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BEFORE THE

CALIFORNIA STATE WATER RESOURCES CONTROL BOARD

HEARING ON THE MATTER OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND UNITED STATES BUREAU OF RECLAMATION REQUEST FOR A CHANGE IN POINT OF DIVERSION FOR CALIFORNIA WATER FIX.	NOTICE OF ERRATA TO EXHIBIT SRCSD-16 RE PART 2 TESTIMONY OF THOMAS GROVHOUG, P.E., AND SUBMITTAL OF EXHIBIT SRCSD-37 AS A SUBSTITUTE FOR INCOMPLETE SRCSD-16

On November 30, 2017, Sacramento Regional County Sanitation District (Regional San) submitted Exhibit SRCSD-16. Inadvertently, pages 2 through 13 were omitted when uploading Exhibit SRCSD-16 into the State Water Resources Control Boards' FTP site.

Regional San hereby corrects this omission by including pages 1 through 13 and requests that the attached Exhibit SRCSD-37 be introduced into evidence as a substitute for Regional San's incomplete Exhibit SRCSD-16. Regional San's Exhibit Identification Index has been updated to include Exhibit SRCSD-37, and is submitted and served concurrently with this Notice.

SOMACH SIMMONS & DUNN

DATED: December 13, 2017

By _____ for
Kelley M. Taber
Attorneys for Sacramento Regional County Sanitation District

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EXHIBIT
SRCSD-37

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HEARING ON THE MATTER OF CALIFORNIA DEPARTMENT OF WATER RESOURCES AND UNITED STATES BUREAU OF RECLAMATION REQUEST FOR A CHANGE IN POINT OF DIVERSION FOR CALIFORNIA WATER FIX.	**PART 2 TESTIMONY OF THOMAS GROVHOUG, P.E.**

This testimony is offered on behalf of the Sacramento Regional County Sanitation District (Regional San).

I. INTRODUCTION

My name is Thomas Grovhoug. I am the President of Larry Walker Associates, an environmental engineering and consulting firm specializing in water quality management. I hold bachelor of science and master's degrees in civil engineering from

the University of California at Davis. I am a registered professional engineer in the State of California. I have over 40 years of professional experience in wastewater engineering and water quality management. I have worked on water quality management and National Pollutant Discharge Elimination System (NPDES) permitting issues for Regional San for 27 years. I am an expert in Clean Water Act and California Water Code regulatory requirements pertaining to municipal wastewater treatment and work regularly on such matters in the Central Valley. I regularly participate in relevant water quality management and monitoring programs in the Central Valley pertaining to salinity and nutrients, including the Delta Nutrient Research Plan, Central Valley Salinity Alternatives for Long-term Sustainability (CVSALTS), and the Delta Regional Monitoring Program. I have assisted Regional San and the Central Valley Clean Water Agencies in the preparation of comments on both the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS) and Final EIR/EIS for the proposed WaterFix project ("WaterFix" or "Project"). (Exhibit SRCSD-17 is a true and correct copy of my statement of qualifications.)

My testimony addresses the potential impact that the location and operation of proposed WaterFix diversion structures will have on the future NPDES permit requirements for the Sacramento Regional Wastewater Treatment Plant (SRWTP) including Regional San's new EchoWater Project at the SRWTP. In my opinion, these impacts have not been adequately identified or addressed in the Draft or Final EIR/EIS prepared for the proposed WaterFix project or any other analysis prepared for the WaterFix project. Similarly, there has been no adequate mitigation proposed for these impacts.

II. BACKGROUND

Currently, the SRWTP provides secondary treatment of municipal wastewater, followed by disinfection and dechlorination prior to discharge to the Sacramento River through a diffuser located across the bottom of the river, downstream from the Freeport Bridge. The Regional San EchoWater Project has been designed to achieve NPDES

permit requirements initially adopted in the SRWTP's 2010 NPDES permit (California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board), Order No. R5-2010-0114-4) and carried forward with limited modification in the 2016 NPDES permit (Order No. R5-2016-0020). (Exhibit SRCSD-3.) The EchoWater Project is currently under construction and is scheduled to be completed in 2023, at which time the facility will provide Title 22 equivalent effluent quality employing filtration and chlorine disinfection. The state-of-the-art EchoWater Project (estimated capital cost of between $1.7 and $2.1 billion) will also include nitrification and denitrification, which will reduce ammonia and nitrate levels to meet stringent effluent limitations originally prescribed in the 2010 permit.

