BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Approval of the Monterey Peninsula Water Supply Project and Authorization to Recover All Present and Future Costs in Rates.	A.12-04- (Filed April 23, 2012)

DIRECT TESTIMONY OF RICHARD C. SVINDLAND

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I. WITNESS QUALIFICATIONS

Q1. Please provide your name, position and business address.

A1. My name is Richard C. Svindland. On July 26, 2010, I re-joined the American Water team as the Director of Engineering for California American Water ("California American Water"). Subsequent to my hire, I was also named an officer of California American Water, becoming its Vice President of Engineering. My business address is 4701 Beloit Drive, Sacramento, CA 95838.

Q2. What were your previous positions prior to re-joining American Water in July of 2010?

A2. Upon graduation in June of 1990, I started my engineering career as an Associate Civil Engineer with Wiedeman and Singleton in Atlanta, GA. In March 1993, I joined Keck & Wood of Atlanta, GA as a Project Engineer, EIT and in February 1995, become a licensed professional engineer where upon I was promoted to a Project Engineer. In February of 1997, I re-joined Wiedeman and Singleton as a Project Manager / Design Team Leader. In October 1999, I started working for Kentucky American Water as an Operations Engineer based in Lexington, KY. In July 2001, I was promoted to a Senior Operations Engineer with Kentucky American Water. In July 2004, I accepted the Engineering Manager – Technical Services position for the Southeast Region of American Water and remained in Lexington, KY until May 2005, when I relocated to Hershey, PA in the same role. I worked in this position until my last day with American Water (February 20, 2007). From March 1, 2007 until July 16, 2010, I worked for the Fayetteville, GA engineering firm of Integrated Science & Engineering as a Senior Consultant and then as a Principal in charge of the Water / Wastewater group. In this role I was responsible for all water and wastewater infrastructure projects for the firm.

Q3. What are your primary duties at California American Water?

A3. As Vice President of Engineering, I am responsible for and oversee the planning and implementation of California American Water's entire capital improvement program which consists of the replacement of aging infrastructure, the planning for new customers and changing regulations, oversight and strategy for planning, permitting, design and construction of all of California American Water's projects. Most recently, I have been heavily involved with our San Clemente Dam Removal Project and with the water supply projects in our Monterey County District.

Q4. What is your educational background and are you a licensed professional engineer?

A4. I received a Bachelor of Civil Engineering from the Georgia Institute of Technology in June of 1990. I received a Master of Science in Civil Engineering from the University of Kentucky in May 2005. I am a licensed Professional Engineer in Georgia and Kentucky.

Q5. Are you a licensed professional engineer in California?

A5. No, I plan to formally apply to the California Board for Professional Engineers, Land Surveyors, and Geologists to become registered in California.

Q6. Will you be providing testimony related to specific engineering opinions in California?

A6. No, I am reporting the findings of work that has been performed by registered engineers that our Company has engaged. I am providing information based on my knowledge of this project and based on my experience related to water infrastructure projects across the country. Finally, as the Corporate Officer with the responsibility for this project, I am providing testimony in this case to discuss how we plan to deliver this project to solve the Monterey Peninsula's water supply problem.

Q7. Have you ever appeared before and/or provided testimony to this Commission.

A7. Yes, I have prepared rebuttal testimony and appeared before this Commission in California American Water's case A.10-09-018.

Q8. Have you provided testimony and/or appeared before other Regulatory Commissions?

A8. Yes. I have provided testimony, responded to numerous data requests and appeared before the Kentucky Public Service Commission.

Q9. How many water treatment plant projects have you been involved with personally?

A9. I have worked on over 30 water treatment plant projects throughout my career. Attached in Attachment 1 is an alphabetical listing of water treatment plant projects (and brief project description) in which I have been involved.

Q10. Has your entire career focused on water and wastewater infrastructure projects?

A10. Yes, I have spend the last 21 years exclusively working on the planning, designing, permitting and construction of water and wastewater related project with the vast majority for municipal and investor owned utilities.

II. PURPOSE OF TESTIMONY AND INTRODUCTION

Q11. What is the purpose of your direct testimony?

A11. The purpose of my testimony is to:

(i) provide a brief history of the water supply issue in the Monterey County District;

(ii) discuss the size of the proposed facilities, the relationship of the plant size to previous projects and the role of groundwater replenishment and aquifer storage and recovery ("ASR") in the plant sizing.

(iii) describe the facilities and their location, design, construction, the anticipated capital cost and the anticipated operation and maintenance costs;

(iv) describe the continued need of the California American Water-only facilities that were approved in D.10-12-016;

(v) discuss the project schedule and some of the obstacles such as permits and ordinances as they relate to the project;

(vi) discuss the role of the Groundwater Replenishment Project that is being proposed by the Monterey Regional Water Pollution Control Agency ("MRWPCA") and the Monterey Peninsula Water Management District ("MPWMD");

(vii) lastly, discuss pertinent items related to the project and this filing.

Q12. Why is California American Water submitting this application?

A12. The record before the California Public Utilities Commission ("CPUC") on this issue is very extensive but simply stated California American Water is under a Cease and Desist Order from the California State Water Resources Control Board ("SWRCB") to eliminate illegal diversions from the Carmel River. The Cease and Desist Order provides a steadily declining yearly water allowance, but essentially by the end of calendar year 2016, California American Water must find a replacement water supply for approximately 70 percent of its water supply. In addition to reductions on the Carmel River, California American Water's second source of supply, the Seaside Basin, was adjudicated and

California American Water faces additional reductions in that water source by the year 2021.

Q13. What is the total magnitude of these reductions in water supply and how does California American Water propose to replace these reductions?

A13. The total replacement supply needed to stay within its legal rights on the Carmel River and within its adjudicated rights in the Seaside basin is linked with customer demands. Prior to 1995, when customer demands exceeded 18,100 acre feet per year (AFY), the replacement supply needed would have been a lot higher than it is today. In 1995, at the time that SWRCB issued its order 95-10, the replacement supply was estimated at 10,730 AFY and by 2009, when the SWRCB issued its Cease and Desist Order, the replacement supply had been reduced to 7,602 AFY, due to the affects of conservation and usage reductions by California American Water's customers. As part of the Environmental Impact Report ("EIR") for D.10-12-016, the CPUC determined that California American Water needed to achieve a total supply source of supply of 15,250 AFY to satisfy the Cease and Desist Order.

California American Water is proposing a three-pronged approach to replace the water supply reductions in the Cease and Desist Order. We have referred to this approach as a three-legged stool in which each leg is needed to replace the lost supply. The three legs are:

- Desalination
- Groundwater Replenishment
- ASR

Based on numerous meeting with local stakeholders, concerned citizens, and industry associations, we believe there is widespread support for this approach. The desalination plant will be owned and operated by California American Water, the Groundwater

Replenishment Project will be owned and operated by MRWPCA and the ASR will be a joint effort between California American Water and MPWMD. Based on community input California American Water has worked very hard to reduce the size of the desalination plant based on current trends and we may be able to reduce the desalination plant further if the Groundwater Replenishment Project is available in time. Discussed below are our sizing needs for the various facilities.

Q14. Why is California American Water pursuing a new project in lieu of the Regional Desalination Project, which has already been approved by the CPUC?

A14. On March 1, 2012, California American Water submitted to the CPUC a project update on the Regional Desalination Project. Basically, after several months of mediation, California American Water and it two public agency partners, Marina Coast Water District ("MCWD") and Monterey County Water Resources Agency ("MCWRA"), were unable to lay out a path forward that would resolve the complex issues that have continued to challenge the project.

Q15. What are these complex issues?

A15. The primary issues are:

- The Stephen Collins alleged conflict of interest and its compounding effect on the project,
- Failure to obtain test well permits,
- The lack of financing to keep the project moving forward, and
- Most recently as of December 2011, the proposed ruling from the Monterey County Superior Court that the EIR that was prepared by the CPUC was not valid for use by MCWD.

Q16. Given the Monterey County Superior Court proposed ruling, is the EIR valid?

A16. Yes, California American Water fully believes that the EIR that was prepared and certified by the CPUC is still valid and can still be used by California American Water to advance a project. As a Class A investor owned water utility in the State of California, the CPUC through its certificate of public convenience and necessity ("CPCN") process is the proper Lead Agency for California American Water. Thus, California American Water believes that the EIR is a valid environmental document for California American Water to use in solving its water supply problem in the Monterey County District. Moreover, the CPUC was not a party to the Monterey County Superior Court proceedings, so it is unlikely that the decision of that court could bind the CPUC.

Q17. Can the Regional Desalination Project solve California American Water's replacement supply by 2016?

A17. If there were no obstacles or challenges, the Regional Desalination Project would solve California American Water's replacement supply in the Monterey County District by 2016. However, the Regional Desalination Project is no longer able to esolve this issue. It has become apparent over the last several months that the Regional Desalination Project is mired in issues that have essentially halted the project. With the looming Cease and Desist Order deadline, California American Water can no longer wait to sort through the issues. California American Water must seek a different project and vehicle to deliver that project in a timely manner in order to comply with the Cease and Desist Order. California American Water terminated the Water Purchase Agreement that was approved as part of D.10-12-016 on September 28, 2011. On this same date California American Water also terminated the related agreements such as the Line of Credit agreement. On January 17, 2012, California American Water publically announced that it could no longer support the Regional Desalination Project.

Q18. What project is California American Water now proposing and what is its name?

A18. The EIR approved by the CPUC fully developed three projects to assist California American Water in solving its water supply problem. The three project alternatives for the Coastal Water Project were the Moss Landing Alternative (which California American Water had proposed as its preferred alternative), the North Marina Alternative, and the Regional Project Alternative, which is also known as the Regional Desalination Project. California American Water proposes to implement a modified North Marina Project that would be similar to the Regional Desalination Project except that the entire facilities would be owned by California American Water, would be slightly smaller in size, would feature all slant intake wells and would allow the further reduction of the desalination plant size if the independent Groundwater Replenishment Project can be delivered on time. We are calling California American Water's project the Monterey Peninsula Water Supply Project.

Q19. What are the modifications to the project that were fully developed in the EIR?

A19. The main modifications to the EIR are the locations of the intake slant wells and the desalination treatment plant. Due to these revised locations, a portion of the product water pipeline or finished water main will need to be routed on a previously un-surveyed corridor.

Q20. Do these location changes require a new EIR and will the impacts be greater than the original project?

A20. Based on discussions with the CPUC California Environmental Quality Act ("CEQA") staff, the proposed location changes can be accommodated by preparing a Supplemental EIR ("SEIR"). It is too early to speculate on the environmental impacts as those need to be fully investigated as a part of the SEIR; however, the amount of large diameter pipelines may be up to 4,000 linear feet shorter in length then the original Regional

Desalination Project depending on results of the surveys due to the proximity of the proposed intake wells to the proposed desalination plant. Please also refer to the testimony of Kevin Thomas, who will address CEQA issues.

III. INFORMATION REGARDING PROPOSED FACILITIES

Q21. Where will the desalination plant be located and is it in a flood plain?

A21. California American Water is in the process of securing an approximately 46-acre parcel of land located just to the north west of the MRWPCA's wastewater treatment plant. The land appears to have been formerly used for grazing, has an industrial land use classification and is currently vacant of structures. Should California American Water be unable to obtain the option to purchase this land, California American Water may need to use its eminent domain authority to secure the land. The plant site is at elevation 100 feet above sea level and is approximately 75 feet above the 100-yr flood elevation. No levees are needed to protect the property and the property is located well above the 2009 Tsunami Inundation level.

Q22. Where will the slant intake wells be located and are they located within a flood plain?

A22. California American Water has been in contact with the property owner and we are working to secure permanent easements on an approximately 376-acre parcel of land located due west of its proposed desalination plant site. This property borders the Pacific Ocean and includes vast portions that have been disturbed. The land features approximately 7,000 feet of ocean shoreline, an existing railroad spur and three phase power source. Should California American Water be unable to obtain the easement rights to the land, California American Water may need to use its eminent domain authority to secure the land. The intake well sites are located above the 100-yr flood elevation. Additionally, the wells are designed with submersible pumps and motors that would allow them to become flooded with little to no effect.

Q23. What is the configuration of the intake system?

A23. California American Water will be using a series of slant wells located west of the sand dunes to draw in as much ocean water as possible. The slant wells will be approximately 700 to 800 feet in length and will feature several hundred feet of screen below the ocean floor. We currently envision the need for six to eight wells that will be located in clusters of two or three. The preliminary design envisions locating the well head approximately 500 feet from the average high tide mark. This will leave 200 to 300 feet of screened slant well length below the ocean floor and to the west of the average high tide mark. The final layout and configuration will be based on the results of additional groundwater modeling that will be completed either as part of the SEIR, to satisfy the California Coastal Commission, State Lands Commission,[1] or as needed for the final design.

Q24. What groundwater modeling has been done and what did it determine?

A24. Geosciences Support Services, Inc. ("GSSI") prepared for California American Water a study titled North Marina Groundwater Model Evaluation of Potential Projects, dated September 26, 2008. This study looked at a California American Water slant well only scenario to be located at MCWD Reservation Road property. The study predicted:

'The predicted TDS concentration of 33,000 mg/L for the feedwater extracted by the six slant wells is approximately 94 to 97 percent of the TDS concentration of seawater (34,000 to 35,000 mg/l). As the modeled layout represents a worse-case scenario (due to the steeper well angles), the most recent layout… …would most likely result in an even higher percentage of seawater in the extracted water."

The location of the slant wells proposed on this project is north of the area studied by GSSI in 2008, and should be re-visited as part of the SEIR to confirm results.

[1] Per the website http://www.slc.ca.gov/About_The_CSLC/Sovereign_Lands.html the State Lands Commission has oversight of all coastal land from the average hide tide line to three nautical miles off shore.

Q25. What are the components of the Regional Desalination Project approved in D.10-12-016?

A25. The Regional Desalination Project included the following items owned by the Public Agencies

Project Component	Description	Ownership
Project Facilities		
Brackish Source Water Wells	Between one and five vertical wells drilled in the 180-Foot Aquifer and between one and five slanted seawater intake wells, for a total of six source water wells. Vertical wells will be located west of Highway 1 between the coastal dunes and Highway 1. Source water will be approximately 85% seawater and 15% seawater-intruded groundwater. Final well configuration to be determined based on Test Well Program.	MCWRA
Brackish Source Water Pipeline	25,000 linear feet (LF) of 36 to 42-inch pipe conveying the source water from the wells to the Desalination Plant.	MCWRA
Desalination Plant	Reverse osmosis treatment plant with a peak production rate of 10 million gallons per day (mgd). On-site facilities include treatment processes, clearwells, brine storage tank, distribution pump station, brackish water meter, product water meter, and non-process structures.	MCWD
MCWD Outfall Facilities and MRWPCA Outfall Facilities	A pipeline for brine conveyance from the Desalination Plant to the outfall headworks (2,500 LF of 36-inch diameter pipeline) and modifications to the existing MRWPCA outfall pipeline, including a new Brine Receiving Facility for monitoring, metering, mixing, and sampling the brine and combined effluent.	MCWD (pipeline) MRWPCA (Brine Receiving Facility)
MCWD Product Water Pipeline	A pipeline for conveyance of product water from the Desalination Plant to Delivery Point (31,000 LF; 36-inch)	MCWD
MCWD Tie In Pipeline	A pipeline for conveyance of product water from the Delivery Point to MCWD Reservoir B and/or C (12,500 LF; 24-inch)	MCWD

The Regional Desalination Project approved in D.10-12-016 also included the following items to be owned by California American Water, known as the "California American Water-only facilities."

Transfer Pipeline	A pipeline for conveyance of product water from the Delivery Point to the western terminus of Auto Center Parkway near Del Monte (15,000 LF; 36-inch)	CAW
Seaside Pipeline	A pipeline for conveyance of product water from the Western terminus of Auto Center Parkway to the Terminal Reservoir (13,000 LF; 36-inch)	CAW
Monterey Pipeline	A pipeline for conveyance of product water from the Western terminus of Auto Center Parkway to Eardley Pump Station, including Presidio of Monterey portion (28,700 LF; 36-inch)	CAW
Terminal Reservoirs and Associated Facilities	Two, 3-MG reservoirs, 130 feet in diameter, and overflow - retention/infiltration basin.	CAW
ASR System	Two ASR injection/extraction wells and a monitoring well located at Fitch Park, a pump station at the Terminal Reservoir site, pipelines along General Jim Moore Blvd. between the new ASR wells and the existing ASR wells near Coe Ave., and an ASR Pump-to-Waste System (including pipelines and a settling basin) currently proposed for the ASR well sites.	CAW
Valley Greens Pump Station	3-mgd capacity, four 25-hp pumps on 800 square foot area.	CAW

Q26. Are all the California American Water components listed above needed for this project?

A26. Yes, each of the California American Water-only facilities is needed for the Monterey Peninsula Water Supply Project. These components will assist California American Water in maximizing the effectiveness of ASR between now and 2016 and are needed for the Monterey Peninsula Water Supply Project. Please refer to the testimony of F. Mark Schubert.

Q27. Are all of the Public Agency components listed above needed for this CPCN?

A27. Yes, except California American Water will not need to build the MCWD Tie In Pipeline, is modifying the type of source water intake wells, and expects the desalination plant to be smaller. All the other Public Agency components are required to provide a replacement water supply for California American Water's Monterey County District. Please refer to Attachment 2, which shows the locations for the slant intake test wells, the pipeline corridors, the proposed desalination plant and the items that are no longer needed as part of this project.

Q28. On Attachment 2 there are corridors that do not appear to be needed but that have not been called out as not being needed. Why is that?

A28. Yes, there are a couple of pipeline corridors that California American Water would like to remain as part of the environmental review process so as to provide alternate pipeline routes in case a design constraint is discovered during the environmental review or final design process.

Q29. Are the components the same for California American Water's project as compared to the Regional Desalination Project?

A29. The components are very similar but there are several differences. Namely:

(i) Our intake wells will all be slant wells located under the ocean floor in lieu of the one slant well and up to five vertical wells as envisioned in the Regional Desalination Project. It is our expectation that we will draw feedwater with a total dissolved solids ("TDS") value equivalent to greater than 96% of the TDS of seawater.

(ii) Our pipelines routes could potentially be up to 4,000 linear feet shorter depending on favorable environmental findings along the routes.

(iii) Our desalination plant is expected to be similar to the Regional Desalination Project plant except that our plant will be smaller in capacity, and located in a different location.

Q30. What if any work completed to date on the Regional Desalination Project can be used by California American Water to help it in delivering its project in a timely manner?

A30. The most important item is the existing certified EIR. Secondly, a lot of environmental work had already started in order to meet National Environmental Policy Act ("NEPA") and "CEQA Plus" requirements that are needed for Federal and State Revolving Loan funding program. Based on recent discussions with the SWRCB, it is our understanding that California American Water is eligible for State Revolving Fund loans for the entire project that includes the California American Water-only facilities. Thus, all worked completed to date towards the NEPA and CEQA Plus activities should be able to be used by California American Water to assist the process of obtaining State Revolving Fund loans. Thirdly, California American Water along with the public agencies jointly submitted three applications to the California Coastal Commission in the form of a Coastal Development Permit. One permit was for the entire project while the second and third permits were for test wells (one vertical and one slant). These permits required application fees totaling $270,000, which was paid by California American Water in 2011. California American Water plans to meet with California Coastal Commission staff in the very near future and would like to transfer the existing three permits to two permits; namely, one for a test slant well and one for the entire project.

Q31. Why did California American Water retain RBF Consulting to perform the study which looked at eleven alternatives to solve the water supply problem and what were the results?

A31. I retained RBF Consulting to initially look at four alternatives. These alternatives were:

(i) Salinas River Water Treatment Plant as contained in Phase 2 of the EIR

(ii) expansion of Sand City Desalination Plant

(iii) a Carmel River only solution using expanded ASR, and

(iv) a desalination plant north of Marina which could be either the Regional Desalination Project or the North Marina Plant.

The reason we undertook the study was that we were receiving a growing number of stakeholder concerns about the feasibility of the Regional Desalination Project in light of the Stephen Collins alleged conflict of interest. As we started wrapping up the initial study, I received even more suggestions from concerned stakeholders about different projects. I expanded the study to include several variants of the above four alternatives and added a groundwater replenishment component to several projects and included three other projects. These projects were:

(v) Desalination plant at Moss Landing

(vi) Smaller desalination plant taking into consideration additional conservation and groundwater replenishment

(vii) A smaller desalination plant in Monterey located at the Naval Post Graduate School.

Basically the study showed that a desalination plant north of Marina still made the most sense in terms of costs and schedule. The study did not differentiate between the Regional Desalination Project or North Marina Plant but indicated at the time of the study (October 2011) that either could be done to meet the Cease and Desist Order deadline. The study also showed that groundwater replenishment appeared to be equal in terms of annual cost.

Q32. Do these eleven alternatives need to be evaluated as part of CEQA?

A32. No. Based on our discussions with the CPUC's CEQA staff, the EIR has already sufficiently addressed alternatives and California American Water is merely requesting to modify one of the alternatives, not review new alternatives. Furthermore, California American Water believes that the results of the study demonstrates, from a cost and schedule perspective, that most of the projects may be properly excluded from consideration as an alternative for CEQA purposes because they are infeasible.

Q33. What is the size of the proposed desalination plant?

A33. For the record I would like to state that the size of this plant is the most scrutinized plant sizing exercise that I have ever been involved with over my career. Generally, plants are sized by the Engineer of Record during the preliminary design of the plant. The Engineer of Record obtains the historical demand records, confers with the various stakeholders, discusses the risks, and estimates the demands out into the future. Typically, a 20 to 30 year planning horizon is used. When this is done, the plant ends up being a lot larger than the current demand because the plant has been sized for growth. It is not uncommon to have a new water plant operating at less than 50 percent of its design capacity at startup.

This plant is different than most plants, because it is replacing an existing water supply and the EIR does not contemplate demands out into the future. Thus, this plant is being sized to operate near full capacity at start up without consideration for growth. RBF consulting has estimated the plant size to be approximately 9 MGD. Please also refer to Attachment 3 – which is a Plant Sizing Memorandum provided by RBF Consulting dated April 20, 2012.

Q34. What criteria were used to size the plant?

A34. The plant has been sized with the following criteria in mind:

(i) The plant is large enough to safely produce enough water to meet demands over the entire year, and over maximum demand months and maximum demand days,

(ii) The plant will be reliable with sufficient redundancy built in,

(iii) The plant is sized to return, if required any Salinas Valley groundwater captured by the intake slant wells during the irrigation months.

(iv) The plant has been sized to exceed the 2006 – 2010, five-year average annual demand levels without reliance of ASR water which during dry water years such as this year, is not available.

(v) The plant has been sized at 95% of the past five-year maximum annual demand level and relies on temporary water available in the Seaside Basin to cover this demand.

(vi) The plant has been sized to initially operate near 100% of rated capacity in the initial years, but as the ASR system matures and as we are able to carryover ASR storage from year to year, the operating levels for the desalination plant could move down to a level close to 80%.

(vii) The plant has been sized accounting for Table 13 water rights that may be available.

(viii) The plant has been sized based on the need to deliver sufficient water in the initial years of operation. The Proposed Decision for A.10-01-012 allows construction of a fourth ASR well. The plant size accommodates this recognition from the recent

Proposed Decision.

(ix) Modular design to allow easy scaling from a smaller plant to a larger plant depending on the ability of MRWPCA's implementation of their Groundwater Replenishment Project.

Q35. Please explain how the desalination plant operating levels can reduce over time?

A35. The size of the plant is based upon the assumption that California American Water can achieve a yield of 1,300 AFY from our ASR system which is currently comprised of three injection and extraction wells and one injection and extraction well that will be constructed in 2012 and 2013 (Seaside Middle School Well 4). Even though we only have ASR water rights permits for 1,920 AFY, it may appear that the ASR system will be able to produce 3,000 AFY. This is because after construction of the ASR wells that are a part of the California American Water-only facilities and after the construction of the second well at Seaside Middle School which is a part of a A.10-01-012, there will be a total of 3 pairs (6 wells) that on paper will be able to achieve 3,000 AFY (approximately 1000 AFY per well couplet). There are two errors in this logic. First, ASR injections are dependant on river flow, and California American Water would have to speculate as to when there would be sufficient ASR flow, once all six wells are constructed, to inject 3,000 AFY. In this regard, I note that California American Water has yet to inject over 1,500 acre feet of ASR water. Second, the water rights permits require California American Water, MPWMD, the National Oceanic and Atmospheric Administration National Marine Fisheries Service ("NOAA Fisheries"), and the California Department of Fish and Game ("CDFG") to meet and confer at the conclusion of the injection season and agree upon the amount of ASR water that will be recovered over the next 5 months. The terms of the water rights permit create a presumption that all ASR water injected between December and the following May (up to 1,500 acre feet) to be recovered over the next June through November. This condition was required to satisfy protests of NOAA

Fisheries and the CDFG. Only in the event California American Water were to actually inject more than 1,500 acre feet per year could California American Water consider carrying over additional ASR water, assuming that the MPWMD, NOAA Fisheries and CDFG were to concur. In addition, the Cease and Desist Order also generally requires ASR injections to be recovered in the same water year, although the SWRCB may allow variations if agreed to by California American Water, the MPWMD, NOAA Fisheries and CDFG. Thus, once California American Water demonstrates to the satisfaction of the SWRCB Deputy Director of Water Rights that we have substituted an alternative water supply for illegally diverted water, future ASR injections can be carried over from year to year in a manner that is dictated by system demands, rather than environmental restrictions. This would mean that in wet years we would be able to bank more water and thus over time start increasing the year over year yield of the ASR system. We cannot, however, predict when that will occur. If the ASR system is able to increase from 1,300 AFY to 3,000 AFY then the desalination plant operating level would reduce by approximately 19% or from near 100% to around 80%.

Q36. Is an operating level of 80 percent of rated plant capacity the right number?

A36. Yes, standard engineering practice is to start the planning process for a system expansion once a plant or system is operating around 80 percent of its rated capacity. There are several reasons for this approach but the two most important are that 1) it takes time to implement capacity expansion-type projects and 2) if a facility is operating over 80% it is very hard to expand the plant because needed plant shut downs to accommodate tie-ins for the expansion cannot be scheduled. As an example, if we needed to expand the finished water storage capacity of this plant and assuming we are still operating at 100% of rated plant capacity, a plant shutdown to perform a tie-in and proper disinfection of that tie-in would likely be impossible while meeting customer demands.

