompanying enclosure provides specific preliminary comments on the draft TM.

Per the 2018 MOA, CAW has agreed to complete a study on the feasibility of removing Los Padres Dam (LPD Feasibility Study) by June 30, 2019. Per the MOA, CAW, the Conservancy, and NMFS (the "Parties") agreed the LPD Feasibility Study must include an analysis of the loss of stored reservoir water used for summer stream flows, and the benefits of improved steelhead passage if LPD is removed. The LPD Feasibility Study must also evaluate options for permanent unimpeded upstream and downstream passage and management of sediment if LPD is left in place. To assist in preparing the LPD Feasibility Study, CAW is relying on ongoing studies for which CAW has provided $1.0 million in funding to MPWMD for certain studies concerning the fate of LPD (MPWMD Studies). These studies include: the LPD Fish Passage Feasibility Study, the Los Padres Dam and Reservoir Alternatives and Sediment Management Study, the Carmel River Basin Hydrological Model, the Instream Flow Incremental Method Study of the Carmel River. CAW is also relying on a CAW funded PIT-tagging program ($1.0 million) and downstream fish passage and in-reservoir survival study at Los Padres Reservoir ($0.5 million) to inform the LPD Feasibility Study.

As outlined in the MOA, CAW and NMFS anticipate the MPWMD studies will be completed by June 30, 2018, at which time CAW and NMFS would meet to discuss the status of the MPWMD Studies and to determine if additional studies by CAW are necessary to complete of the LPD Feasibility Study. If CAW and NMFS agree additional studies are necessary, then they will discuss extending the deadline for completion of the LPD Feasibility Study. Per the MOA, CAW will make its final determination whether to remove the dam within six months following completion of the LPD Feasibility Study, unless the Parties agree that additional studies are necessary and agree to a later deadline. If found feasible, and the Parties agree to removal, CAW further agrees to remove LPD within five years after an alternative water supply is identified and implemented as described in the Final Environmental Impact Report/Environmental Impact Statement for the Monterey Peninsula Water Supply Project (MPWSP). The five-year timeline is subject to reasonable extensions based on permitting or other authorization requirements, or other conditions beyond CAW's control.

In general, NMFS believes removing LPD would alleviate the need for any additional mitigation/take coverage for impacts to steelhead from CAW's operations at LPD. However, the water stored in Los Padres Reservoir is managed to maintain stream flows in the Carmel River, primarily for maintenance of juvenile steelhead rearing habitat downstream of the dam. Therefore, prior to making any final recommendations on preferred alternatives, NMFS will need to review the outcomes of the Carmel Basin Hydrological Model to ensure suitable stream flows and habitat conditions will persist without the reservoir, or that optimal water releases will be provided for steelhead if the reservoir remains in place. In addition, NMFS will utilize the results of the Carmel Basin Hydrologic Model to assess whether there are sufficient water supply alternatives that obviate the need for Los Padres Reservoir. For example, CAW has identified the MPWSP as a feasible long-term water supply to replace unauthorized diversions from the Carmel Valley Aquifer, to reduce reliance upon new points of diversions, and to protect against overdraft of the Seaside Groundwater Basin by 2021 at the earliest. Finally, NMFS will assess the results of the first full year of downstream fish passage performance with the existing facilities as well as any early results from the PIT-tagging study to inform the impact the dam/reservoir has on juvenile steelhead survival and passage and to better evaluate the proposed downstream passage alternatives.

We look forward to continuing our collaborative process with AECOM and the Parties towards the identification and selection of a sustainable alternative for the future of Los Padres Dam that ultimately leads to improved habitat conditions for steelhead in the Carmel River while maintaining adequate water supplies for the Monterey Peninsula. Please direct questions regarding this letter or the enclosed comments to Joel Casagrande of the NMFS North-Central Coast Office in Santa Rosa at (707) 575-6016, or Joel.Casagrande@noaa.gov.

Sincerely,

FOR Alecia Van Atta
Assistant Regional Administrator
California Coastal Office

Enclosure

cc: Dennis Michniuk, California Department of Fish and Wildlife
Trish Chapman, California Coastal Conservancy
Richard C. Svindland, California American Water
Copy to File ARN 151422WCR2017SR00186
Copy to Chron File

EXHIBIT 2-B

Enclosure

NMFS' Preliminary Comments on the Los Padres Dam and Reservoir Alternatives and Sediment Management Study Draft Alternatives Descriptions Technical Memorandum

Current information clearly illustrates the adverse impacts of dams and reservoirs on steelhead and their critical habitat. We seriously question the possibility of increasing the height of Los Padres Dam or the storage capacity of Los Padres Reservoir without incurring irreversible detrimental impacts on the Carmel River population of South-Central California Coast Steelhead (*Oncorhynchus mykiss*), and, in turn, the greater S-CCC steelhead Distinct Population Segment (DPS). The Los Padres Dam and Reservoir Alternatives and Sediment Management Study Draft Alternatives Descriptions Technical Memorandum (TM) describes multiple alternatives for increasing the height of the dam or the storage capacity of the reservoir. Specifically, Alternative 4a includes raising the existing dam; Alternative 4b proposes installation of operational gates (*e.g.,* Obermeyer gates) on the existing spillway; Alternative 4c proposes building a new and larger dam downstream of the existing structure; and Alterative 4d proposes building a new dam downstream while keeping the existing reservoir as sediment trap. With the exception of Alternative 4b, implementation of these alternatives would permanently flood (at least seasonally) critical habitat for steelhead, add complexity and uncertainty to fish passage success and survival in the reservoir, and perpetuate reduced rates of coarse sediment transport and degraded water quality downstream of the reservoir. In previous correspondences among NMFS, CAW, MPWMD, and/or the State Public Utilities Commission (*e.g.,* NMFS 2011), NMFS has clearly stated that we do not support any alternatives that involve constructing a new dam or permanently raising the existing dam height to increase water storage capacity, and instead recommended completing a dam removal feasibility study. We therefore request Alternatives 4a, 4c, and 4d be removed from further consideration. Furthermore, we recommend the alternatives analysis be expanded to include off-channel water supply sources such as increased desalination-sourced water, winter ASR, and regional recycled water opportunities as viable water supply substitutes to reservoir storage.

In consideration of the current status of S-CCC steelhead, the MOA, other relevant agreements, and recent operational and landscape changes (*e.g.*, development of alternative water sources, the State Water Resources Control Board's 2016 Cease and Desist Order, and removal of San Clemente Dam), NMFS offers the following specific comments on the TM. Please note that these comments are preliminary in that key information has not been provided to date (described below) which limits are ability to comprehensively evaluate some of the statements in the TM.

1. A diagram is needed of the reservoir profile (bottom and surface) and sediment that shows the upper and lower profiles and the three main texture packets (zones) that are referred to in the different sediment related alternatives.

2. Suggest presenting flushing scenarios as stand-alone information rather than as embedded in alternatives. Also, the alternatives are not fully understandable without first presenting the thorough sediment flushing study results that NMFS understands is in preparation.

EXHIBIT 2-B

Page 2-1: Conceptual Alternative Descriptions

- Although acknowledged, the costs of different alternatives do not factor in the costs for new fish passage improvements, which would vary depending on alternative and fish passage type, and are likely substantial. Without a likely range of potential fish passage costs, effectively evaluating alternatives for LPD would not be possible. For example, dam removal may have a "High Cost" but no additional fish passage costs. Whereas raising the dam may have a "Low or Moderate" cost but would also require a "Moderate to High" cost for construction, operation, and maintenance of improved fish passage designs, thus making the two alternatives more comparable in the long-term.

Page 2-8: "*The estimated 380,000 CY of ….*"

- Based on the bathymetry, could there be fish passage issues when transitioning between Zone 3 and Zone 2 if only the Zone 2 sediments are sluiced away (slope or drop-off from zone 3 to former zone 2 areas)?

Page 2-13: top paragraph (above map)

- Without the use of the stated public roads, it is not clear how this alternative would proceed. Would it require construction of new, temporary roads? Please explain.
- Last sentence of the same paragraph states - "*there are no practicable feasible locations for this sub alternative.*" Does this mean this alternative should no longer be considered?

Page 2-14: Sustainability

- Regarding sedimentation rates, there is no substantial reason to believe that future rates will be less than past rates. It seems a wider range of potential sediment yield should be considered. It is possible with climate change, fire frequency, *etc*, that the same rate of sedimentation observed over the past 69 years could be achieved in a shorter period (*e.g.*, 40-50 years).

Page 2-14: Effects on Steelhead Passage over Los Padres Dam and through the Reservoir

- "*...where passage would continue in its current form.*" This may not be the case as we have yet to determine the suitability (success) of existing downstream passage.

Page 2-15: Section 2.4.1 Expand with Dam Raise (Alternative 4a)

- 586 AF seems like a minor amount relative to what could be achieved through other, off-channel alternatives such as larger desalinization volumes, increased Aquifer Storage Recover (ASR), *etc.* Please put differences in water storage into context with the supply/demand of the system, and to dry-season stream flow volumes.

Page 3-2: bottom paragraph

- Do we know if Sites D and E experienced inundation during the past winter with multiple >10 year events?

Page 3-4: top paragraph

- Document states "*access to sites D and E would be difficult to develop without construction of an access road in the river channel.*" This would be a substantial impact

to perennial habitat that would be repeated overtime, and therefore should be weighed heavily when considering this as a feasible solution.

Page 3-4: Section 3.3 Sluicing Tunnel (Option 3)

- Table 4-1 indicates this may be an option combined with dam removal alternatives, however there is no mention of that in the text here. Make more explicit in the text.

Page 3-8: Harmful Effects on Steelhead

- With Option 4, would there be bypass flows to maintain optimal stream flow for fish to the reservoir (where the existing trap location is) and for rearing fish in the reach between the reservoir and the outlet of the sluicing tunnel?

Page 3-8: Effects on Downstream Channel Geometry and Flood Elevations

- Under Option 3, the report states "*....the increased fine sediment is expected to have little effect on the channel thalweg elevation downstream, because fine sediment tends to stay suspended throughout the river to the ocean.*" While this is true for fines such as silts and clays, what about the sand fraction (or is this considered coarse)?
- Recommend putting predictions for channel geometry and flood elevation changes into context with the knowledge now available following the removal of San Clemente Dam and delivery of coarse sediment downstream.
- Recommend including particle abrasion (size reduction with distance traveled) effects with opinions and evaluations of sediment delivery impacts downstream.

References Cited

NMFS (National Marine Fisheries Service). 2011. Letter to Monterey Peninsula Water Management District, dated December 1, 2011, regarding reservoir expansion at Los Padres Dam. 2 pages.

EXHIBIT 2-C

Los Padres Dam and Reservoir Alternatives and Sediment Management Study Draft Alternatives Descriptions Technical Memorandum

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Monterey Peninsula Water Management District

in cooperation with
California American Water

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List of Acronyms and Abbreviations

AF	acre-feet
AFY	acre-feet per year
BGS	behavioral guidance system
Cal-Am	California American Water
cfs	cubic feet per second
CY	cubic yards
DSOD	Division of Safety of Dams
HMR	Hydrometeorological Report
LiDAR	Light Detection and Ranging
LP Alternatives Study	Los Padres Dam and Reservoir Alternatives and Sediment Management Study
LPD	Los Padres Dam
LPR	Los Padres Reservoir
MCE	Maximum Credible Earthquake
MPWMD	Monterey Peninsula Water Management District
NAVD	North American Vertical Datum of 1988
NGVD	National Geodetic Vertical Datum of 1929
NMWS	normal maximum water surface
PMF	Probable Maximum Flood
RCC	roller-compacted concrete
RM	River Mile
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TM	Technical Memorandum
TRC	Technical Review Committee

1. Introduction

This Technical Memorandum (TM) is the deliverable for Task 2-2 of the Los Padres Dam and Reservoir Alternatives and Sediment Management Study (LP Alternatives Study). It is provided in draft form prior to Technical Review Committee (TRC) Meeting No. 2. The content of the TM will be updated and developed further based on TRC input, to next be presented in the Draft Alternatives Development TM developed under Task 4. The intent of this TM is to provide conceptual descriptions of alternatives to remove Los Padres Dam (LPD) and Los Padres Reservoir (LPR), recover or increase storage at LPR, and manage sediment deposition and future sediment inflow to the reservoir. This TM also identifies potential effects, both positive and negative, from each alternative. Feedback on this TM will be solicited from the TRC and used to inform further alternatives development in subsequent tasks. Favorable alternatives will be further developed in two additional draft documents (Draft Alternatives Development TM and Draft Final Report), and discussed at two TRC meetings, before they are finalized in the Final Report. Additional description of the LP Alternatives Study and the background information considered in preparation of these concepts is available in the LPD and LPR Alternatives and Sediment Management Study, Study Preparation TM (AECOM 2017a).

1.1 Purpose and Scope

The purpose of this alternatives descriptions study is to develop alternatives for LPD and LPR and sediment management options that could be used in combination with the LPD and LPR alternatives. This document begins to answer two questions that have been identified as key to the overall LP Alternatives Study: (1) “Is it feasible to expand reservoir capacity?”, and (2) “Are there feasible alternatives to manage existing sediment deposition and future sediment inflow to the reservoir?” LPD and LPR alternatives include no sediment management, dam removal, restoring reservoir capacity, and storage expansion. Options for managing sediment in the reservoir include performing periodic dredging, sluicing sediment through the reservoir using a new sluicing tunnel, and constructing a new bypass tunnel to transport sediment around the reservoir. Each LPD alternative and sediment management option is developed with enough detail to adequately understand the following:

- Alternative location;
- Potential effects;
- Complexity;
- Longevity;
- Potential impacts and benefits; and
- Relative cost (low to extremely high).

1.2 Document Organization

This TM is organized into the following sections:

- Section 1 is the introduction, including purpose and scope;
- Section 2 describes the conceptual alternatives for LPD and LPR;
- Section 3 describes sediment management alternatives that could be used in combination with some of the conceptual alternatives for LPD and LPR described in Section 2;
- Section 4 is a summary of the draft LPD and LPR alternatives and sediment management options;
- Section 5 is a statement of limitations for this TM; and
- Section 6 lists references used to prepare this TM.

2. Conceptual Alternatives Descriptions

The discussion of each alternative presented in this section is intended to provide enough detail to understand the approximate location of a proposed alternative, the potential extent of effects, the technical complexity, and whether the alternative is short term or long term; and to list the potential impacts and benefits. The alternatives are presented as concepts to be developed further in subsequent tasks based on input from the TRC. A preliminary, relative characterization of costs has been developed to help screen alternatives from relatively low to high cost. The relative cost, which will be revised as the alternatives are developed further in subsequent tasks, is based on a 60-year planning horizon that includes an estimated 3 to 5 years, depending on the alternative, to begin to implement a project using the following order-of-magnitude costs:

- Very low – $0 to $10M
- Low – $10M to $30M
- Moderate – $30M to $70M
- High – $70M to $150M
- Very High – Greater than $150M

Any of these alternatives may require fish passage improvements that have not been included in the relative cost. Alternatives addressed in this section are listed below:

1. No Sediment Management
2. Dam Removal
3. Restore Reservoir Capacity
4. Storage Expansion

2.1 No Sediment Management (Alternative 1)

No Sediment Management (Alternative 1) is based on a scenario where no action is taken to manage the existing sediment accumulation in the reservoir, or future sediment inputs. This alternative may become the baseline for comparing alternatives.

Under Alternative 1, the reservoir would continue to fill in with sediment. During the past 70 years, an estimated 1,110 acre-feet (AF) of reservoir storage has been lost due to sedimentation (AECOM 2017b). This equates to an annual average of approximately 15.9 AF of sedimentation and loss of storage capacity per year. An estimated 590 AF of sediment was transported into the reservoir during the winter following the 1977 Marble Cone fire (MWH 2013). Discounting this particular event—which was the result of an extremely hot fire covering the majority of the watershed, followed immediately by an extremely wet year (MWH 2013, Hecht 1981)—the annual sedimentation rate and loss of storage capacity would be approximately 7.5 AF per year (AFY). Based on the two rates of sedimentation, the remaining approximately 1,600 AF of reservoir storage capacity would be filled approximately 100 to 210 years from now.

In terms of tonnage, an estimated 300,000 to 440,000 tons of silt and clay and an estimated 1,090,000 to 1,630,000 tons of sand and coarser material have been trapped behind LPD since its construction in 1947 (AECOM 2017b), equating to between 4,290 to 6,290 tons of silt and clay and 15,570 to 23,290 tons of sand and coarser material annually. Analyses have not been performed to differentiate the estimated 590 AF of sediment in the reservoir that resulted from the Marble Cone fire into tons of fines and tons of sand and gravel. Using the ratio (0.475) of the sedimentation rate per year excluding the 1978 winter (7.53 AFY) to the sedimentation rate per year including the 1978 winter (15.86 AF), the estimated annual tonnage of sand and gravel trapped in the reservoir excluding the 1978 winter is 7,500 to 11,200 tons.

In terms of relative cost, Alternative 1 would be very low assuming that significant modifications to LPD are not required during the 60-year planning horizon. Alternative 1 may require implementation of fish passage improvements that have not been included in the relative cost.

2.1.1 Alternative 1 Considerations

Considerations relevant to Alternative 1 include:

1. Effects on the downstream behavioral guidance system (BGS);
2. Effects on steelhead migration over LPD and through LPR;
3. Effects on downstream channel geometry and habitat for steelhead;
4. Streamflow effects on steelhead;
5. Compliance with State Water Resources Control Board (SWRCB) water rights permit conditions;
6. Effects on the water supply for the Monterey Peninsula; and
7. Dam safety.

These considerations are described further in the following sections.

Effects on Downstream Behavioral Guidance System

The downstream BGS might begin to be affected when the toe of the sediment delta reaches the spillway location. It is estimated that this might occur when the current reservoir storage has been halved from 1,100 AF to 550 AF, which would occur in 50 to 105 years. In summary, the BGS includes a 30-foot-long by 22-foot-wide floating collection barge fixed into horizontal position on four steel pilings located within the spillway approach channel. An articulated pipe bridge support structure connects to the spillway face, which allows for a vertical floatation range of approximately 10 feet. Water and fish that enter the collector are conveyed by gravity downstream via a 1,100-foot-long steel fish bypass conduit to a release point approximately 175 feet downstream of the spillway.

Steelhead Migration over Los Padres Dam and through Los Padres Reservoir

Steelhead migration over LPD and through LPR would continue in its current form, as described in Section 2.4.1.8 of the Study Preparation TM (AECOM 2017a). Fish passage at LPD is currently provided via trap-and-haul in the upstream direction, and via the spillway and the BGS in the downstream direction. In summary, trap-and-haul involves collection of the fish with a fish ladder and trap prior to transport. Approximately 250 feet downstream of the dam, on the left bank, a steeppass fish ladder allows upstream migrating steelhead to ascend into a small trapping facility. Steelhead are transferred from the fish trap to a truck via water-to-water transfer, hauled upstream of the dam crest, and released into the reservoir.

Effects on Downstream Channel Geometry and Habitat for Steelhead

Under Alternative 1, LPD would continue to prevent the transport of coarse sediment downstream of LPD through the Carmel River, especially the upstream section of Reach 1 (as described in Section 2.5.1.1 in the Study Preparation TM [AECOM 2017a]), between LPD and Cachagua Creek. Coarse sediment contributes to suitable spawning and rearing habitat for steelhead, so preventing coarse sediment from transporting downstream would continue to have a negative effect on downstream spawning habitat.

Streamflow Effects on Steelhead

As the reservoir is filled in with sediment, the ability to enhance summer rearing habitat for steelhead in the Carmel River downstream of LPD through flow releases from LPR would be incrementally reduced. As previously indicated for Alternative 1, the storage capacity of the reservoir will continue to decrease by an estimated 7.5 to 15.9 AFY. The reservoir is currently operated using a target minimum pool level of El. 1,005.9 North American Vertical Datum of 1988 (NAVD) (El. 1,003 National Geodetic Vertical Datum of 1929 [NGVD]). In very dry years, the minimum pool level is reduced to El. 982.9 NAVD (El. 980 NGVD). Current storage capacity between the normal maximum water surface (NMWS) and minimum pool elevations El. 1,005.9 (NAVD) and El. 982.9 (NAVD) based on 2017 bathymetry is 1,168 AF and 1,512 AF, respectively. Based on the current reservoir storage, average releases of 3.2 cubic feet per second (cfs) to 4.1 cfs can be made through the 6 months between April 15 and October 15. Over 60 years, the reservoir storage would be reduced by an estimated 450 AF to 950 AF, thereby reducing average releases during the same 6-month period to an estimated 1.3 cfs to 2.2 cfs. Also, as sediment fills the reservoir, the short delay that occurs between the onset of winter precipitation and when the reservoir spills would be decreased; on average, attraction and passage flows for steelhead could occur earlier in the wet season.

Compliance with State Water Resources Control Board Water Rights Permit Conditions

Alternative 1 would result in the gradual sedimentation of LPR. This sedimentation would cause a reduction in reservoir storage capacity that would further limit California American Water's (Cal-Am's) ability to release at least 5 cfs directly below LPD. Release of 5 cfs at all times during which water is being stored in the reservoir is a requirement of License 11866. The ability to release 5 cfs would primarily be affected during summer months, when reservoir storage is at its minimum. Because the requirement is for release when water is being stored, it may not apply when storage is reduced and the reservoir is near empty.

In addition to affecting Cal-Am's ability to meet SWRCB water rights permit conditions, Alternative 1 may also result in a reduction in Cal-Am's water rights. Cal-Am's water rights have been reduced due to siltation in LPR in the past. Under License 11866, Cal-Am was originally authorized to divert 3,030 AFY from the Carmel River to LPR. This water right was reduced to 2,179 AFY in 1995 (SWRCB Order WR 95-10) due to siltation in LPR. Therefore, it is possible that, as LPR fills with sediment, the SWRCB would reduce Cal-Am's current water right allowing diversion of 2,179 AFY from the Carmel River to LPR.

Effects on the Water Supply for the Monterey Peninsula

Water supply operations for LPD and LPR are described in Section 2.4.2.2 of the Study Preparation TM (AECOM 2017a). There is no direct connection to a municipal supply system, and re-diversion of flow released occurs at Cal-Am-owned municipal production wells downstream of Carmel Valley Village, primarily between River Mile (RM) 3 and RM 8, and at other private surface diversions and wells. The amount of water available for release and re-diversion downstream under Alternative 1 would be reduced incrementally over time, consistent with the storage and release reductions described above under "Effects on Downstream Channel Geometry and Habitat for Steelhead." However, the impact of this change on water supply would be moderated because Cal-Am intends to reduce its dry season diversion from the lower Carmel River to 1 cfs when replacement water supplies are available (Cal-Am and MPWMD 2016).

Dam Safety

From the standpoint of dam safety, the reservoir could not be allowed to completely fill with sediment. The ability to draw down the reservoir through the low-level outlet works during an emergency would need to be maintained. Encroachment of sediment into the upper reservoir will also continue to reduce the capacity of the reservoir above the spillway crest, which may increase the water surface during the Probable Maximum Flood (PMF). Based on previous analyses of the spillway capacity, the water surface level during the PMF is at the dam crest level (MWH 2012). Therefore, any increase in water surface level during the PMF would require modification of the dam crest or the spillway to increase its capacity.

Given that sedimentation in the area of the low-level outlet works intake has been minimal in the 40 years since the Marble Cone Fire event (AECOM 2017b), it is assumed that significant impacts on the low-level outlet works intake and flood capacity of the spillway would not occur until the current reservoir storage has been halved from 1,100 AF to 550 AF, which could occur in 50 to 105 years. However, if another event similar to the Marble Cone Fire and subsequent wet winter were to occur, the intake to the low-level outlet would likely be buried and require remediation (dredging to clear intake).

