

Memorandum

To: The Water Supply Advisory Committee
From: Bob Raucher and Colleen Donovan, Stratus Consulting Inc.
Date: 2/6/2015
Subject: Technical Team Progress Update

In this memorandum, we provide an update of the Technical Team's activities for Phase 2 of WSAC activities.

Brown and Caldwell

Brown and Caldwell (BC) have been actively engaged in helping review, consolidate, and evaluate alternatives to enhance water supply; Maddaus Water Management, Inc. (MWM) and Rosenblum Environmental Engineering (REE) are evaluating the conservation and demand-management alternatives (see below). BC developed a two-page template to provide a consistent and easy-to-use guide for each relevant supply-side alternative. BC has developed a separate technical memorandum for the February Water Supply Advisory Committee (WSAC) packet to describe their activities more fully.

Since the December meetings in Santa Cruz, BC has:

- ▶ Prepared for and participated in the January 9, 2015, planning meeting for Phase 2
- ▶ Assisted with consolidating alternatives and developing the initial draft "consolidated alternatives" (CAs) memorandum
- ▶ Prepared for and participated in the January 16, 2015, conference call with the WSAC Planning Subcommittee on the CAs
- ▶ Began working with Gary Fiske on applying the *Confluence* model, in preparation for using the model to analyze a short list of CAs
- ▶ Began building the present-value (PV) spreadsheet model for CA costs.

Over the next five months, BC expects to work on the following major activities:

- ▶ Prepare for and participate in WSAC meetings in February through June 2015 (four two-day meetings)
- ▶ Continue to assist in screening alternatives to arrive at the CA short list

- ▶ Coordinate with Gary Fiske and others; estimate reasonable yields, energy requirements, technical feasibility based on the state of the water industry, likely implementation times, and uncertainties
- ▶ Prepare the PV analyses as directed by the City and Stratus Consulting
- ▶ Expand CA summaries (two to five pages each)
- ▶ Assist in preparing a summary report
- ▶ Tour water facilities.

Pueblo Water Resources, Inc.

We are in the process of finalizing a task order with Pueblo Water Resources, Inc. (Pueblo) for scoping-level research on (1) the feasibility, potential yields, and cost of aquifer storage and retrieval (ASR) and groundwater-based indirect potable reuse (IPR); and (2) the viability of developing North Coast brackish wells. Pueblo will prepare a technical memorandum that summarizes the available information on each topic, including technical feasibility, key uncertainties, regulatory constraints, and costs and potential yields. We expect that they will also present their work to the WSAC at the late April/early May 2015 meeting.

Rosenblum Environmental Engineering

Dr. John Rosenblum (REE) completed his initial task under the “Recon” phase of the project. Specifically, he provided a summary of four alternatives for which he conducted a preliminary technical assessment using readily available information and professional insight on cost, likely range of savings, degree of uncertainty, etc. These alternatives are:

- ▶ Water Smart software
- ▶ Water-neutral development
- ▶ Water exchanges
- ▶ Onsite rainwater harvesting and grey water at residential levels.

As part of Phase 2, we have processed a task order for REE to produce a presentation about “beyond-code” water-efficiency scenarios for presentation at an enrichment session on February 11, 2015, for WSAC. This presentation will include general information about beyond-code scenarios, how the beyond-code concept has been applied elsewhere, and how it might be applied to Santa Cruz.

Maddaus Water Management, Inc.

In completing their work under the “Recon” phase of the project, MWM has explored how a small subset of potential “alternatives” would rate within a Multi-criteria Decision Support (MCDS) process. MWM has provided a preliminary technical assessment of four alternatives using readily available information and professional insight on costs, likely range of savings, degree of uncertainty, etc. The four alternatives for this preliminary assessment include:

- ▶ Smart Water meters
- ▶ Water-neutral development
- ▶ Going beyond building codes
- ▶ Onsite rainwater harvesting and grey water at residential properties.

