

**TO:** WATER SUPPLY ADVISORY COMMITTEE (WSAC)  
**FROM:** CLARK MCISAAC & HEIDI LUCKENBACH  
**SUBJECT:** UPDATE ON SOQUEL CREEK WATER DISTRICT ACTIVITIES  
**DATE:** APRIL 20, 2015

---

## **GROUNDWATER MANAGEMENT**

**Cooperative Agreement with City of Santa Cruz (City)** The City and the District have both approved and signed the Cooperative Monitoring/Adaptive Groundwater Management Agreement. (Attachment A)

### **Basin Implementation Group (BIG)**

At their March 25 meeting the BIG adopted a name change to the Soquel-Aptos Groundwater Management Committee (S-AGMC).

The committee is now composed of 11 members as follows.

- Two members from each of the partner agencies (Central Water District, City of Santa Cruz, County of Santa Cruz, and Soquel Creek Water District), each of whom are appointed by their respective elective bodies.
- Three public members who shall be a person or representative of an entity served by, owning, or managing a non-municipal well. The public committee members shall be selected by the partner agency committee members and shall be appointed to serve a two year term.

The committee will soon be seeking to fill two of the public member openings.

A subcommittee of the S-AGMC is meeting April 30, 2015 to begin discussing the options for forming a Groundwater Sustainability Agency required by the Groundwater Sustainability Act. The next meeting of the SAGMC is scheduled for May 21, 2015.

**CA State Legislation on Groundwater** The next ACWA task force meeting on the Sustainable Groundwater Management Act (SGMA) Implementation is tentatively scheduled for May (exact date to be determined). Kim Adamson is working on a task force for legislative clean-up language through ACWA. During the March 3, 2015 Board meeting, the Board voted to formally oppose SB 173 that would define a de minimis extractor as a person who extracts for domestic purposes, 10 acre-feet or less per year. As of March 24, 2015, SB 173 failed to pass out of the Senate natural resources committee, but still has a chance for reconsideration.

## **SUPPLEMENTAL SUPPLY**

**Water Supply Alternatives** Starting in September 2013, SqCWD began evaluating supplemental water supply options that could be pursued since the scwd<sup>2</sup> Regional Seawater Desalination Project with SCWD was put on hold. At the August 24, 2014 Board meeting, staff presented technical memorandums on the various options being considered. One of those options was District only desalination.

Per the Board's request, Staff and Kennedy/Jenks Consultants worked together to develop qualitative and quantitative information on the two agreed upon District only desalination options (Mid-County and Deep Water). A technical Memo was produced providing a conceptual level analysis of implementing either Mid-County or Deep Water Desalination. (Attachment B). Participating in the Deep Water Desalination Project would include membership of a Joint Powers Authority (JPA). The JPA would help finance the project.

Representatives from Deep Water Desal also prepared a presentation regarding their project's progress in Moss Landing. (Attachment C).

**Recycled Water** SqCWD staff has interviewed three firms to conduct a feasibility analysis for recycled water options. Final selection of the firm and approval of the contract is scheduled for May or early June.

COOPERATIVE MONITORING/ADAPTIVE GROUNDWATER MANAGEMENT  
AGREEMENT  
CITY OF SANTA CRUZ/SOQUEL CREEK WATER DISTRICT

The City of Santa Cruz Water Department (City) and the Soquel Creek Water District (District) jointly developed this agreement to ensure the following groundwater management objectives are met:

1. Protect the shared groundwater resource in the Soquel-Aptos Basin area from seawater intrusion.
  2. Allow for the redistribution of pumping inland away from the Purisima A-unit offshore outcrop area.
  3. Maintain inland groundwater levels that promote continued groundwater flow toward coastal wells and the Purisima A offshore outcrop area; and while maintaining coastal groundwater levels that will abate seawater intrusion.
  4. Provide both agencies adequate flexibility to respond to changing water demands, changing water supply availability, and infrastructure limitations.
- A. The Agencies agree that a specific objective for the shared portion of the Purisima Formation is to abate or prevent seawater intrusion at key coastal monitoring wells as shown in Attachment A.
1. For the purpose of this Agreement, coastal monitoring wells will include SC-1A, Pleasure Point Medium, Soquel Point Medium, Moran Lake Medium.
  2. Target coastal groundwater levels are defined as follows:

Table 1 – Target Groundwater Elevations		
Coastal Monitoring Well	Annual Average, Target Groundwater Elevation (Non-Critically Dry years) (feet AMSL*)	30 Day Running Average, Minimum Groundwater Elevation (All years) (feet AMSL*)
SC-1A	6.2	2.0
Pleasure Point Medium**	6.1	2.0
Soquel Point Medium**	6.0 (5.2***)	2.0
Moran Lake Medium**	5.0	2.0
<p>*NGVD 29</p> <p>**Medium zone wells have been selected to maintain target groundwater elevations because seawater has been previously detected in this zone.</p> <p>*** Groundwater levels are currently below the target elevation at the Soquel Point well. Until groundwater levels recover to target elevation, the interim goal is to maintain the annual average above the existing conditions. 5.2 ft amsl represents the annual average for calendar year 2011 and is the interim goal.</p>		

3. Groundwater levels will be recorded at least hourly at coastal monitoring wells using transducers or data loggers installed by the respective monitoring well owner and will be confirmed by monthly soundings. This data will be collected continuously during future District operations under the Well Master Plan (WMP) and future City operations at the Beltz #12 Well

Average annual groundwater levels will be reported as the average of all hourly readings in a calendar year. While all years will be reported for

historical analysis, targets will be calculated based on the annual averages of non-critically dry years only.

Minimum protective groundwater levels will be calculated as the 30-day running average of all hourly readings of all years.

In the event of hourly groundwater level data gaps the monthly soundings measured during the data gap should be used to replace missing data in calculating averages. If no sounding measurement occurred during the data gap, the average of available hourly readings in the 7 days before and the 7 days after the data gap (up to 336 total hourly readings) should be used to replace the missing data in calculating averages. If hourly groundwater level data are deemed by the District and the City to be inconsistent with a sounding measurement, the sounding measurement should be used to replace the inconsistent hourly data in the calculation of averages. For the purposes of this agreement, inconsistent shall be defined as a variation of 0.5-feet between transducer/data logger data and manual well soundings.

4. In addition, groundwater quality samples will be obtained quarterly at coastal monitoring wells and analyzed for general minerals. This data will be collected quarterly during future District operations under the WMP and future City operations at the Beltz #12 Well and quarterly for at least one full pumping season prior to operation of the O'Neill Ranch Well or the Beltz #12 Well.
  5. The District and the City will meet at least annually to discuss data and report results to their respective governing boards. In early March, the agencies will meet and review the previous calendar year's monitoring data, trends, progress toward goals, potential changes to goals, potential changes to pumping distribution for the current year.
  6. The District and the City do not anticipate that groundwater levels at all coastal monitoring wells will recover to target elevations until pumping is reduced which could be achieved with the addition of a supplemental source of supply is available. When a substantial supplemental source of supply is secured, the District and City shall develop a plan to recover the basin such that all coastal monitoring wells recover to target elevations.
- B. The Agencies agree that the redistribution of pumping away from the Purisima A offshore outcrop area will assist in abating or preventing seawater intrusion in the shared portion of the Purisima formation and for that purpose have established annual pumping goals.
1. For the City, annual pumping goals are defined for pumping from January to December (calendar year). Critically dry years are calendar years when flow at the Felton gauge in the San Lorenzo River from October 1 of the previous year through September is less than 29,000 acre-feet. Non-critically dry years are calendar years when flow at the Felton gauge in the San Lorenzo River from October 1 of the previous year through September is greater than or equal to 29,000 acre-feet.

2. The District is implementing its WMP with the overall goals of securing a reliable groundwater supply by improving redundancy and flexibility in the system, redistributing pumping away from the coastal area, and providing a more uniform drawdown of the groundwater basin. The District will increase its annual pumping from its 25-year average (1985-2009) of 1,500 acre-feet to a total maximum annual pumping of 1,660 acre-feet for the western Purisima A and AA and Tu (Santa Margarita) (O'Neill Ranch, Garnet, Main Street, Rosedale wells) for all calendar years.
  3. The City installed a new inland production well with the overall goal of securing a reliable groundwater supply by improving redundancy and flexibility in the system and redistributing a portion of its pumping away from the coastal area to provide a more uniform drawdown of the groundwater basin. The City agrees to maintain its 25-year average annual pumping of 520 acre-feet. The City further agrees to a total maximum annual pumping goal of 645 acre-feet from the Purisima A and AA and Tu (Beltz #8, #9, #10, and Beltz #12 wells) during critically dry years and proposes to limit annual pumping from Purisima A and AA and Tu (Beltz #8, #9, #10, and Beltz #12 wells) to 520 acre-feet in non-critically dry years.
- C. The Agencies agree that there are two potentially restrictive effects of redistributed pumping that could impact either agency's continued use of the shared portion of the Purisima Formation.
1. Lowered groundwater levels that induce seawater intrusion. A restrictive effect will have occurred if average annual groundwater levels at any of the coastal monitoring wells fall below the target elevations in Table 1 for non-critically dry years.

During all years including critically dry years, the restrictive effect would be demonstrated if 30 day running average groundwater levels at any of the coastal monitoring wells fall below the minimum elevation of 2 feet above mean sea level.