Q37. Why can't we achieve more than 1,300 AFY of ASR if we have all six wells installed?

A37. There is no guarantee that we will have 1,300 AFY of water to store in the first year of operation, as was the case this year (winter of 2011-2012). To date this year, we have only been able to inject approximately 26 AF of water into the ASR wells. Given the fact that we are 2/3rds of the way through our injection season it is physically impossible at this point to store 1,300 AFY of water this year. Thus, in keeping with the state practice of evaluating water supply needs over dry years and consecutive dry years, we believe the 1,300 AFY is reasonable at this time. As stated previously, as the long term yield of ASR increases, the operating level of the plant will decrease to a more typical and reasonable operating level.

Q38. If we cannot count on more than 1,300 AFY at this time, please explain the value of injecting more water into ASR?

A38. Expanded ASR could still potentially allow California American Water to meet customer demands if normal to wet years were to occur prior to the 2017 Cease and Desist Order ramp down. Currently, the existing distribution system prevents full utilization of the water rights obtained for ASR. Thus, proceeding with the California American Water-only facilities could potentially allow the injection of more water into ASR.

Q39. Can a further reduction of non-revenue water and additional conservation solve the problem or at least reduce the size of the plant?

A39. No. Non-revenue water volumes in water systems change over time. The current amount of non-revenue water in the Monterey County District is reported to be around 1,000 AFY. The Infrastructure Leakage Index ("ILI") for the Monterey system is currently at 1.08 (world class is considered a 1.0) and the unavoidable annual real loses is estimated at 700 AFY. The difference between the current non-revenue water number and the UARL is not enough to solve the water supply problem. In my opinion, it is unrealistic to reduce the plant size when the ILI is near world class performance. Please also reference the testimony of Eric Sabolsice for additional information and detail on non-revenue water.

Q40. What happens if the desalination plant is too small?

A40. Water plants are designed and ultimately sized to meet the daily needs of its customers. In order to meet customer needs we must produce enough water to maintain at least 30 pounds per square inch (psi) of pressure at all points in the system during high demands periods regardless of the location within the system. During a fire we are allowed to drop to 20 psi as the minimum pressure at any point in the water system. The reason for this minimum pressure requirement is to insure that no backflow or siphoning occurs within the system that could bring in unsafe or contaminated water. If the plant is sized too small and demands cannot be met, additional rationing measures would need to be taken to insure demand is reduced and pressures maintained. An option would be to continue to pull from the Carmel River but this would involve the illegal use of water and potential take of threatened species which carries considerable fines and penalties.

Q41. Is the plant sized to avoid rationing?

A41. Yes, the plant has been sized to meet the reasonable, historical demands of its customers without rationing.

Q42. What is the current demand in the Monterey County District main system that is to be served by the new desalination plant?

A42. For calendar years 2010 and 2011 the demands for the Monterey County District were approximately 12,200 AFY and 12,000 AFY, respectively. The five-year average demand is 13,290 AFY and represents the calendar years 2007 – 2011. The maximum annual demand during this period was 14,640 AFY for the 2007 calendar year. Please also refer to <u>Attachment 3</u> – which is a Plant Sizing Memorandum provided by RBF Consulting dated April 20, 2012.

Q43. What is the maximum month demand in the Monterey main District and what is significant about maximum monthly demands?

A43. The 2009, 2010 and 2011 maximum monthly demands for the Monterey County District where approximately 1,367 AF; 1,323 AF; and 1,225 AF respectively. This is equivalent to annual demand 16,404 AFY, 15,876 AFY, and 14,700 AFY respectively. The 5-year average maximum monthly demand is 1,388 AF (equivalent to 16,656 AFY) and represents the calendar years 2007 – 2011. The highest maximum monthly demand during this period was 1,532 AF (equivalent to 18,384 AFY) and occurred in July 2007. . The significance of these maximum monthly demands is that the water system must be able to meet these demands in addition to the annual demand numbers. The maximum monthly demands will have an effect on the size of the desalination plant.

Q44. What are the historical demands in the Monterey main District?

A44. As stated previously the pre-1995 demands exceeded 18,100 AFY at times. In June of 1994, the maximum month demand was 1,845 AF (equivalent to 22,140 AFY).

Q45. Provide the estimated demand for lots of record and for the General Plan build-out?

A45. The estimated demand for lots of record is 1,181 AFY.[2] The estimated demand for the General Plan build-out is 4,545 AFY. See further discussion in my response to Question 77.

Q46. What are California regulations on sizing a water plant?

[2] Coastal Water Project, FEIR, pg 2-13.

A46. The State of California does not have a specific methodology for sizing water plants; however, it does have requirements that pertain to meeting maximum day demands and annual demands. The activity of sizing a water plant is typically performed by the Engineer of Record. Please also refer to the Plant Sizing Memorandum provided by RBF Consulting dated April 20, 2012, that provides the current basis for the plant size. It is important to note that California American Water will be engaging an Engineer of Record as part of the design of the desalination plant to perform an additional analysis of the plant size. The criteria provided previously within this testimony as well as items identified by the Engineer of Record and items learned during the design process (i.e., final determination of the size of the groundwater replenishment project, and the potential amount of extracted groundwater) will ultimately be used to size the plant.

Q47. What are the components of the desalination plant?

A47. Much like the Regional Desalination Project, California American Water's conceptual proposal for the desalination plant will consist of a slant well intake system; pretreatment consisting of media filtration, chemical feed systems and cartridge filtration; Reverse Osmosis treatment with partial second pass and energy recovery; post treatment consisting of chemical feed systems to re-stabilize the finished water product, and disinfection. Please also refer to Attachment 4 – which is a Cost Memorandum provided by RBF Consulting dated April 20, 2012. This memorandum lists the components of the desalination plant as well as the expected capital and operations and maintenance ("O&M") costs for the facilities. The final configuration of the desalination plant will be determined by the Engineer of Record; however, California American Water believes that we have performed sufficient preliminary design to address the major cost components of the project.

Q48. What is the cost of the desalination plant and its components?

A48. The estimated total project cost for the 9 MGD desalination plant is $260 million or $28.9 per gallon per day of capacity. This total cost includes all the costs to permit, design and construct the slant intake wells, the source water pipelines, the desalination plant, the brine disposal pipeline and facilities, the facilities needed to return flow back to the Salinas Valley basin (if required) and the finished water pipeline. The finished water pipeline, which is also known as the Product Water pipeline, will extend from the proposed plant location to the end of the California American Water-only facilities that were previously approved in D.10-12-016. The costs of the California American Water-only facilities remain unchanged from the previously approved D.10-12-016 at approximately $106.875 million and would need to be added to the above desalination plant cost to compute the total project cost.

Q49. What was the methodology used to estimate the project costs?

A49. The methodology used to compute the costs of the facilities was the same as used in D.10-12-016. This involved computing the total "all-in" project costs based on a preliminary design and with appropriate contingencies. After the Most Probable Project Cost was computed a 1.25 markup factor was used to compute the High Probable Project Cost.

Q50. What is the incremental cost to decrease the size of the desalination plant based on the availability of water from the Groundwater Replenishment Project?

A50. The estimated total project cost for the Groundwater Replenishment Project-adjusted smaller 5.4 MGD desalination plant is $213 million or $39.4 per gallon per day of capacity. This total includes all the costs to permit, design and construct the slant intake wells, the source water pipelines, the desalination plant, the brine disposal pipeline and facilities, the facilities needed to return flow back to the Salinas Valley basin (if required) and the finished water pipeline. The costs of the California American Water-only facilities remain unchanged from the previously approved D.10-12-016 at approximately

$106.875 million and would need to be added to the above desalination plant cost to compute the total project cost.

Q51. What are the estimated O&M costs associated with these facilities?

A51. The estimated O&M costs for the 9.0 MGD plant and the California American Water-only facilities in 2012 dollars is: $12.76 million per year or approximately $1,238 per AF.[3] The estimated O&M costs for the 5.4 MGD plant and the CAW-Only facilities in 2012 dollars is: $9.85 million per year or approximately $955 per AF.[4] Note that these costs do not include the cost to purchase replenished groundwater from the Groundwater Replenishment Project. It is also important to note that approximately half of the O&M costs for each plant is tied to power costs which are subject to varying electric rates which will change over time. Please also refer to Attachment 4 – which is a Cost Memorandum provided by RBF Consulting dated April 20, 2012 The O&M cost provided by RBF in the Cost Memorandum were used by California American Water to model bill impacts.[5]

Q52. How do these costs compare to the Regional Desalination Project?

A52. The capital and O&M costs for our project are very consistent with the costs of the Regional Desalination Project. As a comparison, the Regional Desalination Project was estimated to have a capital cost of $297.5 million or $29.75 per gallon per day and depending on the finance model an annual O&M cost between $11.6 million and $12.9.

Q53. Are there any avoided O&M costs with this new project?

A53. Yes. Since this project is a replacement supply for the Carmel River, the Carmel River facilities will not operate as much as they have in the past thus resulting in lower

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[3] Cost determined by dividing annual O&M by full annual production rate of plant plus ASR (10,306 AFY).

[4] Cost determined by dividing annual O&M by full annual production rate of plant plus ASR (10,306 AFY).

[5] These 2012 O&M costs were escalated using a CPUC escalation rate to reflect estimated 2017 costs. The media and membrane replacement cost were not modeled in year one since these items would be covered by the warranty on the new plant. Likewise, the repair and replacement budget was reduced to 10% for year one operations to reflect items in warranty.

operating and maintenance costs for those facilities. Please refer to the Eric Sabolsice's testimony for the detail explanation of the avoided costs. The estimated avoided O&M cost is approximately $2.0 million per year.

Q54. If water must be returned to the Salinas basin to comply with the Agency Act, how would that would that be accomplished?

A54. We have several options at this point, but the two simplest and promising are: 1) Return the flow to the Castroville Seawater Intrusion Project ponds during the irrigation season as was contemplated in the EIR for the North Marina Alternative or 2) to install an injection well on our property to return the flow back to the 180-foot aquifer. The final selection will be based upon the outcome to the SEIR and on the design engineer's recommendation.

Q55. How will the reverse osmosis concentrate (brine waste) be disposed?

A55. California American Water proposes to discharge brine waste in the same manner as contemplated in the Regional Desalination Project, which is via the outfall of MRWPCA wastewater treatment plant. California American Water retained Trussell Technologies, Inc. to perform an Outfall Capacity Analysis to validate the capacity of the outfall. Please refer Attachment 5, which is a Technical Memorandum provided by Trussell Technologies, Inc. dated April 18, 2012. Assuming no improvements to the outfall and using a very conservative pipe friction factor, the findings of the Technical Memorandum indicate that the outfall has sufficient capacity for greater than 96% of the time. For the small number of occasions that the outfall has insufficient capacity the Technical Memorandum indicates that no occurrences last longer than several hours. As such we have three options to solve this issue. These are:

(i) shutdown the plant for several hours at a time, and use storage in the ASR and Groundwater Replenishment Project systems, or

(ii) store the excess brine until such time that the outfall has sufficient capacity, or

(iii) open the existing plugged ports on the outfall which will increase the outfall capacity to greater than 98% of the time.

Within the cost estimate we have provided for a brine storage basin to accommodate 3 MG of brine discharge and provide at least 6 hours of detention time before a shutdown would be needed.

It is also important to note that the time of the year when the outfall is at capacity is during the wet season and it will probably be at a time when it is not necessary to operate the desalination plant at full capacity. Furthermore, the Technical Memorandum recommends that additional friction factor testing be conducted. The results of this testing alone, may determine that there are no times at which the outfall has insufficient capacity.

Q56. Who will own this project and how will it be implemented?

A56. The entire project would be owned and operated by California American Water. Implementation of the project will be as follows:

(i) Design-Build (DB) – For the Desalination Plant.

(ii) Design-Bid-Build (DBB) – For the brackish water pipelines, the product water pipeline and the related pipelines.

(iii) To Be Determined – For the slant intake wells the decision to implement the project via DB or DBB will be done once the environmental review of the affected area has been completed.

Q57. Will a test slant well be installed and if so, when and how much will it cost?

A57. Yes, California American Water would very much like to install a test slant well. Data from this well will be extremely beneficial to the project in many ways as it will provide water quality data for design of the plant, it will assess the individual well capacities so as the help determine the final number of intake wells needed and finally it well help assess the levels of salinity.. Please refer to the testimony of David P. Stephenson for further detail on the timing and rate treatment of the test well. . It is important to note that prior to the installation of a test well we will need a Coastal Development Permit from the California Coastal Commission.

IV. ROLE OF THE GROUNDWATER REPLENISHMENT PROJECT AND ASR

Q58. What is the role of the Groundwater Replenishment Project and how does it fit in with your project?

A58. The Groundwater Replenishment Project is an important recent development for solving the Peninsula's water supply problem. The project has been around for a while and was originally a part of Phase II of the EIR that the CPUC certified; however, California American Water and many stakeholders now see the Groundwater Replenishment Project as a way to make the desalination plant smaller and split the project risks. In its simplest form, the Groundwater Replenishment Project involves taking effluent from MRWPCA's plant and providing further treatment through a new advance water treatment plant that would include microfiltration, reverse osmosis, ultraviolet light and hydrogen peroxide treatment prior to injecting this highly treated product into the Seaside Basin Aquifer, where it is diluted and stored for a period of time before it can be withdrawn for potable consumption. The Groundwater Replenishment Project basically creates a drought proof underground reservoir which can be used as a source of supply. Please also refer to the testimony of Keith Israel, the General Manager for MRWPCA.

Q59. What are the schedule impacts for the Groundwater Replenishment Project?

A59. As of this filing, MRWPCA is working towards having their project on line by the Fall of 2016, so that water could be placed into the aquifer at the beginning of California American Water's 2017 Water Year and extracted towards the end of the water year. California American Water will closely monitor the progress of the Groundwater Replenishment Project and will make a decision at the time it is ready to begin construction on the desalination plant which is estimated to be in the fourth Quarter of 2014, whether to construct a 9.0 MGD or 5.4 MGD desalination plant. Some of the criteria that California American Water will use in making this decision are as follows:

(i) Is the EIR for the Groundwater Replenishment Project completed and certified?

(ii) Is their widespread public support for the Groundwater Replenishment Project?

(iii) Do the costs associated with the Groundwater Replenishment Project still make financial sense, or in other words is the cost Groundwater Replenishment Project water comparable to desalination?

Should California American Water receive affirmative answers to these types of questions, California American Water will request to the CPUC via an Advice Letter Compliance filing that a smaller 5.4 MGD desalination plant be constructed in lieu of the larger 9.0 MGD.

Q60. What are the costs for the Groundwater Replenishment Project and how have they been modeled?

A60. Please refer to Keith Israel's testimony for the costs of the Groundwater Replenishment Project. From California American Water's perspective, we have modeled the cost to permit, design, build and operate a 9.0 MGD desalination plant. We have also modeled the same items for the 5.4 MGD desalination plant and have computed an incremental cost between the two scenarios. Please refer to the testimonies of Jeffrey T. Linam and David P. Stephenson for further details on the financial modeling;. It is important to note, however, that all of these costs, both California American Water's and MRWPCA, are estimates.

Q61. How does the Groundwater Replenishment Project affect the plant size?

A61. One of the challenges we have in sizing the facilities is that we need to insure that we have enough sources of supply to meet maximum month demands during all conditions. We have been able to model the effects of the Groundwater Replenishment Project on the plant sizing and have determined that for every gallon of Groundwater Replenishment Project water, we can reduce the desalination plant by the same gallon. Thus a 1:1 reduction is possible. The reason we are able to do this is because the Groundwater Replenishment Project creates a vast underground reservoir of water that ultimately would be approximately a billion gallons in volume. This billion gallons is estimated by taking 3,500 AF of Groundwater Replenishment Project water, adding 3,500 AF of dilution water (from either ASR water rights or Carmel River water rights), and dividing by 6 months of in-ground residence time and then converting to gallons. This underground reservoir can then be withdrawn using the existing Seaside Basin wells and the ASR extraction wells.

Q62. What happens when the desalination plant loses power?

A62. The benefits of both ASR and the Groundwater Replenishment Project are that they create an underground reservoir. If the desalination plant loses power and is unable to produce water, water will be removed from the Seaside Basin to meet demands during a power outage. Assuming that a full 3,500 AF of dilution water and Groundwater Replenishment

Project water is within the basin, the desalination plant could be down for several months with no immediate impact to the system. The desalination plant would; however, need to ramp back up to full operating levels to replenish to the aquifer for the next emergency. Additionally, the desalination plant will have emergency generators to provide power to the finished water pump station in order to deliver the storage volume of the on site reservoirs or clearwells (estimated at two million gallons) to the system during a power outage.

Q63. Is dilution water needed for the Groundwater Replenishment Project and if so where does it come from?

A63. Maybe. The guidelines for indirect potable reuse projects in California, of which the Groundwater Replenishment Project falls under, have in the past required dilution water and generally a 1:1 dilution ratio was used; however, the dilution ratio requirements are currently in review. California American Water will work with MRWPCA and the California Department of Public Health to produce a design that will meet the new guidelines. California American Water is planning on using its legal Carmel River Water Rights for this dilution water. In normal years we will fully utilize our water rights which are covered under the ASR permits and then use existing rights for any difference. In dry years such as 2011, we may only be able to use our existing rights. It is important to note that the dilution requirements can be flexible between years so that if Carmel River flows are particularly low in one year and wet in another consecutive year, the dilution requirement could still be met. It is also important to note that the dilution water that is blended with the Groundwater Replenishment Project water is not lost, but cannot be used for a period of time which will likely be between two and six months. What this means is that during critically dry years, when ASR flow “triggers” in the Carmel River cannot be met and we are using California American Water’s other legal water rights, this volume of water may not be withdrawn for a several month period. Thus, during the start up years of the desalination plant it will be important to make sure that the existing Seaside Basin rights that will eventually go away in 2021 be kept in reserve.

Q64. Are all the same components needed if the Groundwater Replenishment Project is implemented?

A64. Yes, all the same components are needed. Two new components that may be needed for the Groundwater Replenishment Project is a new dilution or injection pipeline that would extend from the ASR Booster Pump Station to the location of new dilution injection wells. These new injection wells would be located between our existing ASR wells and the new Groundwater Replenishment Project injection wells. Due to the amount of Groundwater Replenishment Project water stored in the Basin, we will likely need to run our existing ASR wells in extraction mode for a majority of the year and these new injection wells will be needed for dilution of ASR injection water. To offset the potential $5 millon cost for these wells and pipeline, we are considering modifications to the number and size of the Terminal Reservoirs as well as the sizing of other pipelines. The final decision regarding this will be conducted during the final design of the project. Furthermore, since these two components are only needed for the Groundwater Replenishment Project, the environmental review process will be completed by MRWPCA.

Q65. What are the benefits to customers by using the Groundwater Replenishment Project and why does California American Water support it?

A65. The benefits to using the Groundwater Replenishment Project are as follows:

(i) Reduces the size of the desalination plant by nearly 40%, thus reducing the power required to produce a gallon of replacement water on the Peninsula and thereby lowering the carbon footprint of the overall project;

(ii) it further diversifies the portfolio of water projects ;

(iii) it further promotes green technologies by recycling a precious resource and as stated above is more energy efficient since the pressure needed to run the Groundwater Replenishment Project reverse osmosis process is considerably less than desalination;

(iv) it reduces the amount of MRWPCA wastewater plant secondary effluent that discharges via the outfall out into Monterey Bay;

(v) it appears to be cost neutral to desal;

(vi) it is consistent with State goals on recycle water which is to add to 2 million AFY by 2030.

Please also refer to Keith Israel's testimony for additional benefits.

Q66. What is the relationship between California American Water, MRWPCA and MPWMD?

A66. Please see Attachment 6 which is a fully executed copy of the Planning Term Sheet and Memorandum of Understanding to Negotiate in Good Faith that was recently entered into by the three parties.

Q67. Is ASR still a part of California American Water's project?

A67. Absolutely. ASR is a vital ingredient to California American Water's portfolio of water supply projects. As previously stated ASR will be used for dilution water for the Groundwater Replenishment Project. Additionally, once California American Water has reduced its Carmel River diversions to permitted amounts, it can be used to carryover storage from year to year and will allow the long term yield of the aquifer to increase over time as long as normal and wet weather years occur more often than dry and critically dry years. As part of this application, California American Water still plans to install two ASR wells at the Fitch Park site that were a part of the original project. These two wells serve an important function which is to allow the desalination plant, regardless of size, to operate at a nearly flat rate over a long period of time. Unlike conventional water treatment plants, reverse osmosis plants perform the best when they can be operated at nearly a constant demand. Unfortunately, customers do not use water at an even rate over the day or even throughout the week. This is where ASR coupled with a desalination plant works the best, because when customer demands are less than the desalination plant output, excess water will be injected into the ASR system and likewise when customer demands exceed the desalination plant capacity, water will be extracted from the ASR system.

Q68. Why are you not proposing to increase the ASR component beyond the six wells previously discussed in your testimony?

A68. The primary reason is based on the fact that California American Water has a fixed amount of existing infrastructure on the Carmel River and that expanding this infrastructure will come at a considerable cost which would be over and above the cost of this project. As part of the RBF study that looked at eleven Alternatives, we investigated expanding ASR and found it do be expensive due to the amount of new infrastructure needed.

V. RELATED PERTINENT INFORMATION

Q69. What is the project schedule?

A69. Included as an attachment to the application is a high level project schedule which we believe can be achieved if we receive timely reviews for permits, this application and our Coastal Development Permit. Like all projects, there will be schedule risks, but we remain committed to meeting the schedule so as to meet the Cease and Desist Order deadline.

Q70. What are the primary permits needed and are these of concern?

A70. A project of this type will have several dozen permits all of which are required prior to construction. The most important permits are those required to obtain project funding, CEQA compliance and the Coastal Development Permit. Please also refer to the testimony of Kevin Thomas for additional detail.

Q71. Is the project eligible for State Revolving Fund loans and will California American Water apply for this funding?

A71. Yes. Based on discussions between California American Water and the SWRCB, California American Water is eligible for the SWRCB State Revolving Loan Fund for the entire project. The entire project includes the California American Water-only facilities that were previously approved as part of D,10-12-016 as well as the new components submitted as part of this application. Please refer to the testimony of Mr. Stephenson for how California American Water has modeled State Revolving Fund loans in its first year revenue requirement and rate design.

Q72. What is California American Water doing to address Greenhouse Gas emissions?

A72. California American Water is very conscious of the impact these facilities may have on Greenhouse Gas ("GHG") emissions. As part of the CEQA process for this project a thorough review of GHG will be conducted as part of the SEIR. Furthermore, California American Water is in discussion with solar companies to further investigate the use of photo-voltaic system to lower the GHG emissions and the carbon footprint. Where cost effective, California American Water plans to explore LEED certification at the appropriate level for the desalination facilities and will also re-explore the landfill gas option that was contemplated under D.10-12-016. Please also refer to the testimony of Kevin Thomas for additional detail.

Q73. Are there any obstacles facing the project?

A73. This project, like many projects, does contain several obstacles. The three that get the most attention are listed below:

(i) County Ordinance requiring that a desalination plant in Monterey County is owned and operated by a public entity.

(ii) The Agency Act which does not allow for the exportation of groundwater out of the Salinas Valley Groundwater basin.

(iii) The Coastal Development Permit.

Q74. How are these obstacles being addressed?

A74. California American Water is in discussions with the County regarding the applicability of the Ordinance. In addition, the CPUC General Counsel issued a letter to County Counsel in regards to this issue. A copy of the letter and County Staff Report referenced in the CPUC letter is included as Attachment 7. As for the Agency Act, California American Water will comply with this Act to the extent it applies. In terms of the Coastal Development Permit, California American Water will work with the Commission staff to make sure that any project issues are quickly addressed and resolved.

Q75. How are future demands being accounted for?

A75. At this point future demands of the Monterey System have not been included in the sizing of the plant; however, California American Water will follow standard engineering protocols during the design phase of the project to insure that facilities have the ability to be expanded in the future. A good example of this would be to locate the electrical sub-station for the desalination plant in an area where it could be easily expanded, thus avoiding the future expense of having to potentially bring in a second electrical service. Another example would be the location and site of the finished water pump station and pretreatment building. Each of these structures will be sited so that they could be expanded and/or modified.

VI. ADDITIONAL INFORMATION REQUIRED FOR A CPCN

Q76. Can you address community values?

A76. California American Water has been actively discussing water supply needs on the Peninsula for many years. On August 25, 2011, the MPWMD held a public workshop on water supply alternatives which includes presentations on ASR and the Groundwater Replenishment Project. On October 26, 2011, the City of Monterey hosted a public Water Forum which California American Water participated along with MPWMD and MRWPCA. On January 27, 2012, California American Water hosted a meeting attend by various stakeholders including DRA and the Commissions Department of Water Audits in which the Groundwater Replenishment Project was generally supported as a potential solution and path forward in solving the Peninsula's water supply problem. On March 14, 2012, the County hosted a public meeting in which California American Water along with MPWMD and MRWPCA presented their solutions to the Peninsula's water supply problem. Based on all these meeting and discussions, we believe we have achieved a project that meets most of if not all of the stakeholders needs.

Q77. What areas are you not addressing?

A77. A77. While we have done a lot of work to size the plant appropriately, there is still a strong debate over the size of the plant needed to meet customer demands. Based solely on the March 14, 2012, public meeting some stakeholders want to size the plant as small as possible, some want it to meet the current 12,200 AFY demands and nothing else, while others want the plant to be sized to handle full occupancy of the tourist industry plus allowances for the estimated 1,181 AFYfor lots of records, and, some stakeholders asked us to consider the General Plan Build-out demand which is estimated at 4,545 AFY. As discussed previously, the proposed plant sizing is the correct capacity to demonstrate to the SWRCB that we have replaced the illegal Carmel River diversions. The CPUC in its prior EIR findings did not include lots of record in the existing customer demand that would have to be replaced through the project and we cannot guarantee that the plant sizing would accommodate the lots of record. It is also important to note that CAW has an obligation to serve customers in its Certificated service area and the ultimate size of the desal plant must take this obligation into consideration.

Q78. Please provide a summary of what California American Water is seeking?

