

The SHIBATANI GROUP, INC.

*Water Supply Strategic Planning, Climate Change Hydrology, New Reservoir Development
And CVP/SWP Operational Compliance for California's Water Industry*

August 27, 2013

Robert Shibatani
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DELIVERED BY MAIL

Mr. David Stoldt, P.E.
General Manager
Monterey Peninsula Water Management District
5 Harris Court, Building G
Monterey, California 93940

**Re: Monterey Peninsula Water Management District
New Surface Water Storage Options – Pre-Feasibility Study
Proposed Scope of Work**

RECEIVED
SEP 04 2013
MPWMD

Dear David:

Please find set out below for your review and consideration a Scope-of-Work regarding the above referenced matter; *Monterey Peninsula Water Management District; New Surface Water Storage Options – Pre-Feasibility Study*. This Scope-of-Work outlines the activities proposed to be undertaken by The SHIBATANI GROUP, Inc. (the "Consultant") for this effort. Robert Shibatani, CEO & Principal Hydrologist of the firm will direct this effort. A proposed schedule and cost estimate are provided that match both the anticipated timeline and level of effort expected for this project.

Project Understanding and Context

The District is facing critical water shortages in near future as Cal-Am, the major water purveyor within the District service area is facing significant cutbacks in water diversions from the Carmel River as stipulated in SWRCB Order 95-10. Such shortages, despite planned water conservation savings and reduced system losses will have a significant effect on available water supplies within the District's service area as soon as 2017. A supply/demand "cliff" is projected to occur by 2017 when the current Cease and Desist Order takes it full effect. Depending on water-year type, this curtailment could impose extraordinary shortages to customers on the Peninsula and poses a clear and dangerous risk.

In response to these projections, Cal-Am is proceeding with its Monterey Peninsula Water Supply Project ("MPWSP") which includes a number of anticipated supplemental supply projects. A proposed ASR program would store excess Carmel River winter flows in the Seaside Aquifer. A new state-of-the-art desalination plant in Marina is to include sub-surface slant

intake wells, a desalination plant, source/product water pipelines, and brine disposal facilities. A groundwater replenishment project proposes to inject highly purified wastewater into the Seaside Aquifer.

While the MPWSP is being touted as a multiple solution project, it does not include new surface water storage development. In fact, no contemporary effort has yet been identified that looks into developing *new* surface water yield from the Carmel River watershed. The current general sentiment regarding storage development in the watershed actually appears headed in the opposite direction with the removal of San Clemente Dam and Cal-Am's continued stated disinterest in exploring supply enhancement at Los Padres Reservoir. Cal-Am has acknowledged its priority in addressing the long-term feasibility of Los Padres Dam as being focused exclusively on meeting the requirements of NOAA Fisheries. These are centered on habitat and spawning restoration in the upper reaches of the watershed as part of NOAA Fisheries' broader steelhead recovery initiatives for the Central Coast. There appears to be no existing interest by any water agencies in developing new surface water storage within the watershed.

Accordingly, the District, as part of its efforts to enhance long-term water supply security across its various assets (both infrastructure and entitlements), seeks to explore the potential for new surface water storage locations and facilities within the watershed. This effort would be compatible with both District and Cal-Am efforts elsewhere (e.g., MPWSP). In fact, from the District's perspective, investigating the potential for new surface water storage represents a highly prudent action given the challenges associated with the current suite of MPWSP water supply options and the imminent threat of cutbacks from the Carmel River. It is acknowledged that the District's service area, while almost entirely contained within the watershed, does not include the entirety of several source area watersheds to the Carmel River (e.g., Garzas, San Clemente, Pine, Cachagua, Tularcitos, and Chupines creeks) to Carmel River.

Today's water resource management planning requires that all options, especially on-stream surface water storage be considered by all water agencies. New surface water storage today has gained the support of federal (e.g., SECURE Water Act) and State (e.g., Water Bond) public trust resource agencies as well as the extensive bond and private equity markets in ways not seen in recent memory. Many are calling this the *new era of water storage development in California*. The Consultant has been an active surface storage advocate across the State and is working closely with the California Water Commission in its development of public benefits guidelines specific to new storage projects related to the Water Bond. It is also coordinating closely with the U.S. Bureau of Reclamation's Basin Studies Program authorized under the SECURE Water Act to enhance water supply through new water storage across the 17 western States.