A restrictive effect could also be demonstrated if groundwater quality sampling at the City's and District's coastal monitoring wells, at the City's Live Oak well field, or at the District's Garnet well detect chloride concentrations above 150 milligrams per liter and an increasing trend covering 10 years (or since completion if less than 10 years). If an upward trending of chloride concentrations above 150 milligrams per liter is detected, or a drop in the Sodium to Chloride ratio, it could indicate that seawater intrusion (and the resulting restrictive effect) is occurring and that the established target groundwater levels are not high enough.
  2. Lowered static and pumping groundwater levels at production wells that fall below the top of well screens or to pump suction levels. This effect could occur if static or pumping groundwater levels are above the top of the well screen prior to pumping at the O'Neill Ranch Well and/or Beltz #12 Well, and subsequently fall below the top of the well screen after the O'Neill Ranch

Well and/or Beltz #12 Well is brought online and District and City pumping in the vicinity is increased.

The restrictive effects described above will be identified based on review of groundwater level and groundwater quality data. Prior to bringing the O'Neill Ranch Well and Beltz 12 Well online, the District and City will review the available groundwater level and groundwater quality data from the wells. The Agencies will review the groundwater level and groundwater quality data provided by the District and City on a quarterly basis to evaluate whether either restrictive effect is occurring.

- D. The Agencies agree that if either restrictive effect described above is demonstrated, then the Agencies shall implement the mitigation actions described below.
1. The District and City shall modify pumping in the Purisima A and AA, and Tu (all City Live Oak wells including Beltz #12, O'Neill Ranch Well, Garnet Well, Main Street Well, Rosedale Well, Tannery Well, Monterey Well, and Maplethorpe Well) until the restrictive effect is eliminated. The performance criteria for this action will be to raise annual groundwater levels in the coastal monitoring wells to target elevations, raise 30 day running average groundwater levels in the coastal monitoring wells to minimum elevations, or reduce mineral content of groundwater quality samples; or raise static and pumping groundwater levels at production wells above the top of well screen or pump suction levels.
  2. When a restrictive effect is identified, the District and City shall discuss possible pumping redistributions to eliminate restrictive effects that do not require pumping reductions from the goals outlined above in B.2 and B.3. Feasible pumping redistributions should be implemented in an attempt to eliminate restrictive effects. If the restrictive effect is groundwater levels below target annual elevations, the pumping redistribution must raise groundwater levels above target elevations within 90 days or pumping reductions shall be implemented. For other restrictive effects, the pumping redistribution must eliminate the restrictive effect within 30 days or pumping reductions shall be implemented.
  3. The District shall be solely responsible for pumping reductions to eliminate the restrictive effect if annual City pumping is within its 25-year average of 520 acre-feet during non-critically dry years. During critically dry years, District shall be solely responsible for pumping reductions to eliminate the restrictive effect if total annual City pumping is within 645 acre-feet. District's pumping reductions would likely take place at the Garnet Well and/or O'Neill Ranch Well, and redistributed to other District production wells in the District's service area.
  4. The City shall be solely responsible for pumping reductions to eliminate the restrictive effect if annual City pumping exceeds its 25-year average of 520 acre-feet during non-critically dry years and 645 acre-feet during critically dry years if annual District pumping for the western Purisima A and AA and Tu (O'Neill Ranch, Garnet, Main Street, Rosedale wells) is no more than 1,660

acre-feet as specified in B2. The District shall not increase its annual pumping until the restrictive effect is eliminated.

5. Following critically dry years, annual average groundwater levels in the calendar year to date may not be restored above target levels in Table 1 even if the 30 day average groundwater levels during the critically dry year remain above or have been restored above minimum levels in Table 1. District and City will reduce pumping in the western Purisima A and AA and Tu (all City Live Oak wells including Beltz #12, O'Neill Ranch, Garnet, Main Street, Rosedale) by a mutually agreed upon percentage (based on combined non-critically dry year pumping goals at western Purisima A and AA and Tu wells in B above of 1,660 acre-feet for the District and 520 acre-feet for the City) following a critically dry year where the City pumped within 645 acre-feet and annual average groundwater levels were below target levels.
6. If either the City or District exceeds their respective production limits in any (critically dry or non-critically dry) year when annual average groundwater levels are below a target level in Table 1, then the respective agency will implement additional pumping reductions the following season, equivalent to the amount the production limit was exceeded by, in addition to the amounts established in D.3, D.4, or D.5 above, to help restore annual average groundwater levels above target levels.
7. In non-critically dry years following any critically dry or non-critically dry year when annual average groundwater levels are below a target level in Table 1, the District and City shall meet in August in addition to the annual March meeting to discuss progress toward restoring the annual average groundwater level for the full calendar year to target levels in Table 1. In lieu of a meeting, the agency responsible for pumping reductions specified in D2 and D3 may report to the other agency on progress of restoring groundwater levels.
8. District and City will share monitoring and mitigating for impacts to Soquel Creek. Monitoring expenses will be shared equally while pumping reductions and mitigation will be shared proportionately. If monitoring reveals impacts to stream flow, pump tests will be conducted to determine proportionality.
9. District and City will share monitoring and mitigating for impacts to third parties such as private wells found in the area of overlap of 3300 foot radius around District's O'Neill Ranch Well and 3300 foot radius around City's Beltz #12 Well. Monitoring expenses will be shared equally while mitigation expenses will be shared proportionately. If private well monitoring reveals impacts to private wells, pump tests will be conducted to determine proportionality. Monitoring and mitigation of impacts to private wells within 3300 foot radius of either O'Neill Ranch Well or Beltz #12 Well but not located in the overlap area will be the sole responsibility of the agency whose 3300 foot radius encompasses the private well. See Attachment B for map of 3300 foot radius.



E. The Agencies agree that redistribution of pumping away from the Purisima A offshore outcrop area will also require maintaining inland groundwater levels that will ensure continued groundwater flow toward coastal wells and the Purisima A offshore outcrop area.

1. Groundwater levels at inland monitoring wells will be recorded at least daily using transducers or data loggers installed by the respective monitoring well owner and should be confirmed by monthly soundings. Average annual groundwater levels will be calculated as the average of all daily readings in a calendar year.

In the event of daily groundwater level data gaps in excess of 7 days (168 consecutive hourly readings), data gaps will be replaced by monthly soundings as described in A3. If daily groundwater level data are deemed by the District and the City to be inconsistent with a sounding measurement, the sounding measurement should be used to replace the inconsistent daily data in the calculation of averages.

2. District and City will cooperatively determine groundwater gradients and establish target inland water levels to ensure continued groundwater flow toward the Purisima coastal outcrop. (*Agencies to independently propose target inland groundwater levels to achieve the stated objectives, then to discuss and agree upon target levels*). This should be completed based on approximately one year of data collected after both O'Neill Ranch well and Beltz 12 well are in operation.
3. If a restrictive effect as discussed in C is demonstrated, a comparison of inland groundwater levels to target inland groundwater levels will be used to provide a guide to develop a reduction and redistribution strategy for addressing the restrictive effect.

F. District Mandatory Restrictions to Recover Groundwater Basin

In the event of an action by the District to invoke mandatory restrictions for its customers in order to recover the groundwater basin, the City will reduce its use of Purisima A and AA groundwater to match the District's percentage reduction in pumping of western Purisima A and AA. E.g. a reduction of 5% in O'Neill Ranch, Garnet, Main Street, and Rosedale based on the District's 25-year average annual pumping of 1,500 acre-feet would require a corresponding 5% reduction in Purisima A, AA, and Tu pumping at all City Live Oak wells including Beltz #12 based on 520 acre-feet in non-critically dry years and 5% based on 645 acre-feet in critically dry years. Additional reductions may be necessary, should either of the restrictive effects described above be present.

G. Early Neutral Evaluation of Disputes:

At the request of either party, the parties will submit any dispute between them, arising out of or relating to this Agreement or any transaction or relationship arising from it, to (nonbinding) early neutral evaluation, in accordance with the Early Neutral Evaluation procedures of the American Arbitration Association if not otherwise agreed.



We concur that the above accurately reflects the agreed upon course of action.

