

**Proposal for
Lopez Water Project Habitat Conservation Plan
Hydrogeologic Services (PS-#1248)**

Cost Proposal and Project Assumptions

23 September 2014

Prepared for:



San Luis Obispo County
General Services Agency
1087 Santa Rosa Street
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Prepared by:



INTRODUCTION

In response to your request, ECORP Consulting is pleased to provide this detailed scope of work, cost estimate and proposed schedule. Within this submittal are two sections. Section 1 provides discussion of the following tasks:

- Task 1: Review existing model data and verify, update, and develop OASIS simulation model
- Task 2: Water Availability Analysis
- Task 3: Downstream Release Program Alternatives
- Task 4: Project Oversight, Coordination, and Strategic Planning

The fourth task is not something the District specifically requested, but is important to the success of this effort. Section 2 provides a discussion of optional tasks that may be needed to complete the project.

Enclosed are a detailed cost estimate and proposed schedule for the required tasks included in Section 1.

SECTION 1 - SCOPE OF WORK

ECORP Consulting, Inc. (ECORP) will be the prime contractor on this assignment with ECORP's Michael J. Preszler, serving as the Project Manager and principal point of contact. Mr. Preszler will report directly to the County of San Luis Obispo and San Luis Obispo County Flood Control and Water Conservation District (District) with respect to all matters related to this work effort. Jeff Meyer of ECORP will be the Technical Director for this assignment. Our team of noted experts is available to begin work immediately. ECORP will be supported by two subcontractors, Cleath-Harris Geologists, Inc. and Hollenbeck Consulting. All work is planned to be completed within the nine-month schedule assumed for this assignment, following written authorization to proceed. Key project team members included in this work effort are listed below.

Team Member	Responsibility
Mr. Michael J. Preszler, P.E.	Project Manager, Water/Hydropower
Mr. Jeff Meyer, P.E.	Technical Director
Jared Emery, P.E.	Simulation Modeling / Hydrology
Timothy S. Cleath, PG, CHG, CEG	Groundwater / Local Agriculture
Spencer J. Harris, PG, CHG	Groundwater
John Hollenbeck, P.E.	QA/QC – Strategy Support
Paul Cylinder, Ph.D. ¹	HCP Technical Advisor
Terry Adelsbach ¹	HCP Technical Advisor
Chris Stabenfeldt ¹	CEQA Technical Advisor

In addition to the project team members listed above, we will employ support staff to perform necessary project functions such as word processing, information transfer, and document/graphics development.

ECORP will initiate the technical and strategic consulting services to support the District in connection with the Lopez Water Project HCP Hydrogeological Services by carrying out the tasks described below. This scope of work and cost proposal is in response to the Request for Proposals PS-#1248 dated February 14, 2014. We have developed our scope of work and cost proposal based on our current assumptions about and understanding of the project, the directions provided by the

¹ Potential Additional Services, see Section 2

District in its RFP, and our professional assessment of the most effective approach based on our experience.

Task 1: Review existing model data and verify, update, and develop OASIS simulation model

Task 1.1 Review of existing models and available documentation

ECORP proposes to use the OASIS model, as it is a superior tool to the RiverWare™ model for addressing the District's needs on this project. Information contained in the existing spreadsheet and RiverWare™ modeling system will be utilized to the maximum extent possible. Information and data will be extracted for use in the OASIS model development to accurately represent the Lopez Lake operations. A draft simulation modeling schematic created using the OASIS software package is illustrated in Figure 1. The finalization of this simulation modeling schematic is an early task in the development of the technical approach for the HCP analysis.