Exploration into new water storage in the Carmel River watershed is not a new concept. Like most other developed watersheds in California, studies and investigations into water supply storage go back many decades. Many of those earlier efforts, however, do not have the benefit of today's updated hydrology, current water demand projections, new regulatory constraints, current institutional framework, and a changing mindset that reservoirs today provide a multitude of functions; water supply, hydropower, coldwater pool assets (for later season

downstream thermal management), flood attenuation, environmental flows, downstream water quality enhancement, and local recreational opportunities.

Notwithstanding increased pressures to remove existing impoundments to free up historic migratory routes and spawning areas for listed anadromous fish species (e.g. steelhead), this need must be balanced with the benefits of providing a more thermally-sensitized flow regime over larger periods of the year. On many rivers where impoundments exist, the Carmel River included, without controlled releases from dams, current downstream flow and temperature targets would be impossible to achieve. In fact, we have demonstrated to NOAA Fisheries (e.g., C. Yates, Assistant Regional Administrator for Protected Resources, Long Beach, CA) the benefits of new on-stream reservoirs above current existing federal facilities (e.g., Shasta, Folsom, New Melones, Millerton) to existing coldwater pool reserves. The same can be applied here for the Carmel River watershed.

This current undertaking would *true-up* pre-existing studies and investigations that have addressed at least in part new surface water storage in the Carmel River watershed in the past. Bringing forward to current status the latest analysis in hydrological availability, operational constraints (e.g., flood attenuation), regulatory/institutional limitations (e.g., instream flow standards), and known environmental sensitivities across the watershed will provide the District with a more realistic assessment of new surface water storage potential in the Carmel River watershed.

Current Ongoing Studies

The District has identified numerous hydrological studies that it is either anticipating undertaking or is currently evaluating that could augment this Scope-of-Work. Such studies include watershed unimpaired flow analysis, updated IFIM flow analysis, and HSI assessments for all steelhead life cycles that use the Carmel River watershed. It is assumed that these studies are ongoing.

Project Objective

The project objective is to explore possible new on- or off-stream surface water storage sites (reservoirs) within the Carmel River Watershed and prepare a new Pre-Feasibility Study illustrating the best options based on current hydrologic, operational, institutional, and regulatory criteria that would support more detailed design and costing efforts in the future.

Proposed Work Activities (Scope-of-Services)

The proposed Scope-of-Services is focused on the critical initial phases of any new surface water storage investigation. It focuses on the available watershed hydrology, the physical constraints and characteristics of the watershed source areas, operational constraints that would limit or define water/utility operations, and known regulatory and institutional limitations that would restrict or require supply reservation for purposes other than those sought by the project proponent.

Only after this initial phase can verify that from a hydrological, operational, and regulatory/institutional perspective, genuine siting locations exist, would it then be prudent to extend the investigation to the next phase involving geotechnical examination, design alternatives, and integrated revenue stream identification.

The Scope-of-Services acknowledges that several of the source area watersheds to the Carmel River are outside of the District corporate boundary, nevertheless, these watersheds are included in this investigation in order to provide a complete assessment of hydrologic availability and, therefore, new surface water storage potential for the *entire* Carmel River watershed.

The following specific Tasks make up this Scope-of-Services and would be implemented in a general sequential manner, with some overlap for expediency and cost savings:

Task 1 Review Hydrological Availability

Consultant will examine primary and sub-watershed hydrological yield potential. Precipitation and instream flow data records will be examined. Spatial and temporal variability will be corroborated. Working closely with the District Engineer and staff, sub-watershed and tributary hydrology to the Carmel River will be verified; Garzas Creek, San Clemente Creek, Pine Creek, Chupines Creek, Tularcitos Creek, Cachagua Creek, and Miller Fork). It is assumed that extensive data exists within the District or can be easily attained through USGS gauging sites. Consultant will verify that applied rainfall-runoff relationships are appropriate given historical data trends. No independent field experimentation is proposed.

Standard water balance procedures annually and seasonally can route available precipitation through the various water balance fluxes. Consultant will address watershed water balances and corroborate projected unimpaired flows in each of the sub-watersheds agreed upon with the District. Water balance fluxes will vary over a range of water year types. Consultant will confirm seasonal yield ranges for the select sub-watersheds.