The SRWTP discharges to the Sacramento River at Freeport, just 2 miles above the closest possible WaterFix diversion structure evaluated in the Final EIR/EIS, and only slightly farther above the closest proposed WaterFix diversion structure identified in Petitioners' petition. (See Exhibit SRCSD-18.) This figure depicts the mixing zones that have been described in the current NPDES permit in relation to the two northernmost WaterFix diversion structure locations under consideration.

WaterFix proponents and users of water exported from the Delta have a history of commenting on the NPDES permit and wastewater facility EIR documents prepared by Regional San and other Central Valley publicly owned treatment works (POTWs). They have consistently asked for increasing levels of treatment by Regional San and by other municipalities in the Central Valley (e.g. Stockton, Modesto, Turlock, etc). State Water Contractors and numerous other export water users submitted comments on the EchoWater Project EIR. In those comments, they advocated for additional removal of nutrients and salinity, above and beyond the capability of the EchoWater Project. Based on my observations and experience, placing the WaterFix diversion structures within the vicinity of the SRWTP discharge to the Sacramento River will result in intensification of such requests by WaterFix proponents and others. State Water Contractors submitted comments in December 28, 2015 on the North Valley Regional

Recycled Water Program (NVRRWP). These comments requested stringent regulation of high quality recycled water discharges into the Delta Mendota Canal (DMC), including advanced (reverse osmosis (RO)) treatment and phosphorus removal. (Exhibit SRCSD-20 is a true and correct copy of the State Water Contractors' December 28, 2015 letter to the Central Valley Water Board, *Comments on the Tentative Order No. R5-2016-XXXX, NPDES No. CA0085316 for Waste Discharge Requirements for the City of Turlock Regional Water Quality Control Facility and the City of Modesto Water Quality Control Facility, Stanislaus County*.) It is reasonable to expect, given their history of comments on Central Valley POTWs, that WaterFix proponents and Delta export water users will advance identical, or similar, comments and advocacy if the proposed WaterFix intakes are located in the vicinity of the existing SRWTP discharge into the Sacramento River.

III. OPINIONS

Opinion 1: Significant regulatory impacts to Regional San can be anticipated if proposed WaterFix diversion structures are located in the Sacramento River directly downstream of the SRWTP outfall.

In my opinion, the location of the WaterFix diversion structures directly downstream of the SRWTP outfall is likely to result in advocacy for, and a very significant likelihood of, significant regulatory impacts to the SRWTP and Regional San's operations. One issue will relate to the misperception and mischaracterization that the proposed WaterFix diversion structures are "Drinking Water Intakes." Drinking water intakes are properly characterized as those facilities associated with individual drinking water treatment plants. Drinking water intakes are facilities that provide a point of entry of untreated "raw" water directly into a drinking water treatment facility. Delta export water users have themselves argued that the state and federal water project conveyance structures (aqueducts) are "drinking water intakes". (Exhibit SRCSD-20, p. 9.) ("...the DMC itself serves as a drinking water intake..."). Additionally, the State Water Resources Control Board (State Water Board), in its Order WQ 2012-0013

characterized the proposed WaterFix diversion structures as "drinking water intakes," referencing statements made in a November 2010 progress report on the Bay Delta Conservation Plan (the predecessor to the current WaterFix proposal). (State Water Board Order WQ 2012-0013, *In the Matter of Own Motion Review of Waste Discharge Requirements Order No. R5-2010-0114 (NPDES No. CA0077682) for Sacramento Regional Wastewater Treatment Plant*, December 12, 2012, p. 11.) In that regard, it is a reasonable concern that the proposed WaterFix diversion structures may be mistakenly characterized as drinking water intakes in the future.

