REVISED
MEETING OF THE BOARD OF DIRECTORS OF THE
MUNICIPAL WATER DISTRICT OF ORANGE COUNTY
Jointly with the
PLANNING & OPERATIONS COMMITTEE
April 4, 2016, 8:30 a.m.
MWDOC Conference Room 101

P&O Committee:
Director L. Dick, Chair
Director S. Hinman
Director J. Finnegan

Staff: R. Hunter, K. Seckel,
H. De La Torre, K. Davanaugh,
J. Berg

Ex Officio Member: W. Osborne

MWDOC Committee meetings are noticed and held as joint meetings of the Committee and the entire Board of Directors and all members of the Board of Directors may attend and participate in the discussion. Each Committee has designated Committee members, and other members of the Board are designated alternate committee members. If less than a quorum of the full Board is in attendance, the Board meeting will be adjourned for lack of a quorum and the meeting will proceed as a meeting of the Committee with those Committee members and alternate members in attendance acting as the Committee.

PUBLIC COMMENTS - Public comments on agenda items and items under the jurisdiction of the Committee should be made at this time.

ITEMS RECEIVED TOO LATE TO BE AGENDIZED - Determine there is a need to take immediate action on item(s) and that the need for action came to the attention of the District subsequent to the posting of the Agenda. (Requires a unanimous vote of the Committee)

ITEMS DISTRIBUTED TO THE BOARD LESS THAN 72 HOURS PRIOR TO MEETING -- Pursuant to Government Code section 54957.5, non-exempt public records that relate to open session agenda items and are distributed to a majority of the Board less than seventy-two (72) hours prior to the meeting will be available for public inspection in the lobby of the District's business office located at 18700 Ward Street, Fountain Valley, California 92708, during regular business hours. When practical, these public records will also be made available on the District's Internet Web site, accessible at http://www.mwdoc.com.

ACTION ITEMS

1. AWARD PROFESSIONAL SERVICES CONTRACT FOR DOHENY SLANT WELL AND MOBILE TEST FACILITY DECOMMISSIONING

2. AWARD A PROFESSIONAL SERVICES CONTRACT TO BLACK & VEATCH ENGINEERS FOR ENGINEERING AND OPERATIONS ASSISTANCE ON PIPELINES IN ORANGE COUNTY

3. MWDOC'S 2015 URBAN WATER MANAGEMENT PLAN NOTICE OF A PUBLIC HEARING ON MAY 18, 2016

INFORMATION ITEMS (The following items are for informational purposes only – background information is included in the packet. Discussion is not necessary unless a Director requests.)

4. PUBLIC REVIEW OF MWDOC'S DRAFT 2015 URBAN WATER MANAGEMENT PLAN

5. DOHENY DESALINATION PROJECT FOUNDATIONAL ACTION FUNDING PROGRAM REPORT

6. SAN JUAN BASIN AUTHORITY FOUNDATIONAL ACTION FUNDING PROGRAM REPORT

7. RESPONSE TO SOUTH COAST WATER DISTRICT NOTICE OF PREPARATION OF DOHENY OCEAN DESALINATION PROJECT ENVIRONMENTAL IMPACT REPORT

8. STATUS UPDATE ON THE OC RELIABILITY STUDY – APRIL 2016

9. STATUS REPORTS
   a. Ongoing MWDOC Reliability and Engineering/Planning Projects
   b. WEROC
   c. Water Use Efficiency Projects
   d. Water Use Efficiency Programs Savings and Implementation Report

10. REVIEW OF ISSUES RELATED TO CONSTRUCTION PROGRAMS, WATER USE EFFICIENCY, FACILITY AND EQUIPMENT MAINTENANCE, WATER STORAGE, WATER QUALITY, CONJUNCTIVE USE PROGRAMS, EDUCATION, DISTRICT FACILITIES, and MEMBER-AGENCY RELATIONS

BOARD ACTION ITEM (The MWDOC Board will convene as a full Board and may take action as a Board on the following item):

11. **AB 2583 (FRAZIER) – SACRAMENTO SAN JOAQUIN DELTA**

Recommendation: *Adopt "Oppose" position on AB 2583 (Frazier), sign on to Metropolitan Water District's coalition letter, and send a separate letter to the author and members of the Orange County delegation indicating our opposition*

ADJOURNMENT

NOTE: At the discretion of the Committee, all items appearing on this agenda, whether or not expressly listed for action, may be deliberated, and may be subject to action by the Committee. On those items designated for Board action, the Committee reviews the items and makes a recommendation for final action to the full Board of Directors; final action will be taken by the Board of Directors. Agendas for Committee and Board meetings may be obtained from the District Secretary. Members of the public are advised that the Board consideration process includes consideration of each agenda item by one or more Committees indicated on the Board Action Sheet. Attendance at Committee meetings and the Board meeting considering an item consequently is advised.

Accommodations for the Disabled. Any person may make a request for a disability-related modification or accommodation needed for that person to be able to participate in the public meeting by telephoning Maribeth Goldsby, District Secretary, at (714) 963-3058, or writing to Municipal Water District of Orange County at P.O. Box 20895, Fountain Valley, CA 92728. Requests must specify the nature of the disability and the type of accommodation requested. A telephone number or other contact information should be included so that District staff may discuss appropriate arrangements. Persons requesting a disability-related accommodation should make the request with adequate time before the meeting for the District to provide the requested accommodation.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 1

ACTION ITEM
April 20, 2016

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Dick, Hinman, Finnegan)

Robert Hunter, General Manager Staff Contact: Karl Seckel

SUBJECT: **Award Professional Services Contract for Doheny Slant Well and Mobile Test Facility Decommissioning**

STAFF RECOMMENDATION

Staff will bring a recommendation to the P&O Committee that will likely include the option to consider moving this item to another Committee, although the actual recommendation has not yet been developed. Information below provides background on the issue of awarding a contract.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

MWDOC staff met with the five Doheny Desal Participants in December and obtained concurrence to close out the Doheny Desal Project MWDOC has been managing since 2008 under an agreement with all 5 agencies (South Coast, San Clemente, Laguna Beach CWD, City of San Juan Capistrano and Moulton Niguel WD). The concept agreed to was that MWDOC would utilize funding existing from the Project to decommission the slant well and mobile test facility while complying with all of the permits controlling the work at the site, including from the lease with State Parks and permits from the California Coastal

Budgeted (Y/N): Yes	Budgeted amount: $356,000	Core __	Choice ✓
Action item amount:	Line item: 2008 Doheny Desal		
Fiscal Impact (explain if unbudgeted): The entire project for design, permitting, construction and salvage was estimated at $356,000. We will not know the entire costs until such time as the project construction bids have been secured. Additional deposits from the Doheny Participants may be necessary.			

Commission, the State Lands Commissions, the Army Corps of Engineers, the Regional Water Quality Control Board and the Orange County Health Care Agency who oversees well destruction projects in the County. The Doheny Participants, with the exception of South Coast Water District, were not interested in maintaining ownership of any of the facilities and so it was decided that part of the process would be determining a salvage value to dispose of the equipment/materials to bring back value to the Participants and/or to determine a salvage value to be charged to South Coast Water District for the equipment desired (in essence, the salvage value determines a value for South Coast to obtain the equipment or the equipment would be salvaged). To complete the work requires:

- Preparation of plans and specifications for the decommissioning and site restoration work, including compliance with the existing permits (which in many cases requires plans and specs to submit to the permitting entities for review and comment)
- Notice/advertise the decommissioning work and seek public bids
- Award a construction contract
- Monitor the construction work, including having biological monitors and safety inspectors on-site
- Complete the construction contract
- File notice of completion
- Transfer the State Parks Lease to South Coast Water District

MWDOC sent an RFP out to the following engineering, geohydrologists, process specialists and permitting firms to solicit proposals for the decommissioning of the Doheny Slant Well and the Mobile Test Facility. The RFP was also posted to our website. The work requires many facets of work including civil work, well destruction, well inspection and video-logging, preparation of an estimate of salvage value, removal of the mobile test facility and restoration of the site and optional work for inspection of the pump and sampling of biological growth on the well casing. The work also requires close coordination with Doheny State Park and compliance with our existing Lease Agreement. Karl Seckel and Andy Brunhart met directly with the local State Parks staff to discuss our approach; we also conducted a conference call with the regional State Parks staff to discuss the decommissioning work as well as to discuss the ultimate needs of South Coast Water District for implementation of their project. Once the consultant is brought on-board, a kick off meeting will be held directly with the local staff from Doheny State Beach.

A wide mix of firms were contacted including:

- Geoscience Support Services
- GHD
- DDB Engineering, Inc.
- Michael Baker International
- Chambers Group
- Carollo Engineers
- CDM Smith
- SPI
- Dudek
- Richard Slade & Associates
- GTC Geotech

Only one proposal was received and involved teaming from three of the above firms, Geoscience Support Services as the prime, with subconsulting to Chambers Group and Michael Baker International. Staff believes that only one proposal was received because Geoscience has virtually 100% of the slant well expertise in California, consultants are all very busy at this time, the team of Geoscience and Michael Baker International has done a lot of work together in California and Chambers Group was instrumental in much of the prior permitting/construction compliance for the project, supported by a large amount of work towards permitting by Richard Bell while he was project manager. Richard will be lending his expertise through coordination with Karl Seckel, but will not have the primary permitting responsibility for these efforts – they have been delegated to the consultant.

The proposal from Geoscience, et al, met all of the requested requirements of the RFP solicitation and was well prepared. The only concern from staff is that the cost of the effort was higher than anticipated, but we would also note that this is not a simple project. For the decommissioning work, MWDOC agreed to notify the five Doheny Desal agencies of the proposed contract costs prior to initiating or awarding any contracts because they are paying for the work through the retained deposit. Upon notification of the level of the contract, concerns were raised by at least two of the agencies, who requested additional information/negotiation with Geoscience or to seek additional proposals to complete the work. The overall issue identified is that $356,000 was set aside to complete all of the decommissioning work – plans, specifications, permitting and construction work (yet to be awarded), may not be sufficient. Given the costs proposed for the preparation of plans, specifications and for field observations during construction, staff believes it will be difficult to bring the entire project in within this amount and that additional deposit requests will be needed.

In the December “close-out” meeting with the Participants, MWDOC advised them that MWDOC would attempt to secure the work at or less than $356,000, but that if the costs came in higher than the retention amount, we would request additional contributions from the agencies.

Staff had planned on bringing this item forward to the April 4 P&O Committee for review and for Board approval on April 20. Staff will continue working through discussions/negotiations with Geoscience and several of the Participants to attempt to reduce costs where possible and to understand the level of effort required for this project. It is NOT a standard project and is complex from the standpoint of working in the State Park, under conditions dictated by the Coastal Commission and the State Lands Commission. Staff will bring a report to the P&O Committee. One option being considered is to include the contract award at another MWDOC Committee prior to the April 20 Board meeting, if the various issues can be resolved.

Recommendation
To be developed.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 2

ACTION ITEM
April 20, 2016

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Dick, Hinman, Finnegan)

Robert Hunter, General Manager Staff Contact: Karl Seckel

SUBJECT: **Award a Professional Services Contract to Black & Veatch Engineers for Engineering and Operations Assistance on Pipelines in Orange County**

STAFF RECOMMENDATION

Staff recommends the Board of Directors authorize the General Manager to award a contract with Black & Veatch Engineers in an amount not to exceed $25,000.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

MWDOC staff sent out an **Invitation to Submit an SOQ and Input on Engineering and Operations of Pipelines in Orange County** to seven consultants who were prequalified and included on Metropolitan's list of engineering consultants and posted the notice on our website. The purpose of the solicitation was to engage engineering firms experienced with MET's large diameter pipeline design (30" to 78" in diameter, mostly steel), and MET's pipeline specifications, operations, water quality issues, maintenance issues and hydraulic control and hydraulic transients control. The engineering firm was requested to provide assistance to MWDOC in the following areas:

- Examine options and costs for segregating certain reaches of the EOCF#2 pipeline (or other pipelines) from one another, taking into account the potential impact on

Budgeted (Y/N): Yes	Budgeted amount: $25,000 for 15-16	Core ✓	Choice __
Action item amount: $25,000	Line item: 21-701 Outside Consultants		
Fiscal Impact (explain if unbudgeted):			

MET operations and the need to maintain water residence at 3 days or less to preserve the chloramine residual
- Outline the issues, costs and operations of a chlorine or chloramine boost facility to assist maintaining a higher chloramine residual
- Examine what occurs with an outage of a primary local supply source pumping into the EOCF#2 and/or other pipelines due to a pumping outage (surge, pressure relief, protection of the MET and other systems, change of flow in the MET system, etc.)
- Examine potential emergency outage situations where it might be prudent to allow the operations of the pipelines to be re-integrated via valving and interconnections and or pumped interconnections
- Examine options for delivery of water from the EOCF#2 pipeline via existing MET service connections and local flow control facility (as is done today) compared to a REVISED system that would involve:
    - A reverse flow of the EOCF#2 in Reach 4 combined with the bypass of the Coastal Pressure Control Structure and then re-integration of the flows either into Reach 3 of the EOCF#2 for ultimate delivery of water via existing service connections CM-10 and CM-12 (at a pressure up to an HGL of 689 feet); or,
    - Whether a NEW interconnection should be located downstream of CM-10 and/or CM-12 where pressures are reduced to an HGL of 525 feet.
- Conceptual cost estimating of large diameter pipeline construction/replacement costs including estimating remaining useful life and future replacement options
- Outline the needs for surge protection for introducing NEW water sources into pipeline(s)
- Other services related to the operations and maintenance of large diameter pipelines
- MWDOC has water quality expertise under contract that will be made available to the selected consultant (Ed Means via Means Consulting); consultants can provide their own water quality experts

Overall, this work would help with the following projects:
1. Integration of the Poseidon Water
2. Use of the EOCF#2 to move Groundwater in OC
3. Use of other pipelines to move Groundwater in OC (West Orange County Wellfield Project water conveyance)
4. Expansion of the Emergency Services Project to move emergency water to South Orange County

The consultants solicited included:

- AECOM
- Black & Veatch
- Carollo
- CDM Smith
- HDR
- Lee & Ro
- MWH Americas

Proposals were received from Black & Veatch and from Northwest Hydraulic Consultants. Several of the consultants noted potential conflicts of interest with work they have or anticipate from Metropolitan Water District of Southern California and others noted that they are very busy and the magnitude of the work we advertised was not necessarily worth the effort of responding at this time. Staff reviewed both proposals. The Black & Veatch proposal fully met the requirements of the solicitation. Black & Veatch has completed quite a bit of work with Met and would be very helpful to staff. The Northwest Hydraulic Consultants noted in their proposal that they did not meet all of the requirements of the SOQ, but that they would be available for help in any surge or transient analyses required:

> "NHC is a specialty hydraulic engineering firm and does not provide services such as cost estimating for segregating reaches of EOCF#2, water quality and disinfectant residence time analysis, cost estimating for chloramine boost facilities, cost estimating for large diameter pipeline construction/replacement, maintenance of large diameter pipelines, etc., which are also requested in MWDOC's February 23, 2016 Request for Qualifications. However, NHC is willing to work in combination with other engineering firms that MWDOC selects for these services. This Statement of Qualifications describes our qualifications and experience, key personnel, technical approach, and standard billing rates for transient analysis services."

The NHC noted in their proposal that they were responsible for the prior surge analysis completed for Poseidon for connecting the OC-44 line to the EOCF#2. If we get to the point of needing the surge analysis updated, NHC would be a good selection. We are not at that point at this time.

Staff Recommendation

Staff recommends the Board of Directors authorize the General Manager to award a contract with Black & Veatch Engineers in an amount not to exceed $25,000. This level of budget should be sufficient to get work completed on several aspects of the work to move forward in negotiations with MET staff. Other members of the project team include Brian Thomas on financial issues and Ed Means on water quality issues.

Attached are several pipeline schematics of the EOCF#2 and the connecting pipelines and where water may be introduced from the Poseidon Project along with a copy of the B&V proposal.

BLACK & VEATCH
Building a world of difference.

Mr. Karl W. Seckel, P.E.
Assistant Manager/District Engineer
Municipal Water District of Orange County
18700 Ward Street
Fountain Valley, CA 92708

March 18, 2016

Subject: Statement of Qualifications (SOQ)
Services Related to MET Pipelines In Orange County

Dear Mr. Seckel:

The Municipal Water District of Orange County (MWDOC) is currently in conversations with The Metropolitan Water District of Southern California (MET) on how to create projects that introduce "other sources of water" in pipelines that will continue to be predominantly MET water. As described in your Request for Qualifications (RFQ), MWDOC is seeking consulting assistance on the initial phase of this visionary effort. Black & Veatch (B&V) is excited about the possibility of working with you, and we are pleased to submit this letter Statement of Qualifications (SOQ) outlining our team, experience, and preliminary ideas. We believe that our experience with MET pipelines, including our work with their staff to evaluate pipeline isolation, hydraulics, and water quality maintenance issues will be valuable to your studies. We look forward to discussing our ideas with you in more detail.

INTRODUCTION

MWDOC is spearheading the Orange County Water Reliability Study to evaluate the county's current and future water demands and supplies and to "test" portfolios of projects for improving the reliability of supplies for the future. As part of this effort, three Orange County projects are being considered that would potentially benefit from allowing alternative sources of water to be conveyed in the East Orange County Feeder No. 2 (EOCF#2), of which MWDOC is the principal owner, or other pipelines. Your RFQ identifies three potential projects, summarizes MWDOC's preliminary discussions with MET, and lists several specific areas in which you are seeking assistance from a consulting engineering firm. As clearly stated in the RFQ, the discussions with MET are in the very early stages, and MWDOC is expecting input and advice to be provided at a conceptual level at this point in time. If and when negotiations with MET advance, MWDOC envisions requiring more detailed analysis and cost estimating.

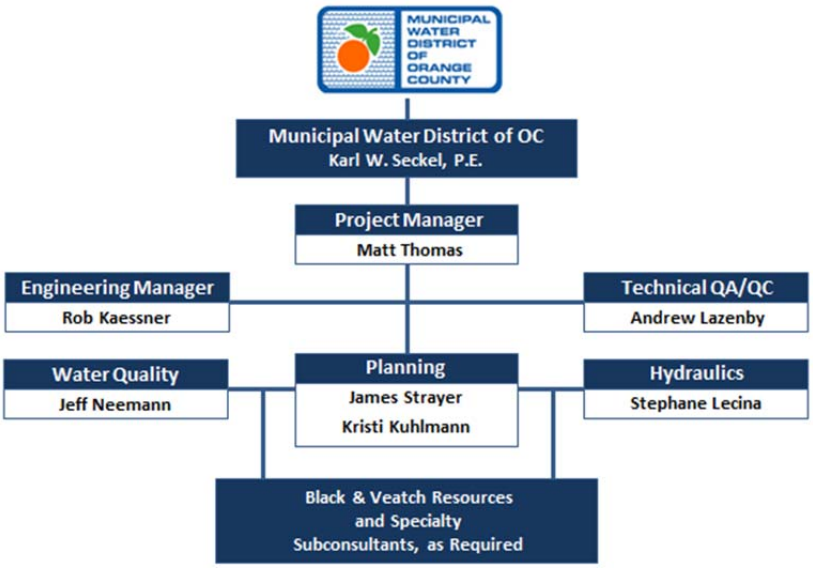
Black & Veatch is well suited to provide the conceptual assistance you are currently seeking and to proceed with more detailed engineering as required. We have a global workforce 10,000 strong, and we have been a strong California presence for over 30 years. Our connected work platforms allow us to manage projects locally, while seamlessly involving global specialists at key project milestones. Of particular benefit is our experience with MET on numerous pipeline and pump station projects. We bring deep understanding of the MET organization, including having collaborated with their experts on matters related to water quality maintenance, isolation and hydraulic control, and overall system hydraulics.

Our experience and relationships with the MET staff will help to identify and develop alternatives that MET would find acceptable.

The discussion that follows is organized in accordance with the requirements of your e-mail and attachments provided on February 23, 2016.

PROJECT ORGANIZATION AND KEY PERSONNEL

For the past 100 years, Black & Veatch has been a leading global engineering, consulting, and construction company specializing in infrastructure development of water, energy, and telecommunication systems. Pipeline planning and design is a specialty; within the last three decades alone, Black & Veatch has designed more than 20 million linear feet of pipelines across the United States.



For the first phase of MWDOC's project, we propose a lean but strong core team extremely well suited to undertake the initially-envisioned work. When the project evolves, our core team will be supplemented by additional B&V resources and specialty subconsultants. As demonstrated by the brief team member profiles below, our core team is California-based and has extensive experience working with MWDOC, MET and other Southern California agencies and with each other. This strong combination of skills ensures that we will work with you seamlessly to develop innovative, defendable ideas and complete tasks on schedule and on budget.

Matt Thomas, P.E., Project Manager. I am based in the Irvine Office and have 25 years of experience focusing on the planning, design, permitting, and operations review of major municipal water supply, conveyance, and storage facilities. I have worked on projects that have a direct bearing on your proposed project MET's Second Lower Feeder(SLF) PCCP Rehabilitation Preliminary Design. On the latter project, my responsibilities included planning and detailed design for replacement of all isolation valves and flowmeters within the SLF and development of contract packaging, which included developing strategies for shutdown, isolations, and water quality maintenance in the SLF while it is relined. As a result, I have understanding of MET's organization, experts, and operational priorities, all of which will be helpful toward developing solutions that are accepted by MET's team while enhancing the feasibility of the proposed south Orange County water supply projects. I look forward to working with MWDOC on your proposed project. My goal as your project manager will be to communicate across all project disciplines and with client stakeholders, bringing clarity of understanding and coordination of effort to assure the project team is meeting and exceeding your expectations.

Rob Kaessner, P.E., Engineering Manager. Rob works with me in our Irvine Office. He has 14 years of experience and is currently the Engineering Manager of the City of Tustin's OC-43 Vault Replacement Project, which involves coordination with MET, MWDOC, and the East Orange County

Water District on hydraulics and facility design requirements. Other recent experience includes MET's SLF Rehabilitation, where Rob coordinated preliminary design activities for rehabilitating the pipeline segment within various jurisdictions in Orange County. Rob also helped develop the Ocean Water Desalination Technical Memorandum, prepared as part of the Seven Colorado River Basin States' Colorado River System Long-Term Augmentation Plan. His technical evaluation established budgetary costs for ocean water collection, RO treatment, and conveyance facilities at capacities ranging from 20 through 80 mgd. For MWDOC's project, Rob will direct the technical evaluations and support me in managing schedule and budget.

Andrew Lazenby, P.E., QA/QC. Andrew, who has 18 years of experience, also is based in Irvine. He is an expert in the treatment and conveyance of State Water Project supplies, Colorado River water, and local surface water sources. In addition, he has been involved in the design of Southern California groundwater treatment facilities and brackish water and seawater desalination projects. He worked on MET's SLF Rehabilitation and is currently managing the Greg Avenue Pressure Control Structure Modifications Project which is part of MET's Drought Response Program. He also worked with Rob on the Seven States Ocean Water Desalination TM Option Team. Andrew will review project progress at specific milestones and participate in meetings and workshops as required.

Jeff Neemann, Water Quality. Jeff, who is relocating to the Irvine Office, has 18 years of experience and specializes in the development and application of advanced water treatment technologies. He also has been instrumental in the development and implementation of Black & Veatch's Smart Integrated Infrastructure (SII) planning tool for the water industry, including SII's Smart Analytics Solutions and Smart Analytics Monitoring & Diagnostics Center. Jeff's Southern California experience includes projects for the Cucamonga Valley Water District, Orange County Water District, Castaic Lake Water Agency, West San Bernardino County Water District, and the City of Downey. Jeff's role on the project will be to provide water quality expertise as it relates to new supply integration and chlorine/chloramine booster stations. He will work closely with MWDOC's consultant, Means Consulting.

James Strayer, P.E., Planning. James, based in our San Diego Office, has 23 years of experience. As the leader of Black & Veatch's Infrastructure Planning Department, James' role on projects spans management, technical oversight, and direct project support. He was a Technical Advisor on the San Diego County Water Authority's 2014 Regional Water Facilities Optimization and Master Plan and managed the City of San Diego's Recycled Water Study and the City of Fountain Valley's Water System Master Plan Update. Prior to joining Black & Veatch in 2009, James was Project Manager and Lead Engineer for the planning of the Anaheim Reuse Demonstration Project, where he worked closely with the City's planning, design, environmental, legal, and survey groups. James will provide overall guidance on the planning tasks for the current project.

Kristi Kuhlmann, P.E., Planning. Kristi, located in our Irvine Office, has 14 years of experience and specializes in water resources facility planning, design, and construction. She was a Task Leader on MET's SLF Rehabilitation, working with Rob on coordinating with various jurisdictions in Orange County, and was Project Engineer on MET's Etiwanda Pipeline Repair Precedent Report and their Chino Basin Dry-Year Yield Program Expansion Project. She also has experience with other agencies likely to be involved with MWDOC's project including Orange County Water District (Fletcher Basin Project) and the City of Anaheim (Walnut Canyon Reservoir feasibility study, design, and construction support). She will assist James in evaluating planning issues.

Stephane Lecina, P.E., Hydraulics. Based in B&V's Sacramento Office, Stephane has 17 years of experience and specializes in hydraulic design and transient and surge analyses. Stephane

performed significant hydraulics analyses on the Delta Habitat Conservation and Conveyance Program (DHCCP), some of the work for MET and some for the California Department of Water Resources (DWR). He was the Project Engineer for a Burris Pit Pumping Station Transient Analysis for OCWD and for two projects associated with Calleguas Municipal Water District's Salinity Management Project: (1) an evaluation of system curves and hydraulic profiles of the proposed gravity brine line transferring brackish water from 14 facilities to the ocean outfall and (2) subsequent analysis of the hydraulic control system for the gravity pipeline. Stephane will take the lead on the initial hydraulics tasks and, as the project moves forward, will work with specialty subconsultants.

RECENT, RELEVANT EXPERIENCE

MWDOC has prequalified recipients of your RFQ and has indicated that a discussion of experience is not required. However, Black & Veatch has recent, relevant experience that may not have been covered during the prequalification process. The narrative below provides a brief summary of these assignments for your consideration:

- Recent MET projects. As indicated above, the majority of the core team has worked on projects for MET and understands the agency's system, staff, and operations. On the SLF, we worked with staff members from throughout MET's organization, as well as with many of the jurisdictions likely to be involved with your proposed project. As noted above, I worked with MET specifically on development of construction phasing strategies while keeping their overall system in operation during construction of the SLF. Those evaluations included collaboration with MET staff to develop water quality maintenance strategies, system isolation, system hydraulics and hydraulic controls, and pipe relinining constructability analyses. On the Greg Avenue Pressure Control Structure Modifications Project, we are working closely with MET's engineering, equipment, design, water supply operations, and hydraulics groups to review existing and reverse flow options to maximize availability of Colorado River water during periods of State Water Project delivery curtailments.
- City of Tustin OC-43 Vault Replacement Project. Andrew Lazenby and Rob Kaessner are, respectively, the Project Manager and Engineering Manager, for the engineering detailed design phase services for a precast vault, distribution piping, pressure control valve, and street improvements. The turnout receives MET water through EOCF#2.
- Orange County Water District. Black & Veatch provided design and construction support services for the recently-completed, award-winning Groundwater Replenishment System (GWRS) Initial Expansion and has worked with the District on the Fletcher Basin and other projects. As part of B&V's on-going collaboration with OCWD, Kristi Kuhlmann regularly attends District Board Meetings and has held discussions with staff regarding their options for distribution of desalinated water within the region.

ELEMENTS OF WORK

We have reviewed your RFQ and potential elements of work and have summarized key considerations and our approach to complete the work in the table below. We recommend that we discuss these work areas with you to further understand short-term objectives and to determine a specific scope of work for Task Order No. 1.

Potential Scope	Considerations	Approach and Basis
Examine options and costs for segregating reaches of the EOCF#2	• Member and retail agency downtime during construction • Dewatering provisions • Residual compliance • Facility location and components	• Use recent MET SLF Project experience to plan construction packaging and reach isolation
Review issues and operation of chlorine/chloramine boost facilities to maintain higher chloramine residual	• Ability to flow pace and adjust dose depending on water quality conditions. • Right sized storage – Consider deliveries and NaOCl degradation in storage selection.	• Configure simple feed systems. As boost sites can be remote, use simple, automated systems that run continuously without the need to be frequently maintained • Manage unintended consequences – conduct simple bench tests to determine potential impact on DBP formation and Stage 2 D/DBPR compliance
Examine potential emergency outage situations	• Evaluate system transient potential with closure of valves or pump shutoff • Consider bypass and alternate connection options	• Evaluate consequences of power outage and consider use of backup power sources, if necessary
Evaluate revised system operations, including reverse flow implications on hydraulics, demand, and pressure	• Review existing pipelines material and pressure class, develop strategy for reversing HGL in pipeline. • Review retail agency pressure requirements • Consider retail agency demands at far end of system	• Follow similar sequence used to conduct capacity evaluation for the MET Greg Ave Pressure Control Structure • Consider feasibility and options for reversing flow, building upon experience of MET Greg Ave PCS, SLF, and drought response projects
Provide conceptual cost estimating for large diameter pipeline construction	• Consider urban and high-density construction • Consider utilities and traffic coordination • Review and identify environmental factors	• Build from MET project cost estimating experience, including SLF, Greg Ave, and the Rialto Pipeline Sectionalizing Structures projects • Obtain cost & constructability input from pipe manufacturers
Outline surge protection requirements	• Evaluate potential sources of transients • Consider surge tanks, PRVs and timed equipment closures/shutoff	• Develop concept scenarios and coordinate surge/transient potential with MET hydraulics modeling team and other available sources

Potential Scope	Considerations	Approach and Basis
Provide water quality expertise relating to water stability for integration of new water sources	• Evaluate water stability of blending new water supplies • Consider corrosion potential and DBP formation	• Consider instrumentation for monitoring of chlorine, chloramines, free ammonia and pH to make sure residuals and ratios of ammonia are maintained • Monitor for microbial activity to determine target chloramine concentration for optimal control of potential biofilm formation and nitrification • Collaborate with Ed Means and MWD staff to determine potential strategies for blended supplies.

BILLING RATE INFORMATION

As requested in your RFQ, a summary of our Team's 2016/2017 billing rates is provided in the table below.

Personnel Classifications	2016/2017 Billing Rate
Project Director/Vice President	**$250-300**
Project Manager 1-3	**$200-250**
Engineer 6-7	**$190-250**
Engineer 4-5	**$135-185**
Engineer 1-3	**$100-130**
Engineering Technician 5-8	**$110-165**
Engineering Technician 2-4	**$90-110**
Word Processing Specialist*	**$90-110**
Clerical and Finance*	**$90-110**
Project Support Assistant*	**$90-110**

(1) Subconsultants will be billed at cost plus 5%.

(2) An $8.75 hourly surcharge will be added to the rates indicated above to cover basic computer charges, minor reproduction fees, long distance telephone charges, car mileage for company-owned vehicles and postage rates.

(3) Other Direct Charges will be billed at cost. Allowable Other Direct Charges include the following:
Travel (transportation fares/tickets, vehicle rental & Fuel, lodging, meals, parking, tolls, IRS-approved mileage)

Delivery (courier, FEDEX/UPS/Express mail, US mail)

Major deliverable reproduction (photocopy, printing)

Field equipment and miscellaneous supplies

Temporary labor

CONFLICT OF INTEREST

Black & Veatch has been a successful company for more than 100 years. We carefully consider each project we undertake to ensure there is no conflict of interest. We are confident that MWDOC's proposed project poses no known or potential conflicts with other agencies or projects.

STANDARD CONSULTING AGREEMENT

During our 30 years in California, Black & Veatch has negotiated contracts with some of the State's most prestigious agencies. We anticipate no difficulties in the negotiation of a contract with MWDOC. If possible, we ask that the following revision to the Insurance Requirements section of Standard Consulting Agreement be considered:

- *Article VI.B requires that the Professional Liability policy includes a provision that requires the insurer to provide 30 days notice of cancelation to the District. Similarly Article VI. C states that CGL, auto, worker's compensation and employer's liability will contain similar clauses. Our insurance policies do not contain this provision. We request that this language be struck or modified to state that Black & Veatch will endeavor to provide thirty days notice of any cancellation.*

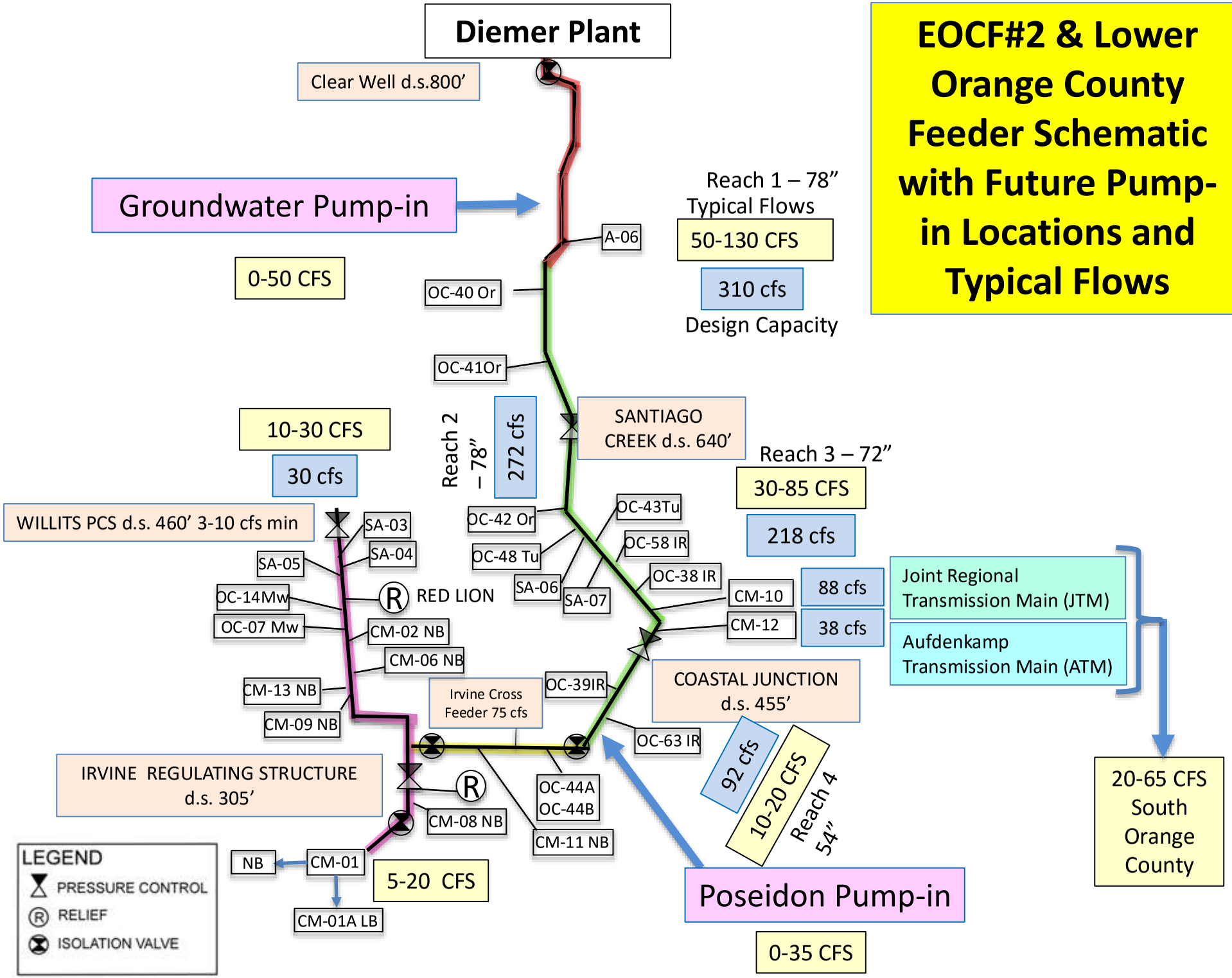
SUMMARY

Black & Veatch looks forward to an opportunity to work with MWDOC. Our core team is available to start this project immediately. If you have any questions, do not hesitate to contact me at 949-788-4250.

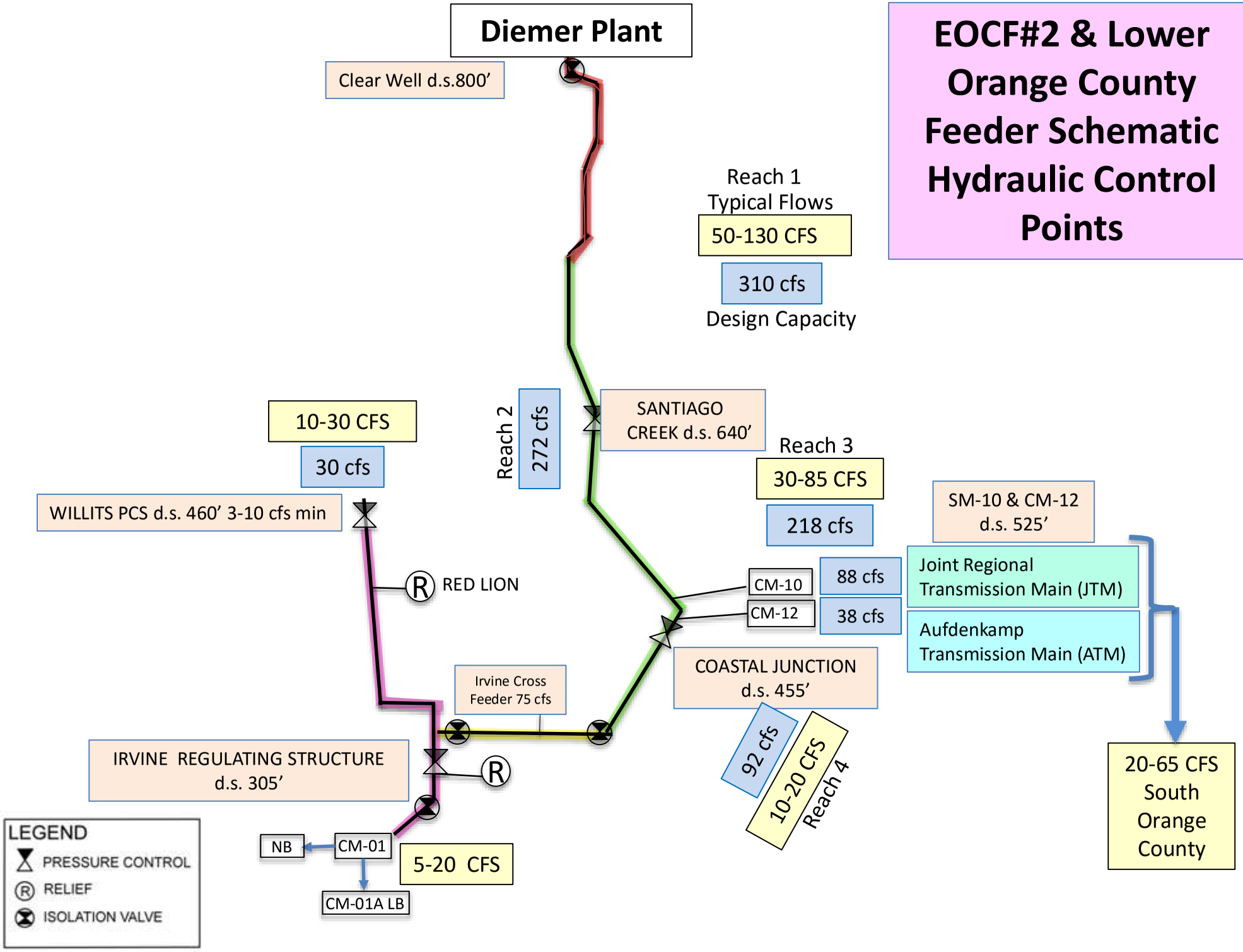
Yours truly,
BLACK & VEATCH CORPORATION

Matt Thomas, P.E.
Project Manager

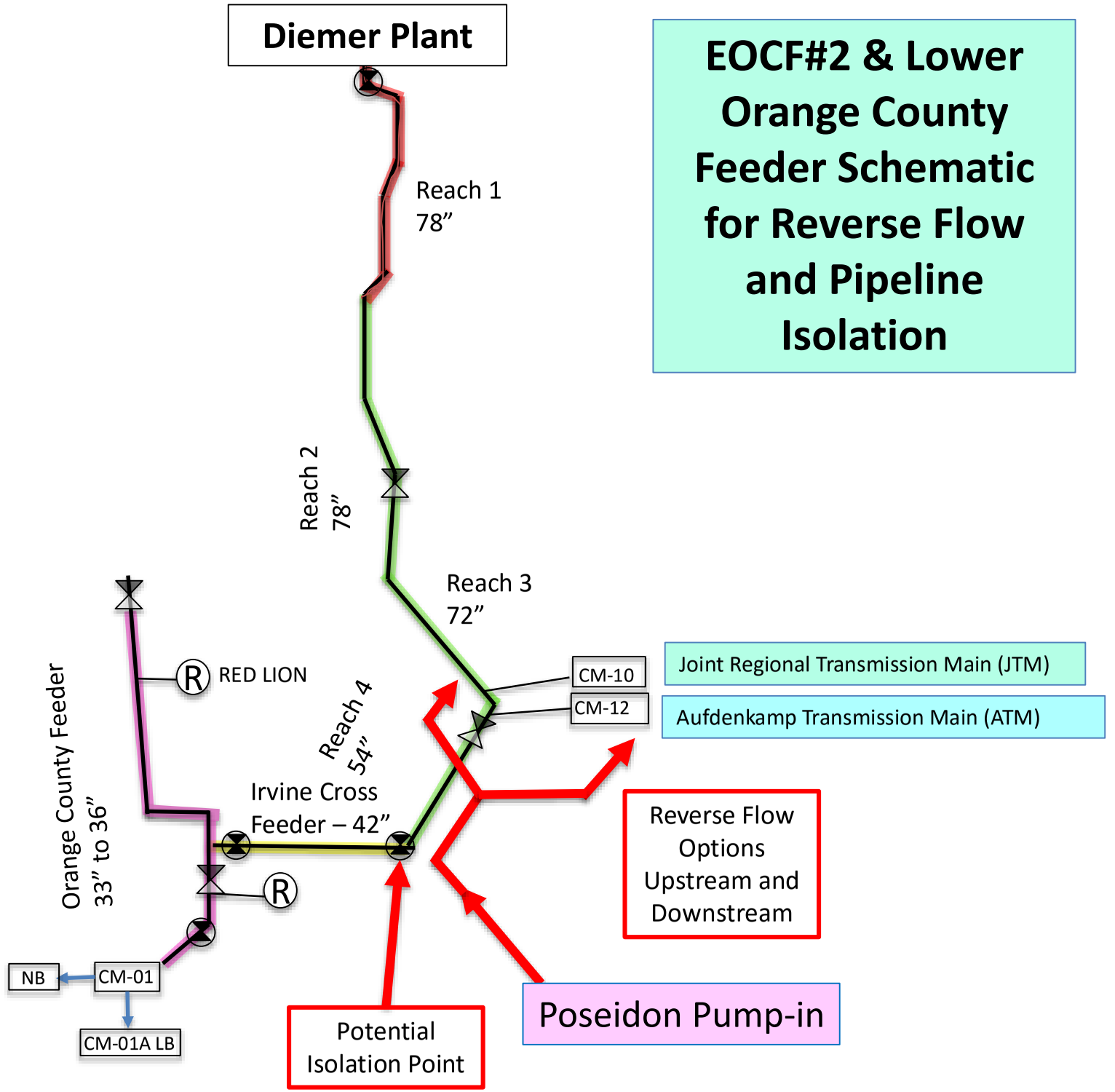
EOCF#2 & Lower Orange County Feeder Schematic with Future Pump-in Locations and Typical Flows



EOCF#2 & Lower Orange County Feeder Schematic Hydraulic Control Points



EOCF#2 & Lower Orange County Feeder Schematic for Reverse Flow and Pipeline Isolation



MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 3

ACTION ITEM

April 20, 2016

TO: Board of Directors

FROM: **Planning & Operations Committee**
(Directors Dick, Hinman, Finnegan)

Robert J. Hunter
General Manager

Staff Contact: Harvey De La Torre

SUBJECT: **MWDOC's 2015 Urban Water Management Plan Notice of a Public Hearing on May 18, 2016**

STAFF RECOMMENDATION

Staff recommends the Board of Directors establish May 18, 2016 as the public hearing date for Municipal Water District of Orange County's 2015 Urban Water Management Plan.

COMMITTEE RECOMMENDATION

Committee to review the proposed schedule on April 4, which calls for setting the public hearing on May 18, 2016.

REPORT

Pursuant to the Urban Water Management Planning Act, each water supplier that is submitting an update 2015 Urban Water Management Plan with the Department of Water Resources must conduct a public hearing. To comply with this requirement, MWDOC is announcing to hold a public hearing on May 18, 2016 on its 2015 Urban Water Management Plan.

Budgeted (Y/N): N	Budgeted amount: N/A
Action item amount: N/A	Line item:
Fiscal Impact (explain if unbudgeted):	

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 4

INFORMATION ITEM
April 4, 2016

TO: **Planning & Operations**
(Directors Dick, Hinman, Finnegan)

FROM: Robert J. Hunter
General Manager

Staff Contact: Harvey De La Torre

SUBJECT: **Public Review of MWDOC's DRAFT 2015 Urban Water Management Plan**

BACKGROUND

The State of California requires all water suppliers (including wholesalers), either publicly or privately owned, that provide water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet annually to submit an updated Urban Water Management Plan (UWMP) with the Department of Water Resources (DWR) at least once every five years; in years ending in five or zero. Due to the passage of SBx7-7 i.e. 20% reduction by 2020 water use efficiency requirement, the 2015 UWMP submittal deadline is July 1, 2016 (six months later). This submittal deadline was put in place to provide agencies time to calculate their year-end 2015 population for their gallon per capita per day (gpcd) water usage. Not to submit an updated UWMP will prevent a water supplier from being eligible for DWR-administered state grants & loans and drought assistance.

As was done for the 2010 UWMP, MWDOC led the effort to facilitate a group of twenty-three retail agencies, including the three MET member agency cities in Orange County to retain one consulting firm- Arcadis to assist in updating their 2015 UWMPs. The consistency and cost savings through economies of scale, led retail agencies to support MWDOC to manage this countywide collaboration once again.

The purpose of this report is to provide the Board, MWDOC member agencies, and the public an opportunity to review MWDOC's Draft 2015 UWMP in order to receive feedback and comments on the plan prior to the official public hearing. This report will describe the plan's overall approach, key areas of importance, linkage to Metropolitan's 2015 UWMP, and next steps.

Budgeted (Y/N): N	Budgeted amount: N/A
Action item amount: N/A	Line item:
Fiscal Impact (explain if unbudgeted):	

REPORT

Since Fall 2015, MWDOC staff have been working with Arcadis in updating MWDOC's UWMP by providing data, key reports such as MET's 2015 Integrated Resource Plan, MET's 2015 Draft UWMP, and information & projections from MWDOC's O.C. Reliability Study. In addition, Arcadis and MWDOC have worked in collaboration to identify any changes from the previous UWMP that DWR has required for wholesale agencies to complete this year.

MWDOC's Regional Approach

Similar to MWDOC's 2010 UWMP, the focus of the analysis and information will be at the regional level i.e. MWDOC's service area. Specific information and data on individual member agencies will not be covered in detail in the MWDOC UMWP. Although information such as demographics, demand and supply projections, and new proposed projects have been collected from the member agencies to determine the overall total for MWDOC's service area, the member agency individual information will be contained in their own UWMPs.

This Regional Approach will ensure better coordination with the member agencies and prevent conflicting information between MWDOC's plan and the member agencies' plans. More importantly, it distinguishes the role of MWDOC as the regional entity and the role of the member agency as the retail entity. It is similar to the "County Level" approach Metropolitan uses in their Regional UWMP.

Areas of Importance

In updating the MWDOC's 2015 UWMP, we found the following as key areas of importance in demonstrating MWDOC's water supply reliability over the next 25 years:

Projected Demands

For Fiscal Year 2014-15 MWDOC's service area demands totaled 499,120 AF. The demands in this year were only somewhat affected by demand curtailment by the State Water Resources Control Board's mandatory restrictions, because they were only in effect for the last two months of the fiscal year (May and June of 2015). These demands include retail municipal & Industrial, groundwater replenishment, and surface water purchases.

Moving forward, under normal conditions, total water demands are projected to increase to 515,425 AF by the year 2040 or 3.27 percent over the next 25 years. This demand projection comes from MWDOC's Orange County (OC) Reliability Study that considered such factors as current and future demographics from the water agencies, future active and passive conservation measures, and ground & surface water needs.