2.2 Dam Removal (Alternative 2)

Dam removal alternatives include full dam removal (Alternative 2a) or partial dam removal (Alternative 2b) down to the original river channel. Phased removal of the embankment dam over multiple years was also considered but determined to be not feasible because it would not be possible to convey flood flows past the dam without an active spillway. Therefore, removal of the embankment (full or partial) would need to be completed in a single 6-month construction period (assumed to be between April 15 and October 15).

Development of the Dam Removal alternative (Alternative 2) considered removal of the dam with and without removing sediment in the reservoir prior to dam removal. The reservoir sediment has been characterized as three zones; Zone 1 (clay/silt/fine sand), Zone 2 (predominately silt and sand), and Zone 3 (sand and coarser materials) (AECOM 2017b). Removal of the dam prior to removal of sediment

(particularly Zones 1 and 2) would expose the reservoir sediment to low flows that would erode through the sediment and severely degrade water quality in a manner similar to that which occurred in October 1981. At that time, the reservoir emptied and river flows cutting through the reservoir sediment resulted in highly sediment-laden water passing through the outlet pipe into the river downstream of the dam (Buel 1981). Degraded water quality impacts would likely continue until a large flow event occurred that would erode the majority of the Zone 1 and Zone 2 sediment from the reservoir. Removal of the dam by excavating a notch to allow overtopping dam failure and accompanying sediment erosion and removal from the reservoir during a high-flow event would not be feasible, due to the size of the dam and the flood (estimated peak flowrate of 177,000 cfs) that would occur as the dam fails, as described in the draft Emergency Action Plan for LPD dated December 15, 2015. Therefore, dam removal requires, at a minimum, removal of the Zone 1 and Zone 2 sediment prior to dam removal. Removal of the sediment could be done either by dredging (described in Section 2.3) or mechanical removal and placing in permanent disposal sites (described in Section 2.2.1), or by sluicing through a sluicing tunnel (described in Section 3.3), but associated impacts would need to be considered.

The two sub-alternatives, Full Dam Removal and Partial Dam Removal, are described in the next two sections.

2.2.1 Full Dam Removal (Alternative 2a)

Removal of the 148-foot-high LPD would require excavation of about 460,000 cubic yards (CY) of zoned embankment (DSOD 2015) for full removal, and removal of about 300,000 CY for partial removal. Conceptually, full dam removal in profile is shown on Figure 2-1. Approximately two-thirds of the excavated embankment materials would be relatively impervious materials that were primarily placed in the downstream portion of the dam. These materials, which are variously described in compaction tests during construction as “sandy soil,” “organic soil,” “sandy loam,” or “sandy organic soil” (AECOM 2017a), would be placed in permanent disposal sites that are discussed below. The remaining embankment materials are sand, gravel, cobbles, and boulders that could either be placed in upland disposal locations or at locations along the river where they could be accessed and entrained into the river system during high flows (described in Section 3.2). The spillway would be removed in its entirety so as to not pose a health and safety risk to the public. Based on other experience from similar projects, it is likely that concrete debris generated during spillway demolition could be buried in the excavated materials being disposed in permanent disposal sites. The intake and outlet structures for the low-level outlet would be demolished and the 30-inch-diameter outlet conduit abandoned by filling with controlled low-strength material or by plugging each end with concrete. The reinforced outlet conduit encasement would be abandoned in place because its removal could destabilize portions of the rock slope in which the encasement was built.

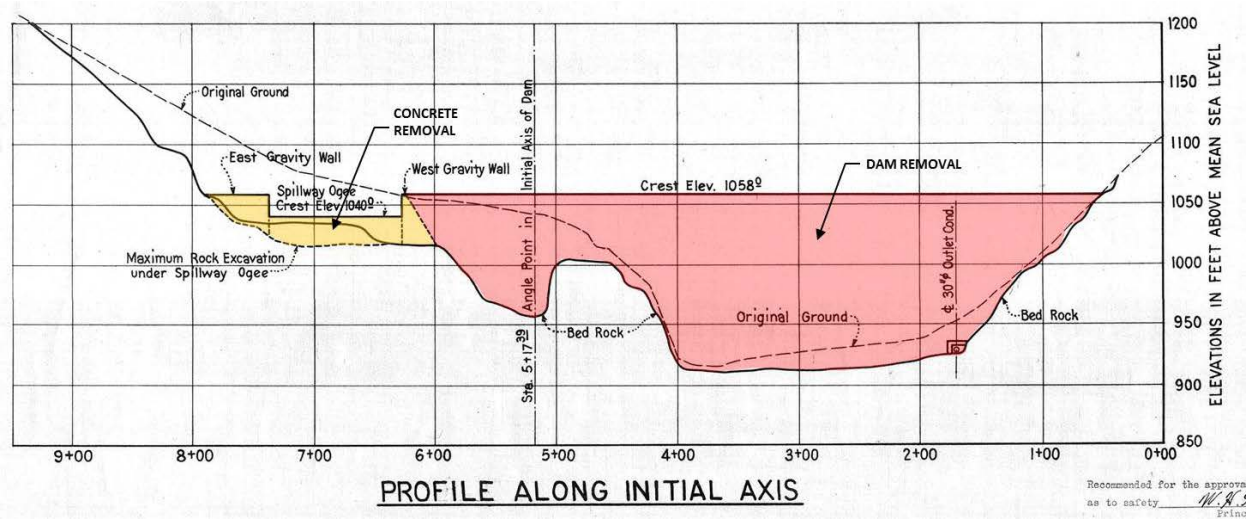

Figure 2-1 Alternative 2a Full Dam Removal Profile

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Three permanent disposal sites have been identified that could be used for disposal of the excavated embankment materials: Sites A, B, and C, as shown on Figure 2-2. Site A is a 5.1-acre site on a terrace on the left side of the reservoir. Site A has a storage capacity of about 107,000 CY at the NMWS El. 1042.9 feet. The fill thickness in Site A would be about 30 feet. Access to Site A would be along the reservoir bottom after sediment has been removed prior to dam removal. Sites B and C are downstream of the dam, as shown in plan on Figure 2-2. Site B is a 16.8-acre site on a terrace on the right side of the canyon and Site C is a 14.1-acre site on a terrace on the left side of the canyon. The storage capacities of Sites B and C are shown by elevation in Table 2-1. Access to Site B would be from the dam and across the spillway along Nason Road. Access to Site C would be from the dam along an access road on the downstream left abutment. The access road would need to be widened and improved.

Table 2-1 Storage Capacity of Disposal Sites B and C

Fill Height (feet)	Site B			Site C		
	Elevation (feet)	Incremental Volume (CY)	Cumulative Volume (CY)	Elevation (feet)	Incremental Volume (CY)	Cumulative Volume (CY)
40	1,020	460,000	460,000	1,000	200,000	200,000
80	1,060	600,000	1,060,000	1,040	360,000	560,000
120	1,100	580,000	1,640,000	1,080	420,000	980,000

Note:
CY = cubic yards

The slopes of the permanent disposal sites would be between 2H:1V and 3H:1V and would be protected from erosion by hydroseeding. The steeper slopes might require zoning the disposal sites, with coarser materials from Zone 3 being placed on the outside of the disposal site and finer materials from Zones 1 and 2 on the inside of the disposal site. Stability analyses would be required to design the slopes of the disposal sites based on the materials to be placed in them.

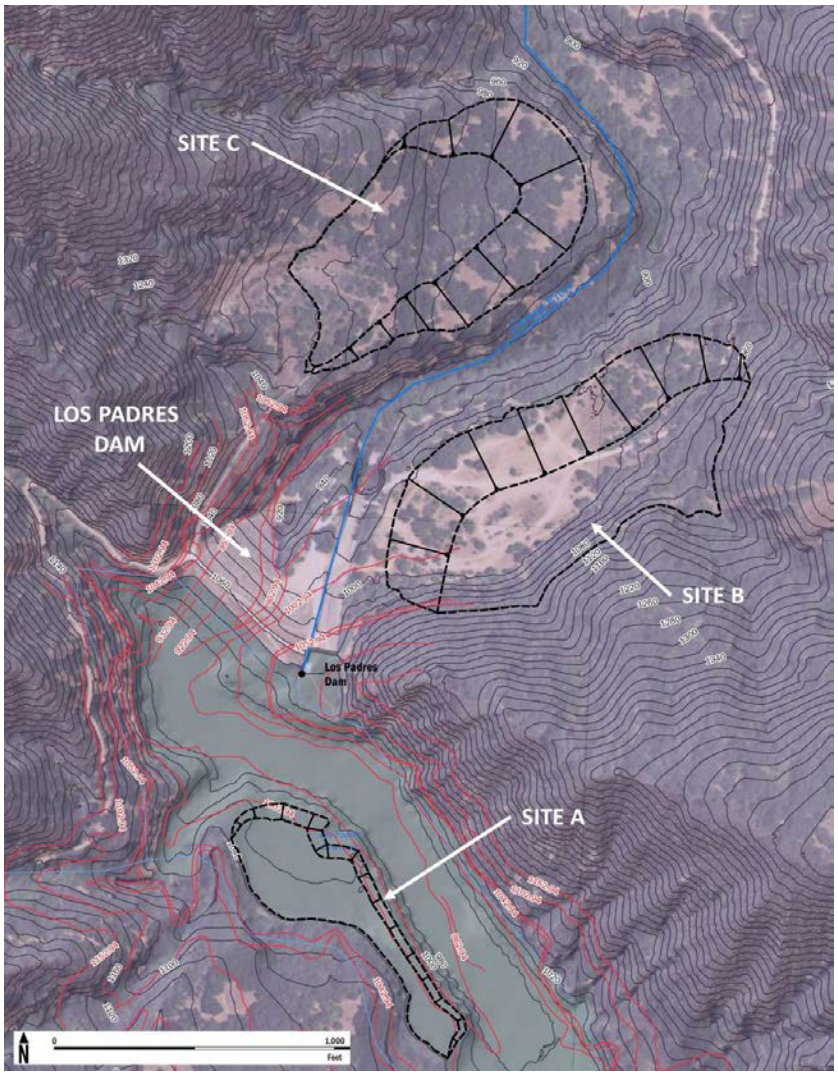

Figure 2-2 Permanent Disposal Sites

The relative cost of Alternative 2a, assuming dredging to remove Zone 1 and Zone 2 sediment, would be high. Dredging and placement of the majority of Zone 1 and Zone 2 materials in Disposal Sites B and C could require 5 years of dredging prior to dam removal, resulting in a 7-year duration for the dam removal project once design and permitting have been completed. Mechanical removal and placement of the majority of Zone 1 and Zone 2 materials in Disposal Sites B and C could require 2 to 3 years of excavation prior to dam removal, resulting in a 4-year to 5-year duration for the dam removal project once design and permitting have been completed.

The relative cost of Alternative 2a, assuming a sluicing tunnel to remove Zone 1 and Zone 2 sediment (described in Section 3.3), would be moderate. The duration for dam removal using a sluicing tunnel to remove the sediment might be on the order of 5 years, considering 2 years to construct the sluicing tunnel, waiting potentially 2 years for a large storm to open the sluicing tunnel and disperse Zone 1 and Zone 2 sediment downstream, and 1 year to remove the dam.

2.2.2 Partial Dam Removal (Alternative 2b)

Partial removal of the embankment would entail removal of the central portion of the embankment in profile, as shown in concept on Figure 2-3. Excavation slopes of 2H:1V are assumed for this study. In concept, the fill remaining on the left abutment (right side of Figure 2-3) would be accessible to Carmel River flood flows and would be entrained into the river when the flows in the river already have a high

suspended sediment concentration. The fill remaining on the right abutment would not be accessible to river flow and would be stabilized by hydroseeding. Similar to full removal, partial removal of the embankment would need to be completed in a single 6-month construction season following removal of sediment from the reservoir. Disposal of the excavated embankment materials would be the same as described for full removal. The spillway structure would be left in place, with the higher walls being demolished or trimmed to reduce health and safety risks to the public. The intake and outlet structures for the low-level outlet would be demolished and the 30-inch-diameter outlet conduit would be plugged at each end with concrete.

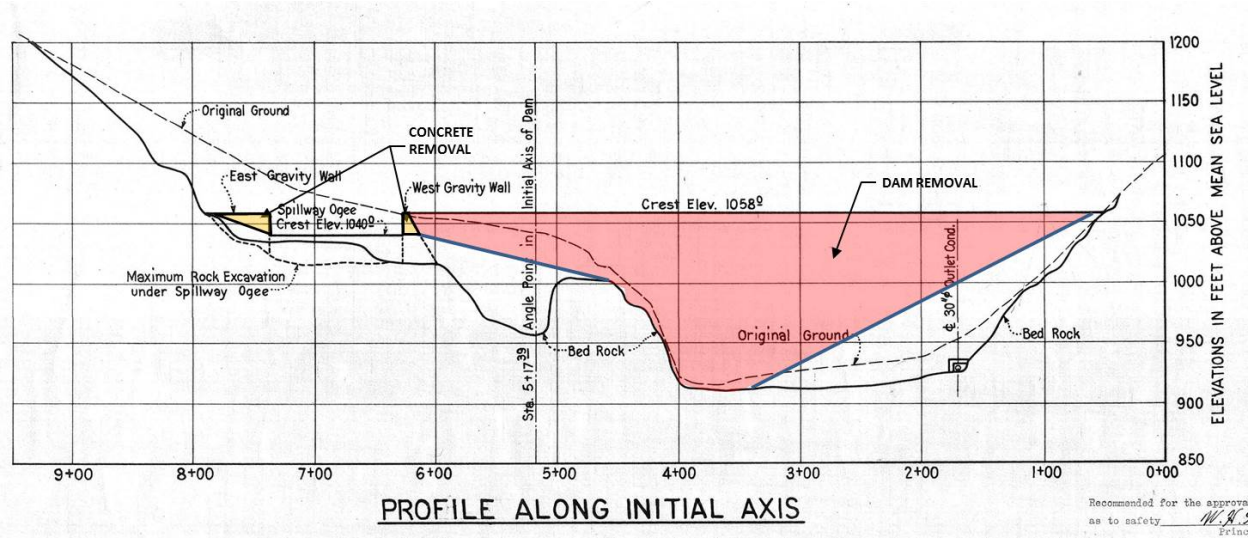

Figure 2-3 Alternative 2b Partial Dam Removal Profile

Construction costs for Alternative 2b would be somewhat less than Alternative 2a, due to a smaller volume of dam to be excavated. However, in terms of relative cost, as described in the introduction to Section 2, Alternative 2b would be the same as Alternative 2a; high assuming dredging to remove Zone 1 and Zone 2 sediment, and moderate assuming a sluicing tunnel to remove Zone 1 and Zone 2 sediment. Alternative 2b would require a duration for implementation similar to that required for Alternative 2a.

2.2.3 Alternative 2 Considerations

Considerations relevant to dam removal include:

1. Disposal, stabilization, or dispersal of existing reservoir sediment;
2. Potential improvements to steelhead passage and restoration of river habitat in the reservoir area;
3. Potential for public ownership of reservoir property;
4. Expected response of the active channel, potential impacts on downstream properties from resumption of the natural sediment load, and the need to develop a riparian management plan;
5. Reduction in dry season flow and the effect on riparian diversions and steelhead habitat below LPD;
6. The effect on water rights and municipal water supply;
7. Impacts on local residents from construction traffic; and
8. For phased removal, dam safety assuming a PMF of 36,000 cfs.

These considerations are described further in the following sections.

Disposal, Stabilization, or Dispersal of Existing Reservoir Sediment

Large, unnatural increases in suspended sediment in the Carmel River that could negatively impact steelhead and other aquatic organisms could occur during or after dam removal, depending on the methods used. Because of the intermittent and unpredictable rainfall patterns and hydrology in the

Carmel River, there would be an unacceptable level of risk associated with any dam removal alternative that would allow accumulated fine sediment to be transported in an uncontrolled manner downstream, where multiple small storm events could create repeated resulting in deleterious water quality conditions over an extended period of time or multiple years. Therefore, as previously discussed, Zone 1 and Zone 2 sediment would need to be removed from the reservoir prior to dam removal. An estimated 340 AF (550,000 CY) of Zone 1 and 692 AF (1,120,000 CY) of Zone 2 sediment are present in the reservoir (AECOM 2017b). The estimated 380,000 CY of coarser Zone 3 sediment in the upstream portion of the reservoir could be left in place to be transported through the reservoir area following dam removal. The timing and magnitude of potential fine sediment releases in the context of effects on steelhead associated with this approach would require further evaluation.

Permanent stabilization of sediment in the reservoir would not be feasible or practicable. Temporary stabilization until there are storm flows large enough to provide adequate dispersal of the sediment would require design of a rock-lined channel over the sediment along the channel thalweg. The rock size would be based on the storm size selected as that under which it would be desirable for the sediment to be transported out of the reservoir area. Risks associated with the temporary stabilization include failure of the temporary stabilization during flows that are less than desired, resulting in high water quality impacts. The rock needed to temporarily line the channel would need to be imported to the site.

Zone 1 and Zone 2 sediment can be removed prior to dam removal by dredging and placement in permanent disposal sites (a subset of Alternative 3a, discussed in Section 2.3), by excavation in the dry and placement in permanent disposal sites (similar to Sediment Management Option 1, discussed in Section 3.1 except that the reservoir would be drained and the Carmel River diverted around the reservoir during the construction season), or by sluicing through a sluicing tunnel (Sediment Management Option 3, discussed in Section 3.3).

Potential Improvements to Steelhead Passage and Restoration of River Habitat in the Reservoir Area

Dam removal would eventually result in fully volitional upstream and downstream passage for all life stages and species of aquatic organisms, including steelhead, to the extent that a natural channel would allow. Passage could at times be disrupted during construction, although careful planning may make that impact avoidable. With either a full or partial dam removal alternative, there would be substantial opportunity for passive or active restoration of habitats inundated by the reservoir. The dam and reservoir currently occupy roughly 1 linear mile of what would otherwise be stream habitat, which would be restored for the benefit of steelhead and many other native aquatic and terrestrial organisms with dam removal. Reservoir restoration to stream habitat may also reduce predation by nonnative species that inhabit the reservoir, and could have an effect on the growth rates of rearing steelhead, assuming some steelhead that would have reared in the reservoir (lacustrine habitat) would rear in riverine habitat instead following dam removal.

Potential for Public Ownership of Reservoir Property

If Cal-Am preferred not to continue with ownership of the property surrounding LPD and LPR following dam removal, its adjacency to public land managed by the United States Forest Service and the Monterey Peninsula Regional Park District may favor conversion of the land to public ownership following dam removal. For example, Cal-Am has agreed to transfer the land at the former San Clemente Reservoir site to the United States Bureau of Land Management at some point in the future.

Expected Response of the Active Channel, Potential Impacts on Downstream Properties from Resumption of the Natural Sediment Load, and the Need to Develop a Riparian Management Plan

With the removal of LPD, bed elevations along channel reaches downstream are expected to increase through sediment transport and deposition of primarily gravels and cobbles (0.5 to 256 millimeters); this is the expected response because downstream reaches have received less coarse sediment per annum than under natural conditions since the dam was constructed. This decrease of coarse sediment supply means that the average bed elevation of downstream reaches has reduced relative to pre-dam levels. The pertinent questions are how fast and over what distance from the dam sediment deposition is expected if the dam is removed. The aggradation of coarse sediment will be greatest in the reaches nearest LPD, and as coarse sediment mobilizes and continues downstream, it may aggrade lower

portions of the river channel bed. Aggradation will begin with the first storms that generate runoff capable of mobilizing portions of the coarse sediment wedge in the reservoir, and in general the most rapid rates of aggradation occur with the first several storms following dam removal and taper off into the future years after these events. However, an aggradational signal in reaches most downstream of the dam will be delayed because it takes time for sediment to arrive to these reaches. A sediment transport model study is underway to understand the magnitude and general location of these effects, and to address the two questions raised above; the results of the sediment transport model will be interpreted to develop conclusions about how the river longitudinal profile could respond during many different sequences of future flood events.

Resumption of the natural sediment load may affect steelhead and riparian habitat downstream of the LPD. Redistribution of gravel-sized coarse sediment to reaches downstream of the dam will increase the available steelhead habitat. Depending on the response of the channel to the sediment, some management or riparian vegetation may be required. Monterey Peninsula Water Management District (MPWMD) has an ongoing program to manage riparian vegetation through which riparian vegetation management needs could be addressed.

Streamflow Effects on Steelhead Habitat and Riparian Diversions

As described in detail in Section 2.4.2.2 of the Study Preparation TM (AECOM 2017a) and summarized in Section 2.1.1 of this TM, releases from LPR are used to augment dry season flows in the Carmel River for the benefit of water diversion and steelhead habitat maintenance. If the dam is removed and alternative storage is not developed, there would no longer be stored water available for this purpose. This may decrease the quality of existing steelhead habitat during the dry season. Drying of the channel during summer months, which currently occurs most years in a portion of the Carmel River below RM 8, could be extended across a greater length of stream or for a greater duration. This could affect the extent of suitable steelhead rearing habitat for steelhead and the amount and timing of water available for diversion. Because of the complex interactions among surface flows, flood events, and groundwater, the magnitude of this effect is uncertain. However, the Carmel River Basin Hydrologic Model, when available, will allow for additional insight into the magnitude and extent of this effect.

The Effect on Water Rights and Municipal Water Supply

Alternative 2 would likely lead to the termination of Cal-Am's License 11866 and an amendment to several water rights orders (Orders WR 95-10, WR 2009-060, and WR 2016-0016). Cal-Am's water right—allowing for diversion of 2,179 AFY to LPR and requiring that at least 5 cfs be released directly below LPD at all times during which water is being stored in the reservoir—would also be terminated.

Removal of the dam would result in a loss of storage that has been used for decades to supplement flows in the Carmel River during the summer months. This reduction in summer flows would not affect diversions associated with Cal-Am and MPWMD's appropriative water rights (Permits 21330, 20808A, and 20808B), because these permits only allow for diversion between December 1 and May 31. Cal-Am's riparian and pre-1914 appropriative water rights, as well as diversions made at other private surface diversions and wells, are not subject to diversion windows, and Cal-Am and private diversion and well owners currently divert water during summer months. Reduced summer flows associated with Alternative 2 would likely reduce these summer water diversions. However, as described in Section 2.1.1, the effects of reduced flows on summer water diversions would be somewhat moderated in the lower Carmel River because Cal-Am intends to reduce its dry season diversion from the lower Carmel River to 1 cfs when replacement water supplies are available (Cal-Am and MPWMD 2016).

Impacts on Local Residents from Construction Traffic

Impacts on local residents during construction would include mobilization and demobilization of equipment for construction, delivery of fuel and other supplies during construction, off-hauling of materials that could not be disposed on site (steel reinforcement and building debris), and workers traveling to and from the construction site. Access to the project from Carmel Valley Road would be via Tassajara Road to Cachagua Road to Nason Road, as shown on Figure 2-4.

Cachagua Road is a winding, narrow 1½-lane road with several sharp curves. The section of Cachagua Road to the north of the intersection with Nason Road is generally narrower than the section to the south.

In addition, the northern section includes a couple of curves that would be difficult to improve for the passage of tractor-trailers hauling lowboys for equipment mobilization or construction materials, such as pipe and sheet piling (which require trailers). Based on an initial assessment, the northern section of Cachagua Road could only be used for vehicles bringing construction personnel to the site. To improve sight distance, tree pruning would be necessary on Cachagua Road at Carmel Valley Road, and a reduced speed limit sign north of Nason Road would be erected.