\_\_\_\_\_  
Martín Bernal  
City Manager  
City of Santa Cruz

Date: \_\_\_\_\_

\_\_\_\_\_  
Kim Adamson  
General Manager  
Soquel Creek Water District

Date: \_\_\_\_\_

Approved as to Form By:

  
\_\_\_\_\_  
City Attorney

Date: 3-30-15



## Attachment A



# SCWD Monitoring Wells

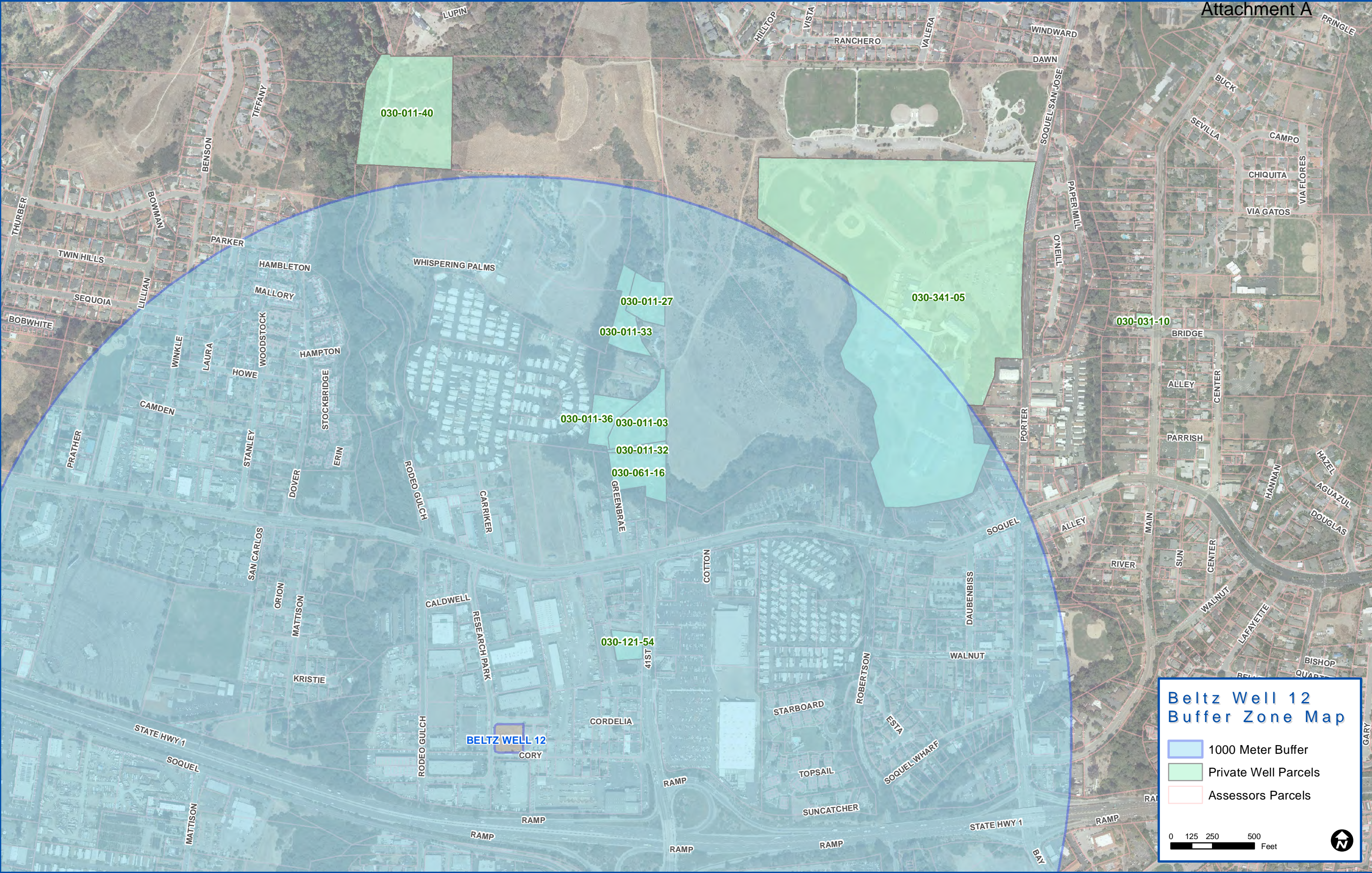
Installed in 2012

- M 2012 MONITORING WELL
- M EX MONITORING WELL
- P EX PRODUCTION WELL

0 400 800 1,600 Feet









# Attachment B

10 July 2014

## **DRAFT Technical Memorandum No. 1 Desalination Alternatives**

To: Melanie Schumacher, Soquel Creek Water District

From: Todd Reynolds, PE and Dawn Taffler, PE LEED<sup>AP</sup>, Kennedy/Jenks Consultants

Subject: Mid-County Desalination and Deep Water Desalination Alternatives  
SqCWD Technical Advisor Services  
K/J 1368027.00

---

### **Summary**

This memorandum provides a conceptual-level analysis of implementing a desalination project to meet the supplemental water supply objectives for the Soquel Creek Water District (District). As part of the District Integrated Resources Plan (IRP, 2006, 2012), the District's supplemental water supply objective requires a project that can provide an estimated average of 1,500 acre feet per year (AFY) - 1.3 million gallons per day (mgd)- of potable water every year for at least 20 years to protect and recover over-drafted aquifers. This Technical Memorandum No 1 (TM #1) provides a conceptual-level evaluation of facilities and cost for two potential projects; (1) a Mid-County Desalination Alternative to produce 1,500 AFY and (2) participating in the Deep Water Desalination Project to provide 1,500 AFY to the District.

### **Objective**

The objective of Mid-County Desalination Project would be to develop facilities within the District's services area to provide an average of of potable water as a supplemental water supply to meet the District's objectives. The seawater desalination treatment plant and associated facilities would provide potable water to the District every year to reduce groundwater pumping and help recover the aquifer and protect it from seawater intrusion.

The objective of participation in the Deep Water Desalination Project would be to be a member of a Joint Powers Authority that develops a larger regional project with the company Deep Water Desal (DWD), which is proposing to build a 10,000 AFY to 25,000 AFY (9 mgd to 22.3 mgd) desalination facility in the Moss Landing Area. The DWD Project proposes to form a joint powers authority (JPA) to finance and operate the desalination facility. The District could participate in the JPA as a member agency and contribute to financing a proportional share of the costs based on receiving an average of 1,500 AFY (1.3 mgd) of potable water every year to reduce groundwater pumping and help recover the aquifer and protect it from seawater intrusion. The DWD alternative would be a take or pay arrangement for a minimum of 20 years.

# Attachment B

## Mid-County Desalination Project

### Description

Seawater could be pumped from the Pacific Ocean to the Mid-County Desalination Facility through an intake facility and pipeline. Brine from the desalination facility could be discharged either through a new ocean outfall near the facility, or conveyed in a longer brine pipeline to the Santa Cruz WWTP to be discharged through an existing wastewater plant ocean outfall. The proposed tunnel and pipeline alignments are conceptual and based on aerial photography, direction from the District, and professional experience. Additional geotechnical, geological, geophysical and engineering studies would be necessary to confirm these alignments. Additional alignments would also be considered in future project phases should this alternative be selected for further study. Figures 1 and 2, show conceptual potential facility locations for a Mid-County Desalination Project in the District service area.

### Project Elements and Assumptions

A brief listing of the Mid-County Desalination Project elements and assumptions for this TM are provided below.

- Mid-County Desalination Project could provide an average of approximately 1.3 mgd (1,500 AFY) of potable drinking water.
- Potable water could be delivered to District, through pumping directly into the potable water supply system.
- The intake system is assumed to be a screened intake with a very low intake velocity to prevent impingement and minimize entrainment.
- Ocean intake and facility pretreatment are sized for approximately 2.6 mgd of source water to produce 1.3 mgd of drinking water.
- The Intake Pump Station and the Mid-County Desalination Facility could be located in an area north of Highway 1 and west of State Park Drive. Conceptually, the facility would be adjacent to highway 1 and would have a landscaped area around the facility.
- Micro-tunneling could be used to convey the dual intake pipelines and brine discharge pipeline from the intake pump station location, beneath the highway and bluffs and out past the surf zone, approximately 1,000 feet from the shoreline. The pipelines could then extend farther out to the intake and brine discharge locations, without additional tunneling.
- The pipeline tunnel could be drilled under Hwy 1, McGregor Drive and SeaCliff State Beach to minimize easement and right-of-way issues.
- Brine could either be discharged through a new independent brine outfall extending approximately 4,000 feet offshore and 2,000 feet beyond the intake (Figure 1) or conveyed to the Santa Cruz WWTP to be blended with existing ocean outfall (Figure 2).

## Attachment B

- The Mid-County Desalination Facility would not need to have DAF pre-treatment to serve the District's needs and would not need a brine equalization system for direct discharge to the ocean.
- A new brine outfall would have discharge mixing nozzles to rapidly disperse the brine into the surrounding water to achieve the background salinity within the required initial zone of dilution. This approach has been successfully used at the Perth, Australia seawater desalination facility, and is used for brine discharge from salinity management pipeline outfalls in Southern California.

### Deep Water Desalination Project

#### Description

The Deep Water Desalination Project would consist of a DWD Desalination Facility constructed at the Moss Landing Area and co-located with a data center that would share infrastructure with the desalination facility. The project includes constructing a new intake and a new outfall pipeline sized to meet the full desalination facility capacity 25,000 AFY (22.3 MGD). Potable water would be delivered to the District's potable water distribution system via a new treated water pipeline extending north of Moss Landing.

The DWD Project proposes to construct a desalination facility near Moss Landing, California to initially produce approximately 10,000 acre-feet per year (AFY) (9 million gallons per day (mgd)) of potable water and up to 25,00 AFY (22 mgd) in a future phase. The major elements of DWD Project that could make it a cost-effective approach to desalination include the following:

- DWD proposes to co-locate the Desalination Facility with a Data Center that would share infrastructure with the Desalination Facility to save capital costs. The Desalination Facility and Data Center elements of the project are critical to the overall success of each, but are structured as separate project elements as described below.
- DWD proposes to finance the capital cost of the intake and outfall with the Data Center, and therefore reduce financing costs for the Desalination Facility.
- The Data Center is proposed to be seawater cooled, and then the warmer seawater would become the feed for the Desalination Facility, which should lower the operating cost of each facility as compared to building and operating two separate facilities.
- DWD has developed a Municipal Power Authority agreement with the City of Salinas which should help the project obtain low cost energy.



