

# Attachment A-2

## TASK ORDER #3

# Technical Support of Sites Project Authority Proposition 1 Application to California Water Commission

Modification No. 1: This Task Order No. 3 is hereby authorized, and made part of, the Standard Agreement for Professionals Services executed November 3, 2015.

This task order identifies necessary tasks and subtask required to provide technical support for assistance in preparation of the Water Storage Investigation Program Proposition 1 funding proposal/application for the proposed Sites Reservoir in addition to tasks identified to assist in preparation of the Feasibility Study in the initial Task Order 1. Given that the proposed WSIP regulations are still in the draft form and subject to change, there is inherent uncertainty related to the contents of the application including the modeling required to support the application. This scope of work is based on the current understanding as of November 8, 2016 of the information needed for the application, and are subject to change in coordination with the AUTHORITY when the final WSIP regulations are released.

The Sites WSIP application is expected to showcase a broad range of water supply and ecosystem improvement benefits of the proposed operations of the Sites Reservoir Project. Currently, it is assumed that Sites draft EIR/EIS Alternative D will be the basis for the AUTHORITY Sites Reservoir proposed alternative for the WSIP application.

The draft WSIP regulations require demonstration and quantification of all benefits of the Sites Reservoir project under current conditions and future climate conditions at years 2030 and 2070. The draft regulations also require demonstrating the benefits of Sites under a highly challenging future condition, which is unspecified at this time.

## Scope of Work

The following new tasks (in italics) are described below.

### Task 1 – Feasibility Study Support

*Subtask 1.5.1 – WSIP Operations Assumptions Refinement*

*Subtask 1.5.2 – WSIP Analytical Framework*

*Subtask 1.5.3 – WSIP Modeling of Alternative D*

*Subtask 1.5.4 – WSIP Application Metrics Development*

*Subtask 1.5.5 – WSIP Technical Documentation*

*Subtask 1.5.6 – WSIP Meetings, Coordination and Support*

*Subtask 1.5.7 - CWC Response and Technical Support*

*Optional Subtask 1.5.8 - Sites Reservoir Sensitivity Scenarios*

All tasks identified below as part of this task order are new work requested by the AUTHORITY to assist in the preparation of the WSIP application not referenced or included in Task Order 1.

### **Task 1.5.1 – Operations Assumptions Refinement**

This task includes refinement of operations modeling assumptions for the preferred alternative (Alternative D) for the Sites WSIP Application in coordination with AUTHORITY. Modeling assumptions will need to be refined for any updates to Alternative D operations criteria to better align with the benefit metrics defined in the final WSIP regulations. These operational criteria may include filling Sites Reservoir, releases, integration with existing CVP/SWP operations, Sites Reservoir participants' demands, public benefits priorities and needs etc. Modeling assumptions will be refined based on input from AUTHORITY, Sites participants and stakeholders, CVP and SWP operators, fishery resource agencies, and State Water Resources Control Board (SWRCB) staff to understand the priorities for Prop 1 public benefits. This task will include review of previous work and findings, and some preliminary exploratory CalSim II modeling to inform the refinement of final assumptions.

**Deliverables:**

- Documentation of the modeling assumptions for the Sites WSIP application.

### **Task 1.5.2 – Analytical Framework**

The draft WSIP regulations require demonstration of quantitative benefits of the Sites Reservoir for current conditions and at years 2030 and 2070. Based on the draft regulations the Prop 1 application requires quantification of expected benefits and changes in the Delta, and its tributaries for a broad spectrum of resource areas including fisheries, ecosystem, habitat, water quality, surface water, recreation etc. In addition changes in water supply, power, and economics need to be quantified to demonstrate the overall feasibility of the Sites Reservoir Project.

In developing the modeling approach for the Sites WSIP application, it is anticipated that an integrated set of tools would be required to quantify and analyze the benefits of Sites Reservoir operations. This task includes development of an updated analytical framework to meet the needs of the WSIP application. The analytical framework and modeling tools used in the preparation of the draft EIR/EIS will form the basis for the modeling approach and technical analyses to support the preparation of the WSIP application. The modeling tools in the analytical framework will be updated to reflect the latest available versions or the tools prescribed in CWC WSIP regulations. The Draft Technical Reference Document (TRD) outlined a large number of tools and models that can be used in quantifying the benefits of the Sites Reservoir. Further, the framework would include models or tools required to develop information needed to quantify or describe the potential benefits and effects of Sites Reservoir operations on various environmental resources outlined in the WSIP regulations. The framework will address climate change and sea level rise, CVP/SWP operations, Delta hydrodynamics and water quality, reservoir and river temperatures, fish and ecosystem effects, power generation, economics etc.