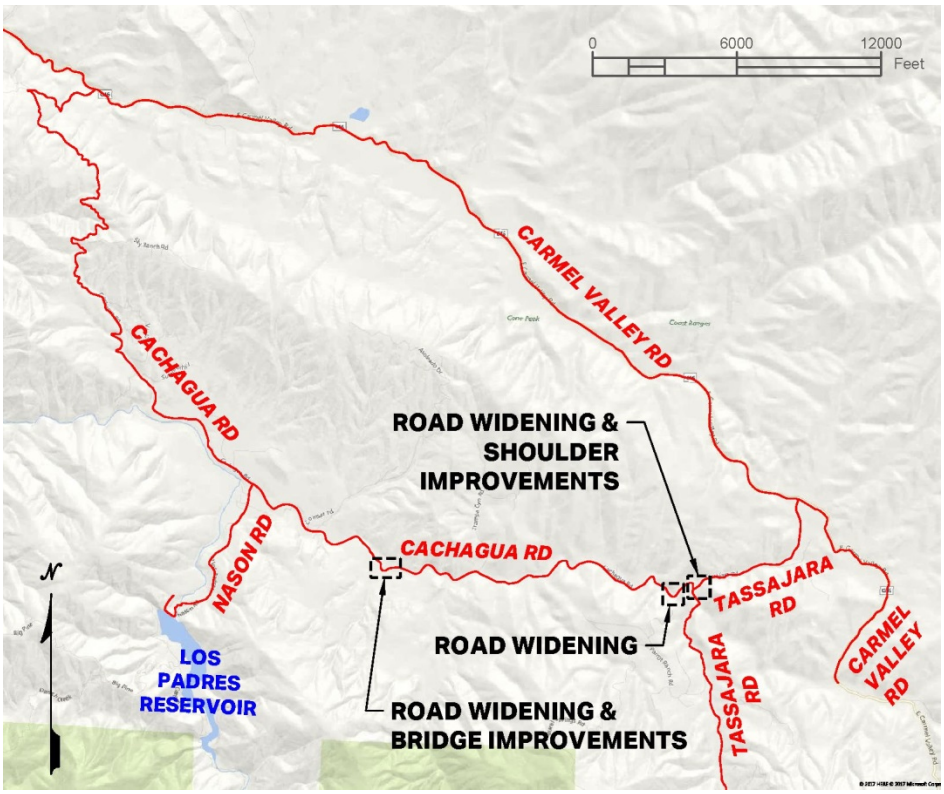

Figure 2-4 Location of Potential Public Road Improvements for Construction

Cachagua Road to the south of the intersection with Nason Road is generally less winding but has three curves that could be difficult for tractor-trailers to negotiate when pulling lowboys. These locations are shown on Figure 2-4. The three curves might require road widening to accommodate construction traffic, depending on the construction equipment that would be mobilized. The southern portion of Cachagua Road also includes two one-lane bridges, one of which is load-restricted. The load-restricted bridge (Bridge #529) would potentially require strengthening to handle construction equipment loads. The road west of Bridge #529 would potentially require widening the curve to 24 feet. The other one-lane bridge, on Tassajara Road near the intersection of Cachagua Road, would not require strength improvement; however, the road west of the intersection would likely require widening to facilitate tractor-trailers to negotiate the turn when pulling lowboys—and, if necessary, to conduct a three-point-turn.

Tassajara Road is wider than Cachagua Road and includes a one-lane bridge, mentioned above. Based on local input, our understanding is that tractor-trailers pulling lowboys have mobilized D8 bulldozers (similar to those recommended for this alternative) up Tassajara Road and the portion of Cachagua Road to Nason Road using the existing roads and bridges. Vehicles hauling construction equipment or materials along this route would require traffic control in the form of pilot cars (and other measures required in the future Contractor-provided, County-approved Traffic Control Plan, and other permits).

2.3 Restore Reservoir Capacity (Alternative 3)

Restore Reservoir Capacity (Alternative 3) includes two sub-alternatives that involve removing sediment from LPR to recover the storage capacity lost since construction. These sub-alternatives differ in the

location where sediment is disposed; on Cal-Am Property for Alternative 3a, and off Cal-Am Property for Alternative 3b. These sub-alternatives are described in the following two sections.

2.3.1 Restore Reservoir Capacity by Dredging and Placing on California American Water Property (Alternative 3a)

Restore Reservoir Capacity by Dredging and Placing on Cal-Am Property (Alternative 3a) is the sub-alternative that includes dredging sediment from the existing reservoir and disposing of the sediment by placing it on Cal-Am property downstream of LPD. This sub-alternative builds on the analysis presented in the LPD Sediment Removal Feasibility Study (MWH 2013), and considers whether the downstream sediment disposal site identified in that study can be expanded to accommodate dredging the reservoir to its original capacity.

Based on our review of the disposal sites proposed in MWH (2013) (see Figure 2-5), it has been concluded that the upstream site is not practicable for the following reasons:

- The length of new access road required along the Carmel River channel (about 1 mile);
- The height to the top of the disposal site above the Carmel River channel (390 feet) requiring a very steeply graded, switchback haul road to access;
- The specialized soil-cement containment dike with 1H:1V slope to facilitate construction in the steep drainage; and
- The difficulty in providing for storm drainage across the disposal site following construction.

The downstream disposal site (Site B for this TM) on the right abutment above the spillway is a feasible location and can be expanded to handle a disposal capacity of up to about 1,640,000 CY, as discussed in Section 2.2. An additional downstream disposal site, Disposal Site C (also discussed in Section 2.2), is also considered in this TM.

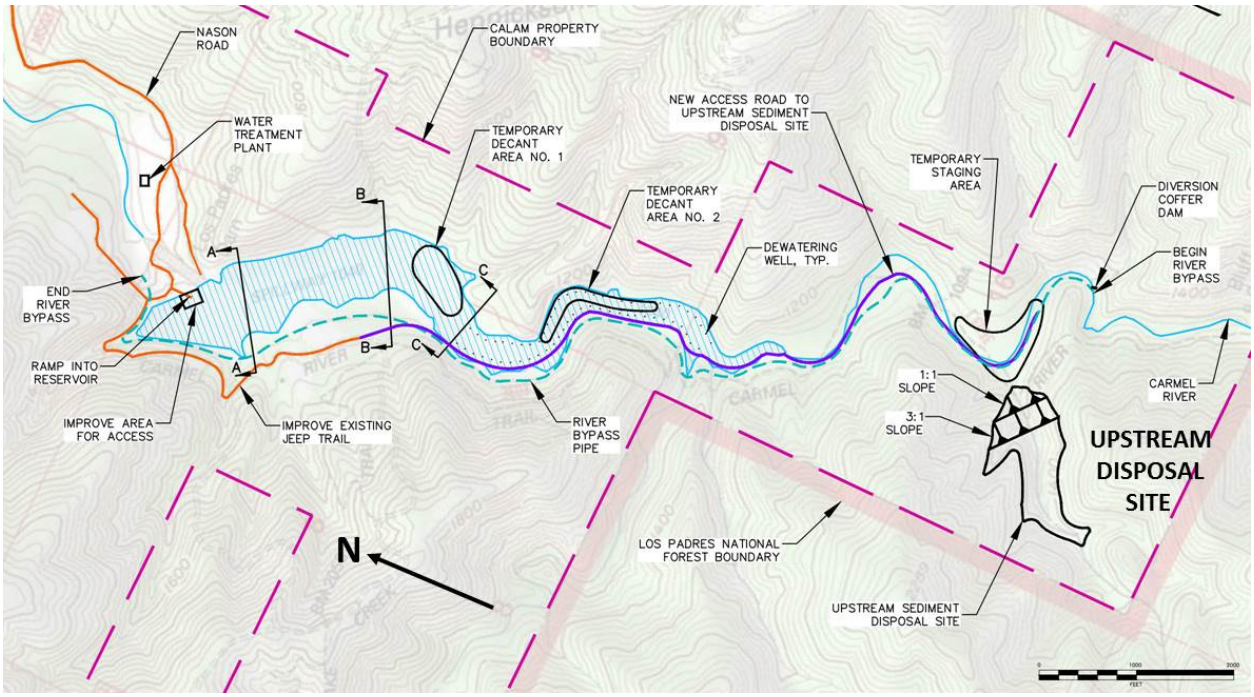

Figure 2-5 Upstream Disposal Site (from Exhibit 2, MWH 2013)

Methods for dredging sediment below the reservoir level, including hydraulic dredging using a suction dredge and barge-mounted clamshell or long-reach excavator, have been previously considered (MWH

2013). The most viable method of dredging Zone 1 and the finer Zone 2 materials would involve mechanical means such as a barge-mounted clamshell or long-reach excavator. The dredged materials would be conveyed to a transport barge that would convey the material to an off-load area where the material would be transferred to trucks and hauled to a decanting area. Following decanting, the sediment would be transported, placed, further moisture-conditioned, and compacted in Disposal Site B or Disposal Site C (Figure 2-2).

Typical operation of LPR during dry years provides the opportunity to excavate Zone 2 and Zone 3 sediment above the reservoir water surface elevation using conventional earth-moving equipment. Based on current sediment conditions (AECOM 2017b) and depending on the water year condition, excavation of sediment could be performed in about the upstream two-thirds of the reservoir. The sediment would be accessed along an existing jeep trail from the dam crest at the left abutment that extends upstream to a terrace that was a source of material for the existing dam. Upstream of the jeep trail, haul trucks would travel on the exposed sediment. Development of access on the exposed sediment would require grading and possibly placement of coarse materials to provide a road base for the access road. Table 2-2 is a summary of the number of days during the years between 2002 and 2016 when the reservoir level was below sediment elevations between El. 1,000 and El. 1,040. Table 2-2 indicates that sediment could have been excavated in the dry down to El. 1,030 in all years, down to El. 1,020 in about 50 percent of the years, and down to El. 1,010 during 2 years of the 15-year record.

Table 2-2 Days of Availability of Sediment for Dry Excavation by Elevation (2002 to 2016)

Days Below El.	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Years of Access
1,042.9	153	39	184	127	95	190	199	175	20	98	183	170	253	161	115	15
1,037.9	124	39	150	110	71	151	179	122	13	59	161	137	221	137	98	15
1,032.9	96	38	125	73	53	117	151	90	12	8	121	111	191	125	96	15
1,027.9	0	0	0	0	34	89	117	82	0	0	24	91	163	113	86	9
1,022.9	0	0	0	0	33	0	69	57	0	0	0	74	141	72	83	7
1,017.9	0	0	0	0	18	0	0	3	0	0	0	19	101	9	79	6
1,012.9	0	0	0	0	0	0	0	0	0	0	0	0	41	0	54	2
1,007.9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Days of record	**365**	**126**	**365**	**365**	**321**	**365**	**365**	**365**	**365**	**365**	**365**	**365**	**365**	**365**	**302**	

Notes:

Vertical datum: North American Vertical Datum of 1988

Gray denotes year with incomplete data

In terms of relative cost, Alternative 3a would be high and would likely be similar Alternative 2a using dredging to remove Zone 1 and Zone 2 sediment because the volume of the dam to be removed in Alternative 2a is similar to the volume of Zone 3 sediment that would be removed as part of Alternative 3a. Dredging and placement of Zone 1, Zone 2, and Zone 3 materials in Disposal Sites B and C could require 5 years, meaning the sediment removal project could have a 6-year duration once design and permitting have been completed. Alternative 3a may require implementation of fish passage improvements that have not been included in the relative cost.

2.3.2 Restore Reservoir Capacity by Dredging and Placing Off California American Water Property (Alternative 3b)

Restore Reservoir Capacity by Dredging and Placing Off Cal-Am Property (Alternative 3b) is the sub-alternative that includes dredging the reservoir to original capacity and transporting some or all reservoir

sediment to an offsite disposal area (see Figure 2-6 for approximate limits of Cal-Am property). With this sub-alternative, existing public roads in Cachagua Valley would not be used (i.e., Nason Road, Cachagua Road, and Tassajara Road). This concept could be combined with placement of a portion of material on the Cal-Am property and the remainder off site. It is expected that many of the same considerations discussed for Alternative 3a would apply. Based on our review of area surrounding the reservoir using aerial photography, there are no practicable feasible locations for this sub-alternative.

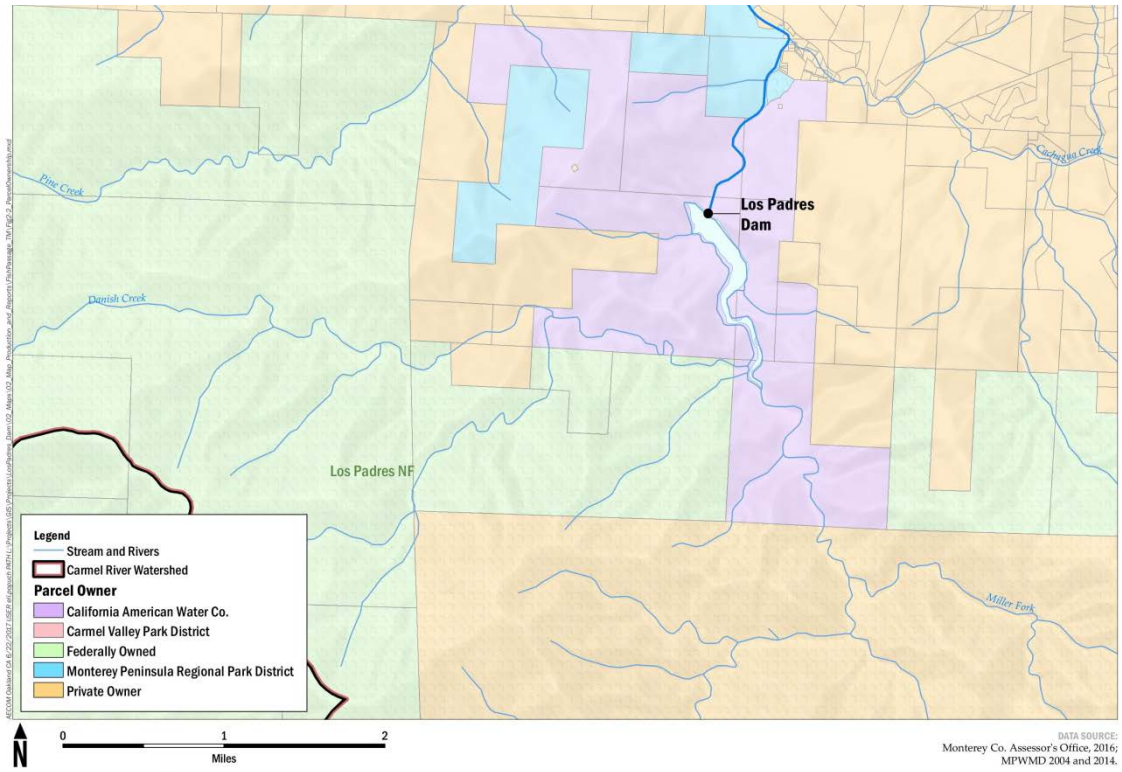

Figure 2-6 Approximate Location of California American Water Property

Source: Cal-Am and MPWMD 2016

2.3.3 Alternative 3 Considerations

Considerations relevant to restoration of reservoir capacity include:

1. Maintaining dam safety;
2. Division of Safety of Dams (DSOD) requirements for disposal containment;
3. Sustainability;
4. Impacts on local residents from construction traffic;
5. Effects on downstream channel geometry and habitat for steelhead;
6. Effects on steelhead passage over LPD and through the reservoir;
7. Environmental and municipal benefits from an increased water supply; and
8. Effects on water rights.

These considerations are described further in the following sections.

Maintaining Dam Safety

This alternative would not impact the dam or its appurtenant structures and would therefore not result in any changes regarding safety of the dam, unless future analyses of the dam found that improvements to the dam were necessary.

Division of Safety of Dams Requirements for Disposal Containment

The disposal areas under consideration do not impact the dam or its appurtenant structures and are not anticipated to be within DSOD's jurisdiction. The possible exception could be Site B, on the terrace above the right side of the spillway structure. DSOD may desire a stability analysis that demonstrates that the disposal site would not pose a stability risk to the slope above the right side of the spillway.

Sustainability

This alternative would recover the 1,108 AF of reservoir capacity lost in the 69 years since construction of LPD was completed in 1948. Assuming the sedimentation rates described in Section 2.1, an estimated 69 to 147 years would be required for the reservoir capacity to be reduced to its current capacity of 1,600 AF.

Impacts on Local Residents from Construction Traffic

Impacts on local residents from construction traffic would be similar to those described for Alternative 2 in Section 2.2.3. The estimated duration of impacts would be six construction seasons.

Effects on Downstream Channel Geometry and Habitat for Steelhead

Effects on downstream channel geometry and habitat for steelhead would be similar to those described in Section 2.1.1 for the No Sediment Management alternative, where LPD and LPR continue to interrupt sediment transport on the mainstem Carmel River until tributaries downstream introduce other sediment sources.

Effects on Steelhead Passage over Los Padres Dam and through the Reservoir

Effects on steelhead passage over LPD and through the reservoir would be similar to those described in Section 2.1.1 for the No Sediment Management alternative, where passage would continue in its current form.

Environmental and Municipal Benefits from an Increased Water Supply

The additional 1,108 AF of storage resulting from removing the accumulated sediment from the reservoir would allow additional average releases of about 3 cfs (6.1 AF) per day during the 6-month dry season period. This increase in summer flow would likely result in opportunities for Cal-Am and private diversion and well owners to divert more water during the dry season, although Cal-Am intends to reduce its dry season diversion when replacement water supplies are available (Cal-Am and MPWMD 2016). An increase in summer instream flow would also increase both the quality and quantity of summer rearing habitat downstream of LPD for steelhead, by increasing flows through existing rearing habitat and by wetting portions of the channel that currently dry during summer months, or by extending the duration of inundation for some reaches.

Effects on Water Rights

Restoration of original reservoir capacity would eliminate the risk of further water rights reductions described in Section 2.1.1 for Alternative 1. With implementation of Alternative 3, Cal-Am could also petition the SWRCB to increase their water right associated with LPR.

2.4 Storage Expansion (Alternative 4)

Storage Expansion (Alternative 4) is the concept of increasing the storage capacity of LPR through modification of the existing dam, a new dam downstream of the existing dam, or a combination of modification of the existing dam and a new downstream dam. The concept includes four sub-alternatives that differ in the type and location of the upgraded dam or dams. The maximum elevation of any storage expansion alternative for this study was set so that the reservoir resulting from a 100-year flood event (8,900 cfs [AECOM 2017a]) would not impinge on the Ventana Wilderness boundary (based on 2010 Light Detection and Ranging [LiDAR] data). The maximum spillway crest elevation for storage expansion alternatives is set at 1,052.5 feet, which is the Ventana Wilderness boundary at Danish Creek of El. 1,060.0 minus 7.5 feet (the depth of water above the spillway crest during the 100-year flood using DSOD's spillway rating curve [MWH 2012]).

The four storage expansion alternatives being considered, and described in this section, include:

1. Expand with Dam Raise (Alternative 4a)
2. Expand with Rubber Dam (Alternative 4b)
3. New Downstream Dam (Alternative 4c)
4. Expand with Combination (Alternative 4d)

2.4.1 Expand with Dam Raise (Alternative 4a)

Expand with Dam Raise (Alternative 4a) is the concept of expanding reservoir surface storage with a small dam raise at the existing dam. The maximum raise for the NMWS would be 9.6 feet, to El. 1,052.5 feet. This would increase the maximum storage capacity of the reservoir by 586 AF, from 1,601 AF to 2,187 AF. Alternative 4a would require raising the dam from the downstream side, modifying the spillway by raising the crest and the walls, and modifying portions of the outlet works. Construction of the dam raise would likely require two construction seasons, with the dam raise occurring during the first 6-month construction season and modifications to the spillway and outlet works being constructed during the following 6-month construction season.

Raised Dam Crest Elevation

Raising the dam would require reevaluation of PMF using Hydrometeorological Report (HMR) 58/59 or, potentially, a probabilistic approach. In either case, the PMF would be greater than the current PMF of 31,579 cfs (DSOD 2015) developed using HMR 36. The water surface elevation during the HMR 36 PMF is 1,060.25 feet, 0.3 foot below the dam crest. Based on a comparison of the HMR 58/59 and HMR 36 PMFs at the former location of San Clemente Dam, 11 miles downstream of LPD, a HMR 58/59 PMF at LPD might be on the order of 42,250 cfs. Based on an extrapolation of the current spillway rating curve, the PMF flood level would be about El. 1,064.44 feet; 21.5 feet above the spillway crest. Thus, the raised dam crest would be El. 1,052.6 feet + 21.5 feet + 2 feet freeboard for wind-wave runup, or El. 1076.1; a dam raise of 15.6 feet. For the purposes of this TM, it is assumed that the design PMF would be that developed using HMR 58/59. The amount of freeboard required to pass the PMF could be reduced if the spillway crest were either widened or modified from its current straight ogee crest to a single-cycle labyrinth spillway crest. For the purposes of this TM, it is assumed that the crest width would stay the same as the existing spillway crest.

Dam Raise

The dam would be raised from the downstream side. The foundation of the dam raise would require excavation at the downstream toe to expose bedrock. The downstream slope of the dam would be prepared by removing vegetation and excavating and stockpiling the existing rock slope protection for reuse, to expose Zone 1 material. The top approximately 40 feet of the dam would be removed to facilitate internal zoning of the top of the dam raise. The dam raise would include extension of the downstream blanket, a chimney filter between Zone 1 (likely silty sand [SM] to sandy silt [ML]) and the material used for the dam raise, and extension of Zones 1, 2, and 3 at the top of the dam raise, as shown on Figure 2-7. The chimney provides protection against uncontrolled piping and erosion of Zone 1 that could occur through cracks that could form during seismic deformation.

EXHIBIT 2-C

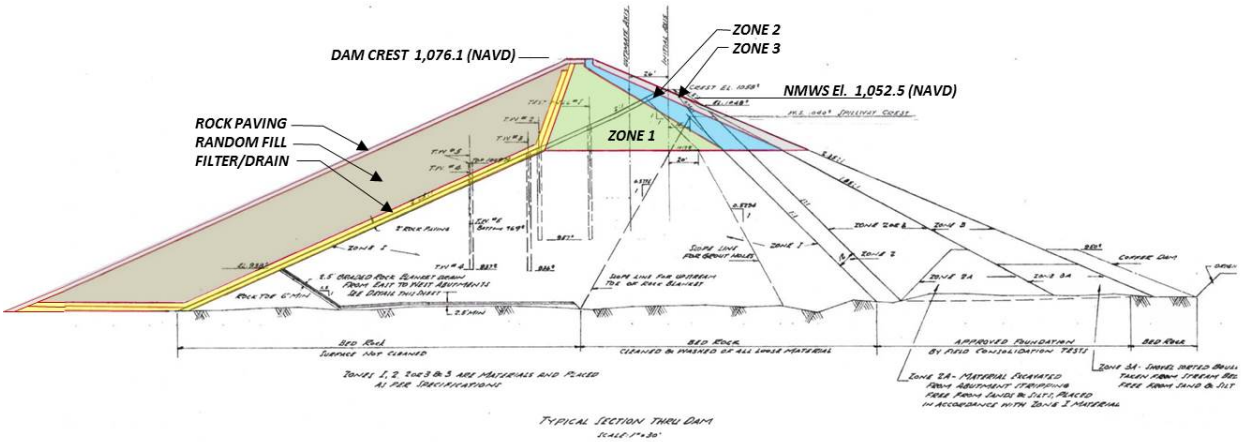

Figure 2-7 Alternative 4a Dam Raise Section Concept

Zone 1 material could come from alluvial fan deposits at the top of the terrace deposits that form the base of permanent disposal Sites A, B, and C (The Mark Group 1995), as shown on Figure 2-2. Potential sources of Zone 2, Zone 3, and random fill materials are the coarse sediment in the upstream portion of the reservoir and terrace gravels underlying the alluvial fan deposits in the terraces that form the base of permanent disposal Sites A, B, and C. Filter and drain materials would likely need to be imported, but could potentially be processed from the coarse sediment in the upper end of the reservoir.