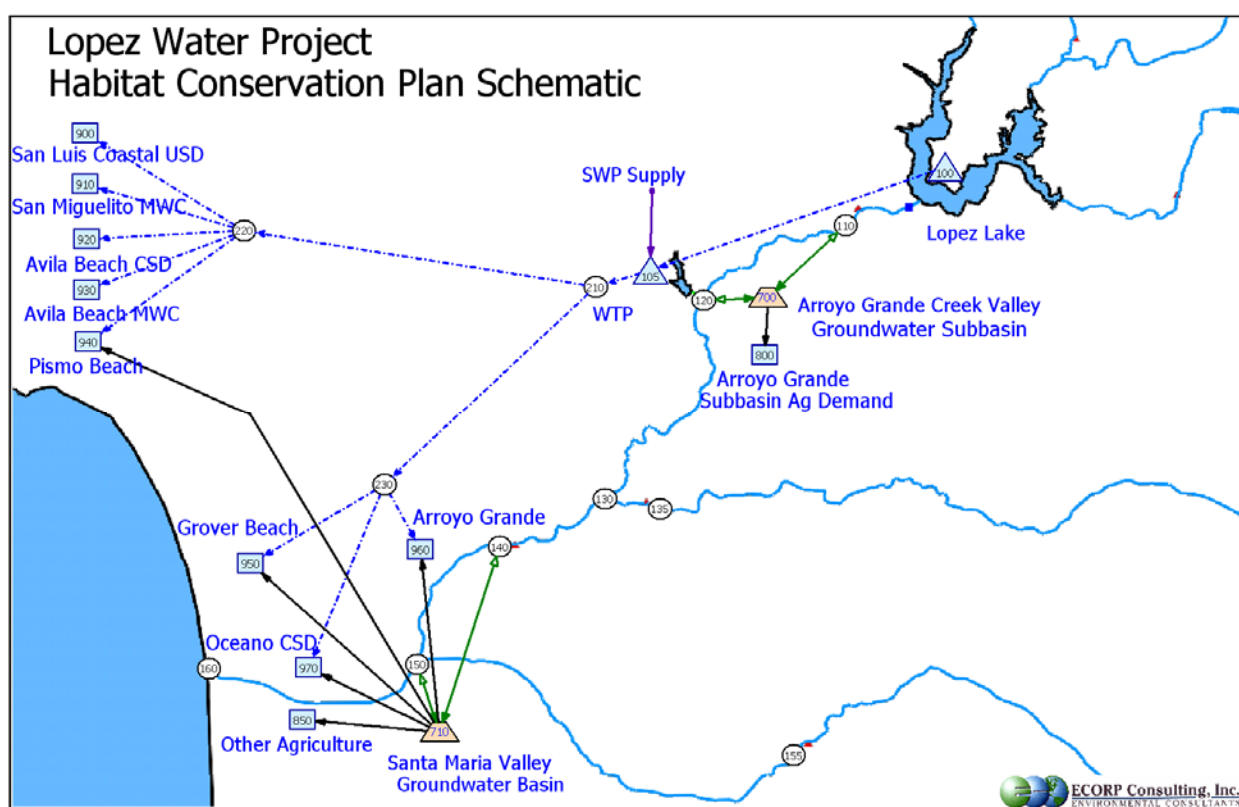


Figure 1 - OASIS Modeling Platform Draft Schematic for the Lopez Water Project HCP

The OASIS modeling platform is extremely flexible and modular and in addition to the HCP project, could be used by the District for multiple future applications, including testing of drought policy, determining feasibility of potential water sales, and operations forecasting and optimization. The flexibility of the platform allows for expansion of the model to include other District water resources and facilities or changes to existing facilities such as pipeline capacities or increases in reservoir storage.

Task 1.2 Review reservoir data and extend hydrology

The existing operations model uses a hydrologic dataset from 1969-2004. The mean-daily hydrologic dataset will be extended an additional nine years (1969-2013), using the recent reservoir operations

data. Preliminary review of the existing modeling tools indicates a potential error in the method used to create the 1969-2004 inflow dataset. This task includes review and revision, if necessary, of the original hydrologic dataset. The result of the efforts completed under Task 1.2 is the creation of a 1969-2013 hydrology dataset on a daily time step.