## Attachment B

Based on the projected water needs of the District, the treated water pipeline diameter would need to be in the range of 12-inches. A larger pipeline would likely be installed for a portion of the route to permit serving other regional members of a JPA for the project. Figure 3 illustrates two treated water pipeline route options, between 14 and 15 miles long, to deliver water from the DWD Desalination Facility at Moss Landing to the District's southern distribution system in La Selva Beach.

### **Project Elements and Assumptions**

A brief listing of the Deep Water Desalination Project elements and assumptions for this TM are provided below.

- The DWD Project initial capacity of 10,000 AFY would provide an average of 1,500 AFY (1.3 mgd) of potable drinking water to the District.
- The DWD Project is able to form a JPA for the Desalination Facility and fully subscribe the initial 10,000 AFY of water delivery.
- The capital cost of the intake and outfall pipelines would be financed by the data center and the O&M costs shared with the desalination facility, helping to reduce the capital and O&M costs of the desalination facility.
- Cool seawater enters data center (eliminating need for chillers and cooling towers) and warmed seawater exits data center to enter DWD desalination facility (requiring less power for potable water production).
- The DWD desalination facility pretreatment would be sized for approximately 20 mgd of source water to produce 9 mgd of drinking water.
- 1,500 AFY (1.3 mgd) of potable water would be delivered to District, through a 14 or 15 mile pipeline from Moss Landing to the tie-in to the District potable water distribution system.
- A conveyance pump station would be located at Moss Landing to convey 1.3 mgd of potable water to the District.

### **Conceptual Evaluation of Costs**

The conceptual level construction and operating costs are based on the project elements described above and use information developed in technical studies conducted by the City of Santa Cruz (City) and the District as part of the scwd<sup>2</sup> Desalination Program, projections developed by DWD, and supplemental cost estimates from similar projects and professional experience. Costs are intended to be used for comparison purposes between other alternatives explored by the District, and the level of accuracy for the capital and operating cost estimates presented should be considered to represent a Class 5 estimate with an estimate accuracy contingency of -30 to +50 percent (AACE, 1997).



## Attachment B

The proposed Mid-County Desalination Project costs have been developed to a planning level, with conceptual design criteria, conceptual site locations and pipeline routes and a basic understanding of project alternative elements and limitations. Costs are based on the production of up to 1,500 AFY (1.3 mgd) of treated water to the District. Because the desalination facility produces water that meets potable drinking water regulations, the water can be delivered to existing water distribution networks to meet potable demands. Conceptual costs are provided for two Mid-County Desalination Project brine disposal options: (1) brine outfall to Soquel Cove (Figure 1) and (2) brine conveyed to Santa Cruz WWTP outfall (Figure 2).

The Deep Water Desalination Project costs have also been developed to a planning level using information provided by DWD and applying assumptions where detailed information was limited. The overall DWD Project is proposed to be a form of a public-private partnership. The DWD Group (DWD) would privately design, finance, construct and operate a seawater-cooled Data Center that would provide high speed internet servers for Silicon Valley companies and the Central California region. The DWD Project proposes to form a joint powers authority (JPA), made up of public water agencies, to finance and operate the Desalination Facility separate from the Data Center part of the project.

The JPA is required for the project to meet the law that water providers in Monterey County be public agencies. The JPA may also be beneficial in obtaining lower interest loans for the Desalination Facility part of the project. Under the JPA, the member agencies would be responsible for financing the capital cost of the Desalination Facility, with the exception of the intake and outfall infrastructure. The JPA would also be responsible for operating and maintenance costs of the Desalination Facility. The JPA would pay DWD for a portion of the operations and maintenance costs of the intake and outfall system.

The DWD Project proposes that the JPA Desalination Facility would operate on a take or pay system for a period of at least 20 years. This provides stable income to the JPA and helps to secure lower financing but requires the JPA members to take the water every year (or pay the equivalent if they choose not to take the full subscribed amount.)

For the purpose of this TM, the District would contribute a proportional share of the capital and O&M costs based on receiving an average of 1,500 AFY (1.3 mgd) of potable water every year. In addition, the District costs would include pumping and conveyance of treated water from Moss Landing to the District distribution system tie-in. Conceptual costs are provided for two Deep Water Desalination Project treated water pipeline alignment options, shown in Figure 3: (1) 80,000 ft alignment utilizing some exiting recycled water pipeline easements and (2) 73,000 ft alignment relying on new easements.

# Attachment B

## Summary of Desalination Alternatives Conceptual Costs

Table 1 summarizes the conceptual capital and operational costs for the Mid-County Desalination Project with a capacity of 1,500 AFY (1.3 mgd).

**Table 1: Conceptual Costs for Mid-County Desalination Project (1,500 AFY)**

Mid-County Desalination Project Facility	Brine Outfall to Soquel Cove(\$mil)	Brine Conveyed to Santa Cruz WWTP Outfall
SWRO Treatment	\$45.0	\$45.0
Intake Facilities	\$21.1	\$21.1
Brine Facilities	\$7.7	\$16.7
Connection to Existing Potable Water System	\$0.4	\$0.4
Management, Engineering and Legal	\$5.0	\$5.0
CEQA and Permitting	\$7.0	\$7.0
<b>Total Capital Costs</b>	<b>\$86.2</b>	<b>\$95.2</b>
Annual O&M (1.3 mgd)	\$2.6	\$2.6
<b>Annualized Unit Costs</b>	<b>\$4,600</b>	<b>\$4,700</b>

Table 2 summarizes the conceptual capital and operational costs for the Deep Water Desalination Project, with an initial capacity of 10,000 AFY (9 mgd) and the District's proportional share based on the delivery of 1,500 AFY (1.3 mgd) of potable water. The estimated costs for the District's participation in the DWD Project are presented in more detail in a separate technical memorandum, Evaluation of the Proposed DWD Project Costs, July 2014. The costs presented in Table 2 include the indirect costs such as management, engineering, CEQA and permitting.

Attachment B**Table 2: Conceptual Costs for Deep Water Desalination Project (1,500 AFY)**

<b>SqCWD Participation in DWD Desalination Project</b>	<b>Costs (\$mil)</b>
District's Share of DWD Desalination Facility	\$14.5
Connection to Existing Potable Water System	\$33
<b>Total Capital Costs</b>	<b>\$47.5</b>
Annual O&M Share (1.3 mgd)	\$2.3
<b>Annualized Unit Costs</b>	<b>\$3,100</b>

Assuming the proposed DWD Project JPA contracts can be fully subscribed to supply 10,000 AFY, with a focus on project cost control during construction, and depending on energy costs, it is reasonable that the proposed JPA Desalination Facility could provide delivered water to SqCWD in the range of \$2,600 to \$3,100 per AF.

## Attachment B

### References

Association for the Advancement of Cost Engineering (AACE), 1997. International Recommended Practices and Standards.

City of Santa Cruz. 2005. Integrated Water Plan.

CDM Smith. 2013. scwd<sup>2</sup> Regional Desalination Project, Seawater Intake Facility Conceptual Design Report. May 2013. CDM Smith, Walnut Creek, CA. Included as Appendix L of Proposed scwd<sup>2</sup> Regional Seawater Desalination Project Draft Environmental Impact Report dated May 2013.

CDM Smith. 2012. scwd<sup>2</sup> Regional Desalination Plant, Phase I Preliminary Design Report. October 2012. CDM Smith, Walnut Creek, CA. Included as Appendix L of Proposed scwd<sup>2</sup> Regional Seawater Desalination Project Draft Environmental Impact Report dated May 2013.

Kennedy/Jenks, 2014. TM. Evaluation of Deep Water Desalination Project Costs, for Soquel Creek Water District and Monterey Peninsula Water Management District. July 2014.

Kennedy/Jenks, 2013. TM. Conceptual-Level Cost Comparison of Water Supply Alternatives. Included as Appendix FF of Proposed scwd<sup>2</sup> Regional Seawater Desalination Project Draft Environmental Impact Report dated May 2013.

Kennedy/Jenks, 2011. scwd<sup>2</sup> Seawater Desalination Intake Technical Feasibility Study. Included as Appendix H of Proposed scwd<sup>2</sup> Regional Seawater Desalination Project Draft Environmental Impact Report dated May 2013.

Soquel Creek Water District, 2012. Integrated Resources Plan Update, September 2012.

URS. 2011. Seawater Intake Facility Conceptual Design Report, scwd<sup>2</sup> Regional Desalination Project, dated September 2011.