Design for a dam raise would require stability analyses and seismic deformation analyses. The most recent seismic stability analysis was performed for LPD by DSOD in 1981 (DSOD 1981). The 1981 seismic stability analysis was based on a seismic hazard analyses for the dam that considered three major active faults: the San Gregario-Hosgri fault, the San Andreas fault, and the Rinconada fault (DSOD 1980). Based on the seismic hazard evaluation, the San Gregario-Hosgri fault was determined to be the controlling fault, with a Maximum Credible Earthquake (MCE) of M7.5 and a peak ground acceleration of 0.4g. Based on current understanding of the seismic hazards in the area of LPD, the Monterey Bay-Tularcitos Fault Zone should also be considered an earthquake source. The Monterey Bay-Tularcitos Fault Zone, being much closer to the dam than the San Gregario-Hosgri fault, will likely result in higher peak ground accelerations.

Ground motions developed based on the revised seismic hazard analysis would be used for liquefaction triggering analyses of the granular Zones 2 and 3 in the upstream shell; seismic deformation of both the upstream and downstream shells; and analyses for potential for cracking of Zone 1 during seismic shaking where it overlies the foundation ridge at the right abutment, which could lead to seepage and potential piping from the downstream slope of the embankment. Seepage analyses, static stability analyses, and seismic stability analyses would require a better understanding of the static and dynamic properties of the Zone 1 (impervious embankment) and Zone 2 (free-draining upstream zone). Obtaining these properties would require drilling a number of holes in the dam to obtain samples for laboratory analyses, including gradation, Atterberg Limits, and shear strength. In addition, downhole geophysics would likely be needed for dynamic properties of the Zone 1 material. Given the relatively steep upstream slope (2.35H:1V), there is a potential that deformation analyses could indicate the need for the upstream shell to be flattened.

Spillway Modifications

The spillway would require significant modification for the dam raise. The spillway crest would be raised by 9.6 feet, to El. 1,052.5 feet. The left and right gravity walls would be raised 15.6 feet, to the embankment crest elevation of 1,076.1 feet. The left gravity wall could potentially require post-tensioned anchorage, depending on the results of its performance during the MCE. If required, the spillway could be shifted to the right into the abutment to allow additional room for the left abutment gravity wall, or to widen the spillway.

Outlet Works

The current outlet works consists of a low-level outlet and a high-level outlet. The low-level outlet includes an upstream intake structure with a 30-inch hydraulically operated slide gate (invert El. 950.2 feet), an approximately 620-foot long 30-inch-diameter steel conduit encased in reinforced concrete, and a downstream outlet works that divides into four outlet gates: a 30-inch butterfly valve, two 12-inch guard gate valves and regulating butterfly valves, and a 12-inch gate valve for habitat flow.

The high-level outlet works is a slide-gate-controlled, 30-inch-diameter, concrete-encased outlet pipe through the left side of the spillway ogee crest that terminates at the spillway chute floor, where it meets the downstream end of the ogee crest. The slide gate invert is El. 1,020 feet; 20 feet below the spillway crest.

The outlet structure for the low-level outlet is far enough downstream that it would not be affected by raising the dam. The upstream slide gate and hydraulic operating system would also not likely be affected by the dam raise (unless flattening of the upstream slope was determined to be needed); however, its ability to operate under the additional 12.5 feet of head at the raised NMWS would need to be confirmed. The high-level outlet would need to be modified to extend through the raise of the existing spillway crest. The combined outlet works would need to be reevaluated for meeting DSOD drawdown criteria, which includes the following:

- Drain 50 percent of the original reservoir capacity in 7 days; and
- Drain the entire reservoir in 20 days.

In terms of relative cost, Alternative 4a is judged to be moderate. Construction of Alternative 4a is judged to be feasible in two construction seasons once design and permitting have been completed. Alternative 4a would require implementation of fish passage improvements that have not been included in the relative cost.

2.4.2 Expand with Rubber Bladder Gates (Alternative 4b)

Expand with Rubber Bladder Gates (Alternative 4b) is the concept of expanding reservoir surface storage by using a gates controlled using rubber bladders within a gate structure installed on the existing spillway crest. The gates could be raised at the end of the precipitation season, when the risk of large storms has passed but there is sufficient flow in the Carmel River that water could still be captured and stored for release later during the dry portion of the year.

A rubber bladder gate structure could be installed on the spillway crest to raise the maximum normal reservoir water surface elevation by 9.6 feet, to El. 1,052.5 feet. This would increase the maximum storage capacity of the reservoir by 586 AF, from 1,601 AF to 2,187 AF. An example rubber bladder gate structure installed for the Salinas River Diversion Structure is shown on Figure 2-8. Installation of the gate structure would require modification of the existing spillway so that when the gates are lowered the spillway capacity would not be less than the current capacity. Operational rules for the gates (when they can be raised, considering flood control, and what other circumstances would require lowering) and protection against vandalism would need to be addressed during design to obtain DSOD approval.

Because the reservoir would be operated temporarily at a level greater than the NMWS, seepage and stability analyses—and likely seismic deformation analyses—would be required to demonstrate that minimum factors of safety are being met. The seepage analyses, stability analyses, and seismic deformation analyses would be similar to those described in Section 2.4.1. It is possible that the analyses will indicate that other features of the dam will also require improvement (e.g., increasing the thickness of Zone 1 to the top of gate elevation, adding a chimney drain, and flattening the upstream slope) for Alternative 4b to be approved by DSOD.

Figure 2-8 Obermeyer Gate at Salinas River Diversion Facility

The spillway modification may be significant enough that DSOD could require the PMF to be reevaluated using HMR 58/59 or, potentially, a probabilistic approach, as described in Section 2.4.1. The raised dam crest required to safely pass the HMR 58/59 PMF using the existing spillway crest would be El. 1,042.9 feet + 21.5 feet + 2 feet freeboard for wind-wave runup, or El. 1,066.4 feet; a dam raise of about 6 feet. A concept section of the dam raise is shown on Figure 2-9. In addition, the spillway walls at the crest would have to be raised to match the raised embankment crest, and the chute walls would also likely need to be raised.

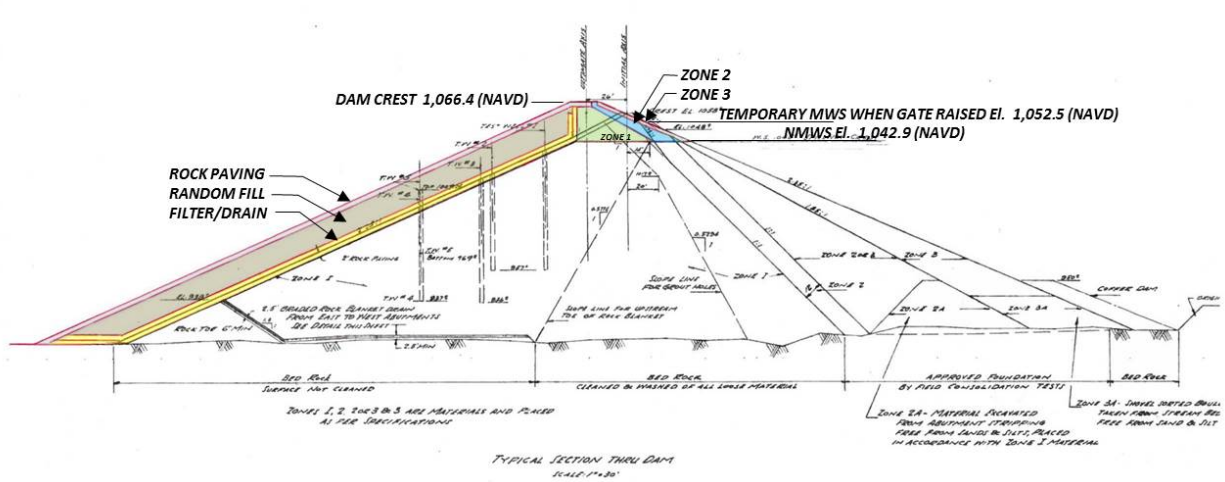

Figure 2-9 Alternative 4b Dam Raise Section Concept to Pass Hydrometeorological Report 58/59 Probable Maximum Flood

Construction of the dam raise to provide sufficient freeboard for the HMR 58/59 PMF would be similar to that described for Alternative 4a in Section 2.4.1, except that about the top 20 feet of the existing dam would be removed to facilitate the dam raise. For the purposes of this TM, it is assumed that the dam would need to be modified as shown on Figure 2-9.

Alternative 4b would cost less and could be implemented in less time than Alternative 4a, due to a smaller volume of dam construction and less spillway modification. In terms of relative cost, Alternative 4b is judged to be low to moderate. Construction of Alternative 4b is judged to be feasible in a single construction season once design and permitting have been completed. Alternative 4b would require implementation of fish passage improvements that have not been included in the relative cost.

2.4.3 New Dam Downstream (Alternative 4c)

New Dam Downstream (Alternative 4c) is the concept of expanding surface storage by constructing a new dam downstream of the existing LPD. The Carmel River canyon downstream of LPD and within Cal-Am property was reviewed for potential locations for the new dam. The location previously selected by The Mark Group (1995) for the New LPD (see Figure 2-10) is the only location that makes sense topographically and geologically. Topographically, this is the narrowest part of the canyon in the area being considered, requiring the least material to construct the new dam.

Geologically, bedrock at the selected location is granitic (The Mark Group 1995), with the right abutment having a somewhat thicker section of weathered rock than the valley or left abutment. All colluvium, alluvial fan deposits, terrace gravels, and weathered rock would need to be excavated for dam construction. Excavation depths for the right abutment, valley, and left abutment were estimated to be 20 to 80 feet, 10 feet, and 20 to 70 feet, respectively. Based on geotechnical investigations made of the New LPD (The Mark Group 1995), the foundation at the site would be suitable for construction of either an embankment dam or a roller-compacted concrete (RCC) dam.

Materials for an embankment dam would be sourced from terraces between the existing dam and new dam, the existing dam, and rock quarried from below the terraces between the two dams. The terraces include alluvial fan deposits overlying terrace gravels. The alluvial fan deposits would be used for the impervious zone, and the terrace gravels would be used for the shells of the dam. The majority of reservoir sediment would be unsuitable for an impervious zone, due to the high organics content and the effort required to dredge the material from the existing reservoir and process the sediment for placement. Filter and drain materials would likely need to be imported, but could potentially be processed from the coarse sediment in the upper end of the reservoir. Aggregate materials for an RCC dam would be developed on site from the terrace gravels and from rock underlying the terrace gravels (The Mark Group 1995). Cement and flyash for the RCC would need to be imported.

Three possible dam sizes were considered at the downstream dam location:

- A dam with a spillway crest elevation that is the same as the existing dam (i.e., El. 1,042.9 NAVD);
- A new dam with a spillway crest elevation of 1,052.5 (9.6 feet above the current NMWS); and
- A new dam with a spillway crest elevation of 1,007 (about 36 feet below the current NMWS).

Freeboard of an additional 20 feet is assumed to be required between the spillway crest and the dam crest to pass the HMR 58/59 PMF. Table 2-3 summarizes the storage capacity, dam height, and estimated volume of material required for dams at the two spillway crest elevations.

Table 2-3 Summary of Potential New Dams Downstream of Los Padres Dam

NMWS (feet)	Storage Capacity (AF)	Dam Height (feet)	Embankment Dam Volume (CY)	RCC Dam Volume (CY)
1,007	3,000	152	1,100,000	230,000
1,042.9	6,311	193	2,100,000	400,000
1,052.5	7,529	203	2,400,000	460,000

Note:

AF = acre-feet
CY = cubic yards
NMWS = normal maximum water surface

As shown in Table 2-3, the volume of materials required for a new embankment dam at maximum NMWS El. 1052.5 is about four to five times greater than for the existing dam, and 2.5 times greater for a new embankment dam having a storage capacity of 3,000 AF. Based on estimated volumes of materials in potential borrows reported in The Mark Group (1995), and including the existing dam, the volume of

available material for the core of the largest new embankment dam appears to potentially be present, but may not have the reserves (typically two times the required volume) desired for construction. New RCC and embankment dams with dam crest El. 1,073 feet (NMWS 1,052.5 feet) are assumed for this TM. Concept plans of a new RCC dam and new embankment dam are shown on Figure 2-10.

In terms of relative cost, Alternative 4c with RCC would be high, and Alternative 4c with embankment would be very high. Alternative 4c would require implementation of fish passage improvements that have not been included in the relative cost. Construction of Alternative 4c would require an estimated four construction seasons once design and permitting have been completed. Construction of an RCC dam would require excavation of the foundation, development of a borrow area for aggregate for the RCC, and construction of diversion during the first construction season. The diversion system would be designed to convey winter flows around the new dam site without developing a large pool behind the partially completed dam after the second year of construction. Two construction seasons would be required for dam construction and removal of the existing dam, and a final construction season for project restoration and closeout.

Construction of an earthfill dam would require excavation of the foundation, excavation of a diversion tunnel (that would also be used as the permanent low-level outlet), development of borrow areas, and construction of a cofferdam for diversion of the Carmel River during construction. The diversion system would be designed to safely convey at least a 100-year storm event around the new dam site without overtopping the cofferdam. Construction of the dam, spillway, and outlet works would require three more construction seasons, and a final construction season for project restoration and closeout.

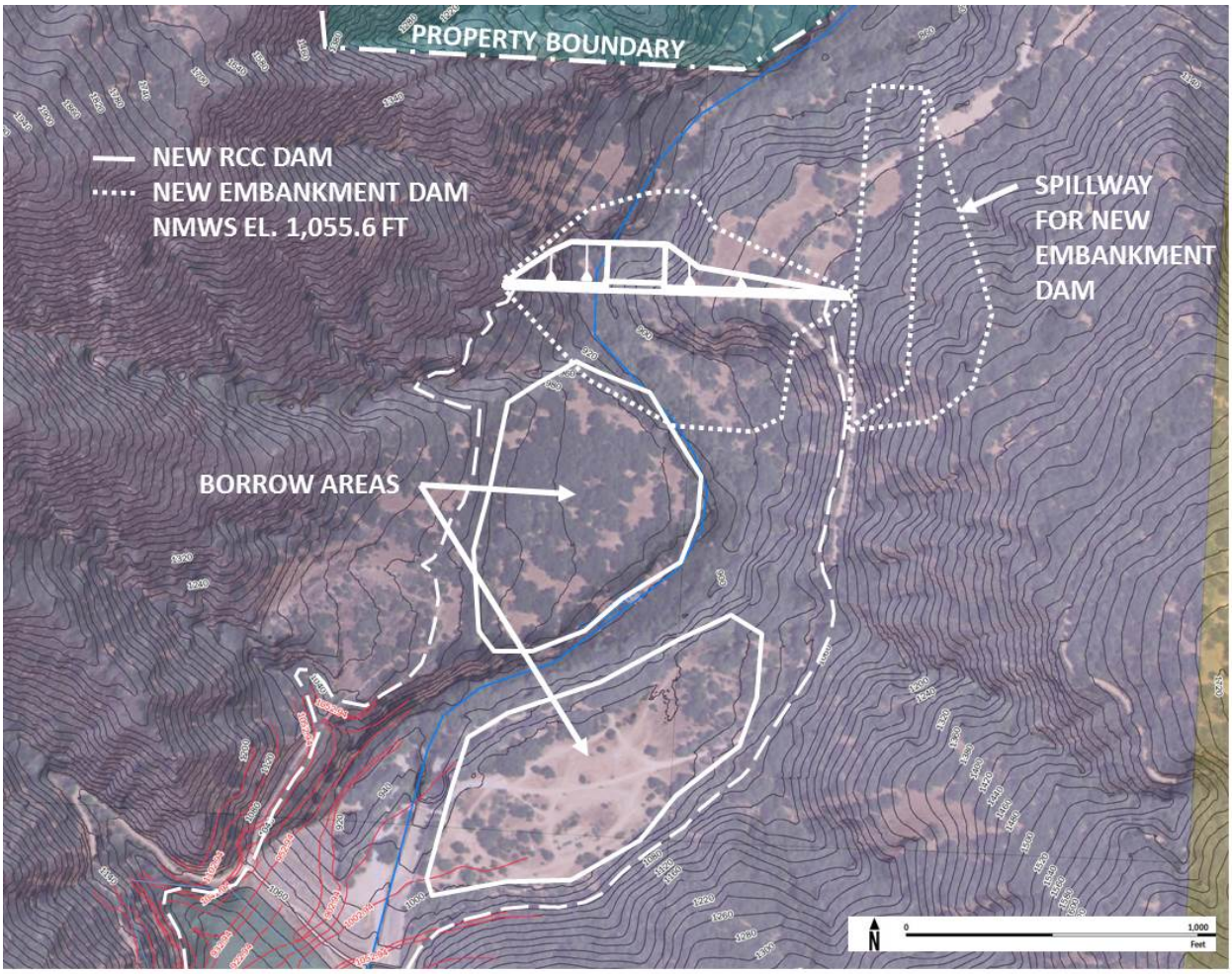

Figure 2-10 Alternative 4c New Downstream Dam Concept Plan

2.4.4 Expand with Combination (Alternative 4d)

Expand with Combination (Alternative 4d) is the concept of expanding surface storage with a combination of two or three methods described above. Alternative 4d could provide an opportunity to use the original reservoir to continue capturing sediment, allowing a lower reservoir to trap less sediment. This alternative would combine a new downstream dam with either a raise of LPD or placement of a rubber dam on the LPD spillway crest (Figure 2-11). The new downstream dam would be restricted to a height that would not cause inundation of the invert of the LPD outlet structure (about El. 927.0 feet) during typical operations. Based on this restriction, the new downstream dam would be on the order of 45 feet high, with a maximum spillway crest elevation of about 920 feet, assuming 2 feet of freeboard between the LPD outlet invert and a reservoir level behind the new dam resulting from a 100-year event. The spillway crest would be at about El. 940 feet, to pass the HMR 58/59 PMF. The new dam would have a reservoir capacity of about 200 AF. The new dam would be constructed with RCC so that the majority of the dam crest could be used as a spillway crest, thereby avoiding construction of a separate spillway structure. The new dam would be at the same location described for Alternative 4c. Construction of the dam would be similar to that described for Alternative 4c.

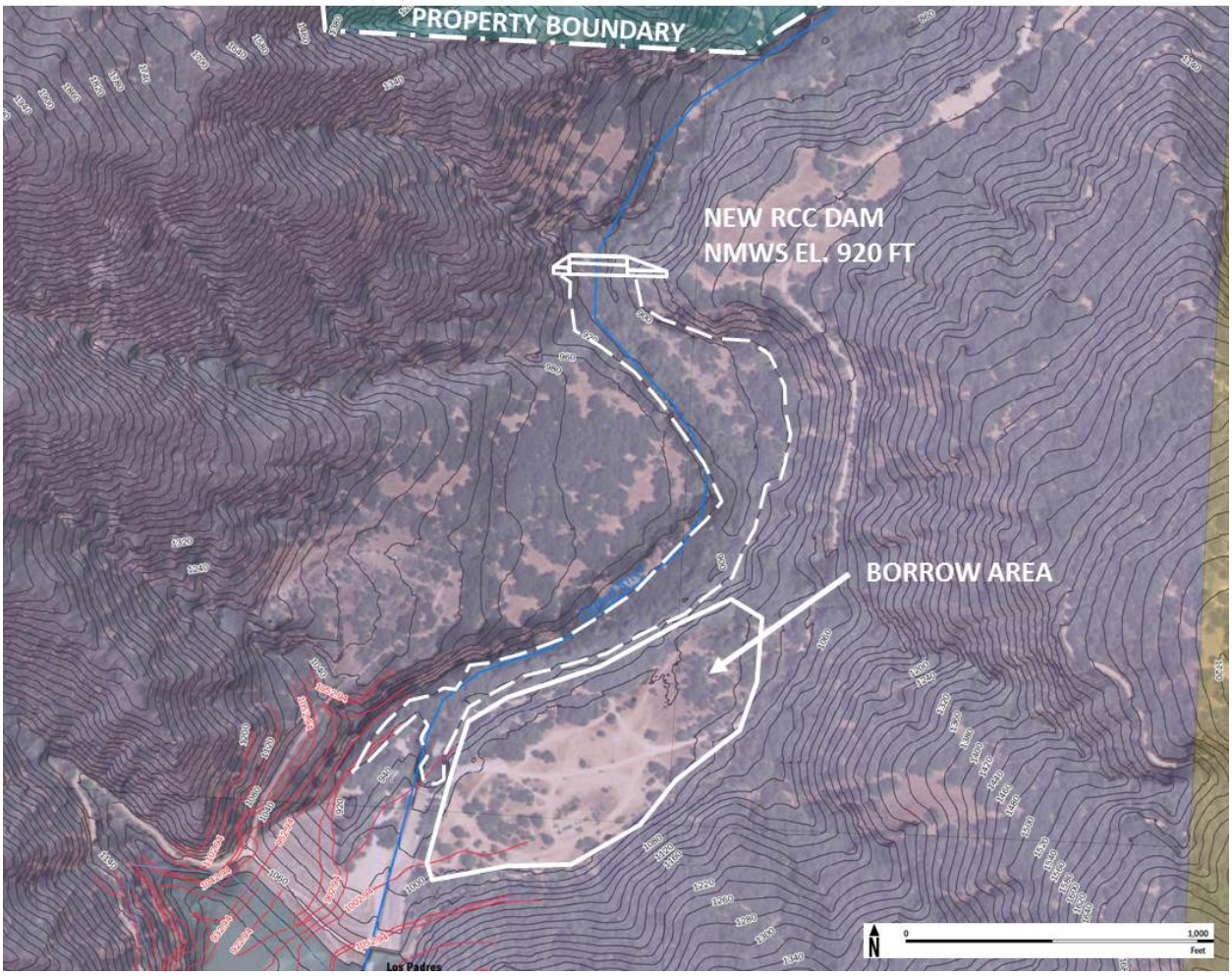

Figure 2-11 Alternative 4d New Downstream Roller-Compacted Concrete Dam Used With Alternatives 4a or 4b

In terms of relative cost, Alternative 4d would be moderate. Construction of Alternative 4d would require an estimated two to three construction seasons once design and permitting have been completed, depending on whether it is combined with Alternative 4a or Alternative 4b. The RCC dam would be constructed during two seasons: the first for excavation of the foundation and development of a borrow

area for aggregate for the RCC; and the second for placement of the RCC, project restoration, and closeout. Alternative 4d would require implementation of fish passage improvements at both dams that have not been included in the relative cost.

2.4.5 Alternative 4 Considerations

Considerations relevant to storage expansion include:

1. Maintaining dam safety and passage of the PMF;
2. Sustainability, especially of surface storage;
3. Local impacts from traffic and noise;
4. Effects on downstream channel geometry and habitat for steelhead;
5. Effects on steelhead passage over a dam and through the reservoir;
6. Water availability analysis (i.e., what effects would alternatives have on instream flows);
7. Municipal and environmental benefits from an increased water supply; and
8. Effects on water rights

These considerations are described further in the following sections.

Maintaining Dam Safety and Passage of the Probable Maximum Flood

The raised dam and modifications to the spillway and outlet works (Alternative 4a); the rubber bladder gate structure and modifications to the dam and spillway (Alternative 4b); the new dam, spillway, and outlet works (Alternative 4c); and the new dam, spillway, and outlet works and the improvements made to the existing dam (Alternative 4d) would all be designed using current standards and would require DSOD approval prior to their construction.