Task 1.3 Review and coordinate information with stakeholders

Under this task, ECORP will engage stakeholders in the development of the simulation model. This process is used to correctly reflect stakeholders' usage in the formulation of the demand dataset. In addition, we will interview project operators to identify operational nuances and procedures that should be reflected in the modeling. While engaged with the stakeholders, we will work with them to prepare performance measures that can be reviewed to compare alternative operational regimes.

Task 1.4 Develop OASIS simulation model of system and Baseline study

Using the information and data obtained from the existing model review, stakeholder interviews, and the extended hydrologic dataset, ECORP will develop an OASIS model application of the Zone 3 system. The model output will be compared to the recent historic data for validation. This first scenario will serve as the Baseline description of existing system to which all alternatives will be compared. We are sensitive to potential differences in federal and State regulatory agency interpretations of what constitutes baseline conditions and will work with the project team and the agencies to ensure full understanding.

Task 1.5 Prepare documentation of model assumptions

The Baseline study methodology, assumptions, and results will be documented for District review and use. Documentation will include operating policies, permits, licenses and agreements, current facilities, and current levels of demand.

Task 1 Deliverables

- Baseline model results
- Model documentation

Task 2: Water Availability Analysis

Task 2.1 Project Approach and Objectives

ECORP will conduct a Water Availability Analysis (WAA) in accordance with SWRCB practices for submittal to the SWRCB, and for use in the hydrology, water quality, and project operational impact analysis. Our analysis will start with documenting projected water needs. Much of this information has been developed in the past based on information contained in the *Water Resources Development and Management Plan, 2008* (Water Plan). Water needs will be documented for the build-out demand.

Next, we will determine the impaired and unimpaired streamflow over a 45-year study period (historic years 1969 through 2013) by evaluating effects resulting from higher priority direct diversion water rights (value of water right and not actual water use), higher priority storage water rights, documented riparian water rights, and instream flow requirements. This analysis will include a discussion of the cumulative effects of all water diversions in the watershed.

It is advantageous to finalize the downstream release program prior to completion of the WAA. Therefore, this process will be somewhat iterative as we move through the negotiations. The Project Manager and Technical Director will prepare for and attend a two-hour meeting with State Water Resources Control Board (SWRCB) staff to discuss specific details associated with the pending water rights filing application.

Lastly, the WAA will include an estimation of water supply in wet, average, and dry water years in support of CEQA and NEPA review. Supply analysis may utilize correlation techniques using historic streamflow and precipitation data, or other acceptable methods depending on available hydrologic data. A comparison of supply and demand for the 45-year study period will be completed to verify that water is available under the water rights applications for appropriation.

In addition to crafting the necessary information to support the WAA required by the SWRCB, it is anticipated that this work effort will be used for environmental analysis of the Arroyo Grande Creek watershed potentially affected by the project.

Task 2.2 System Description

ECORP will provide a technical description of the pending water rights applications. This description will include the use of Lopez Lake storage facilities. Direct diversion from the Arroyo Grande riparian water users will be discussed. The total maximum diversion and re-diversion of water from project sources will be described, including the maximum volume and timing of supplemental water required, if any. Our team will describe the project facilities, including development of maps illustrating the project and place of use and a description of the points of take. This system description will be based on existing information.

Task 2.3 Modeling of system

ECORP will develop procedures, criteria, and assumptions used to determine availability of water from project sources to meet Zone 3 water supply needs. The primary tool for this task is the OASIS model of the project developed in Task 1. In addition, this task will allow development of operating criteria and assumptions. The operation assumptions will be based on the base case operation for the historic years 1969 through 2013 period. ECORP will demonstrate that this period of record is adequate for this study. This includes reservoir releases, direct diversion, and rate of take. The strategy employed in determination of the WAA will be documented.

Task 2.4 Effects of HCP on agricultural and municipal groundwater supply

ECORP will conduct land use and well survey/inventory between the dam and the ocean to identify areas where agricultural and municipal wells tap zones receiving recharge from Arroyo Grande Creek, the fields/water systems they serve, and their estimated historical production. The survey will include research and field verification.

