Build-A-Portfolio Proposal Number: 10 **Agenda Item 4, Document #10a**

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Name of Proposal: Two Tracks to a Sustainable Water Supply

Brief Description: Our portfolio has two tracks, one for SCWD only, and a parallel track for SCWD and our neighbor districts. First we propose a Santa Cruz only set of supply options to keep costs and uncertainties low. We combine maximum winter flow harvest with DPR and with ASR limited to the Santa Cruz well sites. Second and simultaneously we propose to negotiate with our neighbors (SVWD and SqCWD) to pursue regional aquifer restoration for storage and shared supply and/or protection from sea water intrusion.

Long Description:

Introduction

Our task, as given to us by the City Council, is to provide recommendations on how SCWD can have a safe, reliable, economic, sufficient and sustainable water supply, with all options, including desalination, on the table for consideration.

Our group agreed that the following interests are our priorities:

1. Protect our water customers by focusing on low-cost, high-productivity building blocks;
2. Protect the Water Department from revenue shortages by keeping costs down;
3. Reduce near-term uncertainties in order to achieve maximum short-term yields, should the current drought be long-lived or repeated. This includes avoiding legal uncertainties;
4. Reduce uncertainties associated with inter-district agreements by focusing first on Santa Cruz only building blocks, while developing the capacity to increase water available to neighboring districts; and
5. Enhance sustainability by developing new supply sources that are renewable and relieve pressure on existing supply resources, thus living within our means while improving river flows for fish habitat and overall ecosystem vitality.

Analysis:

Possible Building Blocks

WSAC's analysis to date has resulted in this team approach to portfolio building considering building blocks developed by the Technical Team (ref. Building Block Summary Table).

Our portfolio adds two blocks. The first arises from Gary Fiske's presentation on maximum winter flow harvests and is labeled Building Block 9 Winter Flow Harvest on the attached table. [BuildingBlockSummaryTable.SH(2)]. The Fiske research shows how much additional water can be harvested during winter flows under different constraints (avoid first winter flush, replace pipeline to Loch Lomond and add pumping capacity). From the Fiske analysis, our table shows peak season shortages, but costs, production and average yield are not yet available.

The second is Block 2-Phase 1, which is ASR for the Beltz well field only. Data is taken from the Pueblo report, May 2015 and added to Building Block Summary Table. Not all data needed regarding this block is currently available. The Pueblo report analyzes the range of ASR possible with neighboring districts, and suggests a Phase 1 pilot program in which SCWD would develop ASR at its Beltz wells field which is entirely within the SCWD service area. We propose this be further developed to determine its suitability to be part of our First Portfolio Track – SCWD Only:

With these additions to our options, there are several blocks that the SCWD can do independently, without inter-district agreements or legal difficulties while meeting interests #3 and 4. They are Blocks 2-Phase 1 (ASR at Beltz wells), 3 (DPR, or DPR small), 4 (IPR-Loch), 8 (Local Desal, and 8-large) and 9 (Winter Flow Harvest). We have eliminated Block 8 (Local Desal) from further consideration because of its high cost which is inconsistent with interests #1 and 2.

Among these independent options, we think of Block 9 (Winter Flow Harvest) as the "lowest hanging fruit," and it meets all our group interests. While its costs have not been provided, we expect that it will have the lowest cost since relatively few changes to existing infrastructure are needed and parts of the project will be covered by current CIP plans. Improvements to avoid the "first flush" constraint, if needed, will likely add costs. Block 9 would reduce the worst peak season shortage from 1110 mg to 650 mg (60% reduction) with its average yield of 460 mgy. While this does not eliminate our need for supplemental supply, Block 9 should cost far less per MG than any other block and it meets a significant portion of our needs.

In addition, any extra water (producible by Block 9 when Loch Lomond is already full) can be sold as in lieu to Scotts Valley or Soquel Creek Water Districts, serving our group interest #4. (We currently don't know what the Confluence model would project as possible excess winter harvest and what characteristics those years might have.)

Among the remaining blocks, Block 3 and 3-small have the lowest annual production cost ($/MG), and low costs per unit yield (ref. BB Summary Table). Whether Block 3 is pursued on its own, or in conjunction with other blocks (4 or 6), it has the best outcome in terms of production, yield and reduction of shortages. Because DPR recycles waste water, it enhances sustainability (group interest #5). Because waste water flows are relatively stable, DPR will generate reliable supplies, ones that are climate-independent, and thereby serve general WSAC goals. Therefore DPR is the second element of our plan for SCWD to meet its own needs.

Together, Blocks 9 and 3 (3 small) will generate a combined worst-year yield of 1570 mg (1170), thereby eliminating any worst-year shortage, and making the average shortage zero. SCWD could sell a minimum of 60 – 460 mg in worst years (depending on the "first flush" constraint) to a neighboring district, assuming a price agreement.

In an average year, Blocks 3 and 9 together would generate about 1400 mg beyond what we forecast we would need. This amount could be allocated to enhanced river flows and improved habitat (group interest #5), to sell to our neighbors (interest #4), or to use for ASR to protect the Beltz wells (interest #4).