Sustainability, Especially of Surface Storage

Raising the dam (Alternative 4a) or adding a 9.6-foot-high rubber bladder gate structure (Alternative 4b) would add 586 AF of storage to the current reservoir capacity. With an additional 586 AF, and assuming the sedimentation rates described in Section 2.1, an estimated 37 to 78 years would be required for the reservoir capacity to be reduced to its current capacity of 1,600 AF.

The largest new dam downstream (Alternative 4c) would add 4,710 to 5,928 AF of storage to the current reservoir capacity. With an additional 5,928 AF, and assuming the sedimentation rates described in Section 2.1, an estimated 374 to 787 years would be required for the reservoir capacity to be reduced to its current capacity of 1,600 AF.

A new dam downstream, designed to function in combination with either a raise of LPD or placement of a rubber dam on the LPD spillway crest (Alternative 4d), would add 786 AF of storage beyond the current reservoir capacity. With an additional 786 AF, and assuming the sedimentation rates described in Section 2.1, an estimated 50 to 104 years would be required for the reservoir capacity to be reduced to its current capacity of 1,600 AF.

Local Impacts from Traffic and Noise

Local impacts from traffic and noise for Alternative 4 would be similar to those described in Section 2.2.3 for Dam Removal (Alternative 2), but with the following differences by sub-alternative:

- Alternative 4a -- Impacts would occur only over a single construction season. Impacts would potentially include between 2,300 to 3,000 loads of filter and drain material if it is determined that those materials cannot be made on site.

- Alternative 4b -- Impacts would occur only over a single construction season, would require less equipment and manpower than Alternative 4a, and would therefore have a reduced relative impact with respect to traffic and noise. Impacts would potentially include between 2,100 to 2,800 loads of filter and drain material.

- Alternative 4c -- Impacts would occur over four construction seasons. For an RCC dam, impacts would include between 1,500 and 2,500 loads of cement and flyash delivered to the site for a 7.5 thousand acre-feet (TAF) reservoir and between 700 and 1,300 loads of cement and flyash delivered to the site for a 3.0 TAF reservoir. For an embankment dam, impacts would potentially include 15,000 to 20,000 loads of filter and drain material for a 7.5 TAF reservoir and 6,300 to 8,300 loads of filter and drain material for a 3.0 TAF reservoir.

- Alternative 4d -- Impacts would occur over one to two construction seasons. Impacts would include between 100 and 200 loads of cement and flyash delivered to the site and potentially 2,100 to 2,800 loads of filter and drain material.

Effects on Downstream Channel Geometry and Habitat for Steelhead

For Alternatives 4a and 4b, raising the dam or expanding storage with a rubber bladder gate would not result in any changes to the downstream channel geometry from the current condition, but could allow for a greater quantity of water for dry-season release to increase the amount of juvenile rearing habitat in the lower Carmel River. For Alternatives 4c and 4d, the new dam downstream would result in loss of 2,600 to 2,700 feet of river channel that is habitat for steelhead, and also would allow for a greater quantity of water for dry-season release to increase the amount of juvenile rearing habitat in the lower Carmel River.

Effects on Steelhead Passage over a Dam and through the Reservoir

For Alternatives 4a and 4b, upstream passage would be unaffected from the current condition. Downstream passage, however, could be affected by increasing the reservoir water surface elevation during the latter portion of the juvenile out-migration season. Increasing the water surface elevation could be incompatible with the existing BGS or render it inoperable during the period of elevated water surface elevation. For Alternative 4c, current passage facilities would be eliminated and new passage facilities would be required. A larger reservoir would increase the risks associated with passage through a reservoir. For Alternative 4d, where there would be two separate dams and reservoirs, and the existing dam would be modified; entirely new passage facilities would likely be required for upstream and downstream passage. The existing downstream passage BGS could be compromised, as described above for Alternatives 4a and 4b; even if its function could be preserved, it would only pass fish downstream into the lower reservoir. Upstream passage would likely favor trap-and-haul from below the downstream dam to upstream of the upper dam, to avoid having two upstream passage facilities (one at each dam). If passage occurred through—as opposed to around—the reservoir(s), reservoir rearing impacts, such as exposure to nonnative predators, would likely increase.

Effects on Instream Flows

Given the small size of the reservoir, the raised dam (Alternative 4a) and temporarily raised reservoir water surface elevation (Alternative 4b) would not have a significant impact on instream flows during the precipitation season. However, during the dry season, the additional 586 AF of storage would allow additional average releases of 1.6 cfs (3.2 AF) per day over a 6-month period.

For Alternative 4c, the larger size of the reservoir could have a significant impact on instream flows during the precipitation season, depending on the reservoir level at the beginning of the season and the type of water year. An operations plan for releases during the wet season of a dry year would need to be developed to facilitate upstream steelhead migration. During the dry season, the additional 4,710 to 5,928 AF of storage would allow additional average releases of up to 13 to 16 cfs (26 to 32 AF) per day over a 6-month period, assuming a full reservoir at the beginning of the dry season.

For Alternative 4d, given the small size of the two reservoirs, the dams would not have a significant impact on instream flows during the precipitation season. However, during the dry season, the additional 786 AF of storage would allow additional average releases of 2.1 cfs (4.3 AF) per day over a 6-month period.

Environmental and Municipal Benefits from an Increased Water Supply

Alternative 4c would have the potential to significantly reduce instream flows downstream of the new dam during the precipitation season. This could result in Cal-Am and MPWMD meeting the minimum mean daily instream flow requirements in Permits 21330, 20808A, and 20808C less frequently; and therefore,

potentially, to a restriction of Cal-Am's and MPWMD's ability to divert water from the Carmel River Watershed to various groundwater wells and the Seaside Groundwater Basin. Alternatives 4a, 4b, and 4d would not significantly impact instream flows during the precipitation season and would therefore not affect Cal-Am's and MPWMD's water diversions associated with Permits 21330, 20808A, and 20808C.

All four storage expansion alternatives would have the potential to increase instream flows during summer months through release of additional stored water. Increased summer flows would not allow for increased water diversion associated with Cal-Am and MPWMD Permits 21330, 20808A, and 20808C, because diversions under these permits are only authorized between December 1 and May 31. However, the increase in summer flows would likely result in opportunities for Cal-Am (through riparian and pre-1914 appropriative water rights) and private diversion and well owners to divert more water during the dry season, although Cal-Am intends to reduce its dry season diversion when replacement water supplies are available (Cal-Am and MPWMD 2016).

Increased summer instream flow would also increase both the quality and quantity of summer rearing habitat for steelhead downstream of LPD or a new dam, by increasing flows through existing rearing habitat and by wetting portions of the channel that currently dry out in summer months.

Effects on Water Rights

Alternatives 4a and 4b would increase the capacity of LPR, and Cal-Am could petition the SWRCB to increase their water right associated with LPR. Permit 20808B, held by MPWMD, authorizes 18,674 AFY to be diverted to the New LPD. This permit is set to expire in 2020, so Alternatives 4c and 4d would require MPWMD to petition for an extension of this water right. If Alternative 4c or 4d were implemented, the License 11866 requirement to release at least 5 cfs directly below LPD at all times during which water is being stored in the reservoir would be replaced by the minimum instream flow requirements in Permit 20808B.

3. Sediment Management Options

This section includes a discussion of sediment management options that could be incorporated into the alternatives described in the preceding section. A sediment management program would be relevant to alternatives involving retention, expansion, or relocation of LPD, and would evaluate management activities that could result in either maintaining the existing surface storage capacity, or increasing surface storage over time (up to the original reservoir capacity). In addition to reviewing options previously developed for dredging, this evaluation considers whether there are additional feasible alternatives for removing material from the reservoir and transporting it to a disposal site. The following sediment management options are described in this section:

1. Periodic sediment removal off site (Option 1);
2. Periodic sediment removal and placement downstream of LPD, with the intent to allow the material to be captured and mobilized by the river at high flows (Option 2);
3. Sluicing fine sediment during high flows (Option 3);
4. Construction of a bypass tunnel for incoming sediment (Option 4); and
5. Combinations of sediment management options.

3.1 Periodic Sediment Removal to Offsite Disposal Site (Option 1)

This sediment management option would involve excavation of a portion of the Zone 2 and Zone 3 sediment from the upstream half of the reservoir and hauling for placement in the two permanent upland disposal areas downstream of the dam (see Section 2.2 and Figure 2-2). Depending on the volume of sediments removed, this alternative would maintain reservoir capacity or could recover some lost reservoir capacity. Currently, the majority of sediment trapped by the reservoir is Zone 2 and Zone 3 sediment. An estimated 5 AF (8,100 CY) of Zone 2 sediment and 2.5 AF (4,050 CY) of Zone 3 sediment comes into the reservoir each year, assuming an annual ratio of Zone 2 to Zone 3 sediment of 2:1 and an annual rate of sediment accumulation of 7.5 AFY. Based on these assumptions, an estimated 12,150 CY per year would need to be removed from the reservoir to maintain the current reservoir storage. Excavation of Zone 3 sediment at the upstream end of the reservoir would effectively result in a sediment capture area, where coarse sediment being transported from upstream of the reservoir would collect in subsequent years.

Because LPD is operated to enhance fishery habitats in the lower Carmel River during the dry summer months, the reservoir would not be drawn down at the beginning of the dry season to facilitate mechanical removal in the dry. Rather, the volume of sediment excavated in the dry would be dictated by the water year condition and the level to which the reservoir would be drawn down over the dry season. Excavation of sediment in the dry would be limited by the minimum operating pool level (target El. 1,003; in very dry years, El. 980). The number of years and available days that sediment could be removed in the dry for the years between 2002 and 2016 are shown in Table 2-2 in Section 2.3.1. Table 2-2 indicates that sediment could have been excavated in the dry down to El. 1,030 in all years, down to El. 1,020 in about 50 percent of the years, and down to El. 1,010 during 2 years of the 15-year record. An average excavation volume of 60,750 CY could be removed every 5 years to maintain the current reservoir volume. Access to the upstream end of the reservoir would be the same as described for Alternative 3a in Section 2.3.1.

In terms of relative cost, Option 1 would be moderate. The relative cost assumes removal every 5 years on average, with the access road to the upstream end of the reservoir requiring rebuilding each time removal is performed. It is estimated that each periodic removal would require about 3 months to perform.

3.2 Periodic Sediment Removal and Placement Downstream of Los Padres Dam (Option 2)

Sediment management Option 2 would involve excavation of a portion of the coarser Zone 3 sediment from the upstream half of the reservoir, and hauling for placement in two areas downstream of the dam in the river channel that appear to be accessible by flood flows. This alternative would provide a means by

which these coarser sediments (sand, gravel, and cobble), which are currently trapped by the reservoir, could be moved around the dam to maintain steelhead spawning areas and instream habitat downstream of the dam. Currently, the majority of sediment trapped by the reservoir is Zone 2 and Zone 3 sediment. An estimated 2.5 AF (4,050 CY) of Zone 3 sediment comes into the reservoir each year, assuming an annual ratio of Zone 2 to Zone 3 sediment of 2:1 and an annual rate of sediment accumulation of 7.5 AFY.

The two downstream areas (Sites D and E) where placed sediment could be accessed and mobilized during large flow events are shown on Figure 3-1. Site D is a 1.8-acre area that has a capacity of about 20,000 CY at a top elevation of 905 feet. Site E is a 1.8-acre area that has a capacity of about 16,000 CY at a top elevation of 870 feet. Both of these areas would need to be cleared of trees to be used for mechanical placement of sediment. The reliability of these areas to provide the desired function could be improved with some grading to remove the existing armor of boulders and make more of the areas accessible to storm flows.

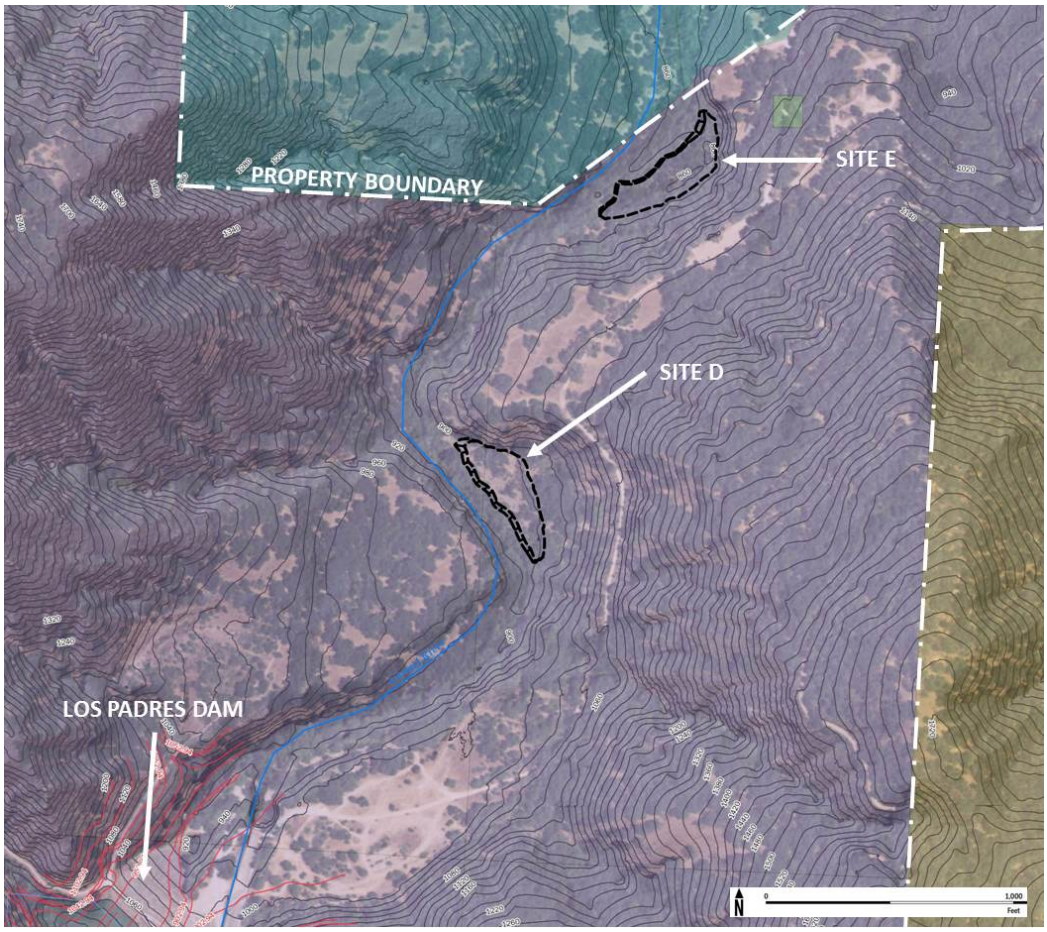

Figure 3-1 Downstream Flood-Accessible Sediment Placement Sites

Peak flood depths and average flow velocities for typical sections at Sites D and E for the estimated 2-year (1,500 cfs), 5-year (3,200 cfs), 10-year (4,500 cfs), 20-year (5,800 cfs), 50-year (7,600 cfs), and 100-year (8,900 cfs) events (as described in the Study Preparation TM, Section 2.6.3, Table 2-6, AECOM 2017a) were approximated using simple Manning's calculations. The slope of the river channel was estimated from the 2010 LiDAR at the two sections. A range of channel roughness values was used in the calculations, as follows:

- 0.045 – Clean, winding, some pools and shoals with some weeds and stones
- 0.07 – Sluggish reaches, weedy, deep pools

- 0.1 – “Floodplain” with heavy stand of timber, few down trees, little undergrowth, flow below branches

The results of the simple Manning’s calculations are summarized for Site D in Table 3-1 and for Site E in Table 3-2.

Table 3-1 Peak Flood Depth and Velocity for Various Flood Events at Site D

Manning's n	Event	2-year	5-year	10-year	20-year	50-year	100-year
	Flow (cfs) (AECOM 2017a)	1,500	3,200	4,500	5,800	7,600	8,900
	Channel Depth (feet)	13.5					
0.045	Flow normal depth (feet)	7.24	9.62	10.93	12.02	13.30	**14.11**
0.07		8.54	11.35	12.90	**14.19**	**15.70**	**16.66**
0.1		9.77	12.98	**14.74**	**16.22**	**17.95**	**19.04**
0.045	Average flow velocity in channel (feet/second)	10.30	12.45	13.56	14.44	15.45	16.08
0.07		7.39	8.94	9.73	10.37	11.09	11.54
0.1		5.66	6.84	7.45	7.94	8.49	8.83

Notes:
Gray shading indicates flood flows at which water depth is greater than the existing condition.
cfs = cubic feet per second

Table 3-2 Peak Flood Depth and Velocity for Various Flood Events at Site E

Manning's n	Event	2-year	5-year	10-year	20-year	50-year	100-year
	Flow (cfs) (AECOM 2017a)	1,500	3,200	4,500	5,800	7,600	8,900
	Channel Depth (yes)	8.5					
0.045	Flow normal depth (yes)	4.28	5.96	6.90	7.68	**8.60**	**9.18**
0.07		5.20	7.20	8.31	**9.23**	**10.32**	**11.01**
0.1		6.07	8.36	**9.63**	**10.69**	**11.93**	**12.72**
0.045	Average flow velocity in channel (feet/second)	8.49	10.30	11.23	11.98	12.82	13.34
0.07		6.11	7.41	8.07	8.61	9.21	9.58
0.1		4.68	5.67	6.18	6.59	7.05	7.34

Notes:
Gray shading indicates flood flows at which water depth is greater than the existing condition.
cfs = cubic feet per second

Tables 3-1 and 3-2 indicate that 10-year to 20-year flows are needed to fully access Sites D and E. Tables 3-1 and 3-2 also indicate that Sites D and E could be graded to be more accessible to smaller storms, perhaps as small as 5-year events. An estimated 36,000 CY of Zone 3 materials could be moved to Sites D and E every 10 years, assuming that the sites are regraded and that a 10-year event is able to remove all of the material placed at each site. During those same 10 years, an estimated 40,500 CY of Zone 3 material will have moved into the reservoir, resulting in a net input into the reservoir of about 4,500 CY. This sediment management option would likely be done in combination with Sediment Management Option 1 to at least maintain the current LPD storage. It is not anticipated that impacts due to flooding would be significantly impacted in the areas of Sites D and E if the material placed at each site were not able to be moved during flood events. The degree of flooding could be confirmed during future design phases.

Sediment Management Option 2 would require the same access road to the upstream end of the reservoir as required for Sediment Management Option 1. Access down to Sites D and E would be difficult to develop without construction of an access road in the river channel. One option could be to simply push Zone 3 material over the right bank from Nason Road to form debris slides that could be accessed by high flows.

In terms of relative cost, Option 2 would be low, given the smaller volumes that could be placed in Sites D and E. The relative cost assumes removal every 5 years on average, with the access road to the upstream end of the reservoir requiring rebuilding each time removal is performed. It is estimated that each periodic removal would require about 1 month to complete. Option 2 could be combined with Option 1.

3.3 Sluicing Tunnel (Option 3)

Option 3 would install a sluicing tunnel through either the right or left abutment that would be used to flush sediment from the reservoir during wet water years (Figure 3-2). Ideally, the flushing flows would be timed to coincide with high flows that are already carrying significant sediment loads, and would therefore represent an incremental increase in sediment load. Flushing would involve lowering the reservoir to allow flows to pass through the reservoir area as run-of-the-river flows that would erode and flush a significant amount of the accumulated sediment downstream. Based on simple calculations of uniform flow through a horseshoe-shaped tunnel, tunnel sizes of 12 feet, 13.5 feet, and 15 feet would be required to pass 5-year (3,200 cfs), 10-year (4,500 cfs), and 20-year (5,800 cfs) storm events. The sluicing tunnel gates would be closed after flows begin to decrease, allowing the reservoir to refill for the dry season. The size of sluice tunnel would ultimately be based on sediment transport analyses. Minimum required stream flow requirements could be met during refilling by making releases through the low-level outlet. Assuming that the majority of Zone 1 and Zone 2 sediment could be flushed, the resulting reservoir capacity would be about 2,600 AF. Refilling of the reservoir would require about 6.5 days, assuming average flows of 200 cfs.

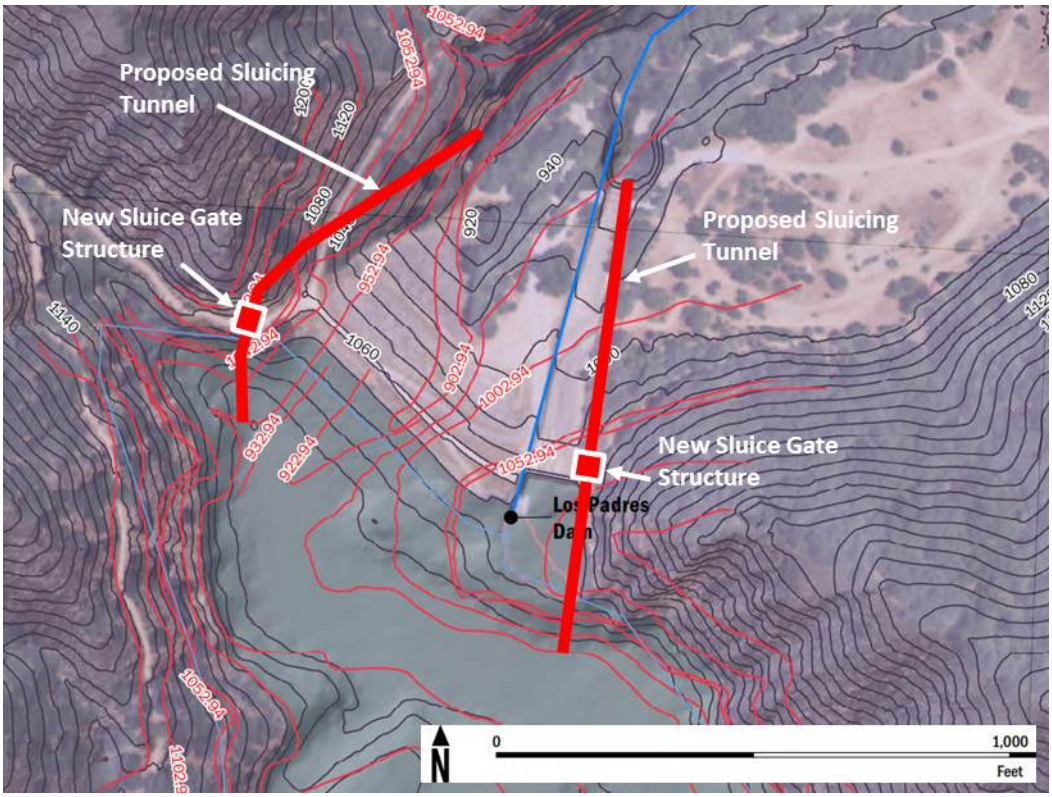

Figure 3-2 Sluicing Tunnel Locations

Assuming a minimum flushing flow of 1,000 cfs, the sluicing tunnel could have been operated 11 of the 15 years from 2002 through 2016, based on data obtained from the MPWMD gauge downstream of the LPD (AECOM 2017a). As shown on Figure 3-3, 6 of the 11 years had two or three events with peaks greater than 1,000 cfs. Operation of the sluicing tunnel would require forecasting of large storm events and protocols for opening the sluice gate, with respect to timing and rate of lowering of the reservoir.