A78. In summary California American Water is seeking approval for the following items:

(i) Approval to permit, design, construct and place into service and in rates the California American Water-only facilities as previously approved in D.10-12-016.

(ii) Approval to permit, design, construct and place into service and in rates a replacement water supply project being comprised of slant intake wells, brackish water pipelines, a desalination plant, product water pipelines, brine disposal facilities and related appurtenant facilities.

(iii) California American Water seeks approval to initially size the desalination plant at 9.0 MGD; however, should the Groundwater Replenishment Project that is being jointly pursued by MRWPCA and MPWMD reach several critical milestones by the time California American Water is ready to start construction on its desalination plant (currently estimated as the 4^{th} Quarter of 2014), California American Water requests permission to submit an Advice Letter reducing the size of the desalination plant to 5.4

MGD. It should be noted, that the deadline would be extended if the desalination project has also experienced delays.

Q79. Does this conclude your testimony?
A79. Yes, it does.

ATTACHMENT 1

Attachment 1 -
WTP Design Experience for Richard C. Svindland

No.	WTP	Design Element
1	Aiken, South Carolina	Chemical Feed & Solids Handling Improvements
2	Bremen, GA	HS Pump Evaluation
3	Carrollton, GA	Expansion from 8 to 12 MGD
4	Dalton, GA - FreemanSprings	Foundation Structural Design of new 2 MGD plant
5	Dalton, GA - Mill Creek	Hydrotreater Improvements, Plant Hydraulics
6	Dalton, GA - Parrott	Chemical Feed Improvements
7	Eatonton, GA	Misc. hydraulics
8	Fayetteville, GA	Chlorine System ERP.
9	Greeneville, TN	Structural Design of a plant capacity upgrade
10	Haralson Co. Water Authority	Sedimentation Basin Improvements, hydraulics
11	Johnson City, TN	Conceptual Plant Upgrade
12	Johnson City, TN	Unicoi Springs Prelim. Engineering
13	KAW – KRS	Several projects from 1999 to 2007 including Rapid Mix repair, filter rehabs, hydrotreater repainting, chlorine system improvements, plant hydraulics, raw, intermediate and HS pumping hydraulics, CT calculations, SCADA upgrade
14	KAW - Pool 3 WTP	Design of new 20 MGD plant
15	KAW – RRS	Several projects from 1999 to 2007 including hydraulics improvements to allow 30 MGD, chemical feed improvements, SCADA improvements, solids handling improvements, temp. solids handling solution.
16	Kingsport, TN	Structural Design of capacity upgrade
17	Lafourche Parish, LA	Chemical Feed system design
18	Lanett, AL CVWSD	Chemical Feed, Filter Rehab & New RWPS
19	Laurens, South Carolina	Generator Building
20	Madison, GA - Lake Oconee	Design of new 2 MGD Conventional WTP with intake, RWPS, WTP, HS and Raw Water mains & reservoir.
21	Madison, GA - Town	New plant flow meters, and solids handling improvements
22	Milledgeville, GA	New Clearwell and Alum Storage
23	Newnan Utilities	Structural Design of rehab project. Raw Water Pump Station Evaluations, Safe Yield Analysis of Reservoir System, Reservoir Expansion Study
24	Owenton, KY	Treatment Optimization, misc improvements, CT study, flow meter installation.
25	Palmetto, GA	Sedimentation Basin Improvements, CT study, Instrumentation addition, high rate pilot study, Filter Rehabilitation
26	PAW - Hays Mine WTP	Prelim. Design for chemical feed improvements and replacement of 75 MGD raw water pump station
27	PAW - Hershey, PA	Prelim. Design for plant expansion from 9.3 to 11 MGD
28	PAW - Silver Springs WTP	New Sludge Lagoons & Ammonia Feed System
29	PAW - West Shore RWTP	New 12 MGD WTP to replace YB No. 1 & 2.
30	Rock Hill, South Carolina	Structural design of plant expansion, hydraulics
31	TAW - Citico Plant	Prelim. Design for plant expansion
32	VAW - Hopewell, VA	Prelim. Design for plant expansion
33	Villa Rica, GA	Raw water meter installation, sedimentation basin improvements
34	Williston, South Carolina	One new well, chemical feeds and pressure filtration and two well sites.

ATTACHMENT 2

Summary of Changes:

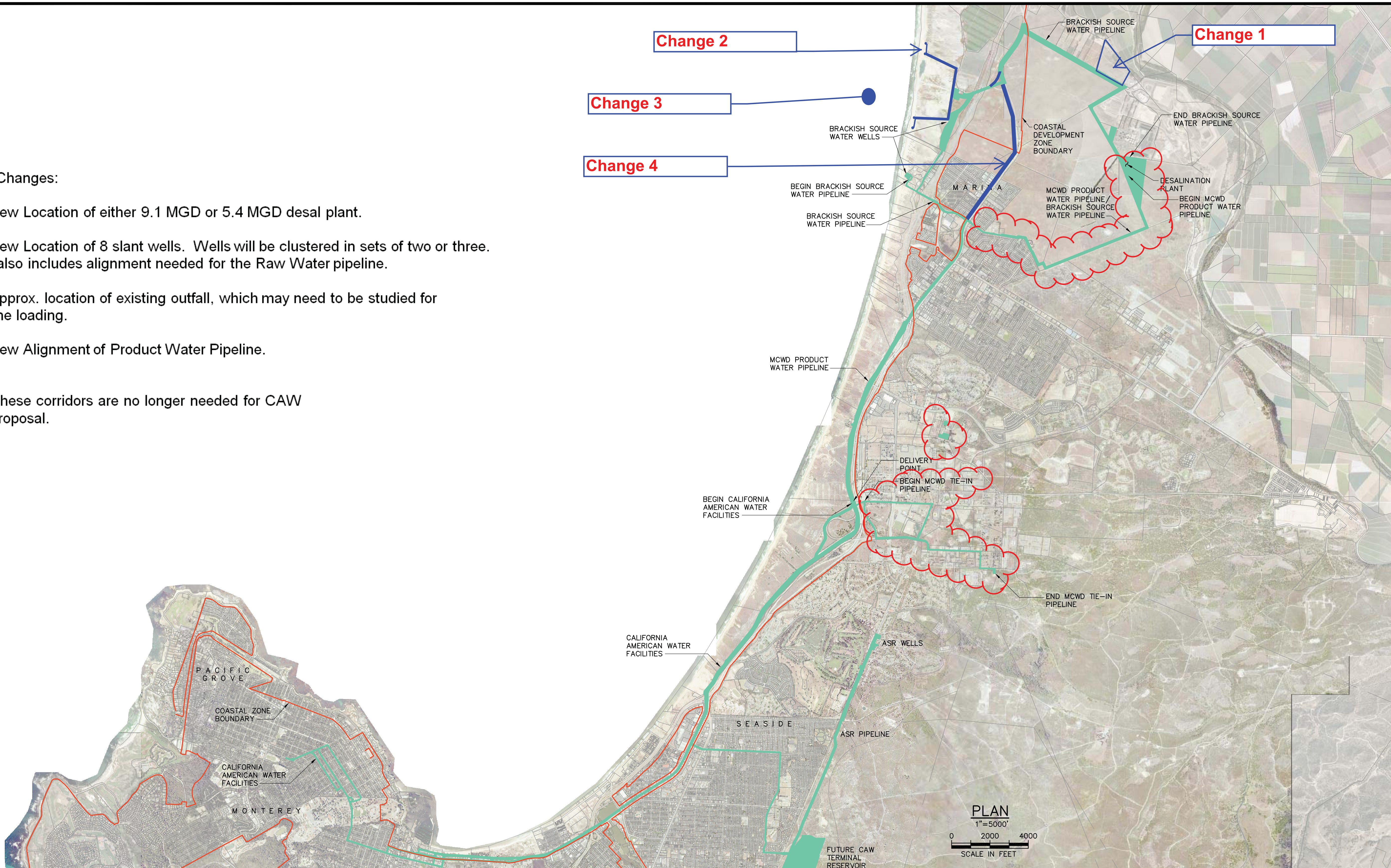
Change 1 - New Location of either 9.1 MGD or 5.4 MGD desal plant.

Change 2 - New Location of 8 slant wells. Wells will be clustered in sets of two or three. This change also includes alignment needed for the Raw Water pipeline.

Change 3 - Approx. location of existing outfall, which may need to be studied for additional brine loading.

Change 4 - New Alignment of Product Water Pipeline.

- These corridors are no longer needed for CAW proposal.



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MONTEREY BAY REGIONAL DESALINATION PROJECT

PROJECT FACILITIES MAPS
OVERALL PROJECT PLAN

FIGURE NO G-3

DATE MAR 2011

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ATTACHMENT 3

M E M O R A N D U M

To: Richard Svindland, California American Water

From: Paul Findley, RBF Consulting

Date: April 20, 2012

Subject: Recommended Capacity for the Monterey Peninsula Water Supply Project (MPWSP) Desalination Plant

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INTRODUCTION

The purpose of this memorandum is to develop the recommended design capacity for the desalination plant for the Monterey Peninsula Water Supply Project (MPWSP). This desalination plant will become the principal supply for CAW's system, replacing a major portion of the supply which comes from the Carmel River, and also a portion of the supply which is currently pumped from the Seaside Groundwater Basin (SGWB). The desalinated water supply will be supplemented by the ASR system, Sand City desalination plant, and reduced amounts from the Carmel River and SGWB. A Groundwater Replenishment (GWR) Project, which could deliver up to 3,500 AFY of replenishment water to the SGWB, could also be integrated into the MPWSP as an additional supply source. This analysis determines the capacity of the desalination plant that would be required both with and without the GWR Project.

APPROACH

The desalination plant, in combination with other sources, must provide a reliable source of supply to meet demand such that CAW can reduce its diversions of Carmel River Water, and its pumping of the SGWB, to legal limits. The capacity of the plant must be sufficient to allow CAW to meet demand under all conditions. For example, the determination of plant capacity must consider:

- Requirements to return a portion of the desalinated water to Salinas Valley users;
- Variability and reliability of water available from the ASR system and SGWB;
- Reductions in plant production capacity caused by aging membranes;
- Variability of plant output caused by changes in feedwater temperature and salinity,
- The percentage of second pass needed to meet treated water quality objectives;
- Modular design of the RO process; and
- Standby capacity.

As a matter of practice, the rated capacity of a desalination plant is always stated in reference to the output (product water) of the plant, not the input (feedwater) to the plant. Also, the daily rated capacity (the capacity of the plant in MGD) of the desalination plant typically does not include production modules that are installed as standby capacity. Standby capacity units are typically required to maintain production at rated capacity when production units are be taken out of service for maintenance. In practice, these standby units provide a margin of safety for reliably meeting annual production targets, but they are not included in the determination of reliable capacity of the plant to meet peak day requirements. This memorandum assumes that one module of RO capacity will be provided as standby capacity, and this assumption was carried forward to the cost estimating technical memorandum prepared by RBF.

HISTORICAL AND EXPECTED DEMAND

The FEIR addresses the supply and demand issue in Chapter 2, pages 2-9 and 2-10, as follows:

> *As part of its analysis of existing demand, MPWMD reviewed actual monthly water use for water years 1996 to 2006, based on CalAm monthly production reports for its Carmel River and Seaside Basin Coastal Subarea sources, to determine the annual average quantity of water currently used by CalAm customers within MPWMD boundaries. Given the regular occurrence of drought periods on the Monterey Peninsula and the effect of weather on water demand, MPWMD also evaluated weather conditions during the years reviewed, which on average were wetter than normal, and developed demand estimates adjusted to reflect normal, dry, and critically dry conditions. The average annual unadjusted demand and weather-adjusted demand for the years reviewed are as follows (MPWMD, 2006a):*
>
> - *Unadjusted Demand: 14,710 AF*
> - *Normal-year demand: 15,095 AF*
> - *Dry-year demand: 15,474 AF*
> - *Critically-dry-year demand: 15,858 AF*
>
> *MPWMD considers the critically-dry year values to provide a worst-case basis for assessing the effect of weather on water production during the analysis period and that the demand values adjusted to reflect critically dry conditions – rather than the unadjusted values, which do not account for the wetter-than-normal conditions during the period of analysis – should be used for water supply planning (MPWMD, 2006a).* ***Table 2-3*** *shows the breakdown of unadjusted average annual demand and adjusted (by 7.8 percent) critically-dry year demand for the Carmel River system and Seaside Basin Coastal subarea. As shown, the unadjusted average annual production over this period is 14,710 afy, and adjusted critically dry year demand is 15,858. From these totals, MPWMD deducted the quantity of Seaside Basin and Carmel River water to which CalAm has an existing legal right based on the Seaside Basin adjudication and Order 95-10 (4,870 afy) to determine the replacement water supply needed to meet demand under the conditions reflected in the unadjusted and critically dry year scenarios. According to Order 95-10's determination of CalAm's legal right to Carmel River system water and MPWMD's calculation of CalAm's eventual legal right to Seaside Basin groundwater, Cal Am's combined rights from these sources would be 4,870 afy. As shown in Table 2-3, assuming critically-dry year demand for the two areas minus this estimate of CalAm's combined recognized water rights, MPWMD calculated*

that approximately 10,988 AF of replacement water would be needed to meet current demand in the areas served by these sources. More recently, the Seaside Basin Watermaster calculated CalAm's rights to Seaside Basin groundwater for the basin as a whole (rather than by subbasin, as MPWMD had done) and determined that CalAm's eventual right to basin groundwater was 1,474 afy, a slight decrease from MPWMD's estimate of 1,494 afy. Based on this revised calculation, replacement water supply needed to meet critically dry year demand for the Carmel River System and Seaside Basin Coastal Subarea is 11,008 afy, as shown in Table 2-3.

TABLE 2-3
SUMMARY OF AVERAGE ANNUAL PRODUCTION, WATER YEARS 1996-2006
CARMEL RIVER AND SEASIDE BASIN COASTAL SUBAREA
ADJUSTED FOR WEATHER CONDITIONS (afy[a])

	Unadjusted demand (average water year)	Critically-Dry-Year Demand
Carmel River System Demand	11,015	11,874
Seaside Basin Coastal Subarea Demand	3, 695	3,983
Subtotal	**14,710**	**15,858**
Minus Legal Water Rights to Carmel River System and Seaside Basin Water	~~4,870~~ 4,850	~~4,870~~ 4,850
Total Replacement Water Needed	**~~9,840~~ 9,860**	**~~10,988~~ 11,008**

NOTE: Numbers may not sum due to rounding.

[a] afy = acre-feet per year.

SOURCE: MPWMD, 2006a.

According to information provided in a technical memorandum prepared subsequent to the CWP Draft EIR on changes to the DEIR Phase 1 Project (Appendix Q), CalAm's annual normal weather demand is approximately 15,270 afy. This estimate is similar to MPWMD's estimate shown above (between the estimates of normal and dry weather demand)."

The FEIR's analysis was based on water demand data up through the year 2006; Table 1 shows total annual demand in CAW's Monterey system over the 5-year period from 2007 to 2011. Annual demand during this time period ranged from 11,989 AF to 14,644 AF, and averaged 13,291 AF. The maximum annual demand during this time period (14,644 AF in 2007) occurred before the economic downturn and before implementation of additional water conservation measures which were implemented in response to the Cease and Desist Order.

Table 1
CAW System Water Demand

Year (Jan-Dec)	Total Annual Demand (AF)
2007	14,644
2008	14,460
2009	13,192
2010	12,171
2011	11,989
5-Year Average	**13,291**

Recently, CAW has used 15,250 AFY as its estimate of the expected demand. Even though recent demand has been suppressed due to the combined effects of strict water conservation and economic downturn, this estimate of expected demand seems reasonable, given that it is only 5 percent more than the demand in 2007.

DESALINATION PLANT CAPACITY

Assuming 15,250 AFY as the expected demand, the desalination plant would be sized for a delivery capacity of 9006 AFY (to CAW), as calculated below:

	15,250 AFY	Demand
Less	4,850 AFY	Combined rights from Carmel River and SGWB
Less	1,300 AFY	Long-term average ASR capacity
Less	94 AFY	Firm-yield to CAW from Sand City Desalination Plant
Total	9,006 AFY	

The desalination plant would also need to be sized to deliver an additional 784 AFY (8 percent of the total desalination plant production) of desalinated water to Salinas Valley users to offset the small amount of fresh water in the feedwater from the desalination plant's slanted coastal intake wells. In theory, the total of 9,790 AFY could be delivered by a desalination plant operating at an annual average of 8.74 MGD. However, RBF is recommending that the plant be designed for a rated capacity of 9.0 mgd for several practical reasons:

- The calculated annual delivery requirement of 9,006 AFY includes an assumption that the delivery of Carmel River ASR water, Carmel River direct delivery, SGWB, and the Sand City Desalination Plant will total 6,244 AFY. If dry years occur in the early years of Project operation, it may not be possible to deliver 1,300 AFY of Carmel River ASR water. However, in these early years of operation (prior to 2021), the capacity of the SGWB is slightly higher, and it may be possible to obtain up to 300 AFY from the San City Desalination Plant. Assuming that the combined delivery from these four sources may be as low as 6,000 AFY, the calculated desalinated water delivery requirement to CAW becomes 9,250 AFY and the total MPWSP desalination plant production requirement becomes 10,054 AFY, which is an annual average of 8.98 mgd.

- The production from a desalination plant declines as the RO membranes age. (Typically, these membranes are replaced every 5 to 10 years.) The design engineer will determine the degree of allowable production decay. In effect, setting the rated capacity at 9.0 MGD allows for a time averaged production decay of three percent.

- The rated capacity of the plant will be set by the design engineer according to a certain set of assumed feedwater temperature and salinity conditions, and an assumed second pass percentage. The actual day-to-day and year-to-year production of the desalination plant will vary according to actual conditions. Furthermore, it is difficult to operate any facility, much less a desalination plant, at its full rated capacity 100 percent of the time. Any shortfalls in production that result from operations at less than annual average capacity must be matched by production from periods that the plant operates at more than the annual average rate. This will be addressed by the design engineer; however, some of these factors will not be known prior to construction of the plant, and the design assumptions that will be made will be conservative and approximate.

- The recommended module size for a 9.0 MGD desalination plant is 1.8 MGD (five 1.8 MGD duty modules plus one 1.8 MGD standby module). If GWR is implemented (see following discussion), the recommended capacity of the desalination plant is 5.4 MGD capacity, which can be achieved with three 1.8 MGD duty modules plus one 1.8 MGD standby module. Due to the timing of the decision on implementation of GWR, the current plan for design of the desalination plant is to prepare a design that can be bid as both capacities (5.4 MGD or 9.0 MGD), and then to delay the decision on which capacity to construct as long as possible to allow the GWR Project to be developed. Using the same size module for both desalination plant capacities would greatly facilitate implementation of this plan.

- The desalination plant needs to operate in conjunction with the other sources, including the ASR system. This conjunctive use strategy may require the desalination plant to operate at a rate that is slightly higher than the average annual rate, particularly during late summer months as the SGWB supply approaches its annual limit.

If the GWR Project is implemented, CAW would receive 3,500 AFY of GWR water that would be injected in the GWR wells in the SGWB, and then extracted by CAW's existing Seaside wells and new ASR wells. If this 3,500 AFY is also subtracted from the 15,250 AFY project delivery requirement (along with the assumed delivery of 6,244 AFY from the Carmel River ASR water, Carmel River direct delivery, SGWB, and Sand City Desalination Plant sources), the resulting required desalination plant delivery capacity (to CAW) would be 5,506 AFY. However, it was assumed this desalination plant would also need to produce an additional 484 AFY (8 percent of plant production) to return to Salinas Valley users This increases the total required annual production of the desalination plant to 5,990 AFY, which is an average of 5.35 MGD.

ANALYSIS OF SUPPLY SOURCES

Once the annual desalination plant production requirement was determined, an analysis was performed to check the adequacy of the desalination plant on a month-by-month basis. This detailed analysis, including all CAW supply sources and their average condition operations, is presented in Tables 2 and 3, and is described in this section in further detail.

Table 2
Monthly Analysis of 5.4 mgd Desalination Plant with GWR Project

	Monthly Average Flow in MGD												Acre-feet
	O	N	D	J	F	M	A	M	J	J	A	S	Total for Year
System Demand	13.6	11.9	10.5	10.5	11.1	11.9	12.9	15.0	16.0	16.7	16.7	16.0	15,250
System Supply:													
Carmel River to System	0.80	0.85	1.35	1.35	1.35	1.35	1.35	0.85	0.85	0.85	0.85	0.80	1176
Seaside Wells to System	1.32	1.32	1.30	1.30	1.30	1.30	1.32	1.32	1.32	1.32	1.32	1.32	1474
Sand City to System	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	94
ASR Extraction to System	6.78	4.28	2.45	2.45	3.05	3.85	5.62	8.13	9.13	9.84	9.84	9.19	7000
Desalination to System	4.61	5.37	5.32	5.32	5.32	5.32	4.53	4.61	4.61	4.61	4.61	4.61	5506
Total Supply to CAW System	13.6	11.9	10.5	10.5	11.1	11.9	12.9	15.0	16.0	16.7	16.7	16.0	**15,250**
Desalination Plant:													
Desalination to System	4.61	5.37	5.32	5.32	5.32	5.32	4.53	4.61	4.61	4.61	4.61	4.61	5506
Desalination to ASR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Desalination to Salinas Valley	0.74	0.00	0.00	0.00	0.00	0.00	0.74	0.74	0.74	0.74	0.74	0.74	484
Total Desalination	5.35	5.37	5.32	5.32	5.32	5.32	5.27	5.35	5.35	5.35	5.35	5.35	5990
Injection (to SGWB):													
GWR	4.40	5.00	5.00	5.00	5.00	4.40	4.40	0.00	0.00	0.00	0.00	4.40	3500
Carmel River	0.00	0	7.65	7.25	7.05	6.65	5.11	3.85	0.00	0.00	0.00	0.00	3500
Desalination	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0
Total Injection	4.4	5.0	12.7	12.3	12.1	11.1	9.5	3.85	0.00	0.0	0.0	4.4	**7000**

Table 3
Monthly Analysis of 9.0 mgd Desalination Plant without GWR Project

	Monthly Average Flow in MGD												Acre-Ft
	O	N	D	J	F	M	A	M	J	J	A	S	Total for Year
System Demand	13.6	11.9	10.5	10.5	11.1	11.9	12.9	15.0	16.0	16.7	16.7	16.0	15,250
System Supply:													
Carmel River to System	0.80	0.85	4.90	4.82	5.10	5.62	6.32	4.42	0.85	0.85	0.85	0.80	3376
Seaside Wells to System	2.70	3.3	0.00	0.00	0.00	0.00	0.00	0.00	1.60	2.70	2.70	2.70	1474
Sand City to System	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	94
ASR Extraction to System	2.40	0.00	0.00	0.00	0.00	0.00	0.00	5.02	5.77	5.25	5.35	4.91	2706
Desalination to System	7.61	7.67	5.52	5.60	5.92	6.20	6.50	5.48	7.70	7.81	7.71	7.50	7600
Total Supply to CAW System	**13.6**	**11.9**	**10.5**	**10.5**	**11.1**	**11.9**	**12.9**	**15.0**	**16.0**	**16.7**	**16.7**	**16.0**	**15,250**
Desalination Plant:													
Desalination to System	7.61	7.67	5.52	5.60	5.92	6.20	6.50	5.48	7.70	7.81	7.71	7.50	7600
Desalination to ASR	0.00	1.03	2.90	2.90	2.90	2.30	1.06	2.00	0.00	0.00	0.00	0.00	1406
Desalination to Salinas Valley	1.19	0.00	0.0	0.0	0.0	0.0	1.19	1.19	1.19	1.19	1.19	1.19	784
Total Desalination	**8.80**	**8.60**	**8.42**	**8.50**	**8.82**	**8.50**	**8.75**	**8.78**	**8.89**	**9.00**	**8.90**	**8.69**	9790
Injection (to SGWB):													
GWR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Carmel River	0.00	0	4.10	3.78	3.30	2.38	0.14	0.28	0.00	0.00	0.00	0.00	1300
Desalination	0.00	1.03	2.90	2.90	2.90	2.30	1.06	2.0	0.00	0.00	0.00	0.00	1406
Total Injection	**0.0**	**3.4**	**7.00**	**6.68**	**6.20**	**4.68**	**1.20**	**0.00**	**0.0**	**0.0**	**0.0**	**0.0**	**2706**

Demand

The demand used for the purposes is 15,250 AFY, as previously described. The percentage of annual demand that occurs in each month was developed based on analysis of recent CAW system demand data. These percentages were then applied against the assumed annual demand of 15,250 FY to develop the monthly demands that were used in the analysis.

Carmel River

It was assumed that the Carmel River production will be a long term annual average of 4,676 AFY. For purposes of analysis this total amount has been distributed over the 12-month period, and this distribution is the same for the 9.0 MGD desalination plant scenario and the 5.4 MGD desalination scenario. It should be recognized that in the early years of project operation, the amount of Carmel River water available may be only 3,376 AFY, and the amount of Carmel River water that is delivered through the ASR may be significantly less than 1,300 AFY. In these years, additional supplies may be available from the SGWB and the Sand City Desalination Plant.

The analysis assumes that the 9.0 MGD and 5.4 MGD desalination options would use the 4,676 AF of Carmel River production differently. In the 9.0 MGD desalination plant project, 3,376 AF of Carmel River water would be diverted directly to the customers and the remaining 1,300 AF would be diverted to ASR injection. The river diversions are mostly concentrated during the winter months, December through May. A minimum maintenance diversion of 0.80 to 0.85 MGD has been assumed through BIRP in June through November.

In the 5.4 MGD desalination plant project, only 1,176 AFY would be diverted directly to customers, with 3,500 AF being injected at the GWR injection wells along with the GWR Project water. This injected water could be counted as dilution water if necessary for regulatory purposes; however, even if it is not necessary for regulatory purposes, the assumption is that it will be injected at the GWR injection wells in order to allow the ASR wells to operate throughout the year in the extraction mode. Similar to the 9.0 MGD desalination plant project, 0.80 to 0.85 MGD of Carmel River water would be produced during June through November in order to maintain BIRP operations throughout the year.

