EXHIBIT A - SCOPE OF WORK

This scope of work reflects the Scope of Work contained in the Request for Proposal dated November 2016 as modified by an Addendum and the Proposal (Proposal) by the Consultant dated December 28, 2016. If ambiguities arise during the study as to the intent of the scope of a task that are not addressed in either document, MPWMD and the Consultant should review the original Scope of Work.

PROJECT OBJECTIVES

This study is to provide critical information to answer key questions related to Los Padres Dam, including:

- Are Carmel River steelhead better off with or without Los Padres Dam and Reservoir?

- Is Los Padres Reservoir critical for water supply on the Monterey Peninsula? Is it feasible to expand reservoir capacity and what effects would this have on water supply and the environment?

- Are there feasible alternatives to manage existing sediment deposition and future sediment inflow to the reservoir?

- What would be the geomorphic response of the Carmel River be to management actions considered, and will there be an increased erosion and/or flood risk?

Task 1: Feasibility Study Preparation

Task 1 is focused on the technical analyses and engineering required for concept development. The Consultant will compile and review available background information to prepare for a concept development workshop with the TRC, and will prepare workshop materials, including preliminary thoughts on alternative concepts based on extensive experience with similar projects, evaluation criteria, and an evaluation process. Background review and opportunities and constraints associated with the specifics of the dam, site topography, and sediment will be identified. The information will be compiled into a Technical Memorandum (TM); will be provided to the TRC for review prior to the workshop; and will be presented and discussed at the workshop. The review will allow TRC members to become familiar with the operational, physical, hydrologic, and biological setting of the LPD and potential effects to the Carmel River; the range of options that could be considered; and draft criteria to evaluate concepts. This information will be important for identifying concepts and alternatives that are compatible with hydrological and physical constraints and that meet study objectives. This background information will be used and added to as necessary throughout all tasks of the Study, and will be documented in the Final Report.

Deliverables, Schedule, and Assumptions

The deliverable for Task 1 is a TM summarizing work completed under Tasks 1-1, 1-2, and 1-3. The draft TM will be provided for TRC review prior to TRC Meeting No. 1, and will be presented at TRC Meeting No. 1. The TM will be revised based on comments or input received from the TRC.

Task 1-1 Compile Background Information

Available background information will be compiled to address physical considerations and setting for consideration during development of feasible dam removal and sediment management options. Existing features of interest include the dam, reservoir, facility operations, river channel, hydrology, and steelhead biology, as summarized in more detail below:

1. Existing inflow/outflow and reservoir operations summary, with a brief narrative on operations in a(n):
    a. Average water year
    b. Wet water year
    c. Single critically dry-water year, and
    d. Multiple dry-water-year scenarios (up to 4 years with dry or critically dry conditions)

2. Biological design criteria and data summary that includes:
    a. Water quality data in the reservoir and downstream of LPD, including temperature, turbidity, dissolved oxygen, and other constituents affecting steelhead
    b. Water quality goals

3. Geomorphic data
    a. Past geomorphic analyses of the Carmel River
    b. Active channel data, including particle-size distributions, thalweg and cross-section surveys, bedload and suspended-load data, sediment transport and stream power relationships
    c. Flood maps, including identification of frequently flooded areas
    d. Aerial photographs, including assessments of streamside vegetation
    e. Structural protection along the river
    f. Reservoir data
    g. Historic and existing reservoir bathymetric data
    h. Studies of fire effects
    i. Sedimentation rates and reservoir trap efficiency
    j. Previous dredging studies
    k. Steelhead studies on behavior through reservoirs

4. Water rights summary with description of related State Water Resources Control Board (SWRCB) orders
5. Summary of available dam safety data and DSOD inspection reports
6. Summary of the 2013 Los Padres Dam Sediment Removal Feasibility Study report
7. Costs (e.g., on a per acre-foot or other basis of comparison) from other relevant dam decommissioning, dredging, expansion projects, and sediment management projects

Deliverables, Schedule, and Assumptions

An overview of Task 1-1 will be included in the Task 1 TM and provided for TRC review prior to TRC Meeting No. 1.

For this subtask, Consultant assumes that information requested from or recommended for inclusion by the TRC not otherwise readily available will be provided by the TRC in a timely manner

that does not affect the task schedule. Consultant also assumes that, for all tasks, any Carmel River Basin Hydrologic Model (CRBHM) or Carmel River IFIM model runs or reporting would be completed by others, or would require additional effort for the Consultant.

Task 1-2 Prepare Evaluation Criteria

The criteria will cover "fatal flaws" that would preclude a concept from advancing further, and a time period will be allotted for comparing alternatives.

If an analysis is available of climate change effects on long-term water availability at LPD, at least the mean of the ensemble of outlooks will be included as one of the evaluation criteria.[1]

Deliverables, Schedule, and Assumptions

The work completed under Task 1-2 will be summarized in the Task 1 TM, and provided for TRC review prior to TRC Meeting No. 1.

Task 1-3 Identify Critical Data Gaps

The Consultant will identify missing or additional desired information, and appropriate steps to acquire the necessary material. The process to address any informational gaps will be identified based on the specifics of the necessary information and a plan to address the informational needs will be formulated for TRC review.

Deliverables, Schedule, and Assumptions

The deliverables for this task include a table identifying missing data or information, to be included in the Task 1 TM, provided prior to TRC Meeting No. 1, and reviewed at the meeting. The plan for acquiring the missing data or information will be added to the table following the meeting. Consultant assumes that any work scope not specifically identified in this proposal needed to fill data gaps would require additional effort or would be completed by others. Consultant would provide a proposal for acquiring additional data or information, if necessary.