The OC Reliability Study also considered the drought impacts on demands by applying the assumption that the unit water demand will bounce back to 85 percent of 2014 levels i.e. pre-drought levels by 2020 and to 90 percent by 2025, and continue at 90 percent of unit water use through 2040

As shown in the 2015 Draft UWMP, the table below illustrates MWDOC's total water demands over the next 25 years:

MWDOC Service Area Total Demands – Projected (AFY)						
Water Source	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
OCWD Basin GW	202,403	196,035	207,383	208,510	208,438	208,665
Non-OCWD GW	20,036	27,297	27,477	27,477	27,477	27,477
Recycled	41,280	49,415	58,157	63,546	66,344	66,842
Surface Water	9,893	5,000	5,000	5,000	5,000	5,000
Imported Water (Retail M&I)	158,664	132,826	144,254	140,203	135,913	135,135
Total MWDOC Direct-Use Water Demand	**432,276**	**410,573**	**442,271**	**444,735**	**443,171**	**443,119**
Imported Demand for Surface Water	8,227	7,306	7,306	7,306	7,306	7,306
Imported Demand for GW Replenishment	58,617	65,000	65,000	65,000	65,000	65,000
Total MWDOC Indirect-Use Water Demand	**499,120**	**482,879**	**514,577**	**517,041**	**515,477**	**515,425**

Source: MWDOC Draft 2015 UWMP, Table 2-3

Linkage to Metropolitan's 2015 UWMP

As the provider of imported water via Metropolitan, MWDOC's UWMP is closely linked to the water supply and demand projections of Metropolitan. Therefore, included in MWDOC's 2015 UWMP are sections describing the conditions, associated challenges, program developments and expected supply availability for each of Metropolitan's core water supplies – Colorado River and State Water Project (SWP). Along with a description of Metropolitan storage and transfer programs' capacity and terms.

In Metropolitan's 2015 UWMP, Metropolitan evaluated supply reliability by projecting supply and demand conditions for the single- and multi-year drought cases based on conditions affecting the SWP and the Colorado River supplies. It concluded that the MET region can provide reliable water supplies not only under normal conditions but also under both the single driest year and the multiple dry year hydrologies. Below are tables illustrating how they plan to meet a single dry year and multi-dry year conditions:

Single Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1977 Hydrology
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	693,000	774,000	852,000	956,000	992,000
California Aqueduct[2]	644,000	665,000	692,000	718,000	718,000
Colorado River Aqueduct					
Total Supply Available[3]	1,451,000	1,457,000	1,456,000	1,455,000	1,454,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**2,537,000**	**2,639,000**	**2,744,000**	**2,874,000**	**2,910,000**
Demands					
Total Demands on Metropolitan	1,731,000	1,784,000	1,826,000	1,878,000	1,919,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**2,005,000**	**2,066,000**	**2,108,000**	**2,160,000**	**2,201,000**
Surplus	**532,000**	**573,000**	**636,000**	**714,000**	**709,000**
Programs Under Development					
In-Region Supplies and Programs	43,000	80,000	118,000	160,000	200,000
California Aqueduct	20,000	20,000	198,000	198,000	198,000
Colorado River Aqueduct					
Total Supply Available[3]	155,000	125,000	75,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**63,000**	**100,000**	**316,000**	**358,000**	**398,000**
Potential Surplus	**595,000**	**673,000**	**952,000**	**1,072,000**	**1,107,000**

[1] Represents Supply Capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.
[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.
[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.
[5] Total deliveries are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Multiple Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1990-1992 Hydrology
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	239,000	272,000	303,000	346,000	364,000
California Aqueduct[2]	712,000	730,000	743,000	752,000	752,000
Colorado River Aqueduct					
Total Supply Available[3]	1,403,000	1,691,000	1,690,000	1,689,000	1,605,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**2,151,000**	**2,202,000**	**2,246,000**	**2,298,000**	**2,316,000**
Demands					
Total Demands on Metropolitan	1,727,000	1,836,000	1,889,000	1,934,000	1,976,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**2,001,000**	**2,118,000**	**2,171,000**	**2,216,000**	**2,258,000**
Surplus	**150,000**	**84,000**	**75,000**	**82,000**	**58,000**
Programs Under Development					
In-Region Supplies and Programs	36,000	73,000	110,000	151,000	192,000
California Aqueduct	7,000	7,000	94,000	94,000	94,000
Colorado River Aqueduct					
Total Supply Available[3]	80,000	75,000	50,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**43,000**	**80,000**	**204,000**	**245,000**	**286,000**
Potential Surplus	**193,000**	**164,000**	**279,000**	**327,000**	**344,000**

[1] Represents Supply Capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.
[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.
[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.
[5] Total deliveries are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

MWDOC Reliability

Based on Metropolitan's supply capabilities and Demand projections, MWDOC will be able to meet its service area demands under average year, single dry year, and multiple dry year scenarios. These projections represent the amount of supplies projected to meet MWDOC demands, as MWDOC will only purchase the amount of water needed to meet its service area demands via Metropolitan.

MWDOC's Dry Year Supply and Demand Comparison (AFY)					
Imported water Demand	2020	2025	2030	2035	2040
Supply totals	213,101	225,215	220,921	216,374	215,549
Demand totals	213,101	225,215	220,921	216,374	215,549
Difference	0	0	0	0	0
NOTES: OC Reliability Study					

Source: MWDOC Draft 2015 UWMP, Table 3-14

Unique to MWDOC is the diversified mix of water resources the service area contains. The access to groundwater through the Orange County groundwater basin, the increased reliability programs in Central and South Orange County, as well as the recent efforts in water efficiency measures has significantly improved Orange County's reliability. In fact, MWDOC's retail water demands today are roughly the same amount as what was used in 1991, although the service area has added about 750,000 more people. Furthermore, we anticipate our water demands, under normal conditions, to slightly decrease over the next 25 years due to continue water conservation measures.

20% by 2020 Orange County Regional Alliance

Under the guidelines of SBx7-7, retail water agencies have the ability to form a regional alliance to collectively assist each other on complying with the 20% by 2020 requirement. Although each retail agency is still required to report how they plan to meet their 20% by 2020 target on an individual basis, they can use regional alliance targets to serve as an "insurance policy". Meaning a retail agency can comply utilize the regional target under the Orange County regional alliance; or comply by using their individual agency's target.

As the lead on the Orange County Regional Alliance, MWDOC describes within its UWMP how the calculation of the regional targets for 2015 and 2020 are formed and how the regional credit associated with OCWD's Groundwater Replenishment System (GWRS) is calculated in the targets.

Based on the Regional Alliance calculations, the regional target for 2015 was 178 gallons per capita per day (GPCD) and 158 GPCD for 2020. The actual 2015 GPCD achieved by the Regional Alliance is 125 GPCD indicating that not only has the region met its 2015 target but it is already well below its 2020 water use target. This is indicative of the collective efforts of MWDOC, retail agencies, and OCWD's GWRS in reducing water use in the region.

Below is MWDOC's timeline status of completing its 2015 UWMP:

- ✓ **Early March –** Letters went out notifying all stakeholders of the 60-day notice of preparation of MWDOC's intent to publish, circulate and hold a public hearing prior to its adoption of its UWMP
- ✓ **March/April –** Internal review of the draft UWMP
- ✓ **April –** Release of the MWDOC Draft 2015 UWMP for MWDOC Board, member agency, and public review.

May – Recommend the Board open the public hearing at the May Board meeting and seek Board adoption of the 2015 MWDOC UMWP as well as a Board Resolution

June - If necessary, seek adoption of the 2015 MWDOC UMWP at the June Board meeting

July 1, 2016 – Submit the Final MWDOC 2015 UWMP to the California Department of Water Resources

Attachment – MWDOC DRAFT 2015 Urban Water Management Plan, April 2015

ARCADIS Design & Consultancy for natural and built assets

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

2015 URBAN WATER MANAGEMENT PLAN

DRAFT

APRIL 2016

Deleted: March

2015 URBAN WATER MANAGEMENT PLAN

Municipal Water District of Orange County

DRAFT

[Signature 1 Name]

[Title]

Prepared for:
Municipal Water District of Orange County
18700 Ward Street
Fountain Valley, California 92708

Prepared by:
Arcadis U.S., Inc.
445 South Figueroa Street
Suite 3650
Los Angeles
California 90071
Tel 213 486 9884
Fax 213 486 9894

Our Ref.:

4109039.0000

Date:

April 2016

CONTENTS

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

20x2020	20% water use reduction in GPCD by year 2020
Act	Urban Water Management Planning Act
ACWRF	Aliso Creek Water Reclamation Facility
AF	Acre-feet
AFY	Acre-feet per year
AOP	Advanced Oxidation Processes
AWTP	Advanced Water Treatment Plant
AWWA	American Water Works Association
BDCP	Bay-Delta Conservation Plan
BEA	Basin Equity Assessment
Biops	Biological opinions
BMO	Best Management Objective
BMP	Best Management Practice
BPP	Basin Production Percentage
BPOU	Baldwin Park Operable Unit
CalWARN	California Water and Wastewater Agency Response Network
CCC	California Coastal Commission
CDR	Center for Demographic Research
CDWC	California Domestic Water Company
CII	Commercial/Industrial/Institutional
CRA	Colorado River Aqueduct
CSANS	California Sprinkler Adjustment Notification System
CTP	Coastal Treatment Plant
CUP	Conjunctive Use Program
CUWCC	California Urban Water Conservation Council
CVP	Central Valley Project
CVWD	Cucamonga Valley Water District
CVWD	Coachella Valley Water District
CWRP	Chiquita Water Reclamation Plant
DATS	Deep Aquifer Treatment System
DDW	Division of Drinking Water
Delta	Sacramento-San Joaquin River Delta
DMM	Demand Management Measure
DVL	Diamond Valley Lake
DWR	Department of Water Resources
EBSD	Emerald Bay Services District
EOCWD	East Orange County Water District
EIR	Environmental Impact Report
EOC	Emergency Operation Center

ET	Evapotranspiration
ETWD	El Toro Water District
FY	Fiscal Year
GAC	Granular Activated Carbon Filter
GAP	Green Acres Project
GCM	General Circulation Model
GPCD	Gallons per capita per day
GPD	Gallons per day
GRF	Groundwater Recovery Facility
GSWC	Golden State Water Company
GWRP	Groundwater Recovery Plant
GWRS	Groundwater Replenishment System
HECW	High Efficiency Clothes Washers
HET	High Efficiency Toilet
IID	Imperial Irrigation District
IPR	Indirect Potable Reuse
IRP	Integrated Water Resource Plan
IRWD	Irvine Ranch Water District
IWA	International Water Association
LAWRP	Los Alisos Water Recycling Plant
LBCWD	Laguna Beach County Water District
LRP	Local Resources Program
LTFP	Long-Term Facilities Plan
MARS	Member Agency Response System
MAWA	Maximum Allowed Water Allowance
M&I	Municipal and industrial
MAF	Million acre feet
MCL	Maximum Contaminant Level
Mesa Water	Mesa Water District
Metropolitan	Metropolitan Water District of Southern California
MF	Microfiltration
MNWD	Moulton Niguel Water District
MGD	million gallons per day
MOU	Memorandum of Understanding Regarding Urban Water Conservation in California
MWDOC	Municipal Water District of Orange County
MWRP	Michelson Water Recycling Plant
NDMA	N-nitrosodimethylamine
NRCS	Natural Resource Conservation Service
OC	Orange County
OCSD	Orange County Sanitation District

OCWD	Orange County Water District
OCWRP	Oso Creek Water Reclamation Plant
Poseidon	Poseidon Resources LLC
PPCP	Pharmaceuticals and Personal Care Product
Ppb	Parts per billion
PPR	Percent perfected right
PVID	Palo Verde Irrigation District
QSA	Quantification Settlement Agreement
RA	Replenishment Assessment
RO	Reverse Osmosis
RRWTP	Robinson Ranch Wastewater Treatment Plant
RTP	Regional Treatment Plant
RWQCB	Regional Water Quality Control Board
SAR	Santa Ana River
SARCCUP	Santa Ana River Conservation and Conjunctive Use Program
SBx7-7	Senate Bill 7 as part of the Seventh Extraordinary Session
SCAB	South Coast Air Basin
SCWD	South Coast Water District
SDCWA	San Diego County Water Authority
SDP	Seawater Desalination Program
SEMS	Standardized Emergency Management System
Serrano	Serrano Water District
SJBA	San Juan Basin Authority
SMWD	Santa Margarita Water District
SNWA	Southern Nevada Water Authority
SOCWA	South Orange County Wastewater Authority
Study	Colorado River Basin Water Supply and Demand Study
SWP	State Water Project
SWRCB	California State Water Resources Control Board
SWSD	Semitropic Water Storage District
TCWD	Trabuco Canyon Water District
TDS	Total Dissolved Solids
TVMWD	Three Valleys Municipal Water District
USBR	United States Bureau of Reclamation
USGVMWD	Upper San Gabriel Valley Municipal Water District
UV	Ultraviolet
UWMP	Urban Water Management Plan
WACO	Water Advisory Committee of Orange County
WBIC	Weather Based Irrigation Controller
WEROC	Water Emergency Response Organization of Orange County

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WRP	Water Recycling Plant
WSAP	Water Supply Allocation Plan
WSDM	Water Surplus and Drought Management Plan
WUE	Water Use Efficiency
YLWD	Yorba Linda Water District

MESSAGE FROM THE BOARD OF DIRECTORS

Since the Municipal Water District of Orange County's (MWDOC) formation in 1951, MWDOC has remained steadfast in its commitment to provide a reliable supply of high-quality water for Orange County at a reasonable rate. Through leadership, representation at the Metropolitan Water District of Southern California (Metropolitan) and collaboration with our retail agencies, MWDOC seeks opportunities to improve Orange County's water resources and reliability. By integrating local planning challenges and regional stakeholder partnerships, MWDOC maximizes water system reliability and overall system efficiencies. MWDOC works to expand Orange County's water supply portfolio by providing planning and local resource development in the areas of recycled water, groundwater, ocean water desalination, and water-use efficiency.

DIRECTORS

Division 1 ***Brett R. Barbre***

Brea, Buena Park, La Habra, La Palma, Yorba Linda Water District, and portions of Golden State Water Company

Division 2 ***Larry D. Dick***

Orange, Tustin, East Orange County Water District, portions of Golden State Water Company, Serrano Water District, portions of Garden Grove, and portions of Irvine Ranch Water District

Division 3 ***Wayne Osborne***

Fountain Valley, Westminster, portions of Golden State Water Company, and portions of Garden Grove

Division 4 ***Joan C. Finnegan***

Huntington Beach, Seal Beach, and Mesa Water District

Division 5 ***Sat Tamaribuchi***

Newport Beach and portions of Irvine Ranch Water District and El Toro Water District

Division 6 ***Jeffery M. Thomas***

Santa Margarita Water District, Trabuco Canyon Water District, and portions of Irvine Ranch Water District

Division 7 ***Susan Hinman***

San Clemente, San Juan Capistrano, Moulton Niguel Water District, Laguna Beach County Water District, and South Coast Water District

MISSION STATEMENT

"To provide reliable, high-quality supplies from Metropolitan Water District of Southern California and other sources to meet present and future needs, at an equitable and economical cost, and to promote water use efficiency for all of Orange County."

1 INTRODUCTION

1.1 Urban Water Management Plan Requirements

Water Code Sections 10610 through 10656 of the Urban Water Management Planning Act (Act) require every urban water supplier providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre-feet (AF) of water annually to prepare, adopt, and file an Urban Water Management Plan (UWMP) with the California Department of Water Resources (DWR) every five years in the years ending in zero and five. The 2015 UWMP updates are due to DWR by July 1, 2016.

This UWMP provides DWR with a detailed summary of present and future water resources and demands within the Municipal Water District of Orange County (MWDOC) service area and assesses its water resource needs. Specifically, the UWMP provides water supply planning for a 25-year planning period in five-year increments and identifies water supplies needed to meet existing and future demands. The demand analysis must identify supply reliability under three hydrologic conditions: a normal year, a single-dry year, and multiple-dry years. MWDOC's 2015 UWMP updates the 2010 UWMP in compliance with the requirements of the Act as amended in 2009, and includes a discussion of:

- Water Service Area and Facilities
- Water Sources and Supplies
- Water Use by Customer Type
- Demand Management Measures
- Water Supply Reliability
- Planned Water Supply Projects and Programs
- Water Shortage Contingency Plan
- Recycled Water Use

Since the original Act's passage in 1983, several amendments have been added. The most recent changes affecting the 2015 UWMP include Senate Bill 7 as part of the Seventh Extraordinary Session (SBx7-7) and SB 1087. SBx7-7, or the Water Conservation Act of 2009, is part of the Delta Action Plan that stemmed from the Governor's goal to achieve a 20 percent statewide reduction in urban per capita water use by 2020 (20x2020). Reduction in water use is an important part of this plan that aims to sustainably manage the Bay Delta and reduce conflicts between environmental conservation and water supply conveyance; it is detailed in Section 3.2.3. SBx7-7 requires each urban retail water supplier to develop urban water use targets to achieve the 20x2020 goal and the interim ten percent goal by 2015. Each urban retail water supplier must include in its 2015 UWMPs the following information from its target-setting process:

- Baseline daily per capita water use
- 2020 urban water use target

- 2015 interim water use target compliance
- Compliance method being used along with calculation method and support data
- An implementation plan to meet the targets

Wholesale water suppliers such as MWDOC are required to include an assessment of present and proposed future measures, programs, and policies that would help achieve the 20 percent water use reduction by 2020 goal.

In an effort to assist retail agencies in Orange County meet the requirement of SB7x7, the MWDOC 2015 UWMP describes the Orange County Regional Alliance and methodology used to calculate the regional targets for 2015 and 2020.

The other recent amendment, made to the UWMP on September 19, 2014, is set forth by SB 1420, Distribution System Water Losses. SB 1420 requires water purveyors to quantify distribution system losses for the most recent 12-month period available. The water loss quantification is based on the water system balance methodology developed by the American Water Works Association (AWWA).

This 2015 Plan update also incorporates MWDOC's current and planned water use efficiency efforts pursuant to the *Memorandum of Understanding Regarding Urban Water Conservation in California* (MOU). MWDOC became a signatory and adopted the MOU in 1991.

A UWMP may serve as a foundational document and source of information for a Water Supply Assessment, (Water Code Section 10613), and a Written Verification of Water Supply, (Water Code Section 66473.7). Both statutes require detailed information regarding water supply availability be provided to city and county decision makers prior to approval of specified large development projects. Additionally, a UWMP also serves as a:

- Long-range planning document for water supply;
- Long-range planning document for water use efficiency measures;
- Source data for development of a regional water plan;
- Source document for cities and counties, as they prepare and update their General Plans;
- Key component of an Integrated Regional Water Management Plan; and
- Condition to qualify for receipt of certain State grant funds.

The activities associated with the update of MWDOC's Plan and the benefits the Plan ultimately affords its local retailers extend far beyond the implied or stated supply-reliability goals. This Plan allows MWDOC to do the following:

- Provide a comprehensive assessment of water resource needs in its service area;
- Provide guidance to coordinate implementation of water use efficiency programs in a cost-effective manner;
- Provide assistance to maximize the beneficial use of recycled water and local groundwater supplies, supplying the region with new sources of local water to reduce the need to purchase imported water supplies from Metropolitan (described in the next section); and

- Offer opportunities for community participation through public meetings, and provide information that allows the public to gain further understanding of the region's comprehensive water planning.

The sections in this UWMP correspond to the outline of the Act, specifically Article 2, Contents of Plans, Sections 10631, 10632, and 10633. The sequence used for the required information, however, differs slightly in order to present information in a manner reflecting the unique characteristics of MWDOC. The UWMP Checklist which identifies the location of Act requirements in this Plan is included in Appendix A. This is an individual UWMP for a wholesale agency, as shown in Tables 1-1 and 1-2. Table 1-2 also indicates the units that will be used throughout this document.

Table 1-1: Plan Identification

Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	-
	☑	Water Supplier is also a member of a Regional Alliance	Orange County 20x2020 Regional Alliance
☐	**Regional Urban Water Management Plan (RUWMP)**		-
NOTES:			

Table 1-2: Agency Identification

Agency Identification	
Type of Agency (select one or both)	
☑	Agency is a wholesaler
☐	Agency is a retailer
Fiscal or Calendar Year (select one)	
☐	UWMP Tables Are in Calendar Years
☑	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
7/1	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES:	

1.2 Municipal Water District of Orange County

1.2.1 Formation and Purpose

Orange County was settled around areas of surface water. San Juan Creek supplied the mission at San Juan Capistrano. The Santa Ana River supplied the early Cities of Anaheim and Santa Ana. The Santa Ana River also provided water to a large aquifer underlying the northern half of the county, enabling settlers to move away from the river's edge and still obtain water by drilling wells.

By the early 1900s, Orange County residents understood that their water supply was limited, the rivers and creeks did not flow all year long, and the aquifer would eventually be degraded or even dry up if the water was not replenished on a regular basis.

In 1928, the Cities of Anaheim, Santa Ana, and Fullerton joined with 10 other southern California cities to form Metropolitan. Their objective was to build an aqueduct from the Colorado River to provide the additional water necessary to sustain the growing southern California economy and its enviable lifestyle.

The Orange County Water District (OCWD) was formed in 1933 to protect the County's water rights on the Santa Ana River. Later that mission was expanded to manage the underground aquifer, optimizing use of local supplies and augmenting those with imported supplies provided through the Metropolitan member agencies in Orange County.

It was not long before other parts of Orange County also saw the need for supplemental supplies. A severe drought in the late 1940s further emphasized this need for coastal communities from Newport Beach to San Clemente. In 1948, coastal communities from Newport Beach south to the San Diego county line formed the Coastal Municipal Water District as a way to join in the benefits provided by Metropolitan. Three years later, MWDOC was formed by Orange County voters in 1951 under the Municipal Water District Act of 1911 to provide imported water to inland areas of Orange County. To improve services and reduce cost, the Coastal Municipal Water District became a part of MWDOC in January 2001.

Today, MWDOC is Metropolitan's third largest member agency, providing and managing the imported water supplies used within its service area.

1.2.2 Relationship to Metropolitan

MWDOC became a member agency of Metropolitan in 1951 to bring supplemental imported water supplies to parts of Orange County. Metropolitan is a consortium of 26 cities and water agencies that provides supplemental water supplies to parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino, and Ventura Counties. Metropolitan's two main sources of supply are the Colorado River and Sacramento-San Joaquin Bay-Delta. Supplies from these sources are delivered to southern California via the Colorado River Aqueduct (CRA) and the State Water Project (SWP). MWDOC purchases imported water from these sources from Metropolitan and distributes the water to its 28 retail agencies, which provide retail water services to the public.

1.2.3 MWDOC Board of Directors

MWDOC is governed by an elected seven-member Board of Directors, with each board member representing a specific area of the County and elected to a four-year term by voters who reside within that part of the MWDOC service area. The Board of Directors map is shown on Figure 1-1.

Each director is a member of at least one of the following three standing committees: Planning and Operations; Administration and Finance; and Public Affairs and Legislation. Each committee meets monthly. The full board convenes for its regular monthly meeting on the third Wednesday of the month, and holds a Board workshop on Metropolitan issues the first Wednesday of the month.

The President of the Board, Vice President, and immediate past President also comprise the Executive Committee, which meets monthly with the General Manager, Assistant General manager, and Board Secretary.

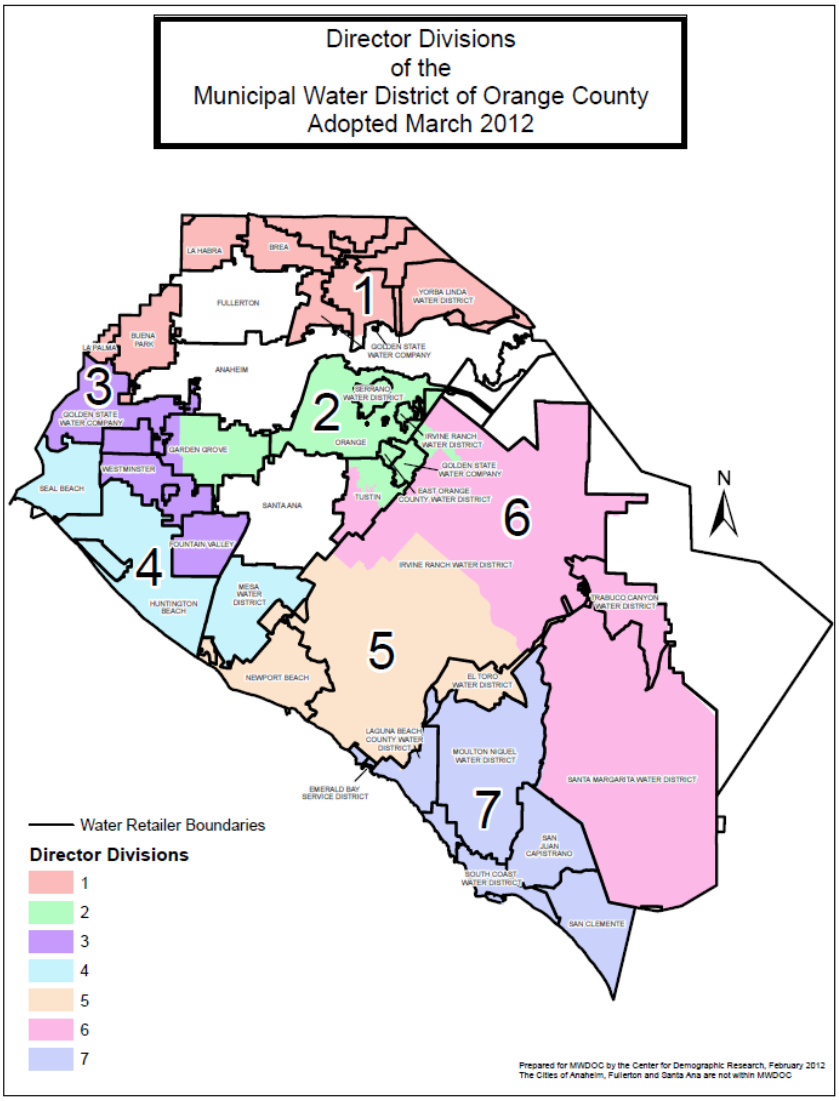

Figure 1-1: MWDOC Board of Directors Map, by Director Division

1.2.4 Goals and Objectives

MWDOC's Mission Statement is "*To provide reliable, high-quality supplies from Metropolitan Water District of Southern California and other sources to meet present and future needs, at an equitable and economical cost, and to promote water use efficiency for all of Orange County.*"

MWDOC's related water management goals and objectives are to

- Represent the interests of the public within its jurisdiction;
- Appoint its representative directors to the Board of Metropolitan;
- Inform its directors and its retail agencies about Metropolitan issues;
- Guide Metropolitan in its planning efforts and act as a resource of information and advocate for our retail agencies;
- Purchase water from Metropolitan and represent the interest of our service area at Metropolitan;
- Work together with Orange County water agencies and others to focus on solutions and priorities for improving Orange County's future water supply reliability;
- Cooperate with and assist OCWD and other agencies in coordinating the balanced use of the area's imported and native surface and groundwater;
- Plan and manage the allocation of imported water to its retail agencies during periods of shortage;
- Coordinate and facilitate the resolution of water issues and development of joint water projects among its retail agencies;
- Represent the public and assist its retail agencies in dealing with other governmental entities at the local, regional, state, and federal levels on water-related issues; and
- Inform its retail agencies and inform and educate the general public on matters affecting present and future water use and supply.

As a regional wholesaler, MWDOC has roles that are broadly applicable to all of its retail agencies. A key goal of MWDOC is to provide broad reaching services and programs that the retail agencies cannot reasonably provide as single entities.

MWDOC works with other agencies to promote efficient use of Orange County's water supply. As previously stated, MWDOC is a signatory to the MOU monitored by the California Urban Water Conservation Council (CUWCC), which outlines 14 Best Management Practices (BMP) for urban water use efficiency. The urban water use efficiency practices are intended to reduce long-term urban demands from what they would have been without implementation of these practices, and are in addition to programs that may be instituted during occasional water supply shortages.

For more than 30 years, MWDOC's Public Information and Water Education programs have reached thousands of consumers and nearly 90,000 Orange County students annually. The programs are performed on behalf of, and in coordination with, MWDOC's retail agencies and are designed to facilitate a student's understanding of current water issues as well as the challenges, opportunities, and costs involved in securing a reliable supply of high quality water.

In 2004, MWDOC formed a partnership with the Discovery Science Center to bring the School Education Program to more students and provide them with even greater educational experiences in the areas of water and science.

1.3 Service Area

MWDOC is a regional water wholesaler and resource planning agency, managing all of Orange County's imported water supply with the exception of water imported to the cities of Anaheim, Fullerton, and Santa Ana. MWDOC serves more than 2.3 million residents in a 600-square-mile service area (see Figure 1-2 below). It is committed to ensuring water reliability for the communities it serves. To that end, MWDOC focuses on sound planning and appropriate investments in water supply, water use efficiency, regional delivery infrastructure, and emergency preparedness.

MWDOC serves imported water in Orange County to 28 retail water agencies. MWDOC has informed these water suppliers of its available supplies in accordance with CWC 10631. These entities, comprised of cities and water districts, are referred to as MWDOC retail agencies and provide water to approximately 2.3 million customers. MWDOC retail agencies include

- City of Brea
- City of Buena Park
- City of Fountain Valley
- City of Garden Grove
- City of Huntington Beach
- City of La Habra
- City of La Palma
- City of Newport Beach
- City of Orange
- City of San Clemente
- City of San Juan Capistrano
- City of Seal Beach
- City of Tustin
- City of Westminster
- East Orange County Water District (EOCWD)
- El Toro Water District (ETWD)
- Emerald Bay Services District (EBSD)
- Irvine Ranch Water District (IRWD)
- Laguna Beach County Water District (LBCWD)
- Mesa Water District (Mesa)
- Moulton Niguel Water District (MNWD)
- Orange County Water District (OCWD)
- Santa Margarita Water District (SMWD)
- Serrano Water District (Serrano)
- South Coast Water District (SCWD)
- Golden State Water Company (GSWC)
- Trabuco Canyon Water District (TCWD)
- Yorba Linda Water District (YLWD)

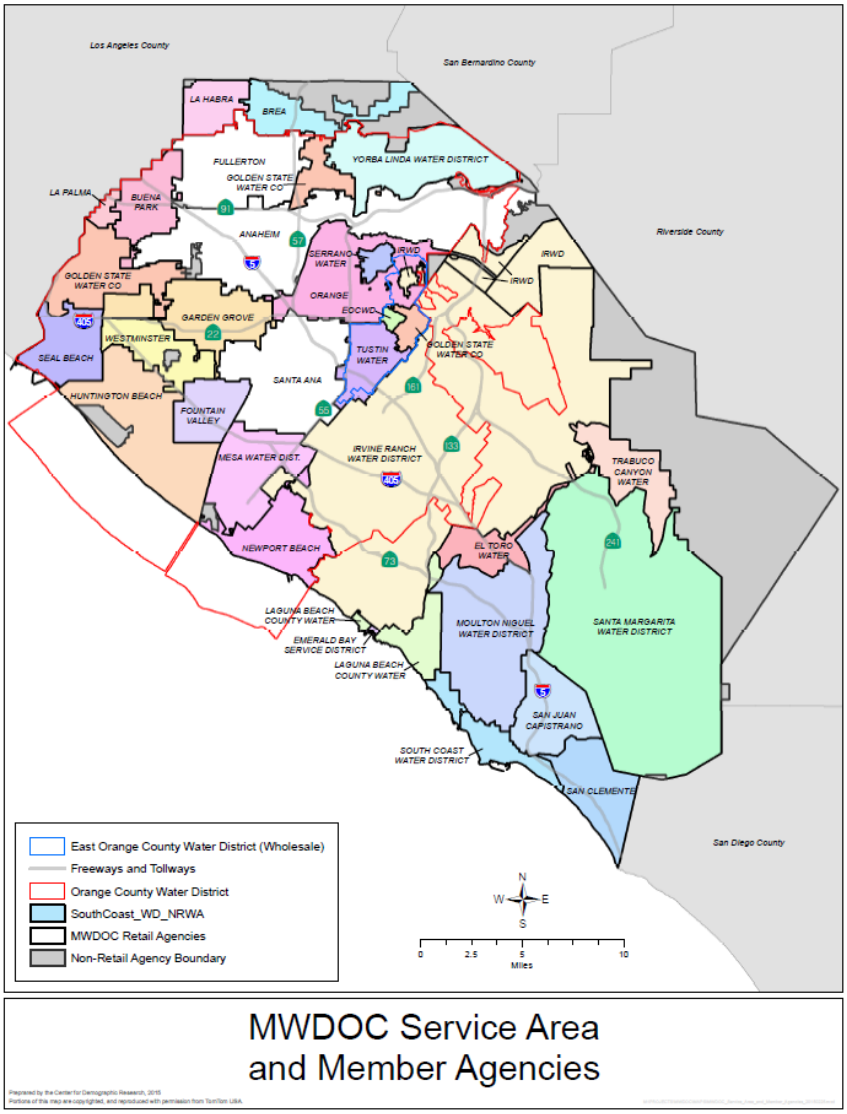

Figure 1-2: Regional Location of Urban Water Supplier

Orange County relies on numerous sources of water and water purveyors to meet the needs of its growing population, sources include imported water, groundwater, surface water, and recycled water.

Imported water provided by Metropolitan from Northern California and the Colorado River meet approximately half of the County's water needs. However, this dependence of 50 percent imported water does not apply evenly over the entire service area. South Orange County relies on imported water to meet approximately 95 percent of its water demand. The remaining five percent is provided by surface water, limited groundwater, and water recycling. North Orange County relies roughly 30 percent on imported water, as a result of their ability to rely on the Orange County Groundwater Basin to meet a majority of their demands.

OCWD manages the Orange County Groundwater basin. The groundwater basin, which underlies north and central Orange County, provides approximately 62 percent of the water needed in that area; with imported water meeting the remaining balance of the water demand. Groundwater is pumped by producers before being delivered to customers.

Figure 1-3 illustrates the water service organization in the MWDOC service area.

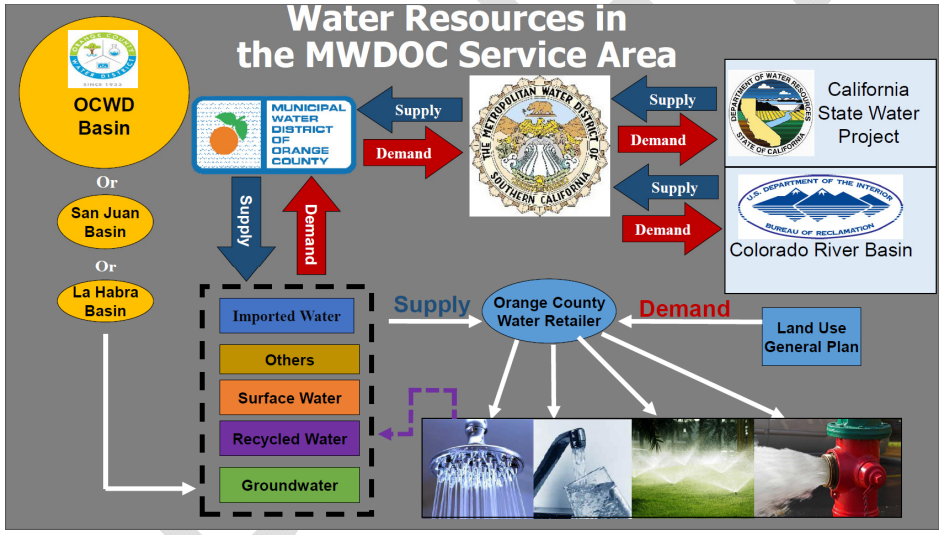

Figure 1-3: Water Service Organization in MWDOC's Service Area

2 WATER DEMAND

2.1 Overview

One of the main objectives of this UWMP is to provide an insight into MWDOC's future water demands. This section describes MWDOC service area's current and future water demands, factors that influence demands, and the methodology used to forecast of future water demands over the next 25 years. In addition, to satisfy SBx7-7 requirements for the Regional Alliance, this section provides details of MWDOC's SBx7-7 compliance method selection, baseline water use calculation, and 2015 and 2020 water use targets.

Similar to all of California, MWDOC's urban water demands has been largely shaped by Governor's Emergency Regulations. This is the result of one of the most severe droughts in California's history, requiring a collective reduction in statewide urban water use of 25 percent by February 2016, with each agency in the state given a specific reduction target by DWR. In response to the Governor's mandate, MWDOC's retail agencies carried out aggressive outreach efforts and implemented higher (more restrictive) stages of their water conservation ordinance.

As shown below, MWDOC service area's municipal and industrial (M&I) water use for the fiscal year (FY) 2014-15 totaled 432,276 AF. This is roughly the same amount of water used 25 years ago (1990-91); all the while the service area's population has grown 32 percent since 1990 as shown on Figure 2-1.

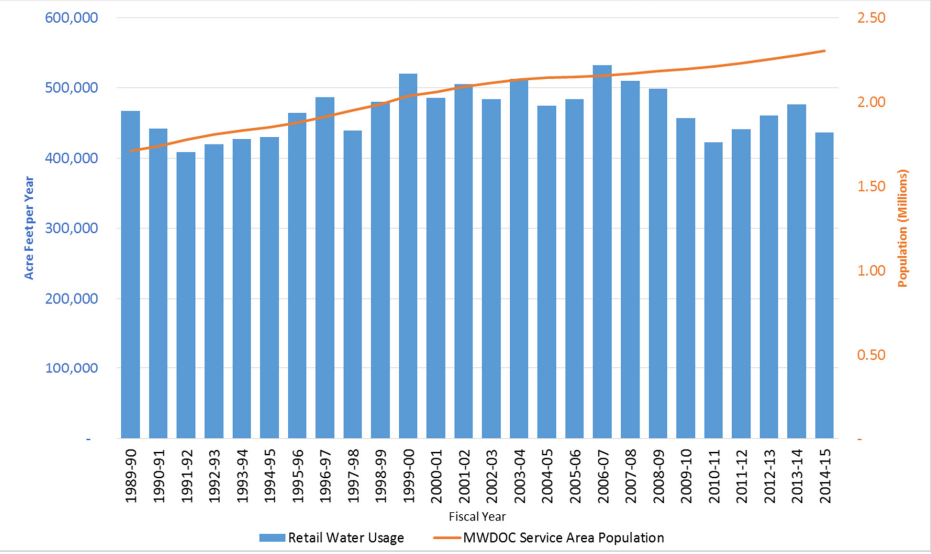

Figure 2-1: MWDOC's Service Area Historical Water Demand and Population

2.2 Factors Affecting Demand

Water demands within MWDOC's service area are dependent on many factors such as local climate conditions, demographics, land use characteristics, and economics. Below is a description of factors that influence water demand.

2.2.1 Climate Characteristics

MWDOC's service area is located within the South Coast Air Basin (SCAB) that encompasses all of Orange County, as well as the urban areas of Los Angeles, San Bernardino, and Riverside Counties. The SCAB climate is characterized by southern California's "Mediterranean" climate: a semi-arid environment with mild winters, warm summers and moderate rainfall.

Local rainfall and temperature greatly influence water usage in the service area. Most of the biggest variation in annual water demand are due to changes in rainfall and temperature. In Orange County, the average daily temperatures range from 58 ˚F in December and January to 74 ˚F in August in a typical year. The average annual precipitation is 14 inches, although the region is subject to significant variations in annual precipitation. The average evapotranspiration (ET) is almost 50 inches per year which is four times the annual average rainfall. This translates to a high demand for landscape irrigation for homes, commercial properties, parks, and golf courses.

It should also be noted that Metropolitan's core water supplies from the SWP and the CRA are significantly influenced by climate conditions in northern California and the Colorado River Basin, respectively. Both regions have been suffering from multi-year drought conditions due to record low precipitation which directly impact water supplies to southern California.

2.2.2 Demographics

MWDOC serves a 2015 population of 2,302,578 according to the California State University at Fullerton's Center of Demographics Research (CDR). MWDOC's population is representative of 28 retail agencies which include 14 cities and 14 water districts. The population is projected to increase 10 percent by 2040, representing an average growth rate of 0.4 percent per year.

Projected growth decreased slightly since the 2010 UWMP due to less than expected economic rebound. However, housing, in particular within the cities, is becoming denser with new multi-storied residential units. This is apparent in many of the cities located in the northern and central areas of MWDOC's service area. Whereas in South Orange County, the southern portion of MWDOC's service area, there still remains open land suitable for further development and growth. Table 2-1 shows the population projections in five-year increments out to 2040 within MWDOC's service area.

Table 2-1: Current and Projected MWDOC Service Area Population

Wholesale: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040
	2,302,578	2,409,256	2,470,451	2,505,284	2,527,230	2,533,088
NOTES: Center for Demographic Research at California State University, Fullerton, 2015						

As shown below in Table 2-2, the number of Housing Units in the MWDOC service area is expected to increase by 11.7 percent in the next 25 years from 791,404 in 2015 to 883,864 in 2040. While the number of persons per household is projected to remain relatively flat, urban employment in the service area is expected to rise by 13.5 percent over the next 25 years.

Table 2-2: MWDOC Service Area Demographics

MWDOC Service Area Demographics						
Demographics	2015	2020	2025	2030	2035	2040
Occupied Housing Units	**791,404**	**814,115**	**836,907**	**849,545**	**862,183**	**883,864**
Single Family	525,735	538,990	547,622	551,054	560,304	569,960
Multi-Family	265,668	275,125	289,285	298,491	301,879	313,903
Persons per Household	**2.89**	**2.91**	**2.89**	**2.89**	**2.85**	**2.89**
Urban Employment	**1,150,840**	**1,174,471**	**1,207,065**	**1,230,646**	**1,259,511**	**1,305,817**
Source: Metropolitan 2015 UWMP						

2.3 Direct and Indirect Water Use

There are two types of water use in Orange County. “Direct use” is the consumption of water directly piped from treatment facilities or wells to homes, commercial, institutional, and industrial buildings, landscape, and agriculture. “Indirect use” is the use of water to replenish groundwater basins and to serve as a hydrologic barrier against seawater intrusion. Although this water is used to fill the groundwater basins or act as a seawater barrier it will eventually become a future source of supply for Orange County residents, thus an indirect use.

Integrating the two usages of water in the planning process can be confusing and misleading and does not necessarily reflect the actual level of consumptive water demand in the region. In practice, the two types of water usage are often shown separately. The following subsections will discuss these two types of uses separately.

2.3.1 Direct Use – Municipal/Industrial and Agricultural Demands

Direct water use in Orange County includes municipal, industrial, and agricultural use. It represents on average approximately 90 percent of MWDOC's total demands. Demands for direct use are met through imported water, groundwater, local surface water, and recycled water. M&I demands represent the full spectrum of water use within a region, including residential and commercial, industrial, institutional (CII), as well as un-metered uses (e.g. hydrant flushing, fire-fighting). Agricultural demands represent less than 1 percent of the total direct use. It has significantly decreased over the years due to development and growth within the service area.

Direct Use water demands total 432,276 AF in FY 2014-15, roughly 36,000 AF or 12 percent less than the 10-year average. This decrease is the result of recent statewide water conservation mandates imposed on retail agencies throughout the state. While MWDOC's service area M&I demands are expected to return to average, conservation and public awareness will likely keep future demands increases relative low.

2.3.2 Indirect Use – Replenishment and Barrier Demands

Indirect water use in Orange County includes water to replenish groundwater basins and to serve as a barrier against seawater intrusion. It represents on average 10 percent of MWDOC's total demands. Most, if not all of the indirect water use delivered is for managing and replenishing the Orange County Groundwater Basin. This water is purchased by the OCWD, a special district created by the state and governed by a ten-member Board of Directors to protect, manage, and replenish the Orange County Groundwater Basin with purchased imported water, storm water, and recycled water. OCWD further protects the groundwater basin from seawater intrusion through the injection of imported and recycled water along the coast, known as the Talbert Injection Barrier.

Since demands for replenishment of the groundwater basin storage and seawater barriers are driven by the availability of supply for Orange County, the demand forecast for this type of use is based on the projection of the following supplies under normal conditions:

- Santa Ana River Flows;
- Incidental Recharge;
- Imported supplies from Metropolitan; and
- Recycled supplies for replenishment & seawater barrier use.

In addition to Replenishment and Barrier demands, MWDOC also provides imported water to meet the needs of surface water demands, such as Irvine Lake. The water delivered to Irvine Lake is used for both consumptive and storage water purposes. Imported water delivered into Irvine Lake can held for a short or long periods of time to be later delivered for consumptive use. On average, surface water demands total 7,300 AFY.

Figure 2-2 shows the historical demand of imported water for indirect consumption in MWDOC's service area.

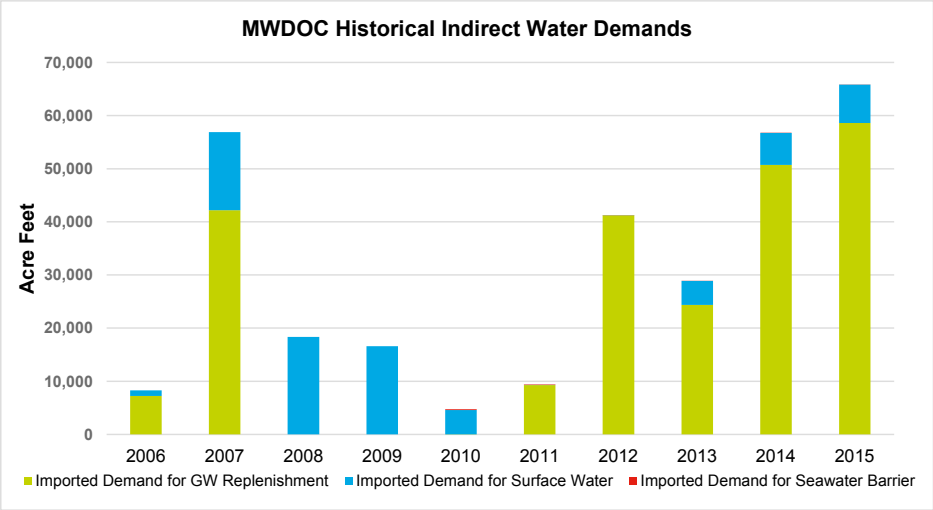

Figure 2-2: MWDOC Historical Indirect Water Demands

2.4 MWDOC Demand Projections

MWDOC's service area total retail water demand in FY 2014-2015 was 499,120 AF, which was met through a combination of 45 percent groundwater, 45 percent imported water, 2 percent surface water, and 8 percent recycled water. This includes both direct and indirect water use. Under normal conditions, total retail water demands are projected to increase to 515,425 AF by the year 2040 or 3.27 percent over the next 25 years. This demand projection comes from MWDOC's Orange County (OC) Reliability Study that considered such factors as current and future demographics, future conservation measures, and ground & surface water needs. Below is a detail description of the methodology used to calculated MWDOC's demand projections.

2.4.1 Demand Projection Methodology

The water demand projections were an outcome of the Orange County (OC) Reliability Study led by MWDOC where demand projections were divided into three regions within Orange County: Brea/La Habra, Orange County Groundwater Basin, and South County. The demand projections were obtained based on multiplying a unit water use factor and a demographic factor for three water use sectors, including single-family and multi-family residential (in gallons per day per household), and non-residential (in gallons per day per employee). The unit water use factors were based on a survey of Orange County water agencies (FY 2013-14) and represent a normal weather, normal economy, and non-drought condition. Additionally, MWDOC worked with OCWD to determine groundwater replenishment and seawater barrier demands. MWDOC also worked with Metropolitan to obtain projections on employment

and economic growth in the MWDOC service area, which was taken into account when developing the demand projections.

Also included was the effects of water conservation on demand projections. Three trajectories were developed representing three levels of conservation: 1) continued with existing levels of conservation (lowest conservation), 2) addition of future passive measures and active measures (baseline conservation), and 3) aggressive turf removal program - 20 percent removal by 2040 (aggressive conservation). The second level of conservation, i.e. baseline demand projection, was selected for the 2015 UWMP. The baseline scenario assumes the implementation of future passive measures affecting new developments, including the Model Water Efficient Landscape, plumbing code efficiencies for toilets, and expected plumbing code for high-efficiency clothes washers. It also assumes the implementation of future active measures, assuming the implementation of Metropolitan incentive programs at historical annual levels seen in Orange County.

The OC Reliability Study also considered the drought impacts on demands by applying the assumption that water demands will bounce back to 85 percent of 2014 levels i.e. pre-drought levels by 2020 and 90 percent by 2025, and continue at 90 percent of unit water use through 2040. The unit water use factor multiplied by a demographic factor yields demand projections without new conservation. To account for new conservation, projected savings from new passive and active conservation were subtracted from these demands. Figure 2-3 shows MWDOC's historical and future demand forecast.