The CWC released two CalSim II without project future conditions:

- WSIP Future 2030 with climate change and sea level rise
- WSIP Future 2070 with climate change and sea level rise

These two without project future conditions from CWC are based on the DCR 2015 current conditions CalSim II study. In addition to the above two without project future conditions, a current conditions without project model is needed to quantify the environmental benefits per the current draft regulations. DCR 2015 current climate CalSim II study from DWR will be used for without project at current conditions. The code and operating criteria in these three without project conditions CalSim II

models are significantly different from the CalSim II model developed for the Administrative Draft Sites EIR/EIS. Thus, major code changes will be required to incorporate Sites Reservoir proposed alternative operations into these three without project models.

The key models that will be updated as part of the analytical framework include:

- CalSim II
- USRDOM
- USRWQM based on latest Sacramento River HEC5Q model
- American River HEC5Q Model
- USBR Monthly Temperature Model
- USBR early life stage mortality models
- SALMOD,
- IOS,
- DPM,
- DSM2 HYDRO, DSM2 QUAL, DSM2 PTM,
- Power models including LTGen, SWP Power and NODOS Power model
- Economics Models including LCPSIM/CWEST, SWAP, LCRBQM and OMWEM.

**Deliverables:**

- A technical memorandum summarizing the analytical framework and the tools used in preparation of the Sites Reservoir WSIP application.
- Updated analytical framework models and tools

**Task 1.5.3 – Modeling of Sites Reservoir WSIP Proposed Alternative**

The Draft CWC WSIP regulations require quantification of benefits under three baseline conditions including a without project current condition, without project future 2030 condition, and a without project future 2070 condition, and an additional unspecified without project future condition to capture the range of sources of future uncertainty. Sites Reservoir operations will be added to the without project future condition models noted above. The Sites Reservoir WSIP application will include modeling results compared against the multiple without project conditions.

This task will include model development and code modifications required to simulate the Sites WSIP application proposed alternative at the three without project conditions (current, 2030 and 2070). The Sites Reservoir proposed alternative for three without project conditions will be simulated using all the models and tools included in the analytical framework developed in the Task 2.

Project specific and CVP-SWP system hydrology and operations model simulations will be prepared for the Sites WSIP proposed alternative.

- Hydrology and operations model simulations will be prepared for the Sites WSIP proposed alternative at three timeframes (current, 2030 and 2070) using the framework of models developed in Task 2. These models include: SWP and CVP Hydrology and System Operations Model (CALSIM II) and Upper Sacramento River Daily Operations Model (USRDOM). These models are used in an iterative process – the USRDOM model is used to verify the availability of supply to divert to storage in the proposed Sites Reservoir and the CALSIM II model is used to incorporate the use of Sites Reservoir storage into the operations of the state water resources system. USRDOM will be run for the three without project conditions corresponding to the three time frames.

- Using the results of the model simulations, detailed evaluations of the changes will be conducted for the three “baselines” by comparing the results to corresponding without project conditions.

Temperature, hydrodynamics, water quality, and ecosystem model simulations will be prepared for the three Sites WSIP proposed alternative runs and the corresponding three without project conditions.

- Model simulations will be prepared for the Sites WSIP proposed alternative at three timeframes using the framework of models developed in Task 2. These models include: Upper Sacramento River Water Quality Model (USRWQM), American River HEC5Q model, Reclamation Monthly Temperature Models (Reclamation Temperature), Delta Hydrodynamics Model (DSM2 HYDRO), and Delta Salinity Model (DSM2 QUAL).
- Ecosystem model simulations will be prepared. These models include: Reclamation Mortality Models and Salmonid Population Model (SALMOD).
- CH2M will compile datasets as necessary for the Sites WSIP proposed alternative runs such that additional models developed by others can be applied to the alternative. These models include: Winter Run Chinook Life Cycle Model (IOS) and the Delta Passage Model (DPM) developed by Cramer Fish Sciences.