Consultant will also address water year type characterizations used in the watershed. In some areas of California, typical water year type classifications are undergoing re-assessment as shifting climatic regimes change the frequency of year-type triggers so that they no longer always represent current conditions. *The "normal" water years of today will increasingly resemble the "dry" and "critically-dry" years of tomorrow.* Adhering to traditional water year type classification system, given changing hydrology, can have significant implications to various regulatory and institutional requirements that identify WY types in many of their prescriptions.

Consultant will also address potential hydroclimatological changes occurring and anticipated to occur in the watershed in the future as a result of shifting climatological trends. The climate change signature for California's coastal watersheds is not as pronounced as it is for the Sierra Nevada or southern Cascades (owing to a lack of snowpack). Nevertheless, increased global temperatures and resultant changes in cyclonic patterns and ocean-atmosphere couplings observed through ENSO periodicity can lead to changing precipitation intensities, storm track

positioning, event duration, and frequencies. For the Carmel River watershed, such changes, to the extent possible, will be evaluated. Incorporation of this information into both planning and real-time operational prescription setting will be important in the long-term as the District and other water users within the basin acclimate to changing hydroclimatological conditions.

Task 2 Review Physical Constraints – Watershed Characteristics

Consultant will review key physical constraints within the watershed. Key among these will be topographic control, drainage area, drainage density, sub-watershed slope, depth of surficial overburden, and the nature of overburden (e.g., porosity, hydraulic conductivity, etc.). Each of these factors influence water propagation through the watershed in both space and time. Conceptual models of rainfall-runoff response integrate many of these controlling variables; the Consultant will check the plausibility of various runoff mechanisms (e.g., Hortonian overland flow, saturation overland flow, subsurface flow, pipe flow, piston flow, return flow, etc.) operating within the watersheds. In unique areas where instream flow source water during specific times of the year are ambiguous, Consultant may recommend isotope studies (e.g., O^{18}/O^{16}) that can be conducted using contemporary methodologies both quickly and inexpensively.

Consultant will review vegetative coverage within sub-watersheds, general structural geology (primarily major fracture lineaments), and upstream boundary conditions of the major aquifer systems. Consultant will also review upper watershed erosion potential, historic/recent mass wasting scars, and downstream floodplain sediment inundation zones with proximity to existing structures (e.g., 19 bridges and 1,600 parcels within 100-year floodplain). All of these watershed physical characteristics will be important in assessing sub-watershed preference.

Task 3 Review Operational Constraints – Institutional and Regulatory

Consultant will review key institutional and regulatory constraints or conditions within the watershed. Key among these will be the necessary operational requirements to maintaining minimum downstream flow as stipulated in water rights permits (e.g., Permit 20808A), diversion reduction schedule in SWRCB CDO (January 15, 2008), terms and conditions contained with SWRCB Order 95-10, amended Orders 98-04 and 2002-02 to allow direct diversions and diversion to storage when flows were above fish flow requirements, SWRCB Permit 20808B (new Los Padres Dam), various provisions in the draft South-Central California Coast Steelhead Recovery Plan, and both the current and projected supply and demand forecasts of Cal-Am and various well users drawing from the Seaside Aquifer.

Consultant will, in combination with Task 2, also review land ownership (e.g., U.S. Forest Service lands), locations of man-made structures (e.g., bridges, roadways, rail crossings, utility easements, buildings, all of which could be subject to increased inundation with the removal of Los Padres Dam as the natural sediment load of the river is re-established.

Considerations will include current locations of steelhead habitat barriers, as well as perennial and seasonal rearing habitat, levees and channelization, upstream habitat conditions, baseline

water temperature conditions (with and without reservoir thermal management), and the effect of non-native piscivorous fish and general predator/prey relationships in the system.

All such constraints and conditions will form an updated institutional and regulatory baseline from which to assess the potential for new on-or off-stream surface water storage reservoirs.

Task 4 Identify Public Benefits

Given the identified site locations and combined with information regarding operational requirements and limitations, the Consultant will identify all potentially accruable public benefits at each site location. Public benefits could be similar to criteria used by the California Water Commission (e.g., ecosystem and water quality benefits) or, Consultant could augment the listing with other criteria such as water supply, flood risk reduction, hydropower (clean energy), environmental flows, water temperature resiliency, recreational benefit, as well as short-term and long-term economic benefits through job creation (e.g., construction-related employment) and economic CII support (e.g., commercial, industrial, and institutional) through the provision of a more reliable long-term firm water supply.