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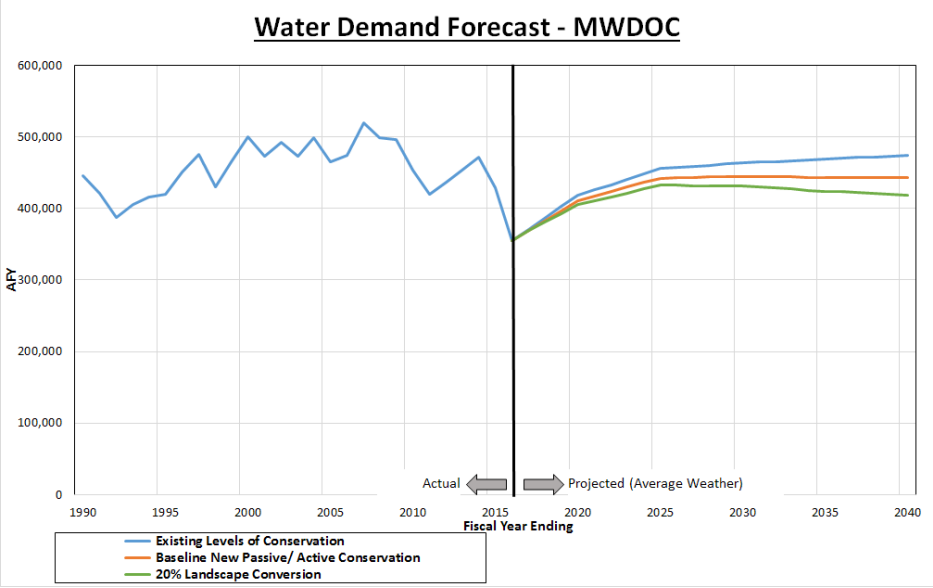
Figure 2-3: MWDOC Water Demand Forecast



2.4.2 25 Year Total Demand Projections

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Based on the OC Reliability Study Demand methodology, MWDOC's total water demands for the next 25 years are shown in Table 2-3.

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Table 2-3: MWDOC Service Area Total Demands – Current and Projected (AFY)

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MWDOC Service Area Total Demands – Projected (AFY)						
Water Source	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**
OCWD Basin GW	202,403	196,035	207,383	208,510	208,438	208,665
Non-OCWD GW	20,036	27,297	27,477	27,477	27,477	27,477
Recycled	41,280	49,415	58,157	63,546	66,344	66,842
Surface Water	9,893	5,000	5,000	5,000	5,000	5,000
Imported Water (Retail M&I)	158,664	132,826	144,254	140,203	135,913	135,135
Total MWDOC Direct-Use Water Demand	**432,276**	**410,573**	**442,271**	**444,735**	**443,171**	**443,119**
Imported Demand for Surface Water	8,227	7,306	7,306	7,306	7,306	7,306
Imported Demand for GW Replenishment	58,617	65,000	65,000	65,000	65,000	65,000
Total MWDOC Indirect-Use Water Demand	**499,120**	**482,879**	**514,577**	**517,041**	**515,477**	**515,425**

The demand data presented in this section accounts for additional future passive measures and active measures. Passive savings are water savings as a result of codes, standards, ordinances and public outreach on water conservation and higher efficiency fixtures. Active savings are water savings as a result of water conservation rebates, programs, and incentives.

As described in previous sections, MWDOC provides only imported water to its service area. Table 2-4 below shows MWDOC's total projected demand of imported water.

Table 2-4: MWDOC's Total Imported Water Demands (AFY)

MWDOC's Total Imported Water Demands (AFY)						
	2015	2020	2025	2030	2035	2040
M&I Water Demands	158,664	132,826	144,254	140,203	135,913	135,135
Groundwater Replenishment and Surface Water Demands	66,844	72,306	72,306	72,306	72,306	72,306
Recycled Water	0	0	0	0	0	0
TOTAL MWDOC IMPORTED WATER DEMAND	**225,508**	**205,132**	**216,560**	**212,509**	**208,219**	**207,441**
NOTES: Includes all M&I as well as GW replenishment and surface water demands						

2.5 SBx7-7 Requirements

The Water Conservation Act of 2009, also known as SBx7-7, signed into law on February 3, 2010, requires the State of California to reduce urban water use by 20 percent by the year 2020. To achieve this each retail urban water supplier must determine baseline water use during their baseline period and target water use for the years 2015 and 2020 to meet the state's water reduction goal. Retail water suppliers are required to comply with SBx7-7 individually or as a region in collaboration with other retail water suppliers, or demonstrate they have a plan or have secured funding to be in compliance, in order to be eligible for water related state grants and loans on or after July 16, 2016.

As a wholesale water supplier, MWDOC is not required to establish a baseline or set targets for daily per capita water use. However, it is required to provide an assessment of its present and proposed future measures, programs and policies that will help its retail water suppliers achieve their SBx7-7 water use reduction targets. One of the ways MWDOC is assisting its retail agencies is by leading the coordination of Orange County Regional Alliance for all of the retail agencies in Orange County. MWDOC's role is to assist each retail water supplier in Orange County in analyzing the requirements and establishing their baseline and target water use, as guided by DWR (DWR, Technical Methodologies, February 2011[1]).

The following sections describe the efforts by MWDOC to assist retail agencies in complying with the requirements of SBx7-7, including the formation of a Regional Alliance to provide additional flexibility to all water suppliers in Orange County. This section also includes the documentation of calculations that allow retail water suppliers to use recycled water for groundwater recharge (indirect reuse) to offset a portion of their potable demand when meeting the regional as well as individual water use targets for compliance purposes. A discussion of programs implemented to support retail agencies in achieving their per capita water reduction goals is covered in Section 4 – Demand Management Measures of this UWMP.

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2.5.1 Orange County 20x2020 Regional Alliance

MWDOC in collaboration with all of its retail agencies as well as the Cities of Anaheim, Fullerton, and Santa Ana, has created the Orange County 20x2020 Regional Alliance in an effort to create flexibility in meeting the daily per capita water use targets. This Regional Alliance allows all of Orange County to benefit from regional investments, such as the Groundwater Replenishment System (GWRS), recycled water, and water conservation programs. The members of the Orange County 20x2020 Regional Alliance are shown in Table 2-5.

[1] An *Updated Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* document is pending DWR management approval and is expected in April 2016.

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Table 2-5: Members of Orange County 20x2020 Regional Alliance

Orange County 20x2020 Regional Alliance	
Anaheim	Moulton Niguel Water District
Brea	Newport Beach
Buena Park	Orange
East Orange County Water District	San Clemente
El Toro WD	San Juan Capistrano
Fountain Valley	Santa Ana
Fullerton	Santa Margarita Water District
Garden Grove	Seal Beach
Golden State Water Company	Serrano Water District
Huntington Beach	South Coast Water District
Irvine Ranch Water District	Trabuco Canyon Water District
La Habra	Tustin
La Palma	Westminster
Laguna Beach County Water District	Yorba Linda Water District
Mesa Water District	

Within a Regional Alliance, each retail water supplier will have an additional opportunity to achieve compliance under either an individual target or a regional water use target.

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- If the Regional Alliance meets its water use target on a regional basis, all agencies in the alliance are deemed compliant.
- If the Regional Alliance fails to meet its water use target, each individual supplier will have an opportunity to meet their water use targets individually.

Individual water suppliers in the Orange County 20x2020 Regional Alliance will state their participation in the Alliance, and include the regional 2015 and 2020 water use targets in their individual UWMPs.

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As the reporting agency for the Orange County 20x2020 Regional Alliance, MWDOC has documented the calculations for the regional urban water use reduction targets. MWDOC will also provide annual monitoring and reporting for the region on progress toward the regional per capita water use reduction targets.

2.5.2 Water Use Target Calculations

To preserve maximum flexibility in the Orange County 20x2020 Regional Alliance, each water supplier in the Regional Alliance first calculates its individual target in its retail UWMP as if it were complying individually. Then, the individual targets are weighted by each supplier's population and averaged over all members in the alliance to determine the regional water use target.

2.5.2.1 Retail Agency Compliance Targets

As described above, the first step in calculating a regional water use target is to determine each water supplier's individual target. DWR has established four target options for urban retail water suppliers to choose from in calculating their water use reduction targets under SBx7-7. The four options are as follows:

- *Option 1* requires a simple 20 percent reduction from the baseline by 2020 and 10 percent by 2015.
- *Option 2* employs a budget-based approach by requiring an agency to achieve a performance standard based on three metrics
  - Residential indoor water use of 55 gallons per capita per day (GPCD)
  - Landscape water use commensurate with the Model Landscape Ordinance
  - 10 percent reduction in baseline CII water use
- *Option 3* is to achieve 95 percent of the applicable state hydrologic region target as set forth in the State's 20x2020 Water Conservation Plan.
- *Option 4* requires the subtraction of Total Savings from the baseline GPCD:
  - Total savings includes indoor residential savings, meter savings, CII savings, and landscape and water loss savings.

MWDOC has analyzed each of these options, and has worked with all retail agencies in Orange County to assist them in selecting the most suitable option in 2010 and 2015. In 2015, retail water agencies may update their 2020 water use target using a different target method than was used in 2010. However, the target method is not permitted to change after the 2015 UWMP is submitted.

2.5.2.2 Regional Targets Calculation and 2015 Compliance

The regional water use targets for the Orange County 20x2020 Regional Alliance are calculated by weighting the individual retail agency water use targets by population and averaging them over all members of the alliance. The calculation of the baseline water use and water use targets in the 2010 UWMP was based on the 2000 U.S. Census population numbers obtained from CDR. In 2015, the baseline water use and water use targets for all retail agencies have been revised using population numbers based on the 2010 U.S. Census obtained from CDR in 2012.

The regional alliance target calculation is provided below in Table 2-5. Column (1) shows the 2015 population for each individual supplier. The individual targets for each supplier is provided in column (2) for the interim 2015 targets, and column (4) for the final 2020 targets.

To calculate the weighted averages for each retail water supplier, the population is multiplied by the individual targets to get a weighted total for each individual supplier. This is found in column (3) for the interim 2015 targets and in column (5) for the final 2020 targets. The regional targets for the Orange County 20x2020 Regional Alliance are then derived as the sum of the individual weighted averages divided by the total population for a regional alliance.

For example, the 2020 water use target for the City of Brea is 222 GPCD, and the 2015 population is 43,093. By multiplying this 2020 target by the population, the result is a weighted average of 9,513,018. The sum of the weighted averages for all members of the Orange County 20x2020 Regional Alliance is 479,137,952. By dividing this weighted total by the regional population of 3,138,846, the resulting regional 2020 water use target is 158 GPCD.

The source of the information in Table 2-6, including the population figures, is from within the individual 2015 UWMPs for each water supplier in the Orange County 20x2020 Regional Alliance.

Table 2-6: Calculation of Regional Urban Water Use Targets for Orange County 20x2020 Regional Alliance

Calculation of Regional Compliance Daily Per Capita Water Use					
Orange County 20x2020 Regional Alliance	**(1) 2015 Population**	**(2) Individual GPCD 2015**	**(3) Weighted Total 2015**	**(4) Individual Targets 2020**	**(5) Weighted Total 2020**
Brea	43,093	222	9,581,501	221	9,513,018
Buena Park	82,791	121	10,034,039	158	13,102,421
East Orange CWD RZ	3,257	206	671,970	232	756,925
El Toro WD	48,797	158	7,704,992	163	7,951,415
Fountain Valley	57,908	122	7,053,791	142	8,196,877
Garden Grove	176,649	102	17,999,322	142	25,004,666
Golden State WC	169,573	109	18,449,432	142	24,003,058
Huntington Beach	198,429	105	20,776,526	142	28,087,625
Irvine Ranch WD	379,510	109	41,456,743	170	64,663,229
La Habra	61,843	138	8,555,901	150	9,292,066
La Palma	16,030	91	1,452,524	140	2,243,890
Laguna Beach CWD	20,311	160	3,250,029	163	3,308,708
Mesa Water	107,588	114	12,254,327	145	15,552,825
Moulton Niguel WD	170,326	140	23,918,392	173	29,410,570
Newport Beach	65,777	177	11,640,781	203	13,322,487
Orange	138,987	145	20,118,020	181	25,089,782
San Clemente	51,385	157	8,065,839	153	7,853,609
San Juan Capistrano	38,829	178	6,908,041	183	7,116,874
Santa Margarita WD	156,949	152	23,858,542	169	26,471,025
Seal Beach	23,706	110	2,598,237	142	3,355,584
Serrano WD	6,464	219	1,415,140	386	2,492,565
South Coast WD	35,004	151	5,280,304	150	5,261,051
Trabuco Canyon WD	12,712	208	2,649,553	200	2,539,757
Tustin	68,088	122	8,286,943	151	10,294,836
Westminster	93,785	93	8,706,701	130	12,195,988
Yorba Linda WD	74,787	203	15,195,992	237	17,698,918
Anaheim	360,142	128	45,964,321	162	58,460,008
Fullerton	140,827	146	20,546,762	179	25,141,917
Santa Ana	335,299	82	27,471,738	116	38,756,257
Regional Alliance Total	3,138,846	**125**	391,866,402	**158**	497,137,952

* Calculated using the first option for calculating regional compliance from page 53 of the Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use, dated October

Table 2-7 provides the regional urban water use targets for the Orange County 20x2020 Regional Alliance – the 2015 target is 178 GPCD and the 2020 target is 158 GPCD. The actual 2015 GPCD achieved by the regional alliance is 125 GPCD indicating that not only has the region met its 2015 target but it has already well below its 2020 water use target. This is indicative of the collective efforts of MWDOC and retail agencies in reducing water use in the region. Note, the target and actual GPCD values listed include appropriate deductions for recycled water used for indirect potable reuse as detailed below.

Table 2-7: Urban Water Use Targets for Orange County 20x2020 Regional Alliance

	2015 GPCD	2020 Target
Orange County 20X2020 Regional Alliance	125	158

2.5.2.3 Deducting Recycled Water Used for Indirect Potable Reuse

SBx7-7 allows urban retail water suppliers to calculate a deduction for recycled water entering their distribution system indirectly through a groundwater source. Individual water suppliers within the Orange County Groundwater Basin have the option of choosing this deduction to account for the recharge of recycled water into the Orange County Groundwater Basin by OCWD, historically through Water Factory 21, and more recently by GWRS. These deductions also benefit all members of the Orange County 20x2020 Regional Alliance.

MWDOC has provided the documentation for the calculations of this deduction to assist retail water suppliers if they choose to include recycled water for indirect potable reuse in their individual targets. This calculation is applied as a deduction from the water supplier's calculation of Gross Water Use.

Table 2-8 provides the calculation deducting recycled water for indirect potable reuse for Orange County Groundwater Basin Agencies. Because year-to-year variations can occur in the amount of recycled water applied in a groundwater recharge operations, a previous five year average of recharge is used, as found in column (1). To account for losses during recharge and recovery, a factor of 96.5 percent is applied in column (2).

After accounting for these losses, the estimated volume of recycled water entering the distribution system is calculated in column (3).

In column (4), the annual deduction for recycled water for indirect potable reuse is expressed as a percentage of the total volume of water extracted from the Orange County Groundwater Basin in that year. This is the annual percentage of total OCWD basin production that is eligible for a deduction. For individual water suppliers in the OCWD Basin, the annual deduction is calculated as their basin pumping in a given year multiplied by the value in column (4).

For example, if Agency A pumped 10,000 AF of water from the OCWD Basin in Fiscal Year 2004-05, then 1.47 percent of that total production would be deducted from the agency's calculation of Gross Water Use for that year as found in column (4). This equates to a deduction of 147 AF.

Table 2-8: Calculation of Annual Deductible Volume of Indirect Recycled Water Entering Distribution System

Deduct Recycled Water Used for Indirect Potable Reuse [1]						
Fiscal Year Ending	Total Groundwater Recharge	(1) 5-Year Average Recharge (Acre-Feet)	(2) Loss Factor for Recharge & Recovery	(1) x (2) = (3) Volume Entering Distribution System (Acre-Feet)	Total Basin Production	(4) Percent of Total Basin Production
1990	6,498	6,498	96.5%	6,271	229,878	2.73%
1991	6,634	6,498	96.5%	6,271	235,532	2.66%
1992	6,843	6,566	96.5%	6,336	244,333	2.59%
1993	8,161	6,658	96.5%	6,425	243,629	2.64%
1994	5,042	7,034	96.5%	6,788	237,837	2.85%
1995	2,738	6,636	96.5%	6,403	276,096	2.32%
1996	4,282	5,884	96.5%	5,678	302,273	1.88%
1997	4,389	5,413	96.5%	5,224	310,217	1.68%
1998	2,496	4,922	96.5%	4,750	297,726	1.60%
1999	3,489	3,789	96.5%	3,657	322,476	1.13%
2000	5,774	3,479	96.5%	3,357	320,250	1.05%
2001	2,067	4,086	96.5%	3,943	323,129	1.22%
2002	4,143	3,643	96.5%	3,515	322,590	1.09%
2003	3,867	3,594	96.5%	3,468	274,927	1.26%
2004	1,784	3,868	96.5%	3,733	272,954	1.37%
2005	4,156	3,527	96.5%	3,404	232,199	1.47%
2006	4,086	3,203	96.5%	3,091	215,172	1.44%
2007	218	3,607	96.5%	3,481	284,706	1.22%
2008	17,792	2,822	96.5%	2,723	351,622	0.77%
2009	54,261	5,607	96.5%	5,411	310,586	1.74%
2010	65,950	16,103	96.5%	15,539	273,889	5.67%
2011	66,083	28,461	96.5%	27,465	248,659	11.05%
2012	71,678	40,861	96.5%	39,431	266,066	14.82%
2013	72,877	55,153	96.5%	53,223	298,175	17.85%
2014	66,167	66,170	96.5%	63,854	318,967	20.02%
2015	76,546	68,551	96.5%	66,152	296,292	22.33%
2016						
2017						
2018						
2019						
2020						

[1] Indirect is recycled water for groundwater recharge through spreading and injection of GWRS and Water Factory 21. The yearly totals are apportioned among the OCWD Basin agencies on the basis of groundwater production over a five year rolling average.

[2] Loss factor provided by OCWD, includes loss over county lines to LA Basin.

The deductible amount of indirect recycled water increased four folds from 2010 to approximately 66,000 AF in 2015 as a result of the full production from GWRS. OCWD has additional expansion plans for GWRS, which are expected to further increase the deductible amount of indirect recycled water up to approximately 98,400 AF.

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3 WATER SOURCES AND SUPPLY RELIABILITY

3.1 Overview

Water supplies in MWDOC's service area are from local and imported sources. MWDOC delivers water, purchased from Metropolitan, to its retail agencies in order to supplement their local supplies. In FY 2014-15, MWDOC supplied approximately 158,664 AFY of imported water to its retail agencies for M&I purposes and 66,844 AFY for groundwater replenishment and surface water purposes. Imported water represents approximately 35 percent of total water supply in the MWDOC service area. Sources of Metropolitan's imported water include the CRA and SWP.

Local supplies developed by individual retail agencies, primarily groundwater, presently account for approximately 65 percent of the service area's water supplies. Local supplies include groundwater, recycled water, and surface water. The primary groundwater basin, Orange County Groundwater Basin is located in the northern portion of MWDOC's service area.

Figure 3-1 shows a breakdown of all sources within MWDOC's service area. Although MWDOC only delivers imported water to its retail agencies, other sources of water are obtained locally and are specific to each retail agency. Note: GWRS Supplies are included as part of groundwater pumping numbers.

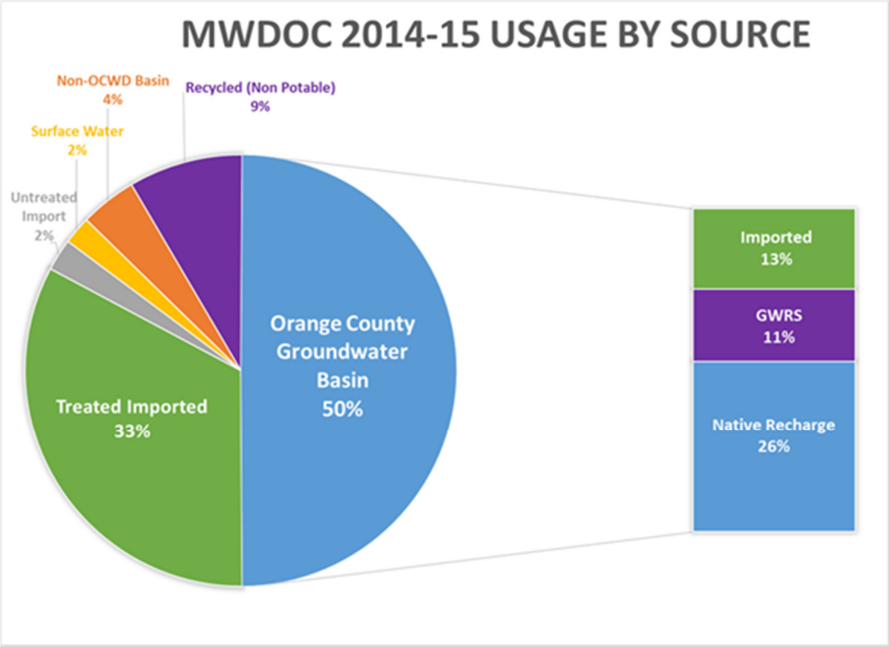

Figure 3-1: Water Supply Sources within MWDOC

MWDOC and its retail agencies collectively work together to improve the water reliability within the service area by developing additional local supplies and by implementing water use efficiency efforts. MWDOC works in collaboration with two primary agencies – Metropolitan and OCWD to insure a safe and high quality water supply.

Figure 3-2 provides a summary illustrating the different water sources in MWDOC service area and for all of Orange County:

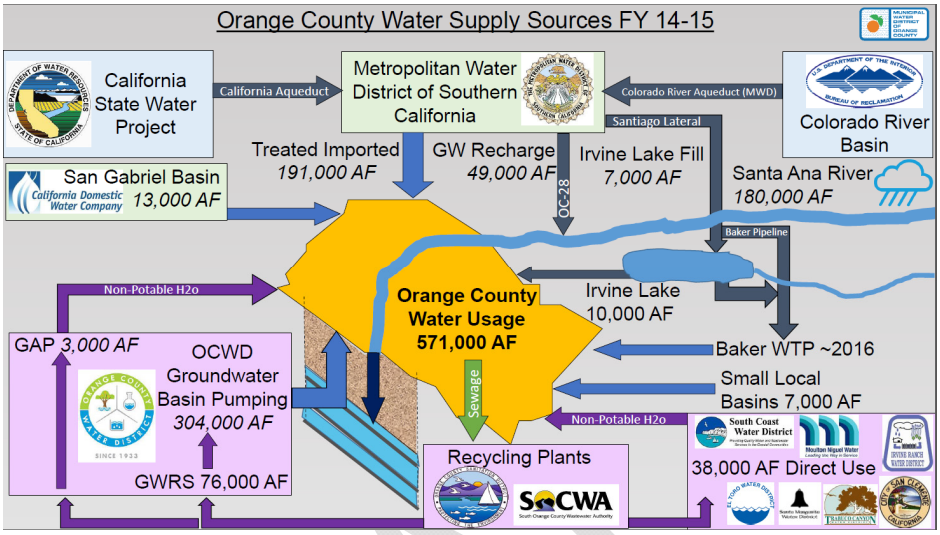

Figure 3-2: Orange County Water Supply Sources

The following sections provide a detailed discussion of MWDOC's water source portfolio as well as projections for the next 25 years. In addition, this section will evaluate MWDOC's projected supply and demand under various hydrological conditions to determine its supply reliability during a 25 year planning horizon.

3.2 Metropolitan Water District of Southern California

Metropolitan is the largest water wholesaler for domestic and municipal uses in California, serving approximately 21.9 million customers. Metropolitan wholesales imported water supplies to 26 member cities and water districts in six southern California counties. Its service area covers the southern California coastal plain, extending approximately 200 miles along the Pacific Ocean from the City of Oxnard on the north to the international boundary with Mexico on the south. This encompasses 5,200 square miles and includes portions of Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura counties. Approximately85 percent of the population from the aforementioned counties reside with Metropolitan's boundaries.

Metropolitan is governed by a Board of Directors comprised of 38 appointed individuals with a minimum of one representative from each of Metropolitan's 26 member agencies. The allocation of directors and voting rights are determined by each agency's assessed valuation. Each member of the Board shall be entitled to cast one vote for each ten million dollars ($10,000,000) of assessed valuation of property taxable for district purposes, in accordance with Section 55 of the Metropolitan Water District Act (Metropolitan Act). Directors can be appointed through the chief executive officer of the member agency

or by a majority vote of the governing board of the agency. Directors are not compensated by Metropolitan for their service.

Metropolitan is responsible for importing water into the region through its operation of the CRA and its contract with the State of California for SWP supplies. Major imported water aqueducts bringing water to southern California are shown in Figure 3-3. Member agencies receive water from Metropolitan through various delivery points and pay for service through a rate structure made up of components including uniform volumetric rates, capacity charges and readiness to serve charges. Member agencies provide estimates of imported water demand to Metropolitan annually in April regarding the amount of water they anticipate they will need to meet their demands for the next five years.

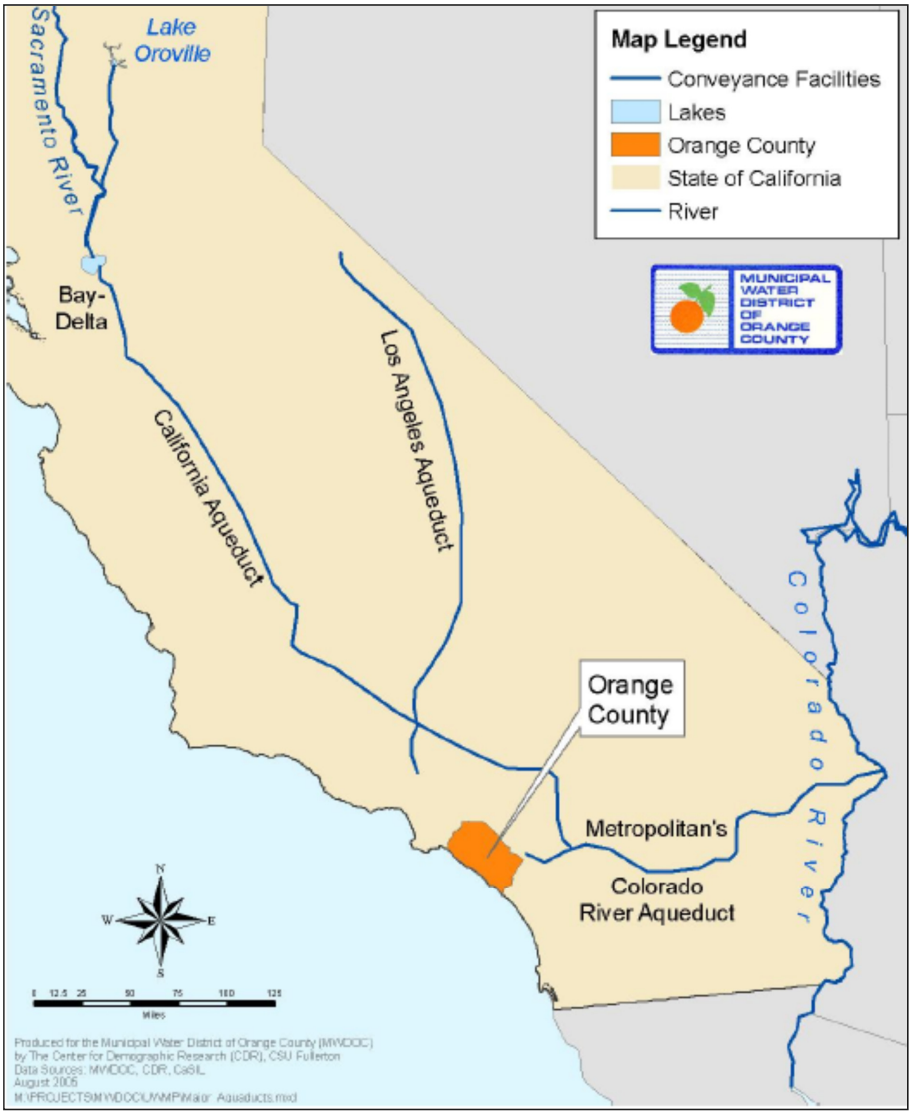

Figure 3-3: Major Aqueducts Bringing Water to Southern California

In Orange County, MWDOC and the cities of Anaheim, Fullerton, and Santa Ana are Metropolitan member agencies that purchase imported water directly from Metropolitan. Furthermore, MWDOC purchases both treated potable and untreated water from Metropolitan to supplement its retail agencies' local supplies. Figure 3-4 illustrates the Metropolitan feeders and major transmission pipelines that deliver water within Orange County (Metropolitan, 2015 Draft UWMP, March 2016).

Figure 3-4: Metropolitan Feeders and Transmission Mains Serving Orange County

3.2.1 Metropolitan's 2015 Urban Water Management Plan

Metropolitan's 2015 Urban Water Management Plan reports on its water reliability and identifies projected supplies to meet the long-term demand within its service area. The Metropolitan 2015 UWMP discusses the current water supply conditions and long-term plans for supply implementation and continued development of a diversified resource mix. It describes the programs being implemented such as: the CRA, SWP, and Central Valley storage/transfer programs, water use efficiency programs, local resource projects, and in-region storage that will enable the region to meet its water supply needs. Metropolitan's 2015 UWMP also presents Metropolitan's supply capacities from 2020 through 2040 for average year, single dry-year, and multiple dry-years as specified in the UWMP Act.

Information concerning Metropolitan's UWMP, including the background, associated challenges, and long-term development of programs for each of Metropolitan's supply sources and capacities have been summarized and included herein. Additional information on Metropolitan can be found directly in Metropolitan's 2015 UWMP, http://www.mwdh2o.com/PDF_About_Your_Water/2015_UWMP.pdf

3.2.2 Colorado River Aqueduct

The Colorado River was Metropolitan's original source of water after Metropolitan's establishment in 1928. The CRA, which is owned and operated by Metropolitan, transports water from the Colorado River to its terminus at Lake Mathews in Riverside County. The actual amount of water per year that may be conveyed through the CRA to Metropolitan's member agencies is subject to the availability of Colorado River water for delivery.

The CRA includes supplies from the implementation of the Quantification Settlement Agreement and related agreements to transfer water from agricultural agencies to urban uses. The 2003 Quantification Settlement Agreement enabled California to implement major Colorado River water conservation and transfer programs, stabilizing water supplies for 75 years and reducing the state's demand on the river to its 4.4 MAF entitlement. Colorado River transactions are potentially available to supply additional water up to the CRA capacity of 1.25 million acre-feet (MAF) on an as-needed basis. Water from the Colorado River or its tributaries is available to users in California, Arizona, Colorado, Nevada, New Mexico, Utah, and Wyoming, as well as to Mexico. California is apportioned the use of 4.4 MAF of water from the Colorado River each year plus one-half of any surplus that may be available for use collectively in Arizona, California, and Nevada. In addition, California has historically been allowed to use Colorado River water apportioned to but not used by Arizona or Nevada. Metropolitan has a basic entitlement of 550,000 AFY of Colorado River water, plus surplus water up to an additional 662,000 AFY when the following conditions exists (Metropolitan, 2015 Draft UWMP, March 2016):

- Water unused by the California holders of priorities 1 through 3
- Water saved by the Palo Verde land management, crop rotation, and water supply program
- When the U.S. Secretary of the Interior makes available either one or both:
  - Surplus water is available
  - Colorado River water is apportioned to but unused by Arizona and/or Nevada

Unfortunately, Metropolitan has not received surplus water for a number of years. The Colorado River supply faces current and future imbalances between water supply and demand in the Colorado River Basin due to long term drought conditions. Over the past 16 years (2000-2015), there have only been three years when the Colorado River flow has been above average (Metropolitan, 2015 Draft UWMP, March 2016). The long-term imbalance in future supply and demand is projected to be approximately 3.2 MAF by the year 2060.

Approximately 40 million people rely on the Colorado River and its tributaries for water with 5.5 million acres of land using Colorado River water for irrigation. Climate change will also affect future supply and demand as increasing temperatures may increase evapotranspiration from vegetation along with an increase in water loss due to evaporation in reservoirs, therefore reducing the available amount of supply from the Colorado River and exacerbating imbalances between increasing demands from rapid growth and decreasing supplies.

Four water supply scenarios were developed around these uncertainties, each representing possible water supply conditions. These four scenarios are as follow:

- **Observed Resampled:** future hydrologic trends and variability are similar to the past approximately 100 years.
- **Paleo Resampled:** future hydrologic trends and variability are represented by reconstructions of streamflow for a much longer period in the past (approximately 1,250 years) that show expanded variability.
- **Paleo Conditioned:** future hydrologic trends and variability are represented by a blend of the wet-dry states of the longer paleo-reconstructed period.
- **Downscaled General Circulation Model (GCM) Projected:** future climate will continue to warm, with regional precipitation and temperature trends represented through an ensemble of future downscaled GCM projections.

The Colorado River Basin Water Supply and Demand Study (Study) assessed the historical water supply in the Basin through two historical streamflow data sets, from the year 1906 through 2007 and the paleo-reconstructed record from 762 through 2005. The following are findings from the study:

- Increased temperatures in both the Upper and Lower Colorado River Basins since the 1970s has been observed.
- Loss of springtime snowpack was observed with consistent results across the lower elevation northern latitudes of the western United States. The large loss of snow at lower elevations strongly suggest the cause is due to shifts in temperature.
- The deficit between the two year running average flow and the long-term mean annual flow that started in the year 2000 is more severe than any other deficit in the observed period, at nine years and 28 MAF deficit.
- There are deficits of greater severity from the longer paleo record compared to the period from 1906 through 2005. One deficit amounted to 35 MAF through a span of 16 years.

- A summary of the trends from the observed period suggest declining stream flows, increases in variability, and seasonal shifts in streamflow that may be related to shifts in temperature.

Findings concerning the future projected supply were obtained from the Downscaled GCM Projected scenario as the other methods did not consider the impacts of a changing climate beyond what has occurred historically. These findings include:

- Increased temperatures are projected across the Basin with larger changes in the Upper Basin than in the Lower Basin. Annual Basin-wide average temperature is projected to increase by 1.3 degrees Celsius over the period through 2040.
- Projected seasonal trends toward drying are significant in certain regions. A general trend towards drying is present in the Basin, although increases in precipitation are projected for some higher elevation and hydrologically productive regions. Consistent and expansive drying conditions are projected for the spring and summer months throughout the Basin, although some areas in the Lower Basin are projected to experience slight increases in precipitation, which is thought to be attributed to monsoonal influence in the region. Upper Basin precipitation is projected to increase in the fall and winter, and Lower Basin precipitation is projected to decrease.
- Snowpack is projected to decrease due to precipitation falling as rain rather than snow and warmer temperatures melting the snowpack earlier. Areas where precipitation does not change or increase is projected to have decreased snowpack in the fall and early winter. Substantial decreases in spring snowpack are projected to be widespread due to earlier melt or sublimation of snowpack.
- Runoff (both direct and base flow) is spatially diverse, but is generally projected to decrease, except in the northern Rockies. Runoff is projected to increase significantly in the higher elevation Upper Basin during winter but is projected to decrease during spring and summer.

The following future actions must be taken to implement solutions and help resolve the imbalance between water supply and demand in areas that use Colorado River water (U.S. Department of the Interior USBR, Colorado River Basin Water Supply and Demand Study, December 2012):

- Resolution of significant uncertainties related to water conservation, reuse, water banking, and weather modification concepts.
- Costs, permitting issues, and energy availability issues relating to large-capacity augmentation projects need to be identified and investigated.
- Opportunities to advance and improve the resolution of future climate projections should be pursued.
- Consideration should be given to projects, policies, and programs that provide a wide-range of benefits to water users and healthy rivers for all users.

3.2.2.1 Background on Colorado River Aqueduct Supplies

Historically, Metropolitan's fifth priority rights under the Seven Party Agreement were satisfied with water allocated to Arizona and Nevada that these states did not use. Beginning in 1985, with the commencement of Colorado River water deliveries to the Central Arizona Project, year-to-year availability of Colorado River water to Metropolitan became uncertain. The Secretary of the Interior asserted that California's users of Colorado River water had to limit their use to a total of 4.4 MAF per year, plus any

available surplus water. Under the auspices of the State's Colorado River Board, these users developed a draft plan to resolve the problems, which was known as "California's Colorado River Water Use Plan" (California Plan).

The California Plan characterized how California would develop a combination of programs to allow the state to limit its annual use of Colorado River water to 4.4 MAF per year plus any available surplus water. The 2003 Quantification Settlement Agreement (QSA) among Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), and Metropolitan is a critical component of this plan. It established a baseline water use for each of these agencies and facilitates the transfer of water from agricultural agencies to urban uses, and specifies that IID, CVWD, and Metropolitan would forbear use of water to permit the Secretary of the Interior to satisfy the uses of the non-encompassed present perfected rights (PPRs). The PPR holders include certain Indian reservation, federal wildlife refuges, and other users, some but not all of which are encompassed by the Seven Party Agreement.

3.2.2.2 Current Conditions of the Colorado River Aqueduct

On November 5, 2003, IID filed a validation action in Imperial County Superior Court, seeking a judicial determination that thirteen agreements associated with the IID/San Diego County Water Authority (SDCWA) water transfer and the QSA are valid, legal and binding. Other lawsuits also were filed challenging the execution, approval and subsequent implementation of the QSA on various grounds. One of the key issues was the constitutionality of the QSA Joint Powers Authority Agreement, pursuant to which IID, CVWD, and SDCWA agreed to commit $133 million toward certain mitigation costs associated with implementation of the transfer of 300 TAF of water conserved by IID pursuant to the QSA, and the State agreed to be responsible for any mitigation costs exceeding this amount. A final judgment was issued on February 11, 2015, holding that the State's commitment was unconditional in nature and, as such, violated the State's debt limitation under the California Constitution, and that eleven other agreements, including the QSA, also are invalid because they are inextricably interrelated with the QSA Joint Powers Authority Agreement and the funding mechanism it established to cover such mitigation costs.

Metropolitan, CVWD and SDCWA have filed appeals of the court's decision, which will stay the ruling pending outcome of the appeal. If the ruling stands, it could delay the implementation of programs authorized under the QSA or result in increased costs or other adverse impacts. The impact, if any, which the ruling might have on Metropolitan's water supplies cannot be adequately determined at this time.

3.2.2.3 Colorado River Programs and Long-Term Planning

Metropolitan has identified a number of programs that could be used to achieve the regional long-term development targets for the CRA and has entered into or is exploring agreements with a number of agencies as discussed below. These programs are described in greater detail in Metropolitan's 2015 UWMP.

Existing and proposed Colorado River Water Management Programs include:

- ***IID / Metropolitan Conservation Program*** - Under this program, Metropolitan has funded water efficiency improvements within IID's service area in return for the right to divert the water conserved by those investments.

- ***Palo Verde Land Management, Crop Rotation, and Water Supply Program*** - Under this program, participating farmers in Palo Verde Irrigation District (PVID) are paid to reduce their water use by not irrigating a portion of their land.
- ***Southern Nevada Water Authority (SNWA) and Metropolitan Storage and Interstate Release Agreement*** - Under this agreement, additional Colorado River supplies are made available to Metropolitan when there is space available in the CRA to receive the water. SNWA may call on Metropolitan to reduce is Colorado River water order to return this water no earlier than 2019, unless Metropolitan agrees otherwise.
- ***Lower Colorado Water Supply Project*** - Under this contract, Metropolitan receives, on an annual basis, Lower Colorado Water Supply Project water unused by the City of Needles and other entities with no rights or insufficient rights to use of Colorado River water in California.
- ***Lake Mead Storage Program*** - This program allows Metropolitan to storage "Intentionally Created Surplus" conserved through extraordinary conservation in Lake Mead.

3.2.2.4 Available Supplies on Colorado River Aqueduct

Metropolitan's current CRA program capabilities under average year, single dry year, and multiple dry year hydrologies are shown below in Table 3-1 (Metropolitan, Draft 2015 UWMP, March 2016). The projections essentially indicate that Metropolitan can achieve a full CRA whenever needed, by augmenting supplies from ICS, fallowing or other exchange opportunities. This analysis has not considered the potential for shortage declarations on the Colorado River under the condition that the Lake Mead elevation declines to 1000 feet; at this point, new provisions would need to be put into place to handle such a situation.

Table 3-1: Metropolitan Colorado River Aqueduct Program Capabilities

Colorado River Aqueduct
Program Capabilities
Year 2035
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
Basic Apportionment – Priority 4	550,000	550,000	550,000
IID/MWD Conservation Program	85,000	85,000	85,000
Priority 5 Apportionment (Surplus)	250,000	0	21,000
PVID Land Management, Crop Rotation, and Water Supply Program	130,000	130,000	130,000
Lower Colorado Water Supply Project	5,000	5,000	5,000
Lake Mead ICS Storage Program	400,000	400,000	400,000
Binational ICS	8,000	24,000	24,000
Forbearance for Present Perfected Rights	(2,000)	(2,000)	(2,000)
CVWD SWP/QSA Transfer Obligation	(35,000)	(35,000)	(35,000)
DWCV SWP Table A Obligation	(45,000)	(42,000)	(118,000)
DWCV SWP Table A Transfer Callback	23,000	22,000	61,000
DWCV Advance Delivery Account	22,000	20,000	57,000
SNWA Agreement Payback	0	0	(5,000)
Subtotal of Current Programs	***1,391,000***	***1,157,000***	***1,173,000***
Programs Under Development			
SNWA Interstate Banking Agreement	0	0	0
Additional Fallowing Programs	25,000	25,000	25,000
Subtotal of Proposed Programs	***25,000***	***25,000***	***25,000***
Additional Non-Metropolitan CRA Supplies			
SDCWA/IID Transfer	200,000	200,000	200,000
Coachella & All-American Canal Lining			
To SDCWA	82,000	82,000	82,000
To San Luis Rey Settlement Parties[1]	16,000	16,000	16,000
Subtotal of Non-Metropolitan Supplies	***298,000***	***298,000***	***298,000***
Maximum CRA Supply Capability[2]	**1,714,000**	**1,480,000**	**1,496,000**
Less CRA Capacity Constraint (amount above 1.20 MAF)	*(464,000)*	*(230,000)*	*(246,000)*
Maximum Expected CRA Deliveries[3]	**1,200,000**	**1,200,000**	**1,200,000**
Less Non-Metropolitan Supplies[4]	*(298,000)*	*(298,000)*	*(298,000)*
Maximum Metropolitan Supply Capability[5]	**902,000**	**902,000**	**902,000**

[1] Subject to satisfaction of conditions specified in agreement among Metropolitan, the United States, and the San Luis Rey Settlement Parties
[2] Total amount of supplies available without taking into consideration CRA capacity constraint.
[3] The Colorado River Aqueduct delivery capacity is 1.20 MAF annually.
[4] Exchange obligation for the SDCWA-IID transfer and exchange and the Coachella and All American Canal Lining projects.
[5] The amount of CRA water available to Metropolitan after meeting its exchange obligations.

3.2.3 State Water Project

3.2.3.1 Background

The SWP consists of a series of pump stations, reservoirs, aqueducts, tunnels, and power plants operated by DWR and is an integral part of the effort to ensure that business and industry, urban and suburban residents, and farmers throughout much of California have sufficient water. The SWP is the largest state-built, multipurpose, user-financed water project in the United States. Nearly two-thirds of residents in California receive at least part of their water from the SWP with approximately 70 percent of SWP's contracted water supply going to urban users and 30 percent to agricultural users. The primary purpose of the SWP is to divert and store water during wet periods in Northern and Central California and distribute it to areas of need in Northern California, the San Francisco Bay area, the San Joaquin Valley, the Central Coast, and southern California.

The availability of water supplies from the SWP can be highly variable. A wet water year may be followed by a dry or critically dry year and fisheries issues can restrict the operations of the export pumps even when water supplies are available.

The Sacramento-San Joaquin River Delta (Delta) is key to the SWP's ability to deliver water to its agricultural and urban contractors. All but five of the 29 SWP contractors receive water deliveries below the Delta (pumped via the Harvey O. Banks or Barker Slough pumping plants). However, the Delta faces many challenges concerning its long-term sustainability such as climate change posing a threat of increased variability in floods and droughts. Sea level rise complicates efforts in managing salinity levels and preserving water quality in the Delta to ensure a suitable water supply for urban and agricultural use. Furthermore, other challenges include continued subsidence of Delta islands, many of which are below sea level, and the related threat of a catastrophic levee failure as the water pressure increases, or as a result of a major seismic event.

Ongoing regulatory restrictions, such as those imposed by federal biological opinions (Biops) on the effects of SWP and the federal Central Valley Project (CVP) operations on certain marine life, also contributes to the challenge of determining the SWP's water delivery reliability. In dry, below-normal conditions, Metropolitan has increased the supplies delivered through the California Aqueduct by developing flexible CVP/SWP storage and transfer programs. The goal of the storage/transfer programs is to develop additional dry-year supplies that can be conveyed through the available Harvey O. Banks pumping plant capacity to maximize deliveries through the California Aqueduct during dry hydrologic conditions and regulatory restrictions. In addition, the California State Water Resources Control Board (SWRCB) has set water quality objectives that must be met by the SWP including minimum Delta outflows, limits on SWP and CVP Delta exports, and maximum allowable salinity level.

Metropolitan's Board approved a Delta Action Plan in June 2007 that provides a framework for staff to pursue actions with other agencies and stakeholders to build a sustainable Delta and reduce conflicts between water supply conveyance and the environment. The Delta action plan aims to prioritize immediate short-term actions to stabilize the Delta while an ultimate solution is selected, and mid-term steps to maintain the Delta while a long-term solution is implemented. Currently, Metropolitan is working towards addressing three basin elements: Delta ecosystem restoration, water supply conveyance, and flood control protection and storage development.

3.2.3.2 Current Conditions on State Water Project

"Table A" water is the maximum entitlement of SWP water for each water contracting agency. Currently, the combined maximum Table A amount is 4.17 MAFY. Of this amount, 4.13 MAFY is the maximum Table A water available for delivery from the Delta pumps as stated in the State Water Contract, however, deliveries commonly are less than 50% of the Table A.

SWP contractors may receive Article 21 water on a short-term basis in addition to Table A water if requested. Article 21 of SWP contracts allows contractors to receive additional water deliveries only under specific conditions, generally during wet months of the year (December through March). Because an SWP contractor must have an immediate use for Article 21 supply or a place to store it outside of the SWP, there are few contractors like Metropolitan that can access such supplies. .

Carryover water is SWP water allocated to an SWP contractor and approved for delivery to the contractor in a given year but not used by the end of the year. The unused water is stored in the SWP's share of San Luis Reservoir, when space is available, for the contractor to use in the following year.

Turnback pool water is Table A water that has been allocated to SWP contractors that has exceeded their demands. This water can then be purchased by another contractor depending on its availability.

SWP Delta exports are the water supplies that are transferred directly to SWP contractors or to San Luis Reservoir storage south of the Delta via the Harvey O. Banks pumping plant. Estimated average annual Delta exports and SWP Table A water deliveries have generally decreased since 2005, when Delta export regulations affecting SWP pumping operations became more restrictive due to the Biops. A summary SWP water deliveries from the years 2005 and 2013 is summarized in Table 3-2.

Table 3-2: Metropolitan Colorado River Aqueduct Program Capabilities

Year	Average Annual Delta Exports	Average Annual Table A Deliveries
2005	2.96 MAF	2.82 MAF
2013	2.61 MAF	2.55 MAF
Percent Change	-11.7%	-9.4%

The following factors affect the ability to estimate existing and future water delivery reliability:

- Water availability at the source: Availability depends on the amount and timing of rain and snow that fall in any given year. Generally, during a single dry year or two, surface and groundwater storage can supply most water deliveries, but multiple dry years can result in critically low water reserves.
- Water rights with priority over the SWP: Water users with prior water rights are assigned higher priority in DWR's modeling of the SWP's water delivery reliability, even ahead of SWP Table A water.
- Climate change: mean temperatures are predicted to vary more significantly than previously expected. This change in climate is anticipated to bring warmer winter storms that result in less snowfall at lower elevations, reducing total snowpack. From historical data, DWR projects that by 2050, the Sierra snowpack will be reduced from its historical average by 25 to 40 percent. Increased precipitation as rain could result in a larger number of "rain-on-snow" events, causing snow to melt

earlier in the year and over fewer days than historically, affecting the availability of water for pumping by the SWP during summer.

- Regulatory restrictions on SWP Delta exports due to the Biops to protect special-status species such as delta smelt and spring- and winter-run Chinook salmon. Restrictions on SWP operations imposed by state and federal agencies contribute substantially to the challenge of accurately determining the SWP's water delivery reliability in any given year.
- Ongoing environmental and policy planning efforts: the California WaterFix involves water delivery improvements that could reduce salinity levels by diverting a greater amount of lower salinity Sacramento water to the South Delta export pumps. The EcoRestore Program aims to restore at least 30,000 acres of Delta habitat, and plans to be well on the way to meeting that goal by the year 2020.
- Delta levee failure: The levees are vulnerable to failure because most original levees were simply built with soils dredged from nearby channels and were not engineered. A breach of one or more levees and island flooding could affect Delta water quality and SWP operations for several months. When islands are flooded, DWR may need to drastically decrease or even cease SWP Delta exports to evaluate damage caused by salinity in the Delta.