Economic analyses will be prepared for the Sites WSIP proposed alternative for three without project conditions. No work will be performed on the alternative until prerequisite physical modeling of the alternative is completed.

- Economics model simulations will be prepared using the same framework of models developed under Task 2. The economics models include: Statewide Agricultural Production Model (SWAP), Least Cost Planning Simulation Model (LCPSIM), Other Municipal Water Economics Model (OMWEM), Lower Colorado River Basin Water Quality Model (LCRBWQM), Bay Area Water Quality Economics Model (BAWQM) and the Reclamation Long Term Generation (LT GEN), State Water Project Power Model (SWP Power), and NODOS Power modules.
- Using the results of the economics model simulations, the Reporting Metrics Tool (RMT) previously developed by DWR will be used to compile the results of the economics analysis for the three baseline conditions.

**Deliverables:**

- Model simulations and results.
- A brief technical memorandum providing model results will be prepared.

**Task 1.5.4 – WSIP Application Metrics Development**

This task will include preparation of quantitative and qualitative metrics that allow evaluation of the benefits of Sites Reservoir. Draft CWC WSIP regulations and any guidance on the evaluation criteria will be reviewed to determine the key metrics needed for the WSIP application. A summary of the key metrics for the Sites Reservoir proposed alternative will be prepared based on the modeling results in the Task 3 and compared against the corresponding without project conditions.

The draft WSIP regulations require analyzing potential changes to the benefits of Sites Reservoir under a highly challenging future climate condition at year 2070. A qualitative summary of this uncertainty analysis required by the draft WSIP regulations will be prepared.

**Deliverables:**

- Summary of the key metrics to support preparation of the Sites WSIP application.

- Summary of qualitative analysis of Sites Reservoir under highly challenging future uncertain conditions.

### **Task 1.5.5 – Technical Documentation**

This task will include documentation of the modeling methodology, assumptions and results for the Sites Reservoir proposed alternative. This task will also include the preparation of the Preliminary Operations Plan required by the draft WSIP regulations. TRD identifies the topics to be described as part of the operations plan. Briefly, it should include project operations under different hydrologic conditions, applicable benefits categories, description of operations for public benefits, storage rules, priorities, coordinated operations with other facilities, adaptive management strategies etc.

#### **Deliverables:**

- Technical memorandum with summary of modeling methodology, assumptions and results.
- Preliminary Operations Plan to meet WSIP requirements.

### **Task 1.5.6 – Meetings and Support**

This task includes time for coordination needed with AUTHORITY, DWR, AECOM, Sites Reservoir Participants, CVP/SWP operators, fishery agencies, State Water Board, and other stakeholders in developing the Sites proposed alternative assumptions, and supporting preparation of the application for WSIP funding.

#### **Deliverables:**

- Summaries of key meetings.

### **Task 1.5.7 – CWC Response and Technical Support**

This task includes time for response and coordination with CWC and others subsequent to submittal of the Prop 1 Application. It is anticipated that there will need to be extensive interaction with the CWC to respond to questions and provide clarification on technical issues, methods, and quantification of physical changes described in the application.

#### **Deliverables:**

- Summaries of key meetings.

### **(Optional) Task 1.5.8 – Sites Reservoir Sensitivity Scenarios**

This task includes effort required to develop up to three (3) additional variants of Sites Reservoir WSIP application proposed alternative at one climate condition. The variations could help demonstrating Sites Reservoir’s versatility in meeting any changing public benefits priorities and needs. The variations could also include studying the expected changes in the CVP/SWP operations when Sites Reservoir is combined with other potential future projects such Cal WaterFix. Only CalSim II sensitivity runs will be developed under this task.

As noted earlier, the draft WSIP regulations require analyzing potential changes to the benefits of Sites Reservoir under a highly challenging future climate conditions at year 2070. If quantitative information is required for the without project conditions by the CWC for the highly challenging future climate, a CalSim II run will be simulated to quantify Sites Reservoir project effects.

#### **Deliverables:**

- A brief technical memorandum summarizing the sensitivity scenarios including key assumptions and CalSim II results.

Nov 18 Reservoir Committee & Nov 21 Authority – Meeting Agenda Item & Attachment: 4.5a

- A brief technical memorandum documenting any CalSim modeling conducted and summarizing conditions under future uncertainty.