Task 2.5 Draft Technical Report for Submittal to SWRCB

The WAA will be summarized in a Draft technical report (Draft Water Availability Analysis) suitable for submittal to the SWRCB. This draft document will be circulated to appropriate parties, including the District's legal counsel, for review and comment.

Task 2.6 Final Technical Report for Submittal to SWRCB

ECORP will incorporate and address each of the comments and suggested changes to the Draft Water Availability Analysis. This will include text changes and may also include changes to graphics/maps and other illustrations. Once comments have been incorporated, the Final WAA will be prepared and made ready for submittal to the SWRCB. This task will include a complete cover-to-cover technical review by the Project Manager and Technical Director.

Task 2 Deliverables

- Draft Water Availability Analysis – digital file
- Final Water Availability Analysis – digital file and three (3) hard copies

Task 3: Downstream Release Program Alternatives

It is anticipated that up to four (4) Lopez Lake water release alternatives will be considered and analyzed for water operations to support biological analyses and decisions by the District. This task will use the model developed in Task 1 to evaluate downstream release alternatives. Tasks 3.1 to 3.3 describe three (3) alternatives that will be used to begin the process; the fourth alternative is the Baseline (see Task 1.4).

The OASIS modeling platform is capable of generating tables and graphs immediately following model execution. Performance measures can be developed to identify if a scenario performs better or worse than any other scenario relative to specific performance objectives. As an example, Lopez Lake storage and delivery might be an indicator of the success or failure of a downstream flow alternative to meet project goals. These performance measures will be developed prior to alternative development to help identify critical elements. All effects will be measured from the Baseline study developed in Task 1.4.

Task 3.1 Develop Technical Input to Evaluate HCP Alternatives

ECORP will compile information on the sources of inflow and outflow within the Arroyo Grande subbasin and the area of the Santa Maria basin where inventory wells are located. Using this information, the team will analyze the relationship between reservoir releases and groundwater availability and lay the groundwork for a more in-depth review of potential water supply impacts in sufficient detail to support the preparation of environmental documents.

Task 3.2 Develop Operate to Water Rights Alternative

ECORP will evaluate an Operate to Water Rights alternative in two steps. For step one, Lopez Lake and municipal demands will be “removed” from the simulation model. This will allow estimation of the unimpaired flow of Arroyo Creek representing the quantity and timing of water available for downstream riparian diverters. In step two, the Lopez Lake Project’s simulated operation will be evaluated using the downstream deliveries to agricultural users determined in step one. The resulting evaluation will illustrate project operations under existing water rights.

Task 3.3 Develop Best Habitat Case Alternative

ECORP will work with the District and other members of the project team to develop the Best Habitat Case alternative using the priority system built into the OASIS model. In the Best Habitat Case Alternative, competing goals include meeting habitat requirements of steelhead and other aquatic species, supporting riparian habitat, meeting agricultural demands, meeting municipal demands, preserving minimum carryover storage in Lopez Lake, and meeting downstream flow requirements. Priority weighting of agricultural demands would have the highest weighting as they are the most senior in terms of water rights (these rights will be determined from the analysis of the Operate to Water Rights Alternative).

As municipal contracts are inviolate, meeting those demands would receive the next highest weighting. Meeting downstream flow targets would receive a lower weighting. It is likely that storage weighting would have the lowest weighting; however, carryover storage is very important in planning for operations for subsequent years. ECORP will work with the District to determine the level of acceptable risk to accept in drawing down the reservoir. ECORP will support the District in making these decisions and potentially addressing District policy for operating the reservoir.