Task 1-4 TRC Meeting No. 1

The TRC and Consultant will meet to discuss project goals and expected outcomes, background information, evaluation criteria, and critical data gaps. Information developed under Task 1 will be packaged and distributed to the TRC in advance of the meeting. An update on the sediment characterization field investigation and preliminary results will be presented at the meeting. The Consultant will send at least two Consultant members to the meeting to participate in and assist with conducting the meeting. They will be prepared to facilitate web meeting and conference call participation for participants unable to attend in person, and will record and distribute draft meeting notes for review. In addition to physical considerations (see definition in Task 1-1 description),

[1] MPWMD is developing a linked surface-groundwater model (the CRBHM) based on GSFLOW and MODFLOW. The U.S. Bureau of Reclamation will be contracting with the U.S. Geological Survey in 2017 to downscale a Global Climate Change model to the Carmel River watershed. At least five climate change scenarios will be evaluated out to year 2099, and results will be incorporated by others into the CRBHM to determine long-term water availability in the watershed.

evaluation criteria to estimate each alternative's expected level of success (evaluation criteria are similar to physical considerations, but are specific and quantified), discussion of the preliminary list of alternatives to be developed under subsequent tasks, and the following, additional considerations will be included in the TRC discussion:

- Additional dam and reservoir considerations include the topography and habitat around it, access to and from the site, and ancillary structures.
- Additional operational considerations include any effects on dam operation, both during normal operations and during any construction activity that may take place in the future.
- Biological considerations include potential temporary impacts to steelhead as a result of activities at the dam and reservoir.
- A discussion of the timescale over which alternatives should be evaluated; for example, how to define "short term" and "long term."

Deliverables, Schedule, and Assumptions

Deliverables for this task include:

- Distribution of the draft Task 1 TM summarizing background information, evaluation criteria, and data gaps, and the draft sediment characterization TM (Task 2-1), to be distributed to the TRC 3 to 6 weeks prior to the meeting.
- Workshop agenda, to be distributed to the TRC prior to the meeting.
- Draft meeting notes, to be provided within 2 weeks of completion of the meeting.

For all TRC Meetings, Consultant assumes that the MPWMD Ryan Ranch office, the Cal-Am Pacific
Grove office, or other agreed-on location will be suitable for a team meeting, with access to web broadcast, presentation screen, and teleconference facilities for TRC members unable to attend in person. Should the TRC prefer to meet in the San Francisco Bay Area, Consultant will host TRC meetings at our 300 Lakeside Drive office beside Lake Merritt in Oakland. A TRC member will be selected as a facilitator prior to the meeting to assure the workshop is conducted in an efficient manner.

Task 2: Sediment Management Options

This task involves obtaining and analyzing sediment data in the reservoir (Task 2-1), developing initial alternative descriptions (Task 2-2), and evaluating the geomorphic effects of changes in sediment load (Task 2-3). These tasks are described below.

This task includes development of a field investigation work plan, field investigation, laboratory analysis, and preparation of a TM.

Field Investigation

All field investigation work will be completed under the guidance of a Field Work Plan that the Consultant will develop and review with MPWMD and Cal-Am prior to mobilizing to the field.

This work plan will describe the intent of the investigations, the number, depth, and location for each boring, and the sample types and depths that are desired. This Field Work Plan will also include a Safety Plan that describes the potential health and safety hazards related to this study,

and the actions and equipment that will be incorporated to mitigate them and allow the work to proceed without incident.

To evaluate the stratigraphy, sedimentology, and volume of alluvial sediment deposited behind Los Padres Dam and farther upstream, the Consultant will complete the following field investigation program developed after our geologist, hydrologist, and drilling subcontractor completed a site reconnaissance visit

A combination of a barge-mounted drill rig in the reservoir, and hand sampling in sediment deposits upstream of the reservoir will be used. The locations of the upstream sediment hand-samples will depend on site access limitations at the time of the sampling, and have not been selected.

A small, portable barge with drilling rig will be launched to the reservoir from the ramp on the upstream side of the dam to sample up to four borings in the reservoir. Consultant will steam clean the barge, if necessary, and any equipment that comes into contact with the water and the watershed. During drilling, the barge will be maintained in place with four anchors placed in the reservoir. Three (3) days of drilling will be performed from the barge. It is expected that reservoir borings will be drilled and sampled to the pre-dam surface, to depths between about 27 and 47 feet below the mudline, as indicated in the table below. Thin-walled tubes and thick-walled drive samplers will be used to collect sufficient sediment samples, approximately every five (5) feet throughout the borings, for both the sedimentologic evaluation, and also the chemical analysis described below. All drill cuttings will be removed from site and disposed at an appropriate landfill.

Hand tools will be used to sample the upstream alluvial deposits that have filled the channel above the reservoir. The upstream sediment sampling area will extend from the upstream edge of the reservoir to approximately elevation 1,060 feet (near the upstream extents of the reservoir when built), and will be accessed on foot from the upstream end of the reservoir. Field work should take one (1) day. Sampling locations will be identified in the field to provide samples that are representative of the sedimentology. The investigation will include some combination of photographic/visual documentation of sediment, pebble counts, and/or use of picks, shovels, hand augers, or other miscellaneous digging tools to excavate and collect samples. If samples are collected, we will perform initial particle size screening and weighing of portions of the samples in the field, followed by additional analysis in the office or laboratory. Field sieving, if used, will minimize the amount of sample material requiring transportation from the upstream area.