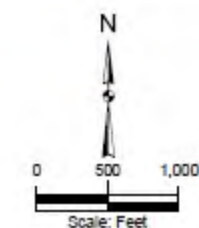


## Attachment B



## Legend

- Proposed Brine Pipelines
- Proposed Intake Pipelines



## Kennedy/Jenks Consultants

SqCWD  
TM#1 Desalination Alternatives

Mid-County Desalination Project  
with Brine Line to Ocean

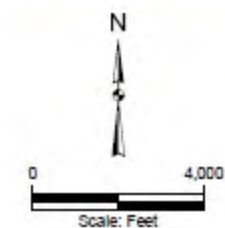
1368027'00

July 2014

Figure 1



## Attachment B



Kennedy/Jenks Consultants

SqCWD

TM#1 Desalination Alternatives

**Mid-County Desalination Project  
with Brine Line to Santa Cruz WWTP**

1368027'00

July 2014

Figure 2

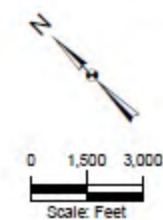


## Attachment B



## Legend

- Option 1 (Use Some Existing RW Pipeline Easements)
- Option 2 (New Easements)



## Kennedy/Jenks Consultants

SqCWD  
TM#1 Desalination Alternatives

Pipeline From DWD Project To SqCWD  
Service Area

KJ 1368027'00

July 2014

Figure 3



## Attachment B

## ATTACHMENT 1

Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project

EIR Section/Topic	Existing Sources of Information in scwd <sup>2</sup> Draft EIR	Adequacy of Existing Information	New Analysis or Study Required
PROJECT DESCRIPTION	Desalination Facility Description: <ul style="list-style-type: none"> <li>Draft EIR Section 4, Project Description</li> <li>Pilot Test Program Report (Appendix D)</li> <li>Desalination Plant: Preliminary Design Report (PDR) (Appendix L)</li> </ul>	The Project Description section would provide much of the needed information to support a project description for the Project, including the desalination facility component. Much of the desalination process description, based on the Pilot Program and the PDR, would still likely apply to the Project. Site specific design information would need to be updated.	<ul style="list-style-type: none"> <li>Prepare preliminary site-specific design information to update prior project description.</li> </ul>
	Intake Facility Description: <ul style="list-style-type: none"> <li>Draft EIR Section 4, Project Description</li> <li>Intake Technical Feasibility Study (ITFS) (Appendix H)</li> <li>Intake Facility Conceptual Design Report (CDR) (Appendix I)</li> </ul>	The Project Description section would provide much of the needed information to support a project description for the Project, including the intake facility component. Much of the design and operation and maintenance description, based on the ITFS and the Intake CDR, would still likely apply to the Project. Site specific design information would need to be provided to update the description.	<ul style="list-style-type: none"> <li>Prepare preliminary site-specific design information to update prior project description.</li> </ul>
	Intake Studies that support conclusion about the feasibility of subsurface intakes: <ul style="list-style-type: none"> <li>Intake Technical Feasibility Study (Appendix H)</li> <li>Offshore Geophysical Study (Appendix F)</li> </ul>	These studies and key references (e.g., Hopkins 2001) cover the hydro-geological assessment of the shoreline from Wilder Ranch to Rio Del Mar Beach and concluded that the beaches and offshore areas along the Santa Cruz coastline are generally not suitable for sub-seafloor intakes due to the presence of shallow sand over bedrock. A possible exception to this is the offshore alluvial channel directly offshore from the San Lorenzo River, which was the subject of the Offshore Geophysical Study.	<ul style="list-style-type: none"> <li>Existing information should likely support a similar conclusion about the feasibility of subsurface intakes near Rio Del Mar Beach for the Project.</li> <li>Conduct additional geotechnical borings, if required by regulatory agencies to verify the conclusion.</li> </ul>
	Brine Disposal Design and Process Description: <ul style="list-style-type: none"> <li>Dilution Analysis for Brine Disposal via Ocean Outfall (Appendix J)</li> </ul>	Largely applicable to the Project option of discharge via the Santa Cruz WWTF. Does not analyze the option of direct brine discharge.	<ul style="list-style-type: none"> <li>If brine is directed to the City's WWTF ocean outfall, conduct minor update to Dilution Study to adjust for project specific details.</li> <li>If direct brine discharge is selected, conduct a new</li> </ul>

## Attachment B

## ATTACHMENT 1

Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project

EIR Section/Topic	Existing Sources of Information in scwd <sup>2</sup> Draft EIR	Adequacy of Existing Information	New Analysis or Study Required
			bioassay study or incorporate the findings of a bioassay study prepared by West Basin Water District. See additional information under Hydrology and Water Quality and Marine Biological Resources below.
	Construction Description: <ul style="list-style-type: none"> <li>Construction Assumptions (Appendix N)</li> </ul>	Format and content requirements can be used, but the information will need to be updated to reflect site-specific information.	<ul style="list-style-type: none"> <li>Update construction assumptions to reflect site-specific information.</li> </ul>
HYDROLOGY & WATER QUALITY	Environmental Setting: <ul style="list-style-type: none"> <li>Section 5.1 Hydrology &amp; Water Quality</li> <li>Appendix D, Pilot Test Program Report</li> <li>Appendix E, Watershed Sanitary Survey</li> <li>Appendix Q, Water Quality Data</li> </ul>	<ul style="list-style-type: none"> <li>Inland Setting - Most information would need to be updated or replaced with site-specific information.</li> <li>Marine Setting - Information on marine circulation and water quality is likely adequate with some updates from other sources.</li> <li>Regional Tsunami Inundation - Background information adequate, but new mapping would need to be prepared.</li> <li>Regional Wastewater Treatment - This information would still apply, with minor updates.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare site-specific setting and mapping to reflect selected desalination facility site.</li> <li>Conduct minor updates identified related to marine setting.</li> </ul>
	Regulatory Framework: <ul style="list-style-type: none"> <li>Section 5.1 Hydrology &amp; Water Quality</li> <li>Appendix M, Storm Water Regulations</li> </ul>	Information mostly adequate with minor edits.	<ul style="list-style-type: none"> <li>Update regulatory framework to reflect any policy changes or new regulations. Specifically, the Ocean Plan 2012 and the pending amendments to the Ocean Plan to address desalination facilities and the disposal of brine discharges will need to be added.</li> </ul>
	Standards of Significance: <ul style="list-style-type: none"> <li>Section 5.1 Hydrology &amp; Water Quality</li> </ul>	These would generally be usable, but may need to be updated.	<ul style="list-style-type: none"> <li>Update if needed to reflect project- or site-specific characteristics.</li> </ul>
	Brine Discharge Water Quality Impact: <ul style="list-style-type: none"> <li>Section 5.1 Hydrology and Water Quality</li> <li>Dilution Analysis for Brine Disposal (Appendix J)</li> </ul>	<ul style="list-style-type: none"> <li>The brine impact and supporting brine dilution analysis would apply to the option of sending the brine back to the City's WWTF outfall, with minor additional information.</li> </ul>	<ul style="list-style-type: none"> <li>No new dilution study required if brine sent back to City's WWTF outfall. Conduct minor update to current Dilution Study to adjust for project specific details.</li> <li>Update EIR quantitative marine water quality analysis</li> </ul>

**ATTACHMENT 1**

**Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project**

<b>EIR Section/Topic</b>	<b>Existing Sources of Information in scwd<sup>2</sup> Draft EIR</b>	<b>Adequacy of Existing Information</b>	<b>New Analysis or Study Required</b>
	<ul style="list-style-type: none"> <li>Water Quality Data (Appendix Q)</li> </ul>	<ul style="list-style-type: none"> <li>The data in Appendix Q can be used. However, additional data will be identified and reviewed to determine if more local ocean source water quality data is available.</li> </ul>	<ul style="list-style-type: none"> <li>of other constituents to reflect additional ocean water quality data sources, specific project characteristics of both brine disposal options, etc.</li> <li>See Marine Biology below for assessing marine biology impacts associated with the option of direct brine discharge.</li> </ul>
	Marine Construction and Operations Impact: <ul style="list-style-type: none"> <li>Section 5.1 Hydrology and Water Quality</li> <li>Construction Assumptions (Appendix N)</li> </ul>	Impact analysis likely applicable with some revisions to reflect site-specific conditions and project-specific characteristics.	<ul style="list-style-type: none"> <li>Update the impact analysis to make it project specific.</li> </ul>
	Inland Impacts and Mitigation (Drainage, Flooding/Inundation, Construction Water Quality): <ul style="list-style-type: none"> <li>Section 5.1 Hydrology and Water Quality</li> </ul>	<ul style="list-style-type: none"> <li>The framework and organization of these impacts and some of the content could be used.</li> <li>Most of the other information is site specific and in general would not apply to the project site location in the District.</li> </ul>	<ul style="list-style-type: none"> <li>Prepare impact analysis based on new site-specific information and mapping about drainage, flooding, etc.</li> </ul>
<b>MARINE BIOLOGY</b>	Environmental Setting Information: <ul style="list-style-type: none"> <li>Section 5.2 Marine Biology</li> </ul>	<ul style="list-style-type: none"> <li>Regional setting – Information adequate.</li> <li>Habitat Types - Information adequate with minor edits.</li> <li>Special-Status Species table – Update with current CNODB records.</li> <li>Threatened &amp; endangered fish species description – Information adequate.</li> <li>Marine mammal species description – Information adequate with minor edits.</li> </ul>	<ul style="list-style-type: none"> <li>Conduct new CNODB search and update special-status species table if needed. Project area is farther south from known black abalone occurrences and critical habitat so there may be incrementally less potential impact to black abalone.</li> <li>Update information about marine mammal haul-out sites and rookeries. Update the population information using the 2014 Stock Assessment Reports.</li> </ul>
	Regulatory Framework: <ul style="list-style-type: none"> <li>Section 5.2 Marine Biology</li> </ul>	Information adequate with minor edits.	<ul style="list-style-type: none"> <li>Critical Habitat is the same as for the scwd<sup>2</sup> project: Critical Habitat for green sturgeon.</li> <li>Update information relating to the Magnuson-Stevens Fisheries Act. There are no Habitat Areas of Particular Concern (HAPC) in the project area.</li> <li>Update information relating to the Marine Life</li> </ul>