The Delta Risk Management Strategy addresses the problem of Delta levee failure and evaluates alternatives to reduce the risk to the Delta. Four scenarios were developed to represent a range of possible risk reduction strategies (Department of Water Resources, The State Water Project Final Delivery Capability Report 2015, July 2015). They are:

- ***Trial Scenario 1 Improved Levees:*** This scenario looks at improving the reliability of Delta levees against flood-induced failures by providing up to 100-year flood protection. The report found that improved levees would not reduce the risk of potential water export interruptions, nor would it change the seismic risk of most levees.
- ***Trial Scenario 2 Armored Pathway:*** This scenario looks at improving the reliability of water conveyance by creating a route through the Delta that has high reliability and the ability to minimize saltwater intrusion into the south Delta. The report found that this scenario would have the joint benefit of reducing the likelihood of levee failures from flood events and earthquakes, and of significantly reducing the likelihood of export disruptions.
- ***Trial Scenario 3 Isolated Conveyance:*** This scenario looks to provide high reliability for conveyance of export water by building an isolated conveyance facility on the east side of the Delta. The effects of this scenario are similar to those for Trial Scenario 2 but with the added consequence of seismic risk of levee failure on islands that are not part of the isolated conveyance facility.
- ***Trial Scenario 4 Dual Conveyance:*** This scenario is a combination of Scenarios 2 and 3 as it looks to improve reliability and flexibility for conveyance of export water by constructing an isolated conveyance facility and through-Delta conveyance. It would mitigate the vulnerability of water exports associated with Delta levee failure and offer flexibility in water exports from the Delta and the isolated conveyance facility. However, seismic risk would not be reduced on islands not part of the export conveyance system or infrastructure pathway.

DWR has altered the SWP operations to accommodate species of fish listed under the ESAs (biops), and these changes have adversely impacted SWP deliveries. DWR's Water Allocation Analysis indicated that export restrictions are currently reducing deliveries to Metropolitan as much as 150 TAF to 200 TAF under median hydrologic conditions.

Operational constraints likely will continue until a long-term solution to the problems in the Bay-Delta is identified and implemented. New biological opinions for listed species under the Federal ESA or by the California Department of Fish and Game's issuance of incidental take authorizations under the Federal ESA and California ESA might further adversely affect SWP and CVP operations. Additionally, new litigation, listings of additional species or new regulatory requirements could further adversely affect SWP operations in the future by requiring additional export reductions, releases of additional water from storage or other operational changes impacting water supply operations.

3.2.3.3 State Water Project Programs and Long-Term Planning

Metropolitan's implementation approach for the SWP depends on restoration of pre-biops exports based on implementation of a number of agreements, including the Sacramento Valley Water Management (Phase 8 Settlement Agreement and the Bay-Delta Conservation Plan (BDCP – now called the California WaterFix). The California WaterFix is being pursued through a collaboration of state, federal, and local water agencies, state and federal fish agencies, environmental organizations, and other interested parties with the ultimate goal of developing a set of actions that will provide for both species/habitat protection and improved reliability of water supplies. The Phase 8 Settlement Agreement was developed among Bay-Delta watershed users to determine how all Bay-Delta water users would bear some of the responsibility of meeting flow requirements.

Other programs and agreements that Metropolitan has implemented to improve management of SWP supplies include:

- ***Monterey Amendment*** – This settlement between SWP contractors and DWR altered the water allocation procedures such that both shortages and surpluses would be shared in the same manner for all contractors, eliminating the prior "agriculture first" shortage provision.
- ***SWP Terminal Storage*** – Metropolitan has contractual rights to 65 TAF of flexible storage at Lake Perris and 154 TAF of flexible storage at Castaic Lake, which provides Metropolitan with additional options for maximizing yield from the SWP. It can provide Metropolitan with 73 TAF of additional supply over multiply dry-years, and in a single-dry year as much as 219 TAF.
- ***Yuba Dry Year Water Purchase Program*** – Metropolitan entered into this agreement with DWR in 2007 to provide for Metropolitan's participation in the Yuba Dry Year Water Purchase Program, which provides transfers of water from the Yuba County Water Agency during dry years through 2025.
- ***Desert Water Agency/CVWD SWP Table A Transfer*** – Under this agreement, Metropolitan transferred 100 TAF of its SWP Table A contractual amount to Desert Water Agency/CVWD. Metropolitan is able to recall the SWP transfer water in years in which Metropolitan determines it needs the water to meet its water management goals. The main benefit of the agreement is to reduce Metropolitan's SWP fixed costs in wetter years when there are more than sufficient supplies to meet Metropolitan's water management goals, while at the same time preserving its dry-year SWP supply.

- ***Desert Water Agency/CVWD Advance Delivery Program*** – Under this program, Metropolitan delivers Colorado River water to the Desert Water Agency and CVWD in advance of the exchange for their SWP Contract Table A allocations. By delivering enough water in advance to cover Metropolitan's exchange obligations, Metropolitan is able to receive Desert Water Agency and CVWD's available SWP supplies in years in which Metropolitan's supplies are insufficient without having to deliver an equivalent amount of Colorado River water.
- ***Desert Water Agency/CVWD Other SWP Deliveries*** – Since 2008, Metropolitan has provided Desert Water Agency and CVWD written consent to take delivery from the SWP facilities non-SWP supplies separately acquired by each agency.
- ***Diamond Valley Lake (DVL)*** – The completion and filling of DVL between 1999 and 2003 marked the most important achievement with respect to protecting southern California against a SWP system outage. The lake can hold up to 810 TAF that provides a portion of southern California's six-month emergency water supply as well as carryover and regulatory storage. The remainder of the six-month emergency supply is held in other SWP reservoirs in southern California and in other Metropolitan reservoirs. It should be noted that the utility of DVL has been compromised by the existence of the quagga mussel in Colorado River supplies. The original design of DVL anticipated storage of both CRA and SWP water; to keep quaggas out of the DVL system, Metropolitan has made the decision to eliminate storage of any CRA supplies in DVL.
- ***Inland Feeder Project*** – The Inland Feeder project is a high-capacity water delivery system designed to increase southern California's water supply reliability. The project will take advantage of large volumes of water when available from northern California, depositing it in surface storage reservoirs, such as Diamond Valley Lake, and local groundwater basins for use during dry periods and emergencies.

3.2.3.4 Available Supplies on State Water Project

Metropolitan's current SWP (also known as the California Aqueduct) program capabilities under average year, single dry year, and multiple dry year hydrologies are shown below in Table 3-3 (Metropolitan, Draft 2015 UWMP, March 2016).

Table 3-3: Metropolitan California Aqueduct Program Capabilities

California Aqueduct
Program Capabilities
Year 2035
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
MWD Table A	410,000	210,000	1,181,000
DWCV Table A	45,000	42,000	118,000
San Luis Carryover [1]	80,000	240,000	240,000
Article 21 Supplies	0	0	51,000
Yuba River Accord Purchase	0	0	0
Subtotal of Current Programs	***535,000***	***492,000***	***1,590,000***
Programs Under Development			
Delta Improvements	87,000	178,000	205,000
Subtotal of Proposed Programs	***87,000***	***178,000***	***205,000***
Maximum Supply Capability	**622,000**	**670,000**	**1,795,000**

[1] Includes DWCV carryover.

3.2.4 Central Valley/State Water Project Storage and Transfer Programs

Storage is a major component of Metropolitan's dry year resource management strategy. Metropolitan's likelihood of having adequate supply capability to meet projected demands, without implementing its Water Supply Allocation Plan (WSAP), is dependent on its storage resources. Metropolitan aims to increase the reliability of its supplies through the development of flexible SWP storage and transfer programs. Over the years, Metropolitan has developed numerous voluntary Central Valley storage and transfer programs, aiming to develop additional dry-year water supplies.

3.2.4.1 Background on State Water Project Transfers

Metropolitan has formed partnerships in the past with Central Valley agricultural districts as well as with other southern California SWP Contractors in order to manage the wide fluctuations of SWP supplies. Metropolitan's storage and transfer programs were established to augment SWP reliability in dry years. Metropolitan's Board determined that the criteria for operating the SWP did not provide sufficient reliability to meet Metropolitan's overall supply reliability objectives. Most recently, DWR's estimates of SWP reliability capability show that SWP reliability under conditions similar to 1977, the driest year on record, could be significantly worse than earlier modeling indicated.

Metropolitan believes that it now has in place Central Valley/SWP storage and transfer programs capable of reaching its planning target, and it has several other programs under development.

3.2.4.2 Current Programs and Long-Term Planning on State Water Project

Metropolitan currently has several Central Valley/SWP storage programs in operation. Metropolitan is also pursuing a new storage program with Antelope Valley-East Kern Water Agency, and it is currently under development. In addition, Metropolitan pursues Central Valley water transfers on an as needed basis. Existing and planned storage and transfer programs include:

- ***Semitropic Storage Program***- Under this program, Metropolitan can store portions of its SWP entitlement water in excess of the amounts needed to meet its demands. The water is delivered to farmers in the Semitropic Water Storage District (SWSD) who use the water in lieu of pumping groundwater. During dry years, Metropolitan's previously stored water is returned by direct groundwater pumping by the SWSD and the exchange of SWP entitlement water. The maximum storage capacity of the program is 350 TAF.
- ***Arvin-Edison Storage Program***- This program was amended in 2008 to include the South Canal Improvement Project, which increases reliability and improves the quality of water returned to the California Aqueduct. Metropolitan can use the program to store excess SWP Table A supplies during wet years. The water can either be directly recharged into the groundwater basin or delivered to farmers in the Arvin-Edison Water Storage District who use the water in-lieu of pumping groundwater. During dry years, the water is returned to Metropolitan by direct groundwater pumping or by exchange of surface water supplies. The program storage capacity is 350 TAF.
- ***San Bernardino Valley MWD Storage Program***- This program allows Metropolitan to purchase a portion of San Bernardino Valley Municipal Water District's SWP supply. The program has a minimum purchase provision of 20 TAF and can deliver up to 70 TAF, depending on hydrologic conditions. The agreement also allows Metropolitan to store up to 50 TAF of transfer water for use in dry years. This agreement can be renewed until December 31, 2035. ***San Gabriel Valley MWD Exchange Program*** – This program allows for the exchange of up to 5 TAF each year. For each AF Metropolitan delivers to the City of Sierra Madre, a San Gabriel Valley MWD member agency, San Gabriel Valley MWD provides two AF to Metropolitan in the Main San Gabriel Basin, up to 5 TAF.
- ***Antelope Valley-Kern Water Agency Exchange and Storage Program*** – This program allows for every two AF Metropolitan receives, Metropolitan returns one AF to AVEK to improve its reliability. The exchange program is expected to deliver 30 TAF over ten years, with 10 TAF available in dry years. Under the program, Metropolitan will also be able to store up to 30 TAF in the AVEK's groundwater basin, with a dry year return capability of 10 TAF.
- ***Kern-Delta Water District Storage Program***- This program, currently under development, will allow Metropolitan to store up to 250 TAF of water and will be capable of providing 50 TAF of dry year supply. The water will be either directly recharged into the groundwater basin or delivered to Kern-Valley Water District farmers who use the water in-lieu of pumping groundwater. During dry years, MWDOC will return Metropolitan's previously stored water by direct groundwater pump-in return or by exchange of surface water supplies.
- ***Mojave Storage Program***- Metropolitan entered into a groundwater banking and exchange transfer agreement with Mojave Water Agency on October 29, 2003.This program will allow Metropolitan to store SWP supply delivered in wet years for subsequent withdrawal during dry years. Metropolitan can annually withdraw the Mojave Water Agency's SWP contractual amounts in excess of a 10

percent reserve through 2021 and the SWP allocation is 60 percent or less. The mount Metropolitan can withdraw increases to 20 percent when the SWP allocation is over 60 percent. Under a 100 percent allocation, the State Water Contract provides Mojave Water Agency 82.8 TAF of water.

- ***Central Valley Transfer Programs***- Metropolitan expects to secure Central Valley water transfer supplies via spot markets and option contracts to meet its service area demands when necessary. Metropolitan secured water transfer supplies in 2003-2015 to fill anticipated supply shortfalls needed to meet service area demands. Metropolitan's recent water transfer activities in have demonstrated Metropolitan's ability to develop and negotiate water transfer agreements either working directly with the agricultural districts who are selling the water or through a statewide Drought Water Bank.

3.2.4.3 Available Supplies on Central Valley/State Water Project

Metropolitan's current Central Valley/SWP storage and transfer program supply capabilities under average year, single dry, and multiple dry year hydrologies are shown below in Table 3-4. In developing the supply capabilities for the Metropolitan 2015 UWMP, Metropolitan assumed a simulated median storage level going into each of the five-year increments based on the balances of supplies and demands.

Table 3-4: Metropolitan Central Valley/State Water Project and Transfer Programs

Central Valley/State Water Project Storage and Transfer Programs
Supply Projection
Year 2035
(acre-feet per year)

Hydrology	Multiple Dry Years (1990-92)	Single Dry Year (1977)	Average Year (1922-2004)
Current Programs			
San Bernardino Valley MWD Minimum Purchase	3,000	0	20,000
San Bernardino Valley MWD Option Purchase	0	0	16,000
San Gabriel Valley MWD Exchange and Purchase	2,000	2,000	2,000
Central Valley Storage and Transfers			
Semitropic Program	50,000	49,000	70,000
Arvin Edison Program	63,000	75,000	75,000
Mojave Storage Program	2,000	0	26,000
Kern Delta Program	47,000	50,000	50,000
Transfers and Exchanges	50,000	50,000	50,000
Subtotal of Current Programs	***217,000***	***226,000***	***309,000***
Programs Under Development			
Antelope Valley/East Kern Acquisition and Storage	7,000	20,000	20,000
Subtotal of Proposed Programs	***7,000***	***20,000***	***20,000***
Maximum Supply Capability	**224,000**	**246,000**	**329,000**

3.2.5 Supply Reliability within Metropolitan

In the Metropolitan UWMP, Metropolitan evaluated supply reliability by projecting supply and demand conditions for the single- and multi-year drought cases based on conditions affecting the SWP (Metropolitan's largest and most variable supply). For this supply source, the single driest-year was 1977 and the three-year dry period was 1990-1992. The analyses also includes Colorado River supplies under the same hydrologies. Metropolitan's analyses are shown in Tables 3-5, 3-6, and 3-7. Metropolitan has concluded that the region can provide reliable water supplies not only under normal conditions but also under both the single driest year and the multiple dry year hydrologies. Because Metropolitan's projections take into account the imported demands from OC, Metropolitan's analysis will be used to determine, by virtue of MWDOC being part of Metropolitan, that demands within MWDOC can be met not only under normal conditions but also under both the single driest year and the multiple dry year hydrologies

Table 3-5: Metropolitan Average Year Projected Supply Capability and Demands through 2040

Average Year
Supply Capability[1] and Projected Demands
Average of 1922-2012 Hydrologies
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	693,000	774,000	852,000	956,000	992,000
California Aqueduct[2]	1,760,000	1,781,000	1,873,000	1,899,000	1,899,000
Colorado River Aqueduct					
Total Supply Available[3]	1,468,000	1,488,000	1,484,000	1,471,000	1,460,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**3,653,000**	**3,755,000**	**3,925,000**	**4,055,000**	**4,091,000**
Demands					
Total Demands on Metropolitan	1,586,000	1,636,000	1,677,000	1,726,000	1,765,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**1,860,000**	**1,918,000**	**1,959,000**	**2,008,000**	**2,047,000**
Surplus	**1,793,000**	**1,837,000**	**1,966,000**	**2,047,000**	**2,044,000**
Programs Under Development					
In-Region Supplies and Programs	43,000	80,000	118,000	160,000	200,000
California Aqueduct	20,000	20,000	225,000	225,000	225,000
Colorado River Aqueduct					
Total Supply Available[3]	5,000	25,000	25,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**63,000**	**100,000**	**343,000**	**385,000**	**425,000**
Potential Surplus	**1,856,000**	**1,937,000**	**2,309,000**	**2,432,000**	**2,469,000**

[1] Represents Supply Capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.
[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.
[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.
[5] Total deliveries are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 3-6: Metropolitan Single-Dry Year Projected Supply Capability and Demands through 2040

Single Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1977 Hydrology
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	693,000	774,000	852,000	956,000	992,000
California Aqueduct[2]	644,000	665,000	692,000	718,000	718,000
Colorado River Aqueduct					
Total Supply Available[3]	1,451,000	1,457,000	1,456,000	1,455,000	1,454,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**2,537,000**	**2,639,000**	**2,744,000**	**2,874,000**	**2,910,000**
Demands					
Total Demands on Metropolitan	1,731,000	1,784,000	1,826,000	1,878,000	1,919,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**2,005,000**	**2,066,000**	**2,108,000**	**2,160,000**	**2,201,000**
Surplus	**532,000**	**573,000**	**636,000**	**714,000**	**709,000**
Programs Under Development					
In-Region Supplies and Programs	43,000	80,000	118,000	160,000	200,000
California Aqueduct	20,000	20,000	198,000	198,000	198,000
Colorado River Aqueduct					
Total Supply Available[3]	155,000	125,000	75,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**63,000**	**100,000**	**316,000**	**358,000**	**398,000**
Potential Surplus	**595,000**	**673,000**	**952,000**	**1,072,000**	**1,107,000**

[1] Represents Supply Capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.
[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.
[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.
[5] Total deliveries are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

Table 3-7: Metropolitan Multiple-Dry Year Projected Supply Capability and Demands through 2040

Multiple Dry-Year
Supply Capability[1] and Projected Demands
Repeat of 1990-1992 Hydrology
(Acre-feet per year)

Forecast Year	2020	2025	2030	2035	2040
Current Programs					
In-Region Supplies and Programs	239,000	272,000	303,000	346,000	364,000
California Aqueduct[2]	712,000	730,000	743,000	752,000	752,000
Colorado River Aqueduct					
Total Supply Available[3]	1,403,000	1,691,000	1,690,000	1,689,000	1,605,000
Aqueduct Capacity Limit[4]	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*	*1,200,000*
Colorado River Aqueduct Capability	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Capability of Current Programs	**2,151,000**	**2,202,000**	**2,246,000**	**2,298,000**	**2,316,000**
Demands					
Total Demands on Metropolitan	1,727,000	1,836,000	1,889,000	1,934,000	1,976,000
IID-SDCWA Transfers and Canal Linings	274,000	282,000	282,000	282,000	282,000
Total Metropolitan Deliveries[5]	**2,001,000**	**2,118,000**	**2,171,000**	**2,216,000**	**2,258,000**
Surplus	**150,000**	**84,000**	**75,000**	**82,000**	**58,000**
Programs Under Development					
In-Region Supplies and Programs	36,000	73,000	110,000	151,000	192,000
California Aqueduct	7,000	7,000	94,000	94,000	94,000
Colorado River Aqueduct					
Total Supply Available[3]	80,000	75,000	50,000	25,000	25,000
Aqueduct Capacity Limit[4]	*0*	*0*	*0*	*0*	*0*
Colorado River Aqueduct Capability	0	0	0	0	0
Capability of Proposed Programs	**43,000**	**80,000**	**204,000**	**245,000**	**286,000**
Potential Surplus	**193,000**	**164,000**	**279,000**	**327,000**	**344,000**

[1] Represents Supply Capability for resource programs under listed year type.
[2] California Aqueduct includes Central Valley transfers and storage program supplies conveyed by the aqueduct.
[3] Colorado River Aqueduct includes programs, IID-SDCWA transfer and exchange and canal linings conveyed by the aqueduct.
[4] Maximum CRA deliveries limited to 1.20 MAF including IID-SDCWA transfer and exchange and canal linings.
[5] Total deliveries are adjusted to include IID-SDCWA transfer and exchange and canal linings. These supplies are calculated as local supply, but need to be shown for the purposes of CRA capacity limit calculations without double counting.

3.2.6 MWDOC's Imported Water Supply

California Water Code requires Metropolitan to provide information to MWDOC for inclusion in its UWMP that identifies and quantifies the existing and planned sources of water available from the wholesale agency. By virtue of MWDOC being a part of Metropolitan and by virtue that imported demands from MWDOC were included in Metropolitan projections, MWDOC's supply projections have been covered by Metropolitan.

Thus, based on Metropolitan's supply projections, MWDOC will be able to meet demands under average year, single dry year, and multiple dry year scenarios. The water supply projections represent the amount of supplies projected to meet MWDOC demands, as MWDOC will only purchase the amount of water needed to meet its service area demands from Metropolitan. The current and future water supply projections are shown in Tables 3-8 and 3-9.

Table 3-8: Wholesale Water Supplies – Actual (AFY)

Wholesale: Water Supplies — Actual			
Water Supply	Additional Detail on Water Supply	**2015**	
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*
Purchased or Imported Water	Purchased from Metropolitan	158,664	Drinking Water
Purchased or Imported Water	GW Recharge	58,617	Untreated Water
Purchased or Imported Water	Surface Storage	8,227	Untreated Water
	Total	225,508	
NOTES:			

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Table 3-9: Wholesale Water Supplies – Projected (AFY)

Wholesale: Water Supplies — Projected						
Water Supply	Additional Detail on Water Supply	Projected Water Supply *Report To the Extent Practicable*				
		2020	2025	2030	2035	2040
Imported Water for M&I	Purchased from Metropolitan	132,826	144,254	140,203	135,913	135,135
Purchased or Imported Water	GW Recharge	65,000	65,000	65,000	65,000	65,000
Purchased or Imported Water	Surface Storage	7,306	7,306	7,306	7,306	7,306
Total		205,132	216,560	212,509	208,219	207,441
NOTES:						

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3.3 Groundwater

Among all local supplies available to MWDOC's retail agencies, groundwater supplies make up the majority. The water supply resources in MWDOC's service area are enhanced by the existence of four groundwater basins, which provide a reliable local source and, additionally, are used as reservoirs to store water during wet years and draw from storage during dry years. This section describes the four groundwater basins used by MWDOC's retail agencies and provides information on historical groundwater production as well as a 25-year projection of the service area's groundwater supply.

3.3.1 Orange County Groundwater Basin

The Lower Santa Ana Groundwater Basin, also known as the Orange County Groundwater Basin underlies the north half of Orange County beneath broad lowlands. It is managed by OCWD and covers an area of approximately 350 square miles, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Pacific Ocean to the southwest, and terminates at the Orange County line to the northwest, where its aquifer systems continue into the Central Basin of Los Angeles County. The aquifers comprising this Basin are over 2,000 feet deep and form a complex series of interconnected sand and gravel deposits. Its full volume is approximately 66 MAF although the amount of "useable storage" has been established by OCWD at a maximum overdraft of about 500,000 AF before permanent problems occur with subsidence. Figure 3-5 depicts the Lower Santa Ana Groundwater Basin.

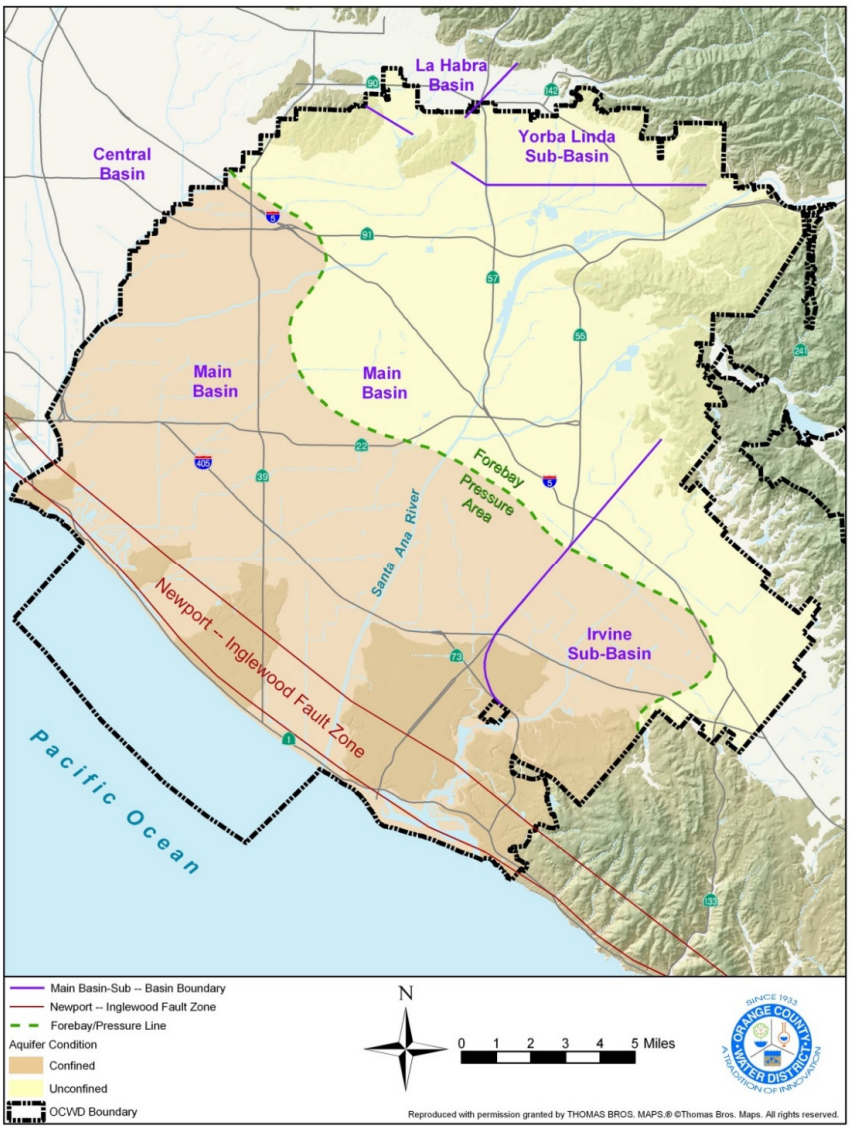


Figure 3-5: Lower Santa Ana Groundwater Basin

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 5

INFORMATION ITEM
April 4, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Hinman, Finnegan)

FROM: **Robert Hunter, General Manager** Staff Contact: Karl Seckel

SUBJECT: **Doheny Desalination Project Foundational Action Funding Program Report**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receives and files the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

OVERVIEW

On March 24, the South Coast Water District Board approved the Final Report and directed staff to submit it to MWDOC and MET to fulfill the requirements of the program. No action is required of MWDOC at this time. Staff will transmit the Final report to MET, complete the final invoicing and prepare the final quarterly progress report in April. The last remaining item for the project is to conduct the Science Advisory Panel review, conducted by NWRI. The Science Advisory Panel report will be transmitted to MET when it is completed, likely around May, to be bound with the final report. MET has the opportunity to submit final comments which must then be considered by MWDOC and South Coast for inclusion in any final work products. This culminates two years of additional study effort on the project and paves the way for preparation of the CEQA documents and the preliminary design, which are both underway.
Please note that the main tasks detailed in the documents include a number of important elements, including:

Budgeted (Y/N): n/a	Budgeted amount: n/a	Core ✓	Choice __
Action item amount: n/a	Line item:		
Fiscal Impact (explain if unbudgeted):			

- Advancement of Slant Well Technology
- Geologic, Seismic and Ocean Risk Analysis for Siting Slant Wells
- Prediction of Coastal/Ocean Groundwater Flow and Water Quality
- Modeling of Slant Well Feed Water Supply, Impacts and Mitigation Approaches
- Coastal Environmental Drawdown Issues and Regulatory Strategies

Report Recommended Next Steps (excerpts from the report)

The report recommends a phased approach for the Doheny Ocean Desalination Project. The feedwater supply for Phase I Doheny Ocean Desalination Project should be 8.6 MGD (i.e., Scenario 2a), which includes the drilling of three slant wells (two operating wells and one standby well). The preliminary Phase I slant well locations (i.e., C-1, C-2 and C-3) are based upon an interpretation of the distribution of geologic materials from both onshore and offshore sources. The current conceptual geologic model is that of an alluvium-filled paleochannel extending offshore from the mouth of San Juan Creek. The depth to bedrock beneath the paleochannel decreases both to the east and the west from the deepest portion of the channel. In order to initiate Phase I, the actual depth and aerial extent of the entire paleochannel should be further investigated using offshore geophysical methods prior to finalizing locations and well designs of the full-scale wells.

Upgrading the intake capacity for higher intake rates in the future (e.g., Phase II) will require additional analysis and consideration. Water level and water quality data, as well as lithologic data collected during the drilling, construction, and operation of Phase I slant wells and any associated monitoring wells needs to be collected. This data should then be used to conduct additional analysis of aquifer performance, refine the locations and designs of the remaining slant wells, and update and refine the model if appropriate. Updating the model with this additional information will enable the model to operate with improved accuracy. In addition, installing monitoring wells near the northern model boundaries should be considered, as water level data collected in this area will help refine the current assumptions of model underflow for future model runs.

The main problem encountered during this project was the development of the chemical module for modeling iron and manganese concentrations in the feed water. The modeling was able to simulate iron and manganese concentrations from the various sources of water which contributed to the slant wells (i.e., young-midage meteoric and brackish groundwater, young marine groundwater and old marine groundwater), but no reactions take place during the mixing of endmembers due to the model limitations (these should be resolved for future work as development of a NEW chemical module by others is nearing final development). It is anticipated that the model will be updated once additional data become available (e.g., offshore geophysical analysis, water levels, water quality and iron and manganese concentration data from Phase I Project pumping, etc. and once the NEW chemical module is available). Data collected from drilling and construction of the Phase I slant wells should

also be used to refine the locations and designs of the remaining slant wells. Such updates will continue to improve the model's ability to predict Project effects and feed water quality.

Staff Observations

Overall, staff believes the work presented was well done and meets the requirements of the Foundational Action Program, and more importantly, provides the basis for South Coast Water District to move forward with their project. Quite a few additional actions are coming up with respect to the project, including:

1. Science Advisory Panel Review and Comments
2. Preparation of a preliminary design report
3. Updated cost and financial analysis
4. Start of CEQA
5. Offshore geophysical work for the purposes of locating the slant wells and to better understand the offshore boundaries of the alluvial fill
6. Electrical supply options from SDG&E

Attachments from the Foundational Action Reports:

Attached are two excerpts from the reports, as follows:

1. The Foundational Action Report is 691 pages in total; staff has provided several pages from the Executive Summary.
2. The Task 4 Groundwater Modeling, which is the key technical analysis completed, is 403 pages of the 691 page report. Staff has provided the Executive Summary from this document.

Should any of the directors desire, full hard copies or electronic copies can be made available.

2.0 FINAL REPORT

2.1 Executive Summary

This final report summarizes the work conducted by GEOSCIENCE Support Services, Inc. (GEOSCIENCE), Carollo Engineers (Carollo), and the Municipal Water District of Orange County (MWDOC) for the Foundational Actions Funding Program (FAFP), on behalf of South Coast Water District (SCWD). This work included conducting a study for the advancement of slant well technology as well as groundwater flow and solute transport modeling for the Doheny Ocean Desalination Project (Project), which is located near the mouth of the San Juan Creek in Dana Point, California.

The purpose of this study was to develop and apply advanced geoscience analytical methodologies to answer slant well application questions including the understanding of feedwater quality produced over time from a slant well system, understanding with precision drawdown effects and environmental strategies along coastal reaches, and the behavior of seawater flow and intrusion control in a multiple layered aquifer system.

During this project, the advancement of slant well technology to-date was summarized, the San Juan Basin (SJB) Regional Groundwater Model (SJB Regional Model) and San Juan Creek Watershed Model were updated from 2010 through 2014, and a coastal fine grid multiple layered aquifer model was developed (SJB Focused Model). This focused coastal groundwater model is able to more accurately forecast effects from Doheny Ocean Desalination Project (Project) pumping at the mouth of the San Juan Creek in Dana Point, California. The models were then used to simulate full scale slant well impacts and mitigation scenarios, including predicting the amount of coastal/ocean groundwater flow, feed water quality produced over time from the slant well system, and drawdown effects. It is important to understand the impacts of Project pumping in order to develop protective approaches for risks related to the installation and operation of slant wells on beaches.

A preliminary geotechnical study was performed to evaluate the beach facilities geotechnical conditions, potential geologic and seismic hazards, and ocean processes that may affect the beach facilities (Ninyo & Moore, 2015). The preliminary geotechnical study concluded that the project is feasible from a geotechnical perspective and identified several hazards including seismic shaking, liquefaction, and beach erosion. Taking into account the effects of beach erosion due to sea level rise, the preliminary geotechnical study recommended siting the wellhead and beach facilities toward the back of the west beach and within the overnight camping area for the east beach.

Slant well capacity is a function of the aquifer parameters (e.g., horizontal and vertical hydraulic conductivity, storativity, leakance, etc.), as well as the screened interval of the well and angle below horizontal. Especially critical is the amount of vertical leakage through the benthic zone of the sea

floor. In addition, wellfield interference must be managed such that an atmosphere of head (approximately 30 vertical feet) of submergence is maintained above the well's pump. Each Project slant well capacity was determined to be 4.3 MGD (2,986 gpm). This is based on geohydrologic information collected from the drilling of the Dana Point Test Slant Well and the long-term pumping test conducted for the Test Slant Well. Well capacity was extrapolated from the specific capacity diagram developed from the Test Slant Well step drawdown test and modified for additional well screen length.

Carollo provided a summary of the significant “lessons learned” concerning the submersible well pump and downhole instrumentation and made recommendations to avoid some of the challenges faced with the Dana Point Test Slant Well. In addition, Carollo provided the conceptual design of a phased approach for the slant well and reverse osmosis (RO) treatment facilities based on the results from the Test Slant well and slant well demonstrations from previous studies. The wellhead vaults, raw water pipeline, and submersible well pumps would be designed to minimize the need to access the equipment and vaults and minimize the disruption to daily activities at the Doheny State Beach Park.

The San Juan Creek Watershed Model, SJB Regional Model, and SJB Focused Model were successfully updated, calibrated, and used to simulate Project pumping under various slant well feed water supply scenarios. Through this, one of the main goals of the project – to develop and apply advanced geoscience analytical methodologies to answer remaining slant well application questions – was achieved. Results from the predictive scenarios provide estimates of groundwater levels, available Basin pumping rates, changes in basin storage, degree of ocean water intrusion, changes in lagoon levels, and slant well feed water quality under various hydrology and Project pumping conditions. Among other findings, it was found that with Project pumping of 4.3 MGD (Scenario 1), the feed water system is unable to create an effective drawdown trough and actually induces additional ocean water intrusion in some locations. However, Project pumping of at least 8.6 MGD (Scenario 2) begins to establish control over ocean water intrusion through the pumping trough created by the feed water system and reduces TDS concentrations seen in inland wells. Project pumping of 8.6 MGD with no SCWD pumping in dry hydrology (Scenario 2a) establishes full control and stops further ocean water intrusion. In addition, Project pumping causes the benzene, MTBE and TBA contamination plumes in the southern end of the SJB to dissipate much faster than they would under Baseline conditions. Organics contamination in the slant well feed water will not occur. The percentage of ocean water in the feed water is expected to range from approximately 90 percent under Scenario 2a conditions (8.6 MGD with no SCWD pumping during dry hydrology) to 96 percent under Scenario 4 conditions (30 MGD). The model-predicted feed water quality for the slant wells begins high in iron and manganese, but reduces to below 1 mg/L between approximately 4 years and 3 months (Scenario 1) and 5 months (Scenario 4 manganese). These concentrations also stabilize at low concentrations (0.2 mg/L) between 9 years (Scenario 1) and 2 years (Scenarios 3 and 4).

During periods of groundwater pumping when there is insufficient surface and rising groundwater flow into the coastal lagoon to maintain an adequate ponded and riparian habitat condition, mitigation may be required. Mitigation options may range from curtailment of groundwater pumping to release of water to maintain ponded coastal lagoon conditions. Offsite mitigation may be possible, but unlikely in areas that are designated for recovery of critical endangered species habitat. The use of tertiary treated wastewater for supplementing the flows into the coastal lagoon to maintain a minimum ponded condition may be suitable to mitigate drawdown impacts. Other mitigation measures may include improving the habitat by planting shade trees and other riparian vegetation, and placing rocks or other materials along the banks that would provide protected, sheltered areas for fish from birds and too keep water temperatures cooler during the summer months. The lagoon area is frequented by large numbers of birds and restoration of the area for steelhead rearing would require improvements to provide protection for the fish.

It is anticipated that the model will be updated once additional data become available (e.g., offshore geophysical analysis, water levels, water quality and iron and manganese concentration data from Phase I Project pumping, etc.). Data collected from drilling and construction of the Phase I slant wells should also be used to refine the locations and designs of the remaining slant wells. Such updates will continue to improve the model's ability to predict Project effects and feed water quality.

The modeling approach outlined through this project is transferable to those locations having similar geologic and geochemical conditions. In some coastal areas, obtaining permits is the number one constraint in constructing a slant well feedwater supply. However, slant wells typically have a more favorable view by regulatory agencies and environmental community, making them easier to permit than other intake systems. In addition, slant wells produce 1.5-2 times more water than vertical wells for the same available drawdown, can lower the cost of supplies and pretreatment costs, and can protect local basins from seawater intrusion. These advantages of slant wells, among others, make them important tools for providing feed water for desalination plants to provide a reliable and high quality water supply.

It is recommended to take a phased approach for the Doheny Ocean Desalination Project. The feedwater supply for Phase I Doheny Ocean Desalination Project should be 8.6 MGD (i.e., Scenario 2a), which includes the drilling of three slant wells (two operating wells and one standby well). The preliminary Phase I slant well locations (i.e., C-1, C-2 and C-3) are based upon an interpretation of the distribution of geologic materials from both onshore and offshore sources. The current conceptual geologic model is that an alluvium-filled paleochannel extends offshore from the mouth of San Juan Creek. The depth to bedrock beneath the paleochannel decreases both to the east and the west from the deepest portion of the paleochannel. In order to initiate Phase I, the actual depth and aerial extent of the entire paleochannel should be further investigated using offshore geophysical methods prior to finalizing locations and well designs of the full-scale wells.

Upgrading the intake capacity for higher intake rates in the future (e.g., Phase II) will require additional analysis and consideration. Water level and water quality data, as well as lithologic data collected during the drilling, construction, and operation of Phase I slant wells and any associated monitoring wells needs to be collected. This data should then be used to conduct additional analysis of aquifer performance, refine the locations and designs of the remaining slant wells, and update and refine the model if appropriate. Updating the model with this additional information will enable the model to operate with improved accuracy. In addition, installing monitoring wells near the northern model boundaries should be considered, as water level data collected in this area will help refine the current assumptions of model underflow for future model runs.

The GEOSCIENCE budget for the project consisted of two contracts: $251,480 from the FAFP and $88,570 funded by SCWD, for a total of $340,050. The total amount of funds disbursed to GEOSCIENCE over the course of this project is $340,025, including $251,476 from FAFP and $88,549 from funding by SCWD. The budget for the work done by Carollo was $128,800, of which $124,515 was expended. While there was some delay in the individual task schedules, the overall project was completed within a month of the planned completion date.

2.2 Introduction

2.2.1 Overview

Water purveyors in coastal areas are considering seawater desalination as a reliable source of supplemental water for municipal supply. Due to a shortage of conventional water supplies, seawater desalination is becoming a working alternative in many areas, especially with breakthroughs in subsurface intake systems and water treatment technologies. The Municipal Water District of Orange County (MWDOC) and South Coast Water District (SCWD) are currently conducting a phased evaluation to study the feasibility of developing a feedwater supply for the Doheny Ocean Desalination Project (formerly the South Orange Coastal Desalination Project) from subsurface intakes at the mouth of San Juan Creek located at Doheny State Beach, in Dana Point, California. The feasibility of a subsurface intake system in the form of slant wells is being investigated because such a system would provide pre-treatment benefits, minimize shock loading, and avoid entrainment and impingement impacts to marine life characteristic of traditional open seawater intakes.

As part of the work for the Foundational Actions Funding Program (FAFP), GEOSCIENCE Support Services, Inc. (GEOSCIENCE) was tasked by SCWD to conduct a study for the advancement of slant well technology as well as groundwater flow and solute transport modeling for the Doheny Ocean Desalination Project (Project), which is located near the mouth of the San Juan Creek in Dana Point, California (see Figure 1).

FOUNDATIONAL ACTIONS FUNDING PROGRAM
ADVANCEMENT OF SLANT WELL TECHNOLOGY AND GROUNDWATER FLOW AND SOLUTE TRANSPORT MODELING FOR THE DOHENY OCEAN DESALINATION PROJECT
TASK 4 – MODELING OF SLANT WELL FEED WATER SUPPLY, IMPACTS AND MITIGATION APPROACHES

1.0 EXECUTIVE SUMMARY

This technical memorandum summarizes Task 4 of the advancement of slant well technology for South Coast Water District (SCWD), under the Metropolitan Foundational Actions Funding Program (FAFP). For this task, the SJB Focused Model was used to more accurately forecast effects from Doheny Ocean Desalination Project (Project) pumping, and to simulate full-scale slant well impacts and mitigation scenarios, including the prediction of the amount of coastal/ocean groundwater flow and water quality.

Six model runs were made using the San Juan Basin (SJB) Regional Model, including one baseline run and five Project scenario runs. The purpose of the SJB Regional Model runs was to evaluate Project impacts on the local groundwater pumping and establish the boundary conditions for the SJB Focused Model. The following table summarizes the major assumptions of the SJB Regional Model runs.

Major Assumptions for the SJB Model Runs

Model Scenario	Hydrology	Local Groundwater Pumping and Well Screen Pumping Constraint	Doheny Ocean Desalination Project
Baseline	1947 to 2010 (Dry, Wet and Average)[1]	Near-term pumping with water level constraint of 2 ft above top of well screen	No Project
Scenario 1			Project Pumping of 4.3 MGD (4,820 AFY) with one slant well
Scenario 2			Project Pumping of 8.6 MGD (9,640 AFY) with two slant wells
Scenario 2a		Near-term pumping with water level constraint of 2 ft above top of well screen, no SCWD pumping under dry hydrology (1947-1976)	Project Pumping of 8.6 MGD (9,640 AFY) with two slant wells
Scenario 3		Near-term pumping with water level constraint of 2 ft above top of well screen	Project Pumping of 21 MGD (23,540 AFY) with five slant wells
Scenario 4			Project Pumping of 30 MGD (33,630 AFY) with seven slant wells

[1] The total model simulation period is a 64-year period that represents the hydrology from 1947 through 2010. Of this, the 30-year period from 1947 through 1976 is characterized as "dry hydrology", 1963 through 1992 is characterized as "average hydrology" and the period from 1978 through 1983 is characterized as "wet hydrology".

For each of these six runs, both flow model (i.e., MODFLOW) and solute transport model (i.e., MT3DMS including total dissolved solids (TDS), iron, manganese, benzene, methyl tertiary butyl ether (MTBE), and tertiary butyl alcohol (TBA) constituents) simulations were made using the SJB Focused Model to:

- Evaluate Project impacts on lagoon level, water level in the shallow aquifer near the lagoon, ocean water intrusion, and contamination plumes of benzene, MTBE and TBA; and

- Predict TDS, iron and manganese concentrations pumped from Project slant wells under each Project scenario conditions.

Two flow model mitigation runs were also made using the SJB Focused Model by injecting approximately 1,410 acre-feet per year (AFY) of water (representing the draw on the groundwater basin under 30 million gallons per day (MGD) slant well feed water supply conditions) to evaluate the effectiveness of the mitigation measures.

1.1 Findings and Conclusions

Results of the scenario runs and the analysis are summarized in the following tables and detailed in the following sections.

Summary of Predictive Scenario Impacts on Local Groundwater Yield

Model Run	Local Yield Dry Hydrology (1947-1976)	Local Yield Average Hydrology (1963-1992)	Local Yield Wet Hydrology (1978-1983)	Change from Baseline – Dry Hydrology (1947-1976)	Change from Baseline – Average Hydrology (1963-1992)	Change from Baseline – Wet Hydrology (1978-1983)
Baseline Scenario (No Project Pumping)	7,756 AFY	7,871 AFY	8,556 AFY	-	-	-
Scenario 1 (Intake Pumping of 4.3 MGD)	7,617 AFY	7,747 AFY	8,521 AFY	-139 AFY	-124 AFY	-35 AFY
Scenario 2 (Intake Pumping of 8.6 MGD)	7,429 AFY	7,579 AFY	8,472 AFY	-327 AFY	-292 AFY	-84 AFY
Scenario 2a (Intake Pumping of 8.6 MGD with no SCWD Pumping during Dry Hydrology)	6,686 AFY	7,303 AFY	8,544 AFY	-1,070 AFY	-568 AFY	-12 AFY
Scenario 3 (Intake Pumping of 21 MGD)	6,813 AFY	6,976 AFY	8,100 AFY	-943 AFY	-895 AFY	-456 AFY
Scenario 4 (Intake Pumping of 30 MGD)	6,448 AFY	6,587 AFY	7,711 AFY	-1,308 AFY	-1,284 AFY	-845 AFY

Summary of Predictive Scenario Basin Impacts

Model Run	Impact on Ocean Water Intrusion	Impact on Shallow Aquifer	Impact on Lagoon Level	Impact on Contamination Plumes
Baseline Scenario (No Project Pumping)	-	-	-	-
Scenario 1 (Intake Pumping of 4.3 MGD)	Induces Additional Ocean Water Intrusion	-4.49 to -5.54 ft	-0.29 to -1.35 ft	TBA Plume Dissipates Faster
Scenario 2 (Intake Pumping of 8.6 MGD)	Partial Control of Ocean Water Intrusion	-9.21 to -11.06 ft	-0.37 to -1.66 ft	Benzene and TBA Plumes Dissipate Faster
Scenario 2a (Intake Pumping of 8.6 MGD with no SCWD Pumping during Dry Hydrology)	Stops Further Ocean Water Intrusion	-8.42 to -9.80 ft	-0.34 to -1.68 ft	Benzene and TBA Plumes Dissipate Faster
Scenario 3 (Intake Pumping of 21 MGD)	Stops Further Ocean Water Intrusion	-23.38 to -27.47 ft	-0.36 to -1.77 ft	Benzene and TBA Plumes Dissipate Faster
Scenario 4 (Intake Pumping of 30 MGD)	Stops Further Ocean Water Intrusion	-34.52 to -41.79 ft	-0.36 to -1.77 ft	Benzene and TBA Plumes Dissipate Faster
Mitigation Scenario A (Intake Pumping of 30 MGD)	-	-30.95 to -35.92 ft	-0.36 to -1.77 ft	-
Mitigation Scenario B (Intake Pumping of 30 MGD)	-	-31.27 to -37.14 ft	-0.36 to -1.77 ft	-

Summary of Predictive Scenario Feed Water Quality

Model Run	Percentage of Ocean Water	Time for TDS to Stabilize	Time for Iron <1 mg/L	Time for Iron to Stabilize at 0.2 mg/L	Time for Manganese <1 mg/L	Time for Manganese to Stabilize at 0.2 mg/L
Scenario 1 (Intake Pumping of 4.3 MGD)	93.7%	5 years	4 years, 3 months	9 years	4 years, 3 months	9 years
Scenario 2 (Intake Pumping of 8.6 MGD)	95.2%	3 years	1 year, 8 months	3 years	1 year, 5 months	3 years
Scenario 2a (Intake Pumping of 8.6 MGD with no SCWD Pumping during Dry Hydrology)	89.8%	3 years	1 year, 9 months	3 years	1 year, 6 months	3 years
Scenario 3 (Intake Pumping of 21 MGD)	95.5%	2 years	8 months	2 years	7 months	2 years
Scenario 4 (Intake Pumping of 30 MGD)	95.8%	2 years	7 months	2 years	5 months	2 years
Scenario 4 – Sensitivity Run (Intake Pumping of 30 MGD with Extended Fine-Grained Layer Offshore)	-	-	6 months	2 years	-	-

1.1.1 Baseline Scenario – No Project Pumping

- The total average groundwater pumping for the Baseline scenario ranges from 7,756 for dry hydrology to 8,556 AFY for wet hydrology, which is less than the total pumping of 10,931 AFY.
- Groundwater levels ranged from 2 ft to approximately 68 ft above the screened interval in nine of the production wells. The water level constraint of 2 ft above the screened interval was not maintained in the CSJC South Cooks Well, Eastern Well WS No. 5, Rosenbaum Well No. 1, and North Open Space Well during the simulated predictive period (i.e., 2016-2079, corresponding to the 64-year hydrologic period from 1947-2010).
- Average annual pumping under dry conditions (1947-1976) is 5,607 AFY for CSJC, 1,299 AFY[1] for SCWD, and 850 AFY for private pumping, totaling 7,756 AFY. Annual pumping under average hydrologic conditions (1963-1992) is 5,721 AFY for CSJC, 1,300 AFY[1] for SCWD, and 850 AFY for

[1] SCWD has 1,300 AFY of Water Rights duly authorized by the State Water Resources Control Board.

private pumping, totaling 7,871 AFY. Annual pumping under wet hydrologic conditions (1978-1983) is 6,407 AFY for CSJC, 1,300 AFY[2] for SCWD, and 850 for private pumping, for a total of 8,556 AFY.