Task 5 Integrate Elements into Pre-Feasibility Study Document

As noted previously, this Pre-Feasibility Study will represent a *truing up* of relevant past investigative work regarding hydrologic availability in the watershed including the various institutional and regulatory provisions that govern management of the Carmel River. Consultant will prepare an initial outline of the Pre-Feasibility Study for District review. Each of the Tasks represent components of the Pre-Feasibility Study and will be integrated into a single document during this Task.

Consultant will also prepare separate sections of the Pre-Feasibility Study including:

1. Executive Summary
2. Introduction
3. Consolidated Results – Siting Locations (with map of areas studied)
4. Recommendations (with map of high potential areas)

A Draft Pre-Feasibility Study will be initially prepared for District review and comment. Following review and discussion with the District, the Consultant will prepare a Final Pre-Feasibility Study.

DELIVERABLES: Draft Pre-Feasibility Study; Final Pre-Feasibility Study

Task 6 Technical Review Meetings with District

Consultant will rely on telephone- and video-conferencing to the maximum extent possible to save time and costs and maintain efficiency with District coordination and liaison. Consultant will undertake one escorted field visit to the primary facilities and watershed view points for orientation. This will also serve as the project kick-off meeting. It is proposed that two ensuing technical meetings with the District Engineer and staff (which would be open to District

management and Board members) will be scheduled; the first would be following Task 4 before the commencement of the Feasibility Study integration and write-up – the second would occur after completion of the Draft Feasibility Study following review and comment by the District and before the Consultant prepares the Final Feasibility Study.

Proposed Schedule

Work activities under this Scope-of-Work can commence immediately upon the District issuing a Notice to Proceed. Given the urgency of new water supply identification for the District, the project is proposed to be completed in as short a time period as possible.

Accordingly, assuming a Notice to Proceed on **October 1, 2013**, the following expedited schedule is proposed:

| | |
|--|------------------------------|
| Kick-Off Meeting and Site Visit | October 2, 2013 |
| Task 1 Review Hydrological Availability | October 25, 2013 |
| Task 2 Review Physical Constraints – Watershed | October 25, 2013 |
| Task 3 Review Operational Constraints – Institutional and Regulatory | November 8, 2013 |
| Task 4 Identify Public Benefits | November 8, 2013 |
| Task 5 Integrate Elements into a Pre-Feasibility Study | November 25, 2013 |
| Technical Review Meeting No. 1 | On or about November 4, 2013 |
| Technical Review Meeting No. 2 | On or about December 2, 2013 |
| Task 5 Final Pre-Feasibility Study | December 11, 2013 |

Note: Highlighted dates show Draft and Final Feasibility Study completion dates.

This expedited project can be completed in about two and a half months.

Proposed Budget

A preliminary proposed budget is provided below. Only professional labor is charged. The 2013 labor rates are fixed through the duration of the project.

| Monterey Peninsula Water Management District New Surface Water Storage Options – Pre-Feasibility Study | | | | |
|---|-----------------------|------------------------------|------------------|----------|
| Task | Hours R. Shibatani | Hours M. Preszler P.E. | Hours GIS/CAD | Budget |
| Hourly Rates | \$225/Hr | \$205/Hr | \$105/Hr | |
| 1. Review Hydrological Availability | 28 | 48 | | \$16,140 |
| 2. Review Physical Constraints – Watershed Characteristics | 24 | 8 | | \$7,040 |
| 3. Review Operational Constraints – Institutional and Regulatory | 32 | 12 | | \$9,660 |
| 4. Identify Public Benefits | 16 | 2 | | \$4,010 |
| 5. Integrate Elements into Pre-Feasibility Study Document | 48 | 24 | 20 | \$17,820 |
| 6. Technical Planning Meetings with District | 24 | 16 | | \$8,680 |
| Total Labor - Hours/Costs | 172 | 110 | 20 | \$63,350 |
| Total Disbursements* | | | | \$0 |
| Total Estimated Budget | | | | \$63,350 |

The total estimated budget is \$63,350.

We appreciate the opportunity to submit this Scope-of-Work and look forward to assisting the District in meeting these important challenges.

If you have any questions or require further enhancement, please feel free to contact me at (916) 719-7612.

Sincerely yours,

The SHIBATANI GROUP, Inc.

A handwritten signature in black ink, appearing to be 'RS', followed by a horizontal line.

Robert Shibatani
CEO & Principal Hydrologist

RS/sj