## Attachment B

## ATTACHMENT 1

Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project

EIR Section/Topic	Existing Sources of Information in scwd <sup>2</sup> Draft EIR	Adequacy of Existing Information	New Analysis or Study Required
			<p>Protection Act (MLPA). This Act sets up state reserves or protected areas. <u>There are no state protected areas under the MLPA close to the Project.</u></p> <ul style="list-style-type: none"> <li>Update information relating to the NPOES permits and Rivers and Harbors Act Section 10 to make is specific to the Project.</li> </ul>
	<p>Standards Significance:</p> <ul style="list-style-type: none"> <li>Section 5.2 Marine Biology</li> </ul>	These would generally be usable, but my need to be updated.	<ul style="list-style-type: none"> <li>Update if needed to reflect project- or site-specific characteristics.</li> </ul>
	<p>Entrainment and Impingement Impacts:</p> <ul style="list-style-type: none"> <li>Open Ocean Intake Effects Study (Appendix G)</li> </ul>	<p>Tenera Environmental found that the field studies, findings, and analyses of potential entrainment impacts of the proposed City of Santa Cruz and Soquel Water District (scwd<sup>2</sup>) are relevant and useful to assess the potential entrainment and impingement impacts, including cumulative impacts of the Project. Given that the studies are not more than 10 years old they should be valid for the Project. See Attachment 2 for additional detail.</p>	<ul style="list-style-type: none"> <li>No new entrainment studies required.</li> <li>Conduct minor update to current Open Ocean Intake Effects Study to adjust for project-specific details.</li> </ul>
	<p>Brine Discharge Water Quality Impact on Marine Life:</p> <ul style="list-style-type: none"> <li>Section 5.2 Marine Biology</li> <li>Section 5.1 Hydrology and Water Quality</li> <li>Dilution Analysis for Brine Disposal (Appendix J)</li> </ul>	<p>The existing analysis of brine discharge impact on marine life would apply to the option of sending the brine back to the City's WWTf outfall, with minor additional information as described under the Hydrology and Water Quality Section above.</p>	<ul style="list-style-type: none"> <li>Incorporate updated marine water quality analysis from Hydrology and Water Quality (see above).</li> <li>If direct brine discharge is selected, incorporate the findings of a new bioassay study or incorporate the findings of a bioassay study prepared by West Basin Water District. This would support the analysis of the short- and long-term exposure effects of high salinity discharges on marine organisms. Compliance with the pending Amendments to the Ocean Plan for desalination brine disposal would need to be demonstrated.</li> </ul>
	<p>Underwater and Airborne Noise Impact:</p> <ul style="list-style-type: none"> <li>Section 5.2 Marine Biology</li> </ul>	<p>Analysis is specific to the project construction methods and materials (piles etc.). This will not</p>	<ul style="list-style-type: none"> <li>Update underwater noise analysis to make it specific to the Project.</li> </ul>



## Attachment B

## ATTACHMENT 1

Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project

EIR Section/Topic	Existing Sources of Information in scwd <sup>2</sup> Draft EIR	Adequacy of Existing Information	New Analysis or Study Required
		necessarily be transferable to the District's Project, unless materials, methods, and physical conditions (e.g., substrate) in the area are similar.	<ul style="list-style-type: none"> <li>Revise the methods of analysis for underwater noise to use NOAA's proposed revision to the noise guidelines that are expected to be implemented in spring or summer 2014.</li> </ul>
	Other Impacts and Mitigation: <ul style="list-style-type: none"> <li>Section 5.2 Marine Biological Resources</li> </ul>	Although the impact analysis for other topics is specific to the previously proposed desalination project, much of the impact analysis and mitigation would likely be similar.	<ul style="list-style-type: none"> <li>Update the information to make it specific to the Project.</li> </ul>
TERRESTRIAL BIOLOGY	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.3 Terrestrial Biological Resources</li> <li>Biotic Resources Survey Report (Appendix R)</li> </ul>	The framework and organization of the section and some of the content (e.g., regulatory setting, standards of significance) could be used with minor edits. Most of the other information is site specific and in general would not apply to the component site locations in the District.	<ul style="list-style-type: none"> <li>Conduct new site-specific biological resource surveys, depending on the conditions at the site(s) selected.</li> <li>Prepare/update EIR section based on the new resource surveys.</li> </ul>
LAND USE, PLANNING & RECREATION	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.4 Land Use, Planning, and Recreation</li> </ul>	The framework and organization of the section and some of the content (e.g., regulatory setting, standards of significance) could be used with minor edits. Environmental setting and impact analysis is specific to the location of scwd <sup>2</sup> desalination project components and may not necessarily be transferable to the District's Project.	<ul style="list-style-type: none"> <li>Prepare/Update section using the proposed location of the project components and relevant existing conditions information.</li> <li>See Permitting Requirements below for land use information about potential sites for the Project.</li> </ul>
AIR QUALITY & CLIMATE	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.5 Air Quality and Climate</li> <li>Energy and GHG Reduction Approach (Appendix O)</li> <li>Air Quality and Climate Calculations (Appendix T)</li> </ul>	The framework and organization of the section and some of the content (e.g., environmental setting, regulatory framework, standards of significance) could be used with minor edits. The impact analysis is specific to the scwd <sup>2</sup> desalination project and would need to be updated.	<ul style="list-style-type: none"> <li>Prepare updated air quality and GHG calculations specific to the District's Project.</li> <li>Any update in the District's GHG approach could be reflected in the new calculations and analysis</li> <li>Prepare/Update EIR section based on new calculations.</li> </ul>

## Attachment B

## ATTACHMENT 1

Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project

EIR Section/Topic	Existing Sources of Information in scwd <sup>2</sup> Draft EIR	Adequacy of Existing Information	New Analysis or Study Required
<b>NOISE &amp; VIBRATION</b>	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.6, Noise and Vibration</li> <li>Long-Term Noise Measurement Data (Appendix U)</li> </ul>	The framework and organization of the section and some of the content (e.g., portions of environmental setting, regulatory framework, standards of significance) could be used with minor edits. Most of the setting and impact information is site specific and in general would not apply to the Project.	<ul style="list-style-type: none"> <li>Perform new site-specific short- and long-term noise measurements at the project site.</li> <li>Estimate project noise levels and compare to the County's relevant noise standards.</li> <li>Prepare/Update EIR section based on new ambient and projected noise levels.</li> </ul>
<b>GEOLOGY &amp; SOILS</b>	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.7, Geology and Soils</li> </ul>	The framework and organization of the section and some of the content (e.g., portions of environmental setting, regulatory framework, standards of significance) could be used with minor edits. Most of the setting and impact information is site specific and in general would not apply to the Project.	<ul style="list-style-type: none"> <li>Prepare preliminary geotechnical information, similar to that provided for the scwd<sup>2</sup> project, as part of PDR.</li> <li>Prepare/Update EIR section based on new site-specific geotechnical information.</li> </ul>
<b>CULTURAL RESOURCES</b>	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.8 Cultural Resources</li> <li>Cultural Resources Study (Appendix V)</li> <li>Paleontological Record Search (Appendix W)</li> </ul>	The framework and organization of the section and some of the content (e.g., portions of environmental setting, regulatory framework, standards of significance) could be used with minor edits. Most of the setting and impact information is site specific and in general would not apply to the Project.	<ul style="list-style-type: none"> <li>Conduct new site-specific records search and cultural resource surveys.</li> <li>Prepare/Update EIR section based on the new records search and surveys.</li> <li>A portion of the Poor Clares site is identified as having or being sensitive for archaeological resources based on the County's GIS.</li> </ul>
<b>UTILITIES &amp; SERVICE SYSTEMS</b>	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.9 Utilities and Service Systems</li> <li>Disposal of Waste Flows to the City of Santa Cruz's Sanitary Sewer System (Appendix X)</li> </ul>	The framework and organization of the section and some of the content (e.g., portions of environmental setting, regulatory framework, standards of significance) could be used with minor edits. Most of the setting and impact information is site specific and in general would not apply to the Project.	<ul style="list-style-type: none"> <li>Prepare an updated assessment for disposal of waste flows that incorporates the County's portion of the sewer distribution system that would receive residual solids from the Project.</li> <li>Prepare an updated assessment of the impact of residual solids disposal in the County's landfill.</li> <li>Prepare an updated assessment of the impact of the project on energy, based on project-specific energy demand and plans for provision of electricity and</li> </ul>

## Attachment B

## ATTACHMENT 1

Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project

EIR Section/Topic	Existing Sources of Information in scwd <sup>2</sup> Draft EIR	Adequacy of Existing Information	New Analysis or Study Required
			<ul style="list-style-type: none"> <li>natural gas.</li> <li>Prepare/Update EIR section based on the revised assessments above.</li> </ul>
Aesthetics	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.10 Aesthetics</li> </ul>	The framework and organization of the section and some of the content (e.g., regulatory framework, standards of significance) could be used with minor edits.  Most of the setting and impact information is site specific and in general would not apply to the Project.	<ul style="list-style-type: none"> <li>Conduct site-specific aesthetics analysis based on site analysis and photography.</li> <li>Prepare/Update EIR section based on the site-specific analysis.</li> <li>Both the conceptual locations for a desalination facility are identified as "scenic" in the County's GIS system due to their location adjacent to Highway 1, which is identified as an Eligible State Scenic Highway by the California Scenic Highways Mapping System.</li> </ul>
HAZARDOUS & HAZARDOUS MATERIALS	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.11 Hazard and Hazardous Materials</li> <li>Potential Hazardous Materials Release Sites (Appendix Y)</li> </ul>	The framework and organization of the section and some of the content (e.g., regulatory framework, standards of significance) could be used with minor edits.  Most of the setting and impact information is site specific and in general would not apply to the potential project sites.	<ul style="list-style-type: none"> <li>Conduct new Phase I ESA for the project site(s).</li> <li>Prepare/Update EIR section based on the ESA.</li> </ul>
TRAFFIC & TRANSPORTATION	Setting, Regulatory Framework, and Impacts & Mitigation Measures: <ul style="list-style-type: none"> <li>Section 5.12 Traffic and Transportation</li> </ul>	The framework and organization of the section and some of the content (e.g., portions of the environmental setting, regulatory setting, standards of significance) could be used.  Most the setting and impact information is site specific and in general would not apply to the potential project sites. However, trip generation rates for the Project could be derived from this section of the scwd <sup>2</sup> Draft EIR.	<ul style="list-style-type: none"> <li>New site-specific traffic volumes and LOS analysis would be needed.</li> <li>Prepare/Update EIR section based on the new traffic information.</li> </ul>
GROWTH	Growth Section: <ul style="list-style-type: none"> <li>Section 6.0 Growth</li> </ul>	Most of the information in the EIR section and appendix would apply to the Project. Information	<ul style="list-style-type: none"> <li>Update/revise growth appendix to reflect project-specific details and any new information. Delete City</li> </ul>