**IN WITNESS WHEREOF**, the parties hereto have caused this Task Order No. 3 to be signed and intend to be legally bound thereby.

**CLIENT:**

**CH2M HILL Engineers, Inc.:**

Signature \_\_\_\_\_

Signature \_\_\_\_\_

Name (printed) \_\_\_\_\_

Name (printed) Allan Highstreet

Title \_\_\_\_\_

Title Vice President

Date \_\_\_\_\_

Date \_\_\_\_\_

**Task Order 3 - Technical Support of Sites Project Authority Proposition 1  
Application to California Water Commission**

<b>Task</b>	<b>Labor Resource</b>	<b>Functional Category</b>	<b>Hours</b>	<b>Rate</b>	<b>Amount</b>
<b>Task 1.5.1 – WSIP Operations Assumptions Refinement</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	30	292.11	8,763.30
	Oliver, Mark T	Principal Professional/Senior Project Manager	200	245.84	49,168.00
	Chilmakuri, Chandra Sekhar	Project Manager	220	216.32	47,590.40
	Thayer, Reed Wells	Staff Professional (Level 2)	260	112.52	29,255.20
	Todak, Jacqueline Ashley	Staff Professional (Level 1)	2	96.45	192.9
		<b>Subtotal Labor</b>	<b>712</b>		<b>134,969.80</b>
					<b>Miscellaneous ODCs</b>
					<b>7% Markup</b>
		<b>Subtotal Expenses and Markup</b>			<b>28.22</b>
					<b>1.98</b>
					<b>30.20</b>
		<b>Total Task 1.5.1 – WSIP Operations Assumptions Refinement</b>			<b>135,000.00</b>
<b>Task 1.5.2 - WSIP Analytical Framework</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	12	292.11	3,505.32
	Oliver, Mark T	Principal Professional/Senior Project Manager	80	245.84	19,667.20
	Chilmakuri, Chandra Sekhar	Project Manager	400	216.32	86,528.00
	Thayer, Reed Wells	Staff Professional (Level 2)	400	112.52	45,008.00
	Sutcliffe, Becky Sue	Clerk	3	80.31	240.93
		<b>Subtotal Labor</b>	<b>895</b>		<b>154,949.45</b>
					<b>Miscellaneous ODCs</b>
					<b>7% Markup</b>
		<b>Subtotal Expenses and Markup</b>			<b>47.24</b>
					<b>3.31</b>
					<b>50.55</b>
		<b>Total Task 1.5.2 – WSIP Analytical Framework</b>			<b>155,000.00</b>
<b>Task 1.5.3 - WSIP Modeling of Alternative D</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	6	300.88	1,805.28
	Oliver, Mark T	Principal Professional/Senior Project Manager	159	253.22	40,261.98
	Chilmakuri, Chandra Sekhar	Project Manager	328	222.81	73,081.68
	Thayer, Reed Wells	Staff Professional (Level 2)	668	115.89	77,414.52
	Sutcliffe, Becky Sue	Clerk	3	82.72	248.16
		<b>Subtotal Labor</b>	<b>1164</b>		<b>192,811.62</b>
					<b>Miscellaneous ODCs</b>
					<b>Subconsultant</b>
					<b>7% Markup</b>
		<b>Subtotal Expenses and Markup</b>			<b>82.60</b>
					<b>30,000.00</b>
					<b>2,105.78</b>
					<b>32,188.38</b>
		<b>Total Task 1.5.3 - WSIP Modeling of Alternative D</b>	<b>1,164.00</b>		<b>225,000.00</b>
<b>Task 1.5.4 – WSIP Application Metrics Development</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	3	300.88	902.64
	Oliver, Mark T	Principal Professional/Senior Project Manager	80	253.22	20,257.60
	Chilmakuri, Chandra Sekhar	Project Manager	104	222.81	23,172.24
	Thayer, Reed Wells	Staff Professional (Level 2)	221	115.89	25,611.69
		<b>Subtotal Labor</b>	<b>408</b>		<b>69,944.17</b>
					<b>Miscellaneous ODCs</b>
					<b>7% Markup</b>
		<b>Subtotal Expenses and Markup</b>			<b>52.18</b>
					<b>3.65</b>
					<b>55.83</b>
		<b>Total Task 1.5.4 – WSIP Application Metrics Development</b>			<b>70,000.00</b>
<b>Task 1.5.5 - WSIP Technical Documentation</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	14	300.88	4,212.32
	Oliver, Mark T	Principal Professional/Senior Project Manager	97	253.22	24,562.34
	Chilmakuri, Chandra Sekhar	Project Manager	140	222.81	31,193.40
	Thayer, Reed Wells	Staff Professional (Level 2)	180	115.89	20,860.20
	RDD Mid Technician	Drafter/Illustrator/Editor/Word Processor (L3)	161	110.18	17,738.98
		<b>Subtotal Labor</b>	<b>592</b>		<b>98,567.24</b>
					<b>Miscellaneous ODCs</b>
					<b>Subconsultant</b>
					<b>7% Markup</b>
		<b>Subtotal Expenses and Markup</b>			<b>30.62</b>
					<b>20,000.00</b>
					<b>1,402.14</b>
					<b>21,432.76</b>
		<b>Total Task 1.5.5 - WSIP Technical Documentation</b>			<b>120,000.00</b>