If political resistance arises to DPR, the more costly option of IPR-Loch Lomond (Block 4) makes sense.

Second Portfolio Track – Aquifer Storage and Restoration

The eight remaining building blocks require that SCWD negotiate a long-term partnership with Scotts Valley Water District, Soquel Creek Water District and/or Deep Water Desal. Negotiations can start immediately, and therefore we characterize our second portfolio track as parallel to the first.

In lieu (Block 1) and aquifer storage and restoration (Block 2) appeal to us because they can reduce the reliance on DPR/IPR in the long term. However, there are substantial drawbacks to both. Blocks 1 and 2 have uncertain performance in yield and time to yield. Even if they perform as hoped, they will result in higher Worst Year Peak Season Shortages and Annual Production Costs ($/MG) than blocks 3 - 6. Blocks 1 and 2 can be considered if the combination of project re-design and district partnerships substantially reduces Worst Year Peak Season Shortages and the Annual Production Costs ($/MG) to a range more comparable with Blocks 3 – 6. Aquifer Storage and Restoration is our choice for solving supply and sustainability problems by working with our neighboring districts.

Timeline:

Timeline for Winter Flow Harvest:

This project was practiced last winter and will be pursued this next winter. But maximum harvests will require system upgrades, which may include solving the first flush constraint. It is unclear how much time will be necessary to solve the first flush constraint if deemed necessary. SCWD will investigate possibilities this winter.

Timeline for DPR/IPR:

The timeline for Blocks 3 - 6 ranges from 8-10 years, though we are informed by the technical team that the State of California is accelerating approval of supply projects and is willing to process DPR and IPR projects before statewide regulations are finalized (for example, City of San Diego recycling project). This could shorten the planning phase of these projects. The technical team informs us that negotiations with the State of California regarding these projects could commence immediately.

We project that the first 2-3 years (+/-) of the timeline will be devoted to project design and approvals related to the CAT facility, at which point the City decides whether the treated water will go to the Loch (Block 4), mix with North Coast water and go to the GHWTP (Block 3), Purisima Aquifer (Block 6 including 5), augment winter flows for injection (Block 2 or 2 Phase 1), or be sold to a neighboring district.

Timeline for Other Blocks:

The timeline for Block 1 is 8 years and Block 2 is 15 to 20 years. The first step for either of these blocks is negotiations with the SVWD and SqCWD to see if agreements can be reached between the districts for implementation of these blocks. This time could also be used for project re-design in order to see if these blocks can become more feasible by having a greater certainty of sufficient yield at a lower cost.

Therefore, it is the suggestion of this group that SCWD simultaneously commence (1) the design and approval process for the CAT facility and the blocks based upon it and (2) negotiations with our regional partners to see if agreements can be reached as to Blocks 1, 2 and/or 6 (including 5). Such agreements would necessarily include provisions for redesign of those projects and allocation among and between the partners of Capital Costs (including design costs), Operations and Maintenance Costs, and Water Yield (including division of water yield to meet worst year peak season shortages).

Unresolved Questions:

1. At the July 29 conference call with technical team members, which included Mike Cloud and Robert Marks (Pueblo), an additional potential Building Block was identified, which we have labeled the Beltz Well Field ASR Block (2-Phase 1). This block would entail a pilot program that would be similar to the Phase 1 pilot program in the Pueblo Technical Memorandum (5/15/2015) but use the DPR output from the CAT facility for direct injection into the Beltz Well Field and test the viability of future extraction. We hope the data is available to evaluate this option at the level of a Building Block, and have requested the technical team to review and consider same.

2. Possible re-consideration of alts that have dropped by the wayside. This portfolio development group is sensitive to the fact that there were many quality ideas for supplemental supply and storage which have been dropped from consideration, but might warrant reconsideration in the future as times, costs and circumstances change. One of particular appeal to members of this group to be updated and considered in the future if there is still a need that has not been otherwise met is off stream storage (i.e. Wilder Ranch, swap with landfill, Arroyo Seco, Moore Creek).

Proposal-wide Ratings:

Adaptive Flexibility (Scalability):

Question: How adaptable or flexible or scalable is this proposal likely to be in the face of changing climate conditions, demand levels or streamflow requirements?

This proposal provides significant adaptive flexibility benefits. It does so because we are able to plan and develop the CAT facility while we negotiate with our regional partners and give further consideration to where the CAT treated water will go. Development of the CAT facility which can generate water that can be used for DPR or IPR provides greater flexibility for consideration of a variety of projects, including those which we might consider with regional partners.

Supply Reliability:

Reliability of water supply relates to how much water can be produced under various climate conditions such as drought or extreme precipitation and includes the system's ability to perform well in a variety of conditions, for example, high flow conditions that may increase turbidities in source waters. The focus of this criterion is on the likelihood that your proposal will improve the reliability of the Santa Cruz water system.