Seaside Wells

The capacity analysis has been performed for the year 2021. In year 2021, the SWGB adjudication would be in full effect and the extraction from the Seaside wells would be limited to 1,474 AF. For purposes of analysis, it was assumed that the Seaside wells are operated only during the months of June through November for the 9.0 MGD desalination alternative. For the 5.4 MGD desalination alternative, it was assumed that the Seaside wells would be operate year round, since they would also be used to extract a portion of the GWR supply.

Sand City Desalination Plant

The Sand City desalination plant is assumed to operate at a constant 0.09 MGD throughout the year, totaling 94 AFY for both the 9.0 MGD and 5.4 MGD desalination plant projects.

GWR Injection

For the 5.4 MGD desalination plant project, 3,500 AFY of GWR Project water would be injected into GWR injection wells. The location and the configuration of the injection wells are yet to be determined, but do not affect the analysis. As previously discussed, it has also been assumed that 3,500 AFY of Carmel River water would be injected at the same GWR injection wells or at nearby new injection wells, even if this is not required to meet regulatory dilution requirements. It has been assumed that GWR water would be available for injection only during the 8-month period of September through April.

ASR Extraction

For the 9.0 MGD desalination plant project, the ASR extraction would be equal to the injected Carmel River water amount (1,300 AFY) plus the injected desalination water (which is 1,406 AFY in the analysis). The stored water would be extracted during the dry season, peaking in June, July and August.

For the 5.4 MGD desalination plant project, the ASR wells would be operated in extraction mode throughout the year to extract the injected GWR water along with the stored Carmel River water. The total volume of water extracted from the ASR wells would be equal to the sum of the injected GWR water (3,500 AFY) and the injected water from the Carmel River (3,500 AFY).

Desalination Plant

In the analysis, the average daily production of desalinated water for the CAW system for each month was determined by subtracting the total average daily production from the other sources from the average daily demand. The desalination plant production requirement was then increased to account for the annual amount of water to be returned to Salinas Valley during the 7-month irrigation season. The resulting average total desalinated water production requirements, shown in Tables 2 and 3, confirm the adequacy of the 5.4 MGD and 9.0 MGD size desalination plant sizes that were determined in the previously discussed annual analysis.

RECOMMENDATION

Based on the above analysis of annual and monthly delivery requirements, RBF recommends a rated capacity of 9.0 MGD for the MPWSP desalination plant. If the GWR project is implemented, with a delivery capacity of 3,500 AFY, RBF recommends a reduction of the rated capacity of the plant to 5.4 MGD. At either capacity, RBF recommends that the RO process at the plant be designed with 1.8 MGD modules, in order to accommodate development and integration of the GWR Project into the MPWSP, to preserve Project schedule, and to minimize design and construction costs for associated changes to the Project.

The Design Engineer for the plant will make the final recommendations regarding standby capacity; however, for the purposes of preparing Project capital cost estimates, RBF has assumed that one full 1.8 MGD RO module will be provided as standby capacity.

ATTACHMENT 4

M E M O R A N D U M

REGISTERED PROFESSIONAL ENGINEER
No. 26189
Exp. 3-31-14
PAUL L. FINDLEY
STATE OF CALIFORNIA
April 20, 2012

To: Richard Svindland, California American Water

From: Paul Findley, RBF Consulting

Date: April 20, 2012

Subject: **Monterey Peninsula Water Supply Project (MPWSP) Capital and O&M Cost Estimate Update**

OBJECTIVE

The objective of this technical memorandum (TM) is to update the capital cost estimates for California American Water's (CAW) Monterey Peninsula Water Supply Project's (MPWSP, or Project) northern facilities and the operation and maintenance (O&M) cost estimates for the entire Project. The northern facilities of the MPWSP are the facilities formerly described as the Regional Facilities of the Monterey Bay Regional Desalination Project. Two possible sizes of desalination plant are discussed in this memorandum; a 5.4 MGD desalination plant that takes in to account a 3,500 AFY Groundwater Recharge (GWR) element provided by Monterey Regional Water Pollution Control Authority (MRWPCA); and a 9.0 MGD desalination plant, which would be implemented if the GWR element is not implemented. Project facilities are summarized here and described in more detail in the Project Description TM dated April 20, 2012, prepared by RBF Consulting.

These updated cost estimates are referenced in testimony provided by Richard Svindland of California American Water in the matter of the amended application of California American Water Company for a Certificate of Public Convenience and Necessity from California Public Utilities Commission.

BACKGROUND

Previous capital cost estimating work by CAW on the Coastal Water Project includes a technical memorandum prepared by RBF Consulting (RBF) entitled *Updated Capital Cost Estimate for the Coastal Water Project, May 20, 2009*; which was appended to Mark Schubert's May 22, 2009 testimony. That report provided estimates for a 10 MGD desalination project located at Moss Landing, and an 11 MGD desalination plant located in North Marina.

A cost estimate was prepared by RMC Water for the Monterey Bay Regional Desalination Project (Regional Project), which included a 10 MGD desalination plant located in North Marina. This cost estimate was set forth in a table titled *Monterey Bay Regional Water Supply Project, Project Cost Comparison-(With Escalation to October 2012).* From that reference, it is clear that the estimate is based on an assumption that all of the supply wells for the regional desalination plant are slant wells, and that the costs are in October 2012 dollars. The capital costs for MCWD and MCWRA are also shown in Exhibit C of the Regional Project's Water Purchase Agreement, as follows:

Project Facilities Estimated Base Construction Costs	$140,100,000
Implementation, Start-up and Acceptance Costs	$ 29,600,000
Initial Capital Outfall Expenses	$ 3,000,000
MCWD and MCWRA Real Property Acquisition Costs	$ 2,000,000
Mitigation Costs	$ 2,000,000
Pre-Effective Date Costs and Expenses	$ 14,000,000
Project Administration and Oversight Expenses	$ 3,000,000
Subtotal – Estimated Project Facilities Cost	**$193,700,000**
Project Contingency	$ 46,700,000
Subtotal - Estimated Project Facilities Cost	**$240,400,000**
High-end Allowance (for Accuracy)	$ 42,070,000
Total Overall Estimated Project Facilities Cost	**$282,470,000**
Reserve Fund Payments Account	$ 6,000,000
Costs of Obtaining Indebtedness	$ 9,000,000
Total	**$297,470,000**

RMC's cost comparison table also includes an estimate for CAW's regional project facilities (aka CAW-Only facilities), in October 2012 dollars, as follows:

Base Construction Cost	$ 53,300,000
Post-Effective Implementation Costs	$ 14,500,000
ROW Easements and Land Acquisition	$ 3,400,000
Mitigation	$ 1,000,000
Capital Costs (Excluding Contingency)	**$ 72,200,000**
Project Contingency	$ 22,700,000
Most Probable Capital Cost with Contingency	**$ 94,900,000**
High End of Accuracy Range (+25%)	$118,600,000
Low End of Accuracy Range (-15%)	$ 80,700,000
Pre-Effective Date Costs and Expenses	$ 36,900,000

From the Settlement Agreement and the CPCN, it is clear that the cost cap of $106.875 million (i.e., approximately $107 million) for CAW facilities (but without CAW's pre-effective costs) was set at the mid-point between a most probable cost estimate of $94.9 million and the high end of the accuracy range at $118.6 million.

An estimate of $404 million for the capital cost of all facilities in the Regional Project can be obtained by adding the estimate of $297 million for MCWD/MCWRA facilities to the estimate of $107 million for CAW facilities. Many of the individual line items in the above cost estimates can be consolidated into facilities or facility categories. The consolidated capital cost estimate for the Regional Project is shown in Table 1.

Table 1
Regional Project Capital Cost

Capital Cost Categories	Estimated Cost (Oct 2012 $)
MCWD/MCWRA	
Raw Water & Brine Facilities	$56,600,000
Treatment Facility	$174,200,000
Conveyance Facilities	$37,200,000
Total MCWD/MCWRA Facilities	**$268,000,000**
Pre-Effective Date Costs	$14,000,000
Reserve Requirements and Financing	$15,000,000
Total MCWD/MCWRA Capital Cost	**$297,000,000**
CAW	
Raw Water and Brine Facilities	$0
Treatment Plants	$0
Conveyance Facilities	$57,300,000
Terminal Reservoir	$24,200,000
ASR System	$25,500,000
Total CAW Capital Cost	**$107,000,000**
TOTAL REGIONAL PROJECT CAPITAL COST	**$404,000,000**

The objective of this Technical Memorandum is to estimate the capital cost for CAW to implement this portion of the project, and to incorporate changes in the size and location of the desalination plant and intake (feedwater) wells, and changes in the alignment of feedwater and brine pipelines. An additional objective of this Technical Memorandum is to update O&M cost estimates for the entire MPWSP, including the newly defined northern facilities, as well as the southern facilities formerly described as "CAW-Only Facilities".

Previous relevant O&M cost estimating work by CAW on the Coastal Water Project includes a technical memorandum titled *Basis of Operations and Maintenance Costs for CWP Replacement Projects, (Makrom Shatila, RBF Consulting),* and *Appendix B-North Marina Alternative Replacement Project Operation and Maintenance Cost Summary Years 2017-2021, (RBF Consulting)*, both of which were appended to Mark Schubert's May 22, 2009 testimony.

The O&M costs reported at that time were $9,670,000 (2009 dollars) per year in the year 2021 for an 11 MGD desalination plant that would deliver 8,800 AFY to CAW and 800 AFY to users in Salinas Valley (via the CSIP system). Avoided costs attributable to the project were also reported as being $2,010,000 per year.

PROJECT FACILITIES

The capital cost estimates in this memorandum are based on the facilities shown on Figure 1 and described in Table 2. These facilities are described in more detail in the Project Description TM dated April 20, 2012, prepared by RBF Consulting.

Table 2
Summary Description of Facilities

Facility	5.4 MGD Desalination Option	9.0 MGD Desalination Option
INTAKE WELLS & SUPPLY/RETURN FACILITIES (Option 2 Configuration)		
Slanted Intake Wells	Six 12-in. wells, 700 LF, 1840 gpm, 200 hp	Eight 12-in. wells, 700 LF, 2200 gpm, 200 hp
Pump-to-Waste Pipeline	17000 LF of 16-in. diam. HDPE or FPVC	
Feedwater Pipeline	24000 LF of 30/36-in. diam. HDPE or FPVC	
Brine Pipeline	3300 LF of 24-inch diam. HDPE, FPVC, or PVC	
SV Return PS & Pipeline	2 @ 7.5 hp, 700 gpm Located at desalination plant 7000 LF 12-in. diam. PVC	2 @ 10 hp, 1,000 gpm Located at desalination plant 7000 LF 12-in. diam. PVC
DESALINATION PLANT		
Feedwater Receiving Tanks	2 x 0.5 MG, covered, glass-lined steel	
Granular Media Filters	Pressure or Gravity, 2100 SF @ 4.5 gpm/sf	Pressure or Gravity, 3500 SF @ 4.5 gpm/sf
Filter Backwash System	2 x 750 gpm 25 hp pumps, 200,000 gallon storage tank	
Reverse Osmosis System	1^{st} Pass + 40-50% to 2^{nd} Pass 4 x 1.8 MGD modules	1^{st} Pass + 40-50% to 2^{nd} Pass 6 x 1.8 MGD modules
Post Treatment System	CO_2 + Calcite + NaOCl, 2 x 4800 cu ft. contactors	CO_2 + Calcite + NaOCl, 3 x 4800 cu ft. contactors
Chemical Storage and Feed	NaOCl, $NaHSO_3$, CO_2, Calcite, NaOH, CIP Chemicals	
Residuals Handling & Treatment	1 MG open, lined WWW settling basin with decant PS, 2 x 10,000 gal waste CIP storage tanks, 3 MG open, lined brine storage basin	
Clearwell PS	3 x 2100 gpm, 30 hp vfd	4 x 2100 gpm, 30 hp vfd
Clearwells	2 x 1.0 MG circular, lined steel/concrete, above-ground	
Desalinated Water Pump Sta.	3 x 2100 gpm, 175 hp vfd	4 x 2100 gpm, 175 hp vfd
Emergency Power (for DWPS)	600 kw diesel eng-gen	750 kw diesel eng-gen.
Admin/O&M/Lab Building	10,000 SF, Single Story	
Filter Structure	11,800 SF open pit, with concrete walls.	16,800 SF open pit, with concrete walls.
RO/Post Treatment/Chem.Bldg.	15,600 SF, 30 Ft High	21,600 SF, 30 Ft High
DWPS & Eng-Gen Bldg	2100 SF, Slab on Grade, CMU, Truss Roof System	
DESALINATED WATER CONVEYANCE PIPELINE (TO CAW)		
Product Water Pipeline	32,000 LF of 36-inch diam. ML/CSP 250 psi	

For the 9.0 MGD desalination option, Project facilities south of the Product Water Pipeline are identical to those previously described as the "CAW-Only Facilities" and the capital cost estimate for these facilities has not been changed. For the 5.4 MGD desalination option, the cost of the ASR Pump Station will need to be increased to allow for higher horsepower pumps to deliver Carmel River water to the GWR injection wells, and an additional pipeline will be required to convey the Carmel River water to the GWR injection wells. The capital cost for this pipeline, which could be as high as $7,000,000, is not included in this analysis. However, the costs to increase the horsepower of the ASR Pump Station would be covered by the contingency allowance for that pump station.

CAPITAL COST ESTIMATING METHODOLOGY AND GENERAL NOTES

These cost estimates are built on the previous work done in RBF's 2009 technical memoranda, using similar methods. Implementation costs were estimated at 20 percent of base construction cost. Contingencies and mitigation costs were estimated at 25 percent and one percent, respectively, of the sum of base construction costs, implementation costs, and ROW/Land/Outfall costs. Unit quantities and unit costs have been checked and/or developed and have been revised and updated to current conditions.

Capital costs include construction costs, Land and ROW acquisition, and allowances for implementation, mitigation and contingencies. It should be noted that the design will first be prepared for the 9.0 MGD desalination option, followed by a decision to construct the smaller project, based on the progress of the GWR. Most, if not all, of the design effort for a 9.0 MGD desalination project will be expended even if the smaller project is constructed. For this reason, the implementation costs were estimated to be the same for both the 9.0 MGD and 5.4 MGD desalination options, at 20 percent of the base construction costs of the 9.0 MGD option. Similarly, the mitigation costs for both options are expected to be the same, and were estimated according to the 9.0 MGD desalination project. For the 5.4 MGD desalination option, the incremental increases in implementation costs and mitigation costs that resulted from these adjustments were taken from the contingency allowance, resulting in a lower contingency allowance percentage for the 5.4 MGD desalination option than for the 9.0 MGD desalination option.

SUMMARY OF UPDATED CAPITAL COST ESTIMATES

The updated capital cost estimates for the two project options are summarized and compared to the Regional Project in Table 3. Detailed worksheets are also attached. The most probable capital cost for the 9.0 MGD desalination option is estimated to be approximately $208,000,000, with an accuracy range of $177,000,000 to $260,000,000, in current (2012) dollars. The most probable capital cost for the 5.4 MGD desalination option is estimated to be approximately $171,000,000, with an accuracy range of $145,000,000 to $213,000,000, in current (2012) dollars. Consistent with previous estimates, for this stage of project development, the estimate is considered to have an accuracy of -15% to +25%. This accuracy range is shown in Table 3.

Table 3
Summary Capital Cost Estimate (2012 Dollars)

Item	Regional (10 MGD)	New CWP	
		5.4 MGD	9.0 MGD
Base Construction Costs			
Intake Wells/Supply/Return Facilities	$ 26.3 M	$ 31.7 M	$ 37.0 M
Desalination Plant	$ 95.1 M	$ 65.5 M	$ 84.2 M
Product Water Pipeline	$ 18.7 M	$ 10.9 M	$ 10.9 M
Base Construction Subtotal	$ 140.1 M	$ 108.1 M	$ 132.1 M
Implementation Costs	$ 32.2 M	$ 26.4 M	$ 26.4 M
ROW/Land/Outfall	$ 5.0 M	$ 5.2 M	$ 6.2 M
Contingency Allowance	$ 46.7 M	$ 28.8 M	$ 41.3 M
Mitigation Cost Allowance	$ 2.0 M	$ 2.1 M	$ 2.1 M
Accuracy Adjustment-Low End of Range	$ - 32.0 M	$ - 25.6 M	$ - 31.1 M
Accuracy Adjustment-High End of Range	$ + 42.0 M	$ +42.6 M	$ 51.9 M
Total Capital Cost at High End of Range	$ 268 M	$ 213 M	$ 260 M

Intake Wells and Supply/Return Facilities

This category of facilities includes the facilities required to obtain and deliver raw water (feedwater) to the desalination plant, to convey intermittent pump-to-waste raw water from the intake wells to the MRWPCA outfall, to convey reverse osmosis RO concentrate (brine) from the desalination plant to the MRWPCA outfall, and to convey desalinated water from the desalination plant to the CSIP irrigation water storage basin. Brine storage and re-aeration facilities, and the expected one-time fee for two connections to the MRWPCA outfall are not included in this item (they are included in desalination plant capital costs). At the high end of the accuracy range, the estimated capital costs for these facilities for the 5.4 MGD and 9.0 MGD desalination options are $62 M and $72 M, respectively, in 2012 dollars, with the following breakdown:

	5.4 MGD	9.0 MGD
Base Construction Costs		
Slanted Intake Wells	$ 17.6 M	$ 22.9 M
Pump-to-Waste Pipeline	$ 3.5 M	$ 3.5 M
Feedwater Pipeline	$ 8.9 M	$ 8.9 M
Brine Pipeline	$ 0.9 M	$ 0.9 M
SV Return PS & Pipeline	$ 0.8 M	$ 0.8 M
Base Construction Cost Subtotal	$ 31.7 M	$ 37.0 M
Implementation Costs	$ 7.4 M	$ 7.4 M
ROW/Land/Outfall	$ 1.0 M	$ 1.0 M
Contingency Allowance	$ 8.5 M	$ 11.5 M
Mitigation Cost Allowance	$ 0.9 M	$ 0.9 M
Accuracy Allowance	$ 12.4 M	$ 14.2 M
Total Capital Cost (High End of Accuracy Range)	$ 62 M	$ 72 M

These intake facility costs are higher than the intake facility costs for the Regional Project for the following reasons:

- Despite the reduced desalination plant size, the MRWSP will use more intake wells than the Regional Project (8 wells versus 6 wells) because of different assumptions regarding the capacity of each well, the recovery percentage of the desalination plant, and the addition of standby well capacity;
- The addition of a pump-to-waste piping system;
- The assumed use of HDD construction methods for connection pipelines between intake wells and for pipelines crossing under coastal dunes; and
- Increased electrical service costs for slant well installations.

Desalination Plant

This category of facilities includes the facilities required to receive, filter, and desalinate the feedwater pumped from the intake wells; condition and disinfect the desalinated water; process and/or recycle residual streams from the process; store and pump desalinated water; and house equipment and personnel.

At the high end of the accuracy range, the estimated capital costs for these facilities for the 5.4 MGD and 9.0 MGD desalination options are $128 M and $165 M, respectively, in 2012 dollars, with the following breakdown:

	5.4 MGD	9.0 MGD
Base Construction Cost		
Plant Inlet and Pretreatment	$ 6.8 M	$ 7.6 M
Reverse Osmosis System	$ 19.9 M	$ 29.0 M
Post Treatment System	$ 1.1 M	$ 1.3 M
Residuals Handling and Treatment	$ 1.1 M	$ 1.1 M
Clearwell PS, Clearwells and DWPS	$ 5.1 M	$ 6.1 M
Plant Infrastructure	$ 22.0 M	$ 26.9 M
Engineering, Mobilization/Demobilization	$ 9.5 M	$ 12.2 M
Base Construction Cost Subtotal	$ 65.5 M	$ 84.2 M
Implementation Costs	$ 16.8 M	$ 16.8 M
ROW/Land/Outfall	$ 2.7 M	$ 3.7 M
Contingency Allowance	$ 16.6 M	$ 26.1 M
Mitigation Cost Allowance	$ 1.0 M	$ 1.0 M
Accuracy Allowance	$ 25.7 M	$ 33.2 M
Total Capital Cost (High End of Accuracy Range)	$ 128 M	$ 165 M

The heart of the desalination plant is the RO process, which has estimated base construction costs of $19.9 M and $29.0 M for the 5.4 MGD and 9.0 MGD options, respectively. The ratio of these costs is approximately 68 percent, which is approximately equal to the ratio of installed capacity for the two plants (7.2 MGD/10.8 MGD=0.66; installed capacity = rated capacity plus standby capacity.)

Product Water Pipeline

The budgeted capital cost for this pipeline is $23 M, in 2012 dollars, for both the 9.0 MGD and 5.4 MGD Desalination Options, and is broken down as follows:

	5.4 MGD	9.0 MGD
Base Construction Cost	$ 10.9 M	$ 10.9 M
Implementation Costs	$ 2.2 M	$ 2.2 M
ROW/Land/Outfall	$ 1.5 M	$ 1.5 M
Contingency Allowance	$ 3.7 M	$ 3.7 M
Mitigation Cost Allowance	$ 0.2 M	$ 0.2 M
Accuracy Allowance	$ 4.5 M	$ 4.5 M
Total Capital Cost (High End of Accuracy Range)	$ 23 M	$ 23 M

O&M COST ESTIMATING METHODOLOGY AND GENERAL NOTES

The annual O&M costs for the MPWSP consist primarily of the following components:

- Energy;
- Chemicals;
- Labor;
- Membrane and Media Replacement; and
- General Repair and Replacement (R&R)

O&M cost estimates for Membrane and Media Replacement and General Repair and Replacement are presented here as annual expenses; however, a portion or all of these costs may be treated as capital expenditures in financial analysis.

Generally, the methodology to estimate O&M Costs follows the methodology described for estimating the North Marina Alternative costs in *Basis of Operations and Maintenance Costs for CWP Replacement Projects, (Makrom Shatila, RBF Consulting, May 20, 2009),* using updated unit cost information. The following sections within explain any differences in the cost estimating method from that used in the previous work.

For the 9.0 MGD desalination option, the O&M cost estimate is based on operating at the system at full capacity; i.e., use of the above facilities to deliver 9,006 AFY of desalinated water to the CAW system, plus 784 AFY of desalinated water to the CSIP system, plus the O&M costs for BIRP, Segunda Pump Station and the ASR Pump Station to capture and deliver 1,300 AFY of Carmel River water to the ASR wells, plus the O&M costs for the ASR Pump Station to pump 1,406 AFY of desalinated water to the ASR wells, and the O&M costs to recover 2,406 AFY of water from the ASR wells.

For the 5.4 MGD desalination option, the O&M cost estimate is similarly based on operation of the system at full capacity in which the Project's facilities would be used to deliver 5,506 AFY of desalinated water to the CAW system, plus 484 AFY of desalinated water to the CSIP system. This option also includes:

- BIRP costs to treat 1,300 AFY of Carmel River Water;
- Segunda Pump Station power costs to pump 3,500 AFY of Carmel River water;
- ASR Pump Station power costs to pump 3,500 AFY of Carmel River water to the GWR injection wells; and
- ASR well power costs to pump 7,000 AFY (3,500 AFY Carmel River injection water + 3,500 AFY injected GWR water) from the ASR wells to the CAW system.

SUMMARY OF UPDATED O&M COST ESTIMATES

A summary of the O&M cost estimates for the 5.4 MGD and 9.0 MGD options is shown in Table 4 and discussed in the paragraphs that follow. Detailed worksheets are also attached.

Table 4
Summary of MPWSP Annual O&M Costs (2012 dollars)

Cost Category	5.4 MGD Desalination Option	9.0 MGD Desalination Option
Energy	$ 4,650,000	$ 6,500,000
Chemicals	$ 560,000	$ 720,000
Labor & Miscellaneous	$ 2,680,000	$ 3,070,000
Membrane and Media Replacement	$ 360,000	$ 520,000
General Repair and Replacement	$ 1,600,000	$ 1,950,000
Purchased GWR Water (at $3000/AF)[1]	$ 10,500,000	--
Total O&M Annual Cost	**$ 20,350,000**	**$12,760,000**

Notes: 1. Purchase price is an assumption and includes all capitalized and annual expenses for treatment, conveyance and injection of advanced treated water from PCA.

Energy Costs

Energy costs were developed for the following components:

- Pumping (intake wells, desalinated water pump station (to CAW and to SV), ASR pump station, Valley Greens Pump Station, ASR wells and Seaside wells extraction);
- Treatment process (filtrate forwarding, high-pressure RO feed, energy recovery boost, second pass feed, clearwell lift, backwash supply, decant recovery);
- Misc. facility power usage.

The total energy usages for the two desalination options are 35,300,000 kwhrs/yr and 50,800,000 kwhrs/yr, for the 5.4 MGD and 9.0 MGD desalination options, respectively.

Table 5 shows the pumping lifts used in the calculation of power costs for the major pumps in the system.

The RO process is assumed to be single pass, followed by a partial second pass. The RO process product water produced is a blend of first and second pass permeates and is assumed to be 40 percent second pass permeate. An operating pressure of 1000 psi has been assumed for the first pass (50 psi provided by the filtrate forwarding pump and 950 psi provided by the high pressure pump), and 125 psi for the second pass. An overall recovery rate of 43 percent has been assumed for the RO process, which includes the additional losses that occur in the partial second pass.

Discussions were held with Pacific Gas and Electric (PG&E) in 2008 and 2009 to determine which electric rate schedule is applicable to each proposed facility. No discussions with PG&E have occurred since 2009, and the current rate schedules have not been reviewed, however, the power rates that were used in the 2009 analysis have been escalated at four percent per year for three years for the purposes of this current O&M cost estimate.