- The cumulative change in basin storage is predicted to be -10,000 acre-ft under Baseline conditions after 64 years of simulation.
- The average streamflow discharge to the ocean for the Baseline scenario under dry (1947-1976), average (1963-1992), and wet (1978-1983) hydrologic conditions are 11,513 AFY, 17,268 AFY, and 40,547 AFY, respectively.
- Basin storage decreases by 620 AFY under dry hydrologic conditions, and increases by 110 AFY and 2,070 AFY under average and wet hydrologic conditions, respectively.
- TDS concentrations in both SCWD wells begin at 1,900 mg/L, remain stable for a period at the beginning of the Baseline model simulation period, and then begin to rise due to ocean water intrusion. TDS concentrations in the SCWD Creekside Well No. 2 begin to rise after approximately 23.5 years and reach a concentration of roughly 2,700 mg/L by the end of year 2045 (1976 hydrology). In the SCWD Stonehill Well, TDS concentrations begin to rise after approximately 13.5 years and reach a concentration of roughly 7,000 mg/L by the end of year 2045 (1976 hydrology).
- Lagoon levels under Baseline conditions fluctuate between 3 ft NAVD88 and 20 ft NAVD88. Lagoon levels under dry, average, and wet hydrology average 10.10 ft NAVD88, 10.86 ft NAVD88, and 12.26 ft NAVD88, respectively.
- The plume for benzene initially has concentrations of over 100 µg/L in model layers 2 and 3. By Baseline year 20, the benzene disperses, but concentrations remain over the MCL of 1 µg/L. MTBE concentrations initially begin above the MCL of 13 µg/L, but dissipate quickly and are no longer detectable by year 5. TBA concentrations are also above the MCL of 12 µg/L in model layers 2 and 3 at the start of the model run and dissipate to below the MCL by year 10 in all model layers.

1.1.2 Scenario 1 – Intake Pumping of 4.3 MGD

- The total average groundwater pumping for Scenario 1 ranges from 7,617 for dry hydrology to 8,521 AFY for wet hydrology, which is less than the total pumping of 10,931 AFY.
- Groundwater levels ranged from 2 ft to approximately 67 ft above the screened interval in nine of the production wells. The water level constraint of 2 ft above the screened interval was not

[2] SCWD has 1,300 AFY of Water Rights duly authorized by the State Water Resources Control Board.

maintained in the CSJC South Cooks Well, Eastern Well WS No. 5, Rosenbaum Well No. 1, and North Open Space Well during the simulated predictive period (i.e., 2016-2079, corresponding to the 64-year hydrologic period from 1947-2010).

- Average annual pumping under dry conditions (1947-1976) is 5,523 AFY for CSJC, 1,244 AFY[3] for SCWD, and 850 AFY for private pumping, totaling 7,617 AFY. Annual pumping under average hydrologic conditions (1963-1992) is 5,640 AFY for CSJC, 1,257 AFY[3] for SCWD, and 850 AFY for private pumping, totaling 7,747 AFY. Annual pumping under wet hydrologic conditions (1978-1983) is 6,371 AFY for CSJC, 1,300 AFY[3] for SCWD, and 850 for private pumping, for a total of 8,521 AFY.
- The cumulative change in basin storage is predicted to be -10,600 acre-ft under Scenario 1 conditions after 64 years of simulation.
- The average streamflow discharge to the ocean for Scenario 1 under dry (1947-1976), average (1963-1992), and wet (1978-1983) hydrologic conditions are 11,472 AFY, 17,199 AFY, and 40,376 AFY, respectively.
- Basin storage decreases by 650 AFY under dry hydrologic conditions, and increases by 100 AFY and 2,100 AFY under average and wet hydrologic conditions, respectively.
- TDS concentrations in both SCWD wells begin at 1,900 mg/L, remain stable for a period at the beginning of the Scenario 1 model simulation period, and then begin to rise due to ocean water intrusion. TDS concentrations in the SCWD Creekside Well No. 2 begin to rise after approximately 25 years (compared to the 23.5 years under Baseline conditions) and reach a concentration of roughly 2,300 mg/L by the end of year 2045 (1976 hydrology). This is approximately 400 mg/L less than the concentration under Baseline conditions. In the SCWD Stonehill Well, TDS concentrations begin to rise after approximately 11.5 years (compared to the 13.5 years under Baseline conditions), and reach a concentration of roughly 7,300 mg/L by the end of year 2045 (1976 hydrology). This is approximately 300 mg/L more than the concentration under Baseline conditions and indicates that, under Scenario 1 pumping, the feed water system is unable to create an effective drawdown trough and actually induces additional ocean water intrusion in this location. This effect, however, does not extend to the vicinity of the SCWD Creekside Well No. 2.
- The maximum change in groundwater elevations between Scenario 1 and the Baseline occurs in the vicinity of the wellfield. In this area, groundwater is expected to decline between approximately 5 ft for model layer 2 and 30 ft for model layers 5, 6, and 7.

[3] SCWD has 1,300 AFY of Water Rights duly authorized by the State Water Resources Control Board.

- Scenario 1 lagoon levels under dry, average, and wet hydrology average 9.82 ft NAVD88, 10.37 ft NAVD88, and 10.91 ft NAVD88, respectively. This represents a change from the Baseline scenario of -0.29 ft under dry hydrology, -0.50 ft under average hydrology, and -1.35 ft under wet hydrology.
- Scenario 1 water levels in the shallow aquifer for Sites A, B, C and D near the lagoon are lower than the Baseline water levels by an average of 5.54 ft, 5.28 ft, 4.79 ft, and 4.49 ft, respectively, over the entire model period
- Project pumping under Scenario 1 conditions has very little effect on the benzene plume – concentrations and footprint extent are very similar between Scenario 1 and Baseline conditions, although the footprint is slightly smaller under Scenario 1. There is also little difference in MTBE concentrations, as they initially begin above the MCL of 13 µg/L, but dissipate quickly and are no longer detectable by year 5 for both Scenario 1 and the Baseline scenario. However, Scenario 1 conditions do have a noticeable effect on the TBA concentrations – the plume dissipates faster under Scenario 1 conditions than under Baseline conditions, and concentrations fall below detection levels by year 20. Organics contamination in the slant well feed water will not occur.

1.1.3 Scenario 2 – Intake Pumping of 8.6 MGD

- The total average groundwater pumping for Scenario 2 ranges from 7,429 for dry hydrology to 8,472 AFY for wet hydrology, which is less than the total pumping of 10,931 AFY.
- Groundwater levels ranged from 2 ft to approximately 67 ft above the screened interval in nine of the production wells. The water level constraint of 2 ft above the screened interval was not maintained in the CSJC South Cooks Well, Eastern Well WS No. 5, Rosenbaum Well No. 1, and North Open Space Well during the simulated predictive period (i.e., 2016-2079, corresponding to the 64-year hydrologic period from 1947-2010).
- Average annual pumping under dry conditions (1947-1976) is 5,453 AFY for CSJC, 1,126 AFY[4] for SCWD, and 850 AFY for private pumping, totaling 7,429 AFY. Annual pumping under average hydrologic conditions (1963-1992) is 5,569 AFY for CSJC, 1,160 AFY[4] for SCWD, and 850 AFY for private pumping, totaling 7,579 AFY. Annual pumping under wet hydrologic conditions (1978-1983) is 6,335 AFY for CSJC, 1,287 AFY[4] for SCWD, and 850 for private pumping, for a total of 8,472 AFY.
- The cumulative change in basin storage is predicted to be -11,100 acre-ft under Scenario 2 conditions after 64 years of simulation.

[4] SCWD has 1,300 AFY of Water Rights duly authorized by the State Water Resources Control Board.

- The average streamflow discharge to the ocean for Scenario 2 under dry (1947-1976), average (1963-1992), and wet (1978-1983) hydrologic conditions are 11,448 AFY, 17,157 AFY, and 40,253 AFY, respectively.
- Basin storage decreases by 670 AFY under dry hydrologic conditions, and increases by 100 AFY and 2,070 AFY under average and wet hydrologic conditions, respectively.
- TDS concentrations in the SCWD Creekside Well No. 2 remain stable through the end of year 2045 (1976 hydrology) at approximately 1,800 mg/L. This is approximately 900 mg/L less than the concentration under Baseline conditions after 30 years. In the SCWD Stonehill Well, TDS concentrations begin to rise after approximately 15 years (compared to the 13.5 years under Baseline conditions), and reach a concentration of roughly 4,000 mg/L by the end of year 2045 (1976 hydrology). This is approximately 3,000 mg/L less than the concentration under Baseline conditions and indicates that Scenario 2 pumping establishes control over ocean water intrusion through the pumping trough created by the feed water system.
- The maximum change in groundwater elevations between Scenario 2 and the Baseline occurs in the vicinity of the wellfield. In this area, groundwater is expected to decline between approximately 10 ft for model layer 2 and 40 ft for model layers 5, 6, and 7.
- Scenario 2 lagoon levels under dry, average, and wet hydrology average 9.73 ft NAVD88, 10.20 ft NAVD88, and 10.59 ft NAVD88, respectively. This represents a change from the Baseline scenario of -0.37 ft under dry hydrology, -0.66 ft under average hydrology, and -1.66 ft under wet hydrology.
- Scenario 2 water levels in the shallow aquifer for Sites A, B, C and D are lower than the Baseline water levels by an average of 11.06 ft, 10.72 ft, 9.45 ft, and 9.21 ft, respectively, over the entire model period.
- Project pumping under Scenario 2 conditions causes the benzene plume to dissipate faster than Baseline conditions – producing similar concentrations but a much smaller footprint. There is little difference in MTBE concentrations, as they initially begin above the MCL of 13 µg/L, but dissipate quickly and are no longer detectable by year 5 for both Scenario 1 and the Baseline scenario. Scenario 2 conditions also help the TBA plume dissipate faster than it would under Baseline conditions, and concentrations fall below detection levels by year 15. Organics contamination in the slant well feed water will not occur.

1.1.4 Scenario 2a – Intake Pumping of 8.6 MGD with no SCWD Pumping during Dry Hydrology

- The total average groundwater pumping for Scenario 2a ranges from 6,686 AFY for dry hydrology to 8,544 AFY for wet hydrology, which is less than the total pumping of 10,931 AFY[5]. The cessation of SCWD pumping under dry hydrology resulted in higher Basin water levels, allowing CSJC to pump slightly more water under Scenario 2a conditions while maintaining the water level constraint, as compared to Scenario 2.
- Groundwater levels ranged from 2 ft to approximately 79 ft above the screened interval in nine of the production wells. The water level constraint of 2 ft above the screened interval was not maintained in the CSJC South Cooks Well, Eastern Well WS No. 5, Rosenbaum Well No. 1, and North Open Space Well during the simulated predictive period (i.e., 2016-2079, corresponding to the 64-year hydrologic period from 1947-2010).
- Average annual pumping under dry conditions (1947-1976) is 5,836 AFY for CSJC, 0 AFY[6] for SCWD, and 850 AFY for private pumping, totaling 6,686 AFY. Annual pumping under average hydrologic conditions (1963-1992) is 5,803 AFY for CSJC, 650 AFY[6] for SCWD, and 850 AFY for private pumping, totaling 7,303 AFY. Annual pumping under wet hydrologic conditions (1978-1983) is 6,404 AFY for CSJC, 1,289 AFY[6] for SCWD, and 850 for private pumping, for a total of 8,544 AFY.
- The cumulative change in basin storage is predicted to be -11,100 acre-ft under Scenario 2a conditions after 64 years of simulation.
- The average streamflow discharge to the ocean for Scenario 2a under dry (1947-1976), average (1963-1992), and wet (1978-1983) hydrologic conditions are 11,519 AFY, 17,202 AFY, and 40,285 AFY, respectively.
- Basin storage decreases by 600 AFY under dry hydrologic conditions, and increases by 30 AFY and 1,920 AFY under average and wet hydrologic conditions, respectively.
- TDS concentrations in both the SCWD Creekside Well No. 2 and Stonehill Well remain stable through the end of year 2045 (1976 hydrology) at approximately 1,800 mg/L. This is approximately 900 mg/L and 5,200 mg/L less than the concentration under Baseline conditions after 30 years of model simulation (1947-1976) for Creekside Well No. 2 and Stonehill Well, respectively. The lack of increases in TDS concentrations indicates that Scenario 2a pumping effectively establishes control over ocean water intrusion through the pumping trough created by the feed water system.

[5] Total near-term pumping for Scenario 2a is actually less; SCWD pumping under dry hydrology is 0 AFY.

[6] SCWD has 1,300 AFY of Water Rights duly authorized by the State Water Resources Control Board.

- The maximum change in groundwater elevations between Scenario 2a and the Baseline occurs in the vicinity of the wellfield. In this area, groundwater is expected to decline between approximately 5 ft for model layer 2 and 40 ft for model layers 5, 6, and 7.
- Scenario 2a lagoon levels under dry, average, and wet hydrology average 9.77 ft NAVD88, 10.24 ft NAVD88, and 10.58 ft NAVD88, respectively. This represents a change from the Baseline scenario of -0.34 ft under dry hydrology, -0.62 ft under average hydrology, and -1.68 ft under wet hydrology.
- Scenario 2a water levels in the shallow aquifer for Sites A, B, C and D are lower than the Baseline water levels by an average of 9.80 ft, 9.50 ft, 8.68 ft, and 8.42 ft, respectively, over the entire model period.
- Project pumping under Scenario 2a conditions causes the benzene, MTBE and TBA plumes to dissipate much faster than Baseline conditions – producing concentrations below detection limits by year 5 for benzene and MTBE, and year 15 for TBA. The reduced pumping in Scenario 2a helps dissipate the benzene and TBA plumes near Doheny Park Road faster, as compared to Scenario 2 pumping. Organics contamination in the slant well feed water will not occur.

1.1.5 Scenario 3 – Intake Pumping of 21 MGD

- The total average groundwater pumping for Scenario 3 ranges from 6,813 for dry hydrology to 8,100 AFY for wet hydrology, which is less than the total pumping of 10,931 AFY.
- Groundwater levels ranged from 2 ft to approximately 66 ft above the screened interval in eight of the production wells. The water level constraint of 2 ft above the screened interval was not maintained in the CSJC South Cooks Well, Eastern Well WS No. 5, Rosenbaum Well No. 1, North Open Space Well, and SCWD Stonehill Well during the simulated predictive period (i.e., 2016-2079, corresponding to the 64-year hydrologic period from 1947-2010).
- Average annual pumping under dry conditions (1947-1976) is 5,255 AFY for CSJC, 708 AFY[7] for SCWD, and 850 AFY for private pumping, totaling 6,813 AFY. Annual pumping under average hydrologic conditions (1963-1992) is 5,372 AFY for CSJC, 754 AFY[7] for SCWD, and 850 AFY for private pumping, totaling 6,976 AFY. Annual pumping under wet hydrologic conditions (1978-1983) is 6,237 AFY for CSJC, 1,013 AFY[7] for SCWD, and 850 for private pumping, for a total of 8,100 AFY.
- The cumulative change in basin storage is predicted to be -12,700 acre-ft under Scenario 3 conditions after 64 years of simulation.

[7] SCWD has 1,300 AFY of Water Rights duly authorized by the State Water Resources Control Board.

- The average streamflow discharge to the ocean for Scenario 3 under dry (1947-1976), average (1963-1992), and wet (1978-1983) hydrologic conditions are 11,419 AFY, 17,102 AFY, and 40,078 AFY, respectively.
- Basin storage decreases by 720 acre-ft per year under dry hydrologic conditions, and increases by 90 AFY and 1,990 AFY under average and wet hydrologic conditions, respectively.
- TDS concentrations in both the SCWD Creekside Well No. 2 and Stonehill Well remain stable through the end of year 2045 (1976 hydrology) at approximately 1,800 mg/L. This is approximately 900 mg/L and 5,200 mg/L less than the concentration under Baseline conditions after 30 years of model simulation (1947-1976) for Creekside Well No. 2 and Stonehill Well, respectively. The lack of increases in TDS concentrations indicates that Scenario 3 pumping effectively establishes control over ocean water intrusion through the pumping trough created by the feed water system.
- The maximum change in groundwater elevations between Scenario 3 and the Baseline occurs in the vicinity of the wellfield. In this area, groundwater is expected to decline between approximately 30 ft for model layer 2 and 75 ft for model layer 7.
- Lagoon levels under dry, average, and wet hydrology average 9.74 ft NAVD88, 10.21 ft NAVD88, and 10.49 ft NAVD88, respectively. This represents a change from the Baseline scenario of -0.36 ft under dry hydrology, -0.66 ft under average hydrology, and -1.77 ft under wet hydrology. The change in Scenario 3 lagoon levels compared to Baseline levels is very similar to the change experienced under Scenario 2 conditions. This indicates that, past a certain amount of Project pumping, lagoon levels are relatively unaffected by increases in slant well pumping.
- Scenario 3 water levels in the shallow aquifer for Sites A, B, C and D are lower than the Baseline water levels by an average of 27.47 ft, 26.96 ft, 23.38 ft, and 23.54 ft, respectively, over the entire model period.
- Project pumping under Scenario 3 conditions causes the benzene, MTBE and TBA plumes to dissipate much faster than Baseline conditions – producing concentrations below detection limits by year 5 for benzene and MTBE, and year 10 for TBA. Organics contamination in the slant well feed water will not occur.

1.1.6 Scenario 4 – Intake Pumping of 30 MGD

- The total average groundwater pumping for Scenario 4 ranges from 6,448 for dry hydrology to 7,711 AFY for wet hydrology, which is less than the total pumping of 10,931 AFY.
- Groundwater levels ranged from 2 ft to approximately 65 ft above the screened interval in eight of the production wells. The water level constraint of 2 ft above the screened interval was not maintained in the CSJC South Cooks Well, Eastern Well WS No. 5, Rosenbaum Well No. 1, North

Open Space Well, and SCWD Stonehill Well during the simulated predictive period (i.e., 2016-2079, corresponding to the 64-year hydrologic period from 1947-2010).

- Average annual pumping under dry conditions (1947-1976) is 5,044 AFY for CSJC, 554 AFY[8] for SCWD, and 850 AFY for private pumping, totaling 6,448 AFY. Annual pumping under average hydrologic conditions (1963-1992) is 5,163 AFY for CSJC, 575 AFY[8] for SCWD, and 850 AFY for private pumping, totaling 6,587 AFY. Annual pumping under wet hydrologic conditions (1978-1983) is 6,134 AFY for CSJC, 727 AFY[8] for SCWD, and 850 for private pumping, for a total of 7,711 AFY.
- The cumulative change in basin storage is predicted to be -14,100 acre-ft under Scenario 4 conditions after 64 years of simulation.
- The average streamflow discharge to the ocean for Scenario 4 under dry (1947-1976), average (1963-1992), and wet (1978-1983) hydrologic conditions are 11,406 AFY, 17,079 AFY, and 40,009 AFY, respectively.
- Basin storage decreases by 780 acre-ft per year under dry hydrologic conditions, and increases by 90 AFY and 1,990 AFY under average and wet hydrologic conditions, respectively.
- TDS concentrations in both the SCWD Creekside Well No. 2 and Stonehill Well remain stable through the end of year 2045 (1976 hydrology) at approximately 1,800 mg/L. This is approximately 900 mg/L and 5,200 mg/L less than the concentration under Baseline conditions after 30 years of model simulation (1947-1976) for Creekside Well No. 2 and Stonehill Well, respectively. The lack of increases in TDS concentrations indicates that Scenario 4 pumping effectively establishes control over ocean water intrusion through the pumping trough created by the feed water system.
- The maximum change in groundwater elevations between Scenario 4 and the Baseline occurs in the vicinity of the wellfield. In this area, groundwater is expected to decline between approximately 50 ft for model layer 2 and 135 ft for model layer 6.
- Scenario 4 lagoon levels under dry, average, and wet hydrology average 9.74 ft NAVD88, 10.21 ft NAVD88, and 10.48 ft NAVD88, respectively. This represents a change from the Baseline scenario of -0.36 ft under dry hydrology, -0.66 ft under average hydrology, and -1.77 ft under wet hydrology. The change in Scenario 4 lagoon levels compared to Baseline levels is the same as the change experienced under Scenario 3 conditions. This indicates that, past a certain amount of Project pumping, lagoon levels are relatively unaffected by increases in slant well pumping.

[8] SCWD has 1,300 AFY of Water Rights duly authorized by the State Water Resources Control Board.

- Scenario 4 water levels in the shallow aquifer for Sites A, B, C and D are lower than the Baseline water levels by an average of 41.79 ft, 40.19 ft, 35.76 ft, and 34.52 ft, respectively, over the entire model period.
- Project pumping under Scenario 4 conditions causes the benzene, MTBE and TBA plumes to dissipate much faster than Baseline conditions – producing concentrations below detection limits by year 5 for benzene, MTBE and TBA. Organics contamination in the slant well feed water will not occur.

1.1.7 Mitigation Scenarios – Intake Pumping of 30 MGD

- Injecting replacement water under Mitigation Run A will result in maximum declines of groundwater levels in the vicinity of the slant well field ranging from 50 ft to 125 ft, while injecting under Mitigation Run B results in maximum declines of 45 ft to 125 ft, as compared to Baseline water levels.
- Lagoon levels under dry, average, and wet hydrology for Mitigation Runs A and B are the same as those for Scenario 4. This is because the water level in the vicinity of the lagoon is no longer in hydraulic connection with the surface water body.
- Mitigation A water levels for Sites A, B, C and D are higher than the Scenario 4 water levels by an average of 5.87 ft, 5.69 ft, 3.46 ft, and 3.57 ft, respectively, over the entire model period (i.e., 2016-2079 with 1947-2010 hydrology). These higher water levels are an indication of the benefits of the injection mitigation.
- Mitigation B water levels for Sites A, B, C and D are higher than the Scenario 4 water levels by an average of 4.65 ft, 4.37 ft, 3.36 ft, and 3.25 ft, respectively, over the entire model period (i.e., 2016-2079 with 1947-2010 hydrology). These higher water levels are an indication of the benefits of the injection mitigation.

1.1.8 Pumped Water Quality

- In general, average TDS concentrations rise rapidly from the initial starting concentrations, approach the assumed ocean water TDS of 35,000 mg/L, and remain fairly stable during the rest of the modeling period. The TDS concentrations begin to stabilize after approximately 5 years for Scenario 1, 3 years for Scenarios 2 and 2a, and 2 years for Scenarios 3 and 4. The average TDS concentration from the slant wells was predicted to be 32,400 mg/L for Scenario 1, 33,100 mg/L for Scenario 2, 31,600 mg/L for Scenario 2a, 33,400 mg/L for Scenario 3, and 33,600 mg/L for Scenario 4.
- The percentage of ocean water in the feed water will average approximately 89.8 percent under Scenario 2a conditions to 95.8 percent under Scenario 4 conditions. The percentage of inland

water, or return percentage, therefore ranges from approximately 10 percent under Scenario 2a conditions to 4 percent under Scenario 4 conditions.

- While the percentage of ocean water in the feed water averages approximately 89.8 percent under Scenario 2a, the average percentage under Scenario 2 (with additional SCWD pumping during the dry hydrology) is 95.2 percent. This shows that, in the case of Scenario 2a, the slant wells are essentially pumping up the groundwater that SCWD wells would have pumped up, had the SCWD wells been operating during the dry hydrology period. Therefore, SCWD is still withdrawing approximately the same amount of groundwater from the basin, just in a different location and in a manner which controls seawater intrusion.
- Average iron concentrations decrease fairly rapidly from the initial starting concentrations and stabilize around 0.2 mg/L. The amount of time it takes for the iron concentrations to fall below 1 mg/L is 4 years and 3 months for Scenario 1, 1 year and 8 months for Scenario 2, 1 year and 9 months for Scenario 2a, 8 months for Scenario 3, and 7 months for Scenario 4. The iron concentrations begin to stabilize after approximately 9 years for Scenario 1, 3 years for Scenarios 2 and 2a, and 2 years for Scenarios 3 and 4.
- The sensitivity results for Scenario 4 (with the extension of the fine-grained layer offshore) indicate that there is no significant difference in average iron concentrations in the slant wells compared to Scenario 4 conditions. With the extension of the fine-grained layer, iron concentrations will fall below 1 mg/L and stabilize at 0.2 mg/L in approximately the same amount of time.
- Average manganese concentrations decrease fairly rapidly from the initial starting concentrations and stabilize around 0.2 mg/L. The amount of time it takes for the manganese concentrations to fall below 1 mg/L is 4 years and 3 months for Scenario 1, 1 year and 5 months for Scenario 2, 1 year and 6 months for Scenario 2a, 7 months for Scenario 3, and 5 months for Scenario 4. The manganese concentrations begin to stabilize after approximately 9 years for Scenario 1, 3 years for Scenarios 2 and 2a, and 2 years for Scenarios 3 and 4.

1.1.9 Recommendations

It is recommended to take a phased approach for the Doheny Ocean Desalination Project. The feedwater supply for Phase I Doheny Ocean Desalination Project should be 8.6 MGD (i.e., Scenario 2a), which includes the drilling of three slant wells (two operating wells and one standby well). The preliminary Phase I slant well locations (i.e., C-1, C-2 and C-3) are based upon an interpretation of the distribution of geologic materials from both onshore and offshore sources. The current conceptual geologic model is that an alluvium-filled paleochannel extends offshore from the mouth of San Juan Creek. The depth to bedrock beneath the paleochannel decreases both to the east and the west from the deepest portion of the paleochannel. In order to initiate Phase I, the actual depth and aerial extent

of the entire paleochannel should be further investigated using offshore geophysical methods prior to finalizing locations and well designs of the full-scale wells.

Upgrading the intake capacity for higher intake rates in the future (e.g., Phase II) will require additional analysis and consideration. Water level and water quality data, as well as lithologic data collected during the drilling, construction, and operation of Phase I slant wells and any associated monitoring wells needs to be collected. This data should then be used to conduct additional analysis of aquifer performance, refine the locations and designs of the remaining slant wells, and update and refine the model if appropriate. Updating the model with this additional information will enable the model to operate with improved accuracy. In addition, installing monitoring wells near the northern model boundaries should be considered, as water level data collected in this area will help refine the current assumptions of model underflow for future model runs.

1.1.10 Limitations and Uncertainty

The model is limited in its ability to predict lagoon levels because of the lack of measured data with which to calibrate the model against. In addition, the model was unable to simulate effects of high-flow events in the San Juan Creek and resulting beach erosion or changes in the lagoon bank elevation. Despite these limitations, the differences between model-simulated lagoon levels provide a relative measure of the effects of Project pumping.

It is important to note that the model is limited by the assumptions of the endmember concentrations and absence of reactions taking place (refer to Appendix G). In Dr. Charette's technical memorandum regarding the development and calibration of chemical modules (included here as Appendix G), he urges the need for further modeling work after additional data is collected to check whether (a) some aspect of the physical model assumptions are in need of further evaluation, (b) the iron distribution is oversimplified or (c) some combination of the two need to be invoked. In the case of the former, it is possible that the vertical hydraulic conductivity is set too high; in this scenario, the model would over-predict the amount of capture of the low iron young marine groundwater. Further, there may be some in situ iron production process that has not been accounted for in this simple mixing-only model. Lastly, initial iron concentrations from the calibration runs should be viewed with caution. The decrease in iron concentrations seen in mid-2012 of the calibration runs is not constrained by data and is largely driven by the assumption that the extent of the old marine groundwater is finite, decreasing to near background levels in the southern-most approximately 2,000 ft of the model domain.

It is anticipated that the model will be updated once additional data become available (e.g., offshore geophysical analysis, water level, water quality, and iron and manganese concentration data from Phase I Project pumping, etc.). Such updates will continue to improve the model's ability to predict Project effects and feed water quality.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 6

INFORMATION ITEM
April 4, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Hinman, Finnegan)

FROM: **Robert Hunter, General Manager** Staff Contact: Karl Seckel

SUBJECT: **San Juan Basin Authority Foundational Action Funding Program Report**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receives and files the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

OVERVIEW

On March 22, the San Juan Basin Authority (SJBA) Board approved the Final Report and directed staff to submit it to MWDOC and MET to fulfill the requirements of the program. No action is required of MWDOC at this time. Staff will transmit the Final report to MET, complete the final invoicing and prepare the final quarterly progress report in April. The last remaining item for the project is to conduct the Science Advisory Panel review, conducted by NWRI. The Science Advisory Panel report will be transmitted to MET when it is completed, likely in May, to be bound with the final report. MET has the opportunity to submit final comments which must then be considered by MWDOC and SJBA for inclusion in any final work products. This culminates two years of additional study effort on the project and paves the way for additional work regarding the phase plan, participation and yield costs by agency and to begin, preparation of the CEQA documents and the preliminary design for decisions to be made regarding the project moving forward.

Please note that the main tasks detailed in the documents include a number of important elements, including:

- Development of Alternatives for Each Program Element of the San Juan Groundwater Management Plan
    - Extraction Barriers
    - Stormwater Recharge, including rubber dams
    - Recycled Water Recharge, including injection wells and rubber dams
    - Adaptive Groundwater Production Management from the basin
- Evaluation of the Feasibility of All Program Elements
- Develop a Phased Implementation Plan
- Preparation of the Final Report

SJBA Project Summary

The project components are listed below. The costs shown do not include any contingency, but the range of costs is expected to be (-30%) to (+50%), meaning that the costs below could be 30% lower to 50% higher than noted.

1. Design and build rubber dams
    a. Approximate cost = $33.6 M, includes dams plus wells and treatment for pumping and treatment of water (no O&M & no R&R included)
    b. Yield without recycled water = 1,120 AF per year (yield means water recharged, pumped out, treated and delivered for potable consumption, so it has treatment recovery losses included of about 20%)
    c. Operating by 2019
    d. Unit costs are shown below (without O&M and without R&R)

2. Instream recharge of recycled water Phase 1
    a. Approximate additional cost = $119.1 million
    b. Yield with recycled water via streamflow recharge + stormwater from above increases by 3,800 AF per year. This will require additional wells and treatment.
    c. Operating by 2024
    d. Unit costs are shown below (without O&M and without R&R)

3. Instream recharge of recycled water Phase 2
    a. Approximate additional cost = $160.9 million
    b. Yield with 7,000 AF of recycled water + stormwater from above increases by 2,440 AF per year.
    c. Operating likely in late 2020's, depending on results of other phases.
    d. Unit costs are shown below (without O&M and without R&R)

The cost summary below (prepared by MWDOC) show the unit costs per phase and the cumulative unit cost combined through each phase as each additional increment is intended to work with the prior investments, and hence there are not discrete separation between the phases.

San Juan Basin Rubber Dams, Recycled Water Recharge, Well Production and Treatment					
Unit Cost Per Project Phase					
	Capital	Annual Cost 30 years, 3%	Yield	Capital Cost Per AF	If Costs are 50% Higher
Phase 1	33,560,000	($1,712,206)	1,120	$1,529	$2,293
Phase 2	119,140,000	($6,078,435)	3,800	$1,600	$2,399
Phase 3	160,900,000	($8,208,999)	2,440	$3,364	$5,047
Cumulative Unit Costs					
Phase 1&2	152,700,000	($7,790,641)	4,920	$1,583	$2,375
Phases 1,2 &3	313,600,000	($15,999,640)	7,360	$2,174	$3,261
Notes:					
No Contingency, O&M Costs or R&R Costs included					
Cost estimates completed on a (-30%) to (+50%) cost accuracy					

Conclusions/ Lessons Learned (excerpts from the report)

There are numerous small, coastal groundwater basins along the southern coast of California. Some of the common features of these coastal alluvial aquifers are: they are narrow, relatively shallow, and the water is impaired from a municipal drinking water standpoint, requiring treatment for constituents such as TDS, iron, and manganese. Producing a safe, reliable drinking water supply in impaired coastal basins is challenging in that the resource is small, the yield can be highly variable across wet and dry climate cycles, treatment is costly, and groundwater pumping can result in seawater intrusion. The impacts of seawater intrusion and dry climate cycles are significant, especially in impaired groundwater basins that rely on desalination to produce potable water. Desalination technology is such that the RO membranes cannot be offline for significant periods of time without significant cost to restart the facility. If pumping wells that supply water to the treatment plant must be shut down to prevent seawater intrusion, or due to low water levels in dry periods with limited natural recharge, there may not be enough inflow to keep the plant operational. The member agencies of the SJBA experienced these challenges during current drought. Supplemental recharge with imported or recycled water is a common groundwater management strategy to support groundwater levels and pumping. In a water quality impaired basin, it is not practical to recharge high-quality, lower-TDS sources of imported water into a high-TDS groundwater basin that requires the water be treated when it is extracted. Thus, recycled water is the most logical option for recharge in an impaired basin. And, it is a sustainable, local supply. However, in small, narrow alluvial aquifers recycled water recharge is challenging in that the amount of water available for blending in the aquifer is small (e.g. Recycled Water Component (RWC) is high) and underground travel times are short. Under current Division of Drinking Water (DDW) regulations, such aquifer characteristics would typically require advanced treatment similar

to that performed by the OCWD for its GWRS program. Again, it is not practical to advance treat water before it is recharged only to have to treat it again on the way out.

Recommended Further Investigations (excerpts from the report)
Several assumptions were made to complete this work. These assumptions and their implications are listed below.

1. Surface water recharge with recycled water. The recharge capacity created by the rubber dam system is much larger than the range of in-stream recycled water recharge volumes investigated herein. The recycled water recharge was spread out among all the cells created by the rubber dams. Prioritizing certain cells (for example, recharging recycled water in some cells and recharging no recycled water in others) could lead to lower RWCs and longer Underground Retention Times (URTs) for some wells. The well locations and capacity to recover the recycled water recharged were not optimized to maximize URT, minimize RWC or explored to evaluate the logical range of recovery rates. Additional work is required to optimize the recharge and recovery plans associated with surface recharge.

2. Injection and recovery wells location and related project capacity. The locations of the injection and recovery wells were assumed and not optimized to maximize URT, minimize RWC or explored to evaluate the logical range of injection and recovery rates. Additional work is required to optimize the injection and recovery plans before a decision is made to proceed with groundwater injection.

3. Seawater extraction barrier. Per Alternative 6 of the San Juan Basin Groundwater Facilities Management Plan (SJBGFMP), it was assumed that an extraction barrier was included as a Program Element within each alternative. Additional work could be performed to determine a projected project yield under selected recharge alternatives in the absence of the extraction barrier. In such a scenario, the wells would need to be operated in a manner similar to the baseline alternative, where the Multi-Node Well Package (MNWP) controls pumping to ensure a positive subsurface discharge to the ocean to prevent seawater intrusion.

4. Compliance with SWRCB permits. It was assumed that the 50 percent storage metric would apply in all Program alternatives. For Program alternatives that incorporate a seawater extraction barrier, provide surface water flows that could support riparian vegetation, and replace pumping by private pumpers with alternative water supplies, it is reasonable to assume that the limits imposed with the MNWP could be relaxed to only limit pumping when elevations threaten sustainable pumping. Additional evaluation is needed to determine how much more water could be recharged and/or recovered if this limitation were relaxed and what other measures could be taken to protect water quality, habitat, and riparian producers. This new information would be used to request modifications to the existing SWRCB diversion permits to enable greater

operational flexibility, increased yield and be protective of water quality, habitat, and riparian producers.

5. Subsurface boundary inflows to the model. The groundwater model used herein has a constant boundary inflow from Oso Creek, the Arroyo Trabuco, Horno Creek and San Juan Creek. In aggregate this boundary inflow is about 27 percent of the average inflow. This assumption could result in an underestimation of the RWC and an over estimation of pumping capability during drought periods. The boundary inflows need to be refined and incorporated into future investigations.

6. Groundwater Model. The groundwater model used in Task 3 evolved from a prior groundwater model developed by MWDOC to provide a boundary condition to another groundwater model developed by MWDOC that simulates the coastal groundwater response to and impacts from the then proposed (Doheny Desal Project) (South Orange County Ocean Desalination) SOCOD project and secondarily to project the impacts of the SOCOD project on the San Juan Basin. In going forward the SJBA should conduct a needs assessment to define the modeling specifications required to implement the SJBGFMP, compare these specifications to the SJBA model and consider updating or replacing the model to improve the accuracy of the model projections and resulting planning information.

Next Steps

The project implementation phasing plan has been presented to the SJBA Board for planning considerations and to evaluate which project elements could be incorporated in a project plan. It has been recommended to the SJBA Board that the Technical Advisory Group (TAG) further review this phasing plan with current capital improvement projects for each agency to determine what “shared costs” could be captured with this project and to return a confirmed project schedule at the April, 2016 Board meeting. It is anticipated that this report, and the technical supporting documents, will be submitted to the NWRI technical panel for review to assist SJBA in selection of the final project concept design elements. Subject to completion of the NWRI technical review, it is anticipated that the Board may request modifications to the implementation phasing plan to accelerate the preparation of the EIR and CEQA/NEPA documents along with the permitting and preliminary design phases which could lead to construction proceeding by 2018.

Attachments from the Foundational Action Reports:

Attached are several excerpts from the reports, as follows:

1. The Foundational Action Report is approximately 800 pages in total; staff has provided several pages from the Executive Summary, Conclusions, several tables and one figure. The full report is available if any of the directors would like to review it.

1. EXECUTIVE SUMMARY

San Juan Basin Authority (SJBA) has been actively pursuing development and expansion of groundwater production facilities, while ensuring preservation and sustainability of the local water resources. Current water demands of the SJBA member agencies is approximately 86,400 acre-feet per year (afy) for a total service area population of about 406,200. This demand is satisfied through imported potable water sources (69,600 afy) augmented by local groundwater production (5,268 afy), and local recycled water (14,000 afy) supplies. Demand within the basin is expected to increase to about 106,400 afy by 2035 due to population growth.

The San Juan Basin Groundwater Facilities Management Plan (SJBGFMP) recognized that in-stream recharge along both San Juan Creek and Arroyo Trabuco Creek is the only viable large-scale recharge method for the San Juan Basin due to the lack of suitable off-stream sites for stormwater storage and recharge, and the inability of the basin to accept large amounts of recharge at a specific site. The San Juan Basin watershed has an alluvial stream morphology that extends offshore and currently the aquifer has storage capacity that is underutilized. Without adaptive management and expanded recharge of the watershed there is limited opportunity for production of potable water. Basin enhancement concepts include:

- increasing groundwater recharge utilizing stormwater capture
- introduction of recycled water for groundwater recharge
- dry-weather discharge of recycled water to creeks
- application of alternative groundwater production techniques
- protecting against seawater intrusion

In 2013 the SJBA, in conjunction with the Municipal Water District of Orange County, submitted a proposal to the Metropolitan Water District of Southern California for a Foundational Actions Fund (FAF) Program to evaluate the feasibility of implementing alternative six of the SJBGFMP. The objective of the FAF Program was to analyze options for sustainable, long-term use of an impaired watershed that is typical to Southern California.

Program alternatives evaluated in the FAF Program study included a seawater extraction barrier to ensure that seawater would not intrude into San Juan Basin due to upstream groundwater pumping and to produce a new source of water. Modeling work conducted for this project confirmed the hydrologic feasibility of the creation of a 3,000 afy extraction barrier would prohibit seawater intrusion along the coastal extent of San Juan Creek. For all Program alternatives the seawater barrier accounted for about 2,100 afy from the ocean, about 700 afy

from groundwater originating upstream, and the remaining 200 afy from vertical recharge that occurs between the coast and the SCWD wells.

Six conceptual strategies were developed from the project alternatives for refinement and cost evaluation. Each conceptual strategy contained some or all of the following program elements:

- seawater extraction barrier (in absence of a desalination facility)
- enhanced stormwater recharge
- recycled water recharge
- in-lieu recharge through the offset of private well pumping with direct recycled water deliveries to the pumpers.

The conceptual strategies were then grouped into two categories as they relate to the recharge elements of the Program:

- surface water recharge (SWR) and
- injection (INJ).

Surface water recharge involves recharge with rubber dams and/or incidental recycled water recharge. Injection involves construction of injection wells in strategic locations to inject recycled water into the basin and subsequently recover it downstream without allowing rising groundwater to occur. Rubber dams would create a series of ponds in the stream channel making the channel flow “bank to bank” thereby maximizing the wetted area and recharge to capture storm water runoff before it reaches the ocean. During wet periods, the rubber dams would remain inflated as long as the flow in the channel results in a stage less than one-foot greater than the rubber dam crest. When this stage limit is exceeded, the rubber dam would deflate restoring the full flood capacity of the channel. The rubber dam would re-inflate as soon as the flow in the channel is reduced for subsequent recharge.

Current State regulations for injection and for some surface recharge applications of recycled water require Full Advanced Treatment (FAT). There are a few options for achieving FAT, but the most typical process include micro-filtration and reverse osmosis (MF-RO) followed by advanced oxidations processes (AOP), which achieve the requisite chemical contaminant removal. For the facilities included in this planning project, a combination of ultraviolet (UV) light with a strong oxidant such as hydrogen peroxide (UV-AOP) has been considered for treating water prior to injection. However, due to the cost impact of advanced treatment of the recycled water prior to injection combined with the current requirements to treat the groundwater produced, the injection options were not considered in the final Concept Strategies.

The key findings from the San Juan Basin Desalination and Optimization Program include:

- injection of treated recycled water into an impaired groundwater basin is not currently economically feasible at this time due regulatory requirements to implement FAT water treatment processes for the recharge water combined with the current necessity for micro-filtration and reverse osmosis treatment for production water resulting in a "double treatment" of the water.
- installation of the seawater extraction barrier, although technically feasible, is not currently economically feasible at this time due to the necessity to construct a new groundwater treatment facility for a limited 3,000 afy production capacity.
- utilization of rubber dams for stormwater capture is feasible from both regulatory and environmental perspectives and can be a cost-effective source for groundwater recharge.
- utilization of rubber dams to promote groundwater recharge from recycled water during dry-periods is feasible from both regulatory and environmental perspectives and can be a cost-effective source for groundwater recharge.
- incidental recharge of recycled water is a viable alternative for groundwater recharge and has multiple environmental benefits for the local watershed.
- there is an adequate supply of recycled water from the existing wastewater treatment facilities, although some treatment modifications may be required at individual plants, provided that seasonal storage facilities are utilized (for off-peak water storage).

The final Concept Strategies (all surface water strategies) for project consideration included:

- SWR-1 *Storm Water Capture Rubber Dams*
- SWR-2 *Storm Water Capture + Recycled Water Recharge Using Rubber Dams*
- SWR-3 *Recycled Water "Incidental Recharge"*
- SWR-4 *Storm Water Capture + Recycled Water Recharge Using Rubber Dams + Recycled Water "Incidental Recharge"*

The average project yield for the final selected Concept Strategies was determined to be about 1,980 afy for SWR-1 up to 8,220 afy for SWR-4.

The project implementation phasing plan identified the preparation of the programmatic environmental impact report and CEQA documentation to be the initial "critical path" items to initiate any of the concept strategies. It was also concluded that a strong public outreach program would be required to develop community support for the project. Project planning and design efforts for strategy SWR-1 could be "fast-tracked" such that the rubber dam construction

could be implemented within 24-months (estimated June 2018). The construction of the rubber dams would occur concurrent with the required Title 22 studies for introduction of recycled water for groundwater recharge (in support of strategies SWR-2 thru SWR-4).

The estimated project cost for implementing Phase 1 and Phase 2 from 2016 thru 2026 was determined to be on the order of $156,550,000. These estimated fees do not include typical design or construction contingency fees or project financing fees. These fees also do not include annual operations and maintenance charges or administrative fees.

Key findings from the San Juan Basin Desalination and Optimization Program that can be applied in other impaired costal groundwater aquifers include:

Seawater Extraction Barrier

- An extraction barrier would produce water that otherwise may not have been produced thus increasing the project yield.

Recycled Water Recharge via Injection in an Impaired Basin

- Based on current State of California Division of Drinking Water (DDW) regulations, injection of recycled water requires advanced treatment and may be cost prohibitive for an impaired basin.

Recycled Water Recharge via Surface Water Recharge in an Impaired Basin

- Surface water recharge strategies are optimal because they also have the benefit of increasing storm water capture for recharge.
- Incidental recharge of stormwater or recycled water (also referred to as live stream recharge) has the multiple benefits of supporting riparian habitat, supporting elimination of non-native vegetation through selective abatement programs as well as providing food sources, breeding grounds, and a wintering ground for migratory birds.
- Monitoring and modeling will be required to optimize the location of recharge to minimize recycled water contributions (RWC) and underground retention time (URT).
- Incidental recharge operations will need to be adaptive: in wet years recharge will be less and in dry years recharge can increase.

Adaptive Production Management

- Groundwater pumping needs to be adaptive to match the basin recharge (with or without enhanced recharge).
- Monitoring and modeling will be required to develop an adaptive production management plan.

- Conveyance Pipeline Construction - Three of the conceptual strategies include the installation of approximately 1,450 (SRW-2 and SRW-3) to 21,685 (SRW-4) linear feet of conveyance pipeline in the existing roads and easements throughout portions of the project area. Temporary construction impacts such as noise, air quality, and traffic are anticipated. Measures to mitigate these impacts include designated working hours, the application of water or dust suppressants, and the implementation of an approved traffic control plan.

Project Implementation Phasing Plan

Based on the analysis performed pursuant to the San Juan Basin Groundwater and Desalination Optimization Program investigation, the recommended strategy for accomplishing the goals of the San Juan Basin Groundwater Facilities and Management Plan (SJBGFMP), hereafter referred to as the SJBGFMP implementation plan, includes the following Program Elements:

- Adaptive Production Management (APM), which consists of the continuation of the SJBA's existing program of monitoring and reporting and the development and periodic update of an APM policy to set annual production limits consistent with water rights permits and related agreements.
- Construction of rubber dams within San Juan Creek and the Arroyo Trabuco to increase storm water recharge and provide future recharge sites for instream recharge of recycled water.
- Construction of recycled water recharge and recovery facilities (conveyance, wells, and expanded groundwater treatment) and conversion of private groundwater pumpers to alternative sources of water. The facilities should be phased in over time based on recycled water availability and the need to demonstrate project success at small scales to the DDW and Regional Board.

A seawater extraction barrier is not included in the SJBGFMP implementation plan as it is projected to be very costly; and excluding it in the next phase of planning does not preclude it from being reconsidered and included in subsequent phases. In the absence of the seawater extraction barrier the SJBA would use APM to ensure there is no seawater intrusion.

SJBGFMP Implementation Plan: A Phased Approach

A phasing strategy is proposed and is laid out in such a way that each phase can be an endpoint or off-ramp from further expansion (see Technical Memorandum 4.2, 4.3 included as Appendix H). At the end of each phase, a new source of water is available to the SJBA and the technical, engineering, and planning analyses for implementing the next phase of expansion are refined

enough to determine if that next phase should be implemented or revised in scope. The recommended phasing strategy for the SJBGFMP implementation plan is as follows:

- Phase 1:
    - Complete planning, permitting, design and construction of rubber dams within San Juan Creek and/or Arroyo Trabuco, and
    - Complete Title 22 Engineering and permitting process for the indirect potable reuse (IPR) of recycled water in the San Juan Basin.
- Phase 2
    - Refine the planning, project specific permitting, and design of the recycled water recharge and recovery facilities and construct the facilities to enable up to 4.0 mgd of recycled water recharge. (This would yield about 3.0 mgd of treated product water. Actual capacities would be established in the planning and engineering work in Phase 2.)
    - Convert private groundwater producers to other sources of water
- Subsequent phases of the SJBGFMP implementation would include the refined planning, design and construction of facilities that maximize the recharge of recycled water in the basin and could include: recycled water treatment improvements, additional groundwater extraction and conveyance facilities, and expansion of the groundwater treatment facilities constructed in Phase 2.

The on-going implementation of the SJBGFMP operations and APM activities, including monitoring and the update of the surface and groundwater models, plans and reports that support these activities, will provide the data and planning information to support each phase. This work is necessary even in the absence of the projects in Phase 1, 2, and subsequent phases.

The cumulative new project yield from the implementation of the SJBGFMP at the end of each phase is:

- Phase 1: 1,120 afy
- Phase 2: 4,920 afy (includes the 1,120 from Phase 1)
- Subsequent phases: 7,360 afy (includes the 4,920 from Phase 2)

Phasing Plan Tasks and Schedule

Figure 4-2.1 is a detailed schedule that demonstrates the process for implementing the SJBGFMP through Phase 2. In addition to Phases 1 and 2, Exhibit 1 include basin management tasks and

process to periodically update the SJBGFMP and the surface and groundwater models used to support the implementation process. The two updates are assumed to begin in fiscal 2017/18 and again in fiscal 2022/23.

The major implementation tasks in Phase 1 include:

- Preparation of a programmatic environmental document for the SJBGFMP and project specific documentation for the construction of rubber dams under CEQA/NEPA (EIR/EIS)
- Public outreach efforts to support the environmental documentation and Phase 1 efforts
- Submit for and obtain funding for construction of rubber dams
- Planning, permitting, design and construction of rubber dams (For the purpose of cost estimating, Phase 1 assumes construction of seven rubber dams along San Juan Creek, the actual number and locations will be determined during the planning/permitting process.)
- Title 22 Engineering and permitting process that enables the recharge and recovery of recycled water in Phase 2

Phase 1 begins in earnest in FY 2016/17 and is completed by the end of FY 2020/21. The schedule for completing the CEQA/NEPA process and the design and construction of the rubber dams is aggressive; if followed, the dams can be completed by the start of the wet season in FY 2018/19 (Fall 2018).