Sediment Analysis

All samples from the reservoir drilling and any collected during upstream alluvial sediment sampling will be taken to a geotechnical testing laboratory for grain-size analysis (American Society for Testing and Materials [ASTM] D422) and plasticity evaluation (ASTM D4318). Because concentrations of nutrients, metals, and certain organic pollutants can be elevated in post-fire runoff, and the Marble Cone fire led to a significant amount of sedimentation in the reservoir, samples will also be collected for chemical analysis to understand potential effects to fish and other downstream uses. Approximately three samples per boring will be analyzed, corresponding to recent fire-related and pre-fire sediment deposition. Analyses will be performed

for metals, organics, nutrients, hardness, and pH. Chemical analyses will be performed at Curtis & Tompkins Laboratories in Berkeley, California, or an equivalent laboratory.

The Consultant will create a longitudinal subsurface profile from the furthest upstream sampling location downstream to the dam, which will show the base of the sediment, describe the stratigraphy that is apparent from the samples, and show the reservoir surface. From this profile and the pre-dam channel topographic cross–section, we will confirm previous estimates of sediment volume that has accumulated below about elevation 1,060 feet. This cross section will also depict schematically the stratigraphy of the sediments that were encountered in the borings and upstream sampling locations.

Deliverables, Schedule, and Assumptions
The deliverable for this task includes a Field Work Plan, and a TM that will include the following information:
− Logs of bores and/or test pits
− Grain-size analysis
− Particle-size distribution
− Sediment profile along pre-dam main-stem alignment
− Estimate and location of volumes of organics, fines, sands, gravel, and cobble

The draft sediment characterization TM will be provided to the TRC prior to Meeting No. 1. The draft TM will be prepared within one (1) month of completion of the field investigation and receipt of laboratory test results, and finalized based on comments received from the TRC. Consultant understands that Los Padres Reservoir is normally drawn down to its lowest level in the fall, and that the reservoir will not be drawn down to accommodate sediment sampling. Because the preferred Study schedule from the RFP includes initiation of the Study in February 2017, and completion of the sediment characterization field investigation prior to TRC Meeting No. 1, Consultant assumes that the sediment characterization work will be completed with a full reservoir. Consultant will obtain environmental health drilling permits for the proposed investigation, and assumes either no other permits are required, or MPWMD or Cal-Am has—or will identify and obtain—any other permits required for the investigation, including any insurance requirements beyond those prescribed in our professional service contract for this project. We anticipate up to three (3) days of drilling from the barge, and will adjust the boring locations and/or number of borings if unforeseen conditions or circumstances limit our ability to drill all four planned borings within the three (3) days of planned drilling.

Task 2-2 Describe Alternatives

The Consultant will describe reservoir alternatives and potential effects, both positive and negative, from each alternative. The discussion of each alternative will provide enough detail to adequately understand the location of a proposed alternative, potential extent of effects, complexity of the alternative, whether the alternative is short-term or long-term, and list the potential impacts and benefits. A qualitative characterization of costs will be developed (e.g., to help screen alternatives from relatively low-cost to extreme high-cost). The following four alternatives will be among those addressed, as well as a sediment management program:

1. No Action (Alternative 1) may become the baseline for comparing alternatives. The Consultant will evaluate the effect of taking no action to manage the existing sediment accumulation in the reservoir or future sediment inputs. Considerations include:

a. Effects on the downstream Behavioral Guidance System;
b. Effects on steelhead migration over LPD and through Los Padres Reservoir;
c. Effects to downstream channel geometry and habitat for steelhead;
d. Compliance with SWRCB water rights permit conditions;
e. Effects to the water supply for the Monterey Peninsula; and
f. Dam safety.

2. Dam Removal (Alternative 2) includes sediment management and dam removal. Considerations include:

a. Disposal or stabilization of existing reservoir sediment;
b. Potential improvements to steelhead passage and restoration of river habitat in the reservoir area;
c. Potential for public ownership of reservoir property;
d. Expected response of active channel and potential impacts to downstream properties from resumption of the natural sediment load;
e. Reduction in dry season flow and the effect on steelhead habitat below LPD;
f. The effect to water rights and municipal water supply;
g. Impacts to local residents from construction traffic; and
h. For phased removal, dam safety assuming a Probable Maximum Flood (PMF) of 36,000 cfs.

3. (Alternative 3) includes two sub-alternatives that differ in the location where sediment is disposed, summarized in more detail below:

a. Sub-alternative 3a: Dredge and place sediment on Cal-Am property downstream of LPD – The Consultant will review the 2013 MWH report and evaluate whether the downstream sediment disposal site can be expanded to accommodate dredging the reservoir to its original capacity. Considerations include:

i. maintaining dam safety;
ii. DSOD requirements for disposal containment;
iii. sustainability;
iv. impacts to local residents from construction traffic;
v. effects to downstream channel geometry and habitat for steelhead;
vi. effects on steelhead passage over LPD and through the reservoir;
vii. municipal and environmental benefits from an increased water supply.

b. Sub-alternative 3b: Dredge and place sediment off the Cal-Am property – The Consultant will describe dredging the reservoir to original capacity and transporting some or all reservoir sediment to an off-site disposal area. With this alternative, existing public roads in Cachagua Valley would not be used (i.e., Nason Road, Cachagua Road, and Tassajara Road); however, the concept of building a new road or conveyor system on private property

will be evaluated. 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 as Sub-alternative 3a would apply.