Table 5
Pumping Lifts Used for Power Cost Calculations

Pump	Total Dynamic Head (TDH) in Feet	
	5.4 MGD Desalination Option	9.0 MGD Desalination Option
Intake Wells	240	240
Filtrate Forwarding Pumps to RO	120	120
High Pressure RO Feed Pumps	2200	2200
Energy Recovery Booster Pumps	280	280
Second Pass Feed Pumps	290	290
Clearwell Pump Station	45	45
Desalinated Water Pump Station (to CAW)	220	220
Salinas Valley Return Pump Station	25	30
ASR Pump Station	200	60
ASR Wells	560	450
Carmel Valley Wells (to and through BIRP)	400	400
Valley Greens Pump Station	90	90
Segunda Pump Station	270	270

Chemical Costs

Several chemicals are required during the pretreatment, desalination, and post-treatment processes. The chemicals that are assumed to be required during the treatment process consist of:

- Sodium Hypochlorite (Iron oxidant, Disinfection)
- Sodium bisulfite (Dechlorination)

- Carbon Dioxide (Alkalinity addition)
- Lime (calcite) (Remineralization)
- Sodium Hydroxide (pH adjustment)
- Various chemicals used in the Clean-in-Place (CIP) process for the RO membranes

Annual chemical consumption values are calculated based on flow rate and the dosages listed below:

- Sodium Hypochlorite – applied to plant raw feedwater at 1.3 mg/L, final plant product water at 2 mg/L, and ASR well extraction at 2 mg/L;
- Sodium bisulfite – applied to desalination plant filtered feedwater at 1.3 mg/L and Carmel River water injected into ASR or GWR wells at 2 mg/L;
- Carbon Dioxide – applied to desalination plant product water at 15 mg/L;
- Lime (calcite) – applied to desalination plant product water at 35 mg/L as $CaCO_{3;}$
- Sodium Hydroxide – applied to desalination plant product water at 2 mg/L;
- BIRP chemicals – Estimated at $23/AF; and
- CIP chemicals – not estimated, costs are negligible

For the 2009 O&M cost analysis, chemical costs were obtained from Univar USA, which is a leading chemical distributor in the United States. These chemical unit costs were escalated to 2012 prices at 4 percent per year. Some adjustments were also made based on consumption, with lower unit prices being assumed for chemicals that can be purchased in larger bulk quantities.

Labor Costs

The labor rates that were used in the 2009 analysis were escalated to 2012 at 4 percent per year. Some adjustments in staffing levels were made to account for the smaller desalination plant sizes and the anticipated sharing of staff between the BIRP facility and the desalination plant.

Membrane Replacement Costs

Membrane replacement costs associated with reverse osmosis membranes are included in the annual O&M cost, with approximately 17 percent of the membranes being replaced on a yearly basis. As mentioned previously, some or all of these costs may be treated as capital expenses. Membrane replacement cost associated with RO membranes is calculated below:

For 5.4 MGD desalination plant

- (2350-1st pass elements x 0.167 = 395 elements)x $600/element = $240,000/yr
- (480- 2nd pass elements x 0.167 = 80 elements) x $600/element = $ 50,000/yr

For 9.0 MGD desalination plant

- (3520 - 1st pass elements x 0.167 = 590 elements)x $600/element = $ 350,000/yr
- (720 - 2nd pass elements x 0.167 = 120 elements) x $600/element = $ 70,000/yr

This item also includes $70,000/yr for the 5.4 MGD desalination plant, and $100,000/yr for the 9.0 MGD desalination plant to cover replacement of multi-media sand in the pretreatment filters and replacement of cartridge filter media.

General Repair and Replacement

A general Repair and Replacement (R&R) cost is included in the annual O&M costs for both projects. The R&R cost is a budgeted amount based on a long term average of expenditures for the repair and/or replacement of mechanical equipment (pumps, etc.), electrical equipment, instrumentation and controls, and basic facility maintenance. As mentioned previously, some portion of these costs may be treated as capital expenses. Industry standard assumptions for this type of cost range from one percent to three percent per year as a percentage of construction cost, with the higher percentages occurring as the facilities approach the end of their useful life. For newly constructed facilities, the annual average R&R cost was estimated at being 1.5 percent of the basic construction cost of the non-pipeline elements of the project, as follows:

- For the 5.4 MGD option: 0.015 x $107,000,000 = $1,600,000/yr.
- For the 9.0 MGD option: 0.015 x $130,000,000 = $1,950,000/yr.

ATTACHMENT 5

TECHNICAL MEMORANDUM

MRWPCA Outfall Capacity
Prepared for California American Water

Draft Date: April 11, 2012
Final Date: April 18, 2012

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Reviewers: Rhodes Trussell, Ph.D., P.E.

Job Number: 99.001

Subject: MRWPCA Outfall Hydraulic Capacity Analysis

This study is an expansion of an earlier study, which evaluated the hydraulic capacity of the Monterey Regional Water Pollution Control Agency (MRWPCA) outfall for conveying desalination concentrate in addition to secondary effluent to the ocean. The first study, conducted by CH2M-Hill and reviewed and modified by Trussell Technologies, evaluated the capacity of the outfall for the addition of 12.7 MGD desalination concentrate from the planned Marina Coast Water District (MCWD) Desalination Plant (CH2M-Hill, March 2010 and August 2010; Trussell Technologies, March 2010). The purpose of the current study is to consider whether the outfall has sufficient capacity to also convey up to 11.0 MGD of additional brine from the planned California American Water (CAW) North Marina Desalination Plant. This expanded hydraulic capacity analysis will use the same approach used in the earlier MCWD study, which was based on CH2M-Hill's hydraulic model results for the case of conveying secondary effluent only along with a simplified model developed by Trussell Technologies, which evaluated the impact of a higher salinity discharge on outfall capacity. The analysis presented below will also evaluate whether brine storage will be required during peak wastewater flow conditions.

1 - EXECUTIVE SUMMARY

MCWD and CAW are both planning to build reverse osmosis (RO) desalination facilities and are considering disposal of the resultant brine through MRWPCA's existing ocean outfall, which presently carries primarily secondary effluent from its WWTP. An earlier 2010 study considered whether the MRWPCA outfall had sufficient capacity for the wastewater effluent plus 12.7 MGD MCWD brine. This study is an expansion of that earlier study, and considers whether the MRWPCA outfall will have the capacity for an additional 11.0 MGD of CAW brine, in addition to the effluent plus MCWD brine, and whether brine storage will be required under peak wastewater flow conditions.

Results of this study showed that the MRWPCA outfall has sufficient capacity for the addition of both 12.7 MGD MCWD brine and 11.0 MGD CAW brine, when considering average daily effluent flows and worst-case hydraulic conditions for the pipeline (Hazen-William's friction factor C=80 and diffuser ports plugged). However, when considering **daily peak secondary effluent flows** under worst-case hydraulic conditions (C=80, ports plugged), the additional brine in the outfall potentially will exceed available hydraulic capacity a small percentage of the time. In a conservative assessment of peak wastewater effluent flow duration, the worst-case peak flow duration is assumed to be 6 hours.

The following recommendations are offered as CAW plans for its new RO desalination facility:

- Inspect the MRWPCA outfall to establish baseline conditions;
- Conduct hydraulic tests on the outfall pipeline to accurately characterize headloss through the outfall;
- Include the cost of opening all ports along the pipeline in CAW's estimated cost of the new RO facility; and
- Include the cost of a brine storage tank that can contain up to 6 hours of brine flow during periods of peak secondary effluent flows in CAW's estimated cost of the new RO facility.

2 - INTRODUCTION

MRWPCA has an ocean outfall, which presently carries secondary effluent from the MRWPCA's wastewater treatment plant (WWTP) plus a maximum 0.17 MGD (rounded to 0.2 MGD) brine which is hauled from a nearby California Water nitrate removal treatment facility and Monterra Ranch's desalination facility, and than diluted 3:1 with MRWPCA effluent before disposal (max diluted brine flow is 475 GPM). The MCWD and CAW each plan to build a seawater reverse osmosis (RO) desalination facility on nearby property, and propose using the MRWPCA's outfall to return the seawater concentrate (also referred as brine) to the ocean. During the winter months, 100% of the secondary effluent is discharged to the ocean. However, during the agricultural growing season, flow through the outfall is substantially reduced when a large portion (up to 100%) of the secondary effluent is diverted to the Salinas Valley Reclamation Project's (SVRP) tertiary treatment facility for additional advanced treatment, and then used for crop irrigation. The MRWPCA is presently considering a RO and Advanced Oxidation Process (AOP) treatment facility, which will provide treatment of secondary effluent during the winter months (non-growing season) for groundwater replenishment. This Technical Memorandum (TM) does not consider the planned groundwater replenishment program since a worst-case scenario would occur when the RO/AOP facility was off-line and the outfall pipeline was required to convey 100% of the secondary effluent plus brine from both the MCWD and CAW desalination facilities.

The outfall consists of about four miles of 60-inch diameter reinforced concrete pipe, half located on land (approximately 12,745 feet) and half under water (approximately 10,392 feet). The outfall travels west from the MRWPCA facility to the ocean. The end of the outfall consists of 907 feet of 48-inch diameter diffuser, containing 106 2-inch outlet ports fitted with 4-inch duckbill valves, and 500 feet of 60-inch diameter diffuser, containing 65 2-inch outlet ports fitted with 4-inch duckbill valves. The elevation of this last part is -106.9 MSL (CH2M-Hill, August 2010). Presently, the outfall is operated with 42 of the 65 outlet ports in the 60-inch diffuser section plugged. As will be discussed, removing the plugs from these 42 ports increases available outfall capacity. The earlier outfall modeling, as well as the current analysis, considers both scenarios—all 42 ports plugged and all 42 ports open. A schematic of the Monterey Bay outfall is provided in Figure 2.1.

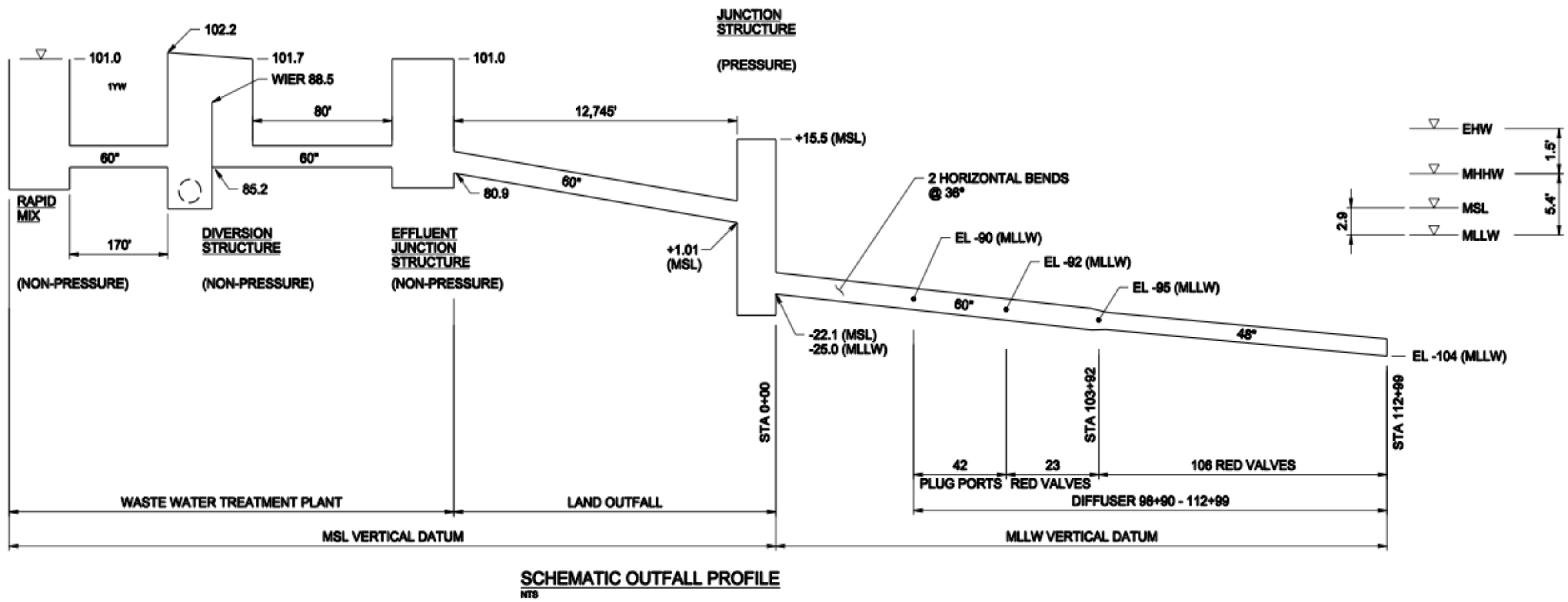


Figure 2.1. Schematic of MRWPCA Ocean Outfall (taken from CH2M-Hill, August 2010).

The planned concentrate flow from the MCWD desalination facility is 12.7 MGD, and the following analysis assumes this flow is continuous. Two different capacity CAW desalination facilities are considered: (1) 5.4 MGD permeate flow with a 6.6 MGD concentrate flow and (2) 9.0 MGD permeate flow with an 11.0 MGD concentrate flow. A 45% recovery is assumed for RO desalination in both cases. Table 2.1 summarizes the different brine discharge scenarios considered in the outfall hydraulic capacity analysis presented in this TM. Scenario 0, is the “baseline” scenario with no CAW concentrate. Scenarios 1 and 2 include concentrate from the two sized CAW desalination facilities. Scenarios 3 and 4 consider cases where pretreatment of the RO feed water is needed (e.g. manganese removal through a Greensand filter) and the pretreatment washwater is also discharged to the ocean through the outfall.

Table 2.1. Brine discharge scenarios considered in the hydraulic calculations of maximum effluent flow and total outfall capacity.

Scenario	MCWD RO Concen-trate Flow (MGD)	Existing Concentrate Flow to Outfall (MGD)	California American Water			Total Concentrate Flow in Outfall (MGD)
			New RO Permeate Flow (MGD; 45% Recovery)	New RO Concentrate Flow (MGD)	RO Pretreat-ment Washwater Flow (MGD)	
0	12.7	0.2	0	0	0	12.9
1	12.7	0.2	5.4	6.6	0	19.5
2	12.7	0.2	9.0	11.0	0	23.9
3	12.7	0.2	5.4	6.6	1.2	20.7
4	12.7	0.2	9.0	11.0	2.0	25.9

3 - HYDRAULIC ANALYSIS

In the first analysis of outfall hydraulic capacity, considering secondary effluent only and secondary effluent plus 12.7 MGD MCWD brine, CH2M-Hill did detailed calculations of headloss and flow through the outfall pipeline using its WinHydro program (CH2M-Hill, March 2010). In a review capacity, Trussell Technologies found the initial WinHydro calculations did not correctly account for the changes in salinity from the brine flow. Detailed review of the WinHydro program and the assumptions incorporated into the CH2M-Hill model was beyond the scope of work at the time the March 25, 2010 Trussell Tech review was done. Rather, Trussell Tech took the approach of assuming the WinHydro program correctly calculated the hydraulic capacity of the outfall under the scenario when conveying only wastewater effluent, and then constructed a simplified iterative model based on the WinHydro effluent only results. Using this simplified iterative model, Trussell Tech calculated the effect of the brine's salinity on outfall capacity, when mixed with secondary effluent for ocean disposal. Because the internal condition of the outfall pipeline is unknown, the WinHydro program considered Hazen-Williams C values of 80, 100, and 120. As will be discussed in Section 3.2 (Assumptions), the simplified model constructed by Trussell Tech assumes the WinHydro program incorporates the appropriate hydraulic equations and that the true friction factor for the pipeline is within the range of C factors considered. The approach used by Trussell Technologies in its simplified iterative model is discussed below.

3.1 Simplified Hydraulic Calculations

3.1.1 Basic Hydraulic Considerations – Hydrostatics

When concentrate (total dissolved solids (TDS) concentration ≈ 70,000 mg/L) is mixed with wastewater effluent (TDS ≈ 813 mg/L), the density of the water in the outfall column increases. It is the weight of this water that drives the flow out of the outfall. So an increase in density of the water being discharged will increase (slightly) the hydraulic capacity of the outfall, due to an increased driving head. The difference in head between the outfall and the ocean at the point of discharge is converted to kinetic energy in the flow down the outfall and into the ocean.

To examine the difference in flow between conditions with MRWPCA secondary effluent only and conditions with the blend of secondary effluent and desalination concentrate, we will use basic headloss equations, assuming that hydrostatics can be used to estimate the change in driving force. Figures 3-1 and 3-2 show the different hydrostatics for the two cases: (1) secondary effluent only and (2) secondary effluent blended with brine. These figures represent a simplified overview of the outfall system and their primary purpose is to illustrate the hydraulic calculation discussed in the following section.

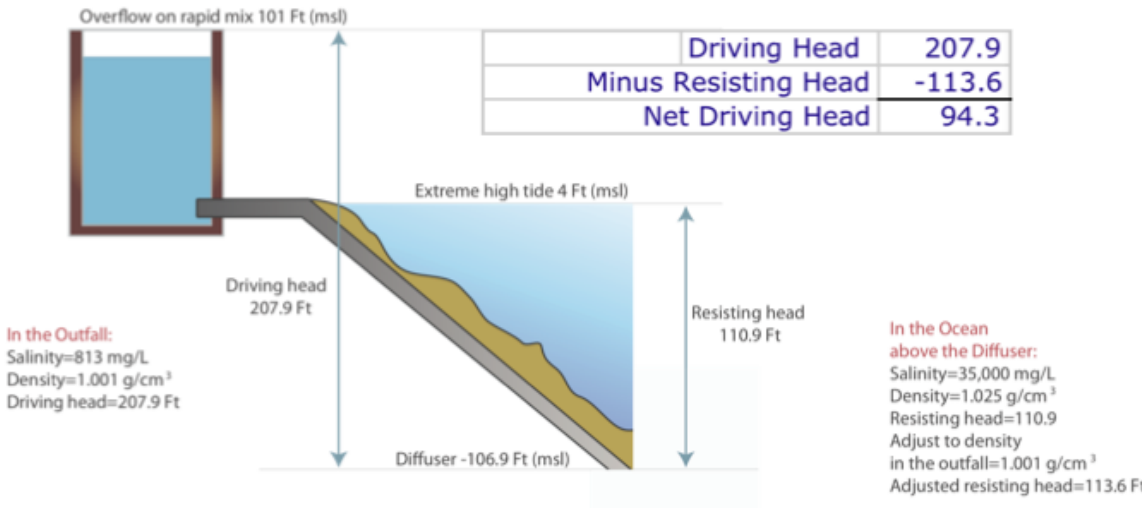


Figure 3.1. Hydrostatic characteristics for secondary effluent only

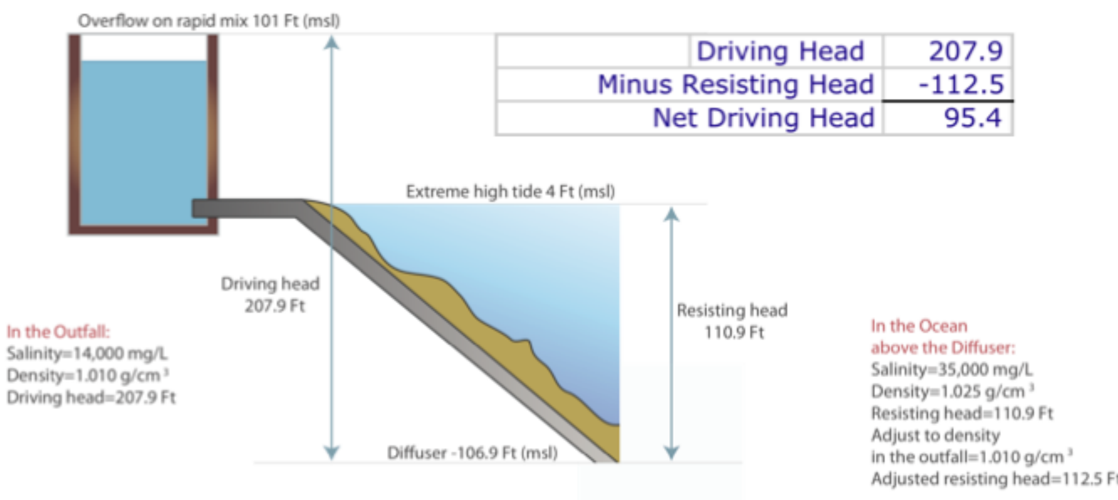


Figure 3.2. Hydrostatic characteristics for secondary effluent blended with brine

3.1.2 Basic Hydraulic Considerations – Fluid Dynamics

Introducing the density of brine into the equation does nothing to the geometry, roughness, etc. of the outfall system so the results from WinHydro for a particular configuration (e.g., ports plugged ports or unplugged, different C values) can be characterized using the Darcy-Weisbach Equation (Brater & King, 1976):

$\Delta H = f \cdot [L/d] \cdot V^2 / 2g$ [Eq. 3-1a]

or

$\Delta H = f \cdot [L/d] \cdot (Q/A)^2 / 2g$ [Eq. 3-1b]

Assuming that all the hydraulic characteristics emulated in the WinHydro program (Eqs. 3-1a and 3-1b) can be simplified using the value ø, for a given configuration, the headloss equation can be written as

$\Delta H = øQ^2$ [Eq. 3-2]

where

$ø = f \cdot [L/d] \cdot (1/A)^2 / 2g$ [Eq. 3-3]

Knowing ø and ΔH from hydrostatic calculations, it's possible to estimate Q. Assuming that WinHydro correctly estimated the values for the cases of secondary effluent only, a value of ø can be calculated for each configuration. The driving force, ΔH_i, can be estimated from analysis of the static conditions for the effluent in the outfall (Figure 3.1). So, by knowing ø and ΔH from hydrostatic calculations, we can estimate the flow, Q, and salinity of the effluent-concentrate blend in the outfall. Thus the flow, Q_i, for secondary effluent blended with concentrate, is calculated using:

$Q_i = \text{sqrt}[\Delta H_i/ø]$ [Eq. 3-4]

Table 3.1 presents the maximum outfall flows, for secondary effluent only, determined for the different cases using WinHydro (CH2M-Hill, August 2010). The WinHydro headloss calculations assumed extreme high tide conditions with the ocean water level being 4.0 feet above mean sea level (MSL), which are representative of worst-case effluent discharge conditions (CH2M-Hill, August 2010). The original design capacity of the outfall was 81 MGD (B. Holden, personal communication). In comparison with the WinHydro calculations of outfall capacity with ports open, the outfall design capacity of 81 MGD is right in the middle of the calculated capacities shown in Table 3.1. Thus, it is reasonable to assume that the original outfall design considered hydrostatic conditions similar to those considered in this study.

Table 3.1. Maximum outfall flow with wastewater effluent only (CH2M-Hill, August 2010).

C	Outfall Capacity with Ports Plugged* (MGD)	Outfall Capacity with Ports Open* (MGD)
80	66.5	70.8
100	77.1	83.7
120	85.6	94.6
* Calculated for effluent only using CH2M-Hill's WinHydro model (CH2M-Hill, August 2010)		

Table 3.2 provides the calculated hydraulic characteristic, ø, for each maximum outfall flow included in Table 3.1. These ø values will be used in the next section to calculate maximum outfall capacities for the different CAW brine scenarios presented in Table 2.1.

Table 3.2. Hydraulic characteristic, ø, used in simplified iterative hydraulic calculations.

C	Ø, Ports Plugged*	Ø, Ports Open*
80	0.0213	0.0188
100	0.0159	0.0135
120	0.0129	0.0105
*Calculated using estimated static head (ΔH) and flow (Q) from Table 3.1.		

3.2 Assumptions

To properly interpret the results of the analysis presented in this TM, it is important to understand the assumptions that were made. These assumptions are listed below:

- The CH2M-Hill WinHydro model accurately calculated headloss through the outfall pipeline and diffusers for the scenario with ports plugged and the scenario with ports open, using Hazen-Williams friction factors (C) of 80, 100 and 120.
- Model results do not address additional headloss associated with any future modifications made to the outfall structure, pipeline or diffuser, other than opening the 42 currently plugged ports.

- The metered daily WWTP influent instantaneous peak flows are representative of daily peak flows in the outfall pipeline during the period of the year that the recycle facility is off-line. Effluent flows to the outfall are not metered.
- Only flow data provided by MRWPCA for the period 2004 – 2011 was used in this analysis.
- The daily influent instantaneous flows when the meters were calibrated were excluded from the analysis presented in this TM. These dates were identified in the data spreadsheets provided by MRWPCA, and are the following:

Year	Dates of Meter Calibration
2004	3/18, 12/30
2005	3/22, 9/1, 12/18, 12/28
2006	1/2, 1/10, 1/12, 1/13, 1/14, 1/15, 1/16, 1/20, 1/22, 1/23, 1/24, 2/5, 2/8, 2/20, 2/22, 2/26, 2/28, 3/1, 3/4, 3/5, 3/8, 3/10, 3/14, 3/15, 3/17, 3/31, 4/15, 4/17, 4/30, 5/20, 12/2
2007	6/22
2008	none. (unsure if peak flows (all < 50MGD) were calibration values (B. Holden, personal communication)
2009	none. (unsure if peak flows (all < 50MGD) were calibration values (B. Holden, personal communication)
2010	none. (unsure if peak flows (all < 50MGD) were calibration values (B. Holden, personal communication)
2011	none. (unsure if peak flows (all < 50MGD) were calibration values (B. Holden, personal communication)

- The period of the year when the SVRP recycle facility is off-line and 100% of the secondary effluent is discharged through the outfall is conservatively estimated to be October through March. Further discussion of this assumption is presented in a subsequent section.
- The existing California Water concentrate flow is assumed to be continuous and not to exceed 0.17 MGD (rounded to 0.2 MGD). This brine flow is diluted 3:1 with MRWPCA secondary effluent before entering the outfall, for a maximum diluted brine flow of 475 GPM.
- The planned MCWD concentrate flow is assumed to be a continuous 12.7 MGD.

- The planned CAW concentrate flow is assumed to be a continuous 11.0 MGD in the case of the larger desalination facility, and 6.6 MGD in the case of the smaller desalination facility.
- If the CAW RO facility requires pretreatment of the RO feed water (e.g., manganese removal), the pretreatment washwater will not exceed 10% of the feed water flow. The salinity of this washwater is assumed to be the same as seawater.

3.3 Results

A simplified schematic of the flows through the MRWPCA WWTP, flows to the outfall, and flows to the SVRP for tertiary treatment and then crop irrigation, is provided in Figure 3.3. This figure also identifies locations where flow is metered, which include: (1) the influent to the WWTP, (2) the flow diverted to the SVRP, (3) the small existing brine flow (max 0.17 MGD) which is diluted with MRWPCA effluent and then discharged through the outfall, and (4) the backwash flow from the SVRP that is sent back to the head of the WWTP. The secondary effluent flow that is discharged to the ocean through the outfall, however, is not metered. For the purpose of the following data analysis, the metered influent flows to the WWTP were used rather than the calculated effluent flows. During periods when the recycle facility is off-line, a conservative analysis assumes that all of the influent flow is treated and then discharged to the ocean through the outfall and that no flow equalization occurs as the water travels through the plant.