The major implementation tasks in Phase 2 include:

- Preparation of project specific environmental documentation for the construction and operation of the recycled water recharge and recovery facilities
- Public outreach efforts to support the environmental documentation and Phase 2 efforts
- Submit for and obtain funding for construction of recycled water recharge and recovery facilities
- Obtain facility specific permits and agreements
- Design and construction of the recycled water recharge and recovery facilities including new wells, a new groundwater treatment plant and treatment upgrade at the CSJC GWRP. It is assumed that the recycled water recharge and recovery will be designed in the Phase 1 planning efforts so that treatment upgrades are not required at the SCWD GRF. The pipelines to convey recycled and ground water will be constructed at the ultimate capacities. Subsequent expansions of the groundwater recovery and treatment facilities will occur when additional recycled water becomes available for recharge.

Phase 2 begins in earnest in FY 2020/21 and is completed in the beginning of FY 2024/25. Per this schedule, recycled water recharge and recovery would begin in the late summer of 2024.

Phasing Plan Costs

Table 4.2-1 summarizes the estimated annual costs for the major implementation steps for Phases 1 and 2 (excluding contingency) per the schedule shown in Figure 4.2-1. Table 4.2-1 also shows the total estimated cost to implement subsequent phases (excluding contingency). The cost estimates in Table 4.2-1 are refinements of the estimates contained in the January 25, 2016 Technical Memorandum summarizing the work performed pursuant to FAF Program Task 3 (TM 3). The implementation costs that were generalized in TM 3 (e.g. program management, public outreach, permitting, engineering design, etc.) are explicitly estimated in Table 4.2-1.

Table 4.2-2 summarizes the total program costs and unit capital costs, by phase; and for each phase, provides a breakdown of the construction and implementation costs. All of the costs shown in Tables 4.2-1 and 4.2-2 exclude contingency factors.

Table 4.2-3 summarizes the range of potential costs with contingencies for all phases of the SJBGFMP implementation. The range of costs shown (-30% to +50% of the estimated cost in Exhibit 2) are reflective of ACEC Cost Estimating Guidelines for Feasibility-Level Studies. Also shown in Table 4.2-3 are some of the potential sources of grant funding that could offset the cost of implementing the SJBGFMP. There are also low-interest loans available from the State Water Resources Control Board to implement recycled water reuse projects.

Notes on Implementation Plan Costs

The estimated costs contained herein are at a conceptual feasibility-level and actual costs may vary greatly in the future. The following assumptions apply:

- Estimated costs do not include:
    - escalation of costs in the future; all costs are present day values;
    - administration or financing charges of loans;
    - addressing institutional challenges/negotiations;
    - agency staff time;
    - purchase of recycled water supplies (whether from SJBA member agency or another agency);
    - benefits of cost share for shared infrastructure such as pipelines, treatment plants (GW and WW/RW), or pump stations with another agency(s);
    - converting existing non-potable groundwater pumpers to recycled water system;
    - well replacements that may be necessary;
    - impacts to current groundwater supply production;

- use of the proposed Trampas Reservoir seasonal storage;
- environmental mitigation requirements;
- land acquisition costs

As noted, no contingency costs were included in the implementation plan cost estimate shown in Tables 4.2-1 and 4.2-2. When agencies are budgeting for program implementation, they should consider using a contingency level appropriate to the activity being conducted in the current budget cycle. Refer to Table 4.2-3 for the potential range of program costs.

Task 5 Overview

SJBA participating agency personnel, and the technical consulting team members, have met with various regulatory agencies during the public review periods for both Task 2 and Task 3 of the FAF Program to present project concepts and strategies. The project meetings and attendees included:

- On September 29, 2015 the SJBA Project Manager facilitated a public meeting presenting the findings of the FAF Project Task 2 to stakeholders within the basin. Attendees included SJBA agency members, county and state regulators, local government representatives, local non-governmental organizations, and the general public. Fact sheets outlining the FAF Program and Technical Memorandum for Task 2 were prepared and distributed as informational review and comment items for attendees. These documents were also made available on the SJBA website.
- On October 20, 2015 the SJBA participating agencies held an in-person and teleconference workshop for planning of recycled water recharge with representatives from Orange County Environmental Health, Orange County Public Works, and the State of California Department of Water Resources.
- On December 21, 2015 the SJBA participating agencies held an in-person and teleconference workshop in regards to San Juan watershed management with representatives from Orange County Environmental Health, Orange County Public Works, CA State Fish and Game Department, and Orange County Parks.
- On February 9, 2016 the SJBA Project Manager and the consultant team facilitated a public meeting to present the findings of Task 3 to the SJBA Board and stakeholders within the basin. Attendees included SJBA agency members, stakeholders, local government representatives, local non-governmental organizations, and the general public. The presentation included an overview of the Task 3 objectives, scope of work, and findings. Fact sheets outlining the FAF Program, Tasks 2, and Task 3 were prepared and distributed

as informational review and comment items for attendees. These documents were also made available on the SJBA website.

- On March 8, 2016 the SJBA Project Manager and Scott Lynch from Black & Veatch (project consultant team member) facilitated a presentation of Task 4 Phasing Plan to the SJBA Board, stakeholders within the basin, local non-governmental organizations, and the general public. The presentation included an overview of the Task 4 objectives, scope of work, and findings. The technical documents were distributed to those present and were included as attachments to the Board packet for posting on the SJBA website.

Review comments were solicited at each of the public meetings and the comments were incorporated into the various Technical Memoranda as appropriate and Responses To Comments were included in each of the Technical Memoranda.

On March 22, 2016 the SJBA Project Manager presented the Groundwater and Desalination Optimization Program Foundation Actions Fund (FAF) Program Draft Final Report to the SJBA Board, SJBA agency members, stakeholders, local government representatives, local non-governmental organizations, and the general public at a public workshop. The Draft Final Report was published with the SJBA Board packet and was posted on the SJBA website. The comments on the Draft Final Report were incorporated as appropriate and the comments are included herein as Appendix I.

Preparation of the Draft Report, presentation of the Draft Final Report at a public workshop for agency and public review, and preparation of this Final Report constitute the principal objectives of Task 5.

Project Goals and Objectives Met

At this time we have not met with State and Local regulators (including State Water Resource Control Board, Regional Water Quality Control Board, Department of Public Health, and Orange County Flood Control) on the Final Report and Project Phasing Schedule (remaining item of Task 5). It is anticipated that these agencies will be invited to participate in a workshop to present our findings and implementation plan and to solicit comments from them. It is anticipated that this workshop will occur during the remainder of the first quarter and throughout the second quarter of 2016 to assist in development of a specific project. The results and feedback from these meetings will be presented in the 6-Month Progress Report due in June, 2016.

To date we have not initiated the proposed “Third Party Technical Review” of the project alternatives. Efforts have been made by SJBA and MWDOC personnel to coordinate and schedule the technical review through the National Water Research Institute (NWRI) and the completed Task 3 Technical Memorandum has been circulated to their staff for initial concept review. It is

anticipated that the NWRI panel review would be accomplished during the remainder of the first quarter and throughout the second quarter of 2016 to assist in development of a specific project. The results of this technical review will be presented in the 6-Month Progress Report due in June, 2016.

Major Problems Encountered

The most significant problem in completing the project was the year-long delay imposed by the SJBA Board debating the San Juan Basin GWFMP third party peer review and delayed authorization for finalization of the GWFMP and adaptive management groundwater monitoring program (approved in November, 2014).

Subsequent project delays occurred throughout 2015 resulting from combinations of the following factors:

- groundwater level declines and seawater intrusion associated with persistent drought conditions throughout the watershed
- agency concerns related to seawater extraction barrier compared to the proposed SCWD ocean desalination project
- agency concerns related to water rights and groundwater production allocations throughout the San Juan Basin
- delays in authorization of consultant contracts for approved project tasks
- delays in authorizing successive phases of work for individual consultants
- slow agency responses to the consultant's request for existing facility operating capacity, capital expansion program information, and projected recycled water demands
- agency concerns regarding potential impacts to existing water treatment facilities from introduction of recycled water
- uncertainties regarding existing wastewater treatment facility upgrades for recycled water availability.

Applications of Project Findings to Other Regions

Key findings from the San Juan Basin Desalination and Optimization Program that can be applied in other impaired costal groundwater aquifers include:

Seawater Extraction Barrier

An extraction barrier is a feasible method of protecting inland groundwater from seawater intrusion and develops a new, reliable water supply. Considerations for developing an extraction barrier include:

- Monitoring and modeling will be required to appropriately size the extraction well barrier to ensure the effectiveness of the barrier.
- The extraction barrier wells will likely reduce the pumping capacity at existing inland production wells that are close to the coast. This lost capacity should be accounted for in estimating the project yield.
- The extraction barrier can capture recharge that is not captured by inland production wells.
- An extraction barrier project is expensive, but costs can be reduced by seeking Regional support. Decreasing imported water demand in one service area benefits all local water agencies and this is valuable from a reliability standpoint.

Recycled Water Recharge via Injection in an Impaired Basin

- Based on current DDW regulations, injection of recycled water requires advanced treatment and is cost prohibitive for an impaired basin.

Recycled Water Recharge via Surface Water Recharge in an Impaired Basin

- Surface water recharge strategies are optimal because they also have the benefit of increasing storm water capture for recharge.
- Live stream recharge of recycled water also has the multiple benefit of supporting riparian habitat.
- Monitoring and modeling will be required to optimize the location of recharge to minimize RWC and URT.
- Recharge operations will needs to be adaptive: in wet years recharge will be less and in dry years recharge can increase.
- Facilities should be sized for the dry years, where the maximum amount of recharge can occur.
- Constructing Seasonal storage for recycled water will increase the amount of water available for recharge – both seasonally and in variable climates.
- Projects and facilities should be phased to incrementally increase recharge over time.

Adaptive Production Management

- Groundwater pumping needs to be adaptive to match the basin recharge (with or without enhanced recharge).
- If seawater barriers are cost prohibitive, groundwater pumping can be adapted from year to year in order to minimize groundwater outflow to the ocean and protect against seawater intrusion.

6. CONCLUSION

Lessons Learned

There are numerous small, coastal groundwater basins along the southern coast of California. Some of the common features of these coastal alluvial aquifers are: they are narrow, relatively shallow, and the water is impaired from a municipal drinking water standpoint, requiring treatment for constituents such as TDS, iron, and manganese. Producing a safe, reliable drinking water supply in impaired coastal basins is challenging in that the resource is small, the yield can be highly variable across wet and dry climate cycles, treatment is costly, and groundwater pumping can result in seawater intrusion.

The impacts of seawater intrusion and dry climate cycles are significant, especially in impaired groundwater basins that rely on desalination to produce potable water. Desalination technology is such that the RO membranes cannot be offline for significant periods of time without significant cost to restart the facility. If pumping wells that supply water to the treatment plant must be shut down to prevent seawater intrusion, or due to low water levels in dry periods with limited natural recharge, there may not be enough inflow to keep the plant operational. The member agencies of the SJBA experienced these challenges during current drought.

Supplemental recharge with imported or recycled water is a common groundwater management strategy to support groundwater levels and pumping. In a water quality impaired basin, it is not practical to recharge high-quality, lower-TDS sources of imported water into a high-TDS groundwater basin that requires the water be treated when it is extracted. Thus, recycled water is the most logical option for recharge in an impaired basin. And, it is a sustainable, local supply. However, in small, narrow alluvial aquifers recycled water recharge is challenging in that the amount of water available for blending in the aquifer is small (e.g. RWC is high) and underground travel times are short. Under current DDW regulations, such aquifer characteristics would typically require advanced treatment similar to that performed by the OCWD for its GWRS program. Again, it is not practical to advance treat water before it is recharged only to have to treat it again on the way out.

Recommended Further Investigations

Several assumptions were made to complete this work. These assumptions and their implications are listed below.

1. Surface water recharge with recycled water. The recharge capacity created by the rubber dam system is much larger than the range of in-stream recycled water recharge volumes investigated herein. The recycled water recharge was spread out among all the cells created by the rubber dams. Prioritizing certain cells (for example, recharging more

recycled water in some cells and recharging no recycled water in others) could lead to lower RWCs and longer URTs for some wells. The well locations and capacity to recover the recycled water recharged were not optimized to maximize URT, minimize RWC or explored to evaluate the logical range of recovery rates. Additional work is required to optimize the recharge and recovery plans associated with surface recharge.

2. Injection and recovery wells location and related project capacity. The locations of the injection and recovery wells were assumed and not optimized to maximize URT, minimize RWC or explored to evaluate the logical range of injection and recovery rates. Additional work is required to optimize the injection and recovery plans before a decision is made to proceed with groundwater injection.

3. Seawater extraction barrier. Per Alternative 6 of the SJBGFMP, it was assumed that an extraction barrier was included as a Program Element within each alternative. Additional work could be performed to determine a projected project yield under selected recharge alternatives in the absence of the extraction barrier. In such a scenario, the wells would need to be operated in a manner similar to the baseline alternative, where the MNWP controls pumping to ensure a positive subsurface discharge to the ocean to prevent seawater intrusion.

4. Compliance with SWRCB permits. It was assumed that the 50 percent storage metric would apply in all Program alternatives. For Program alternatives that incorporate a seawater extraction barrier, provide surface water flows that could support riparian vegetation, and replace pumping by private pumpers with alternative water supplies, it is reasonable to assume that the limits imposed with the MNWP could be relaxed to only limit pumping when elevations threaten sustainable pumping. Additional evaluation is needed to determine how much more water could be recharged and/or recovered if this limitation were relaxed and what other measures could be taken to protect water quality, habitat, and riparian producers. This new information would be used to request modifications to the existing SWRCB diversion permits to enable greater operational flexibility, increased yield and be protective of water quality, habitat, and riparian producers.

5. Subsurface boundary inflows to the model. The groundwater model used herein has a constant boundary inflow from Oso Creek, the Arroyo Trabuco, Horno Creek and San Juan Creek. In aggregate this boundary inflow is about 27 percent of the average inflow. This assumption could result in an underestimation of the RWC and an over estimation of pumping capability during drought periods. The boundary inflows need to be refined and incorporated into future investigations.

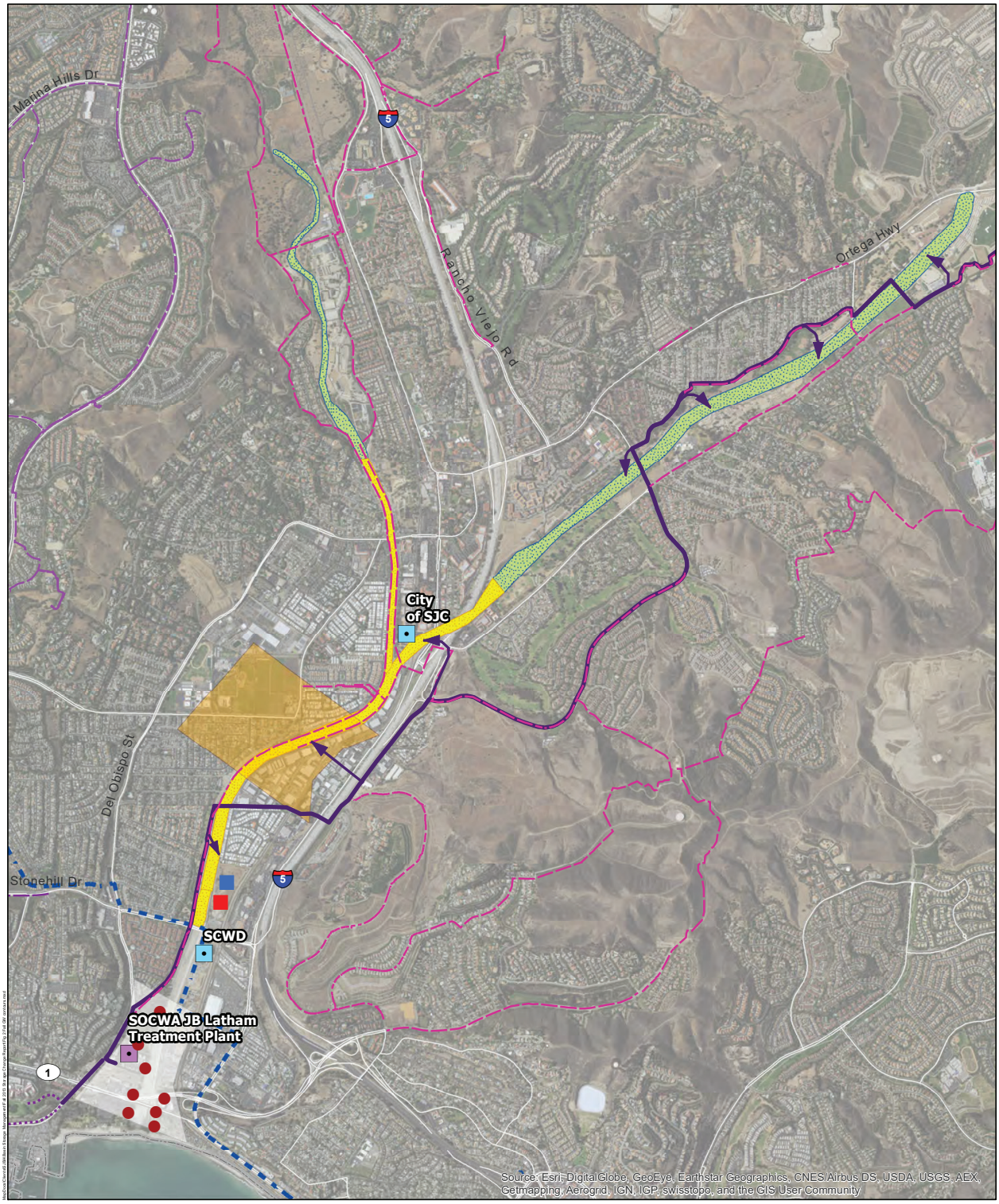
6. Groundwater Model. The groundwater model used in Task 3 evolved from a prior groundwater model developed by MWDOC to provide a boundary condition to another groundwater model developed by MWDOC that simulates the coastal groundwater response to and impacts from the then proposed SOCOD project and secondarily to project the impacts of the SOCOD project on the San Juan Basin. In going forward the SJBA should conduct a needs assessment to define the modeling specifications required to implement the SJBGFMP, compare these specifications to the SJBA model and consider updating or replacing the model to improve the accuracy of the model projections and resulting planning information.

Next Steps

The project implementation phasing plan has been presented to the SJBA Board for planning considerations and to evaluate which project elements could be incorporated in a project plan. It has been recommended to the SJBA Board that the TAG further review this phasing plan with current capital improvement projects for each agency to determine what "shared costs" could be captured with this project and to return a confirmed project schedule at the April, 2016 Board meeting.

It is anticipated that this report, and the technical supporting documents, will be submitted to the NWRI technical panel for review to assist SJBA in selection of the final project concept design elements.

Subject to completion of the NWRI technical review, it is anticipated that Board may request modifications to the implementation phasing plan to accelerate the preparation of the EIR and CEQA/NEPA documents along with the permitting and preliminary design phases which could lead to construction proceeding by 2018.



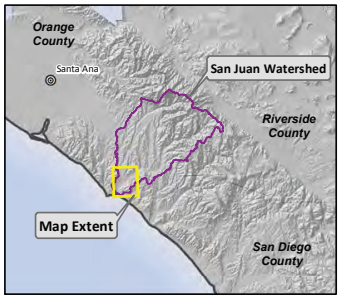
Existing Facilities

Recycled Water Distribution Facilities (12" and larger)

- Wastewater Treatment Plant
- Groundwater Recovery Facility
- MNWD
- SCWD (6" and larger)
- SMWD
- CSJC
- SCWD RW Extension (planned)
- Water Importation Pipeline (WIP)

Proposed Facilities

- Extraction Barrier Well
- Groundwater Recovery Facility
- Seawater Extraction Barrier Water Treatment Plant
- Recycled Water Pipeline
- Groundwater Recovery Wellfield
- Rubber Dams Area
- Incidental Recharge
- Seawater Extraction Barrier Wellfield



Author: MR
Date: 20151221
File: SWR4

0 1,000 2,000 Feet
0 0.25 0.5 Miles

Conceptual Strategy SWR-4

Stormwater and Recycled Water Recharge via Rubber Dams and Incidental Recharge

Figure 3.4-4

Table 4.2-1: Implementation Plan for the San Juan Basin Groundwater Facilities and Management Plan	Annual Implementation Cost by Fiscal Year ($1,000)										
	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	Next Ten Fiscal Years
SJBGFMP Basin Operations and Adaptive Management	**$300**	**$650**	**$375**	**$300**	**$300**	**$300**	**$300**	**$300**	**$650**	**$375**	**$3,500**
Monitoring and reporting	$300	$300	$300	$300	$300	$300	$300	$300	$300	$300	$3,500
Update surface and groundwater models		$300							$300		
Update the SJBGFMP		$50	$75						$50	$75	
SJBGFMP Implementation Phase 1	**$1,385**	**$13,665**	**$18,025**	**$485**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Project Planning, Management and Communication	$180	$150	$140	$140							
Prepare RFPs for program management, planning, engineering and public relations services and solicit proposals	*$15*										
Review proposals, conduct interviews, and retain consultants	*$15*										
Public relations and outreach	*$50*	*$50*	*$40*	*$40*							
Program management, including submit for and obtain funding	*$100*	*$100*	*$100*	*$100*							
Program-level CEQA/NEPA Document Preparation and Project Specific Instream Recharge Project EIR/EIS	$550	$50									
SJBA negotiates agreements with federal/state/local agencies and NGOs to construct rubber dams and incidental recharge facilities consistent with CEQA	$180	$20									
Acquire permits from Orange County and the Army Corps of Engineers	$150	$50									
Acquire all other permits related to rubber dam construction	$75	$25									
Design and Construct Rubber Dams	$250	$12,860	$17,340								
Preliminary Design Report	*$250*										
Design Rubber Dams		*$1,300*									
Construct Rubber Dams		*$11,560*	*$17,340*								
Amend/acquire permit from the SWRCB		$200	$200								
Acquire IPR Permit		$310	$345	$345							
SJBGFMP Implementation Phase 2	**$0**	**$0**	**$0**	**$0**	**$800**	**$7,720**	**$20,128**	**$77,465**	**$13,028**	**$0**	**$0**
Project Planning and Communication					$180	$140	$140	$140	$140		
Prepare RFPs for program management, planning, engineering and public relations services and solicit proposals					*$15*						
Review proposals, conduct interviews and retain consultants					*$15*						
Public relations and outreach					*$50*	*$40*	*$40*	*$40*	*$40*		
Program management, including submit for and obtain funding					*$100*	*$100*	*$100*	*$100*	*$100*		
Project Specific CEQA/NEPA for Instream Recycled Water Recharge Facilities					$200	$400	$200				
SJBA negotiates agreements with federal/state/local agencies and NGOs to construct instream recycled water recharge facilities consistent with CEQA						$50	$50				
Acquire permits from Orange County and the Army Corps of Engineers						$100	$100				
Acquire all other permits						$50	$50				
Design and Construct Instream Recycled Water Recharge Facilities					$420	$6,980	$19,588	$77,325	$12,888		
Prepare predesign report for instream recycled water recharge facilities					*$420*	*$280*					
Design Instream Recycled Water Recharge Facilities						*$6,700*	*$6,700*				
Construct Instream Recycled Water Recharge Facilities							*$12,888*	*$77,325*	*$12,888*		
Subsequent Phases to Increase IPR to Maximum Capacity											**$160,900**
Total Annual Cost (does not include contingency)	**$1,685**	**$14,315**	**$18,400**	**$785**	**$1,100**	**$8,020**	**$20,428**	**$77,765**	**$13,678**	**$375**	**$164,400**
Cumulative Implementation Cost (does not include contingency)	**$1,685**	**$16,000**	**$34,400**	**$35,185**	**$36,285**	**$44,305**	**$64,733**	**$142,498**	**$156,175**	**$156,550**	**$320,950**

Table 4.2-2: Breakdown of Construction and Implementation Cost Components of the Total Phased Cost to Implement the Recommended SJBGFMP						
Implementation Phase	Cost Breakdown by Phase ($1,000) Excluding Contingency			Cumulative Yield (AFY)	Potential Unit Capital Costs	
	Total Program *a = b + c*	Construction *b*	Implementation *c*		30-Year Lifecycle	50-Year Lifecycle
SJBGFMP Basin Operations and Adaptive Management	$7,350	$0	$7,350	0	N/A	N/A
Phase 1	$33,560	$26,300	$7,260	1,120	$1,530	$1,160
Phase 2[1]	$119,140	$89,600	$29,540	4,920	$1,580	$1,210
Subsequent Phases[2]	$160,900	$123,700	$37,200	7,360	$2,170	$1,660
Total	**$320,950**	**$239,600**	**$81,350**			

Notes

1. Unit capital cost estimates for Phase 2 include Phase 1 costs and yield.
2. Unit capital cost estimates for subsequent phases include Phase 2 costs and yield.

Table 4.2-3: Range of Potential Costs for the Implementation of all SJBGFMP Phases (FY 2016/17 through FY 2034/35)

Cost Component	Range of Potential Costs ($1,000) by Contingency Percentage		
	-30%	$0	+50%
Range of Construction Costs	$167,720	$239,600	$359,400
Range of Implementation Costs	$56,945	$81,350	$122,025
Range of Total Costs	**$224,665**	**$320,950**	**$481,425**
Potential Sources of Grant Funding to Offset the Cost of the SJBGFMP			
USBR Title XVI	$11,667	$16,667	$25,000
Calif. State Funding (Prop. 1, etc.)	$9,333	$13,333	$20,000
Potential Funding Total	**$21,000**	**$30,000**	**$45,000**
Potential Range of Costs with Funding	**$203,665**	**$290,950**	**$436,425**
Range of Potential Unit Capital Costs without Potential Funding			
Project Yield (AFY)		7,360	
30-Year Lifecycle	$1,560	$2,220	$3,340
50-Year Lifecycle	$1,190	$1,690	$2,540
Range of Potential Unit Capital Costs with Potential Funding[1]			
Project Yield (AFY)		7,360	
30-Year Lifecycle	$1,410	$2,020	$3,030
50-Year Lifecycle	$1,080	$1,540	$2,300

Notes

1. MWD LRP funding up to $340/AF for 25 years is also available and could further reduce the net unit capital costs.

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 7

INFORMATION ITEM
April 4, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Hinman, Finnegan)

FROM: Robert Hunter, General Manager Staff Contact: Karl Seckel

SUBJECT: **Response to South Coast Water District Notice of Preparation of Doheny Ocean Desalination Project Environmental Impact Report**

STAFF RECOMMENDATION

Staff recommends the Committee receive and file the report on the South Coast Water District Notice of Preparation (NOP) for the Doheny Ocean Desalination Project EIR. Comments are due no later than close of business on April 12.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

SUMMARY

South Coast Water District has provided a Notice of Preparation (NOP) and scheduled a scoping meeting for March 31 (prior to the meeting of the P&O Committee). Staff plans on attending the scoping meeting and will provide a report to the P&O Committee. Information and guidelines in responding to an NOP under CEQA are included below:

1. What is a typical response to a NOP?
   - A written reply specifying the scope and content of the environmental information in the EIR that a **"responsible agency"** needs to review. "Responsible agency" means a public agency, other than the lead agency, which has responsibility for carrying out or approving a project.
   - Responses must be limited to environmental information within the responsible agency's area of statutory responsibility.

Budgeted (Y/N): n/a	Budgeted amount: n/a	Core ✓	Choice __
Action item amount:	Line item:		
Fiscal Impact (explain if unbudgeted):			

- Responses must be specific and must relate directly to the project.
- Meetings may also be requested to determine the scope and content of the EIR.

2. When should a response be made?
   - Within 30 days after receipt of the NOP, although the responding agency may request additional time.

3. What information should be included in the Written Response?
   - Significant environmental issues, alternatives, and mitigation measures within the responsible agency's area of expertise.
   - Determination of whether the responding agency will be a responsible agency or a trustee agency (one with responsibility for Natural Resources).

4. What if the Responsible Agency Fails to Respond to the NOP?
   - The lead agency may assume that the reviewing agency has no response to make and may subsequently ignore later responses.
   - Failure to respond, however, does not prevent a responsible agency from raising issues during the EIR comment period.

Attached is the NOP provided by South Coast Water District.

MWDOC's role in the project will be to help secure LRP funding from MET and provide support towards other funding that might develop towards the project as well as general support for the project and potential expansion of the project to bring other agencies in as Participants. The project is one of the projects included in the OC Water Reliability Study and helps to improve both system and supply reliability to SOC. Regarding the environmental issues related to the project, it would be important for MWDOC to emphasize the need for the SJBA and the Doheny Project to work together to maximize the development of local water resources while protecting the groundwater resources in the lower San Juan groundwater basin.

NOTICE OF PREPARATION & PUBLIC SCOPING MEETING NOTICE

Date: March 11th, 2016

To: Reviewing Agencies, Organizations, and Interested Parties

Lead Agency: South Coast Water District

Subject: ***Notice of Preparation & Scoping Meeting Notice***

Doheny Ocean Desalination Project Environmental Impact Report

The purpose of this Notice of Preparation (NOP) is to notify reviewing agencies, including Responsible and Trustee Agencies (Agencies), that the South Coast Water District (District), as the Lead Agency, will be preparing an Environmental Impact Report (EIR) for the proposed Doheny Ocean Desalination Project (Project). The South Coast Water District is requesting comments and guidance on the scope and content of the EIR from Responsible and Trustee agencies, interested public agencies, organizations, and the general public (State of California Environmental Quality Act [CEQA] Guidelines §15082).

Project Summary: The EIR will assess the potential environmental effects of implementing a proposed ocean water desalination facility of up to 15 million gallons per day (MGD) of potable drinking water, with an initial demonstration phase of 4 to 5 MGD. The proposed facilities are located in Dana Point, including subsurface intake wells proposed at Doheny State Beach, and various conveyance lines connecting the intake and discharge facilities to existing District property located approximately ½ mile inland, adjacent to San Juan Creek. Refer to Exhibit 1, *Local Vicinity Map*; and Exhibit 2, *Project Study Area*. Additional project description information is provided below and on South Coast Water District's website at www.scwd.org/projects/oceandesal3.asp.

Agencies: The District requests your agency's views on the scope and content of environmental issues relevant to your agency's statutory responsibilities in connection with the proposed Project, in a manner consistent with California Code of Regulations, Title 14, Section 15082(b). Your agency may use the EIR prepared by the South Coast Water District when considering any permits that your agency must issue, or other approvals for the Project.

All parties that have submitted their names and mailing addresses will be notified as part of the Project's CEQA review process. If you wish to be placed on the mailing list or have any questions or need additional information, please contact the lead agency contact noted below. A copy of the Expanded NOP is also located at the City of Dana Point public library (Dana Point Library, 33841 Niguel Road, Dana Point, CA 92629), on South Coast Water District's website (www.scwd.org/NOP) and is also on file at the South Coast Water District, located at the address provided below. The project description, location, and potential environmental effects are provided in the attached materials.

Public Review Period: CEQA requires a 30-day public review period for an NOP. In accordance with CEQA, should you have any comments, please provide a written response to this NOP within the 30-day NOP period between **March 14th 2016 and April 12th 2016**.

Public Comments: The South Coast Water District requests your careful review and consideration of this notice, and it invites ***written comments*** from interested agencies, persons, and organizations regarding the preparation of the EIR. Please indicate a contact person for your agency or organization. You may also provide oral or written comments in person at the ***Scoping Meeting*** noted below. Comments in response to this notice must be submitted to the South Coast Water District through the close of business on **April 12th, 2016**.

Lead Agency Contact: All comments should be submitted in writing to:

South Coast Water District
Attn: Mr. Andrew Brunhart, Ph.D., PE - General Manager
31592 West St, Laguna Beach, CA 92651
(949) 499-4555

Public Scoping Meeting: The South Coast Water District will conduct a public scoping meeting in order to present the Project and the CEQA process and to receive public comments and suggestions regarding the scope and content of the EIR. The meeting will be held at the following location, date and time:

Thursday, March 31st 2016
6:00 p.m.
(ending no later than 8:00 p.m. or when discussion concludes)
Dana Point Community Center
34052 Del Obispo Street, Dana Point, CA 92629
Phone: (949) 248-3536

Special Accommodations. Should you require special accommodations at the public scoping meeting, such as for the hearing impaired or an English translator, please contact South Coast Water District no later than March 24th (see contact information above).

ATTACHMENT TO THE NOTICE OF PREPARATION AND PUBLIC SCOPING MEETING NOTICE OF AN ENVIRONMENTAL IMPACT REPORT FOR THE DOHENY OCEAN DESALINATION PROJECT

South Coast Water District Background

The South Coast Water District (District) is a public agency, formed by popular vote and owned by the people it serves. The District provides the core services of potable water production and distribution, recycled water distribution, and wastewater collection. The District was formed in 1932 to serve the area known as South Laguna. The District is situated along the southern coastline of Orange County and encompasses an area of approximately 8.3 square miles. The District provides domestic and non-domestic water service to residential, commercial, and institutional customers within the City of Dana Point and the City of Laguna Beach. A small portion of San Clemente covers approximately 200 acres within the District.

The District receives its potable drinking water from two main sources – imported water from the Municipal Water District of Orange County (MWDOC) and the San Juan Basin. The sources for imported water include the Colorado River and the State Water Project. The District's water supply is 80 percent dependent on imported water, with the remaining 20 percent of its supply from recycled water and shallow, brackish groundwater treated by the District's 1 million gallon per day (MGD) Groundwater Recovery Facility. Regarding recycled water, the District has invested in an Advanced Water Treatment facility and associated recycled water distribution infrastructure that provides approximately 300 million gallons (over 11 percent of the District's water supplies) for landscape irrigation.

The State of California is in a record multi-year drought. In 2015, the lowest snowpack in the Sierra Nevada occurred since records have been kept.[1] In response, on April 7th, 2015, the District's Board of Directors declared a Level 2 Water Supply Warning, which includes a limit on landscape irrigation using potable water to 1 day per week between 5 p.m. and 9 a.m. from November 1, 2015 through March 31, 2016. District customers have responded by reducing water use by 26 percent, compared to the State reduction requirement of 24 percent for the District.

As referenced above, the District has significantly expanded its water supply portfolio over the past decade through enhanced water recycling, shallow groundwater treatment, and water use efficiency projects. Even with these achievements, the District's water supply is still heavily dependent on imported

[1] California Department of Water Resources. *Central Valley Project and State Water Project 2016 Drought Contingency Plan For Water Project Operations February – November 2016*. Submitted January 15, 2016.

water supplies and remains vulnerable to water shortages and imported water system interruptions from catastrophic events. In order to provide a reliable, long term, sustainable, drought-proof supply of potable water to its customers and surrounding communities, the District is pursuing a desalinated ocean water project.

Ocean Desalination Feasibility Study

MWDOC began exploring the feasibility of developing an ocean desalination facility in 2002 as part of a program to improve water supply reliability in south Orange County. MWDOC, in partnership with participating agencies, undertook a comprehensive investigation into the feasibility study of the Doheny Ocean Desalination Project (Project). A 2004 Water Reliability Study recommended an ocean desalination project in Dana Point due to the geology, availability of land, existing outfall for brine disposal, and proximity to existing water pipelines.

The feasibility investigation included three phases. Phases 1 and 2 Testing were successfully completed from 2005 to 2007 at Doheny State Beach in Dana Point. Phase 3, *Extended Pumping and Pilot Plant Testing*, was completed in 2012. The investigation found that the construction and operation of slant wells along Doheny State Beach is feasible.

Project Description

The District proposes the Doheny Ocean Desalination Project (Project) in order to produce up to 15 MGD of potable drinking water, which is 16,000 acre feet per year (AFY). The District intends to initially construct a 4 to 5 MGD demonstration phase of the Project, with potential future expansions up to 15 MGD. The Project EIR will evaluate both the initial 4 to 5 MGD demonstration phase as well as the potential 15 MGD ultimate capacity. Both the initial 4 to 5 MGD and ultimate 15 MGD capacities would be available for the District and local water agencies to provide a high quality, locally-controlled, drought-proof potable drinking water supply. The desalination facility would also provide emergency back-up water supplies, should an earthquake, system shutdown, or other event disrupt the delivery of imported water to the area.

Project Location

There are several components to the Project. The slant well intake site is located in Doheny State Beach in Dana Point, California. The desalination facility would be situated on approximately 5 acres within a District owned 30-acre property being reserved for the Project by the District. The desalination facility site is located on the east side of San Juan Creek about 2,500 feet inland from the beach and north of Pacific Coast Highway. The site is south of Stonehill Drive and is bound by railroad tracks to the east. Access to the site is proved via a private access road that connects Stonehill Drive with Pacific Coast Highway. The proposed site contains paved and unpaved areas. The subsurface slant well intake system would be located south of the desalination facility site, fully buried within Doheny State Beach. Collector pipes and the intake pipeline will run from Doheny State Beach north to the desalination facility site and be required to cross the San Juan Creek, and possibly as the Caltrans right-of-way for Pacific Coast Highway and San

Juan Creek Bridge. The Project study area is traversed by two regional imported supply pipelines and the adjacent San Juan Creek Ocean Outfall, which has sufficient brine disposal capacity.

Project Goals

- To create a drought-proof, reliable and high-quality source of potable drinking water for the District.
- To further diversify the District's water supply portfolio, combining conservation, recycling, and local supplies to reduce dependence on imported water supplies.
- To provide emergency back-up water supplies, should an earthquake, system shutdown, or other event disrupt the delivery of imported water to our area.

Project Facilities

The major components of the Project would include:

- **Feedwater Supply** – Feedwater supply to the desalination facility would be produced from a proposed subsurface slant well intake system. The slant wells would be located and fully buried within Doheny State Beach. The slant wells would tap into the marine alluvial channel extension of San Juan Creek, which is a highly permeable formation that can be used to both produce and filter ocean water.
- **Desalination Facility** – The facility would be located on a 5-acre site adjacent to the San Juan Creek. The site is located on the east side of San Juan Creek about 2,500 feet inland from the beach. The desalination facility site would house all the treatment and pumping facilities, including product water distribution pumping and connections to the local distribution system. The full-scale facility would receive feedwater at approximately 30 MGD with a recovery rate of 50 percent which would yield 15 MGD of product water.
- **Product Water Distribution** – Product water distribution in Phase 1 would likely be into the District's local distribution system. The product water from future phases could be into both local and regional transmission pipeline(s) that are located adjacent to the site.
- **Ocean Water Concentrate Disposal** – The Project site is adjacent to the South Orange County Wastewater Authority (SOCWA) L. B. Latham Wastewater Treatment Plan and the San Juan Creek Ocean Outfall. The reverse osmosis ocean water concentrate would be disposed to the SOCWA San Juan Creek Outfall for co-disposal with secondary treated wastewater from SOCWA's J.B. Latham Wastewater Treatment Plan. The L.B. Latham Plant is located across San Juan Creek from the desalination facility site.
- **Electrical Energy Service** – Electrical energy service would most likely be provided by the San Diego Gas & Electric Company. Technical studies on the electrical supply are currently underway.

Summary of Permits and Approvals Required

The District is serving as the CEQA Lead Agency and will consider the Final EIR for certification and the Project for approval. Additional permits and/or approvals from the following agencies are anticipated to be necessary for implementation of the Project:

Agency	Permit
South Coast Water District	Final EIR Certification; Project Approval
California Coastal Commission	Coastal Development Permit (marine)
State Lands Commission	Lease/Amendment
Regional Water Quality Control Board	Ocean Plan compliance; National Pollutant Discharge Elimination System (NPDES)/Water Discharge Requirements (WDR) Permits; 401 Certification
City of Dana Point	Coastal Development Permit (onshore)
California Department of Parks and Recreation	Lease; Doheny State Beach General Development Plan Consistency Determination
State Water Resources Control Board, Division of Drinking Water	Domestic Water Supply Permit
State Water Resources Control Board	Ocean Plan compliance
U.S. Army Corps of Engineers	Section 404/Section 10 Permit
California Department of Fish & Wildlife	Section 1602 Streambed Alteration Agreement; California Endangered Species Act consultation
National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Services, U.S. Fish & Wildlife Services	Endangered Species Act Section 7 Consultation
State Historic Preservation Officer	National Historic Preservation Section 106 Compliance
California Department of Transportation (Caltrans)	Pacific Coast Highway encroachment permit
South Orange County Wastewater Authority	Outfall agreement; NPDES permit coordination
San Juan Basin Authority	Groundwater monitoring and mitigation, if required
Orange County Health Care Agency	Well construction permit

Summary of Key Environmental Issues

The following is a list of issues anticipated to be discussed in the EIR, based on preliminary Project review (the list of issues is not exhaustive). The EIR will evaluate potential Project impacts for each of the topics below.

- Aesthetics, Light and Glare;
- Air Quality;
- Biological Resources;
- Cultural Resources;
- Geology and Soils;
- Greenhouse Gas Emissions;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;
- Land Use and Planning;
- Noise;
- Public Services;
- Recreation;
- Transportation and Traffic; and
- Utilities and Service Systems.

Other CEQA mandated sections, including, but not limited to, alternatives, cumulative impacts, and growth inducement, will also be evaluated in the EIR.

Aesthetics, Light and Glare

The desalination facility would be located within currently disturbed land owned by the District. The slant wells would be located below grade in Doheny State Beach. The EIR will analyze the Project's potential impacts concerning aesthetics, as well as light and glare on the surrounding environment. Impacts related to scenic vistas within and surrounding Doheny State Beach will be evaluated. Consistency with the City of Dana Point General Plan (concerning designated scenic vistas and resources), the Local Coastal Program, and the Coastal Act will also be analyzed. The site design will consider landscaping and architectural design to ensure compatibility with surrounding land uses.

Air Quality

The EIR will evaluate short-term construction-related and long-term operation-related emissions based upon South Coast Air Quality Management District standards.

Biological Resources

The EIR will evaluate potential Project impacts upon biological resources, both terrestrial and marine. Because the Project desalinates ocean water, the primary biological resource that has the potential to be impacted is aquatic life. It is anticipated that the design of the desalination facilities will have little impact on biological resources. This is because the subsurface intake system would prevent the impingement or entrainment of aquatic life. Additionally, the desalination concentrate would be discharged through the existing ocean outfall for the wastewater treatment plant. The EIR will evaluate potential effects of ocean water intake, ocean water discharge, and related effects, as well as evaluate the potential effects to biological resources in and around San Juan Creek. The proposed slant well intake system may draw in a

small percentage of onshore groundwater, which may affect the existing San Juan Creek seasonal lagoon. This impact will be evaluated in the EIR and appropriate mitigation developed, if necessary.

Cultural Resources

The EIR will evaluate potential Project impacts upon archaeological, paleontological, and historic resources. The EIR will address the potential for discovering cultural resources during construction activities.

Geology and Soils

The EIR will evaluate the potential exposure of people and structures to seismic and geologic-related hazards.

Greenhouse Gas Emission (GHG)

The EIR will evaluate the Project's potential effects on global climate change, including construction-related and operational GHG emissions.

Hazards and Hazardous Materials

The EIR will evaluate relevant potential hazards including hazardous materials. The EIR will also address other hazards including the site's proximity to the ocean and San Juan Creek and related concerns such as coastal hazards (including sea level rise, wave run-up, coastal erosion and storm surge).

Hydrology and Water Quality

The EIR will address potential Project effects upon surface hydrology, such as providing adequate storm water drainage, and water quality. The EIR will evaluate potential flood hazards, including the desalination site's proximity to San Juan Creek, and the intake wells' proximity to coastal hazards such as tsunami and storm surge. The water quality discussion will include evaluation of surface water quality, as well as ocean water quality pursuant to the California Ocean Plan and Porter Cologne Water Quality Control Act, and other applicable, local, state, and federal regulations. The Project proposes to use the existing San Juan Creek Ocean Outfall for discharge of the desalination concentrate and will be required to meet applicable ocean water quality standards. Drinking water produced by the Project will also be required to meet applicable drinking water standards, as well as be compatible with end user water quality requirements.

Land Use and Planning

The EIR will address the Project's consistency with applicable local, state, and federal land use and planning policies and regulations adopted for the purpose of avoiding or mitigating an environmental effect. This evaluation will include consistency with the Doheny State Beach General Plan.

Noise

Some construction activities related to the Project may generate levels of noise higher than current ambient levels. Noise associated with operation of the desalination facility is expected to be minimal. An on-site noise analysis will be performed as part of the EIR, in order to identify any necessary mitigation measures. The EIR's noise analysis will consider sensitive receptors located in proximity to the Project site, such as the residential uses situated to the west of San Juan Creek.

Public Services

The EIR will evaluate the possible effects to public services resulting from increased demand created by the Project, including police, fire and solid waste services. The EIR will also address adequacy of emergency access into the site, and potential temporary effects upon emergency responders due to conveyance line construction in public streets.

Recreation

The EIR will address the Project's potential effects upon public recreation. The desalination facility site does not have any public access. However, the slant wells would be located and fully buried within Doheny State Beach. Access and/or use of the state park may be affected during construction activities. Once constructed, impacts to the beach are expected to be minimal, as the slant wells will be located primarily below grade and out of the public's view and access. In addition, maintenance of these facilities is anticipated to be infrequent. The EIR will evaluate opportunities to improve and enhance existing public recreation spaces and access.

Traffic and Circulation

The EIR will evaluate construction-related and operational traffic and circulation issues, including potential temporary disruption of existing public streets during the desalination facility and conveyance line construction. The EIR will also evaluate any potential disruption to the San Juan Creek trail, located adjacent to the west bank of San Juan Creek.

Utilities and Service Systems

The Project will require connections to various infrastructure facilities such as water (for potable uses by employees and visitors), sewer (for domestic purposes and for disposal of pretreatment and reverse osmosis cleaning solutions), telephone/cable, and electricity. The EIR will evaluate the potential physical impacts associated with connections to these facilities, and the possible effects resulting from increased demand created by the Project.

Cumulative Impacts

As required by CEQA, potential cumulative impacts of the Project when added to all other reasonably foreseeable projects in the vicinity will be addressed within the EIR. The cumulative projects to be considered will include those from local agencies in the immediate Project area, as well as cumulative ocean intake/discharge projects in the local area.

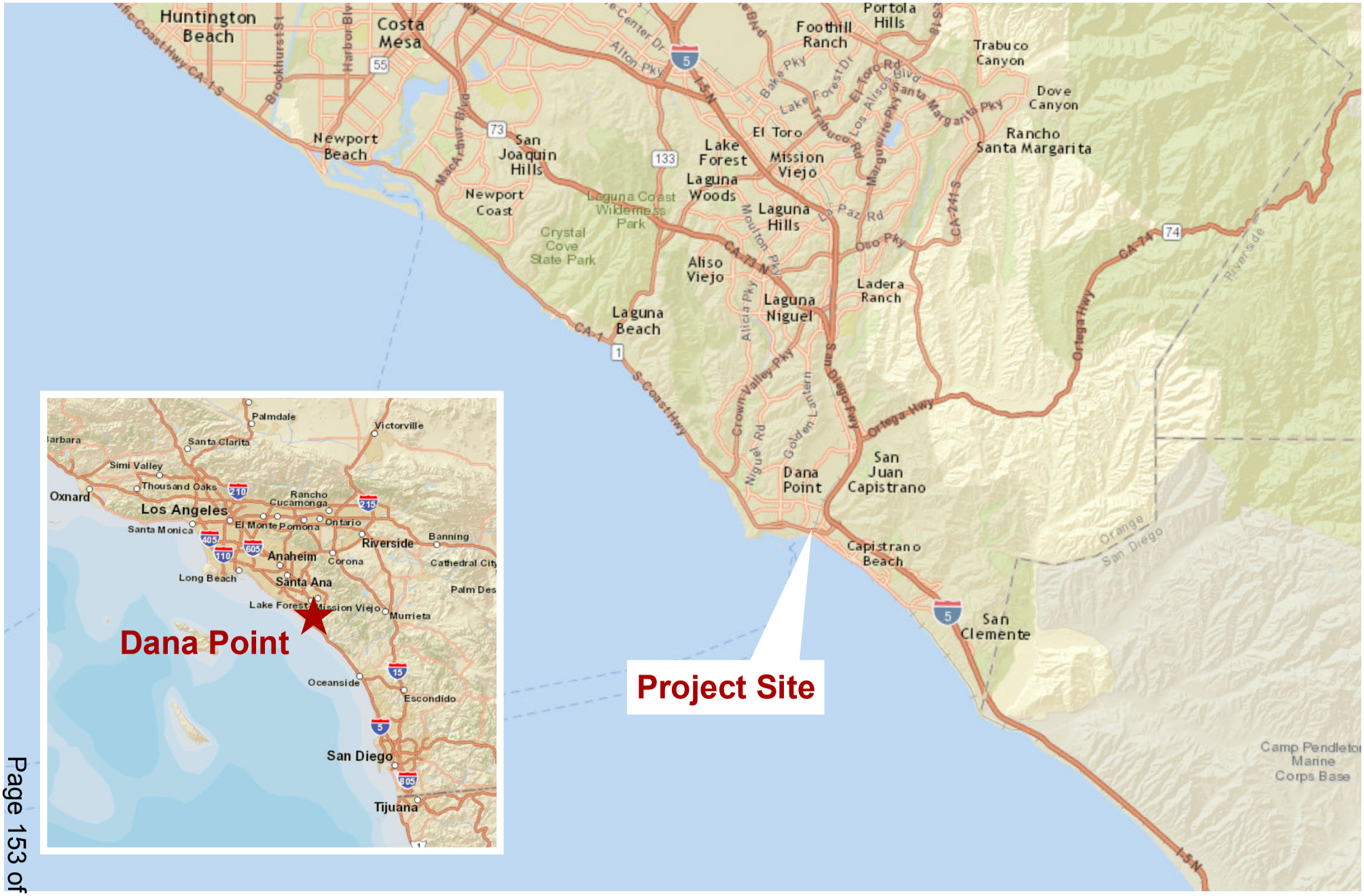
Alternatives

The EIR will evaluate a "reasonable range" of Project alternatives. This summary of alternatives is preliminary, as the District anticipates input from the public and stakeholders regarding appropriate alternatives to consider.