Task 3.4 Develop HCP Alternative

Based on the Baseline, Operate to Water Rights alternative, and Best Habitat Case alternative described above and using the power of the OASIS modeling tool, ECORP will work with the project

team to develop the HCP Alternative. We anticipate that the HCP Alternative will fall somewhere between the Operate to Water Rights Alternative and the Best Habitat Case Alternative. The OASIS modeling platform with developed performance measures will be used to test operational scenarios to reach the optimal solution for operations in balancing fishery and supply needs. From such model outputs, the user can quickly identify the effects of each scenario. We plan to use methods such as these to develop the HCP Alternative in an efficient and transparent process that engages the District, agencies, and stakeholders. This HCP Alternative may actually be several iterations leading to a negotiated settlement.

Task 3 Deliverables

- Model results
- Technical memo of assumptions

Task 4: Project Oversight, Coordination, and Strategic Planning

Task 4.1 Overall Project Coordination

4.1.1 Project Management and Coordinate Task Activities

The Project Manager will, over the duration of the project (nine months), undertake ongoing management and oversight of all project activities. This will require detailed coordination with our two sub-consultant firms represented, where appropriate, by their Technical Leaders and close interaction with the Technical Director. Activities under this subtask are assumed to include schedule development and review, progress monitoring, technical collaboration, personnel/staff planning, budgetary oversight, and ongoing liaison with the District.

4.1.2 District Kick-Off and Coordination Meetings

Over the nine-month duration of the project assignment, the Project Manager and Technical Director will prepare for and attend up to three (3) two-hour coordination meetings with the District, held in San Luis Obispo County. As the first of these three meetings, we plan to start the project with a kick-off meeting to introduce team members, establish communication protocols, and begin to gather data to support model construction. The remaining two coordination meetings would be scheduled to provide a venue for discussion on topics including, but not necessarily limited to, the implementation of the strategic approach, interagency/stakeholder liaison, key issues, project definition, potential alternatives, hydrologic modeling, water availability, and SWRCB liaison. These would be ad hoc meetings, and scheduled at mutually agreed times as specific needs arise.

4.1.3 TAC Meetings

The Project Director and Technical Director will attend up to five (5) Technical Advisory Meetings (TAC) meetings assumed to be held in San Luis Obispo. It is assumed that the TAC meetings will serve as a forum for broad issues discussion related to the HCP process and the Lopez Water Project HCP Hydrogeologic Services throughout this effort.

4.1.4 Prepare 9 Monthly Progress Reports

The Project Director will prepare nine (9) monthly progress reports for submittal to the District. These reports will capture the activities of the ECORP project team over the past month. They will include summaries of all meetings undertaken, technical progress, key analytical assumptions made, any preliminary analyses completed, identification of problems or issues, recommended actions, and a summary of the next month's anticipated activities.

Task 4.2 Strategic Planning

4.2.1 Develop Project Approach

The project approach, stemming from discussions and input from the Coordination Meetings (see Subtask 4.1.2 above), will be developed by the Project Director and Technical Director with input from the various Technical Leaders where necessary. This will be an essential early element of the project, as it will guide the overall development of the analysis.

4.2.2 SWRCB Water Rights Application Briefing Meeting

The Project Director and Technical Director will prepare for and attend a 2-hour meeting with SWRCB staff to discuss specific details associated with the pending water rights filing application.

Task 4 Deliverables

- Monthly progress reports (up to 9 reports) - electronic files via email
- Summary of meeting outcomes and action items

SECTION 2 - POTENTIAL ADDITIONAL SERVICES

This section provides brief descriptions of optional additional tasks that ECORP could perform in support of the District. These tasks are not included in ECORP's proposed scope of work, schedule, or cost estimate. On the District's request, ECORP could provide more detailed task descriptions and a cost estimate for each of these optional additional tasks.

Additional ECORP Recommended Task: Modeling

Several other alternative simulation evaluations may be necessary to develop the draft and final HCP release program. ECORP could support this process by providing modeling expertise. We would use the Computer Aided Negotiation (CAN) process to develop the release program. Once the internal team understands the limits of the project operation, flow proposals can be developed.

Alternative Task 1 Habitat Conservation Plan (HCP) Support

ECORP professionals are highly experienced in the preparation of HCPs and, in particular, HCPs involving fisheries and flow issues.