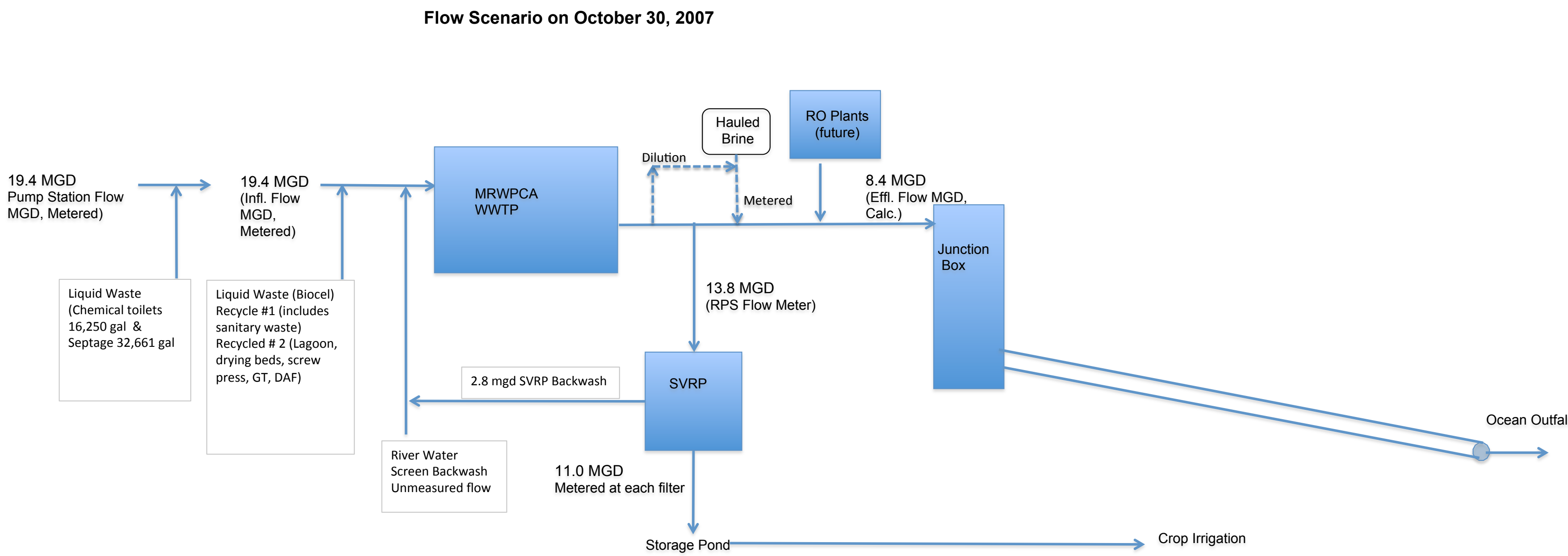


Figure 3.3. Simplified Schematic of the Flows Going to the MRWPCA Ocean Outfall, October 30, 2007.

The brine discharge scenarios considered in the analysis of outfall capacity are summarized again in Table 3.3 below (a repeat of Table 2.1). MCWD concentrate and the existing concentrate are included in all scenarios.

Table 3.3. Brine discharge scenarios considered in the hydraulic calculations of maximum effluent flow and total outfall capacity.

Scenario	MCWD RO Concen-trate Flow (MGD)	Existing Concentrate Flow to Outfall (MGD)	California American Water			Total Concentrate Flow in Outfall (MGD)
			New RO Permeate Flow (MGD; 45% Recovery)	New RO Concentrate Flow (MGD)	RO Pretreat-ment Washwater Flow (MGD)	
0	12.7	0.2	0	0	0	12.9
1	12.7	0.2	5.4	6.6	0	19.5
2	12.7	0.2	9.0	11.0	0	23.9
3	12.7	0.2	5.4	6.6	1.2	20.7
4	12.7	0.2	9.0	11.0	2.0	25.9

Using the iterative model discussed in Section 3.1, maximum outfall capacity and maximum secondary effluent flows were calculated for each of the brine discharge scenarios listed above. As indicated, opening the ports increases the allowed flows through the outfall.

Table 3.4. Summary of calculated outfall capacities, maximum effluent flows and maximum RO concentrate flows, for the cases presented in Table 2.1.

Maximum Outfall Flows (MGD)									
		Ports Plugged				Ports Open			
Scenario	C	Concentrate Flow (MGD)*	Wastewater Effluent Flow (MGD)	Washwater Flow (MGD)	**Calculated Max Outfall Capacity (MGD)**	Concentrate Flow (MGD)*	Wastewater Effluent Flow (MGD)	Washwater Flow (MGD)	**Calculated Max Outfall Capacity (MGD)**
0	80.0	12.9	54.0	0	**66.9**	12.9	58.3	0	**71.2**
	100.0	12.9	64.5	0	**77.4**	12.9	71.1	0	**84.0**
	120.0	12.9	73.0	0	**85.9**	12.9	82.2	0	**95.1**
1	80.0	19.5	47.6	0	**67.1**	19.5	51.9	0	**71.4**
	100.0	19.5	58.1	0	**77.6**	19.5	64.6	0	**84.1**
	120.0	19.5	66.6	0	**86.1**	19.5	75.8	0	**95.3**
2	80.0	23.9	43.3	0	**67.2**	23.9	47.6	0	**71.5**
	100.0	23.9	53.8	0	**77.7**	23.9	60.4	0	**84.3**
	120.0	23.9	62.3	0	**86.2**	23.9	71.6	0	**95.5**
3	80.0	19.5	46.4	1.2	**67.1**	19.5	50.7	1.2	**71.4**
	100.0	19.5	56.9	1.2	**77.6**	19.5	63.5	1.2	**84.2**
	120.0	19.5	65.4	1.2	**86.1**	19.5	74.7	1.2	**95.4**
4	80.0	23.9	41.4	2.0	**67.3**	23.9	45.6	2.0	**71.5**
	100.0	23.9	51.8	2.0	**77.7**	23.9	58.4	2.0	**84.3**
	120.0	23.9	60.3	2.0	**86.2**	23.9	69.6	2.0	**95.5**

* A concentrate flow of 23.9 MGD = 12.7 MGD from MCWD+11.0 MGD from CAW+0.2 existing concentrate.
A concentrate flow of 19.5 MGD = 12.7 MGD from MCWD+6.6 MGD from CAW+0.2 existing concentrate.
A concentrate flow of 12.9 MGD = 12.7 MGD from MCWD+0.2 existing concentrate.

4 - COMPARISON OF OUTFALL CAPACITY WITH MRWPCA EFFLUENT FLOWS

To assess whether the MRWPCA outfall has sufficient capacity to convey CAW concentrate in addition to MCWD concentrate and secondary effluent, calculated maximum wastewater effluent flows are compared with daily average effluent flows from the WWTP and daily peak influent flows to the WWTP, during worst-case conditions when the SVRP recycle facility is off-line. At the plant, daily average effluent flows are calculated rather than metered, by subtracting SVRP flows from WWTP influent flows. Daily peak influent flows are used in the comparison below rather than peak effluent flows because the effluent flows are not metered and because it is considered a conservative approach to assume peak influent flows equaled peak effluent flows, with none of the water being diverted to the SVRP.

4.1 SVRP Period of Operation

The period of time that secondary effluent from the MRWPCA was diverted to the SVRP to produce recycled water for irrigation varied from year to year. Between 2004 and 2011, the period of SVRP operation ranged from 7 months to 10 months of the year, as summarized in Table 4.1. Figure 4.1 shows the effluent flow to the SVRP in comparison with the effluent flow to the outfall, for two of the extreme months. Taking a conservative approach in selecting the period of time when the SVRP would likely be off-line, the months of **October through March** were selected as peak flow months, when no effluent would be diverted to the recycle facility.

Table 4.1. Period of SVRP Operation.

Year	SVRP Period of Operation	Duration of SVRP Operation (months)
2004	early March – mid October	7.5
2005	mid April – mid November	7.0
2006	mid April – mid November	7.0
2007	February – October	9.0
2008	mid February – mid December	10.0
1009	mid March – mid October	7.0
2010	mid March – mid November	8.0
2011	February - October	9.0

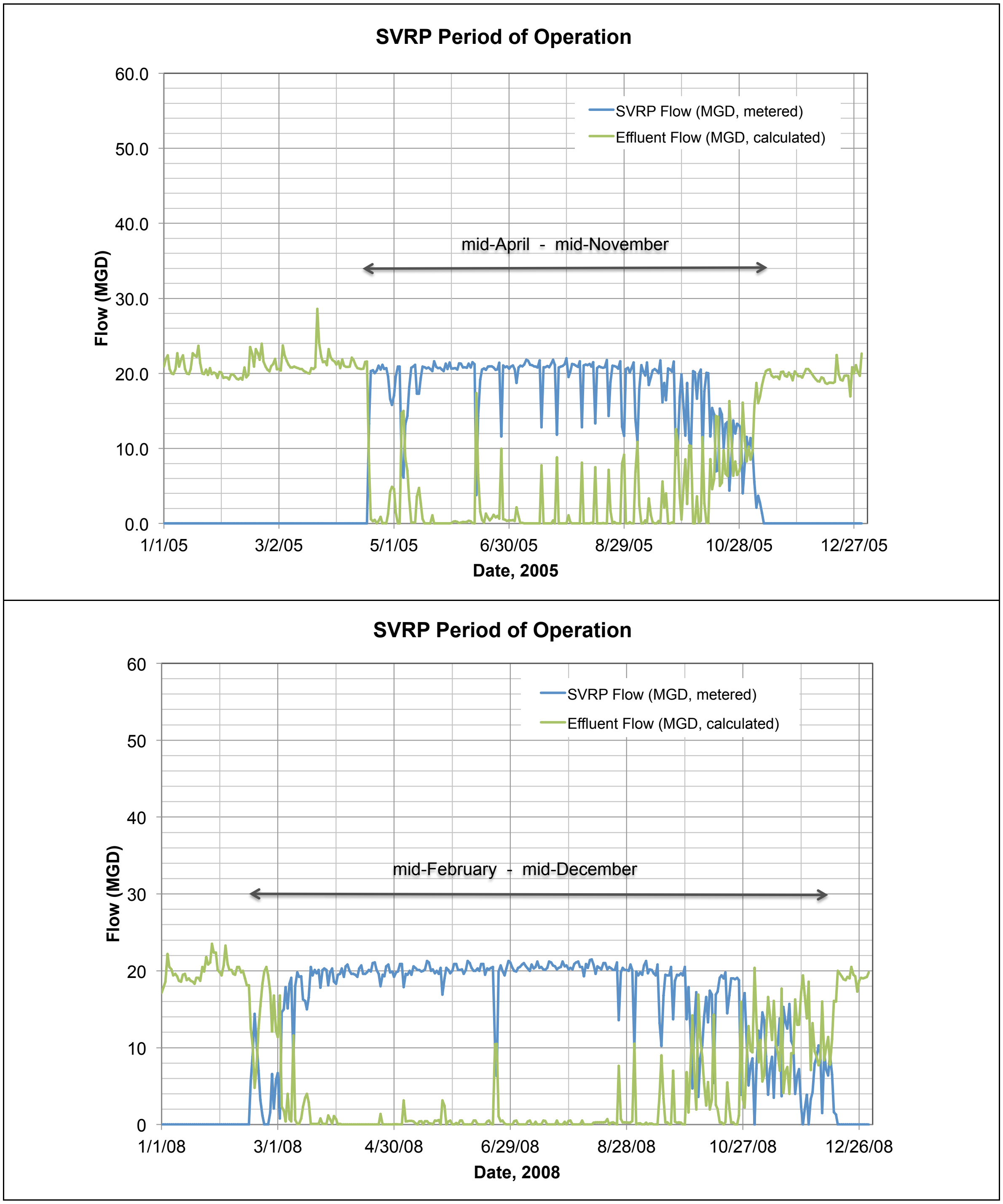


Figure 4.1. Flow to the SVRP in comparison with effluent flow to the outfall.

4.2 Outfall Capacity Compared with Daily Average Effluent Flows

The range (max and min) and average daily effluent flows calculated by month is shown in Figure 4.2. In comparison with the calculated maximum secondary effluent flows reported in Table 4.3, in relation to outfall capacity for the various scenarios evaluated, none of the daily average effluent flows exceeded or even came close to the worst-case maximum allowed effluent flow of 41.4 MGD. This same point is illustrated in Figures 4.3 through 4.5, which shows probability plots of average daily secondary effluent flows in relation to the calculated maximum effluent flows for the different CAW concentrate scenarios, for the cases of ports plugged and ports open, and C factors of 80, 100 and 120. ***Based on average daily effluent flows, the MRWPCA outfall has sufficient capacity to convey CAW concentrate plus MCWD concentrate plus secondary effluent, even under worst-case conditions of ports plugged and C=80.***

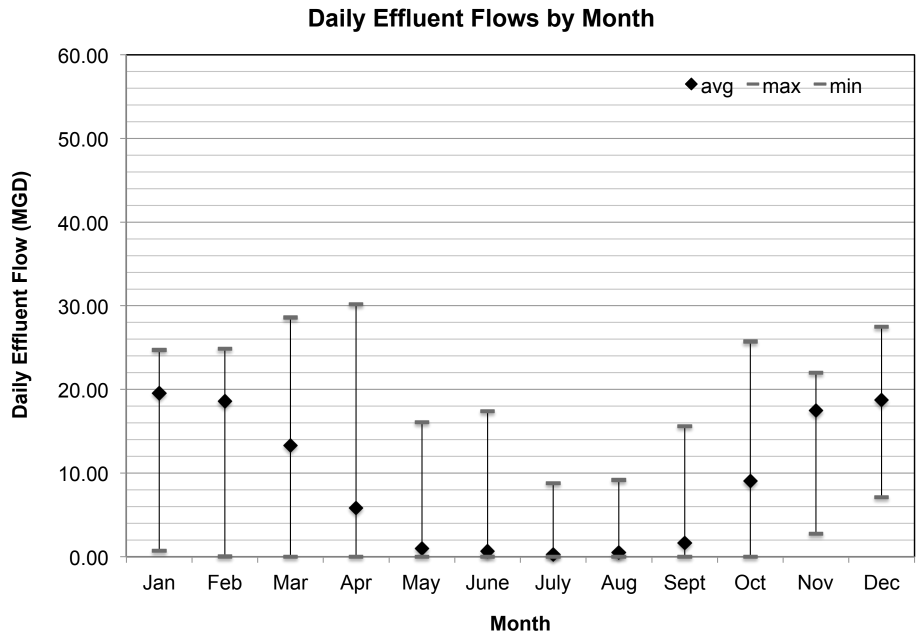
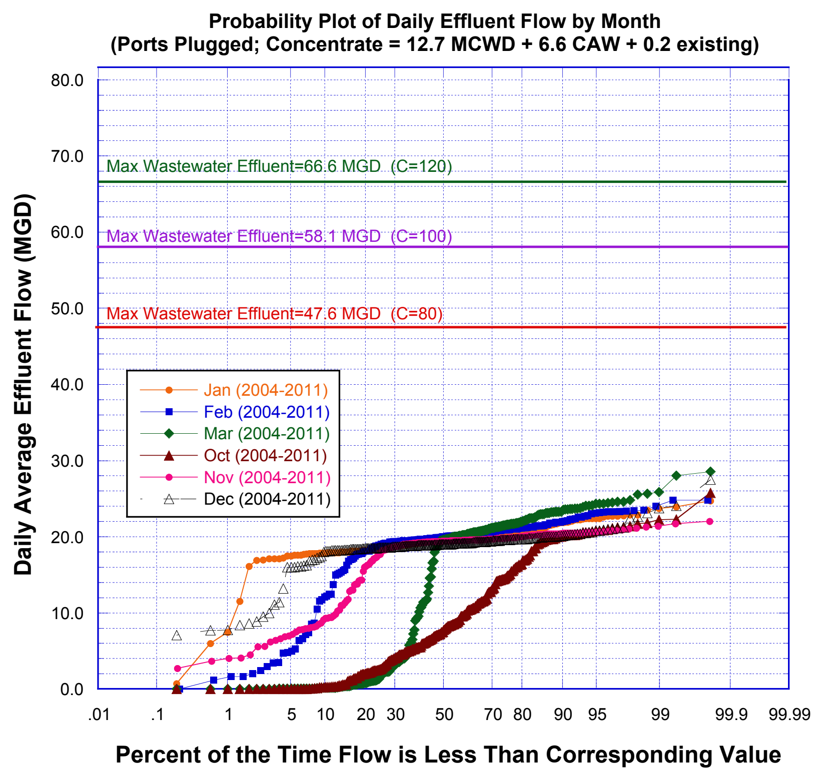


Figure 4.2. Average and range of daily effluent flows (MGD) to the outfall, by month.



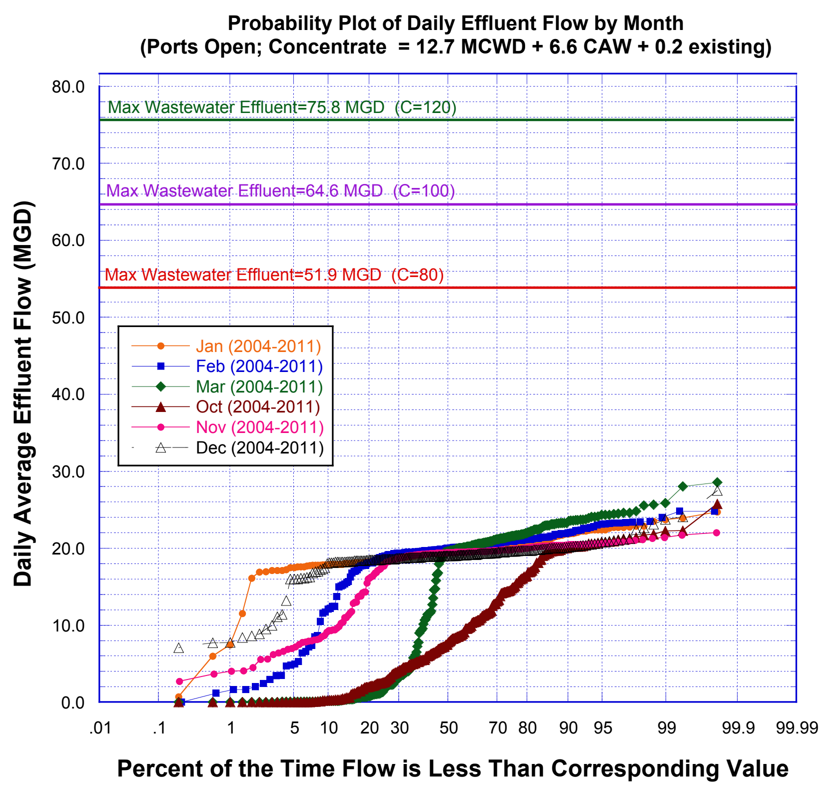
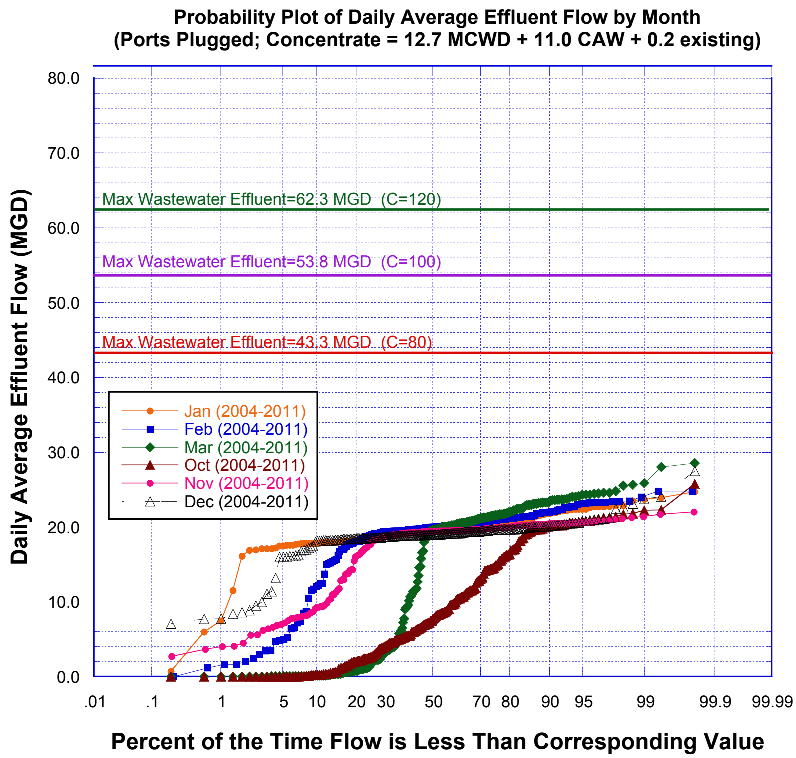


Figure 4.3. Probability plots of daily average effluent flows, by month, in relation to calculated maximum effluent flows summarized in Table 3.4 for Scenario 1 (CAW concentrate flow is 6.6 MGD; Ports Plugged-Top, Ports Open-Bottom).



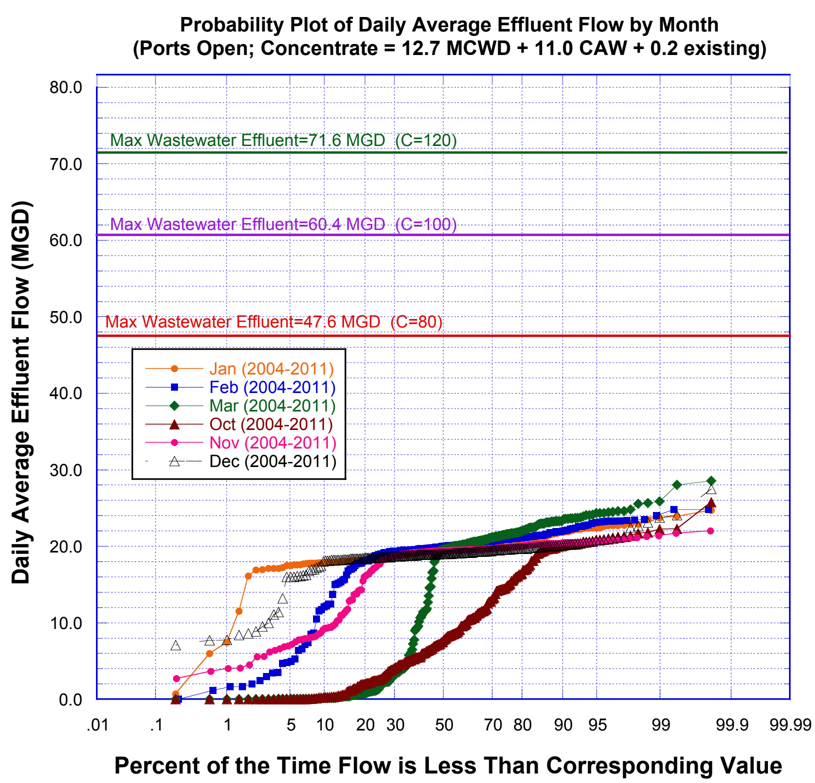
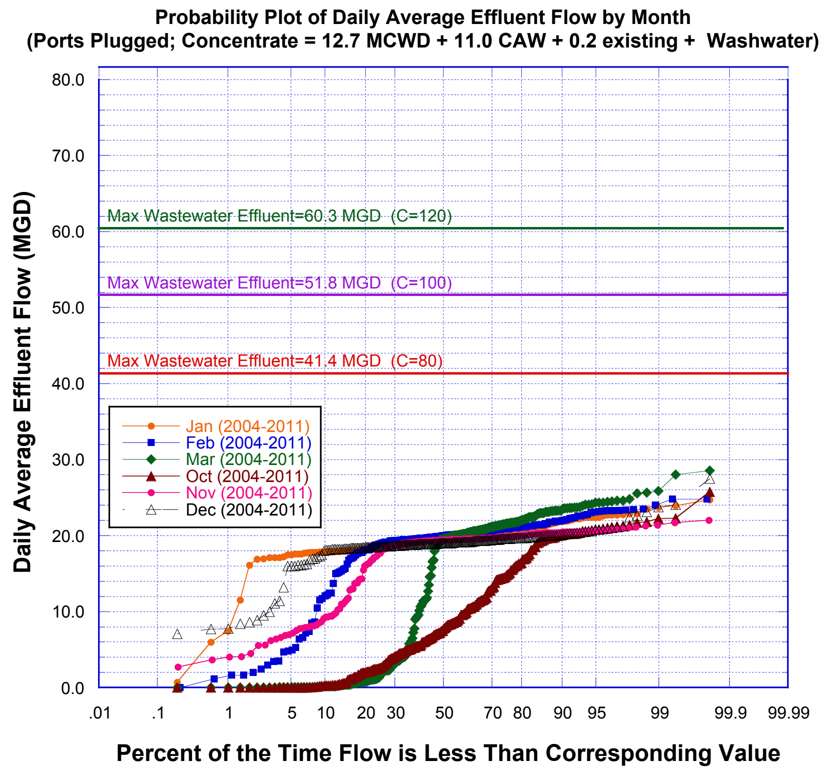


Figure 4.4. Probability plots of daily average effluent flows, by month, in relation to calculated maximum effluent flows summarized in Table 3.4 for Scenario 2 (CAW concentrate flow is 11.0 MGD; Ports Plugged-Top, Ports Open-Bottom).