4. Storage Expansion (Alternative 4) includes four sub-alternatives that differ in the type and location of the upgraded dam or dams.

a. Sub-alternative 4a: Expand reservoir storage expansion with a rubber dam – The Consultant will describe an expansion of surface storage of up to 9,000 acre-feet through the use of a rubber dam. Considerations include:

i. maintaining dam safety and passage of the PMF;[2]
ii. sustainability, especially of surface storage;
iii. local impacts from traffic and noise;
iv. effects to downstream channel geometry and habitat for steelhead;
v. effects on steelhead passage over a dam and through the reservoir;
vi. water availability analysis (i.e., what effects would alternatives have on instream flows);
vii. municipal and environmental benefits from an increased water supply.

b. Small dam raise at the existing dam – The Consultant will describe an expansion of surface storage of up to 9,000 acre-feet with a small dam raise at the existing dam. It is expected that many of the same considerations as Alternative 4a would apply.

c. Construction of a new dam downstream at the elevation of the existing dam (i.e., elev. =1042.9 NGVD 88) that would inundate the existing dam – The Consultant will describe an expansion of surface storage, with a new dam located downstream. It is expected that many of the same considerations as those for Alternative 4a would apply.

d. Expand surface storage with a combination of two or three methods described above, an alternative that could provide an opportunity to use the original reservoir to continue capturing sediment, allowing a lower reservoir to trap less.

Sediment Management Program

A Sediment Management Program would be relevant to alternatives involving retention or expansion of LPD, and would include evaluation of a long-term sediment management program. The evaluation will describe levels of sediment management 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, the Consultant will determine if there are additional feasible alternatives for removing material from the reservoir and transporting it to a disposal site. The evaluation

[2] The current PMF of 36,000 cfs is based on Hydrometeorological Report (HMR) No. 36, which has been superseded by HMR Nos. 58 and 59. Revised PMF studies that AECOM completed using HMR Nos. 58 and 59 often increase the PMF peak flow rate that the dam and spillway must safely pass. We anticipate that for any of the options under Alternative 4, DSOD would require an updated PMF study to be completed, as well as updated seismic and stability evaluations. The costs of performing these studies and evaluations will be included in the cost estimates for alternatives evaluation, but it is assumed these studies would be completed by others, or under a separate task order.

might consider periodic dredging and removal off site; periodic dredging and placement downstream of LPD, with the intent to allow the material to be captured and entrained by the river at high flows; constructing a sediment capture area in the reservoir; sluicing fine sediment during high flows; or construction of a bypass tunnel for incoming sediment. Other combinations could be evaluated. Considerations 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 (how frequently would sediment management be required?);
4. Effect of fire/landslides in the watershed;
5. Beneficial effects to downstream aquatic habitat (e.g., from restoring a more natural sediment load);
6. Harmful effects on steelhead passage (e.g., from increased bedload and suspended load during high flows);
7. Effects to downstream channel geometry;
8. Effects on flood elevations; and
9. Municipal and environmental benefits from an increased water supply.

Deliverables, Schedule, and Assumptions

The deliverable for this task is a TM describing alternatives and considerations, with preliminary sketches as appropriate. The draft TM will be provided prior to TRC Meeting No. 2, and will be revised based on comments received from the TRC, and additional alternatives development conducted under Task 4.

Dam safety considerations will be evaluated based on information contained in reports made available by Cal-Am, the DSOD, or the MPWMD. The Consultant team assumes up to 15 alternatives and sub-alternatives will be described as part of Task 2-2.

Task 2-3 Evaluate Geomorphic Effects of Changes in Sediment Load

Consultant understands that despite previous sediment studies, there remains uncertainty regarding how much material can be transported through the channel without significant deposition that would lead to an adverse effect on 100-year flood elevations. For the LPD & Reservoir Study, the Consultant will evaluate the potential geomorphic effects from future sediment loading in the river downstream of LPD. Consideration will be given to the following sediment transport alternatives: 1) existing and future effects from the No Action Alternative; 2) existing and future effects from alternatives that do not involve passage of sediment (background or accumulated) downstream of LPD; and 3) effects on the active channel from increased sediment transport past LPD (background sediment and background plus accumulated sediment). The study results will include a description of the range of expected effects to the active channel. Preliminary results will inform alternative descriptions in Task 2-2.

To understand the flooding and steelhead effects of changes in sediment load, the Consultant proposes to estimate the natural range of sediment transport in the Carmel River (Subtask 2-3.1),

and then simulate the geomorphic response to changes in sediment supply using a one-dimensional (1D) morphodynamic model (Subtask 2-3.2). The proposed approach will meet the intent of the RFP, produce a statistical range of channel responses, and allow for evaluation of alternatives at a lesser cost. The 1D morphodynamic model will enable the TRC to understand the trajectory of potential effects for various alternatives. The following subsections describe the scope of Task 2-3 and subtasks, including Subtasks 2-3.1 and 2-3.2.

Subtask 2-3.1 Estimate Natural Range of Sediment Transport in the Carmel River

The purpose of Subtask 2-3.1 is to develop sediment-rating curves for the Carmel River system from Los Padres Reservoir to the ocean. Bedload curves will be used as model input in Subtask 2-3.2, and suspended sediment curves will allow for qualitative discussion of the effects of changes to suspended sediment supply. Curves will be developed for the following reaches: 1) the inter-dam reach between LPD and the upstream end of the inundation zone of the former San Clemente Reservoir; 2) San Clemente Reservoir to Camp Steffani at RM 15.5; 3) Camp Steffani to the Narrows at RM 9.8; 4) from the Narrows to the Carmel River lagoon; and 5) from the lagoon to the ocean.

The Consultant will prepare bedload and suspended-load sediment rating curves for reaches 2 through 5, from the former San Clemente Dam site to the Pacific Ocean. This part of the effort will be informed by available measurements of instantaneous bedload and suspended sediment transport, previously measured by the USGS and Balance Hydrologics. We will also develop bedload and suspended-load sediment rating curves for Reach 1, from LPD to the former San Clemente Dam, reflective of incoming sediment conditions since LPD construction, which we assume captures the near immediate pre-dam era at Los Padres. This will be accomplished using records of reservoir sedimentation, information regarding the gradation of sediments in the reservoir deposits (to be collected in Task 2-1), and an understanding of episodic cycles of sedimentation associated with fire.