HCPs that involve actions resulting in changes to flow in riverine systems require close coordination between the hydrogeologic experts using physical models and the fisheries, wildlife, and riparian biologists who will assess biological effects. Under this optional task, ECORP hydrogeologic experts will work with H.T. Harvey biologists to ensure that they have the information necessary to assess impacts of alternatives on fish and wildlife species covered under the HCP. Various aspects of flow are important to fish habitat and riparian vegetation including rate of flow, volume within the channel, frequency and duration of floodplain inundation, and temperature. Information generated by the hydrologic model will provide daily flows for each water year type based on the configuration and operation of the system under the each of the Downstream Release Program alternatives.

To support the assessment of fish habitat within the channel and floodplain, ECORP would obtain existing cross-sectional data on the channel and floodplain at representative sites for reaches of Arroyo Grande Creek. Existing habitat data subdivide the creek into ten reaches. If necessary, new cross-sectional data would be collected. This channel morphologic information combined with the flow model results will allow for the estimates of channel volume and floodplain inundation at different times of year, in different water year types, and under different alternatives.

Water temperature, particularly during the spring, summer, and fall is an important factor influencing habitat quality and availability for steelhead. A temperature model could be applied to the flow data to assess temperature changes under the various alternatives using the existing temperature data for Arroyo Grande Creek and the reservoir to calibrate the model. While temperature models can be used to assess potential effects on steelhead habitat, past field monitoring data and current understanding indicated that temperature may not be limiting in this system.

Effects on riparian habitat and the wildlife that use this habitat are typically assessed based on the frequency and duration of floodplain inundation and groundwater levels within the riparian zone. Inundation is important to the reproduction of riparian trees and shrubs from seed and groundwater levels are important to the survival of adult trees and shrubs. Riparian cover (“shaded riverine habitat”) is a key factor in maintaining appropriate water temperatures for steelhead. The analysis of effects on riparian habitat will be based on known or estimated groundwater depths in the riparian zone under existing conditions and projected changes in groundwater resulting from different operational alternatives.

Existing flow conditions and channel configuration in Arroyo Grande Creek are generally not conducive to red-legged frog because of the lack of deep pool habitat. In addition, introduced predators adversely affect red-legged frog populations. While different operational alternatives may affect the deep pool habitat need by red-legged frog, restoration of such habitat could be designed and implemented based on whichever flow regime alternative is selected.

Alternative Task 2 CEQA/NEPA Support

ECORP Consulting provides comprehensive, multi-disciplinary management of environmental impact documentation projects, as required by the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). CEQA documentation is required for projects directly undertaken by a state, regional, or local public agency or are supported by a public agency through funding or granting of a permit or other entitlement. Similarly, NEPA documentation is required for projects directly undertaken by a federal public agency or supported by a federal public agency through funding or granting of a permit, HCP, or other entitlement. Some projects have involvement by both federal and state/local public agencies and require joint CEQA/NEPA documents.

ECORP provides agencies with the expertise to determine the appropriate CEQA or NEPA document for each project, from exemptions to Environmental Impact Reports/Statements. Working with other ECORP departments and specialty subcontractors, we also provide the technical studies necessary to support the environmental determinations. The CEQA/NEPA process relies on the development of a project description. In this case, the project is the HCP, which still needs to be negotiated. Knowing that CEQA and NEPA will be triggered through this process, consideration should be given to potential future conditions. This will be particularly important when negotiating the downstream release program. Any downstream release program should account for the future conditions so that when demands are at build-out levels, the District can still meet the release program objectives without violation.

With regard to the hydrogeologic services, potential future conditions must be evaluated to satisfy the requirements of CEQA and NEPA. For example, two possible future scenarios may be:

- Existing facilities with future build-out level of demand
- Lopez Lake Dam raise with future level of demand

There may be others as well. In support of the CEQA/NEPA process, we will assume that three future levels scenarios must be evaluated.