Under Clean Water Act and State of California regulations, discharges of treated effluent in the vicinity of drinking water intakes are carefully regulated. For instance, the granting of mixing zones for priority pollutants is restricted in the vicinity of drinking water intakes (State Water Board, Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays and Estuaries of California (SIP), Section 1.4, 2005.). In fact, the State Water Contractors make this argument on page 9, Exhibit 1 to their December 28, 2015 comment letter to the Central Valley Water Board regarding the NPDES permit for the NVRRWP ("a mixing zone shall not... be allowed at or near any drinking water intake.") (Exhibit SRCSD-20, p. 9, Exh. 1.) Since the SRWTP relies on a harmonic mean flow-based human health mixing zone to properly account for the actual dilution of treated effluent in the Sacramento River in the calculation of trihalomethane (THM) effluent limitations, this is a very important issue to the successful operation of the facility, as described in greater detail below.

In these proceedings, Petitioners have proposed three locations for WaterFix diversion structures, identified as location Nos. 2, 3, and 5, selected from the 12 alternative locations identified in the WaterFix Final EIR/EIS. As shown in Exhibit SRCSD-18, the alternative WaterFix diversion structure location No.1 is located within the harmonic mean flow-based human health mixing zone that has been granted in the current NPDES permit for the SRWTP for the derivation of effluent limitations for two THMs, specifically for the disinfection by-products chlorodibromomethane (CDBM) and

dichlorobromomethane (DCBM). CDBM and DCBM are priority pollutants regulated under the California Toxics Rule (CTR) and subject to the requirements of the SIP. Chlorine disinfection creates levels of CDBM and DCBM that exceed CTR criteria in undiluted effluent. The CTR criterion for CDBM is 0.0004 milligrams per liter (mg/l) and the CTR criterion for DCBM is 0.00056 mg/l. The projected maximum daily concentrations in effluent from the SRWTP after the completion of the EchoWater Project are 0.012 mg/l for CDBM and 0.035 mg/l for DCBM. (Regional San Technical Memorandum, *Antidegradation Analysis in Consideration of Increased Effluent Limits for Chlorodibromomethane and Dichlorobromomethane at the SRCSD AWTP at the SRCSD AWTP*, May 31, 2013.) While exceeding the CTR criteria, the sum of CDBM and DCBM in undiluted effluent would not exceed the Drinking Water Maximum Contaminant Level (MCL) for total trihalomethanes of 0.080 mg/l, which is the Safe Drinking Water Act limit applicable to tap water. Although it does not appear that Petitioners propose location No. 1 for approval by the State Water Board as part of the current petition, any order by the State Water Board approving the petitioned changes should confirm that location No. 1 shall not be used as a WaterFix diversion location to avoid the consequences described below.

The proposed alternative WaterFix diversion structure location No. 2 is located about one-mile downstream from the edge of the existing harmonic mean mixing zone. As noted above, both WaterFix diversion structure locations Nos. 1 and 2 likely would jeopardize the effluent limits and dilution credits for THMs in the current NPDES permit, if the WaterFix diversion structures were deemed to be "drinking water intakes". If the current dilution credit for THMs was eliminated as a result of the WaterFix diversion structure location due to concerns regarding the short distance between the edge of the mixing zone and the proposed WaterFix diversion structures, Regional San could not reliably meet the resulting effluent limitations for CDBM and DCBM and would be compelled to cease operation of its new EchoWater Project chlorine disinfection facilities. In lieu of use of chlorine disinfection, Regional San would be forced to