Sediment rating curves developed under this subtask will aid development (under Task 4-2) of periodic dredging and placement downstream of LPD (described in Task 2-2), and will help determine the engineering feasibility of replicating the pre-dam sediment transport rates downstream of LPD. The Consultant will establish a range of flows at which sediment could be entrained; determine the gradation of material to entrain; propose a method to relocate sediment to an area where the river can capture the sediment (one of the sediment management approaches preliminarily described as part of Task 2-2); and estimate the range of annual volume of sediment that could be transported for the range of water-year scenarios developed in Task 1-1.

Subtask 2-3.2 Simulation of Geomorphic Response to Changes in Sediment Supply

To simulate probable downstream channel responses to upstream variations in both water and bedload sediment supply (Scenario 3 above, effects on the active channel from increased sediment transport past LPD) and to understand the timeline of those changes, we will use an efficient 1D morphodynamic model based on the work of Gary Parker at the University of Illinois and refined by Carles Ferrer-Boix and Marwan Hassan at the University of British Columbia.

From the results, we will estimate a time series of downstream channel slope and bed sediment character responses, and identify statistically probable downstream equilibrium channel slopes and bed sediment character associated with each particular supply case. Simulations will be prepared for the five reaches of the Carmel River described under Subtask 2-3.1, from LPD to the Pacific Ocean, with cross-sections spaced roughly 100 to 250 meters apart. For efficiency's sake, simulations will assume steady flow, and will use the normal flow approximation. Sediment supply magnitude, frequency, and composition will be varied to reflect the dam removal alternative, as well as the identified sediment management alternatives. For any given simulation, many different sediment supply magnitude, frequency, and compositional scenarios can be dispatched to evaluate sensitivity of simulated equilibrium slope to the character of sediment supply. Topographic input to the model will rely on LiDAR or other available data such as the National Elevation Dataset, augmented with available channel section data from previous modeling or data collection efforts (e.g., 2009 FEMA Flood Insurance Study or Carmel River IFIM).

Results from the Subtask 2-3.2 simulations will include tables, maps, and plots of probable equilibrium slope conditions and bed sediment character for the five reaches.

Task 3: Evaluate Effects on Steelhead

The Consultant will evaluate and summarize potential effects to steelhead and their habitats, in the context of the South-Central California Coast (S-CCC) steelhead population, as a result of the alternatives to be studied. Preliminary results from Task 3 (or Tasks 3-1 and 3-2, if Task 3-3 results are not available) will inform the alternative descriptions in Task 2-2.

Task 3-1 Increases in Sediment Transport

The Consultant will evaluate the effect of increases in suspended load and bedload associated with alternatives that would result in sediment being transported past LPD in the foreseeable future on all steelhead life stages. This will include effects on juvenile and adult migration; spawning substrate, redds, and alevins; and rearing substrate and habitat. The effect of increased sediment transport on the overall steelhead population will also be evaluated, to the extent possible, based on available data.

The analysis will focus on the response of steelhead and their habitat to increases in sediment in at least the following five response reaches: 1) the inter-dam reach between LPD and the upstream end of the inundation zone of the former San Clemente Reservoir; 2) San Clemente Reservoir to Camp Stephani at RM 15.5; 3) Camp Stephani to the Narrows at RM 9.8; 4) from the Narrows to the Carmel River lagoon; and 5) from the lagoon to the ocean. These response reaches are consistent with the sediment transport analysis in Task 2, and may be subdivided, based on key tributary junctions, expected geomorphic responses to increased sediment, and other reach-scale features, to provide a more detailed level of analysis. Increased suspended sediment could affect adult migrating steelhead and rearing juveniles in any of these reaches depending on the time of year.

The quality and extent of spawning and rearing habitat will also be influenced by increased sediment deposition, with effects that vary with distance from the dam, as well as reach-specific channel gradient, confinement, or other factors. Increased sediment deposition in the Carmel River lagoon may also influence the extent and quality of estuarine rearing habitat, as well as sandbar breaching dynamics.

Based on the steelhead population data available from the NMFS' steelhead recovery plan, trapping and fish count data available from the MPWMD, CDFW habitat and fish surveys, and other readily available sources, the effects analysis will consider the proportion of the steelhead cohort (of each life stage) predicted to be present in the response reaches during suspended sediment events under each alternative, considering both spatial distribution (proportion of the life stage expected to be in the response reaches compared to tributaries, and proximity to LPD), and life-history timing (proportion of the population expected to be present during the period of effect). Describing which life-stages of steelhead will occur in each response reach during key periods of expected increases in sediment is critical to understanding potential effects.

For the proportion of each life stage anticipated to be exposed to increased sediment, the predictions of the order–of-magnitude changes in Total Suspended Sediment (TSS) relative to an unimpaired condition from the sediment transport analysis for each alternative (Task 2) will be integrated with an evaluation of the impacts of varying TSS concentrations and durations on each stage of steelhead life. This evaluation will rely on the synthesis of the effects of high TSS on salmonids by Newcombe and Jensen (1996) since Carmel River-specific thresholds are not available. This method will be used to estimate the relative magnitude-of-severity of ill effects on specific life stages (juvenile and adult migration, spawning and rearing, and alevins) of steelhead in each of the response reaches. All effects analysis is based on comparing the severity of effect with sediment management, in comparison to existing conditions. Each alternative (and various scenarios of each alternative) will be assessed based on the season of sediment release, and the severity, frequency, and persistence of the effects.