- **No Project Alternative** – the EIR will evaluate potential impacts from not implementing the Project;
- **Increased Conservation and Recycling Alternative** – the EIR will evaluate the impacts of this Alternative, and its ability to meet basic project objectives.
- **Reduced Size/Capacity Alternative** – the EIR will evaluate potential environmental effects of the Project with a reduced size/capacity;
- **Alternative Water Supply** – the EIR will discuss potential alternative supplemental water supplies, such as greater reliance upon imported water (through water banking and exchanges);
- **Alternative Facility Sites** – the EIR analysis will consider develop of the Project at alternative sites; and
- **Desalination Site Design and Technology Alternatives** – the EIR will consider potential environmental effects of alternative desalination designs and technologies, such as alternative intake technology.

Environmental Review Process

Following the completion of the 30-day Notice of Preparation public review period, the District will incorporate relevant information into the Draft EIR, including results of public scoping and technical studies. The Draft EIR will be circulated for public review and comment for a minimum 45-day public review period. All individuals that have requested to be notified, in writing, will be placed on a Notice of Availability list for the Draft EIR. In addition, the Draft EIR and related materials will be available for review at the District offices located at 31592 West Street, Laguna Beach, CA 92651. Following receipt of all written comments on the Draft EIR, the District will prepare Responses to Comments as part of the Final EIR, which will be considered and acted upon by the District's Board of Directors.



Source: ESRI, 2016

FIGURE 1: Regional Location Map

South Coast Water District
Doheny Desalination Project

NORTH

Kimley»Horn

Source: GHD

FIGURE 2: Project Vicinity Map

South Coast Water District
Doheny Desalination Project

Kimley»Horn

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

Item No. 8

INFORMATION ITEM
April 4, 2016

TO: **Planning & Operations Committee**
(Directors Dick, Hinman, Finnegan)

FROM: **Robert Hunter, General Manager** Staff Contact: Karl Seckel

SUBJECT: **Status Update on the OC Water Reliability Study – April 2016**

STAFF RECOMMENDATION

Staff recommends the Planning & Operations Committee receives and files the report.

COMMITTEE RECOMMENDATION

Committee recommends (To be determined at Committee Meeting)

OVERVIEW

In March work continued in the following areas:

- Two meetings were held during the month regarding the OC Water Reliability Study and OCWD staff with MWDOC's consultant to discuss assumptions and operations of the OCWD groundwater basin to set the modeling assumptions for the upcoming Portfolio analyses.

- One meeting was held with the SOC agencies to discuss test Portfolios to analyze for the SOC Reliability study.

Budgeted (Y/N): n/a	Budgeted amount: n/a	Core ✓	Choice __
Action item amount: n/a	Line item:		
Fiscal Impact (explain if unbudgeted):			

- Work continued by the Consultant in putting together the project information for various projects in OC.
- The Consultant worked on incorporating the comments received on Technical Memoranda #1 and #2 so that final versions can be issued. They should be available in early April.
- The next meeting of the Workgroup (the last planned meeting) will be held on April 14. The consultant will have DRAFT Portfolio results for review and input by the agencies before the results re finalized.
- Following that meeting a presentation will be prepared for the May 13 WACO Agenda. Work on documentation of the Phase 2 results is targeted for May. An outreach component will be developed.

Status of Ongoing MWDOC Reliability and Engineering and Planning Projects

March 29, 2016

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Baker Treatment Plant or Expansion of Baker Water Treatment Plant	IRWD, MNWD, SMWD, ETWD Trabuco CWD		On line date is Oct 2016	MWDOC has requested that IRWD be allowed to utilize the NEW OC-33 Mag Meter at a lower flow rate that the manufacturer of the meter indicates is acceptable, but it does not comply with MET's administrative code; this would be a temporary request until such time as the plant becomes operational. MWDOC is awaiting a response from MET. A meeting will be held in the near future on the invoicing of water through the plant. IRWD and MWDOC will work together to include the Baker Treatment Plant water on MWDOC water bills to the other agencies receiving water from the Baker Water Treatment Plant.
Doheny Desalination Project	South Coast Water District, Laguna Beach CWD			South Coast Water District is continuing to pursue a 5 mgd ocean desalination project. MWDOC is working on the decommissioning and removal of the test facilities. South Coast Water District just completed the Foundational Action Program work and has provided copies to MWDOC. Work is underway to conduct a Science Advisory Panel on the work.
Poseidon Resources				The Poseidon date for consideration of the permit from the

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
Ocean Desalination Project in Huntington Beach				California Coastal Commission is now set for July 2016.
Other Meetings/Work				
				Karl Seckel and Director Susan Hinman attended the special San Juan Basin Authority meeting in March where the final Foundational Action Funding Program report was reviewed and approved by the Board. Work is underway to conduct a Science Advisory Panel on the work.
				Keith Lyon and Kevin Hostert continued working with EOCWD staff and MET to concur with the location for installation of a NEW meter to assist with an upcoming flow test process along with a visual inspection of the check valve and venturi meter at the OC-70 service connection. The work involves resolving an apparent flow discrepancy between the EOCWD system and the MET meter. EOCWD will proceed with the NEW meter installation and then the flow test will be scheduled.
				Karl Seckel and Director Susan Hinman attended a special South Coast Water District Board meeting where a presentation was made on the Doheny Foundational Action Funding Program Study which was approved by the Board. Work is underway to conduct a Science Advisory Panel on the work.

Description	Lead Agency	Status % Complete	Scheduled Completion Date	Comments
				Karl Seckel attended the Santiago Aqueduct Commission (SAC) where the budget for 2016-17 was approved and included the water deliveries for about nine months of the coming fiscal year for the NEW Baker Water Treatment Plant. The need for another SAC meeting to approve the OC-33 service connection with MET will probably be needed in May.
				MWDOC, on behalf of Santa Margarita WD, submitted an LRP Application to MET for the Lake Mission Viejo Advanced Purification Water Treatment Facilities (APWTF). When completed later in 2016, the Project would supply about 300 AFY of refill water to Lake Mission Viejo that would offset the use of potable imported water. As a follow up, Karl and Keith participated in a phone conference with Don Bunts from SMWD and Ray Mokhtari and Nadia Hardjadinata from MET to review the application, and SMWD will provide a revised application based on comments from that conference call.
				Two meetings were held during the month regarding the OC Water Reliability Study and OCWD staff and MWDOC's consultant to discuss assumptions and operations of the OCWD groundwater basin to set the modeling assumptions for the portfolio analyses. One meeting was held with the SOC agencies to discuss test portfolios to analyze for the SOC Reliability study.

Status of Ongoing WEROC Projects
March 2016

Description	Comments
General Activities	Kelly Hubbard participated in the California Emergency Services Association State Board Conference call. Kelly has reduced some of her commitments to this organization, but is working to make sure duties transfer smoothly.
Coordination with Member Agencies	WEROC hosted a U.S. EPA sponsored one-day workshop for drinking water and wastewater utilities entitled "Introduction to Cybersecurity: Workshop and Response Exercise." The workshop introduced attendees to the cybersecurity threat, highlighted the results from on-site cybersecurity assessments conducted at other utilities, and demonstrated some free cybersecurity resources and tools that are available. This was the only session that was offered in EPA Region 9. Agencies Represented: El Toro Water District, WEROC, Irvine Ranch Water District, City of Newport Beach, South Coast Water District and 8 agencies outside of OC. WEROC worked with Irvine Ranch Water District staff and the Orange County Intelligence Assessment Center (OCIAC) to schedule a training titled "Targeting, Sabotage and Disruption of Public Utilities." IRWD hosted the class one day for water utility staff and a second day for law enforcement. Attendees were very complimentary of the training and requested more trainings of a similar nature. WEROC is working with the OCIAC staff to evaluate what other classes may be appropriate and will fit within their grant funding for the year. Agencies Represented: City of Garden Grove, State Water Resource Control Board – Division of Drinking Water, Yorba Linda Water District, City of Huntington Beach, City of Fountain Valley, South Orange County Wastewater Authority, City of Orange, Santa Margarita Water District and Irvine Ranch Water District. WEROC staff hosted an Exercise Planning Meeting for the water utilities on March 22nd. The meeting was to evaluate what each agency is doing for their spring exercise and what support is needed. It was determined that WEROC would host 2 separate Joint Tabletop Exercises for both WEROC EOC Staff and for Member Agency EOC staff. The group worked together to identify

Description	Comments
	reoccurring training needs. Kelly will utilize this information to create the materials for the joint exercises, as well as provide the materials to the few agencies who will be hosting their own exercises in conjunction with the WEROC exercises. Agency Representation: Yorba Linda Water District, South Coast Water District, Moulton Niguel Water District, East Orange County Water District, Mesa Water District, MWDOC, WEROC, Westminster and State Water Resource Control Board – Division of Drinking Water. *Orange County Water Procurement and Distribution Planning Update – On February 25 WEROC hosted the first meeting for this planning effort with water utility members and representatives from cities, county departments, American Red Cross and others. The purpose of the meeting was to discuss the roles and responsibilities of various entities during a disaster response to provide drinking water.* Since this meeting Shenandoah Hage has taken the lead in developing several tools: Water Utility Water Distribution Template, City Water Distribution Template, Point of Distribution (POD) Site Evaluation Checklist, and a POD Supplies Checklist. There are several guidance's available that were utilized, however staff's goal is to create tools that lead to true planning with details already identified for actual implementation. Kelly refined the tools that Shenandoah developed and has sent them to a small group that has volunteered to provide feedback. A larger planning meeting is scheduled for April 20 in which the refined tools will be presented and discussed. This is a critical effort for emergency response in OC.
Coordination with the County of Orange	It is WEROC's and the OCEMO Exercise Design Committee's goal is to try to get more of Orange County's government agencies involved in disaster exercises to make exercises more realistic and to ensure county readiness. To encourage this concept, the OCEMO Exercise Design Committee developed a training that included "Exercise Design Training" and "EOC Staff Train the Trainer." Kelly provided the Exercise Design Training for the March offering of this training. There were 30 attendees with 10 of the WEROC water utilities represented. This same class will be provided again in July to encourage participation in the Fall exercise. Agencies Represented: City of Orange, City of Anaheim, City of La Palma, Yorba Linda Water District, City of Westminster, South Coast Water District, City of Tustin, City of Santa Ana, City of Fountain Valley, and Costa Mesa Sanitation District.

Description	Comments
Coordination with Outside Agencies	The California Water/Wastewater Agency Response Network (CalWARN) hosts a half-day workshop at each CAL-NV AWWA Conference. Kelly was not available to present at this conference (March 24) in Sacramento, but offered to develop a PowerPoint on Mutual Aid Legal Considerations. An experienced water emergency manager from Northern California will be presenting the training for Kelly. Kelly will provide this presentation to the WEROC member agencies at the May WEROC Emergency Coordinator meeting. Brandon coordinated with Victor Galvez from MET to develop a flyer for the upcoming Safety Fest at Santa Ana Public Yard on May 18th. The flyer has been finalized and distributed to increase attendance to the upcoming event. All event information has been finalized and scheduled.
WEROC Emergency Operations Center (EOC) Readiness	Kelly provided two sessions of WEROC New EOC Staff Training to 16 individuals. The training was attended by some new WEROC EOC staff, as well as some current staff who wanted a refresher. Additionally, it is part of the OC Division of Drinking Water staff protocol to send their staff to the WEROC EOC during an actual event. They have been rotating their staff through trainings and now all of their staff have received at least the basic training. Brandon participated in the OC Operational Area Radio Test and the MET Radio Test. The MET Radio Test was performed with the updated equipment at the MWDOC office. Staff is working with MET to get the MARS radios at the two WEROC EOC's updated by early April. Brandon conducted the bimonthly test of the WEROC Radio system from the South EOC with 21 responses. Bimonthly radio tests will be conducted from alternate sites to help strengthen the resiliency in communications should a disaster occur. Brandon performed a system update to the Safety Center App which included: update of current WEROC EOC Staff, completion of AlertOC contact information, Member Agency contact information and system access to all current users. Brandon has been working with Facility Dude in the updating of the app and solutions to maximize system management.

Status of Water Use Efficiency Projects

March 2016

Description	Lead Agency	Status % Complete	Scheduled Completion or Renewal Date	Comments
Smart Timer Rebate Program	MWDSC	Ongoing	Ongoing	For February 2016, 46 residential and 57 commercial smart timers were installed in Orange County. For program water savings and implementation information, see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Rotating Nozzles Rebate Program	MWDSC	Ongoing	Ongoing	For February 2016, 5,482 rotating nozzles were installed in Orange County. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Water Smart Landscape Program	MWDOC	On-going	On hold pending evaluation and RFP process	This Program is currently on hold while a Process and Impact Evaluation is conducted. Once the Evaluation is complete, the results will be used to make refinements to the Program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
SoCal Water$mart Residential Indoor Rebate Program	MWDSC	On-going	On-going	In February 2016, 406 high efficiency clothes washers, 162 high efficiency toilets, and 36 premium high efficiency toilets were installed through this program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.

SoCal Water$mart Commercial Rebate Program	MWDSC	On-going	On-going	In February 2016, 339 high efficiency toilets, 112 multi-family high efficiency toilets, 799 premium high efficiency toilets, and 1 cooling tower conductivity controller were installed through this program. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
Industrial Process Water Use Reduction Program	MWDOC	95%	September 2016	A total of 41 Focused Surveys and 19 Comprehensive Surveys have been completed or are in progress. To date, 15 companies have signed Incentive Agreements. Updated discharger lists have been obtained, and outreach is continuing to sites with feasible water savings potential. As a result of this program, 359 AFY of water savings is being achieved.
MWDOC Conservation Meeting	MWDOC	On-going	Monthly	This month's meeting was held on March 3, 2016 at MWDOC. The next meeting will be on April 7, 2016 at Irvine Ranch Water District.
Metropolitan Conservation Meeting	MWDSC	On-going	Monthly	This month's meeting was held on March 17, 2016. The next meeting will be April 21, 2016 at Metropolitan.
Turf Removal Program	MWDOC	On-going	Ongoing	In March 2016, 694 rebates were paid, representing $2,675,593.31 in rebates paid this month in Orange County. To date, the Turf Removal Program has removed approximately 15.5 million square feet of turf. For program savings and implementation information, please see MWDOC Water Use Efficiency Program Savings and Implementation Report.
California Sprinkler Adjustment Notification System – Base Irrigation Schedule Calculator	MWDOC	95%	April 2016	MWDOC was awarded an additional grant from the Bureau of Reclamation to develop the Base Irrigation Schedule Calculator in support of the California Sprinkler Adjustment Notification System (CSANS). This system will e-mail or "push" an irrigation index to assist property owners with making global irrigation scheduling adjustments. Participants voluntarily register to receive this e-mail and can unsubscribe at any time.

California Sprinkler Adjustment Notification System – Base Irrigation Schedule Calculator (cont.)				EcoLandscape California (ELC) was selected and approved by the Board to develop the Base Irrigation Schedule Calculator and instructional videos. Development of the calculator and instructional video has been completed and is operational on our website. Staff will be composing the final report to the Bureau of Reclamation in April 2016. Through a grant from the Department of Water Resources (DWR) to the California Urban Water Conservation Council, the East Bay Municipal Utility District and Bay Area Water Supply and Conservation Agency are now being enrolled in CSANS. Once this has been completed, staff will be pursuing DWR for administration of CSANS state-wide.
Landscape Irrigation Survey Program	MWDSC	Ongoing	June 2016	Through this program, Metropolitan offers, at no cost, the services of a certified landscape irrigation auditor who will survey and provide written recommendations for qualifying non-residential properties within Metropolitan's service area. To date, 150 sites in the MWDOC service area have contacted Metropolitan to request surveys.
Spray to Drip Conversion Program	MWDOC	68%	October 2017	This is a pilot program designed to test the efficacy of replacing conventional spray heads in shrub beds with low-volume, low-precipitation drip technology. Through a rebate program format, residential and commercial sites will be encouraged to convert their existing spray nozzles to drip. To date, 170 residential sites and 49 commercial sites have completed spray to drip conversion projects.
Landscape Training and Outreach	MWDOC & County Stormwater	Ongoing	Ongoing	The Orange County Garden Friendly (OCGF) Pilot Program promotes the use of climate appropriate plants and water efficient irrigation practices, with the overall goals of reducing water runoff and improving outdoor water use efficiency. The Program is a collaborative effort of the Orange County Stormwater Program (OCSP) and the University of California Cooperative Extension (UCCE). Recently held OCGF events

Landscape Training and Outreach (cont.)				include two that were held on March 19, 2016, one at the Home Depot in Anaheim Hills and one at the Tree of Life Nursery in San Juan Capistrano. Upcoming events include one on April 2 at the Home Depot in Huntington Beach and one on April 30 at the Home Depot in Costa Mesa.

Orange County

Water Use Efficiency Programs Savings
and
Implementation Report

Retrofits and Acre-Feet Water Savings for Program Activity

Program	Program Start Date	Retrofits Installed in	Month Indicated		Current Fiscal Year		Overall Program		
			Interventions	Water Savings	Interventions	Water Savings	Interventions	Annual Water Savings[4]	Cumulative Water Savings[4]
High Efficiency Clothes Washer Program	2001	February-16	406	1.17	3,239	48.22	106,606	3,678	20,740
Smart Timer Program - Irrigation Timers	2004	February-16	103	3.27	991	90.19	14,058	4,852	29,131
Rotating Nozzles Rebate Program	2007	February-16	5,482	21.92	37,207	684.83	498,077	2,498	9,797
SoCal Water$mart Commercial Plumbing Fixture Rebate Program	2002	February-16	1,251	3.44	9,120	92.20	57,286	3,518	34,331
Water Smart Landscape Program [1]	1997	November-15	12,677	904.62	12,677	3,615.21	12,677	10,621	72,668
Industrial Process Water Use Reduction Program	2006	March-16	0	11.41	1	11.41	15	359	1,599
Turf Removal Program[3]	2010	March-16	1,196,741	13.95	7,951,555	122	15,469,228	2,166	3,694
High Efficiency Toilet (HET) Program	2005	February-16	198	0.70	10,854	307.79	57,128	2,112	11,556
Home Water Certification Program	2013	November-15	0	0.000	53	0.251	312	7.339	15.266
Synthetic Turf Rebate Program	2007						685,438	96	469
Ultra-Low-Flush-Toilet Programs [2]	1992						363,926	13,452	162,561
Home Water Surveys [2]	1995						11,867	160	1,708
Showerhead Replacements [2]	1991						270,604	1,667	19,083
Total Water Savings All Programs				**960**	**8,025,697**	**4,972**	**17,547,222**	**45,187**	**367,351**

[1] Water Smart Landscape Program participation is based on the number of water meters receiving monthly Irrigation Performance Reports.

[2] Cumulative Water Savings Program To Date totals are from a previous Water Use Efficiency Program Effort.

[3] Turf Removal Interventions are listed as square feet.

[4] Cumulative & annual water savings represents both active program savings and passive savings that continues to be realized due to plumbing code changes over time.

HIGH EFFICIENCY CLOTHES WASHERS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 06/07	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY13/14	FY14/15	FY15/16	Total	Current FY Water Savings Ac/Ft (Cumulative)	Cumulative Water Savings across all Fiscal Years	15 yr. Lifecycle Savings Ac/Ft
Brea	132	175	156	42	186	144	93	115	114	52	1,786	0.84	347.22	924
Buena Park	85	114	146	59	230	145	105	106	91	36	1,424	0.53	263.54	737
East Orange CWD RZ	18	22	17	3	23	10	10	8	8	6	187	0.09	38.28	97
El Toro WD	91	113	130	32	162	112	134	121	111	39	1,448	0.65	267.82	749
Fountain Valley	205	219	243	72	289	158	115	102	110	50	2,309	0.74	468.00	1,195
Garden Grove	238	304	332	101	481	236	190	162	165	109	3,294	1.13	644.24	1,704
Golden State WC	339	401	447	168	583	485	265	283	359	172	4,789	2.32	911.61	2,478
Huntington Beach	761	750	751	211	963	582	334	295	319	134	7,975	2.00	1,650.85	4,126
Irvine Ranch WD	1,972	2,052	1,844	1,394	2,621	2,170	1,763	1,664	1,882	893	22,665	14.03	4,168.57	11,728
La Habra	96	136	83	22	179	128	82	114	87	40	1,248	0.54	230.80	646
La Palma	33	35	51	25	76	46	34	25	34	16	435	0.21	79.12	225
Laguna Beach CWD	57	77	77	27	96	57	38	37	39	27	908	0.47	181.16	470
Mesa Water	239	249	246	73	232	176	114	86	89	53	2,378	0.63	499.57	1,230
Moulton Niguel WD	652	716	742	250	1,127	679	442	421	790	454	9,112	7.17	1,695.78	4,715
Newport Beach	245	270	259	57	197	142	116	92	95	51	2,548	0.82	541.43	1,318
Orange	366	365	403	111	349	262	218	163	160	76	3,770	1.20	782.48	1,951
Orange Park Acres	4	8	-	-	-	-	-	-	-	-	12	0.00	3.09	6
San Juan Capistrano	109	103	127	43	190	110	76	73	92	43	1,406	0.77	271.39	728
San Clemente	204	261	278	63	333	206	140	94	141	56	2,531	0.85	495.16	1,310
Santa Margarita WD	654	683	740	257	1,105	679	553	662	792	299	8,982	4.80	1,663.40	4,648
Seal Beach	47	46	57	7	81	51	31	29	38	17	587	0.28	113.32	304
Serrano WD	30	31	23	7	21	20	13	10	26	5	343	0.09	71.90	177
South Coast WD	107	130	148	43	183	112	89	79	68	33	1,530	0.51	297.67	792
Trabuco Canyon WD	69	60	62	28	82	62	30	45	47	25	761	0.40	146.74	394
Tustin	152	146	144	45	174	97	78	59	80	38	1,540	0.65	314.59	797
Westminster	213	171	233	74	329	208	121	82	109	65	2,418	0.68	481.94	1,251
Yorba Linda	288	350	367	117	394	273	181	167	156	88	3,661	1.36	750.92	1,894
MWDOC Totals	7,406	7,987	8,106	3,331	10,686	7,350	5,365	5,094	6,002	2,877	90,047	43.78	17,380.59	17,397
Anaheim	854	847	781	860	910	477	331	285	295	152	10,355	2.13	2,141.72	5,358
Fullerton	269	334	330	69	397	270	200	186	211	99	3,522	1.36	645.47	1,822
Santa Ana	236	235	257	87	355	190	163	131	132	111	2,682	0.94	572.47	1,388
Non-MWDOC Totals	1,359	1,416	1,368	1,016	1,662	937	694	602	638	362	16,559	4.44	3,359.66	3,199
Orange County Totals	8,765	9,403	9,474	4,347	12,348	8,287	6,059	5,696	6,640	3,239	106,606	48.22	20,740.25	20,596

SMART TIMERS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 08/09		FY 09/10		FY 10/11		FY 11/12		FY 12/13		FY 13/14		FY 14/15		FY 15/16		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm	Res	Comm.	
Brea	3	9	0	0	2	0	8	0	9	8	4	0	43	6	10	4	90	76	401.15
Buena Park	3	1	0	0	0	0	4	19	3	0	0	0	4	10	3	3	17	33	87.90
East Orange CWD RZ	0	0	0	0	1	0	5	0	2	0	0	0	2	0	0	0	13	0	3.55
El Toro WD	0	25	2	18	5	5	26	2	7	2	11	0	8	9	6	16	79	346	1,986.89
Fountain Valley	1	0	0	6	2	2	8	2	3	2	4	0	7	10	5	0	50	27	115.13
Garden Grove	2	1	6	0	5	4	7	0	5	2	9	0	10	14	9	11	69	38	112.12
Golden State WC	1	2	9	22	7	4	13	3	9	49	9	25	39	12	9	1	143	140	521.11
Huntington Beach	13	1	6	27	6	36	15	4	18	33	20	35	19	2	34	14	176	176	675.86
Irvine Ranch WD	29	56	14	145	28	153	267	71	414	135	71	59	67	310	19	5	1,205	1,664	7,927.56
La Habra	0	0	0	21	0	0	3	0	4	7	2	0	4	7	124	70	145	106	192.51
La Palma	0	0	0	0	0	0	1	0	1	0	2	0	2	0	2	1	8	1	1.64
Laguna Beach CWD	2	0	2	14	4	1	109	2	76	2	71	0	86	0	2	1	386	20	158.28
Mesa Water	6	7	13	7	7	22	21	0	10	2	15	2	17	28	6	1	139	102	487.39
Moulton Niguel WD	21	23	17	162	36	60	179	31	51	74	40	45	46	95	16	3	531	575	2,339.77
Newport Beach	10	27	7	58	6	0	275	12	242	26	168	75	11	9	86	73	1,066	427	1,991.65
Orange	5	2	2	13	5	8	25	0	20	24	13	9	18	31	13	11	178	153	675.79
San Juan Capistrano	10	0	7	49	13	1	103	2	14	18	6	11	6	19	9	2	189	111	448.96
San Clemente	81	20	13	209	46	11	212	17	26	7	28	2	28	24	30	13	1,018	371	2,061.74
Santa Margarita WD	25	44	10	152	61	53	262	7	53	171	64	93	53	321	19	2	658	1,017	3,565.82
Santiago CWD	0	0	0	0	0	0	0	0	0	0	0	0	0	0	97	52	97	52	39.48
Seal Beach	0	0	0	1	0	0	0	3	1	0	1	36	1	12	0	0	3	52	104.07
Serrano WD	0	0	11	0	4	0	3	0	1	0	0	0	4	0	2	0	25	0	6.00
South Coast WD	11	6	3	10	13	3	78	10	13	16	8	4	104	73	7	11	269	212	836.43
Trabuco Canyon WD	1	0	2	0	2	10	12	0	6	0	2	0	6	1	11	0	85	104	695.50
Tustin	7	9	10	14	10	0	11	0	8	4	9	1	18	14	19	6	96	55	216.17
Westminster	3	0	3	0	1	1	2	0	1	1	2	0	13	17	6	1	47	32	131.69
Yorba Linda	8	5	5	21	25	0	22	0	20	0	12	5	32	2	44	18	249	103	541.97
MWDOC Totals	242	238	142	949	289	374	1,671	185	1,017	583	571	402	648	1,026	588	319	7,031	5,993	26,326.14
Anaheim	9	59	5	46	12	11	23	60	19	10	9	26	7	52	9	21	136	434	1,958.61
Fullerton	2	2	2	39	9	33	22	51	9	29	8	0	40	26	13	8	127	188	643.70
Santa Ana	2	4	1	8	8	0	6	5	8	19	7	8	9	27	15	18	60	89	202.17
Non-MWDOC Totals	13	65	8	93	29	44	51	116	36	58	24	34	56	105	37	47	323	711	2,804.49
Orange County Totals	255	303	150	1,042	318	418	1,722	301	1,053	641	595	436	704	1,131	625	366	7,354	6,704	29,131

ROTATING NOZZLES INSTALLED BY AGENCY
through MWDOC and Local Agency Conservation Programs

Agency	FY 10/11			FY 11/12			FY 12/13			FY 13/14			FY 14/15			FY 15/16			Total Program			Cumulative Water Savings across all Fiscal Years
	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	Small		Large	
	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	Res	Comm.	Comm.	
Brea	32	0	0	130	0	0	65	120	0	84	0	0	157	45	0	0	2,484	0	498	2,749	0	20.27
Buena Park	29	0	0	32	0	0	65	0	0	53	0	0	248	0	0	45	98	0	509	173	2,535	451.38
East Orange	0	0	0	340	0	0	55	0	0	30	0	0	221	0	0	0	0	0	751	0	0	9.60
El Toro	174	0	0	357	76	0	23	6,281	0	56	3,288	0	1,741	28,714	0	730	4,457	0	3,314	45,980	890	638.35
Fountain Valley	83	0	0	108	0	0	35	0	0	0	0	0	107	0	0	186	0	0	674	0	0	8.62
Garden Grove	38	0	0	119	0	0	95	0	0	80	0	0	88	50	0	79	0	0	847	201	0	17.30
Golden State	303	943	0	294	0	0	257	2,595	0	192	0	0	583	1,741	0	311	0	0	2,464	5,308	0	103.87
Huntington Beach	203	625	0	458	0	0	270	0	0	120	0	0	798	1,419	0	1,314	1,822	0	3,617	8,150	2,681	752.74
Irvine Ranch	2,411	2,861	0	1,715	4,255	0	25,018	1,014	0	11,010	4,257	0	1,421	632	0	1,201	1,110	0	46,014	81,113	2,004	2,660.49
La Habra	0	0	0	33	90	0	0	0	0	15	0	0	109	338	0	300	0	0	481	1,236	900	218.61
La Palma	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0.24
Laguna Beach	156	0	0	763	0	0	3,596	0	0	2,948	878	0	2,879	1,971	0	95	0	0	10,844	2,896	0	164.80
Mesa Water	118	0	0	297	277	0	270	0	0	361	0	0	229	0	0	148	0	0	1,899	385	343	117.54
Moulton Niguel	1,578	0	0	1,225	0	0	512	1,385	0	361	227	0	1,596	4,587	0	719	419	0	6,948	13,621	2,945	907.88
Newport Beach	337	1,208	0	640	3,273	0	25,365	50	0	19,349	6,835	0	460	3,857	0	348	670	0	46,678	21,413	0	950.38
Orange	135	30	0	343	0	0	264	0	0	245	120	0	304	668	0	547	34	0	3,086	1,015	0	59.41
San Clemente	2,612	851	0	4,266	117	1,343	631	172	0	415	5,074	0	326	0	0	426	0	0	9,989	7,538	1,343	387.59
San Juan Capistrano	1,452	0	0	949	0	0	684	30	0	370	0	0	495	737	0	310	593	0	5,420	8,729	0	243.37
Santa Margarita	3,959	3,566	0	4,817	0	0	983	0	0	389	0	0	1,207	1,513	0	1,344	837	0	15,674	6,921	611	421.38
Seal Beach	0	0	0	0	0	0	0	0	0	0	0	0	40	5,261	0	0	2,300	0	155	7,852	0	60.16
Serrano	364	0	0	58	0	0	190	0	0	105	0	0	377	0	0	533	0	0	3,243	0	0	49.12
South Coast	318	1,772	0	688	359	0	435	0	0	70	0	0	4,993	13,717	0	1,421	2,889	0	8,114	18,870	0	229.18
Trabuco Canyon	0	0	0	379	0	0	34	0	0	0	0	0	56	0	0	130	0	0	2,086	791	0	52.64
Tustin	512	0	0	476	1,013	0	378	0	0	329	0	0	408	0	0	277	45	0	3,266	1,058	0	60.68
Westminster	0	0	0	26	0	0	15	0	0	0	0	0	54	0	0	57	0	0	343	0	0	5.47
Yorba Linda	529	0	0	559	0	0	730	0	0	40	990	0	921	0	0	1,526	0	0	5,679	4,359	500	259.19
MWDOC Totals	15,343	11,856	0	19,072	9,460	1,343	59,970	11,647	0	36,622	21,669	0	19,818	65,250	0	12,047	17,758	0	182,603	240,358	14,752	8,850.27
Anaheim	372	382	0	742	38,554	0	459	813	0	338	0	0	498	712	0	335	5,221	0	3,414	45,846	105	576.61
Fullerton	416	0	0	409	0	0	119	0	0	107	0	0	684	1,196	0	426	0	0	2,750	1,260	1,484	307.03
Santa Ana	53	0	0	22	65	0	99	0	0	86	2,533	0	310	0	0	0	1,420	0	859	4,646	0	63.15
Non-MWDOC Totals	841	382	0	1,173	38,619	0	677	813	0	531	2,533	0	1,492	1,908	0	761	6,641	0	7,023	51,752	1,589	946.78
Orange County Totals	16,184	12,238	0	20,245	48,079	1,343	60,647	12,460	0	37,153	24,202	0	21,310	67,158	0	12,808	24,399	0	189,626	292,110	16,341	9,797.05

SOCAL WATER$MART COMMERCIAL PLUMBING FIXTURES REBATE PROGRAM[1]
INSTALLED BY AGENCY
through MWDOC and Local Agency Conservation Programs

Agency	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	Totals	Cumulative Water Savings across all Fiscal Years
Brea	27	113	24	4	1	234	0	10	91	**631**	**348**
Buena Park	153	432	122	379	290	5	23	56	478	**2,243**	**922**
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	**0**	**0**
El Toro WD	0	92	143	1	137	0	212	6	268	**1,027**	**519**
Fountain Valley	17	35	0	2	314	0	0	1	4	**627**	**517**
Garden Grove	5	298	130	22	0	4	1	167	496	**1,861**	**1,317**
Golden State WC	46	414	55	68	135	0	1	0	385	**2,189**	**1,693**
Huntington Beach	48	104	126	96	156	104	144	7	540	**2,070**	**1,371**
Irvine Ranch WD	121	789	2,708	1,002	646	1,090	451	725	2,739	**13,547**	**5,937**
La Habra	191	75	53	4	0	0	0	0	152	**695**	**480**
La Palma	0	140	21	0	0	0	0	0	0	**166**	**74**
Laguna Beach CWD	20	137	189	0	0	0	27	0	0	**446**	**281**
Mesa Water	141	543	219	669	41	6	0	79	389	**3,200**	**1,821**
Moulton Niguel WD	9	69	151	6	0	0	0	3	125	**708**	**728**
Newport Beach	98	27	245	425	35	0	0	566	0	**1,834**	**1,144**
Orange	18	374	67	1	73	1	271	81	194	**2,098**	**1,565**
San Juan Capistrano	2	1	1	0	0	0	14	0	0	**260**	**367**
San Clemente	2	18	43	0	19	0	0	1	0	**432**	**350**
Santa Margarita WD	6	23	11	0	0	0	0	2	90	**207**	**186**
Santiago CWD	0	0	0	0	0	0	0	0	0	**0**	**0**
Seal Beach	1	2	124	0	0	0	0	0	0	**354**	**383**
Serrano WD	0	0	0	0	0	0	0	0	0	**0**	**0**
South Coast WD	9	114	56	422	84	148	0	382	0	**1,320**	**441**
Trabuco Canyon WD	0	4	0	0	0	0	0	0	0	**11**	**14**
Tustin	115	145	25	230	0	0	0	75	114	**946**	**725**
Westminster	40	161	16	63	35	1	28	0	118	**933**	**902**
Yorba Linda	10	24	8	30	0	1	0	0	224	**509**	**501**
MWDOC Totals	**1,079**	**4,134**	**4,537**	**3,424**	**1,966**	**1,594**	**1,172**	**2,161**	**6,407**	**38,314**	**22,583**
Anaheim	766	3,298	582	64	48	165	342	463	1,699	**12,071**	**6,127**
Fullerton	133	579	29	4	0	94	0	178	377	**2,058**	**1,440**
Santa Ana	493	815	728	39	12	16	17	5	637	**4,843**	**4,180**
Non-MWDOC Totals	**1,392**	**4,692**	**1,339**	**107**	**60**	**275**	**359**	**646**	**2,713**	**18,972**	**11,747**
Orange County Totals	**2,471**	**8,826**	**5,876**	**3,531**	**2,026**	**1,869**	**1,531**	**2,807**	**9,120**	**57,286**	**34,331**

[1] Retrofit devices include ULF Toilets and Urinals, High Efficiency Toilets and Urinals, Multi-Family and Multi-Family 4-Liter HETs, Zero Water Urinals, High Efficiency Clothes Washers, Cooling Tower Conductivity Controllers, Ph Cooling Tower Conductivity Controllers, Flush Valve Retrofit Kits, Pre-rinse Spray heads, Hospital X-Ray Processor Recirculating Systems, Steam Sterilizers, Food Steamers, Water Pressurized Brooms, Laminar Flow Restrictors, and Ice Making Machines.

Water Smart Landscape Program

Total Number of Meters in Program by Agency

Agency	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	Overall Water Savings To Date (AF)
Brea	0	0	0	0	0	22	22	22	22	22	64.37
Buena Park	0	0	0	17	103	101	101	101	101	101	462.69
East Orange CWD RZ	0	0	0	0	0	0	0	0	0	0	0.00
El Toro WD	227	352	384	371	820	810	812	812	812	812	4,856.93
Fountain Valley	0	0	0	0	0	0	0	0	0	0	0.00
Garden Grove	0	0	0	0	0	0	0	0	0	0	0.00
Golden State WC	0	14	34	32	34	32	32	32	32	32	200.59
Huntington Beach	0	0	0	31	33	31	31	31	31	31	148.43
Irvine Ranch WD	646	708	1,008	6,297	6,347	6,368	6,795	6,797	6,769	6,780	38,304.89
Laguna Beach CWD	0	0	57	141	143	141	124	124	124	124	733.07
La Habra	0	0	23	22	24	22	22	22	22	22	136.72
La Palma	0	0	0	0	0	0	0	0	0	0	0.00
Mesa Water	138	165	286	285	288	450	504	511	514	515	2,943.57
Moulton Niguel WD	113	180	473	571	595	643	640	675	673	661	4,120.71
Newport Beach	23	58	142	171	191	226	262	300	300	300	1,501.19
Orange	0	0	0	0	0	0	0	0	0	0	0.00
San Clemente	204	227	233	247	271	269	269	299	407	459	2,368.77
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0	0.00
Santa Margarita WD	618	945	1,571	1,666	1,746	1,962	1,956	2,274	2,386	2,386	14,178.10
Seal Beach	0	0	0	0	0	0	0	0	0	0	0.00
Serrano WD	0	0	0	0	0	0	0	0	0	0	0.00
South Coast WD	0	62	117	108	110	118	118	118	164	164	829.91
Trabuco Canyon WD	0	12	49	48	62	60	60	60	60	60	350.52
Tustin	0	0	0	0	0	0	0	0	0	0	0.00
Westminster	0	10	18	18	20	18	18	18	18	18	116.46
Yorba Linda WD	0	0	0	0	0	0	0	0	0	0	0.00
MWDOC Totals	**1,969**	**2,733**	**4,395**	**10,025**	**10,787**	**11,273**	**11,766**	**12,196**	**12,435**	**12,487**	**71,316.9**
Anaheim	0	0	0	142	146	144	190	190	190	190	1,351.53
Fullerton	0	0	0	0	0	0	0	0	0	0	0.00
Santa Ana	0	0	0	0	0	0	0	0	0	0	0.00
Non-MWDOC Totals	**0**	**0**	**0**	**142**	**146**	**144**	**190**	**190**	**190**	**190**	**1,351.53**
Orange Co. Totals	**1,969**	**2,733**	**4,395**	**10,167**	**10,933**	**11,417**	**11,956**	**12,386**	**12,625**	**12,677**	**72,668.45**

INDUSTRIAL PROCESS WATER USE REDUCTION PROGRAM

Number of Process Changes by Agency

Agency	FY 07/08	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	FY 15/16	Overall Program Interventions	Annual Water Savings[1]	Cumulative Water Savings across all Fiscal Years[1]
Brea	0	0	0	0	0	0	0	0	0	0	0	0
Buena Park	0	1	0	0	0	0	0	0	0	1	54	392
East Orange	0	0	0	0	0	0	0	0	0	0	0	0
El Toro	0	0	0	0	0	0	0	0	0	0	0	0
Fountain Valley	0	0	0	0	0	0	0	0	0	0	0	0
Garden Grove	0	0	0	0	0	0	0	0	0	0	0	0
Golden State	1	0	0	0	0	0	0	0	0	1	3	24
Huntington Beach	0	0	0	0	0	2	0	1	0	3	127	298
Irvine Ranch	0	0	2	1	1	1	1	0	0	6	98	415
La Habra	0	0	0	0	0	0	0	0	0	0	0	0
La Palma	0	0	0	0	0	0	0	0	0	0	0	0
Laguna Beach	0	0	0	0	0	0	0	0	0	0	0	0
Mesa Water	0	0	0	0	0	0	0	0	0	0	0	0
Moulton Niguel	0	0	0	0	0	0	0	0	0	0	0	0
Newport Beach	0	0	0	0	0	0	0	1	0	1	21	28
Orange	1	0	0	0	0	0	0	0	1	2	45	353
San Juan Capistrano	0	0	0	0	0	0	0	0	0	0	0	0
San Clemente	0	0	0	0	0	0	0	0	0	0	0	0
Santa Margarita	0	0	0	0	0	0	0	0	0	0	0	0
Seal Beach	0	0	0	0	0	0	0	0	0	0	0	0
Serrano	0	0	0	0	0	0	0	0	0	0	0	0
South Coast	0	0	0	0	0	0	0	0	0	0	0	0
Trabuco Canyon	0	0	0	0	0	0	0	0	0	0	0	0
Tustin	0	0	0	0	0	0	0	0	0	0	0	0
Westminster	0	0	0	0	0	0	0	0	0	0	0	0
Yorba Linda	0	0	0	0	0	0	0	0	0	0	0	0
MWDOC Totals	2	1	2	1	1	3	1	2	0	14	348	1509
Anaheim	0	0	0	0	0	0	0	0	0	0	0	0
Fullerton	0	0	0	0	0	0	0	0	0	0	0	0
Santa Ana	0	0	0	0	0	0	0	0	1	1	11	90
OC Totals	2	1	2	1	1	3	1	2	1	15	359	1599

[1] Acre feet of savings determined during a one year monitoring period.

If monitoring data is not available, the savings estimated in agreement is used.