construct an alternative disinfection system to meet the THM effluent limitations and Title 22 equivalent requirements in its NPDES permit, at significant cost. Regional San has developed cost estimates for such an alternative system, which would include pre-ozonation followed by ultra-violet (UV) disinfection. The capital costs for that facility have been estimated to be $319 million (in 2014 costs). (Regional San Technical Memorandum, *Evaluation of Treatment Alternatives to Remove Disinfection Byproducts (DBPs) for the Advanced Wastewater Treatment Plant (AWTP),* May 31,2013). Operational costs for this ultra-violet disinfection process would be an estimated $5 million per year higher than the costs to operate the chlorine disinfection system. Also, based on my experience and discussion with Ken Abraham, P.E., a leading expert in wastewater treatment plant design and operation and WaterFix design team member, significant additional capital costs of $63 million for expanded filtration facilities to comply with Title 22 requirements for UV disinfection facilities would be necessitated if Regional San were forced to abandon its new chlorine disinfection system Updating to present day construction costs, the total capital cost to convert from chlorine to UV disinfection with pre-ozonation at the SRWTP would be approximately $400 million.

A second significant issue is the anticipated argument by the export water users and others that the discharge of SRWTP effluent in the vicinity of the proposed WaterFix diversion structures will constitute either "raw water augmentation" or "reservoir water augmentation," as recently defined in Assembly Bill (AB) 574. (Exhibit SRCSD-21 is a true and correct copy of Assem. Bill No. 574 (2017-2018 Reg. Sess.) October 6, 2017.) AB 574 is a bill signed by the Governor in October 2017 that amends the California Water Code[1] to establish a framework and timeline for adoption of uniform water recycling criteria for direct potable reuse through "raw water augmentation". AB 574 also includes definitions for "raw water augmentation" and "reservoir water augmentation". Those definitions are, in part, as follows:

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[1] AB 574 amends Water Code sections 13560 and 13561 and adds sections 13560.5 and 13561.2.

'Raw water augmentation' which means the planned placement of recycled water into a system of pipelines or aqueducts that deliver raw water to a drinking water treatment plant...

'Reservoir water augmentation' means the planned placement of recycled water into a raw surface water reservoir...or into a constructed system conveying water to such a reservoir.

Prior to passage of AB 574, State Water Contractors argued that the discharge of recycled water into the DMC under the NVRRWP represented "surface water augmentation." SRCSD (Exhibit SRCSD-20, p. 2 and Exh. 1.) Now that AB 574 has passed, a similar argument by Delta export water users would be anticipated for the SRWTP discharge to the Sacramento River, in particular if WaterFix diversion structures at locations No. 1 or No. 2 were implemented.

The implication is that, if the SRWTP discharge to the Sacramento River were to be deemed to be either "raw water augmentation" or "reservoir water augmentation," the SRWTP facilities, even after completion of the EchoWater Project, would need to be significantly upgraded to meet anticipated water recycling criteria for potable reuse. Although proposed regulations for "reservoir water augmentation" (aka Surface Water Augmentation in State Water Board documentation) are under development and water recycling criteria for "raw water augmentation" may not be finalized until 2023, per AB 574, it is projected that treatment criteria for each will include "full advanced treatment," which is likely to include RO, and advanced oxidation. (Exhibit SRCSD-22 is a true and correct copy of SBDDW-16-02, October 12, 2016, State Water Resources Control Board Draft Regulations for Surface Water Augmentation Using Recycled Water, Tit. 22, Div. 4, Ch.3.) Implementation of these additional treatment processes at the SRWTP would result in capital and operational costs that would be significant (on the order of the construction cost of the EchoWater Project).

Opinion 2: The operation of the proposed WaterFix diversion structures along the Sacramento River will produce water quality degradation in the Sacramento-San Joaquin Delta, which may lead to more restrictive NPDES permit requirements for the SRWTP.