**Task Order 3 - Technical Support of Sites Project Authority Proposition 1  
Application to California Water Commission**

<b>Task</b>	<b>Labor Resource</b>	<b>Functional Category</b>	<b>Hours</b>	<b>Rate</b>	<b>Amount</b>
<b>Task 1.5.6 – WSIP Meetings, Coordination and Support</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	33	300.88	9,929.04
	Oliver, Mark T	Principal Professional/Senior Project Manager	110	253.22	27,854.20
	Chilmakuri, Chandra Sekhar	Project Manager	120	222.81	26,737.20
	Thayer, Reed Wells	Staff Professional (Level 2)	60	115.89	6,953.40
	Todak, Jacqueline Ashley	Staff Professional (Level 1)	31	99.35	3,079.85
	Sutcliffe, Becky Sue	Clerk	1	82.72	82.72
		<b>Subtotal Labor</b>	<b>355</b>		<b>74,636.41</b>
	<b>Miscellaneous ODCs</b>				<b>12.70</b>
	<b>Travel</b>				<b>5,000.00</b>
		<b>Subtotal Expenses and Markup</b>			<b>5,012.70</b>
	<b>7% Markup</b>				<b>350.89</b>
		<b>Subtotal Expenses and Markup</b>			<b>5,363.59</b>
	<b>Total Task 1.5.6 – WSIP Meetings, Coordination and Support</b>				<b>80,000.00</b>
<b>Task 1.5.7 - CWC Response and Technical Support</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	10	300.88	3,008.80
	Oliver, Mark T	Principal Professional/Senior Project Manager	52	253.22	13,167.44
	Chilmakuri, Chandra Sekhar	Project Manager	60	222.81	13,368.60
	Thayer, Reed Wells	Staff Professional (Level 2)	41	115.89	4,751.49
	Sutcliffe, Becky Sue	Clerk	8	82.72	661.76
		<b>Subtotal Labor</b>	<b>171</b>		<b>34,958.09</b>
	<b>Miscellaneous ODCs</b>				<b>39.17</b>
	<b>7% Markup</b>				<b>2.74</b>
		<b>Subtotal Expenses and Markup</b>			<b>41.91</b>
	<b>Total Task 1.5.7 - CWC Response and Technical Support</b>				<b>35,000.00</b>
<b>Optional Task 1.5.8 - Sites Reservoir Sensitivity Scenarios</b>					
	Buchholz, Gwendolyn	Principal Professional/Project Director	8	300.88	2,407.04
	Oliver, Mark T	Principal Professional/Senior Project Manager	158	253.22	40,008.76
	Chilmakuri, Chandra Sekhar	Project Manager	220	222.81	49,018.20
	Thayer, Reed Wells	Staff Professional (Level 2)	419	115.89	48,557.91
		<b>Subtotal Labor</b>	<b>805</b>		<b>139,991.91</b>
	<b>Miscellaneous ODCs</b>				<b>7.56</b>
	<b>7% Markup</b>				<b>0.53</b>
		<b>Subtotal Expenses and Markup</b>			<b>8.09</b>
	<b>Total Optional Task 1.5.8 - Sites Reservoir Sensitivity Scenarios</b>				<b>140,000.00</b>
	<b>Grand Total Task Order 3 - Technical Support of Sites Project Authority Proposition 1 Application to California Water Commission</b>				<b>960,000.00</b>