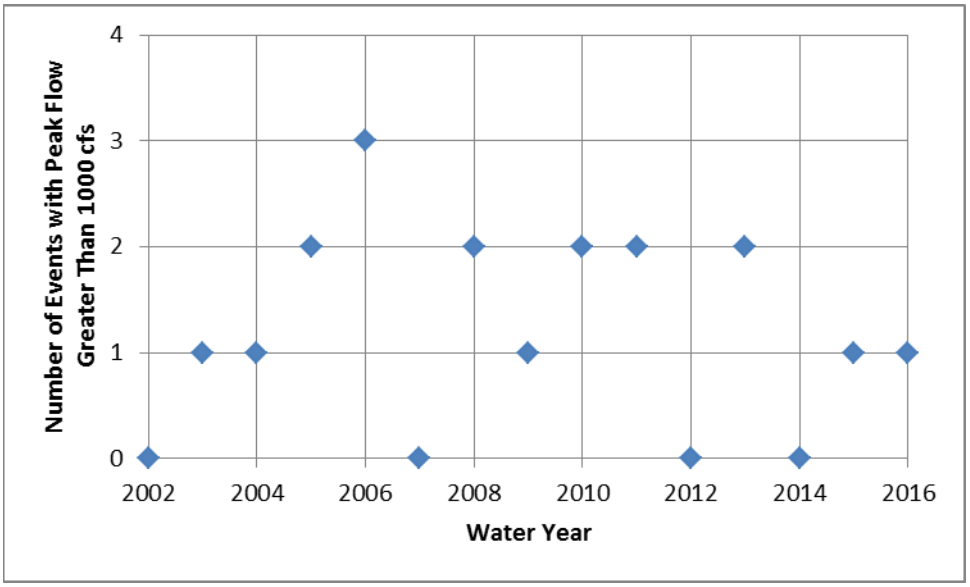

Figure 3-3 Flow Events Greater than 1,000 cfs at MPWMD Gauge below Los Padres Dam

In terms of relative cost, Option 3 would be low. Construction of the approximately 900-foot-long tunnel could occur over a 2-year construction period, with the first construction season being used to construct the sluice gate shaft and downstream portion of the tunnel. Completion of the upstream portion of the tunnel would occur during the dry season, when the reservoir could be emptied and Carmel River flows pumped around the dam. Excavation of the tunnel and shaft through granitic rock would likely use drilling and blast methods, with the excavated tunnel walls being temporarily supported by rock dowels. Rock excavated from the tunnel and shaft would be hauled and placed in one of the permanent disposal sites (Site B or Site C). Following excavation, the tunnel and shaft would be lined with reinforced concrete.

3.4 Bypass Tunnel (Option 4)

Option 4 would construct a bypass tunnel from the upstream end of the reservoir, extending downstream past LPD (Figure 3-4). The intent of the bypass tunnel would be to convey sand and finer sediment past the reservoir during high-flow events, when sediment transport is greatest. A settling basin just upstream of the intake would trap coarser sediment to prevent gravel, cobbles, and boulders from entering the tunnel and potentially being trapped in the tunnel. Access to the intake location would be required for construction and for periodic removal of gravel, cobbles, and boulders from the settling basin. The access road would include improving 3,200 lineal feet of existing unimproved road along the left side of the reservoir, and construction of an additional 6,600 lineal feet of new access road along the left side of the reservoir. The coarse sediment could be hauled to permanent disposal sites (Site B and Site C) or to Sites D and E along the river downstream of LPD, where it could be mobilized back into the river system during high flows.

The size and length of tunnel that would be needed to convey sediment past the dam would be significant and potentially cost-prohibitive. The length of tunnel would be on the order of 7,000 feet and would have a flatter slope (about 1.9 percent) than the sluicing tunnel. Based on simple calculations of uniform flow through a horseshoe-shaped tunnel, tunnel sizes of 13 feet, 15 feet, and 16.5 feet would be required to pass 5-year (3,200 cfs), 10-year (4,500 cfs), and 20-year (5,800 cfs) storm events. Sediment would be transported past the bypass tunnel into the reservoir during larger, less frequent storms. Bypass flows

would be timed to coincide with high flows that are already carrying significant sediment loads and would thus represent an incremental increase in sediment load. Assuming that one-third of the sediment might get past the bypass tunnel, 125 AF to 260 AF of reservoir capacity might be lost during the 60-year project life.

Based on characterization of the sediment in the reservoir (AECOM 2017b) an estimated 1,800 to 3,000 CY of gravel and larger-size particles could be trapped annually in the settling basin. Assuming that the settling basin was large enough to accommodate 15,000 CY, periodic cleanout of the settling basin would occur on average every 5 years. Periodic cleanout would require reconditioning the access road and excavation and hauling of the coarse material to either the permanent disposal sites (Sites B and C) or the in-river disposal sites (Sites D and E).

In terms of relative cost, Option 4 would be very high. Construction of Alternative 4d would require an estimated four construction seasons once design and permitting have been completed. Construction of the bypass tunnel and intake structure would likely require three construction seasons. Both the upstream and downstream portals would require cofferdams to separate the work from the active river channel. Construction from the downstream end could be performed year round; construction from the upstream end would be limited to the dry season, when the access road would be less likely to be impacted by higher flows in the river channel. Rock from the tunnel excavation would be hauled and placed in one of the permanent disposal sites (Site B or Site C). Excavation of the tunnel and shaft through primarily granitic rock would likely use drilling and blast methods, with the excavated tunnel walls being temporarily supported by rock dowels in areas of stronger rock, and steel sets in areas of weaker rock. Following excavation, the tunnel would be lined with reinforced concrete.

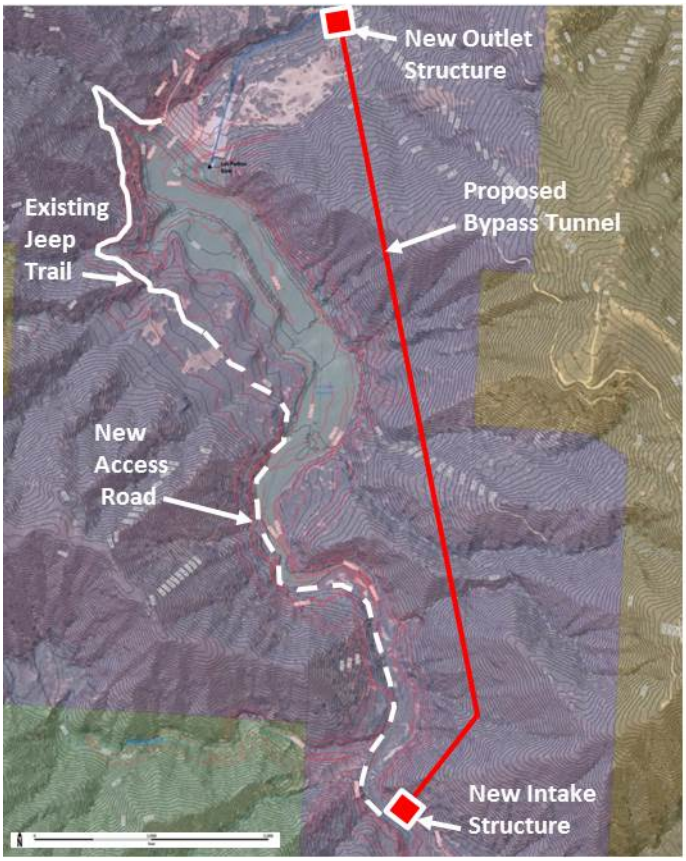

Figure 3-4 Bypass Tunnel Location

3.5 Combinations of Sediment Management Options

Some combination of sediment management options could include combining a sluicing tunnel for removing finer Zone 1 and Zone 2 sediment from the reservoir during flooding events, and mechanical removal of coarser sediment from upstream of the reservoir to downstream sites where those materials could be mobilized during large flow events.

3.6 Sediment Management Considerations

Considerations relevant to sediment management include:

1. Maintaining dam safety;
2. DSOD requirements for placement of sediment downstream of the dam, a sediment capture area, sediment sluicing, and bypass tunnel;
3. Sustainability;
4. Effect of fire/landslides in the watershed;
5. Beneficial effects on downstream aquatic habitat;
6. Harmful effects on steelhead; and
7. Effects on downstream channel geometry and flood elevations.

These considerations are described further in the following sections.

Maintaining Dam Safety

Sediment Management Options 1 and 2 would not impact the safety of LPD. Option 3, construction and operation of a sluicing tunnel, and Option 4, a bypass tunnel, would not have a direct effect on the safety of LPD.

Division of Safety of Dams Requirements

Sediment Management Options 1 and 2 are not likely to require DSOD design review and approval for construction. The sluicing tunnel described in Option 3 would be considered a modification of the existing LPD, and would require DSOD design review and approval for construction. Because the bypass tunnel (Option 4) would bypass the dam, there would not likely be any DSOD requirements for Option 4.

Sustainability

Sustainability in the context of these sediment management options refers to how frequently sediment management would be required. For Option 1, a reasonable estimate would be that sediment removal would occur every 5 years. Every 5 years, an estimated 60,750 CY of Zone 2 and Zone 3 sediment would accumulate in the reservoir. Removal of this volume of sediment would require about 2 to 3 months, assuming a production rate of about 1,500 CY per day. Option 2 would be similar, but a smaller volume of sediment would be removed each time. Based on the water years between 2002 and 2016, Option 3 could potentially be operated on average every 2 years to flush sediment from the reservoir. Option 4 may be less effective, given a lesser capacity to transport sediment and the potential for sediment to pass the bypass tunnel inlet and be transported into the reservoir.

Effect of Fire/Landslides in the Watershed

Option 3, the sluicing tunnel, would provide an effective means of managing sediment resulting from fire or landslides in the watershed. In decreasing order of effectiveness, Options 1, 2, and then 4 would also provide some ability to manage sediment associated with future fires or landslides that may occur in the LPD watershed.

Beneficial Effects on Downstream Aquatic Habitat

Beneficial effects on downstream aquatic habitat could include habitat effects that may occur as a result of restoring a more natural sediment load. Of the sediment management options described above, Option 2 is the only one that specifically describes placement of coarse sediment downstream of LPD at a location where it could be captured by the river and transported downstream to improve habitat conditions. Transport of fine sediment downstream, as is described for Options 3 and 4, is not expected to markedly improve downstream aquatic habitat, and could have short-term deleterious effects on

steelhead. Generally, any option that restores the transport of coarse sediment downstream of LPD would be expected to improve habitat conditions.

Harmful Effects on Steelhead

Harmful effects on steelhead, in the context of the sediment management options described above, could include an increase in bedload and suspended sediment beyond what would be expected to occur naturally. This could occur with any sediment management option that moves accumulated sediment (as opposed to the naturally occurring sediment load) downstream of LPD. Effects during operations could include entrainment in bypass or sluice tunnels, reduced ability to encounter prey, injury or mortality during periods of increased suspended sediment, and burial of redds by pulses of sediment.

Effects on Downstream Channel Geometry and Flood Elevations

Option 1 would result in no change to the sediment regime over existing conditions, and the downstream channel geometry would be similar to current conditions.

Option 2 would introduce coarse sediment downstream of the dam during high-flow events. The addition of coarse sediment would return sediment to starved reaches and eventually increase coarse sediment supplies further downstream. Depending on the quantity of excavated sediment that is placed at the disposal sites and then mobilized by high flows, the magnitude of effects would vary. With the largest amounts of sediment reintroduced, the response of the channel is expected to be similar to that experienced under Alternative 2 (dam removal).

Option 3 would sluice sediment from the reservoir. During the initial sluicing events, the majority of sluiced sediment would be fine sediment from the lower reservoir. The increased fine sediment is expected to have little effect on the channel thalweg elevation downstream, because fine sediment tends to stay suspended throughout the river to the ocean. Depending on how the sluicing is managed, the amount of coarse sediment moving downstream would vary. If the intent is to restore reservoir capacity, the sluicing could be managed to only mobilize the fine sediment and maintain the coarse sediment in place, to prevent it from moving further into the reservoir and displacing capacity. This management approach would not increase coarse sediment supply downstream and would have little effect on the active channel geometry. If the intent is to mobilize coarse sediment as well, to restore sediment supplies downstream, then the channel downstream would see an increase in coarse sediment supply and its response would be similar to that experienced under Option 2 and Alternative 2.

Option 4 would bypass mobilized sand and fine sediment around the reservoir during high-flow events and introduce them to the downstream river reaches. The amount of fine sediment from upstream is expected to be similar to the amount of fine sediment currently discharged via the spillway, so there would be no effects on the downstream channel from fine sediment. Sands likely will enter the bypass tunnel at higher concentrations than what currently discharges via the spillway during high-flow events. This would increase the amount of sand entering the reach downstream and would lead to an accumulation of sand in reaches downstream.

4. Summary

Table 4-1 is a summary of the draft LPD and LPR alternatives and sediment management options. The summary includes the relative cost; the estimated reservoir capacity 60 years from the present; and the assumptions made regarding durations for design and permitting, construction, and operation for the 60-year planning period.

EXHIBIT 2-C

Table 4-1 Summary of Draft Los Padres Dam and Reservoir Alternatives and Sediment Management Options

Alternative/ Option	Description	Relative Cost [a, b]	Storage Capacity in 60 Years (AF)		60-Year Implementation [c]		
			Low Sedimentation Rate (7.53 AFY)	High Sedimentation Rate (15.86 AFY)			
1a	No Sediment Management	Very Low	1,150	650	–	–	O 60-year
2a + 3a	Full Dam Removal + Dredge Zone 1 and Zone 2	High	0	0	D&P 5-year	C 7-year	O 48-year
2a + SM-3	Full Dam Removal + Sluicing Tunnel	Moderate	0	0	D&P 5-year	C 5-year	O 50-year
2b + SM-3	Partial Dam Removal + Sluicing Tunnel	Moderate	0	0	D&P 5-year	C 5-year	O 50-year
3a	Dredge and Place on Cal-Am Property	High	2,300	1,900	D&P 3-year	C 6-year	O 51-year
3b	Dredge and Place off Cal-Am Property	not practicable					
4a	Raise LPD	Moderate	1,700	1,400	D&P 5-year	C 2-year	O 53-year
4b	Rubber Dam in LPD Spillway	Low	1,700	1,400	D&P 5-year	C 1-year	O 54-year
4c (RCC)	New 7.5 TAF RCC Dam Downstream of LPD	High	7,100	6,600	D&P 5-year	C 4-year	O 51-year
4c (Emb)	New 7.5 TAF Embankment Dam Downstream of LPD	Very High	7,100	6,600	D&P 5-year	C 5-year	O 50-year
4c (RCC)	New 3.0 TAF RCC Dam Downstream of LPD	Moderate	2,500	2,000	D&P 5-year	C 3-year	O 52-year
4c (Emb)	New 3.0 TAF Embankment Dam Downstream of LPD	High	2,500	2,000	D&P 5-year	C 4-year	O 51-year
4d	Combo 4c + 4a or 4b	Moderate	2,100	1,600	D&P 5-year	C 3-year	O 52-year
SM-1 [d]	Periodic Sediment Removal to Offsite Disposal Site	Moderate	1,600	1,100	D&P 3-year	C 5-year	O 57-year
SM-2 [e]	Periodic Sediment Removal and Placement Downstream	Very Low	1,200	700	D&P 3-year	C 5-year	O 57-year
SM-3 [f]	Sluicing Tunnel	Low	1,800	1,800	D&P 5-year	C 2-year	O 53-year
SM-4 [g]	Bypass Tunnel	Very High	1,400	1,200	D&P 5-year	C 4-year	O 51-year

Notes:

[a] Relative cost does not include implementation of fish passage improvements.
[b] Very Low ($0 to $10M), Low ($10M to $30M), Medium ($30M to $70M), High ($70M to $150M), Very High (>$150M)
[c] D&P (Design and Permitting), C (Construction), O (Operation)
[d] Assumes removal of 7.53 AFY average.
[e] Assumes removal of 1.11 AFY average.
[f] Assumes that stable sediment bed plane through reservoir will occupy one-third of original storage capacity.
[g] Assumes one-third of average annual sediment will pass by intake structure and deposit in reservoir.

AF = acre-feet, TAF = thousand acre-feet, AFY = acre-feet per year
LPD = Los Padres Dam
RCC = roller-compacted concrete
SM = sediment management

5. Limitations

AECOM represents that our services were conducted in a manner consistent with the standard of care ordinarily applied as the state of practice in the profession, within the limits prescribed by our client. No other warranties, either expressed or implied, are included or intended in this technical memorandum.

Background information, design bases, and other data have been furnished to AECOM by MPWMD and/or third parties, which AECOM has used in preparing this technical memorandum. AECOM has relied on this information as furnished, and is neither responsible for nor has confirmed the accuracy of this information.

The analyses and results presented in this report are for the current study only and should not be extended or used for any other purposes.

6. References

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EXHIBIT 2-C

EXHIBIT 2-D

Memorandum of Agreement

THIS Memorandum of Agreement is made by and between California-American Water Company ("CAW"), the U.S. Department of Commerce, National Marine Fisheries Service ("NMFS"), and the California State Coastal Conservancy ("the Conservancy"). Throughout this Memorandum of Agreement, CAW, NMFS and the Conservancy are collectively referred to as the "Parties."

RECITALS

I. Introduction

A. CAW is the owner and operator of the public drinking water system for the Monterey Peninsula, which serves approximately 40,000 customers. CAW is regulated by the California Public Utilities Commission ("CPUC") and is mandated by California law to serve potable water to its customers and to comply with federal and state safe drinking water laws and regulations, as well as the federal Endangered Species Act, 16 U.S.C. § 1531, *et seq*. (the "ESA"). A major source of CAW's water supply is diversions from the Carmel Valley Aquifer. CAW is currently working to develop an alternative long-term water supply to replace a significant portion of that water supply.

B. NMFS, part of the National Oceanic and Atmospheric Agency ("NOAA") is the federal agency that listed the naturally-spawned populations of South-Central California Coast Steelhead Distinct Population Segment ("SCCC steelhead") as threatened under the ESA and that oversees protection, conservation and recovery of the SCCC steelhead.

C. The Conservancy is a California State agency established to protect and improve natural lands and waterways.

D. The Parties have a mutual interest in promoting the conservation and recovery of SCCC steelhead.

E. In 2016 the State Water Resources Control Board ("SWRCB") issued an amended order ("Amended CDO"), described below, requiring CAW to take certain measures to promote and conserve steelhead and to eliminate unauthorized diversions of water from the Carmel River by December 31, 2021. CAW is also party to a 2009 Settlement Agreement, as amended ("Settlement Agreement") with NOAA, described below, and a 2001 Conservation Agreement ("Conservation Agreement") with NMFS, described below, requiring CAW to take certain measures for the benefit of the SCCC steelhead. CAW and NMFS also have an agreement ("ASR Agreement") with California Department of Fish and Wildlife ("CDFW") and the Monterey Peninsula Water Management District ("MPWMD") establishing protocols for recovery of water from groundwater storage during the recovery season (June 1 through November 30).

F. The Parties acknowledge that CAW has completed some of the measures required in the Conservation and Settlement Agreements. In addition, CAW asserts that, as part of an overall effort to protect and enhance SCCC steelhead, CAW and its customers have paid for additional steelhead mitigation measures for many years. Some of these measures, implemented by the MPWMD, include annual fish rescues, the construction, maintenance, renovation, and operation of a rearing facility to hold rescued steelhead, monitoring of and improvements to the instream and riparian habitat, improvements to the Carmel River Lagoon, and monitoring fish numbers during migration, and have cost CAW's ratepayers over $28M to date. CAW also asserts that it has funded a number of other fishery restoration activities, including funding a forbearance agreement with the Trust for Public Land to add approximately 300 afa to the Carmel River over the next three years, part of a larger effort to convert the Rancho Cañada golf course to riparian habitat; helping to fund the removal of the San Clemente Dam, part of the Carmel River Reroute and San Clemente Dam Removal ("CRRDR") Project; facilitating a third-party water right change petition resulting in the dedication of water to instream flows as part of the Carmel River Floodplain Restoration and Environmental Enhancement Project; and development of a program to acquire and cause the dedication of new water sources and/or water rights to offset CAW's unauthorized diversions from the Carmel River and increase instream flows, all at a cost to CAW's ratepayers. And, beginning in early 2009, CAW worked with a stakeholder group comprised of NMFS, CDFW, and MPWMD to evaluate alternatives and reach a consensus on fish passage improvements at Los Padres Dam (LPD). The Los Padres Dam Fish Passage project, including a floating weir surface collector and bypass conduit system, was identified as the preferred downstream fish passage alternative, allowing juvenile and adult steelhead to migrate downstream past LPD. Project components include a behavioral guidance system, floating weir surface collector, fish bypass conduit, bypass access portals, and bypass outfall. CAW placed the facility into service in March 2016 at a cost of about $5 million.

G. The Parties also acknowledge that some of the work required under the two Agreements with NOAA and NMFS has not been fully completed and/or is ongoing. In addition, the Amended CDO requires CAW to undertake actions to eliminate unauthorized diversions from the Carmel River and to terminate all unauthorized diversions from the river no later than December 31, 2021, and to take certain actions that benefit SCCC steelhead in the interim.

H. The Parties agree that additional measures pending completion of the remaining work under the Amended CDO, the Conservation Agreement, and the Settlement Agreement, would facilitate improvements to SCCC steelhead and their Carmel River habitat. NMFS believes that the impacts of LPD are among the challenges to improving their habitat, and that a clear passage channel is critical for upstream and downstream migration of steelhead through the sediment delta. In addition, LPD traps sediment, and may at times have contributed to a starved river condition downstream of LPD, lacking spawning gravels for steelhead and other sized sediment for food production.

I. The Parties also agree that, prior to implementing such additional measures, one or more studies are necessary to identify and guide the selection of appropriate and feasible interim and longer-term measures, and that studies currently being carried out by third parties, including MPWMD, may assist in this process. This Memorandum of Agreement therefore sets forth a process and schedules for carrying out such studies and for the implementation of certain interim measures. The Parties agree to address longer term additional measures as guided by the studies contemplated in this Memorandum of Agreement within a process and timetable geared toward resolving long term issues with respect to CAW's pumping operations, water withdrawals from the Carmel River and remaining operations. Adherence to the process set forth herein for carrying out the studies and implementing interim measures and the framework and timetable to resolve longer term issues shall demonstrate both commitment and good faith progress toward reaching the long term objectives of the Parties identified in Paragraph L, below.

J. The Parties recognize that implementation of the measures contemplated by this Memorandum of Agreement may involve other parties, and may require permits and/or authorizations from other regulatory agencies.

K. Accordingly, the Parties are entering into this Memorandum of Agreement to extend the terms of the Conservation Agreement and Settlement Agreement and implement new terms related to CAW's operations. The Parties also enter into this Memorandum of Agreement to ensure the long-term cooperation between the Parties to achieve the goals set forth in this agreement, which reflect the goals stated in the Conservation and Settlement Agreements.

L. The goals and objectives of this Memorandum of Agreement are as follows:

1. NMFS' goal and objective is to protect and conserve SCCC steelhead in the Carmel River, including maximizing the Carmel River Basin's substantial contribution toward recovering SCCC steelhead and enforcing the ESA.

2. CAW's goal and objective is to supply water in accordance with its CPUC Certificate in a manner that complies with the ESA and other regulatory obligations under state and federal law.

3. The Conservancy's goal is to restore and enhance coastal resources and coastal watersheds, consistent with Division 21 of the Public Resources Code, including by funding projects that restore and enhance habitat for SCCC steelhead, and/or otherwise aid in the recovery of SCCC steelhead in the Carmel River Watershed.

II. State Water Resources Control Board Orders

A. CAW's operations on the Carmel River are regulated by a number of agencies pursuant to certain orders and agreements. In 1995, the SWRCB issued Order No. WR 95-10 ("Order 95-10"), mandating that CAW find an alternative supply

for unauthorized diversions of water from the Carmel River and, pending the implementation of an alternative water supply, limit its diversions from the Carmel Valley to 11,284.8 acre-feet ("AF"). Order 95-10 was amended in 2002 to incorporate certain provisions of the Conservation Agreement (described below) relating to additional limitations on CAW's diversions at San Clemente Dam and upstream wells during low flow periods. CAW's operation of Los Padres Dam is controlled by an annual agreement among CAW, MPWMD and CDFW.