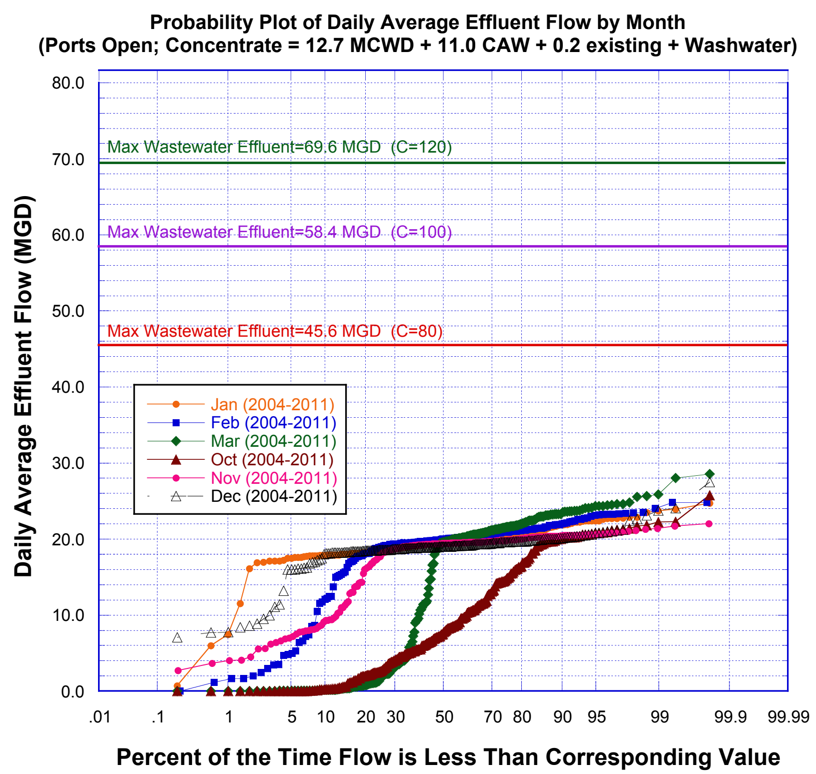


Figure 4.5. Probability plots of daily average effluent flows, by month, in relation to calculated maximum effluent flows summarized in Table 3.4 for Scenario 4 (CAW concentrate flow is 11.0 MGD plus RO pretreatment washwater; Ports Plugged-Top, Ports Open-Bottom).

4.3 Outfall Capacity Compared with Daily Peak Effluent Flows

The next points to consider are:

- Will the outfall capacity be exceeded for periods of the day when effluent flows peak?
- If yes, what is the typical duration of those exceedances, and what size storage tank might be required for holding the brine during periods of peak secondary effluent flows?

Figure 4.6 shows the average and range of instantaneous peak flows through the WWTP, for each month. For the worst-case scenario, with ports plugged and C=80, a maximum effluent flow of 43.3 MGD was calculated (no RO pretreatment washwater). From Figure 4.6, we find that outfall capacity exceedance is possible each month, assuming the SVRP is off-line.

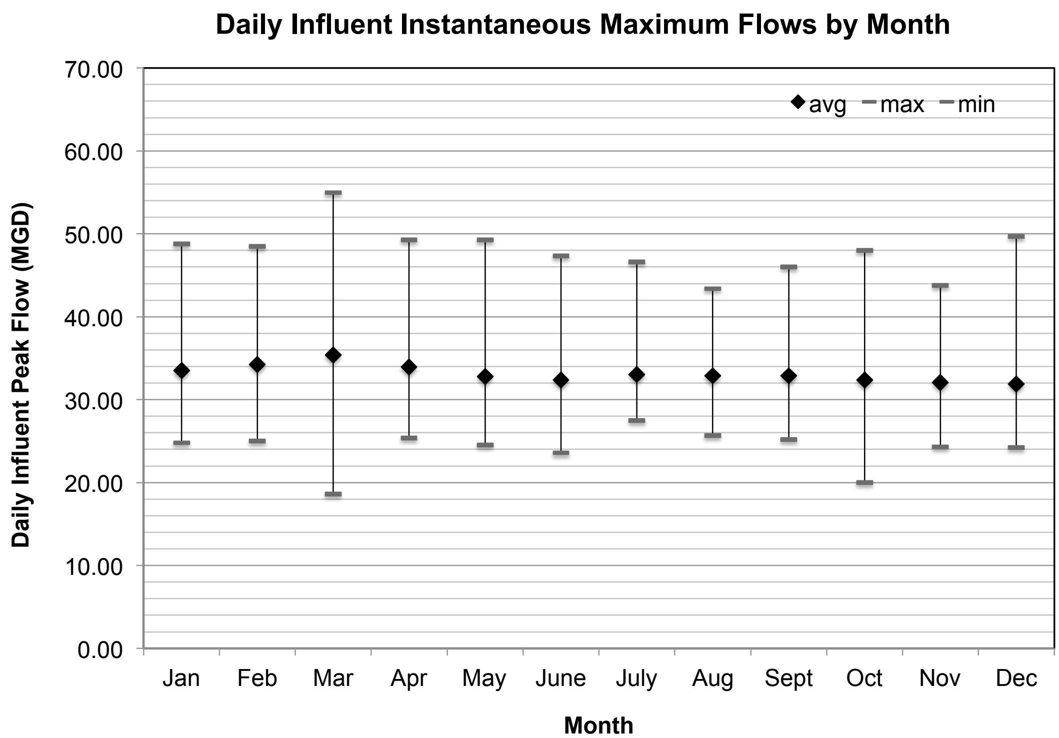


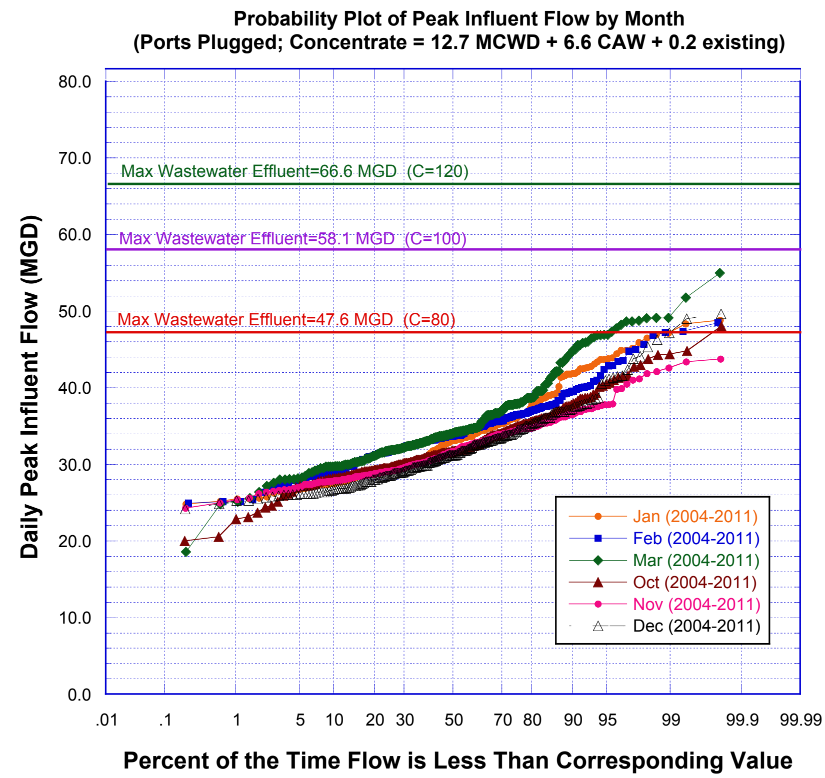
Figure 4.6. Average and range of daily influent flows (MGD) to WWTP, by month.

To assess the frequency of outfall capacity exceedance, probability plots of daily peak influent flows for October through March, the period when the SVRP is potentially off-line, are shown in Figures 4.7 through 4.10 in relation to the calculated maximum effluent flows for the different C values and different test scenarios. Results indicate:

- Higher peak flows occur in March.

- No excursions occurred for a C of 120, and very few excursions (always less than 1% of the time) occurred for a C of 100.
- Operating with the ports open increases available outfall capacity and significantly reduces the frequency of flow exceedance.

The frequency of exceedance for the different test scenarios, by month, is summarized in Table 4.2.



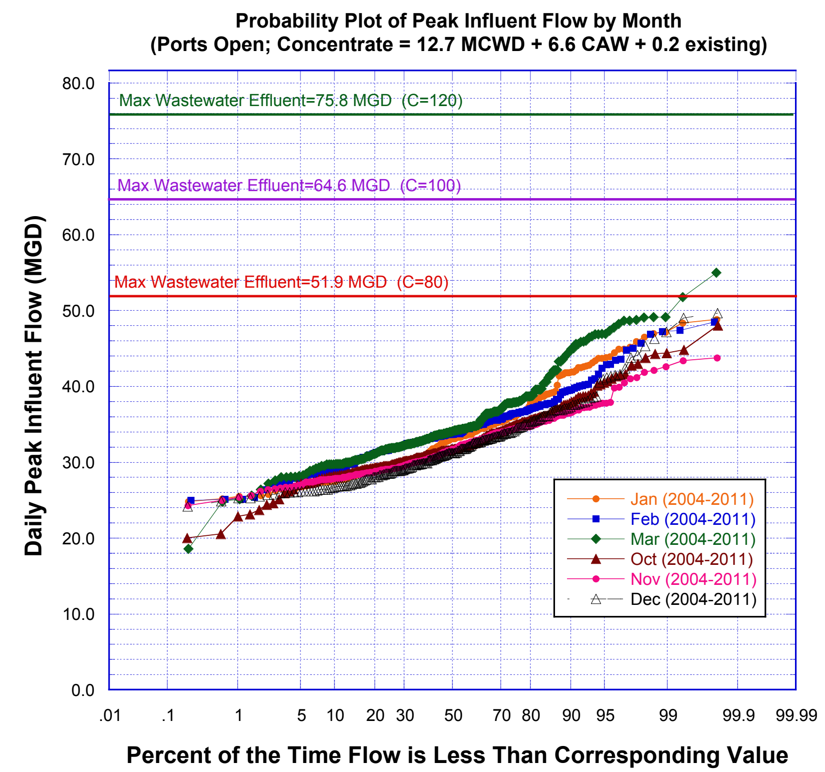
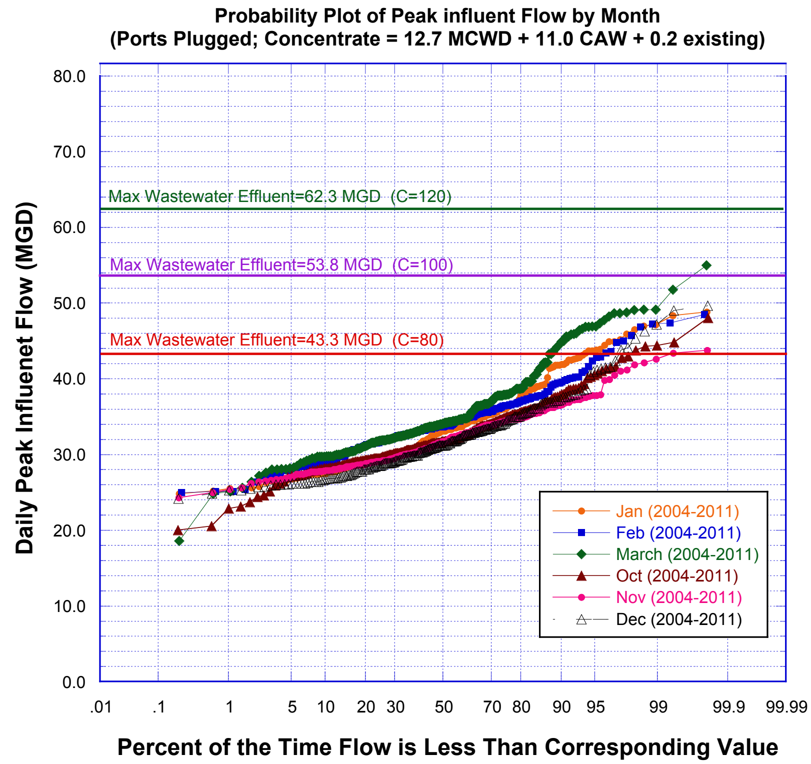


Figure 4.7. Probability plots of daily peak influent flows, by month, in relation to calculated maximum effluent flows summarized in Table 3.4 for Scenario 1 (CAW concentrate flow is 6.6 MGD; Ports Plugged-Top, Ports Open-Bottom).



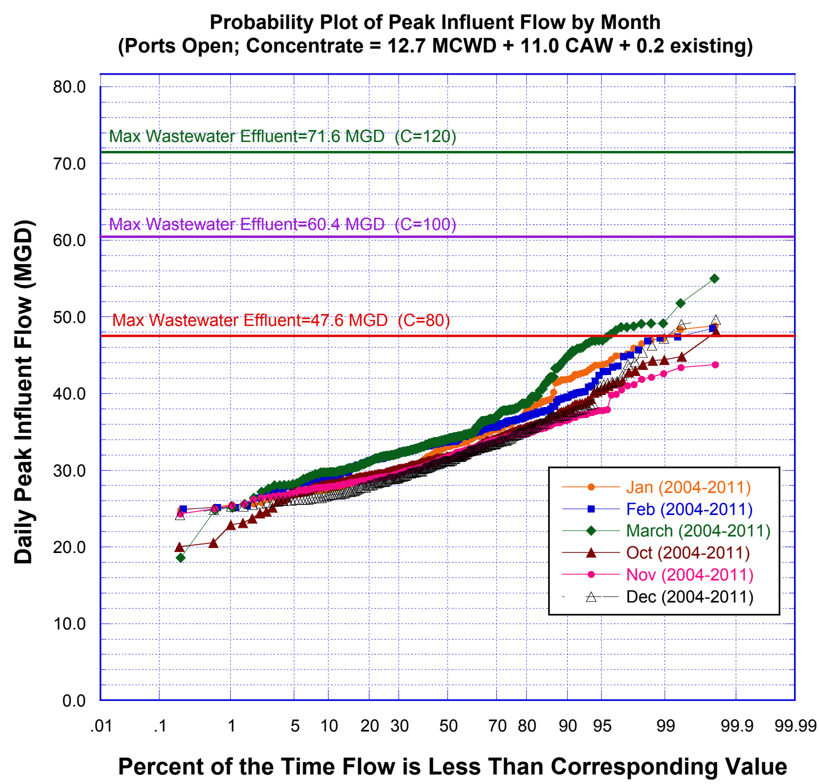
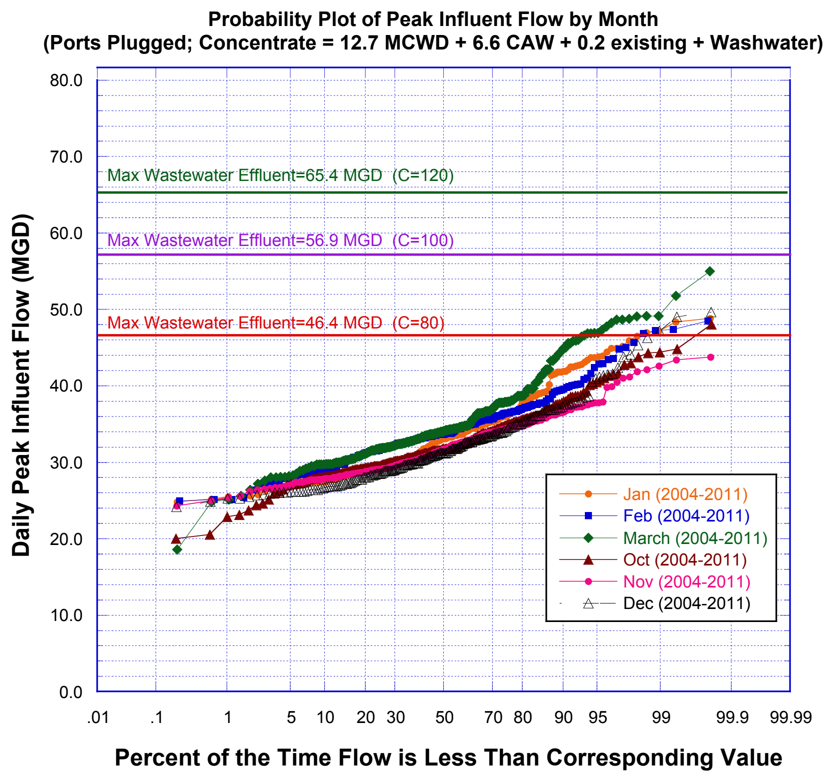


Figure 4.8. Probability plots of daily peak influent flows, by month, in relation to calculated maximum effluent flows summarized in Table 3.4 for Scenario 2 (CAW concentrate flow is 11.0 MGD; Ports Plugged-Top, Ports Open-Bottom).



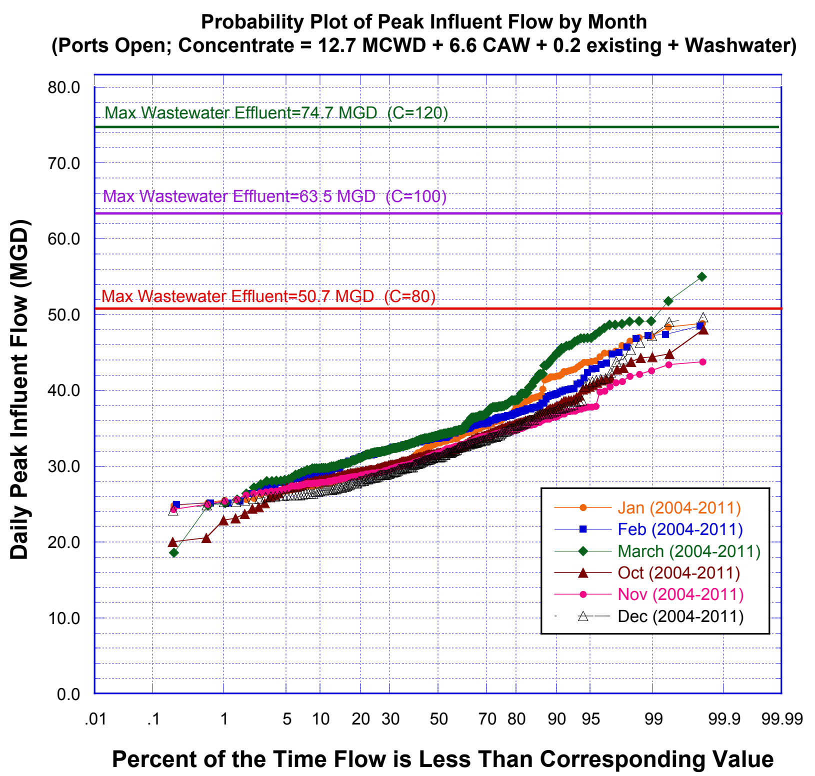
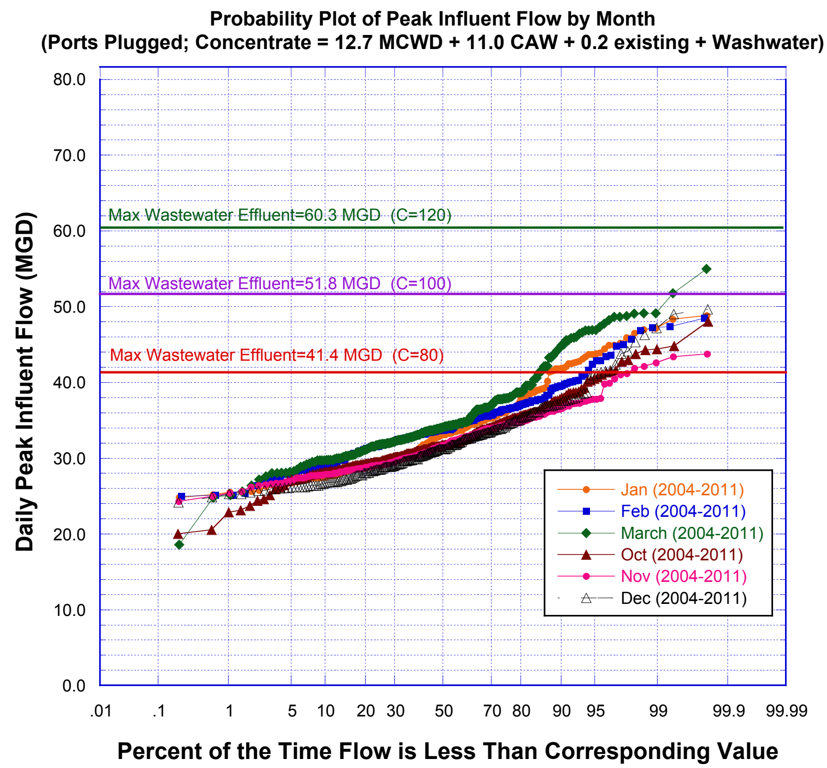


Figure 4.9. Probability plots of daily peak influent flows, by month, in relation to calculated maximum effluent flows summarized in Table 3.4 for Scenario 3 (CAW concentrate flow is 6.6 MGD plus RO pretreatment washwater; Ports Plugged-Top, Ports Open-Bottom).



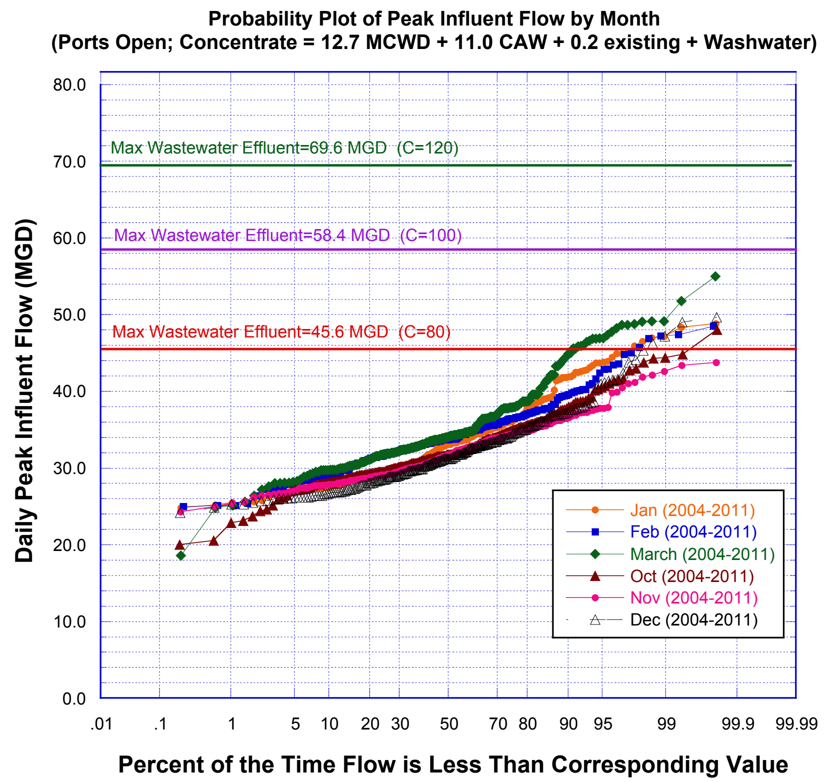


Figure 4.10. Probability plots of daily peak influent flows, by month, in relation to calculated maximum effluent flows summarized in Table 3.4 for Scenario 4 (CAW concentrate flow is 11.0 MGD plus RO pretreatment washwater; Ports Plugged-Top, Ports Open-Bottom).

Table 4.2. Average Monthly Exceedance of Calculated Maximum Effluent Flow (C=80).

Scenario	Ports Plugged			Ports Open		
	Brine Flow (MGD)	Maximum Wastewater Effluent Flow; C=80 (MGD)	Average Exceedance per Month (%)	Brine Flow (MGD)	Maximum Wastewater Effluent Flow; C=80 (MGD)	Average Exceedance per Month (%)
1	**19.5 MGD** (12.7 MGD MCWD + 6.6 MGD CAW + 0.2 MGD Existing)	**47.6 MGD**	Jan – 1.5% Feb – 1.5% Mar – 5% Oct. – <1% Nov – 0% Dec – 1%	**19.5 MGD** (12.7 MGD MCWD + 6.6 MGD CAW + 0.2 MGD Existing)	**51.9 MGD**	Jan – 0% Feb – 0% Mar – <1% Oct. – 0% Nov – 0% Dec – 0%
2	**23.9 MGD** (12.7 MGD MCWD + 11.0 MGD CAW + 0.2 MGD Existing)	**43.3 MGD**	Jan – 6.5% Feb – 4.5% Mar - 12.5% Oct. – 2% Nov – 1% Dec – 3%	**23.9 MGD** (12.7 MGD MCWD + 11.0 MGD CAW + 0.2 MGD Existing)	**47.6 MGD**	Jan – 2% Feb – 2% Mar – 5% Oct. – <1% Nov – 0% Dec – 1%
3	**19.5 MGD + Wash-water** (12.7 MGD MCWD + 6.6 MGD CAW + 0.2 MGD Existing)	**46.4 MGD**	Jan – 2% Feb – 2% Mar – 7.5% Oct. – <1% Nov – 0% Dec – 1.5%	**19.5 MGD + Wash-water** (12.7 MGD MCWD + 6.6 MGD CAW + 0.2 MGD Existing)	**50.7 MGD**	Jan – 0% Feb – 0% Mar – <1% Oct. – 0% Nov – 0% Dec – 0%
4	**23.9 MGD + Wash-water** (12.7 MGD MCWD + 11.0 MGD CAW + 0.2 MGD Existing)	**41.4 MGD**	Jan – 12.5% Feb – 6.5% Mar – 15% Oct. – 5% Nov – 3% Dec – 5%	**23.9 MGD + Wash-water** (12.7 MGD MCWD + 11.0 MGD CAW + 0.2 MGD Existing)	**45.6 MGD**	Jan – 3% Feb – 3% Mar – 9% Oct. – <1% Nov – 0% Dec – 2%

Using March - Scenario 2 as an example, the data show that outfall capacity exceedance occurs, on the average, 12.5% of the time each March, or roughly 4 days.

4.4 Estimated Duration of Peak Effluent Flows

Under worst case conditions—C=80, ports plugged, and CAW concentrate flows of either 6.6 MGD or 11.0 MGD—the data indicate the outfall capacity will be exceeded some small portion of the day in most months between October and March. The greatest probability of flow exceedance occurs in March.

To understand the duration of the peak secondary effluent flows, when the addition of CAW brine in the outfall pipeline would exceed outfall capacity, diurnal curves of influent flow collected every minute were prepared for several days when peak flows greater than 40 MGD occurred. Only the months of October through March were considered, when the SVRP could be off-line. The duration of the peak was estimated from the diurnal curves. The influent flow of 40 MGD was selected as the definition of a "peak" flow occurrence because (1) it is greater than the "average" peak influent flow of roughly 32 MGD (shown in Figure 4.6) and (2) it is just below the worst-case calculated maximum secondary effluent flow of 41.4 MGD for Scenario 4, with 12.7 MGD MCWD brine plus 11.0 MGD CAW brine plus RO pretreatment washwater, with ports plugged and C=80.