As disclosed in the WaterFix Final EIR/EIS, and as further documented in evidence by Regional San and others submitted in these proceedings,[2] operation of the proposed WaterFix diversion structures along the Sacramento River will produce water quality degradation in the Sacramento-San Joaquin Delta (Delta), worsening existing problems. The adverse impacts of the proposed WaterFix on Delta water quality include the following:

1. Electrical Conductivity (EC) – The WaterFix Final EIR/EIS acknowledged that increases in ambient EC concentrations will occur in some areas of the Delta due to operation of the proposed WaterFix diversion structures along the Sacramento River. The Delta is currently listed as impaired for EC under Section 303(d) of the Federal Clean Water Act. Although the Department of Water Resources (DWR) and the U.S. Bureau of Reclamation (Reclamation) are currently obligated to operate their projects to meet EC water quality objectives in the Delta, these obligations have not been met for over two decades (Exhibit SRCSD-23 is a true and correct copy of U.S. Department of the Interior, Bureau of Reclamation, *Special Study: Evaluation of Dilution Flow to Meet Interior South Delta Water Quality Objectives to meet Water Rights Order 2010-002 Requirement 7.* April 8, 2011; Exhibit SRCSD-24 is a true and correct copy of State Water Board Order WR 2010-0002, *In the Matter of Cease and Desist Order WR 2006-0006 against the Department of Water Resources and the United States Bureau of Reclamation in Connection with Water Rights Permits and License for the State Water Project and the Central Valley Project*, April 8, 2011); violations of EC objectives will be worse into the future as a result of the operation of the proposed Water Fix diversion structures. The WaterFix Final EIR/EIS asserts that real-time salinity management by DWR and Reclamation will mitigate these impacts. The unsuccessful history of past attempts by these agencies to meet existing EC objectives in the South Delta through

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[2] See testimony of Dr. Susan Paulsen, Exhibit SRCSD-29; see also STKN- 047; Antioch-234; Brentwood-100.

various means casts significant doubt on this assertion.

Under Clean Water Act requirements, a total maximum daily load (TMDL)[3] (or equivalent plan) to address EC impairment in the Delta must be developed, creating probable pressure on Regional San and other POTWs discharging to the Delta to reduce salt loadings to remedy the current problem and, importantly, to offset the significant increases in EC levels caused by the WaterFix project operation. A future EC TMDL for a Delta which is further degraded by the WaterFix project may require EC reductions at SRWTP, which would likely require RO treatment for all or a portion of the EchoWater discharge (at significant expense).

In the Central Valley, the CVSALTS program is developing a strategy and implementation plan for sustainable management of salts in the surface and groundwaters of the Central Valley. Phase 1 of the CVSALTS effort will be the development of a Prioritization and Optimization (P&O) study to establish a long-term salinity management plan for the Central Valley, including the Delta. Management of salinity in the Delta is also being addressed through the Bay-Delta planning process managed by the State Water Board. Integration of these plans will be needed to determine an appropriate management approach for salinity in the Delta. The WaterFix Petitioners should be compelled to participate in these programs and subsequent control programs as a means of identifying and implementing effective mitigation requirements for the WaterFix project.

2. Harmful Algal Blooms (HABs)/cyanobacteria/*Microcystis*/toxins – Blooms of harmful algae (e.g., cyanobacteria such as *Microcystis*) have become an increasing problem in the Delta since 2000. Recent work completed as part of the Delta Nutrient

[3] A TMDL is a regulatory term in the federal Clean Water Act, describing a plan for restoring impaired waters that identifies the maximum amount of a pollutant that a body of water can receive while still meeting water quality standards.

Research Plan process (Berg & Sutula (2015))[4] as well as evidence submitted by numerous parties in this proceeding, has indicated that residence time and temperature, in combination with elevated nutrients and other factors, are key factors which create conditions conducive to the initiation and proliferation of HABs. These blooms lead to the production of toxins that potentially can impair beneficial uses. The WaterFix Final EIR/EIS acknowledges that the proposed WaterFix project operation will incrementally increase residence times in specific areas of the Delta, exacerbating the conditions that have led to HABs in the Delta. This fact has been confirmed by the modeling work performed by Exponent and Flow Science (Exhibits SRCSD-29, SRCSD-31). The increase in residence times has the potential to increase the magnitude and duration of *Microcystis* and other HABs in the Delta. (Exhibit SWRCB-102, WaterFix Final EIR/EIS, page 8-980, line 33.) Based on the history of the Delta export water users' advocacy efforts in the Delta, the continuation and exacerbation of existing adverse HABs conditions can be expected to result in increased pressure and advocacy for nutrient load reduction by Regional San and other POTWs by the WaterFix proponents. (Exhibit SRCSD-25 is a true and correct copy of Contra Costa Water District Letter to Regional San, *Sacramento Regional County Sanitation District Echo Water Project Draft EIR*, April 16, 2014; Exhibit SRCSD-26 is a true and correct copy of Alameda County Water District, Alameda County Flood Control and Water Conservation District, Zone 7, Contra Costa Water District, Kern County Water Agency, Metropolitan Water District of Southern California, San Luis and Delta Mendota Water Authority, Santa Clara Valley Water District, State Water Contractors, Westlands Water District Letter to Regional San, *Comments on the Draft Environmental Impact Report for the Sacramento Regional County Sanitation District EchoWater Project, Control Number 2012-70044, State*