B. In 2009, the SWRCB issued Order WR 2009-0060, the Cease and Desist Order ("CDO"), finding that CAW had failed to fully comply with the requirements of Order 95-10, and was in violation of California Water Code Section 1052 from its unauthorized water diversions on the Carmel River. The CDO mandated, among other things, that CAW: a) shall diligently implement actions to eliminate unauthorized diversions from the Carmel River and terminate all unauthorized diversions by December 31, 2016; b) shall not divert water from the Carmel River for new service connections or for any increased use of water at existing service addresses resulting from a change in zoning or use; and, c) shall reduce water diversions by 5% (549 acre-feet per annum [afa]) beginning in October 2009, and increase reductions by an additional 121 afa (cumulative) beginning in October 2011.

C. In 2016, at CAW's request, the SWRCB issued Order WR 2016-0016, amending in part the CDO ("Amended CDO"). The Amended CDO found that CAW would not terminate its unauthorized diversions by December 31, 2016 because a planned regional desalination plant would not be constructed by that date, and identified instead CAW's plans for the Monterey Peninsula Water Supply Project ("MPWSP"), which included an alternate desalination plant, a water recycling plant, and expansion of facilities for groundwater storage, projects that are undergoing review by permitting agencies and that are anticipated to become operational before December 31, 2021. The Amended CDO, among other things, mandates that CAW terminate all unauthorized diversions by December 31, 2021, establishes interim milestones for the projects identified by CAW, and provides that CAW may withdraw 8,310 afa from the Carmel River beginning October 1, 2015 through December 31, 2021 (with certain exceptions and adjustments as provided in the Amended CDO), with specified reductions to that amount each time a milestone is not met.

D. The Amended CDO also requires that CAW provide annual funding in the amount of up to $175,000 for preparation of an annual report evaluating the status of the threatened South-Central California Coast Steelhead Distinct Population Segment ("SCCC Steelhead DPS"), to be prepared if possible by NMFS Southwest Fisheries Science Center ("SWSFC") and, if not possible, for CAW to designate another entity with the requisite expertise that NMFS finds acceptable. If a SWFSC annual report indicates a significant change in the status of the SCCC Steelhead DPS since the previous report, NMFS may provide recommendations

for additional adaptive management measures to be taken with respect to the SCCC Steelhead DPS in the Carmel River.

E. The Amended CDO notes that CAW has indicated that it will implement an additional $2.5 million of projects to improve fish habitat during the four years following adoption of the Amended CDO, including a) improvements to the existing upstream fish passage ladder and trap at Los Padres Dam ($0.2 million), installation of a fish screen at the inlet pipe in Los Padres Reservoir ($0.8 million), a pit tagging program ($1.0 million); and a through- reservoir study for Los Padres Reservoir ($0.5 million). The Amended CDO provides that if these projects are not implemented according to the plans developed by CAW and NMFS, the SWRCB may revisit the Amended CDO.

F. Subsequent to the issuance of the Amended CDO, NMFS became aware that installation of a fish screen at the inlet pipe may not provide the benefits initially sought and that installation done at certain times of the year or in a certain manner may result in greater harm to the SCCC Steelhead DPS. NMFS has concluded that CAW should conduct or fund a study to determine the benefits of fish screen installation, before risking possible harm to the steelhead. This study could be conducted as part of ongoing studies.

III. 2001 Conservation Agreement

A. On September 18, 2001, NMFS and CAW entered into the Conservation Agreement which required CAW to implement certain measures, categorized as Tier I, II and III, to reduce the impact of its operations in the Carmel River on steelhead and their habitat. As described below, CAW has implemented many but not all of the measures.

B. The Conservation Agreement contained three tiers of activities. Tier I included short- and mid-term (Phase I and II) actions designed to conserve steelhead in the Carmel River. Tier II described the process to be followed to address the California Division of Safety of Dams' ("DSOD") issues with San Clemente Dam and other mid-term measures designed to conserve steelhead in the Carmel River. Tier III described the process to be followed to address the long-term implementation of actions designed to meet the goals identified by NMFS and CAW in the Conservation Agreement.

C. Since September 2001, CAW has implemented all of the measures set forth in Phase I of Tier I of the Conservation Agreement. These measures include ceasing surface water diversions at San Clemente Dam during low flow periods, ceasing diversions from the Upper Carmel Valley Wells during low flow periods, and installing a booster station to move water from the lower Carmel Valley to the Upper Carmel Valley.

D. Phase II of Tier I of the Conservation Agreement required CAW to maintain a continuous surface flow in the Carmel River as far downstream as possible in

AQ3 (a defined area of the Carmel Valley Aquifer) by offsetting CAW water diversions in upstream sections of AQ3 with expanded diversion capability in AQ4, in the lowermost reaches of AQ3, and the Seaside Basin aquifer storage and recovery ("ASR") expansion. Phase II required CAW to increase well capacity downstream of and including the San Carlos Well by 3.0 to 5.0 cfs. CAW retrofitted the Rancho Cañada Well and increased its capacity initially by 140%. The reconditioned well was put into service on March 31, 2003. At about the same time, the California Department of Health Services opined that extractions from the nearby San Carlos Well constitute groundwater under the influence of surface water. The San Carlos Well was therefore taken out of service, as there is no means of providing surface water treatment at that location. This resulted in no net gain in pumping capacity in the lower aquifer.

E. The next step in Phase II of Tier I of the Conservation Agreement was to be the installation of a new well in the lower Carmel Valley aquifer. Studies showed that any new well in the lower Carmel Valley would likely require surface water treatment and construction of a surface water treatment plant, which was estimated to cost approximately $5.5 million. In light of CAW's need to focus its financial and personnel resources on a long-term water supply project, rather than those interim measures in the Carmel River, the Parties agreed that proceeding with the measures set forth in Phase II of Tier I would not be financially prudent.

IV. 2009 Settlement Agreement

A. On March 3, 2009, NOAA, CAW, and CDFW entered into the Settlement Agreement that required CAW to continue its implementation of the Tier I measures set forth in the Conservation Agreement. The Settlement Agreement also provided as new Tier I Phase II Activities that CAW make annual payments totaling $11,200,000 to CDFW for mitigation projects to address the impacts of CAW's well-pumping and water withdrawals on the Carmel River ("New Tier I Phase II Activities"). For Tier III, CAW identified the Coastal Water Project ("CWP") as its proposed project for a long-term water supply, and committed to diligently pursue the environmental review and required permits to design, build and operate the CWP. On June 30, 2014, the Settlement Agreement was amended to include the Conservancy as a party for receipt, custody and control of the payments due under the Settlement Agreement.

B. Paragraph VIII (A) of the 2009 Settlement Agreement noted that the Settlement Agreement does not address NOAA's ESA concerns with respect to any of CAW's operations other than well-pumping and water withdrawals from the Carmel River watershed. CAW and NOAA agreed to negotiate in good faith, and using their best efforts, to reach an agreement addressing NOAA's ESA concerns regarding CAW's "remaining operations" that were not covered by the 2009 Settlement Agreement.

C. Under the 2009 Settlement Agreement (as amended), CAW has paid $11,200,000 to fund New Tier I Phase II Activities. Moreover, CAW is currently meeting or has met all conditions of Tier I Phase I of the Conservation Agreement.

D. As identified in the Amended CDO, the CWP and its proposed alternative, the Regional Desalination Plant, were not able to be constructed. CAW has identified as an alternative the MPWSP as its proposed project for a long-term water supply.

AGREEMENT:

NOW, THEREFORE, the Parties hereby agree to the following set of activities for CAW to operate over the next five years

I. Continuation of Tier I Phase I Activities:

Throughout the term of this Memorandum of Agreement, CAW shall continue to implement all of the measures described in Phase I of Tier I of the Conservation Agreement.

II. Additional Funding for New Tier I Phase II Activities:

A. In order to minimize effects resulting from its ongoing water operations, including ongoing water diversions, CAW agrees to pay a total of Five Million Five Hundred Thousand Dollars ($5,500,000.00) over a period of five (5) years in consecutive annual payments of One Million One Hundred Thousand Dollars ($1,100,000.00) per year, as specified in Table 1 of this Memorandum of Agreement, which is attached hereto and is part of this Memorandum of Agreement, for New Tier I Phase II Activities as described in the 2009 Settlement Agreement. Each annual payment shall be due and payable on or before July 1. These payments are in addition to any expenditures required by Paragraphs 4 and 5 of the Amended CDO for the annual report on the status of SCCC Steelhead and other conservation projects.

B. All payments CAW makes under this Memorandum of Agreement shall be used to fund projects to improve habitat conditions for, and production of, SCCC steelhead, including adaptive management of habitat at the former San Clemente Dam site, and/or otherwise aid in the recovery of SCCC steelhead in the Carmel River Watershed (collectively, "projects"). No funds shall be expended for activities or projects that are the responsibility of CAW to complete under this Memorandum of Agreement or any other municipal, state or federal action.

C. Subject to any required approvals by the California Department of Finance, the Conservancy shall deposit all funds received pursuant to this Memorandum of Agreement into the Coastal Trust Fund. All future payments CAW makes under this Memorandum of Agreement shall be made to the Conservancy in accordance with procedures specified by the Conservancy for transfer of the funds. CAW shall notify all Parties each time a payment is made under the Memorandum of Agreement. The Conservancy shall have custody and control of the payments until they are expended pursuant to this Memorandum of Agreement. The Conservancy shall maintain records of its management of CAW's payments and shall provide annual accounting reports to NMFS and CAW on or before September 30 of each year, regarding the management and expenditure of the funds, until such time as all funds have been

expended. Within 60 days of the expiration of this Memorandum of Agreement pursuant to Section IX(A) below, the Conservancy shall prepare a final accounting report to NMFS and CAW. The Conservancy shall ensure that all payments are expended for the benefit of SCCC steelhead in accordance with the purposes described in Section II(B) of this Memorandum of Agreement, but will use 10% of each payment to administer, manage and monitor the funds and the projects described in Section II(B). When expending the payments for projects pursuant to Section II(B), the Conservancy shall seek to maximize the value of the funds by seeking cash or in-kind matching contributions from fund recipients or non-State, third party project partners whenever possible.

D. The Conservancy shall consult with NMFS and CAW, as it deems necessary, or as may be required by statute or regulation, to resolve any questions it may have concerning projects to be funded with the money paid by CAW pursuant to Section II(A), including any technical questions it may have.

E. The Parties recognize that any activity on or near the Carmel River can have potentially adverse effects on CAW's ability to serve potable water safe for public consumption. The Conservancy will not fund any projects that will adversely affect CAW's mandate under California law to serve potable water to its customers and to comply with federal and state safe drinking water laws and regulations.

F. Any failure by CAW to make any payment required by this Memorandum of Agreement within the time period this Memorandum of Agreement specifies shall constitute a breach of this Memorandum of Agreement. In the event of a breach, the Conservancy shall notify NMFS and NMFS shall give CAW written notice of the breach by registered mail and demand that CAW make payment within ten (10) business days of receipt of such notice by CAW.

III. Tier III Activities:

CAW has identified the MPWSP as its proposed project for a long-term water supply to replace unauthorized diversions from the Carmel Valley Aquifer and to reduce reliance upon and protect against overdraft of the Seaside Groundwater Basin. CAW will continue to diligently pursue the environmental review and required permits to design, build and operate the MPWSP. The current schedule contemplates having the MPWSP in full operation by 2021 at the earliest. The Parties recognize that the MPWSP will require extensive environmental review and permits from many federal, state and local agencies over which CAW has no control. CAW will keep NMFS informed of the MPWSP's schedule, progress, potential delays and the reasons therefore. Pending completion of the MPWSP, in order to minimize the effects resulting from its ongoing water operations including ongoing water diversions, CAW will comply with the new Tier I Phase II activities outlined in Paragraph II.A. and will comply with the obligations identified in Paragraph IV.

IV. Activities Related to CAW Remaining Operations

Paragraph VIII (A) of the Settlement Agreement noted that the Settlement Agreement does not address NOAA's ESA concerns with respect to CAW's operations other than well-pumping and water withdrawals from the Carmel River watershed, and requires the Parties to negotiate in good faith, and using their best efforts, to reach an agreement addressing NOAA's ESA concerns regarding CAW's "remaining operations." This Section addresses ESA concerns identified in the 2009 Agreement and additional NMFS' ESA concerns. For purposes of this Memorandum of Agreement, the "remaining operations" of CAW are limited to: Operation and maintenance of Los Padres Dam; Management of water diversions from the Carmel River; General maintenance and drainage of CAW managed roads; and, planning for long term legal authorization for possible future incidental takes of SCCC steelhead (collectively, the "Remaining Operations").

A. CAW's Obligations with Respect to Operation, Maintenance and Potential Removal of Los Padres Dam

Los Padres Dam ("LPD") is a 148-foot high earth fill dam on the Carmel River located at river mile 24.8 built in 1948. The original storage capacity behind LPD was 3,030 acre-feet. Current storage is approximately 1,731 acre-feet. There is a fish ladder just downstream of the dam that extends from the Carmel River to a tank located about 100 feet up the left bank (facing downstream). Fish that swim into the ladder enter the tank and are held there until CAW operators transfer them to a truck and deliver them to a release site near the reservoir upstream of the LPD. CAW currently possesses an appropriative right to divert water to storage in the Los Padres Reservoir from October 1 to May 31 under License 11866, whose face amount is 3,030 afa. Subject to certain conditions, License 11866 also requires the licensee to maintain a flow of not less than five cubic feet per second in the channel of the Carmel River directly below the outlet structure of LPD.

NMFS believes that removing LPD would provide sufficient access to the upper watershed for spawning and rearing of steelhead, and that removal of LPD would alleviate the need for any additional mitigation/take coverage for impacts to steelhead from CAW's operations at LPD. However, the water stored behind LPD is currently used each year to maintain flows as far downstream as possible during the summer rearing season for juvenile steelhead. Removal of LPD should not occur, if at all, until the impacts of removal on the river system are assessed and alternative water sources are in place to ensure stored water is not needed during the low flow season. Additionally, prior to removal of LPD, CAW must receive approval from the SWRCB for a change in method and place of diversion under License 11866 such that CAW's diversion rights are fully protected. The Parties agree that SWRCB approval of such a water rights change petition is a condition precedent to removal of LPD.

While LPD remains in place, NMFS believes that measures to ensure safe unimpeded passage over or past the dam are critical for upstream and downstream steelhead migration.

1. Study Evaluating Feasibility of Removal of LPD

a. By June 30, 2019, CAW will complete a study ("LPD Feasibility Study") to evaluate the feasibility of removal of the LPD dam. The Parties agree that the LPD Feasibility Study must include analysis of the loss of water storage for summer flows and the benefits of access to the upper watershed if LPD is removed. The LPD Feasibility Study must also evaluate options for permanent unimpeded upstream and downstream passage and management of sediment if LPD is left in place. In addition, the LPD Feasibility Study should include an analysis of technical, environmental, economic and permitting issues, and an analysis of any impact on CAW's water rights, including an assessment of whether SWRCB approval may be obtained for a change to CAW's permitted diversions to storage at Los Padres Reservoir.

b. To assist in preparing the LPD Feasibility Study, CAW may rely on ongoing studies for which CAW has provided $1.0 million in funding to MPWMD for certain studies concerning the fate of LPD ("MPWMD Studies"). As of the date of this Memorandum of Agreement, MPWMD anticipates completion of the MPWMD Studies by the end of 2018. CAW and NMFS agree to meet by June 30, 2018 to discuss the status of the MPWMD Studies, to determine what, if any, additional studies by CAW may reasonably be necessary for completion of the LPD Feasibility Study. If CAW and NMFS agree that additional studies are necessary, they may agree on an extended deadline for completion of the LPD Feasibility Study.

The MPWMD Studies include the following individual component studies:

i) LPD Fish Passage Feasibility Study: MPWMD and CAW are facilitating a study of volitional and other fish passage improvements to help inform the long-term management of LPD and the decision of whether to introduce improvements that would allow upstream volitional passage or improve the existing trap and transport program. Potential volitional fish passage alternatives will be identified and evaluated concurrently with the existing trap and transport program, and at least one upstream volitional alternative will be carried throughout the study. The study will consider technical feasibility (including both engineering feasibility and fish passage feasibility), biological feasibility, and economic feasibility (including financial feasibility and a cost effectiveness analysis), and will evaluate whether upstream passage facilities can also act in the downstream direction to provide enhanced opportunities for downstream migration. MPWMD anticipates that a draft fish passage feasibility report would be completed by the end of 2017.

ii) Los Padres Dam and Reservoir Alternatives and Sediment Management Study: MPWMD and CAW are facilitating a study to evaluate the effects of five alternatives to address sediment at LPD: (1) a no action alternative; (2) dam removal; (3) dredging reservoir sediments; (4) reservoir storage

expansion; and (5) sediment management (evaluating alternatives that would result in a sustaining long-term surface storage while minimizing downstream impacts on aquatic habitat). MPWMD anticipates a completion date in the second quarter of 2018, but completion could be delayed if permits are required from the Army Corps of Engineers and/or CDFW. In addition to the meeting to occur prior to June 30, 2018 identified in Section IV.A.1.b, above, to discuss the status of all of the studies, CAW and NMFS agree to meet by March 31, 2018, to discuss the status of this Sediment Management Study, to determine whether additional studies on interim sediment removal by CAW are necessary to complete the Sediment Management Study, and, if additional studies are needed, to determine a reasonable deadline for completion of those studies.

iii) Carmel River Basin Hydrologic Model: MPWMD is facilitating preparation of a hydrologic model to address freshwater availability in the Carmel River watershed, document water storage capabilities of surface water storage facilities and storage in the aquifer system, and refine and develop surface water/groundwater models to help better understand the aquifer system. The model will be used to estimate daily water availability in the Carmel River with various current and future demands, operational changes, and water supply alternatives scenarios. U.S. Geological Survey has agreed to calibrate the model and is expected to complete work in the spring of 2017. MPWMD anticipates a study completion date in the fourth quarter of 2017.

iv) Instream Flow Incremental Method Study of the Carmel River: MPWMD is facilitating preparation of an instream flow assessment for the Carmel River to support a variety of studies and efforts in connection with managing the Carmel River lagoon, evaluating options for the future of LPD, and evaluating operational changes due to proposed water supply projects that replace Carmel River diversions. Habitat typing was completed in 2015 and transects were selected in cooperation with CDFW in early 2016. Flow measurements were completed in 2016 and a 2-D daily time step hydraulic model to simulate passage in critical riffles in the lower river has been calibrated. Big Sur River habitat suitability criteria were validated for use in a 1-D daily time step habitat simulation model for the middle and upper portions of the river. MPWMD anticipates completion of the study in the second quarter of 2017.

Once the individual MPWMD studies are completed, MPWMD plans to consolidate the results to determine feasible options for LPD. MPWMD anticipates completing its studies of LPD alternatives by the end of 2018.

c. Within three months after completion of the LPD Feasibility Study, CAW and NMFS agree to meet to discuss the results of the LPD Feasibility Study. The parties may also determine that additional studies are needed, and a schedule for completion of additional studies will be developed at that time. Representatives from MPWMD and CDFW may also participate in the meeting and provide input.

d. CAW will make its final determination whether to remove the dam within six months following completion of the LPD Feasibility Study, unless the Parties agree that additional studies are necessary and agree to a later deadline.

e. . If removal of LPD is found to be feasible and the Parties agree to removal CAW agrees to submit necessary petitions to the SWRCB for a Change of Method of Diversion, requesting a change from storage to direct diversion from wells for diversions under License 11866, and a Change of Point of Diversion, requesting to change the point of diversion to the lowermost wells in Sub-unit 3 of the Carmel Valley Alluvial Aquifer. Any changes to License 11866 must fully protect CAW's diversion rights, and SWRCB approval of such changes must be received prior to the removal of LPD. Changing the point of diversion for CAW's water right under License 11866 would also alleviate NMFS' ESA concerns related to CAW's operations from pumping under License 11866.

f. If found feasible, and the Parties agree to removal, CAW further agrees to remove LPD within five years after an alternative water supply, as described in the Final Environmental Impact Report/Environmental Impact Statement for the MPWSP, is implemented, subject to reasonable extensions based on permitting or other authorization requirements, or other conditions beyond CAW's control.

2. Interim measures pending the completion of the LPD Feasibility Study, and, if removal of LPD is found feasible and the Parties agree to removal, pending removal of LPD.

The following interim measures shall be implemented to ensure unimpeded steelhead passage upstream and downstream of the LPD. The Parties agree to make reasonable adjustments to individual deadlines stated below if reservoir levels or river flow regimes create conditions that would make the specified activity infeasible or that could be harmful to steelhead or their habitat if carried out within the time period provided.

a. Los Padres Dam and Reservoir Piping.

Three outlet structures currently exist at LPD to release water from Los Padres Reservoir. They are all tied to one intake pipe located in the reservoir approximately 30 feet from the dam at elevation 950' ("intake pipe"). The intake is approximately 36" in diameter. The intake pipe is currently not screened in accordance with NMFS' fish screen criteria.

i) CAW agrees to conduct or fund a study to investigate juvenile steelhead residence time and behavior in the Los Padres Reservoir to determine the need for screening the intake pipe. The study would inform future conservation actions if LPD remains in place, or pending removal of LPD, and future restoration projects aimed at recovering steelhead in the watershed. NMFS and CAW will agree on a study design by June 30, 2018, including a date for completion of the study and preparation of a final report, taking into consideration the scope of the study, site access, and acquisition of any necessary permits and authorizations. The study would provide valuable information on the behavior and residence time of steelhead in the Los Padres Reservoir.

ii) This study could be undertaken as part of existing studies, including as part of the existing MPWMD studies, the studies required as part of the CDO, or as part of the restoration projects.

b. Steelhead Passage Upstream

NMFS believes that redesigning and/or reconfiguring the existing ladder collecting fish for the trap and transport operation at LPD would improve attraction efficiency.

i) The Parties agree to meet within three months following execution of this Memorandum of Agreement to consider implementation, on an interim basis, of improvements to the trap and transport program including development of standard operating procedures (SOP) as well as design improvements to the existing ladder. Representatives from MPWMD and CDFW may also participate in these meetings and provide input. Any proposed design improvements to the existing ladder must be approved by NMFS prior to installation and must be implemented, following receipt of any necessary discretionary approvals by applicable permitting agencies and consistent with the requirements of such approvals, within six months following execution of this Memorandum of Agreement. The Parties agree to provide reasonable extensions of this deadline to accommodate the acquisition of any permits or other authorizations that may be necessary depending on the improvements selected.

ii) The SOP would include at a minimum the following existing procedures: ensuring trap and transport operators have the appropriate education, training and/or experience; checking the trap daily from Monday through Saturday (including holidays) during the adult steelhead migration season of December through May and after the Carmel Lagoon sandbar is open; increasing the frequency of trap monitoring from December through May when more than one adult steelhead is observed in the trap or immediately downstream of the ladder until adult abundances decrease; checking the trap daily from Monday through Sunday (including holidays) when adult steelhead are moving upriver.