## Attachment B

## ATTACHMENT 1

Applicability of scwd<sup>2</sup> Regional Seawater Desalination Draft EIR to District-Only Desalination Project

EIR Section/Topic	Existing Sources of Information in scwd <sup>2</sup> Draft EIR	Adequacy of Existing Information	New Analysis or Study Required
	<ul style="list-style-type: none"> <li>Desalination Project Growth Review (Appendix EE)</li> </ul>	about the City would not apply if a joint project is no longer being pursued.	<p>information, if a joint project is no longer being pursued.</p> <ul style="list-style-type: none"> <li>Prepare/Update the EIR section to reflect revised growth appendix.</li> </ul>
CUMULATIVE IMPACTS	<p>Cumulative Impacts Section:</p> <ul style="list-style-type: none"> <li>Section 7.0, Cumulative Impacts</li> <li>Estimated Cumulative Effects of Intake on Fish Populations (Appendix GG)</li> </ul>	<p>Much of this information, especially about other cumulative projects, would still be relevant. The analysis would need to be updated to reflect the specific impacts of a District-Only project and any updated information about other cumulative projects, if any.</p> <p>Appendix GG would still be applicable to the Project, but should have a minor updates. (See Attachment 2 for additional details.)</p>	<ul style="list-style-type: none"> <li>Minor update to Appendix GG to reflect project-specific details.</li> <li>Prepare/Update EIR section to reflect District-Only project.</li> </ul>
ALTERNATIVES	<p>Alternatives Section:</p> <ul style="list-style-type: none"> <li>Section 8, Alternatives to the Proposed Project</li> <li>Intake Alternatives - Review and Status of Subsurface Intakes (Appendix AA)</li> <li>Comparison of Desalination Technologies (Appendix CC)</li> <li>Additional Seawater Reverse Osmosis Brine Disposal Options (Appendix DD)</li> <li>Conceptual-Level Cost Comparison of Water Supply Alternatives (Appendix FF)</li> </ul>	<p>Much of this information would still be relevant to an alternatives discussion for a District-only Desal Project.</p> <p>Appendices AA, CC, and DD would support the evaluation of other desalination-related technologies. Appendix FF would be augmented and updated by the current District review and evaluation of other water supply alternatives.</p>	<ul style="list-style-type: none"> <li>No new technical studies would likely be required.</li> <li>Incorporate information about other water supply alternatives currently being reviewed by the District Board of Directors.</li> <li>Prepare/Update EIR section based on the above and also on the determination of the appropriate CEQA document for the Project. (See CEQA Environmental Review Approach above.)</li> </ul>

April 7, 2015

**MEMO TO THE BOARD OF DIRECTORS**

Subject: Agenda Item No. 6.3

Presentation by Deep Water Desal

Attachment: Presentation

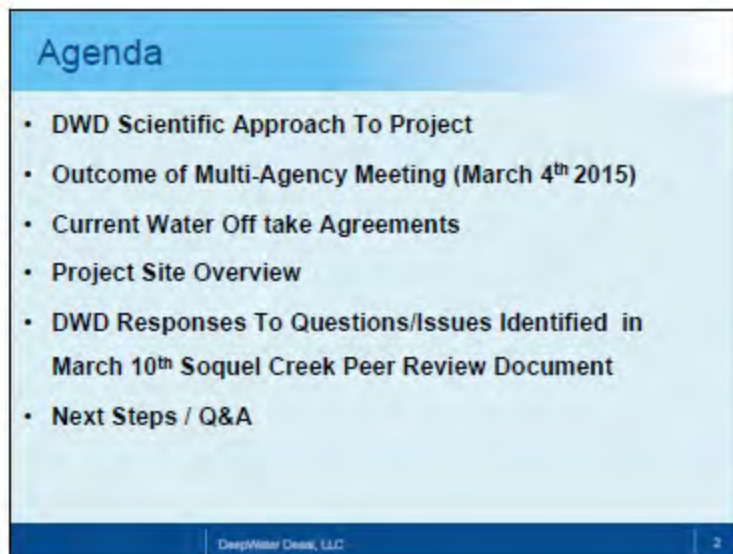
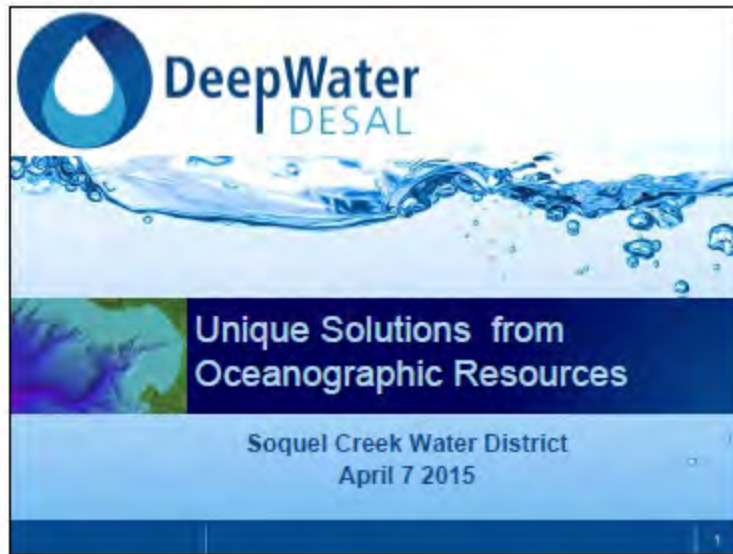
At the August 26, 2014 Board Water Supply Workshop, directors chose to continue following the status of the proposed Deep Water Desal Project located in Moss Landing.

Thus, representatives from Deep Water Desal, have prepared a presentation about their projects progress. Dr. Brent Constanz (CEO), Mr. David Armanasco (Public Relations/Government Affairs Officer), Mr. Dennis Ing (CFO), Mr. Grant Gordon (COO) and Mr. George Reilly (Site Planner) will be in attendance to present and answer questions related to the project

**POSSIBLE BOARD ACTION**

For Informational Purposes. Proved Direction to Staff as Needed.

By   
\_\_\_\_\_  
Kim Adamson  
General Manager

Attachment C

## Attachment C

### Scientific Approach Taken By DWD

- **Intake Study Using Empirical Transport Model- ETM**
  - Tenera, Joe Phelan, PhD
- **Discharge Study**
  - Scott Jenkins, PhD
- **Alternative Intakes / Hydrogeology**
  - Eco-Management, Hany Elwany, PhD
- **GHG Reductions From Combined Desal/Data Center**
  - PE International, Julie Sinistore, PhD
- **Spring Survey – Tank Farm Parcel**
  - Denise Duffy and Associates
- **Phase I Environmental Analysis-Land**
  - All West Environmental

DeepWater Desal, LLC

3

### Follow Up Items from April 4 Agency Meeting (Coastal Commission, MBNMS, CSLC)

#### **Monterey Bay National Marine Sanctuary (March 30, 2015)**

"The CEQA/NEPA process will evaluate impacts based on the revised project description, which currently includes a plant designed to produce up to 25,000 acre-feet per year. We are requesting detailed justification of water needs for each of the jurisdictions requesting potable/desalinated water from this facility. This may include written agreements, information contained in urban water management plans, (available water, shortcomings, demand, desal as an alternative source, etc.), local coastal plans, water purchase agreements, or other evidence of need from DWD potential customers."

DeepWater Desal, LLC

4



# Attachment C

## Follow Up Items from April 4 Agency Meeting (Coastal Commission, MBNMS, CSLC)

### California Coastal Commission (March 13, 2015)

"Project purpose and need: We discussed the need to document the project's proposed production of 25 million gallons per day, along with several related issues – i.e., where that amount of water would be used and how it would be distributed, what agreements were in place for water purchases, what planning documents support that particular production volume, whether a smaller amount would be adequate and result in reduced project impacts to marine life, etc."