Using this analytical approach, the Consultant will estimate the proportion of juvenile steelhead that are expected to rear in the affected reaches and will suffer some level of direct mortality; the proportion anticipated to be far enough downstream to suffer only sub-lethal effects; and the proportion in tributaries able to avoid effects entirely. The same analysis will be conducted for each life stage, and for each scenario. The population-level consequences of each scenario will then be assessed, based on the loss of the estimated proportion of redds, alevins, juveniles, and adults from each cohort anticipated to be present during each year of potential increased sediment.

In addition to assessing the potential effects of suspended sediment on steelhead, the Consultant will also assess the effects of increased sediment transport on habitat for steelhead, including juvenile rearing habitat and spawning habitat. Results of sediment transport analysis (Task 2) will be used to predict the effect of each alternative (and scenarios of each alternative) on the channel profile (Task 2) in each of the response reaches, and over time. These results will be used to assess the degree to which sediment deposition reduces pool volume, increases available spawning habitat, and increases floodplain habitat access from increased bed elevation. Predictions of bedload substrate size composition (Task 2) will also be assessed to predict how

changes in substrate facies affect spawning habitat. The predicted effects on steelhead habitat will be compared with the spatial distribution of steelhead spawning and rearing in the watershed to evaluate the likely population level effects of the various alternatives.

This task will include a one (1)-day field reconnaissance survey to evaluate existing habitat conditions.

Task 3-2 No Increase in Sediment Transport

For alternatives that result in no sediment being transported past LPD in the foreseeable future, we will describe the expected effect of continued lack of sediment transport on spawning and rearing habitat downstream of LPD in the same response reaches described in Task 3-1.

Existing channel cross-section data and descriptions of current channel morphology will be assessed, as well as results of current gravel augmentation projects. In particular, we will focus on the distribution, quantity, and quality of current spawning habitat in the Carmel River downstream of LPD. Areas with affected rearing habitat will also be evaluated. Based on this assessment, to the extent feasible, an estimate will be made of the minimum volume and gradation of bedload material necessary to re-establish spawning and rearing in areas considered to be armored, or otherwise impacted by existing sediment starvation.

Task 3-3 Incorporate Data from Alternative Water Supply Options

MPWMD will provide time-series data of water availability and availability of steelhead habitat based on water availability in the main stem for the alternatives to be studied. For alternatives involving reservoir storage expansion, the effect of a larger volume of water in the reservoir will be described. The Consultant will include the information as part of the evaluation criteria, and present the information at one of the TRC meetings if it is available.

Deliverables, Schedule, and Assumptions (all Task 3)

The deliverable for Task 3 is a TM summarizing effects to steelhead of varying levels of water supply and sediment transport in the river, and potential changes to steelhead and their habitats. The draft TM will be provided prior to TRC Meeting No. 2, and will be revised based on comments received from the TRC after the meeting.

Consultant assumes that information related to water and steelhead habitat availability, to be provided by others, will be available two (2) months prior to the scheduled due date of the Task 3 draft TM, or will require additional effort to incorporate into the Study. This task does not include collection of data describing existing conditions in the Carmel River (e.g., locations of channel armoring), and will use existing data and the results of Task 2 as the basis for analysis.

Task 4: Identify Feasible Alternatives

For this task, the Consultant will present the final results of Task 2 and the initial results from Task 3 at TRC Meeting No. 2; and develop feasible alternatives, evaluate benefits and impacts, and rank alternatives, the results of which will be presented at TRC Meeting No. 4.

Task 4-1 TRC Meeting No. 2

The Consultant will meet with the TRC to discuss feasible alternatives and criteria for evaluation. Using the information developed in Tasks 1, 2, and 3, the Consultant will develop a draft evaluation matrix of alternatives and evaluation criteria prior to scoring. Information developed will be packaged and distributed to the TRC in advance of the meeting. A key objective of this meeting will be to discuss and confirm a list of feasible alternatives for additional development. The meeting will be conducted as a workshop, with the following preliminary agenda items:

1. Briefly review background information, including previous TMs.
2. Review and update evaluation and comparison criteria prior to beginning discussion, so all meeting attendees are familiar with the criteria that must be met or addressed.
3. Discuss alternatives matrix; identify risks and uncertainties associated with each concept, and develop a list of study and informational needs that will be required to finalize selection of concepts. This will include any information needed to confirm poor viability of any concept with fatal flaws.
4. Review concepts with respect to obvious fatal flaws. Any alternatives that are not constructible, or that have less than a good chance of satisfying all crucial criteria (i.e., are fatally flawed) will be dropped from consideration. If a concept is to be dropped due to high risk or uncertainty, discuss how this uncertainty could be reduced. Descriptions of those alternatives and their fatal flaws will be summarized with a meeting record for the final report.
5. Assign a priority to develop additional information or design drawings for shortlisted alternatives.
6. Document those alternatives that were not selected.
7. Adopt a common format for alternative development

The Consultant will send at least two members to the meeting to participate in and assist with conducting the meeting; they will be prepared to facilitate web meeting and conference call participation for participants unable to attend in person, and will record and distribute draft meeting notes for review.

Deliverables, Schedule, and Assumptions

Deliverables for this task include:

− Distribution of the final Task 1 (background information, evaluation criteria, and data gaps) and Task 2-1 (sediment characterization) TMs, and draft documents developed under Task 2-2 (preliminary alternatives descriptions), Task 2-3 (geomorphic effects), and Task 3 (effects on steelhead) to the TRC 3 to 6 weeks prior to the meeting.

− Workshop agenda provided prior to TRC Meeting No. 2.