In reviewing the historical data provided by MRWPCA, most of the days with instantaneous peak flows above 40 MGD occurred between 2004 and 2007, and most of the minute flow data for that period of record has been archived and is not readily available (B. Holden, personal communication). Minute flow data were available for January 2006, a month with several days of peak flow above 40 MGD, as well as all days in January – March of 2009 through 2012. Diurnal curves were plotted for select days during the period when minute data was available, and several are shown in Figure 4.11 below.

When examining the minute instantaneous flow data, it was noticed that in many cases the peak influent flow in the dataset of minute data did not match the daily peak instantaneous influent flow reported in the 2004-2011 data spreadsheets provided by MRWPCA. Generally, the peak flows reported in the 2004-2011 spreadsheets were slightly larger than the peak flows measured with the minute data. For the purpose of this analysis, the numbers in the 2004-2011 data spreadsheets are assumed correctly representative of instantaneous peak flows, and the minute data will be used to assess peak flow duration, even if peak flows between the two datasets do not match.

The diurnal flow curve for three days when instantaneous peak flows exceeded 40 MGD are shown in Figure 4.11. On January 9, 2006 and October 27, 2010, the peak influent flow was very brief, lasting only a minute or two. On October 13, 2009, however, the influent flow clearly exceeded 40 MGD for a period of 2 hours, and was very close and/or over 40 MGD for a period of 6 hours. October 13, 2009 is assumed to be representative of a worst-case peak flow day. Therefore, in a conservative assessment of peak flow duration and because only limited "minute" data were available for review, the worst-case peak flow duration is assumed to be 6 hours. Sizing of the brine storage tank should be based on this 6-hour peak flow duration.

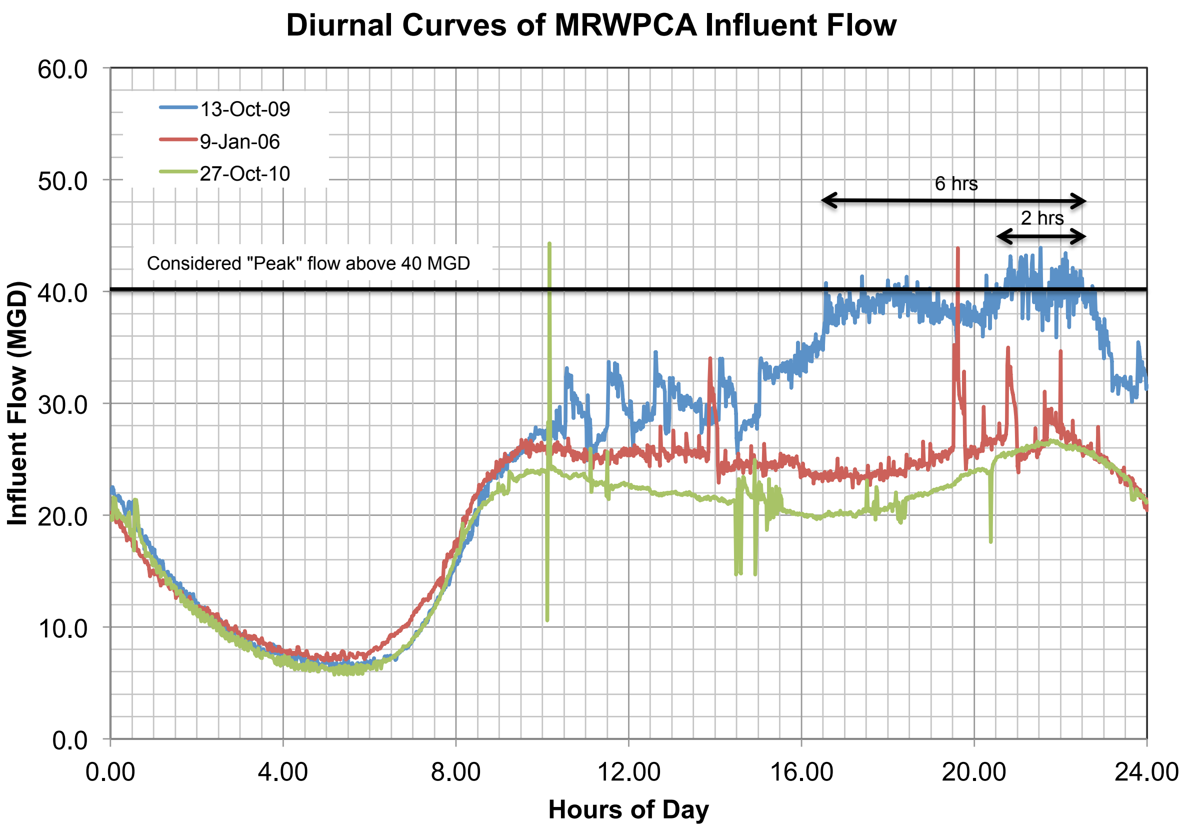


Figure 4.11. Diurnal curves of minute instantaneous influent flows to the WWTP on selected days, with peak flows greater than 40 MGD.

5 - ENGINEERING ALTERNATIVES FOR STORAGE OR DISCHARGE OF EXCESS BRINE FLOW AND RECOMMENDATIONS

When comparing outfall capacity with average daily effluent flows for the different brine scenarios (Figures 4.3 – 4.5), the outfall has sufficient capacity to carry the combined effluent plus brine. However, when comparing outfall capacity with daily peak influent flows (Figures 4.7 – 4.10), the combined flow has the potential to exceed the outfall capacity, particularly for the worst-case scenario with a C of 80 and all outfall ports plugged. March had the highest peak daily effluent flows and the highest percentage outfall capacity exceedance, in comparison with the other winter months, as summarized in Table 4.2.

For the scenario where the ports are plugged, C=80, and the outfall pipeline is carrying peak flows of secondary effluent plus CAW and MCWD concentrate flows, model calculations indicate the outfall capacity occasionally will be exceeded. The potential for capacity exceedance is significantly reduced or non-existent for the scenarios with all ports open. Also, if the "true" C value is greater than the assumed worst-case scenario of C=80, the probability of exceeding outfall capacity is greatly diminished.

The following recommendations are offered as CAW plans for its new RO desalination facility:

- **Inspect the outfall.**

  Presently, the condition of the outfall is not known. In agreement with CH2M-Hill's recommendation (August 2010), Trussell Technologies also recommends an initial inspection of the outfall (i.e., pipeline, vaults, diffuser, ports, valves, etc.) to establish baseline corrosion and scale conditions as well as future inspections to monitor outfall deterioration. This inspection recommendation is described in detail in the August 2010 CH2M-Hill TM.

- **Conduct hydraulic tests on the outfall pipeline.**

  Hydraulic tests should be conducted to calibrate headloss through the outfall. Both head and flow should be measured through the pipeline, at several different flow rates, to allow accurate calculation of the hydraulic characteristic, ø, shown in Equation 3-2. Because ø characterizes all components of headloss through the outfall, once calculated from field measurements, it can be used to more accurately calculate the outfall's hydraulic capacity (Equation 3-4) for the range of flow rates considered in this TM.

- **Estimate the cost of opening all ports along the pipeline.**

  Opening the ports along the diffuser section of the pipeline will allow higher flows through the outfall. The cost of opening and retrofitting the 42 currently plugged ports in the 60-inch diffuser section should be included in CAW's estimated cost of the planned RO desalination facility.

  As part of NPDES permitting requirements, MRWPCA will consider modifications to reconfigure the existing ports along the diffuser to point upward, which will provide greater dispersion of the discharge with seawater. Opening the plugged ports concurrent with the MRWPCA possible modifications will be less costly than independently arranging for a diving and construction crew to open the ports.

- **Estimate the cost of a storage tank to hold 6 hours of brine flow during periods of peak secondary effluent flows.**

  Analysis of peak secondary effluent flows in comparison with calculated maximum allowed effluent flows (Figures 4.7 through 4.10) indicated outfall capacity occasionally will be exceeded when the outfall conveys both MCWD and CAW concentrate along with the WWTP's secondary effluent. The duration of peak secondary flows through the outfall were shown in Figure 4.11. Reviewing data from the assumed worst-case peak flow day indicates that a brine storage tank sized to contain 6 hours of concentrate flow should be more than adequate to meet storage needs during periods of peak effluent flow.

6 - REFERENCES

Brater, E.F. and King, H.W. 1976 HANDBOOK OF HYDRAULICS – For the Solution of Hydraulic Engineering Problems, 6th Edition.

CH2M-Hill, March 4, 2010, *MRWPCA Outfall Hydraulic Flow Analysis*, Draft Technical Memorandum.

CH2M-Hill, August 3, 2010, *MRWPCA Outfall Hydraulic Flow Analysis*, Technical Memorandum.

Holden, B., April 2012, Personal Communication.

Trussell Technologies, March 25, 2010, *Impact of MCWD Desal Concentrate on the Hydraulic Capacity of the MRWPCA Outfall*, Technical Memorandum.

ATTACHMENT 6

MRWPCA-MPWMD-CAL AM GROUNDWATER REPLENISHMENT PROJECT PLANNING TERM SHEET AND MEMORANDUM OF UNDERSTANDING TO NEGOTIATE IN GOOD FAITH

This Groundwater Replenishment Project Planning Term Sheet And Memorandum of Understanding To Negotiate In Good Faith ("GWR MOU") is entered into as of April 20, 2012, by and between the Monterey Regional Water Pollution Control Agency, a joint powers authority ("MRWPCA"), the Monterey Peninsula Water Management District, a California special act district ("MPWMD"), and the California-American Water Company ("Cal Am"), an investor-owned water utility, collectively the "Parties", based upon the following facts, intentions and understandings of the Parties.

I. BACKGROUND

A. MRWPCA owns and operates a wastewater collection and treatment system in northern Monterey County, including the Regional Treatment Plant ("RTP") and the associated ocean outfall ("Outfall"). From the RTP, MRWPCA produces treated wastewater that has the potential for reuse;

B. MPWMD was created by the California Legislature in 1977 for the purposes of "conserving and augmenting the supplies by integrated management of ground and surface water supplies, for control and conservation of storm and wastewater, and for the promotion of the reuse and reclamation of water." The MPWMD's specific functions are "management and regulation of the use, reuse, reclamation, conservation of water and bond financing of public works projects." It is authorized to issue bonds, assess charges for groundwater enhancement facilities, levy assessments on real property and improvements, and "fix, revise, and collect rates and charges for the services, facilities, or water furnished by it";

C. Cal Am is an investor-owned water utility regulated by the California Public Utilities Commission ("CPUC") that serves retail customers in the Monterey Peninsula. Cal Am has been ordered by the State Water Resources Control Board to significantly reduce its diversions from the Carmel River, its largest source of water supply, on a schedule that will result in Cal Am being able to divert only 30 percent of its historical draw from the Carmel River by December 31, 2016. Cal-Am requires additional sources of water to serve Cal Am's Monterey Peninsula customers. CPUC approval for certain aspects of such additional water supplies is required.

D. The CPUC previously approved Cal Am's participation in the "Regional Project," in conjunction with the Monterey County Water Resources Agency and the Marina Coast Water District (Decision 10-12-016, December 2, 2010.) The Regional Project was intended, among other things, to fulfill Cal Am's need for additional water supplies. However, Cal Am has withdrawn from participation in that project, and is seeking alternative approaches to meet its needs.

E. The Seaside groundwater basin ("Seaside Basin") is in a state of overdraft, and rights to water and pumping thereof have been adjudicated by the Monterey Superior Court. The Seaside Basin is governed by a Watermaster appointed by the Court.

F. MPWMD and Cal Am have an existing aquifer storage and recovery project ("ASR") which involves the injection of water into the Seaside Basin, and its recovery for the benefit of Cal Am. This initial phase ("ASR Phase 1") uses water diverted from the Carmel River, which is injected and extracted using two existing wells.

G. MRWPCA treats wastewater at the RTP, creating a potential source of water supply.

H. The parties believe that an additional increment of water supply should be generated for the benefit of Cal Am and its customers, many of whom are within the service areas of MPWMD and MRWPCA, by conveying advanced treated wastewater from the MRWPCA to the Seaside Basin, where it could be injected for storage and subsequent recovery by Cal Am ("GWR Project").

I. There would be substantial benefits of such a Groundwater Replenishment Project, including but not limited to:

- Drought resistant element of water supply portfolio;
- Cost-effective water supply; and
- Diversification of Cal Am's water supply portfolio

- There are also other benefits to this project, including but not limited to:
    - i. Improved water quality in Monterey Bay
    - ii. Advance the State of California's recycled water policies;
    - iii. Reuse of water otherwise discharged to the ocean;
    - iv. Lower carbon footprint relative to desalination;

J. The Parties intend by this GWR MOU to enable planning and environmental evaluation of a groundwater replenishment project by the following:

- to commit themselves to evaluate the ways in which a groundwater replenishment project could be effectively accomplished;
- to commit themselves to negotiate in good faith to reach agreement on such a project, should it be deemed viable;
- for MRWPCA to commit to act as lead agency to achieve California Environmental Quality Act ("CEQA") compliance for such a project, should it be deemed viable;
- for MPWMD to assist MRWPCA in providing the necessary financial support for the foregoing planning and CEQA compliance activities, subject to Recital M, below; and
- to identify non-binding preliminary terms of a GWR project agreement, which will assist in focusing the development of a GWR project responsive to the Parties' capabilities and needs.

K. Except as set forth in Recital J above, the terms set forth in this GWR MOU are the Parties' preliminary concept of terms that may be included in future agreements by and among some or all of the Parties ("GWR Agreements".) They are not intended to be, nor should they be considered as, binding on the Parties.

L. None of the Parties intends by this GWR MOU to commit itself, or the other Parties, to a particular course of action, other than as set forth in Recital J above. The Parties reserve their discretion to evaluate and determine the feasibility or viability of any GWR Project, as well as project impacts, alternatives and mitigation measures, including but not limited to not proceeding with the GWR Project.

M. MPWMD financial support for GWR described in Recital J above is contingent upon successful implementation of a new revenue collection mechanism during the 2012-13 fiscal year.

II.
BINDING TERMS REGARDING PROCESS TO EVALUATE AND IF FEASIBLE DEVELOP A GROUNDWATER REPLENISHMENT PROJECT

1. MRWPCA

A. MRWPCA is anticipated to be the source of the recycled water supply. MRWPCA would apply additional treatment to wastewater from the RTP, convey that water to the Seaside Basin, and inject it into the aquifer, thus making an additional source of water available for use by Cal Am and its customers.

B. MRWPCA will in good faith commit to evaluate its resources and capabilities with respect to the feasibility of performing the foregoing functions.

C. In the event that a feasible project is identified, MRWPCA will act as lead agency pursuant to CEQA, and will prepare or have prepared an environmental document pursuant to CEQA to evaluate the environmental impacts of such a GWR Project. If MRWPCA chooses to implement a GWR Project, MRWPCA will adopt or certify an environmental document – including any necessary supplements or addenda thereto (collectively "CEQA Documents") – that in its judgment complies with CEQA. MRWPCA will use funding provided by MPWMD, in addition to its own funds, for this effort.

D. MRWPCA will negotiate in good faith with the other Parties to develop GWR Agreements acceptable to all Parties, which agreements will be consistent with the CEQA Documents. The Parties' goal is that such agreement will be complete and fully executed in a timeframe which will enable the GWR Project to be operational such that water can be made available to Cal Am on the schedule set forth by the SWRCB.

E. MRWPCA expressly retains its discretion with respect to whether it will implement a GWR Project or enter into a GWR Agreement, and on what terms. Nothing in this agreement shall be construed as limiting MRWPCA's obligation to consider any and all alternatives, including the "no project" alternative, and any and all mitigation measures, and to make the requisite findings, in the above-referenced CEQA process.

2. MPWMD

A. MPWMD will provide matching funding for MRWPCA and MPWMD GWR evaluation, planning, pre-design, and environmental review costs for the GWR derived from its new revenue collection mechanism implemented for the 2012-13 fiscal year. The Parties anticipate that MPWMD will contribute 50% of MRWPCA's actual GWR related costs, which 50% is currently estimated to be $1,036,550 in FY 2012-13 and $1,469,200 in FY 2013-14. Initially within 90 days after MPWMD's implementation of its new revenue collection mechanism for FY 2012-13, and by April 1 of each following year, the MRWPCA and MPWMD will meet and confer to review and must agree upon the Project budget for the following fiscal year. During a fiscal year, upon presentation to MPWMD by MRWPCA of invoices representing Project expenditures, MPWMD will remit to MRWPCA within 60 days an amount representing 50% of the expenditure. However, if required by MPWMD's new revenue collection mechanism, invoices presented before November 1 shall be paid no later than December 31, and invoices presented before May 1 shall be paid no later than June 1.

B. If MPWMD determines that a GWR Project is viable, MPWMD will negotiate in good faith with the other Parties to develop a GWR Agreement acceptable to all Parties, which agreement will be consistent with the above-described CEQA Documents. The Parties' goal is that such agreement will be complete and fully executed in a timeframe which will enable the GWR Project to be operational such that water can be made available to Cal Am on the schedule set forth by the SWRCB.

C. In the event that GWR Agreements are executed, MPWMD will undertake the permanent financing of GWR with long-term debt, secured by either revenues of MPWMD or payments to be received under a water purchase agreement with Cal Am, or both. Proceeds of the financing, or revenues received from water sales, will be used to reimburse MRWPCA for its past out-of-pocket contributions of MRWPCA for a GWR Project (any unreimbursed costs including the MRWPCA investment before execution of this MOU). Such permanent financing will be undertaken when and if the Parties agree that the Project shall proceed to design and construction and requires funding in excess of that reasonably available from pay-as-you-go monies, notwithstanding that MRWPCA and MPWMD may decide to undertake more than one permanent financing in order to facilitate a pilot project or construction in phasing.

D. MPWMD expressly retains its discretion with respect to whether it will enter into any GWR Agreement, and on what terms; as well as its discretion to consider the CEQA Documents in a manner fully consistent with its role as a responsible agency under CEQA.

3. CAL AM

A. If each Party independently agrees that a GWR Project is viable, Cal Am will negotiate in good faith with the other Parties to develop a GWR Agreement acceptable to all Parties, which agreement will be consistent with the above-described CEQA Documents. The Parties' goal is that such agreement will be complete and fully executed in a timeframe which will enable the GWR to be operational such that water can be made available to Cal Am on the schedule set forth by the SWRCB.

B. Subject to ratemaking treatment approved by the CPUC and terms acceptable to Cal Am, Cal Am will enter into a GWR Agreement with MPWMD, with minimum annual purchase obligations of water at a price sufficient to pay the annual costs of debt and the costs of the GWR Project, including without limitation, operations, maintenance, repair, replacement, regulatory compliance, and administration costs, associated with the portion of the GWR Project's output purchased by Cal Am.

C. As the CPUC regulated entity, Cal Am will have the primary role with respect to the CPUC, including but not limited to, obtaining the approvals required by that agency.

D. Cal Am will bear its own costs with respect to all of its efforts in furtherance of realizing a GWR Project.

4. Good Faith Commitment

A. In order to explore the potential public and private benefits of this project, and to ensure that each Party's efforts in furtherance of realizing such a project are well spent, the Parties hereby make a good faith commitment to pursue development of such a GWR, in compliance with all applicable laws. The Parties shall meet with the goal of reaching agreement by June 30, 2012, on the criteria for determining the viability of a GWR Project, which criteria shall include but not be limited to (1) providing for a schedule and for adjustments of same for the timeframe within which the GWR Project will be operational, and (2) a process and timeframe for verifying that the range of estimated costs for GWR Project water are consistent with the MRWPCA current cost estimates of $2500-$3000 per acre foot.

5. Term and Termination

A. This GWR MOU shall expire upon the earlier of (1) full execution of a GWR Agreement, or (2) upon written agreement of the Parties to terminate.

B. Upon thirty days advance written notice to all Parties, and upon the withdrawing Party's good faith determination that further participation is not feasible for any reason, any Party may withdraw from this MOU. If two Parties withdraw, this MOU is terminated.

C. Any obligation to pay survives termination until such payment is made in full.

III.
NON-BINDING PRELIMINARY TERMS

The provisions in this Section III set forth the Parties' preliminary understanding that may be included in a final project agreement or agreements ("GWR Agreement"). These provisions are not intended to be, nor should they be considered as, binding on the Parties. Each Party expressly retains discretion with respect to whether it will enter into a GWR Agreement, or on what terms.

1. The GWR Project is intended by the Parties to provide approximately 3500 AF of advanced treated wastewater ("Replenishment Water") that can be made available, conveyed to the Seaside Basin and injected therein using new wells, by MRWPCA. MRWPCA will design, construct, own and operate the facilities to convey the water from the RTP and inject it into the Basin.

2. Upon payment by MPMWD to MRWPCA as set forth below, MPWMD shall take title to the Replenishment Water that has been injected into the aquifer. MPWMD will make the Replenishment Water available for purchase by Cal Am for the purpose of serving Cal Am's retail water customers in the Monterey Peninsula area.

3. Upon permanent financing, MPWMD will pay to MRWPCA the full amount of MRWPCA's costs to design, construct, obtain regulatory approvals, treat, deliver and inject the Replenishment Water. The commodity cost for the Replenishment Water shall recover at minimum all costs associated with GWR operation, maintenance, repair, replacement and administration, including regulatory compliance.

4. MRWPCA, MPMWD, and Cal Am shall coordinate the scheduling of injection of recycled water, Carmel River water, and any other water.

5. Subject to CPUC ratemaking approval, Cal Am shall enter into a contract to purchase the Replenishment Water from MPWMD. This contract will inter alia promptly

reimburse MPWMD for the following prudently incurred costs: MPWMD's annual cost of debt service, Replenishment Water payments to MRWPCA for operations and maintenance, reimburse MRWPCA for any of its project development costs not previously reimbursed by MPWMD, as well as for MPWMD's costs.

6. The parties anticipate that terms addressing the following non-exhaustive list of topics will also be needed:

- Additional Financial Provisions;
- No Partnership, Joint Venture or JPA.
- Coordination with others
- CPUC approvals
- Regulatory Compliance
- Storage and Recovery Agreement with Seaside Basin Watermaster
- Brine Disposal
- Additional Acts
- Representations and Warranties.
- Litigation; Cooperation in Litigation
- Force Majeure
- No Third Party Beneficiaries.
- Dispute Resolution
- No Assignment
- Default, Cure and Remedies
- Attorneys Fees
- Notices
- Miscellaneous Provisions

The Parties re-confirm that neither a GWR Agreement, nor any replenishment project, can proceed unless and until the Parties have negotiated, executed and delivered mutually acceptable GWR Agreements, with any public agency action performed in compliance with CEQA and on other public review and hearing processes, and subject to all applicable governmental approvals. The Parties intend by this GWR MOU to inform and focus the work necessary to develop and review a water transfer program, not to pre-determine what that program may be.

WHEREFORE, this GWR MOU was executed by the parties on the date first above written.

MRWPCA

MONTEREY REGIONAL WATER POLLUTION CONTROL AGENCY,

By: ______________________
Ron Stefani, Board Chair
MRWPCA Board of Directors

MPWMD

MONTEREY PENINSULA WATER MANAGEMENT DISTRICT,

By: ______________________
David Stoldt
General Manager

CAL AM

CALIFORNIA AMERICAN WATER COMPANY,

By: ______________________
Robert MacLean
President

ATTACHMENT 7

STATE OF CALIFORNIA EDMUND G. BROWN, Jr., *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

April 18, 2012

Charles J. McKee
County Counsel
County of Monterey
168 West Alisal Street, 3rd Floor
Salinas, California 93901

Re: Monterey County Ordinance 10.72.030(B)

Dear Mr. McKee:

On behalf of the Public Utilities Commission of the State of California ("Commission"), I am writing to inform you of our views regarding the lawfulness of the above-referenced ordinance, as applied to a Commission-regulated, investor-owned utility company such as California American Water Company ("CalAm").

The subject ordinance purports to impose a requirement that the sponsor of any desalination project in Monterey County "[p]rovide assurances that each facility will be owned and operated by a public entity." (Ordinance Sec. 10.72.030(B).)

It is our view that, to the extent this ordinance purports to limit sponsorship of a desalination project only to governmentally-owned enterprises, and more particularly to prohibit such sponsorship by a private, for-profit, investor-owned utility company regulated by our Commission – such as CalAm – the ordinance would be preempted and of no legal validity under settled principles of California law.

Regulation of water utilities like CalAm has been declared to be a matter of statewide concern in California. Under the Constitution and the Public Utilities Code, jurisdiction over such utilities has been vested exclusively with our Commission. Local ordinances such as Section 10.72.030(B) are preempted to the extent they interfere with this Commission's statewide regulation of water utilities. (*See*, e.g., California Constitution, Article XII, §§ 1, 3-4 and 8; Public Utilities Code §§ 216(a); 1001, 2701-2714, 1718-2720, and 2725-2726; *California Water & Telephone Co. v. County of Los Angeles* (1967), 253 Cal.App. 2d 16, at 31; *Harbor Carriers, Inc. v. City of Sausalito* (1975) 46 Cal.App.3d 773, at 775-776; *Southern California Gas Co. v. City of Vernon* (1995), 41 Cal.App.4th 209, at 217.)

We note that a memorandum dated April 1, 2003, authored by your predecessor, then-Acting County Counsel David Nawi, and addressed to the Monterey County Board of Supervisors, contained essentially this same analysis and conclusion, relying on many of the same authorities. Mr. Nawi's memorandum found that, to the extent the above-quoted provisions of Section 10.72.030(B) were interpreted to prohibit sponsorship of a desalination facility by a private company like CalAm, "the County might be preempted from using a 'public entity' requirement to deny Cal-Am a permit to operate the facility." (Nawi Memorandum, p. 5.)

We agree with Mr. Nawi's analysis. We would only add that, in our opinion, the ordinance, as so construed, certainly would be preempted, not merely that it "might" be preempted.

We appreciate your attention to this opinion, and ask that you please share it with the Members of the Monterey County Board of Supervisors.

Yours truly,

FRANK R. LINDH
General Counsel
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, California 94102

cc: Anthony J. Cerasuolo, General Counsel
California American Water Company