Steelhead adults are assumed to be moving upriver when they are found in the trap any Monday through Saturday; and using best efforts to check the trap at approximately the same time daily to ensure that no fish is kept in the trap longer than necessary.

iii) The following reports to NMFS will also be included in the SOP: weekly notification of trapping activities to NMFS during the adult steelhead migration; notifying NMFS within 24 hours of any steelhead mortalities or injuries within the trap or during transport activities; and providing a written summary on trap and transport operations to NMFS by August 15 of the year following any improvements to the trap and transport program.

c. Steelhead Passage Downstream

A feasibility study was completed in 2009, and the Alternative B—Floating Weir Surface Collector--was selected as the preferred alternative for improving steelhead migration, allowing juvenile and adult steelhead to migrate downstream past LPD. CAW implemented the Floating Weir Surface Collector and associated behavioral guidance system in 2016 to provide smolts, kelts, and juveniles suitable downstream passage while avoiding any potential harm associated with passage over the spillway.

i) CAW will continue to operate the Floating Weir Surface Collector.

d. Stored Sediment

Since the dam was constructed, sediment has been filling in the reservoir, with approximately 40 percent of the reservoir filled as of the execution of this Memorandum of Agreement.

i) CAW agrees to complete a feasibility study for methods to remove sediment behind the LPD and to improve fish passage and to maintain a migration channel in the sediment delta for up and downstream fish passage until LPD is removed. CAW and MPWMD are currently facilitating the LPD and Reservoir Alternatives and Sediment Management Study, which includes an evaluation of alternatives to address sediment behind LPD. MPWMD anticipates completion of the study in the second quarter of 2018, but completion could be delayed if permits are required from the Army Corps of Engineers and/or CDFW. As stated above in IV.A.1.b.ii., CAW and NMFS agree to meet by March 31, 2018 to discuss the status of the MPWMD Sediment Management Study, to determine whether additional studies on interim sediment removal by CAW are necessary, and, if additional studies are needed, to determine a reasonable deadline for completion of those additional studies.

ii) The Parties agree to meet within three months after completion of the sediment removal studies to consider implementation, on an interim basis, of measures to maintain a migration channel in the sediment delta. Any proposed design improvements must be approved by NMFS prior to installation and must be implemented, following receipt of any necessary discretionary approvals by applicable permitting agencies and consistent with the requirements of such approvals, within three months following the Parties' meeting. The Parties agree to provide reasonable extensions of this deadline to accommodate the acquisition of any permits or other authorizations that may be necessary depending on the improvements selected.

e. Downstream Gravel Replenishment

Following receipt of any necessary discretionary approvals by applicable permitting agencies, and consistent with the requirements of any such approvals, CAW agrees to provide for gravel replenishment below the LPD, from sources such as the sediment delta behind LPD or other approved areas on a regular basis. This replenishment shall maintain spawning gravels downstream of LPD pending removal of LPD. Replenishment amounts, methods and scheduling are to be approved by NMFS prior to implementation. The Parties agree to meet within three months following execution of this Memorandum of Agreement to discuss a proposed replenishment plan and scheduling. Representatives from MPWMD and CDFW may also participate in the meeting and provide input. Following receipt of all necessary discretionary approvals by applicable permitting agencies and consistent with the requirements of such approvals, the Parties anticipate that gravel replenishment will begin in the fall of 2018. The Parties agree to meet on a regular basis to discuss status of this project and acquisition of any permits or other authorizations that may be necessary depending on the gravel replenishment methods selected.

3. Required Actions if the LPD is not Removed

If CAW determines not to remove LPD or if removal of the LPD is determined to be infeasible as a result of the MPWMD Studies, the following measures must be addressed to ensure permanent unimpeded passage for steelhead up and downstream of LPD. The Parties agree that these measures will continue as long as the dam remains in place. The Parties acknowledge that certain actions may require CAW to obtain permits or other authorizations from other agencies, and that such permit application processes may create delays beyond CAW's control, affecting CAW's ability to meet the below-listed schedules. CAW will keep the Parties informed of any such delays in obtaining required permits, and the Parties agree to adjust schedules as may be necessary.

a. Passage upstream

The Parties agree that as long as the LPD remains in place, permanent unimpeded upstream passage for adult and juvenile steelhead is necessary.

i) The Parties agree to meet within three months of a determination that the LPD will remain in place to determine feasible permanent unimpeded upstream fish passage improvements to be implemented, if any. Improvements must be implemented, following receipt of any necessary discretionary approvals by applicable permitting agencies and consistent with the requirements of such approvals, within six months following such meeting, unless the Parties agree on a different date. Representatives of MPWMD and CDFW may also participate in this meeting. Any proposed improvements must be approved by NMFS prior to implementation.

b. Passage downstream

The Parties agree that as long as the LPD remains in place, permanent unimpeded downstream passage for for kelts, smolts, and juveniles is necessary.

i) If NMFS determines that continued operation of the Floating Weir Surface Collector pursuant to IV.A.2c provides for unimpeded downstream passage for kelts, smolts, and juveniles, CAW will continue such operation.

ii) If NMFS determines that the interim measures for downstream fish passage implemented pursuant to IV.A.2.c do not provide permanent unimpeded downstream passage for kelts, smolts, and juveniles, the Parties agree to meet within three months of a determination to leave LPD in place to determine feasible permanent unimpeded downstream fish passage improvements to be implemented, if any. Improvements must be implemented, following receipt of any necessary discretionary approvals by applicable permitting agencies and consistent with the requirements of such approvals, within six months following such meeting, unless the Parties agree on a different date. Representatives from MPWMD and CDFW may also participate in the meeting. Any proposed improvements must be approved by NMFS prior to implementation.

c. Stored Sediment

The Parties agree that unimpeded fish passage through the reservoir must be maintained throughout the life of the LPD.

i) The Parties agree to meet within three months of a determination to leave LPD in place to determine feasible measures to improve passage through the reservoir in addition to those identified in IV.A.3.b and c, if any. Improvements must be implemented, following receipt of any necessary discretionary approvals by applicable permitting agencies and consistent with the requirements of such approvals, by within six months following such meeting unless the Parties agree to a different date. Representatives of

MPWMD and CDFW may participate in the meeting. Any proposed improvements must be approved by NMFS prior to implementation.

d. Downstream Gravel Replenishment

The Parties agree that as long as LPD remains in place, gravel replenishment downstream will be necessary for the life of the dam.

i) CAW agrees to continue to provide for gravel replenishment below the LPD, from sources such as the sediment delta behind LPD or other approved areas, on a regular basis This replenishment shall maintain spawning gravels downstream of LPD. Replenishment amounts, methods and scheduling are to be approved by NMFS prior to implementation.

B. CAW's Obligations with Respect to General Maintenance and Drainage of CAW Managed Roads

NMFS believes that many of the roads managed by CAW are dirt roads with inadequate drainage systems. Some of these roads may be able to be decommissioned now that San Clemente Dam has been removed, while other roads needed for access to CAW property may need to be upgraded and sloped correctly, with proper drainage to avoid sediment runoff into the streams and river. The Parties agree that maintenance and repair activities to prevent sediment runoff into streams and the river from roads and drainages would alleviate the need for any additional mitigation/take coverage for impacts to steelhead from CAW's roads.

1. Required Actions:

a. CAW agrees to complete an assessment of the roads managed by CAW to determine whether any roads managed by CAW are having an adverse impact on SCCC steelhead and their habitat and, if so, which roads need improvement, and which roads may be decommissioned within six months following execution of this Memorandum of Agreement.

b. If any roads managed by CAW are found to have an adverse impact on SCCC steelhead and their habitat, CAW agrees that, following receipt of any necessary discretionary approvals by applicable permitting agencies and consistent with the requirements of such approvals, within six months of completing the assessment described in Section IV.B.1.a, above, it will repair and maintain such dirt roads and drainages necessary for access to CAW operations in such a manner as to prevent sediment runoff into streams. CAW further agrees that maintenance of these roads will be conducted on a regular schedule for the life of the road. The Parties agree that repair and maintenance must provide protection to steelhead equivalent to or better than guidelines set forth in the *Handbook for Forest and Ranch Roads* (Weaver, W.E. and D.K. Hagans, 1994).

c. Within one year of the completion of the Carmel River Reroute and San Clemente Dam Removal ("CRRDR") Project, CAW agrees to decommission any of its roads that are no longer necessary for access to any CAW facilities or for long-term monitoring of the CRRDR Project.

C. CAW's Obligations with Respect to Planning for Long Term Legal Authorization for the Possible Future Take of Steelhead

The Parties agree to assess whether incidental take coverage for impacts to steelhead from any remaining CAW operations may be needed. NMFS expects that if LPD remains in place that CAW will apply for and receive an Incidental Take Permit (ITP) for ongoing take of listed steelhead. NMFS also expects that if CAW has applied for an ITP but no permit has been granted, this Agreement will be extended for the purpose of maintaining necessary measures while the permit application is pending.

1. Required Actions:

a. If LPD remains in place and unless incidental take is otherwise authorized, CAW agrees that, within two years from a decision to leave the LPD in place, CAW will submit an application for an ITP for any remaining take occurring from CAW's operations on the Carmel River following termination of this Memorandum of Agreement. CAW further agrees that this application will include a Habitat Conservation Plan.

b. If LPD remains in place and CAW has timely applied but has not yet obtained an ITP, the Parties further agree to meet at least one (1) year prior to the expiration of this Memorandum of Agreement to reach a new agreement on necessary measures for permanent unimpeded upstream and downstream fish passage, sediment management, and downstream gravel replenishment.

V. Annual Report Evaluating Status of Steelhead under the Amended CDO

Pursuant to the Amended CDO, CAW will provide annual funding in the amount of up to $175,000 for preparation of an annual report evaluating the status of the threatened SCCC steelhead. If possible, NMFS Southwest Fisheries Science Center (SWFSC) will enter into a separate agreement to undertake these annual studies, pursuant to its authority under the Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661-666c, and the Special Studies Authority, 15 U.S.C. § 1525. In the event that SWFSC is not able to prepare the report, CAW will designate another entity with the requisite expertise that NMFS finds acceptable. The annual funding of up to $175,000 required by CAW under the Amended CDO and under any agreement with SWFSC for preparation of an annual report is in addition to CAW's commitment to pay $5.5 million under Section II of this Memorandum of Agreement.

VI. ASR Agreement

CAW and NMFS will continue to cooperate pursuant to the ASR Agreement to allocate water to and from the Aquifer Storage and Recovery Project to offset withdrawal from the

Carmel River that would otherwise occur during the low-flow season, subject to any limitations imposed by the SWRCB.

VII. Take of SCCC Steelhead

NMFS has consulted under section 7 of the ESA to insure that NMFS' entrance into this Memorandum of Agreement is not likely to jeopardize listed species or destroy or adversely modify designated critical habitat. Based on this consultation, NMFS has concluded that it may enter into this Memorandum of Agreement and NMFS' signature indicates that NMFS has reached this conclusion. If for whatever reason the biological opinion is vacated, amended or withdrawn, NMFS will meet with CAW to discuss whether or how the agreement should be modified to insure that NMFS is in compliance with ESA section 7. The Parties' obligations under the Memorandum of Agreement will remain unchanged until the Parties agree on changes to the Memorandum of Agreement. NMFS will in making decisions about bringing or referring enforcement actions and appropriate penalties under Section 9 of the ESA consider CAW's compliance with its obligations under this Memorandum of Agreement an important mitigating factor for any enforcement decision related to any unintentional take of ESA-listed fish.

VIII. NMFS' Cooperation with CAW and Other Agencies:

A. NMFS and CAW recognize that the CPUC is CAW's primary regulatory agency. CAW is obligated to serve its customers in a cost-effective manner. CAW must obtain CPUC permission to fund activities such as environmental mitigation, and the rates charged to CAW's customers must be approved by the CPUC. NMFS acknowledges that in CAW's role as a CPUC regulated water provider, that it has an obligation to serve its customers.

B. CAW is facing a plethora of permitting and regulatory issues related to CAW's quest to implement a replacement long-term water supply, to comply with the ESA and regulatory requirements of other federal and state agencies.

C. Cooperation, as used herein, means providing comments on a project or course of action by writing letters, appearing at public meetings and hearings to speak or give testimony, and meeting with other government agencies, consistent with NMFS' authorization, mission, policies, and its ESA responsibilities, and taking into account the limitations imposed by staff time and resources.

D. Cooperation shall not be read to create an obligation for NMFS, or any other line office or division of NOAA (e.g., Monterey Bay National Marine Sanctuary [MBNMS[), or any agency of the United States, to endorse, promote, take a position or advocate on behalf of CAW's application for a permit, authorization, or other approval of a particular long-term water supply proposal or the MPWSP.

E. Nothing in this Memorandum of Agreement may be read to indicate any commitment on the part of NMFS, NOAA, FWS, EPA, or any agency of the United States to grant any permit, authorization, or other approval needed for any particular long-term water supply proposal or for the MPWSP. In particular, nothing in this Memorandum of Agreement may be read to indicate any commitment on the part of NMFS in regards

to its consultation under ESA section7 and Essential Fish Habitat under the Magnuson-Stevens Act on any federal permit, authorization or approval of a particular long-term water supply proposal or the MPWSP.

F. California Public Utilities Commission

1. NMFS will cooperate in CPUC proceedings related to certification of the Environmental Impact Report/Environmental Impact Statement ("EIR/EIS") under the California Environmental Quality Act for the MPWSP, and approval of the Certificate of Public Convenience and Necessity for the MPWSP, by explaining the importance of the recovery of the SCCC steelhead and the habitat of the Carmel River, and the environmental benefits of a replacement long-term water supply compared to the environmental detriment of continuing the current water supply for the Monterey Peninsula.

2. NMFS will cooperate in any CPUC general rate proceedings concerning the recovery in rates of costs of a replacement long-term water supply project and funds paid for mitigation by explaining to the CPUC: (1) the benefits to steelhead of any mitigation funds paid pursuant to any agreement with NMFS; (2) the penalties applicable to violations of the ESA; and (3) that compliance with the ESA is mandatory.

G. State Water Resources Control Board ("SWRCB")

If NMFS concludes after CAW completes the study identified in IV.A.2 that installation of a fish screen on the intake pipe upstream of LPD is not warranted, NMFS will cooperate by providing information to the SWRCB as to the findings of the study and the reasons for its conclusions.

H. Other Agencies with Permitting/Regulatory Authority over the MPWSP.

1. Monterey Bay National Marine Sanctuary ("MBNMS")

CAW has applied for authorization and a special use permit from NOAA's MBNMS under the National Marine Sanctuaries Act, 16 USC 1431 *et seq.*, for MPWSP's installation and operation of intake pipes in the Sanctuary, and discharge of waste brine into the sanctuary. NMFS will also provide information to personnel who manage MBNMS regarding the potential benefits for listed threatened steelhead and their habitat of a replacement long-term water-supply project. Nothing in this Memorandum of Agreement may be read to indicate any commitment on the part of NOAA (MBNMS, NMFS, or any line office of NOAA) to grant a NMS permit or authorization for a particular long-term water supply proposal or the MPWSP.

2. California Coastal Commission ("CCC")

A Coastal Development Permit from CCC is required for the MPWSP. NMFS will cooperate with CAW by explaining to CCC the critical need for threatened

SCCC steelhead and their habitat for the replacement of a long-term water supply for Carmel River.

3. State Water Resources Control Board ("SWRCB")

The second component of the MPWSP is ASR in the Seaside Basin, which may require additional water rights approvals from SWRCB. NMFS has supported the concept of ASR for years. NMFS will cooperate with CAW regarding the benefits of diversions to ASR during times of excess flow on the Carmel River. NMFS will meet and confer with CAW to discuss any of its concerns with CAW'S ASR permit applications before commenting publicly, unless doing so would be inconsistent with statutory or regulatory authority.

4. U.S. Fish and Wildlife Service ("USFWS")

NMFS will cooperate with CAW by providing information to USFWS related to the benefits to threatened SCCC steelhead of a replacement long-term water supply project. Nothing in this Memorandum of Agreement may be read to indicate any commitment on the part of FWS in regards to its consultation under ESA Section 7 on any federal permit, authorization or approval for a particular long-term water supply proposal or the MPWSP.

5. California Department of Fish and Wildlife

NMFS will cooperate with CAW regarding CDFW issues related to permits for a replacement long-term water supply project.

I. Agencies With Permitting/Regulatory Authority for Activities Under This MOA

NMFS commitments with respect to the MPWSP are addressed above. With respect to other approvals or permits for activities under this MOA, NMFS will cooperate with CAW regarding any approvals or permits that may be necessary prior to carrying out any activities contemplated under this Agreement; provided, however, that such cooperation shall not limit any discretion to be exercised by NMFS, NOAA, FWS, EPA, or any agency of the United States to grant any such approval or permit.

IX. Term of Memorandum of Agreement:

A. This Memorandum of Agreement shall expire 364 calendar days following the fifth (5^{th}) anniversary of the Effective Date of the Memorandum of Agreement. However, the Parties recognize that certain terms and milestones of this Memorandum of Agreement will extend beyond that expiration date. Accordingly, the Parties agree to exercise the meet and confer obligation set forth in Section IX(D) below not later than six (6) months prior to the expiration date in order to negotiate in good faith, and using their best efforts, an amendment to this Memorandum of Agreement. The Parties understand that this amendment may include the extension of any or all of the terms of this Memorandum of Agreement as are relevant at the time, adopting new

terms, or that circumstances may require that the Memorandum of Agreement not be renewed.

B. Notwithstanding the expiration of this Memorandum of Agreement pursuant to Section IX(A), the Conservancy shall continue to comply with all requirements of the Memorandum of Agreement until such time as all funds paid to the Conservancy by CAW have been expended and the Conservancy has provided a final accounting report to NMFS and CAW, pursuant to Section II(C).

C. The term of this Memorandum of Agreement may be extended by mutual written consent of the Parties, or as specified in Section IX(A) above.

D. The Parties recognize that certain terms and milestones of this Memorandum of Agreement will extend beyond the expiration date. By the start of year three of this Memorandum of Agreement NMFS and CAW shall meet and confer regarding: (i) the progress of actions funded by this Memorandum of Agreement to improve habitat conditions for or otherwise aid in the recovery of SCCC steelhead; and (ii) authorizing any take of SCCC steelhead caused by CAW's operations that may remain at the expiration of this Memorandum of Agreement. Either party may call for such meeting no earlier than two years prior to the expiration of this Memorandum of Agreement and no later than six months prior to the expiration of this Memorandum of Agreement. This meet and confer obligation is in addition to the discretion of the parties to extend this Memorandum of Agreement pursuant to Section IX(A) and (C).

X. Effective Date:

The Effective Date of this Memorandum of Agreement means the date on which all Parties have signed the Memorandum of Agreement.

XI. Miscellaneous Provisions:

A. By entering into this Agreement, the Parties do not limit their discretion or the discretion of any other governmental agency with permitting or approval jurisdiction over any transaction related to or arising from this Agreement, nor do they make any irreversible and irretrievable commitment of resources. In addition, and notwithstanding anything to the contrary stated herein, any obligation of a Party or any timeline or deadline stated herein shall not limit the discretion of any public agency to consider, approve, reject and/or condition any permit or other approval required for any activity covered in this Agreement, and shall not limit or predetermine any environmental review for such activity. This subsection is not to be construed as altering the commitments set forth in Section VIII.H.

B. The Parties must comply with all obligations under this Agreement, except any obligation that would violate or otherwise be inconsistent with applicable law. If any obligation would violate or otherwise be inconsistent with applicable law, the Parties must comply with all remaining obligations.

C. Any Party may issue a press release regarding the contents of this Memorandum of Agreement.

D. The provisions of this Memorandum of Agreement shall apply to and be binding upon the Parties and their respective successors and assigns.

E. The Parties recognize the authority and expertise of the State Water Resources Control Board to regulate, inter alia, CAW's water diversion activity on the Carmel River. Accordingly, CAW's compliance with the conditions and milestones of State Water Resources Control Board Order No. WR 2016-0016 and any future amendments of same occurring within the pendency of this Memorandum of Agreement, are required under this Memorandum of Agreement.

F. For purposes of this Memorandum of Agreement, a determination that CAW has failed to comply with any condition or milestone of WR2016-0016, and any future amendments of same which occur during the pendency of this Memorandum of Agreement, shall be based on a finding of the State Water Resources Control Board.

G. Agreement Sections I, II and III of the Conservation Agreement, except any obligations to increase well capacity in the lower Carmel Valley as previously required by Phase II Tier I, Agreement Sections I and II of the 2009 Settlement Agreement as amended, and the ASR Agreement are expressly incorporated herein by reference. Any modification of this Memorandum of Agreement shall be in writing and signed by the Parties.

H. All notices and communications required under this Memorandum of Agreement shall be made to the Parties through each of the following persons and addresses:

Party	Contact Name/Title	Mailing Address	Phone/Fax
CAW	Richard C. Svindland President California-American Water Company	655 West Broadway Suite 1410 San Diego, CA 92101	Phone: 619-446-4761 Fax: 619-230-1096
NMFS	Alecia Van Atta Assistant Regional Administrator for California Coastal Office, West Coast Region	777 Sonoma Ave., Rm. 325 Santa Rosa, CA 95404	Phone: 707-575-6058 Fax: 707-578-3435
Conservancy	Sam Schuchat Executive Director California State Coastal Conservancy	1550 Clay Street, Suite 1000 Oakland, CA 94612-2530	Phone: 510-286-1015 Fax: 510-286-0470

I. This Memorandum of Agreement may be executed in one or more counterparts, each of which shall be deemed an original, and such counterparts shall constitute one and the same agreement.

J. Each undersigned representative of a party to this Memorandum of Agreement certifies that he or she is fully authorized by that party to enter into and execute the terms of this Memorandum of Agreement and legally bind such party to this Memorandum of Agreement.

IN WITNESS WHEREOF, the parties have executed this Memorandum of Agreement as of the dates written below.

ACCEPTED ON BEHALF OF CALIFORNIA-AMERICAN WATER COMPANY BY:

Richard C. Svindland
President
California-American Water Company

DATED: Jan 10, 2018

ACCEPTED ON BEHALF OF THE NATIONAL MARINE FISHERIES SERVICE BY:

_____

Barry A. Thom
Regional Administrator, West Coast Region
National Marine Fisheries Service, NOAA

DATED: _____

ACCEPTED ON BEHALF OF THE CALIFORNIA STATE COASTAL CONSERVANCY BY:

_____

Sam Schuchat
Executive Officer
California State Coastal Conservancy

DATED: _____

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Richard C. Svindland
President
California-American Water Company

DATED: _____

ACCEPTED ON BEHALF OF THE NATIONAL MARINE FISHERIES SERVICE BY:

_____

Barry A. Thom
Regional Administrator, West Coast Region
National Marine Fisheries Service, NOAA

DATED: Dec. 21, 2017

ACCEPTED ON BEHALF OF THE CALIFORNIA STATE COASTAL CONSERVANCY BY:

_____

Sam Schuchat
Executive Officer
California State Coastal Conservancy

DATED: _____

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Richard C. Svindland
President
California-American Water Company

DATED: _____

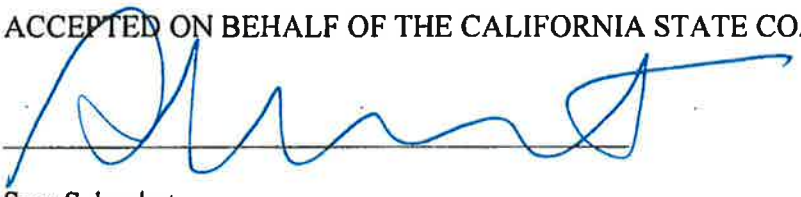
ACCEPTED ON BEHALF OF THE NATIONAL MARINE FISHERIES SERVICE BY:

_____

Barry A. Thom
Regional Administrator, West Coast Region
National Marine Fisheries Service, NOAA

DATED: _____

ACCEPTED ON BEHALF OF THE CALIFORNIA STATE COASTAL CONSERVANCY BY:



Sam Schuchat
Executive Officer
California State Coastal Conservancy

DATED: 12/20/17

EXHIBIT 2-D

TABLE 1:

Due Date	Payment Amount
July 1, 2017, or 30 days after the Effective Date, whichever date is later	$1.1 million
July 1, 2018	$1.1 million
July 1, 2019	$1.1 million
July 1, 2020	$1.1 million
July 1, 2021	$1.1 million
Total:	**$5.5 million**