− Meeting report with notes from TRC Meeting No. 2 describing the alternatives considered and discarded, conclusions, and recommendations for further analysis, to be provided 2 weeks after completion of the meeting.

Task 4-2 Alternatives Development

This task is to further develop the alternatives selected during TRC Meeting No. 2, and focus on uncertainties concerning impacts, benefits, costs, environmental compliance, and permitting of alternatives. Alternatives that are not feasible will be dropped from consideration, and reasons for them being dropped will be described. It may be that an alternative scores low due to a specific uncertainty; in this case, the alternative will be retained and a plan to address this uncertainty identified. The final list of feasible alternatives identified during TRC Meeting No. 2 will be considered for additional development. The primary goals of this task are to:

− Define each concept with respect to its operational characteristics.
− Draw and define the concepts so that the design intent is clearly communicated. The Consultant team will develop a common format for drawings in this task.

For each alternative, the Consultant will provide:
1. Plan and section drawings to scale, to adequately define the concept.
2. Function design features, shown on the sketches, or on separate sheets.
3. Brief write-up suitable for review to describe the concept's key characteristics and how the alternative operates.
4. List of pros and cons for each alternative relative to operations.
5. An evaluation matrix containing alternatives and the evaluation criteria. The evaluation matrix will build on the criteria previously developed, and will be presented in a grid form or Pugh Matrix, which breaks down the alternatives into discrete elements for comparison, evaluation, and optimization.

With the additional investigation, some of the preliminary concepts or alternatives developed under Task 2-2 may prove to be infeasible, or may be modified as part of this Task.

Deliverables, Schedule, and Assumptions
The deliverable for this task is a TM that includes:
− compilation of alternatives
− an evaluation matrix
− supporting documentation

This TM will be developed by revising and expanding on the TM developed for Task 2-2 (preliminary alternatives), and will be provided 3 to 6 weeks prior to TRC Meeting No. 3. The Consultant will retain a dam removal alternative and a reservoir expansion alternative for the duration of the study, through the final set of alternatives, regardless of their perceived feasibility. The Consultant assumes up to five alternatives and sub-alternatives will be further defined in Task 4-2. The contents of the TM will be revised based on comments received at TRC Meeting No. 3 for inclusion in the Task 5 report.

The Consultant will develop an opinion of probable construction and operations and maintenance costs for alternatives carried forward to Task 5. If the project proponent(s)' ability to afford or obtain funding for the project is to be included in the evaluation criteria, Consultant

assumes that information will be provided by others, or will require additional effort and a contract amendment.

Task 4-3 TRC Meeting No. 3

The Consultant and TRC will meet to finalize the alternatives and the evaluation criteria, and review the evaluation matrix. Protocols will be similar to Meeting Nos. 1 and 2. The evaluation matrix will be used during this meeting to prepare an evaluation of the alternatives, and will result in consolidated scores. The results of the matrix evaluation can be used to further refine facility components, identify data gaps, and assess the potential influence of uncertainties. The process of developing and using the matrix, along with provisional criteria that will be used in it, will follow the guidelines explained in the Proposal, Appendix A: Alternatives Evaluation Process and Criteria. Based on the results of our evaluation, the Consultant will work to update descriptions and drawings for the alternatives (Task 4-2). The results will be presented to the TRC for review at TRC Meeting No. 3, with the goals of receiving input and the TRC reaching consensus on a final list of alternatives, and making recommendations for scoring the alternatives. The meeting will be organized as follows:

1. The Consultant will present an overview of the work completed to date, and will address any questions from the previously distributed meeting notes.
2. Discuss and refine evaluation criteria based on the current state of the alternatives.
3. Identify any criteria that would constitute a fatal flaw, if not fundamentally satisfied.
4. Identify any uncertainties and/or risks associated with each alternative, and a means to address these issues.
5. Review the alternatives evaluation matrix, select weighting factors, and update the matrix based on input at the meeting.
6. Perform a fatal flaw analysis on each alternative; eliminate alternatives with fatal flaws; and record eliminated alternatives for reporting in the meeting notes.

Deliverables, Schedule, and Assumptions

The deliverable for this task will include a meeting agenda, and a meeting summary with the following:
1. Final evaluation spreadsheet.
2. List of alternatives identified in the session.
3. List of additional information necessary to reduce uncertainty or risks associated with each alternative.
4. A discussion of the fatal flaw analysis and documentation of alternatives eliminated from further consideration at this time.
5. A recommendation of alternatives for further development.

A draft meeting summary will be provided for review by the TRC within 2 weeks of completion of the meeting. The meeting summary will be finalized following TRC review of the draft, based on feedback from the TRC.

Task 5: Final Report

Once alternatives are defined, an initial opinion of probable construction and operating cost will be provided in this task for each alternative. Estimates will be to a Class 5 level, as defined by the Association for the Advancement of Cost Engineering International (AACE)[3]. The cost estimates will be suitable for comparison of the alternatives, but may not reflect an accurate number for capital budgeting, because they will be developed based on very limited information. The level of accuracy of the estimate will be commensurate with a concept-level screening process, and—depending on the complexity of an alternative—may have a wide expected accuracy range. The estimated performance of the alternatives over the long-term (where long-term has been previously defined in coordination with the TRC) will be compared. While working on this task, the Consultant will describe operational protocols and issues, address comments and/or issues brought up at previous meetings, and address constructability issues and any remaining data needs or significant risks. A dam removal option and reservoir expansion option will be included in the final list of alternatives.