For Phase 2, we are in the process of finalizing a task order for MWM to analyze options to shave peak-season water demands to get permanent savings of 10%, 25%, and 50% of the water use that constitute the added water use during peak-demand months. In other words, MWM will focus on the difference between baseline demand and peak month demands, not total demands in the peak season. MWM will use the data and insights from their Least Cost Planning Decision Support System Model (DSS Model) to identify a range of options, focusing on the conservation measures needed to conserve a specified quantity of water. MWM will explore the difference in water demand in the peak season compared to the non-peak season, and apply the set percentage reductions of 10%, 25%, and 50% to this difference.

Additionally, MWM will assist Stratus Consulting staff in developing Phase 2 technical summaries for demand-side alternatives, notably, a summary of “Program C Recommended” from the draft Master Conservation Plan. MWM will finalize the assessment of applicable conservation alternatives previously developed under Task Order 1 (TO1). These alternatives include WaterSmart home water reports and, possibly, water-neutral development, rainwater harvesting and greywater use, and going beyond building codes.

Habitat Conservation Plan (HCP) and Climate Change-related Activities – Balance Hydrologics, Gary Fiske, Stratus Consulting

Stratus Consulting has been coordinating with and advising Shawn Chartrand, of Balance Hydrologics, and Gary Fiske on methodological and data issues related to incorporating climate change projections into the instream hydrologic flow models, with and without HCP-related restrictions; the team will then move those climate-altered streamflow results through the *Confluence* model to examine projected impacts on system yields and potential curtailments.

This ongoing collaboration has addressed a wide range of issues. These issues include accessing and properly interpreting available climate change projections for projected long-term average

changes in monthly precipitation and temperature from downscaled datasets derived from Global Climate Models (GCMs).

Also addressed has been the desire to reflect changes in variability (e.g., frequency and duration of droughts) to go beyond the projected changes in long-term averages that typically emerge from the GCM runs. Part of this variability-oriented effort has entailed examining information from the Paleo-climate record to consider the plausibility of extended, multi-year droughts (e.g., six to eight years or longer). Although such extended-period droughts are not evident in the hydrologic datasets collected over relatively recent past decades, extended mega-droughts are evident in tree-ring data for earlier centuries, with some droughts lasting for as long as 200 years.

The application of an extended drought simulation is an important way to explore the Santa Cruz water system's vulnerability to climate variability. As part of their water respective system planning processes (e.g., Santa Barbara applies a seven-year extended drought and the San Francisco Public Utilities Commission applies an eight-year extended drought).

We hope to have results to share in the timeframe of the upcoming March 2015 meetings.

David Mitchell, M-Cubed

Working with water department staff, Dave Mitchell has updated the City's existing baseline demand forecasts to incorporate the most up-to-date information available on future levels of water conservation, water rates, and projected growth. This will be reviewed at the upcoming WSAC meeting on February 12, 2015.

Over the next several months, Dave Mitchell will work with water department staff to develop new statistically based customer-class water demand models that will be used in the City's next urban-water management plan and in ongoing water supply planning processes.

Mr. Mitchell also will give a presentation on the economic impacts of drought and curtailment at the next enrichment session on February 11, 2015, including the outcomes from the September 2014 round of table/focus groups with local representatives from Santa Cruz's green industry and hospitality sectors.

Stratus Consulting

Stratus Consulting has been engaged in a broad array of technical issues, including and extending beyond those described above. A partial list of the additional technical activities includes:

- ▶ Scenario planning and development
- ▶ Consolidating the alternatives

- ▶ Risk assessment and risk management
- ▶ Triple bottom line and related analyses
- ▶ MCDS-related support, including criteria and related scales for rating the alternatives
- ▶ Enrichment activities, planning, and organization
- ▶ Organization, review, consolidation, and evaluation of alternatives.

In addition, Stratus Consulting continues to actively engage in WSAC planning and meeting-support activities, as well as project administration and contract management.