HIGH EFFICIENCY TOILETS (HETs) INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY05-06	FY 06-07	FY 07-08	FY 08-09	FY 09-10	FY 10-11	FY 11-12	FY 12-13	FY 13-14	FY 14-15	FY 15-16	Total	Cumulative Water Savings across all Fiscal Years
Brea	0	2	7	43	48	8	0	0	38	146	145	437	**57.97**
Buena Park	0	1	2	124	176	7	0	0	96	153	101	660	**127.21**
East Orange CWD RZ	0	0	10	12	1	0	0	0	13	26	24	86	**13.11**
El Toro WD	0	392	18	75	38	18	0	133	218	869	228	1,989	**349.32**
Fountain Valley	0	69	21	262	54	17	0	0	41	132	196	792	**171.85**
Garden Grove	0	14	39	443	181	24	0	0	63	350	344	1,458	**284.25**
Golden State WC	2	16	36	444	716	37	80	2	142	794	493	2,762	**519.52**
Huntington Beach	2	13	59	607	159	76	0	0	163	1,190	577	2,846	**449.17**
Irvine Ranch WD	29	1,055	826	5,088	2,114	325	0	1,449	810	1,777	2,041	15,514	**3,812.27**
Laguna Beach CWD	0	2	17	91	28	11	0	0	45	112	66	372	**67.58**
La Habra	0	3	18	296	34	20	0	0	37	94	72	574	**139.98**
La Palma	0	1	10	36	26	13	0	0	21	59	50	216	**37.41**
Mesa Water	0	247	19	736	131	7	0	0	147	162	150	1,599	**442.74**
Moulton Niguel WD	0	20	104	447	188	46	0	0	400	2,497	1,819	5,521	**609.32**
Newport Beach	0	5	19	163	54	13	0	0	49	168	224	695	**114.40**
Orange	1	20	62	423	79	40	0	1	142	978	401	2,147	**329.11**
San Juan Capistrano	0	10	7	76	39	11	0	0	35	140	185	503	**71.50**
San Clemente	0	7	22	202	66	21	0	0	72	225	227	842	**143.21**
Santa Margarita WD	0	5	14	304	151	44	0	0	528	997	1,006	3,049	**362.31**
Seal Beach	0	678	8	21	12	1	0	2	17	50	56	845	**311.75**
Serrano WD	2	0	1	13	5	0	0	0	2	40	51	114	**13.07**
South Coast WD	2	2	29	102	41	12	23	64	102	398	232	1,007	**135.47**
Trabuco Canyon WD	0	0	4	23	23	0	0	0	10	108	153	321	**33.20**
Tustin	0	186	28	387	479	17	0	0	64	132	188	1,481	**396.10**
Westminster	0	17	25	541	167	23	0	0	35	161	339	1,308	**289.23**
Yorba Linda WD	0	14	89	323	96	18	0	0	40	280	366	1,226	**227.73**
MWDOC Totals	38	2,779	1,494	11,282	5,106	809	103	1,651	3,330	12,038	9,734	48,364	**9,508.76**
Anaheim	0	255	78	2,771	619	114	0	0	156	1,188	574	5,755	**1,440.84**
Fullerton	0	4	28	286	60	23	0	0	61	293	269	1,024	**177.73**
Santa Ana	0	11	25	925	89	23	0	0	33	602	277	1,985	**428.83**
Non-MWDOC Totals	0	270	131	3,982	768	160	0	0	250	2,083	1,120	8,764	**2,047.39**
Orange County Totals	**38**	**3,049**	**1,625**	**15,264**	**5,874**	**969**	**103**	**1,651**	**3,580**	**14,121**	**10,854**	**57,128**	**11,556.15**

TURF REMOVAL BY AGENCY[1]

through MWDOC and Local Agency Conservation Programs

Agency	FY 11/12		FY 12/13		FY 13/14		FY 14/15		FY 15/16		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	
Brea	3,397	9,466	7,605	0	5,697	0	71,981	30,617	85,886	341,732	174,566	381,815	**104.25**
Buena Park	0	0	0	0	0	0	11,670	1,626	46,894	13,769	58,564	15,395	**12.22**
East Orange	0	0	0	0	1,964	0	18,312	0	13,529	0	33,805	0	**7.85**
El Toro	4,723	0	4,680	72,718	4,582	0	27,046	221,612	45,515	115,494	86,546	409,824	**140.74**
Fountain Valley	1,300	0	682	7,524	4,252	0	45,583	5,279	51,421	0	103,238	12,803	**28.73**
Garden Grove	14,013	0	4,534	0	8,274	0	67,701	22,000	111,408	18,694	205,930	86,871	**97.94**
Golden State	42,593	30,973	31,813	3,200	32,725	8,424	164,507	190,738	217,464	27,318	489,102	260,653	**222.12**
Huntington Beach	27,630	48,838	9,219	12,437	20,642	0	165,600	58,942	244,531	213,148	468,423	337,016	**205.01**
Irvine Ranch	6,450	1,666	32,884	32,384	36,584	76,400	234,905	317,999	368,959	1,964,918	685,205	2,406,161	**586.53**
La Habra	0	8,262	0	0	0	0	14,014	1,818	32,299	2,936	46,313	20,791	**21.68**
La Palma	0	0	0	0	0	0	4,884	0	9,557	59,760	14,441	59,760	**11.07**
Laguna Beach	2,533	0	2,664	1,712	4,586	226	13,647	46,850	33,603	0	58,011	48,788	**28.71**
Mesa Water	6,777	0	10,667	0	22,246	0	131,675	33,620	130,868	3,930	302,233	37,550	**85.21**
Moulton Niguel	4,483	26,927	11,538	84,123	14,739	40,741	314,250	1,612,845	523,661	321,535	869,627	2,102,310	**771.12**
Newport Beach	3,454	0	3,548	2,346	894	0	33,995	65,277	56,129	231,319	98,020	298,942	**74.13**
Orange	12,971	0	15,951	8,723	11,244	0	120,093	281,402	196,886	18,509	357,145	308,634	**170.19**
San Clemente	21,502	0	16,062	13,165	18,471	13,908	90,349	1,137	159,904	427,379	306,288	455,589	**152.85**
San Juan Capistrano	22,656	103,692	29,544	27,156	12,106	0	101,195	32,366	127,900	88,384	293,401	251,598	**192.95**
Santa Margarita	1,964	11,400	10,151	11,600	17,778	48,180	211,198	514,198	333,532	274,050	579,106	864,989	**345.84**
Seal Beach	0	0	3,611	0	0	0	15,178	504	13,712	1,190	32,501	1,694	**8.50**
Serrano	0	0	0	0	2,971	0	41,247	0	92,724	4,403	136,942	4,403	**26.39**
South Coast	6,806	0	9,429	4,395	15,162	116,719	84,282	191,853	135,826	104,372	251,505	433,663	**192.55**
Trabuco Canyon	272	0	1,542	22,440	2,651	0	14,771	0	30,393	88,272	49,629	110,712	**35.48**
Tustin	0	0	9,980	0	1,410	0	71,285	14,137	147,927	33,362	230,602	47,499	**55.48**
Westminster	0	0	0	0	0	0	14,040	34,631	44,474	3,554	58,514	38,185	**20.35**
Yorba Linda	0	0	0	0	0	0	112,136	12,702	283,938	54,587	407,423	67,289	**91.88**
MWDOC Totals	**183,524**	**241,224**	**216,104**	**303,923**	**238,978**	**304,598**	**2,195,544**	**3,692,153**	**3,538,940**	**4,412,615**	**6,397,080**	**9,062,934**	**3,689.76**
Anaheim	0	0	0	0	0	0	0	0	0	0	0	0	**-**
Fullerton	0	0	0	0	0	9,214	0	0	0	0	0	9,214	**3.87**
Santa Ana	0	0	0	0	0	0	0	0	0	0	0	0	**-**
Non-MWDOC Totals	**0**	**0**	**0**	**0**	**0**	**9,214**	**0**	**0**	**0**	**0**	**0**	**9,214**	**3.87**
Orange County Totals	**183,524**	**241,224**	**216,104**	**303,923**	**238,978**	**313,812**	**2,195,544**	**3,692,153**	**3,538,940**	**4,412,615**	**6,397,080**	**9,072,148**	**3,694**

[1] Installed device numbers are listed as square feet

HOME WATER SURVEYS PERFORMED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	FY 13/14		FY 14/15		FY 15/16		Total		Cumulative
	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Surveys	Cert Homes	Water Savings
Brea	1	0	2	0	0	0	3	0	0.16
Buena Park	0	0	1	0	0	0	1	0	0.05
East Orange	19	0	1	0	0	0	20	0	1.39
El Toro	0	0	3	0	0	0	3	0	0.14
Fountain Valley	3	0	4	0	1	0	8	0	0.42
Garden Grove	0	0	6	0	1	0	7	0	0.31
Golden State	0	0	0	0	0	0	0	0	0.00
Huntington Beach	2	0	5	0	2	0	9	0	0.42
Irvine Ranch	1	0	3	0	6	0	10	0	0.35
La Habra	0	0	1	0	0	0	1	0	0.05
La Palma	0	0	0	0	0	0	0	0	0.00
Laguna Beach	4	0	8	0	1	0	13	0	0.68
Mesa Water	0	0	0	0	0	0	0	0	0.00
Moulton Niguel	4	0	4	0	0	0	8	0	0.47
Newport Beach	2	0	8	0	6	0	16	0	0.66
Orange	2	0	18	0	1	0	21	0	1.01
San Clemente	15	0	13	0	0	0	28	0	1.67
San Juan Capistrano	4	0	13	0	2	0	19	0	0.94
Santa Margarita	15	0	40	1	14	0	69	1	3.27
Seal Beach	0	0	1	0	2	0	3	0	0.09
Serrano	0	0	2	0	0	0	2	0	0.09
South Coast	6	0	4	0	1	0	11	0	0.64
Trabuco Canyon	0	0	4	0	0	0	4	0	0.19
Tustin	0	0	10	0	5	0	15	0	0.59
Westminster	0	0	0	0	0	0	0	0	0.00
Yorba Linda	0	0	13	0	10	0	23	0	0.85
MWDOC Totals	78	0	164	1	52	0	294	1	14.44
Anaheim	0	0	0	0	0	0	0	0	0.00
Fullerton	0	0	17	0	1	0	18	0	0.82
Santa Ana	0	0	0	0	0	0	0	0	0.00
Non-MWDOC Totals	0	0	17	0	1	0	18	0	0.82
Orange County Totals	78	0	181	1	53	0	312	1	15.266

SYNTHETIC TURF INSTALLED BY AGENCY[1]

through MWDOC and Local Agency Conservation Programs

Agency	FY 07/08		FY 08/09		FY 09/10		FY 10/11		Total Program		Cumulative Water Savings across all Fiscal Years
	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	Res	Comm.	
Brea	0	0	2,153	2,160	500	0	0	0	2,653	2,160	3.30
Buena Park	0	0	1,566	5,850	0	0	0	0	1,566	5,850	5.19
East Orange	0	0	0	0	983	0	0	0	983	0	0.55
El Toro	3,183	0	2,974	0	3,308	0	895	0	10,360	0	6.98
Fountain Valley	11,674	0	1,163	0	2,767	0	684	0	16,288	0	12.46
Garden Grove	1,860	0	0	0	3,197	0	274	0	5,331	0	3.47
Golden State	6,786	0	13,990	0	15,215	0	2,056	0	38,047	0	24.88
Huntington Beach	15,192	591	12,512	0	4,343	1,504	0	0	32,047	2,095	25.29
Irvine Ranch	11,009	876	13,669	0	2,585	0	0	0	27,263	876	21.00
La Habra	0	0	0	0	0	0	0	0	0	0	-
La Palma	429	0	0	0	0	0	0	0	429	0	0.36
Laguna Beach	3,950	0	3,026	0	725	0	0	0	7,701	0	5.84
Mesa Water	4,114	0	3,005	78,118	4,106	0	2,198	0	13,423	78,118	63.46
Moulton Niguel	14,151	0	25,635	2,420	7,432	0	0	0	47,218	2,420	35.69
Newport Beach	2,530	0	6,628	0	270	0	0	0	9,428	0	6.92
Orange	4,169	0	7,191	0	635	0	0	0	11,995	0	8.89
San Clemente	9,328	0	11,250	455	2,514	1,285	500	0	23,592	1,740	18.37
San Juan Capistrano	0	0	7,297	639	2,730	0	4,607	0	14,634	639	9.02
Santa Margarita	12,922	0	26,069	0	21,875	0	7,926	0	68,792	0	44.68
Seal Beach	0	0	817	0	0	0	0	0	817	0	0.57
Serrano	7,347	0	1,145	0	0	0	0	0	8,492	0	6.97
South Coast	2,311	0	6,316	0	17,200	0	1,044	0	26,871	0	16.43
Trabuco Canyon	1,202	0	9,827	0	0	0	0	0	11,029	0	7.89
Tustin	6,123	0	4,717	0	2,190	0	0	0	13,030	0	9.67
Westminster	2,748	16,566	8,215	0	890	0	0	0	11,853	16,566	22.47
Yorba Linda	11,792	0	12,683	0	4,341	5,835	0	0	28,816	5,835	24.48
MWDOC Totals	132,820	18,033	181,848	89,642	97,806	8,624	20,184	0	432,658	116,299	384.83
Anaheim	4,535	0	7,735	20,093	13,555	65,300	4,122	0	29,947	85,393	69.18
Fullerton	4,865	876	5,727	0	6,223	0	105	0	16,920	876	12.36
Santa Ana	0	0	2,820	0	525	0	0	0	3,345	0	2.27
Non-MWDOC Totals	9,400	876	16,282	20,093	20,303	65,300	4,227	0	50,212	86,269	83.81
Orange County Totals	142,220	18,909	198,130	109,735	118,109	73,924	24,411	0	482,870	202,568	468.63

[1]Installed device numbers are calculated in square feet

ULF TOILETS INSTALLED BY AGENCY

through MWDOC and Local Agency Conservation Programs

Agency	Previous Years	FY 95-96	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY 00-01	FY 01-02	FY 02-03	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09	Total	Cumulative Water Savings across all Fiscal Years
Brea	378	189	299	299	122	144	867	585	341	401	26	48	17	4	0	**3,720**	**1,692.64**
Buena Park	361	147	331	802	520	469	524	1,229	2,325	1,522	50	40	18	9	0	**8,347**	**3,498.37**
East Orange CWD RZ	2	0	33	63	15	17	15	50	41	44	19	18	13	2	0	**332**	**138.23**
El Toro WD	1,169	511	678	889	711	171	310	564	472	324	176	205	61	40	0	**6,281**	**3,091.16**
Fountain Valley	638	454	635	858	1,289	2,355	1,697	1,406	1,400	802	176	111	58	32	0	**11,911**	**5,383.10**
Garden Grove	1,563	1,871	1,956	2,620	2,801	3,556	2,423	3,855	3,148	2,117	176	106	67	39	0	**26,298**	**12,155.41**
Golden State WC	3,535	1,396	3,141	1,113	3,024	2,957	1,379	2,143	3,222	1,870	167	116	501	43	0	**24,607**	**11,731.47**
Huntington Beach	3,963	1,779	2,600	2,522	2,319	3,492	3,281	2,698	3,752	1,901	367	308	143	121	0	**29,246**	**13,854.70**
Irvine Ranch WD	4,016	841	1,674	1,726	1,089	3,256	1,534	1,902	2,263	6,741	593	626	310	129	0	**26,700**	**11,849.23**
Laguna Beach CWD	283	93	118	74	149	306	220	85	271	118	32	26	29	6	0	**1,810**	**845.69**
La Habra	594	146	254	775	703	105	582	645	1,697	1,225	12	31	6	7	0	**6,782**	**2,957.73**
La Palma	65	180	222	125	44	132	518	173	343	193	31	27	20	17	0	**2,090**	**927.52**
Mesa Water	1,610	851	1,052	2,046	2,114	1,956	1,393	1,505	2,387	988	192	124	56	14	0	**16,288**	**7,654.27**
Moulton Niguel WD	744	309	761	698	523	475	716	891	728	684	410	381	187	100	0	**7,607**	**3,371.14**
Newport Beach	369	293	390	571	912	1,223	438	463	396	1,883	153	76	36	16	0	**7,219**	**3,166.77**
Orange	683	1,252	1,155	1,355	533	2,263	1,778	2,444	2,682	1,899	193	218	88	53	4	**16,600**	**7,347.93**
San Juan Capistrano	1,234	284	193	168	323	1,319	347	152	201	151	85	125	42	39	0	**4,663**	**2,324.42**
San Clemente	225	113	191	65	158	198	667	483	201	547	91	66	37	34	0	**3,076**	**1,314.64**
Santa Margarita WD	577	324	553	843	345	456	1,258	790	664	260	179	143	101	29	0	**6,522**	**3,001.01**
Seal Beach	74	66	312	609	47	155	132	81	134	729	29	10	6	12	0	**2,396**	**1,073.80**
Serrano WD	81	56	68	41	19	52	95	73	123	98	20	15	14	2	0	**757**	**338.66**
South Coast WD	110	176	177	114	182	181	133	358	191	469	88	72	32	22	0	**2,305**	**990.05**
Trabuco Canyon WD	10	78	42	42	25	21	40	181	102	30	17	20	12	14	0	**634**	**273.02**
Tustin	968	668	557	824	429	1,292	1,508	1,206	1,096	827	69	89	26	12	0	**9,571**	**4,423.88**
Westminster	747	493	969	1,066	2,336	2,291	2,304	1,523	2,492	1,118	145	105	70	24	0	**15,683**	**7,064.28**
Yorba Linda WD	257	309	417	457	404	1,400	759	1,690	1,155	627	158	136	81	41	0	**7,891**	**3,409.49**
MWDOC Totals	24,256	12,879	18,778	20,765	21,136	30,242	24,918	27,175	31,827	27,568	3,654	3,242	2,031	861	4	**249,336**	**113,878.61**
Anaheim	447	1,054	1,788	3,661	1,755	7,551	4,593	6,346	9,707	5,075	473	371	462	341	1	**43,625**	**18,359.52**
Fullerton	1,453	1,143	694	1,193	1,364	2,138	1,926	2,130	2,213	1,749	172	77	44	23	2	**16,321**	**7,435.23**
Santa Ana	1,111	1,964	1,205	2,729	2,088	8,788	5,614	10,822	10,716	9,164	279	134	25	5	0	**54,644**	**22,887.95**
Non-MWDOC Totals	3,011	4,161	3,687	7,583	5,207	18,477	12,133	19,298	22,636	15,988	924	582	531	369	3	**114,590**	**48,682.70**
Orange County Totals	27,267	17,040	22,465	28,348	26,343	48,719	37,051	46,473	54,463	43,556	4,578	3,824	2,562	1,230	7	**363,926**	**162,561.30**

Item No. 11

MUNICIPAL WATER DISTRICT OF ORANGE COUNTY

COMMITTEE ACTION ITEM
April 4, 2016

TO: Board of Directors

FROM: Robert Hunter, General Manager Staff Contact: Heather Baez

SUBJECT: **AB 2583 (Frazier) – Sacramento San Joaquin Delta**

STAFF RECOMMENDATION

Staff recommends the Board of Directors vote to oppose AB 2583 (Frazier), sign on to Metropolitan Water District's coalition letter, and send a separate letter to the author and members of the Orange County delegation indicating our opposition.

SUMMARY

AB 2583 would add the definition of the California Water Fix to the Sacramento-San Joaquin Delta Reform Act of 2009, which established the Delta Stewardship Council and requires the council to develop, adopt, and commence implementation of a comprehensive management plan for the Delta, known as the Delta Plan.

BACKGROUND

From ACWA: The California Water Fix is the Brown Administration's proposal for a Delta Conveyance project, which involves the construction of two water conveyance tunnels underneath the Delta and including other elements. On August 18, 2015, Assembly Member Frazier participated in a Senate Informational Hearing on the California Water Fix proposal. The Assembly Member later published a press release on the hearing detailing his perceived lack of transparency, accountability, and public oversight of the proposal. The Author has introduced this bill to provide updated references in the Act and improve the transparency for the California Water Fix discussions.

Arriving at a Delta solution is a complex process. Invariably, there are differing opinions about the specific details. State and Federal agencies have been working in collaboration with stakeholders and the science community for years to weigh alternatives in order to develop the best plan possible to ensure that the coequal goals, as established by the Legislature, are met.

Budgeted (Y/N): n/a	Budgeted amount:	Core x	Choice __
Fiscal Impact (explain if unbudgeted):			

As stated in ACWA's 2013 Statewide Water Action Plan for California, ACWA supports a Delta solution as a critical component of a broader set of actions that will address water supply reliability and ecosystem health. ACWA does not have a position on the Brown Administration's proposed California Water Fix.

ARGUMENTS IN OPPOSITION

A summary of four major new requirements embedded in AB 2583 are outlined below:

- AB 2583 would give any state or federal water contractor that "will receive water" (presumably from new Delta conveyance) a veto over construction of the California WaterFix by requiring every one of them to enter a legally binding agreement to pay all costs associated with both new conveyance and the existing CVP and SWP facilities, including reimbursing the state for any bonds or General Funds used to date for either project.

- It would require the SWRCB to complete its update to the Bay-Delta Water Quality Control Plan before it could grant a change in point of diversion permit, which would make it a prerequisite to beginning construction.

- It eliminates current requirements for BDCP incorporation into the Delta Plan, which was a prerequisite to receiving state funding for public benefits, and replaces the requirements with onerous new prerequisites that must be met before construction could begin, and which would radically alter permitting and regulation of operations, including:

    - New conveyance must operate to maximize both coequal goals.
    - New conveyance cannot receive any public funding under any circumstances, even if it ends up including measures that would produce public benefits, e.g., by providing ecosystem benefits beyond those required to mitigate project impacts.
    - Acquisition of water must meet Prop. 1 bond funding requirements (i.e., any acquired water must be permanently dedicated to instream beneficial uses, which is an attempt to render it unavailable for rediversion even after it has served its in-stream purpose).
    - A Mitigation Monitoring and Reporting Plan (MMRP) and Adaptive Management Plan are adopted along with financial assurances that both will be implemented.
    - The Independent Science Board is given implementation oversight of the MMRP and Adaptive Management Plan to ensure rough proportionality of impacts and mitigation at all times.
    - Each region that receives water has improved self-reliance by 50% over supply levels during 2010-2015 due to reduced demand from Delta supplies.
    - Exports must "match more closely" with "surplus water supplies available" by water year type, Bay-Delta water quality objectives, the coequal goals and projections of in-Delta demands (i.e., the CVP and SWP may only export whatever water remains after all other ecological and in-Delta diverter needs are met).

- Conveyance infrastructure (not just new conveyance) must enhance Delta inflows and outflows "consistent with Delta ecosystem needs and needs of Delta water users," and provide net benefits to the ecosystem, which goes beyond ESA Section 7, California Endangered Species Act (CESA) 2081, or any other regulatory requirements.
- The EIR is revised to include an analysis of a reasonable range of flow criteria, rates of diversion and other operational requirements needed to recover the Delta ecosystem and restore fisheries in compliance with area of origin and Delta Protection Act requirements, the CVPIA, PL 108-361 (Water Supply, Reliability, and Environmental Improvement Act), the Longfin Smelt CESA permit, and the current Operations Criteria and Plan (OCAP) BiOps.

- It adds a requirement for the California WaterFix to include a transparent real-time, annual, and long-term operational decision-making process in which fishery agencies ensure that applicable biological performance measures are achieved.

In addition to the above, other major provisions of the bill include:

First, it would amend Water Code Section 85088 to require the SWRCB to complete its update to the 2006 Water Quality Control Plan for the Bay-Delta (commonly referred to as the "Bay- Delta Plan"). That update was initiated in 2009, and Phase 1 isn't even complete for the San Joaquin River. The Delta Reform Act did not require this timing provision. Instead, it requires the SWRCB to adopt flow criteria for any change in point of diversion for new conveyance like the California WaterFix, a process that has already begun, and which will finish years before the SWRCB revises its Bay-Delta Plan.

Second, it would amend Section 85089 to impose more onerous requirements on the water contractors financing the California WaterFix. Currently, Section 85089 prohibits construction of new Delta conveyance until the water contractors "have made arrangements or entered into contracts" to pay for (1) the costs of environmental review, planning, design, construction and mitigation of any new Delta conveyance facility, and (2) full mitigation of property tax or assessments levied by local governments or special districts for land used in the construction, location, mitigation, or operation of new Delta conveyance facilities.

As amended, AB 2583 would require all water contractors "that will receive water supplies" [*presumably from new conveyance facilities, but this is not specified*] to enter "legally binding financial agreements or contracts signed by each of the state and federal water contractors that will receive water supplies that commit them to pay for all costs, including reimbursement to the state for any General Fund or water bond funding used to date, that are associated with" the costs to plan, study, design, build, and mitigate new conveyance and full mitigation of property taxes and assessments.

Broadening the requirement to all water contractors, not just those prepared to fund California WaterFix, would require unanimous support from ***all*** state and federal contractors before construction could begin. This would give any holdout water contractor veto authority over the California WaterFix, something never contemplated in the Delta Reform Act, and something that likely would have blocked the Delta Reform Act from ever being adopted had it been included as a provision in 2009.

It also restricts the more general language to "make arrangement or enter contracts" to "legally binding financial agreements or contracts," which would rule out MOUs or other approaches to making arrangements to pay the required costs.

AB 2583 would also amend Section 85089(a) to require the legally binding contracts to obligate all state and federal water contractors not only to pay the costs of new conveyance, it would require all water contractors "that will receive water supplies" to pay all costs, including reimbursing the state for any General Fund or water bond funding used to date "associated with" the construction, operation, and maintenance ***of the federal Central Valley Project and the State Water Project***.

This would represent a major shift in the Delta Reform Act. State water contractors already pay all costs "associated with" construction, operation and maintenance of the SWP. But I am not sure whether the CVP contractors are required to pay all costs "associated with" the CVP. This new requirement has nothing to do with new conveyance or furthering the coequal goals.

Third, it guts and amends Section 85320. That section currently applies to the BDCP and sets forth the prerequisites for incorporation into the Delta Plan, which is a prerequisite for public funding of BDCP's public benefits. The California WaterFix is not an HCP/NCCP, so the Delta Stewardship Council is not required to incorporate it into the Delta Plan, nor is there any specific legal bar to receiving public funding for any public benefits.

The laundry list of additional requirements in the numbered list above speaks for itself. These prerequisites for construction would renege on a host of compromises in the Delta Reform Act and render the project financially infeasible and thwarts achievement of the coequal goals.

Fourth, AB 2583 would add a new requirement to the California WaterFix that mandates a transparent, real-time operational decision-making process that would put the fishery agencies in charge of ensuring timely achievement of "applicable biological performance measures." This requirement does not make sense outside the context of an HCP/NCCP.

COMMENTS

This bill is scheduled for hearing in the Assembly Water, Parks & Wildlife Committee on April 12, 2016.

The Metropolitan Water District of Southern California is crafting a coalition letter on behalf of all Southern California water districts. The draft letter is attached.

DETAILED REPORT

The full text of AB 2583 is attached.

AMENDED IN ASSEMBLY MARCH 17, 2016

CALIFORNIA LEGISLATURE—2015–16 REGULAR SESSION

ASSEMBLY BILL No. 2583

Introduced by Assembly Member Frazier

February 19, 2016

An act to amend ~~Section 85057.5 of,~~ *Sections 85057.5, 85086, 85088, 85089, 85320, and 85321 of, to amend the heading of Chapter 2 (commencing with Section 85320) of Part 4 of Division 35 of, and* to add Section 85053.5 to, ~~and to repeal Section 85085 of,~~ the Water Code, relating to the Sacramento-San Joaquin Delta.

LEGISLATIVE COUNSEL'S DIGEST

AB 2583, as amended, Frazier. Sacramento-San Joaquin Delta Reform Act of 2009.

Existing law, the Sacramento-San Joaquin Delta Reform Act of 2009, establishes the Delta Stewardship Council and requires the council to develop, adopt, and commence implementation of a comprehensive management plan for the Delta, known as the Delta Plan. *The Delta Plan is required to further the coequal goals of providing a more reliable water supply and protecting, restoring, and enhancing the Delta ecosystem. The act requires the council to consider the Bay Delta Conservation Plan (BDCP) for inclusion in the Delta Plan and requires the incorporation of the BDCP into the Delta Plan if the BDCP meets certain requirements.*

This bill would add a definition of the California Water Fix to the act. *This bill would eliminate certain provisions applicable to the BDCP and would revise other provisions to instead refer to a new Delta water conveyance project for the purpose of exporting water. This bill would require new Delta water conveyance infrastructure to be considered*

as interdependent parts of a system and to be operated in a way that maximizes benefits for each of the coequal goals.

The act requires a state or local public agency that proposes to undertake a covered action that will occur within the boundaries of the Delta or the Suisun Marsh to prepare, and submit to the council, a specified written certification of consistency with the Delta Plan prior to taking those actions. The act defines the term "covered action" to mean a plan, program, or project, as prescribed.

This bill would delete certain exclusions relating to the ~~Bay Delta Conservation Plan~~ *BDCP* from the definition of a covered action. *This bill would prohibit any certification of consistency for a new Delta water conveyance project unless specified requirements are met.*

~~The act requires the Department of Water Resources to coordinate with the Department of Fish and Wildlife, the State Water Resources Control Board, the California regional water quality control boards, and the State Lands Commission efforts to cooperate with the United States Bureau of Reclamation to construct and implement the Two-Gates Fish Protection Demonstration Project by December 1, 2010, to evaluate the effectiveness of the Three Mile Slough Barrier project, to expeditiously move ahead with certain near term actions, and to assist in implementing early action ecosystem restoration projects.~~

~~This bill would eliminate these requirements.~~

Under the act, until the State Water Resources Control Board issues an order approving a change in the point of diversion of the State Water Project and the federal Central Valley Project from the southern Delta to a certain point on the Sacramento River the Department of Water Resources is prohibited from commencing construction of any diversion, conveyance, or other facility necessary to divert and convey water pursuant to the change in point of diversion.

This bill would apply the above prohibition to a new point of diversion as well as a change in the point of diversion. This bill would prohibit the board from granting final approval of the requested change in or new point of diversion until the board has completed its update of a specified water quality control plan.

The act prohibits construction of a new Delta conveyance facility from being initiated until the persons or entities that contract to receive water from the State Water Project and the federal Central Valley Project or a joint powers authority representing those entities have made arrangements or entered into contracts to pay for certain costs required for the construction, operation, and maintenance of the facility

and full mitigation of property tax or assessments levied for land use in the construction, location, mitigation, or operation of the facility.

This bill would instead prohibit the construction until legally binding financial agreements or contracts are signed by each of the state and federal water contractors that will receive water supplies that commit them to pay for the costs required for the federal Central Valley Project, State Water Project, and any new Delta water conveyance facility, as specified, and full mitigation of property tax or assessments levied for land use in the construction, location, mitigation, operation, or maintenance of the facility.

Vote: majority. Appropriation: no. Fiscal committee: yes. State-mandated local program: no.

The people of the State of California do enact as follows:

SECTION 1. Section 85053.5 is added to the Water Code, to read:

85053.5. "California Water Fix" or "Water Fix" means a project, within the meaning of Section 21065 of the Public Resources Code and subdivision (a) of Section 85057.5, to construct new State Water Project conveyance facilities in the Delta.

SEC. 2. Section 85057.5 of the Water Code is amended to read:

85057.5. (a) "Covered action" means a plan, program, or project as defined pursuant to Section 21065 of the Public Resources Code that meets all of the following conditions:

(1) Will occur, in whole or in part, within the boundaries of the Delta or Suisun Marsh.

(2) Will be carried out, approved, or funded by the state or a local public agency.

(3) Is covered by one or more provisions of the Delta Plan.

(4) Will have a significant impact on achievement of one or both of the coequal goals or the implementation of government-sponsored flood control programs to reduce risks to people, property, and state interests in the Delta.

(b) "Covered action" does not include any of the following:

(1) A regulatory action of a state agency.

(2) Routine maintenance and operation of the State Water Project or the federal Central Valley Project.

(3) Regional transportation plans prepared pursuant to Section 65080 of the Government Code.

(4) A plan, program, project, or activity within the secondary zone of the Delta that the applicable metropolitan planning organization pursuant to Section 65080 of the Government Code has determined is consistent with either a sustainable communities strategy or an alternative planning strategy that the State Air Resources Board has determined would, if implemented, achieve the greenhouse gas emission reduction targets established by that board pursuant to subparagraph (A) of paragraph (2) of subdivision (b) of Section 65080 of the Government Code. For purposes of this paragraph, "consistent with" means consistent with the use designation, density, building intensity, transportation plan, and applicable policies specified for the area in the sustainable communities strategy or the alternative planning strategy, as applicable, and any infrastructure necessary to support the plan, program, project, or activity.

(5) Routine maintenance and operation of a facility located, in whole or in part, in the Delta, that is owned or operated by a local public agency.

(6) A plan, program, project, or activity that occurs, in whole or in part, in the Delta, if both of the following conditions are met:

(A) The plan, program, project, or activity is undertaken by a local public agency that is located, in whole or in part, in the Delta.

(B) Either a notice of determination is filed, pursuant to Section 21152 of the Public Resources Code, for the plan, program, project, or activity by, or the plan, program, project, or activity is fully permitted by, September 30, 2009.

(7) A project within the secondary zone, as defined pursuant to Section 29731 of the Public Resources Code as of January 1, 2009, for which a notice of approval or determination pursuant to Section 21152 of the Public Resources Code has been filed before the date on which the Delta Plan becomes effective.

(8) Leases approved by a special district if all of the following apply:

(A) The uses proposed by the lease are authorized by the applicable general plan and zoning ordinances of the city where the special district is located.

(B) The uses proposed by the lease are approved by the city where the special district is located and the city complies with

Chapter 3 (commencing with Section 85225) of Part 3, if applicable, prior to approval of the lease by the special district.

(C) The special district complies with the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) prior to approving the lease.

(9) (A) Routine dredging activities that are necessary for maintenance of facilities operated by a special district.

(B) For purposes of this paragraph, "routine dredging activities" are limited to the following:

(i) Dredging to maintain the Stockton Deep Water Ship Channel at a depth of 40 feet in the sediment trap at the confluence of the San Joaquin River, between river mile 39.3 to river mile 40.2, and to maintain the remaining Stockton Deep Water Ship Channel at a depth of 35 feet plus two feet of overdredge from river mile 35 to river mile 43.

(ii) Dredging designed to maintain the Sacramento Deep Water Ship Channel at a depth of 30 feet plus two feet of overdredge from river mile 0.0 to river mile 30, and at a depth of 35 feet from river mile 35 to river mile 43.

(C) Except as provided by this subdivision, it is the intent of the Legislature that this exemption shall not be interpreted or treated as changing or modifying current substantive and procedural regulations applicable to the decision to approve dredging operations.

(c) For purposes of this section, "special district" means the Port of Stockton or the Port of West Sacramento.

(d) This section shall not be interpreted to authorize the abrogation of a vested right whether created by statute or by common law.

~~SEC. 3. Section 85085 of the Water Code is repealed.~~

SEC. 3. Section 85086 of the Water Code is amended to read:

85086. (a) The board shall establish an effective system of Delta watershed diversion data collection and public reporting by December 31, 2010.

(b) It is the intent of the Legislature to establish an accelerated process to determine instream flow needs of the Delta for the purposes of facilitating the planning decisions that are required to achieve the objectives of the Delta Plan.

(c) (1) For the purpose of informing planning decisions for the Delta Plan and the Bay Delta Conservation Plan, the board shall,

pursuant to its public trust obligations, develop new flow criteria for the Delta ecosystem necessary to protect public trust resources. In carrying out this section, the board shall review existing water quality objectives and use the best available scientific information. The flow criteria for the Delta ecosystem shall include the volume, quality, and timing of water necessary for the Delta ecosystem under different conditions. The flow criteria shall be developed in a public process by the board within nine months of the enactment of this division. The public process shall be in the form of an informational proceeding conducted pursuant to Article 3 (commencing with Section 649) of Chapter 1.5 of Division 3 of Title 23 of the California Code of Regulations, and shall provide an opportunity for all interested persons to participate. The flow criteria shall not be considered predecisional with regard to any subsequent board consideration of a permit, including any permit in connection with a ~~final BDCP.~~ *new Delta water conveyance project for the purpose of exporting water.*

(2) Any order approving a change in the point of diversion of the State Water Project or the federal Central Valley Project from the southern Delta to a point on the Sacramento River shall include appropriate Delta flow criteria and shall be informed by the analysis conducted pursuant to this section. The flow criteria shall be subject to modification over time based on a science-based adaptive management program that integrates scientific and monitoring results, including the contribution of habitat and other conservation measures, into ongoing Delta water management.

(3) Nothing in this section amends or otherwise affects the application of the board's authority under Part 2 (commencing with Section 1200) of Division 2 to include terms and conditions in permits that in its judgment will best develop, conserve, and utilize in the public interest the water sought to be appropriated.

(d) The board shall enter into an agreement with the State Water Project contractors and the federal Central Valley Project contractors, who rely on water exported from the Sacramento River watershed, or a joint powers authority comprised of those contractors, for reimbursement of the costs of the analysis conducted pursuant to this section.

(e) The board shall submit its flow criteria determinations pursuant to this section to the council for its information within 30 days of completing the determinations.

SEC. 4. Section 85088 of the Water Code is amended to read:

85088. Until the board issues an order approving a change in ~~the~~ *or a new* point of diversion of the State Water Project and the federal Central Valley Project from the southern Delta to a point on the Sacramento River as specified in subdivision (c) of Section 85086, the department shall not commence construction of any diversion, conveyance, or other facility necessary to divert and convey water pursuant to the change in *or new* point of diversion. *In order to ensure protection of fish and wildlife and in-Delta beneficial uses of the Bay-Delta estuary's waters, final approval by the board of a change or new point of diversion described in this section shall not be granted until the board has completed its update of the 2006 water quality control plan for the Bay-Delta estuary that was initiated with a notice of preparation in 2009.*

SEC. 5. Section 85089 of the Water Code is amended to read:

85089. Construction of a new Delta conveyance facility shall not be initiated until the persons or entities that contract to receive water from the State Water Project and the federal Central Valley Project or a joint powers authority representing those entities have ~~made arrangements or~~ entered into *legally binding financial agreements or* contracts *signed by each of the state and federal water contractors that will receive water supplies that commit them* to pay for *all costs, including reimbursement to the state for any General Fund or water bond funding used to date, that are associated with* both of the following:

(a) The costs of the environmental review, planning, design, construction, and mitigation, including mitigation required pursuant to Division 13 (commencing with Section ~~21000~~ *21000)* of the Public Resources ~~Code),~~ *Code,* required for the construction, operation, and maintenance of *the federal Central Valley Project, the State Water Project, and* any new Delta water conveyance facility.

(b) Full mitigation of property tax or assessments levied by local governments or special districts for land used in the construction, location, mitigation, *maintenance,* or operation of *a* new Delta conveyance ~~facilities.~~ *facility.*

SEC. 6. The heading of Chapter 2 (commencing with Section 85320) of Part 4 of Division 35 of the Water Code is amended to read:

CHAPTER 2. ~~BAY DELTA CONSERVATION PLAN~~ *DELTA WATER CONVEYANCE*

SEC. 7. Section 85320 of the Water Code is amended to read:

~~85320. (a) The Bay Delta Conservation Plan (BDCP) shall be considered for inclusion in the Delta Plan in accordance with this chapter.~~

~~(b) The BDCP shall not be incorporated into the Delta Plan and the public benefits associated with the BDCP shall not be eligible for state funding, unless the BDCP does all of the following:~~

~~(1) Complies with Chapter 10 (commencing with Section 2800) of Division 3 of the Fish and Game Code.~~

85320. (a) New Delta water conveyance infrastructure shall be considered as interdependent parts of a system and operated in a way that maximizes benefits for each of the coequal goals. A certification of consistency pursuant to Section 85225 shall not be made for a new Delta water conveyance project for the purpose of exporting water unless all of the following requirements are met:

(1) The costs of the design, construction, and operation of the water conveyance project and the associated mitigation and maintenance costs are not eligible for state funding. This includes implementation of existing habitat restoration requirements of the Department of Fish and Wildlife Longfin Smelt Incidental Take Permit for the State Water Project Delta operations and the United States Fish and Wildlife Service and National Oceanic and Atmospheric Administration National Marine Fisheries Service biological opinion for the current coordinated operations of the State Water Project and federal Central Valley Project. These costs shall be the responsibility of the water agencies that benefit from the conveyance project.

(2) The restrictions on the use of state bond funding for the acquisition of water pursuant to Section 79709 are met.

(3) A legally binding finance agreement is signed by all beneficiary state and federal water contractors committing them to pay all water conveyance project construction, mitigation, operation, maintenance, monitoring, and adaptive management costs, including reimbursement of local agency property taxes and assessments pursuant to subdivision (b) of Section 85089.

(4) An enforceable mitigation implementation plan and monitoring and an enforceable monitoring and adaptive management plan are completed and contain mechanisms, such as establishing an endowment fund, to ensure adequate and ongoing funding necessary to mitigate the impacts to communities and agricultural production in the project area and to carry out the plans that are finalized and approved by the Department of Fish and Wildlife. The Delta Independent Science Board shall perform oversight regarding implementation of these plans for the purposes of ensuring that implementation of all mitigation measures required pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code is roughly proportional in time and extent to the impact on all resources analyzed in the environmental impact report and to assess the effectiveness and adequacy of mitigation performance, funding, and habitat protection measures. The Delta Independent Science Board shall annually submit its findings and recommendations to the department, the council, and the Department of Fish and Wildlife.

(5) The council determines that the proposed changes in Delta water conveyance are consistent with Section 85021 because each region that will import water from the Delta using the new Delta water conveyance demonstrates that it has improved its regional self-reliance for water by 50 percent over average regional water supply levels during the period of 2010 to 2015, inclusive, due to reduced import demand from the Delta through investment in water use efficiency, water recycling, advanced water technologies, local and regional water supply projects, and improved regional coordination of local and regional water supply efforts to the maximum extent possible.

(6) Water exported from the Delta will match more closely the surplus water supplies available to be exported based on water year type, compliance with water quality objectives of the water quality control plan for the Bay-Delta estuary, the coequal goals, and the Delta water supply protections of Chapter 1 (commencing with Section 12220) of Part 4.5 of Division 6.

(7) Conveyance infrastructure and operations enhance Delta inflows and outflows by reducing diversions in dry periods consistent with the beneficial use needs of the Delta ecosystem

and water users and provide net benefits to the ecosystem beyond protecting the ecosystem from further degradation.

(8) The water conveyance project complies with real-time operational requirements in accordance with Section 85321.

~~(2) Complies with~~

(9) The requirements of Division 13 (commencing with Section 21000) of the Public Resources ~~Code,~~ *Code are met,* including a comprehensive review and analysis of all of the following:

(A) A reasonable range of flow criteria, rates of diversion, ~~and other operational criteria required to satisfy the criteria for approval of a natural community conservation plan as provided in subdivision (a) of Section 2820 of the Fish and Game Code,~~ and other operational requirements and flows necessary for recovering the Delta ecosystem and restoring ~~fisheries~~ *fisheries, in compliance with all of the following,* under a reasonable range of hydrologic conditions, which will identify the remaining water available for export and other beneficial ~~uses.~~ *uses:*

(i) Section 85031.

(ii) The federal Central Valley Project Improvement Act (Public Law 102-575).

(iii) The federal Water Supply, Reliability, and Environmental Improvement Act (Public Law 108-361).

(iv) The Department of Fish and Wildlife Longfin Smelt Incidental Take Permit for State Water Project Delta operations.

(v) The United States Fish and Wildlife Service and National Oceanic and Atmospheric Administration National Marine Fisheries Service biological opinion for the current coordinated operations of the State Water Project and federal Central Valley Project.

(B) A reasonable range of Delta conveyance alternatives, including through-Delta, dual conveyance, and isolated conveyance alternatives and including further capacity and design options of a lined canal, an unlined canal, and pipelines.

(C) The potential effects of climate change, possible sea level rise up to 55 inches, and possible changes in total precipitation and runoff patterns on the conveyance alternatives and habitat restoration activities considered in the environmental impact report.

(D) The potential effects on migratory fish and aquatic resources.

(E) The potential effects on Sacramento River and San Joaquin River flood management.

(F) The resilience and recovery of Delta conveyance alternatives in the event of catastrophic loss caused by earthquake or flood or other natural disaster.

(G) The potential effects of each Delta conveyance alternative on Delta water quality.

~~(c)~~

(b) The department shall consult with the council and the Delta Independent Science Board during the development of ~~the BDCP.~~ *projects to construct new Delta water conveyance facilities for the purpose of exporting water.* The council shall be a responsible agency in the development of the environmental impact report. The Delta Independent Science Board shall review the draft environmental impact report and submit its comments to the ~~council~~ *department, the council,* and the Department of Fish and ~~Game.~~ *Wildlife.*

~~(d) If the Department of Fish and Game approves the BDCP as a natural community conservation plan pursuant to Chapter 10 (commencing with Section 2800) of Division 3 of the Fish and Game Code, the council shall have at least one public hearing concerning the incorporation of the BDCP into the Delta Plan.~~

~~(e) If the Department of Fish and Game approves the BDCP as a natural community conservation plan pursuant to Chapter 10 (commencing with Section 2800) of Division 3 of the Fish and Game Code and determines that the BDCP meets the requirements of this section, and the BDCP has been approved as a habitat conservation plan pursuant to the federal Endangered Species Act (16 U.S.C. Section 1531 et seq.), the council shall incorporate the BDCP into the Delta Plan. The Department of Fish and Game's determination that the BDCP has met the requirements of this section may be appealed to the council.~~

~~(f)~~

(c) The department, in coordination with the Department of Fish and ~~Game,~~ *Wildlife,* or any successor agencies *or joint powers authority* charged with ~~BDCP implementation,~~ *implementation of a new Delta water conveyance project,* shall report to the council on the ~~implementation of the BDCP~~ *implementation, funding, and schedule* at least once a year, including the status *and effectiveness* of *mitigation measures,* monitoring ~~programs~~ *programs,* and adaptive management.

~~(g)~~

(d) The council may make recommendations ~~to BDCP~~ *for the purpose of the Delta Habitat Conservation and Conveyance Program and to the department, other Delta water conveyance* implementing ~~agencies~~ *agencies, and joint power authorities* regarding the implementation of ~~the BDCP. BDCP implementing~~ *a new Delta water conveyance project. Implementing* agencies shall consult with the council on these recommendations. These recommendations shall not change the terms and conditions of the permits issued by state and federal regulatory agencies.

SEC. 8. Section 85321 of the Water Code is amended to read:

85321. ~~The BDCP~~ *A new Delta water conveyance project for the purpose of exporting water* shall include a transparent, ~~real-time~~ *real-time, annual, and long-term* operational decisionmaking process in which fishery agencies ensure that applicable biological performance measures are achieved in a timely manner with respect to water system operations.

O

DATE

Assembly Member Jim Frazier
California State Assembly
State Capitol, Room 3091
Sacramento, CA 95814

Re: AB 2583 (Frazier): Delta Reform Act of 2009 - **OPPOSE**
Assembly Water, Parks and Wildlife Committee – April 12, 2016

Dear Assembly Member Frazier:

On behalf of the public water agencies and organizations noted below, we regret to inform you we must oppose your bill, AB 2583, as it creates an unnecessary and destructive double standard in California for advancing projects to modernize the statewide water system.

The subset of public water suppliers that receive deliveries directly from the Sacramento-San Joaquin Bay/Delta should not be regulated any differently than the water users that divert a far greater quantity of water upstream. AB 2583 would establish a faulty regulatory scheme in a number of unproductive ways and represents a step backward in meeting California's co-equal goals of a reliable water supply and a restored Delta ecosystem.

The Delta Reform Act of 2009 established a path forward to modernize the statewide water system and establish new governance structures such as the Delta Stewardship Council to meet the co-equal goals. AB 2583 proposes a variety of new impediments that are designed to thwart, not advance, water progress in California. This measure, for example, attempts to impose new financing requirements on federal facilities owned and operated by the U.S. Bureau of Reclamation. AB 2583 seeks to mandate how the Central Valley Project is to recover costs, far beyond the state's jurisdiction relating to these vital federal facilities. AB 2583 also seeks to impose new requirements on regional self-sufficiency for some regions that rely on the Delta watershed, but not others such as your own district. The Delta Reform Act takes a watershed-based approach to promoting regional self-sufficiency, while AB 2583 does not.

AB 2583 seeks to mandate a timetable for an independent state body, the State Water Resources Control Board (SWRCB), for its ongoing process of updating the Bay-Delta Water Quality Control Plan. Legislative intervention is neither helpful nor appropriate. Your bill rewrites the 2009 Delta Reform Act to put new and onerous mandates on a single covered action under the jurisdiction of the Delta Stewardship Council – California WaterFix – and no others.

No water modernization project in California can happen without meeting every state and national environmental law and complying with the California water rights system via the SWRCB. That holds true for the Delta and upstream. Legislation that would create onerous standards for some projects, and not others, are not good-faith attempts to making water progress in California.

California is one state. We need solutions that meet all of California's water needs in a sustainable, responsible manner. We oppose AB 2583 for seeking to set different standards for different regions and for rewriting the letter and spirit of legislative water policy that has served California well.

For all the above-stated reasons, we, the undersigned, oppose AB 2583.

Sincerely,

cc: Members of the Assembly Water, Parks and Wildlife Committee
Ryan Ojakian, Senior Policy Consultant, Assembly Water, Parks and Wildlife Committee
Robert Spiegel, Policy Consultant, Assembly Republican Caucus

Analysis on AB 2583 (Frazier)

As Amended March 17, 2016

General overview: AB 2583 adds requirements to the Delta Reform Act for California WaterFix, a physical solution to advance the coequal goals for the Delta. At a minimum, AB 2583 would delay the start of construction for at least several years and add significant new financial and regulatory burdens to the operations of new Delta conveyance.

A summary of four major new requirements embedded in AB 2583 are outlined below:

1. AB 2583 would give any state or federal water contractor that "will receive water" (presumably from new Delta conveyance) a veto over construction of the California WaterFix by requiring every one of them to enter a legally binding agreement to pay all costs associated with both new conveyance and the existing CVP and SWP facilities, including reimbursing the state for any bonds or General Funds used to date for either project.
2. It would require the SWRCB to complete its update to the Bay-Delta Water Quality Control Plan before it could grant a change in point of diversion permit, which is a prerequisite to beginning construction.
3. It eliminates current requirements for BDCP incorporation into the Delta Plan, which was a prerequisite to receiving state funding for public benefits, and replaces the requirements with onerous new prerequisites that must be met before construction could begin, and which would radically alter permitting and regulation of operations, including:

    a. New conveyance must operate to maximize both coequal goals.
    b. New conveyance cannot receive any public funding under any circumstances, even if it ends up including measures that would produce public benefits, e.g., by providing ecosystem benefits beyond those required to mitigate project impacts.
    c. Acquisition of water must meet Prop. 1 bond funding requirements (i.e., any acquired water must be permanently dedicated to instream beneficial uses, which is an attempt to render it unavailable for rediversion even after it has served its in-stream purpose).
    d. An MMRP and Adaptive Management Plan are adopted along with financial assurances that both will be implemented.
    e. The Independent Science Board is given implementation oversight of the MMRP and Adaptive Management Plan to ensure rough proportionality of impacts and mitigation at all times.
    f. Each region that receives water has improved self-reliance by 50% over supply levels during 2010-2015 due to reduced demand from Delta supplies.
    g. Exports "match more closely" "surplus water supplies available" by water year type, Bay-Delta water quality objectives, the coequal goals and projections of in-

Delta demands (i.e., the CVP and SWP may only export whatever water remains after all other ecological and in-Delta diverter needs are met).

h. Conveyance infrastructure (not just new conveyance) enhance Delta inflows and outflows "consistent with Delta ecosystem needs and needs of Delta water users," and provide net benefits to the ecosystem, which goes beyond ESA Section 7, CESA 2081, or any other regulatory requirements.
i. The EIR is revised to include an analysis of a reasonable range of flow criteria, rates of diversion and other operational requirements needed to recover the Delta ecosystem and restoring fisheries in compliance with area of origin and Delta Protection Act requirements, the CVPIA, PL 108-361 (Water Supply, Reliability, and Environmental Improvement Act), the Longfin Smelt CESA permit, and the current OCAP BiOps.

4. It adds a requirement for the California WaterFix to include a transparent real-time, annual, and long-term operational decision-making process in which fishery agencies ensure that applicable biological performance measures are achieved.

In addition to the above, other major provisions of the bill include:

First, it would amend Water Code Section 85088 to require the SWRCB to complete its update to the 2006 Water Quality Control Plan for the Bay-Delta (commonly referred to as the "Bay-Delta Plan"). That update was initiated in 2009, and Phase 1 isn't even complete for the San Joaquin River. The Delta Reform Act did not require this timing provision. Instead, it requires the SWRCB to adopt flow criteria for any change in point of diversion for new conveyance like the California WaterFix, a process that has already begun, and which will finish years before the SWRCB revises its Bay-Delta Plan.

Second, it would amend Section 85089 to impose more onerous requirements on the water contractors financing the California WaterFix. Currently, Section 85089 prohibits construction of new Delta conveyance until the water contractors "have made arrangements or entered into contracts" to pay for (1) the costs of environmental review, planning, design, construction and mitigation of any new Delta conveyance facility, and (2) full mitigation of property tax or assessments levied by local governments or special districts for land used in the construction, location, mitigation, or operation of new Delta conveyance facilities.

As amended, AB 2583 would require all water contractors "that will receive water supplies" [*presumably from new conveyance facilities, but this is not specified*] to enter "legally binding financial agreements or contracts signed by each of the state and federal water contractors that will receive water supplies that commit them to pay for all costs, including reimbursement to the state for any General Fund or water bond funding used to date, that are associated with"

the costs to plan, study, design, build, and mitigation new conveyance and full mitigation of property taxes and assessments.

Broadening the requirement to all water contractors, not just those prepared to fund California WaterFix, would require unanimous support from ***all*** state and federal contractors before construction could begin. This would give any holdout water contractor veto authority over the California WaterFix, something never contemplated in the Delta Reform Act, and something that likely would have blocked the DRA from ever being adopted had it been proposed in 2009.

It also restricts the more general language to "make arrangement or enter contracts" to "legally binding financial agreements or contracts," which would rule out MOUs or other approaches to making arrangements to pay the required costs.

AB 2583 would also amend Section 85089(a) to require the legally binding contracts to obligate all state and federal water contractors not only to pay the costs of new conveyance, it would require all water contractors "that will receive water supplies" to pay all costs, including reimbursing the state for any General Fund or water bond funding used to date "associated with" the construction, operation, and maintenance ***of the federal Central Valley Project and the State Water Project***.

This would represent a major shift in the Delta Reform Act. State water contractors already pay all costs "associated with" construction, operation and maintenance of the SWP. But I am not sure whether the CVP contractors are required to pay all costs "associated with" the CVP. This new requirement has nothing to do with new conveyance or furthering the coequal goals.

Third, it guts and amends Section 85320. That section currently applies to the BDCP and sets forth the prerequisites for incorporation into the Delta Plan, which is a prerequisite for public funding of BDCP's public benefits. The California WaterFix is not an HCP/NCCP, so the Delta Stewardship Council is not required to incorporate it into the Delta Plan, nor is there any specific legal bar to receiving public funding for any public benefits.

The laundry list of additional requirements in the numbered list above speaks for itself. These prerequisites for construction would renege on a host of compromises in the Delta Reform Act and render the project financially infeasible and thwarts achievement of the coequal goals.

Fourth, AB 2583 would add a new requirement to the California WaterFix that mandates a transparent, real-time operational decision-making process that would put the fishery agencies in charge of ensuring timely achievement of "applicable biological performance measures." This requirement does not make sense outside the context of an HCP/NCCP.