Task 5-1 Prepare Draft and Final Report

Prior to preparing the Draft LPD and Reservoir Alternatives and Sediment Management Study Report (Report), the Consultant and TRC will have reviewed the final set of alternatives and made recommendations at TRC Meeting No. 3. A Report (including a Report Outline, Draft Report, and Final Report) will be developed to document the scope of the study, background information used, design criteria, the process used to conduct the analyses, the results of the analyses, and the TRC recommendation. A preliminary outline for the Report is provided in Figure 6.3.

An updated Report Outline will be developed by the Consultant for review by the TRC, and the Draft Report will be developed in consideration of any comments received on the Report Outline. The Consultant will provide a Draft Report to the TRC for review. The TRC will review the technical feasibility of the alternative(s), the expected performance, and the cost to construct and operate each alternative. Evaluation of alternatives will include strong consideration of the risk; uncertainties associated with the implementation and performance of the alternatives; and whether alternatives would include continuation of the existing trap and transport facilities. If no substantive issues are raised during the review, the Consultant will respond to minor comments in writing and during a 2-hour conference call, and move on to production of the Final Report.

Deliverables, Schedule, and Assumptions

[3] "AACE International Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 10% complete. They are typically used for any number of business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, or long-range capital planning. Virtually all Class 5 estimates use stochastic estimating methods such as cost curves, capacity factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may have been spent preparing the estimate depending on the project and estimating methodology."

Deliverables for this task include:
− Report Outline
− Draft Report, to be provided for TRC review at least 30 calendar days prior to the scheduled preparation of the Final Report − Response to comments on Draft Report (written and via 2-hour conference call)
− Final Report

Consultant assumes there are no more than three alternatives or sub-alternatives carried forward through the Study to Task 5, and that no substantive issues requiring additional TRC meetings or Web meetings are raised during Task 5, or in response to the Draft Report. For all tasks (1 through 6), all reports will be provided electronically, and hardcopy deliverables may be provided with additional effort.

Task 6: Project Management

This task consists of standard project management tasks, including scheduling, budget tracking, invoicing, health and safety, quality management, and general project communications.

Task 6-1 Project Administration
Consultant will use its Project Delivery System as described in the Proposal to assist its project managers in the successful execution of this project. The Consultant Project Manager will maintain logs of Action Items, Deliverables, and Decisions that will be included, as appropriate, in progress reports or Project Management meeting minutes, to keep key participants informed of project status.

Task 6-2 Meetings and Conference Calls
In addition to project tracking and quality control, under this task the Consultant Project Manager will facilitate meetings (in addition to the TRC Meetings described under other tasks) with MPWMD, Cal-Am, and other interested parties, including, but not limited to: 1) kick-off meeting with MPWMD and Cal-Am; 2) review of existing and proposed operations in the field with MPWMD and Cal-Am; 3) meetings with regulatory agencies as required to determine constraints. Meetings will generally be held at the MPWMD Ryan Ranch office or at the Cal-Am Pacific Grove office, unless other arrangements are made. Consultant will host meetings at 300 Lakeside Drive office beside Lake Merritt in Oakland, on request. Consultant will also facilitate a monthly, 1-hour conference call with the MPWMD Project Manager and any other appropriate parties to coordinate various aspects of the Study.

Deliverables, Schedule, and Assumptions
Deliverables under this task include:
− Invoices and progress reports transmitted monthly to the MPWMD. Each invoice will be transmitted with a progress report that includes a description of tasks performed and accomplishments, a comparison of budgeted versus actual expenses, and a discussion of the schedule progress. Invoices and progress reports will be transmitted electronically.
− Copies of communications among agencies and the Consultant (if appropriate).
− Minutes for meeting conducted under this task.

− Periodic transmittals of Action Items, Deliverables, and Decision logs, as appropriate.

Consultant assumes that meetings conducted under this task will include three in-person meetings (one kick-off meeting, one operations meeting in the field, and one meeting with regulatory agencies to identify constraints), held in the Monterey Peninsula/Carmel River area (travel required), each to be attended by two Consultant staff. All other meetings are assumed to be simple conference calls (no presentation or travel required), also with participation of up to two Consultant staff, and Consultant has budgeted for a total of twenty 1-hour conference calls.

EXHIBIT B – FEE SCHEDULE

Task	Description	Hours	Budget
1	**Feasibility Study Preparation**	**250**	**$44,392**
1-1	Compile Background Information	75	$12,195
1-2	Prepare Evaluation Criteria	59	$10,225
1-3	Identify Critical Data Gaps	42	$7,158
1-4	TRC Meeting No. 1	74	$14,814
2	**Sediment Management Options**	**749**	**$210,500**
2-1	Obtain and Analyze Reservoir Sediment Samples	252	$94,273
2-2	Describe Alternatives	258	$42,692
2-3	Evaluate Geomorphic Effects of Changes in Sediment Load	239	$73,535
3	**Evaluate Effects on Steelhead**	**267**	**$40,975**
3-1	Increase in Sediment Transport	123	$18,266
3-2	No Increase in Sediment Transport	55	$9,080
3-3	Incorporate Alternative Water Supply Options and Task 3 TM	89	$13,629
4	**Identify Feasible Alternatives**	**590**	**$91,295**
4-1	TRC Meeting No. 2	128	$20,221
4-2	Alternative Development	388	$56,260
4-3	TRC Meeting No. 3	74	$14,814
5	**Final Report**	**340**	**$51,878**
5-1	Prepare Draft and Final Report	340	$51,878
6	**Project Management**	**337**	**$60,660**
6-1	Project Administration	207	$34,536
6-2	Meetings and Conference Calls	130	$26,124
Total		**2533**	**$499,700**

EXHIBIT C – SCHEDULE

If the Schedule differs from that in the Proposal, a refined schedule is to be submitted within 30 days of execution of agreement. All tasks to be completed within 18 months of execution date of agreement.