DeepWater Desal, LLC

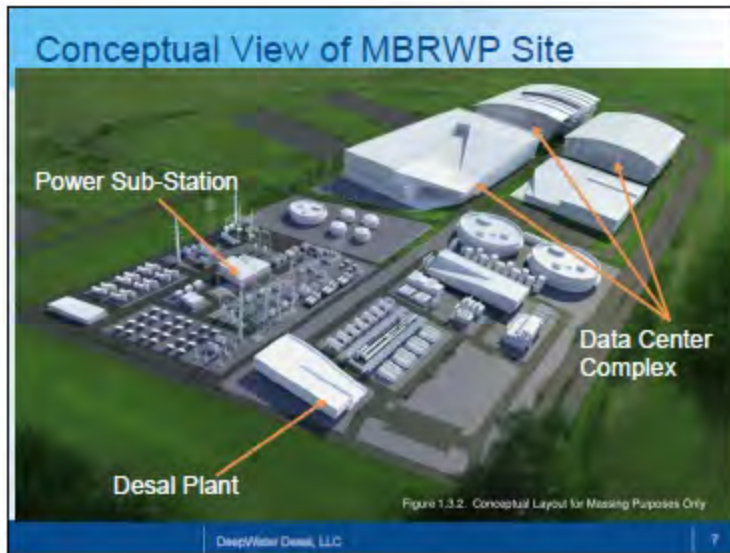
5

## Current / Potential Water Off Takers (Rationale for 25K Acre Ft Facility)

<u>Off Taker</u>	<u>Form Of Agreement</u>	<u>Quantity</u>
California Water Service	Salinas MOU Q2 2013	10,000 Acre Ft
Castroville Community Services District	MOU Signed Q3 2014	1,000 Acre Ft
Soquel Creek Water District	KJ Engineering Study	1,500 Acre Ft (?)
<u>DWD Alternative to CalAm</u>		
MPWMD/CalAm	MPWMD Agreement Q2 2014	9,000 Acre Ft

DeepWater Desal, LLC

6

Attachment C

# Responses to Peer Review Questions and Comments

DeepWater Desal, LLC

8

# Attachment C

## Uncertainty of Capital Cost Distribution

It is unclear how many public water agencies would be taking part in the JPA. The outcome of the JPA formation would have a direct impact on the District's financial commitment to the project. In addition, potential conflicts or issues within the JPA members may arise that may impact operations and/or water production. The JPA arrangement and participating members need to be better defined.

- Can add to SWRO plant in trains if capacity needed
- Partnerships on distribution lines will have the largest impact on distributed price of water
  - potential partnerships of Soquel Creek, Santa Cruz, Watsonville / Pajaro Valley would reduce costs.
- Plant size has smaller impact on cost
  - Some infrastructure costs are absorbed by other elements of the Project

DeepWater Desal, LLC

8

## Need for Better Definition of "Take or Pay" Water Purchase Agreement

A water purchase agreement can be written in many different ways that are amenable to both seller and purchaser. Two examples are: (1) Contract can be written for shorter period of time, with higher tariff. That will be same as lower tariff over longer period of time. A clear definition on these conditions would better define financial requirements for the District (2) Take or Pay contract can be written in a way that, when the water is not needed, the tariff will go down, since the seller has not incurred costs of consumables. Thus, the buyer can only pay fixed costs and assumed profit.

- Fixed "Term" intended for all JPA members
- Members may opt to sell share of rights over time
  - Public facility: Cost models will be decided within the JPA structure
  - JPA member with allocation responsible for the water off take or reallocation
- Consider flexible options to control excess water

DeepWater Desal, LLC

10



# Attachment C

## Challenges To Increase District's Share of Production Capacity

It was suggested in the Memo to the Board of Directors (July 15, 2014) that the District could potentially purchase additional spare capacity in the JPA Seawater Desalination Plant, if available. The purchase of additional capacity would be difficult since the financial model of a JPA is often based on the number of water purchasers determined a priori, with the contract capacity and terms signed by each party before financing is provided by the banks. It should be noted that the initial 9MGD has already been promised to Monterey Cities and the City of Salinas.

- Project no longer phased
- 9MGD allocation for CalAm backup plan has NO impact on ability for others to join JPA.
- Accommodate all JPA commitments up to 25K Acre Ft
- Develop plan to accommodate additional needs after the JPA formed (if < 25K Acre Ft Commit)

DeepWater Desal, LLC

11

## Ownership of Intake / Outfall May Impact Production Reliability

Since the JPA does not own the intake and outfall structures, it would need to rely on DWD to ensure intake and outfall operations are optimized to benefit the treatment plant. For example, the timing of cleaning and maintenance may impact production capacity during peak demands (e.g. summer months). As a "worst case," the JPA may need to purchase or take over operation of the intake and outfall should the Data Center shut down.

- DWD to operate and maintain SWRO facility
  - Includes specific maintenance items with SLA's
- Facility designed with fully redundant intake / outfall
  - maintenance should not impact capacity
- Data center will not impact SWRO Capacity
- Data center unrelated to other water needs onsite

DeepWater Desal, LLC

12

# Attachment C

## Uncertainty of Regulation Approval of Using Seawater for Once-Through Cooling

Power plants in California using once-through cooling are all being phased out and switching to more efficient cooling technologies that are more environmentally friendly. The proposed once-through cooling approach for the Data Center may not receive approval from regulatory agencies. (e.g. discharge of warmer waters back into the ocean).

- Proposed design IS NOT once-through cooling
- Water pumped on shore for desalination
- Looped through data centers to pre-warm water
- No additional water consumed by data center
- Blended discharge water temp < 5 degree delta T
- Note: New power plant cooling technologies NOT more efficient and significantly increase carbon footprint. DWD project uses less than 5% of water volume vs Dynegy power plant with harbor intake.

DeepWater Desal, LLC

13

## Minimal Overall Savings Associated With "Warmer" SWRO Feed Water

Although warmer water feeding the SWRO system may require less pressure, it also results in the SWRO membranes to be more permeable and potentially degrading the SWRO permeate water quality. This may result in more water being treated by the second pass SWRO to meet water quality objectives.

- Relative temperature change has minimal impact on the O&M costs Vs 2-3MW/Hr energy savings
- Management of blended intake water pre SWRO to optimize balance of power and membrane impact
- Feed water is 8-12 Degrees C.
  - <5 Degrees C Delta if blended vs dedicated trains

DeepWater Desal, LLC

14

# Attachment C

## Public Outreach Program To Gain Public Acceptance

A public outreach and education program would be implemented by the District and should be included in project costs.

- DWD has an active public outreach program
- Cost absorbed by DWD
- Outreach will increase as interest is expressed by Monterey Bay water agencies
- DWD would certainly increase availability and outreach in Santa Cruz County if requested

DeepWater Design, LLC

15

## Dependence on Data Center

Overall project viability and project success is dependent on the Data Center.

- Modular Project
  - Components can be deployed independently
- Continuous optimization opportunity
- Even without data center (highly unlikely), DWD regional facility still the lowest cost alternative
- DWD can provide details on cost impacts

DeepWater Design, LLC

16

## Attachment C

### Power Agreement with City of Salinas

Power agreement with the City of Salinas is a factor in overall project feasibility.

- Power agreement with Salinas covered under current MOU
- Onsite back up power generation required

DeepWater Desalt, LLC

17

### Make-up, number, and contract terms of participating public water agencies in the JPA

- To be determined by JPA

DeepWater Desalt, LLC

18



## Attachment C

### Regulatory Approval for Proposed Once-Through Cooling System for Data Center / Intake Approach

- Proposed design IS NOT once through cooling
- As for the Intake Approach:
  - DWD working diligently to ensure Project complies with most recently proposed amendments to Ocean Plan
  - Confident DWD science and frequent communications with regulatory agencies will result in required permits and regulatory approvals

DeepWater Diesel, LLC

18

### Contract terms and purchase price in the Water Purchase Agreement between DWD and JPA

- DWD to help facilitate mutually beneficial relationship between all JPA Members

DeepWater Diesel, LLC

20

## Attachment C

### Financial model of the overall DWD Project (e.g. ability to secure adequate funding)

- DWD Management is confident in ability to provide necessary equity and debt financing for the Project.
- Wedbush Securities previously defined a model for municipal bond financing of a publically owned desalination plant for Monterey County and Santa Cruz County

DeepWater Desal, LLC

21

### Review preliminary treatment design criteria used to develop capital / O&M costs to ensure completeness and accuracy

- DWD Project Engineer available to speak with Soquel Creek staff
- Refer to Soquel Creek / MPWMD Funded Kennedy Jenks study for additional design validation

DeepWater Desal, LLC

22

Attachment C

Clarify "take or pay" contract arrangement with DWD. Can be written numerous ways.

- Any arrangement must comply with municipal bond funding requirements including backing by off take agreements

DeepWater Design, LLC

29

Financial model for proposed DWD Project should be reviewed before any consideration given to joining JPA

- DWD available to review
- Model reviewed by two outside agencies including recent Kennedy Jenks study validating design approach and financials

DeepWater Design, LLC

30

## Attachment C

### History and background of the DWD Project investor should be reviewed

- DWD will comply with any reasonable request upon clarification need

DeepWater Desalt, LLC

25

\$99M estimated project cost by DWD more consistent with recent costs for seawater desalination plants of similar capacity (\$117 million estimated by K/J could be on the high side)

- DWD agrees \$117M is on high side
  - very conservative number developed by Kennedy Jenks
- DWD confident in our financial models
- Kennedy Jenks had higher contingency values and a higher price for power than planned power costs
- Economy of scale from DWD Regional facility will certainly provide for water at a lower cost than smaller single desalination facilities can offer

DeepWater Desalt, LLC

26