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[4] Berg M and Sutula M. 2015. Factors affecting the growth of cyanobacteria with special emphasis on the Sacramento-San Joaquin Delta. Southern California Coastal Water Research Project Technical Report 869 August 2015.

Clearinghouse #2012052017, May 9, 2014.) If such advocacy is successful, this will likely lead to a requirement for additional nutrient load reduction actions by Regional San to address degradation caused by the WaterFix project operation, which would require construction of additional enhanced biological treatment facilities, above and beyond the capabilities of the EchoWater Project, or the diversion of discharge from the Sacramento River. The treatment costs for enhanced biological nutrient removal to achieve possible effluent limitations in the range of 1.0 mg/l total nitrogen and 0.1 mg/l total phosphorus would be a significant additional cost, on top of the current EchoWater project cost of $1.7 to $2.1 billion.

The Delta Nutrient Research Plan, which is being developed by the Central Valley Water Board as part of a stakeholder process, is providing the forum for resolution of the question whether nutrient load reductions will be an effective management action to address HABs in the Delta. Decisions regarding the need for nutrient load management, modified water management, or other control measures in the Delta will be informed by the monitoring, research and modeling that will occur under the Delta Nutrient Research Plan and associated efforts.

3. Macrophytes – As described previously for HABs, the occurrence and magnitude of macrophyte blooms in the Delta are recognized to be significantly influenced by residence time and temperature.[5] Since the proposed WaterFix project operation will increase residence times in the Delta, the extent and duration of blooms of macrophytes will likely be exacerbated by the WaterFix project. As with HABs, it is anticipated that export water users will exert increased regulatory pressure for nutrient load reduction requirements on Regional San and other POTWs to address a problem that will be worsened by the WaterFix project. As noted in the discussion above, the additional cost for enhanced nutrient removal would be a significant increase over and

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[5] Boyer, K. and M. Sutula. 2015. Factors Controlling Submersed and Floating Macrophytes in the Sacramento-San Joaquin Delta. Southern California Coastal Water Research Project. Technical Report No. 870. Costa Mesa, CA.

above the cost of the EchoWater Project. As noted above, the Delta Nutrient Research Plan, which is led by the Central Valley Water Board, is providing the forum for resolution of the question whether nutrient load reductions or other water management actions will be an effective approach to address macrophyte blooms in the Delta. Decisions regarding nutrient load management, modified water management, or other control measures in the Delta to address macrophytes will be informed by the monitoring, research, and modeling that will occur under the Delta Nutrient Research Plan and associated efforts.

Opinion 3: The location of the proposed WaterFix diversion structures threatens significant impacts to Regional San's operation of the SRWTP, including increased regulatory requirements and adverse Delta water quality impacts that could complicate Regional San's ability to comply with its NPDES permit and require millions of dollars of additional investment in supplemental treatment facilities and associated increased operating costs. There are terms and conditions that could reduce the likelihood that significant impacts to Regional San's operation of the SRWTP would occur. This is discussed in the Part 2 testimony of Regional San District Engineer Prabhakar Somavarapu.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this 30th day of November 2017 in Sacramento, California.

Thomas R Grovhoug

THOMAS GROVHOUG, P.E.