This portfolio with its focus on DPR/IPR provides the best supply reliability available. It has the capacity to virtually eliminate shortages in all years, and thereby to eliminate the need for curtailments. (Note it does not eliminate the need for conservation.)

Supply Diversity:

This criterion measures the how well prepared or positioned the system will be to respond to future uncertainties based on the diversity of its supply portfolio. The premise is that supplies coming from different sources are less likely to be as vulnerable to the same kinds of uncertainties.

Question: How does this Approach affect the diversity of Santa Cruz water sources?

Our proposal significantly increases the diversity of Santa Cruz's supply portfolio. DPR/IPR combination provides a new, independent, supplemental source which fully fills the unmet gap which previously existed in dry years. If a building block for ASR for the Beltz Well Field is developed (Block 2-Phase 1) this would further diversify our supply portfolio.

Environmental Profile:

The environmental profile of a proposal takes into account all the potential environmental impacts and benefits associated with that proposal.

Question: What is the environmental profile of this proposal?

This proposal provides significant environmental benefits in that treated effluent currently discharged from the sewage treatment plant to the ocean is significantly reduced. The additional supply of potable water will allow us to reduce our take from the San Lorenzo River and North Coast streams, and thereby increase the release of water for fish habitat to exceed the requirements of DFW-5. Excess water production can be stored in Loch Lomond to be released when higher than DFW-5 flows are desired.

Political Feasibility:

This measures the extent to which a proposal will claim and retain the support of the community, both formal political entities and informal social and political groups and the community at large.

Question: What level of political support is the proposal likely to have?

With timely and appropriate informational and educational outreach to the community, this proposal may be acceptable in the near future. There is a relatively small segment of the population who will not consider IRP/DRP safe notwithstanding that the tap water produced this way will meet safe drinking water standards. There will therefore need to be some specifically tailored outreach.

Block-by-Block Proposal Ratings:

Regulatory Feasibility: Rate each block

Regulatory Feasibility addresses the certainty, ease and likely timeframe of receiving necessary regulatory approvals for the block. If you are worried about a lawsuit regarding a regulatory permit, that concern should be addressed here (not in *Legal Feasibility).*

Question: How easy or difficult would the regulatory approval process be for this Block? (Indicate one; cut and paste if you need more scales)

All Blocks within this proposal are rated as highly certain for regulatory reviews and approvals to be easy and quick; regulatory issues are limited, routine, and/or non-controversial. Our technical team has informed us that current conditions in the State of California have created a favorable climate for accelerated regulatory approval of DPR/IPR, even if we seek approval before final regulations are issued. Other blocks are already recognized as easily approved under existing regulatory schemes.

Energy – Rate by Block

This criterion focuses on the acceptability of the energy use of the block. How much energy will this block require per million gallons of water produced?

As shown in the BB Summary Sheet, DPR and IPR have the lowest energy use (MWH/MG) of all blocks evaluated so far. The energy profile of this block is acceptable without mitigation.

Likewise, we expect Block 9 (winter flow harvests) to use energy primary for pumping, and we anticipate its energy use will be the lowest of all blocks.

ASR and in lieu (whether in our first or second portfolio tracks) have similarly low energy use values.

Legal Feasibility: Rate each block

Legal Feasibility addresses siting including acquisition of land, easements or rights or way, water rights, or other legal rights relevant to implementing the alternative as envisioned. This criterion is distinct from Regulatory Feasibility, which relates to specific regulatory approvals that would be required, separate from the legal requirements addressed here. Lawsuits about regs are still part of 'regulatory feasibility.'

Question: Does this Proposal have the necessary rights in the form needed?

Block Rating IPR/DPR: Unambiguous "yes;" legal issues are routine, non-controversial. We have the legal right to treat the effluent from the sewage treatment plant. There is no controversy regarding this. Likewise for ASR-Phase 1 and Winter Flow Harvest.

Administrative Feasibility: Rate each block

The extent to which success of the proposal is dependent on the actions, cooperation, collaboration, financial participation or willingness to enter into intergovernmental agreements of other partners or players.

Question: To what degree does this proposal require the cooperation, collaboration, financial participation, and/or intergovernmental agreements to succeed, and how likely is it that these can be obtained?

For our portfolio track 1 (Winter Flow Harvest + DPR + ASR-Beltz), agreement with other parties is not needed.

For ASR/In Lieu or Sea Barrier, agreement with other parties is essential, except for a possible smaller project that is limited to the Beltz Wells field, which being solely under the control of SCWD, would not require any agreement with other parties.

Cost Metrics: rate each block

Question: What is the unit cost for the water produced by this block, when compared across blocks? ($/mg)

We reasoned above that Block 9 (our first block) will have the lowest production cost per mg, and likewise low yield unit costs.

DPR and DPR-small (our second block) have the next lowest production costs per mg, and relatively low yield unit costs.

ASR-Phase 1 is likely to have smaller production costs per mg, and yield unit costs, than ASR.

ASR for our second portfolio track has high production cost per mg, and mid-to-high yield unit costs.

In lieu for our second portfolio track has the highest production cost per mg, but its yield unit costs are among the low ones.