



● **Board of Directors**  
***Water Planning and Stewardship Committee***

August 18, 2009 Board Meeting

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**7-5**

**Subject**

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Appropriate \$350,000; and authorize execution of agreement to complete environmental review and technical studies for San Joaquin Valley Agricultural Water Recovery Demonstration Project

**Description**

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Authorization is requested to enter into an agreement with the Semitropic Water Storage District (Semitropic) to perform environmental and other technical studies for an agricultural water recovery project. This agreement will reimburse Semitropic for consultant costs based upon a mutually-agreed-upon project description and an approved scope of work. The maximum amount payable for this project is \$350,000.

**Background**

In March 2009, staff presented an informational letter describing a new potential water supply from the recovery of agricultural water in the San Joaquin Valley. Under this initiative, agricultural drainage water would be recovered from perched groundwater basins and tile drain systems located south of the Delta. Results from a reconnaissance-level analysis were presented for potential projects with Semitropic and the Tulare Lake Drainage District. This letter further describes the Semitropic project, addresses a number of the concerns raised by board members, and requests funding to further investigate hydrogeologic conditions, groundwater quality, environmental review and develop detailed capital and O&M cost estimates, based on the results of the investigation, the feasibility and business case for implementing these projects will be provided for Board consideration.

This potential water supply is part of Metropolitan's program to enhance reliability over the next several years even under continued drought and court-ordered restrictions affecting the Delta. Because this supply would be delivered to the California Aqueduct via exchange, it could also alleviate potential supply restrictions to Metropolitan's State Water Project (SWP) exclusive delivery areas.

Staff's conceptual-level analysis showed the Semitropic demonstration project could yield up to 11,000 acre feet (AF) per year [10 million gallons per day], over a project lifetime of 20 years. With authorization to proceed and assuming favorable environmental and permitting requirements, this demonstration project could begin operation in 2011. Preliminary cost analyses indicate the present-value cost of the water (delivered to the California Aqueduct in the San Joaquin Valley) ranges from \$400 to \$600 per AF.

At this time, staff recommends deferring a decision on the Tulare Lake Drainage District project which was described in the March 2009 board letter. The Tulare project may be less favorable because of its higher unit cost and the need to construct a pipeline to the California Aqueduct in the near term. However, staff will continue evaluating the Tulare project and will revisit the feasibility of the project in the near future once the scope and potential environmental alternatives are better defined.

**Semitropic Water Storage District**

Semitropic delivers irrigation water for approximately 141,000 acres (of a total of 220,000 acres in its service areas). Semitropic also supplies energy to its customers and provides groundwater banking and storage services to Metropolitan and a number of other water districts. Semitropic's annual SWP allocation is 158,000 AF. Semitropic has only 110 acres of land equipped with tile drains and a total tile drain flow of less than 100 AF per

year. Excess agricultural water which flushes salt from the root zone either flows through the tile drains (less than 0.1 percent of the acreage) or remains perched in shallow aquifers overlying a clay layer. Under current irrigation practices, groundwater levels rise due to the volume of runoff and poor permeability of the upper geological formations. The local farming landowners have concerns about the high groundwater table in the shallow aquifers and elevated salinity because these conditions may adversely impact future crop production.

Metropolitan and Semitropic desire to review the feasibility and effectiveness of entering into a program where both agencies can develop water management tools that can be drawn upon during critical water supply years. In this arrangement, Semitropic would directly receive the recovered agricultural water and Metropolitan would receive a like amount of Semitropic's SWP supplies via exchange. It is contemplated that this program would provide long-term water supply benefits wherein high salinity subsurface water is treated; enabling the beneficial use of a currently unusable resource. It should be noted that the shallow perched water resulting from agricultural irrigation is not considered to be native groundwater and is not prevented from export from Kern County (22 of California's 58 counties have ordinances that prohibit or restrict the export of groundwater). Semitropic would use the recovered agricultural supplies within their service area for irrigation and would deliver a like amount of SWP water to Metropolitan via exchange.

In order to proceed with the program, an environmental assessment must be completed and Semitropic's Waste Discharge Requirements (WDRs - permit to operate brine evaporation ponds) may need to be amended. Further, additional groundwater quality and hydrogeologic investigations are needed to confirm the project feasibility. It is important to note that this project will not appreciably affect the "salt balance" of the basin which currently accumulates more salt than is ultimately disposed. Rather, the project extracts a usable resource (fresh water) from a much larger amount of water without a current beneficial use.

### **Description of Proposed Work**

For the proposed agreement, Semitropic would act as the lead agency for purposes of the California Environmental Quality Act (CEQA) and would undertake technical studies and environmental evaluations to (1) determine the feasibility and effectiveness of the proposed project and (2) obtain any necessary amendments to their WDRs which permit the diffuse discharge of agricultural drainage to land or groundwater. In the following section, the technical approach proposed for the larger project is described. However, this current authorization would only fund groundwater studies, environmental studies, and permitting.

The proposed agreement with Semitropic is designed to identify certain water quality, hydrogeologic, environmental, and permitting issues associated with implementation of the demonstration project. Areas of environmental concern expressed by Board members during the March 2009 meeting include: (1) salt loading; (2) impacts of selenium on wildlife; (3) brine disposal; and (4) energy and costs of treatment. Each of these areas will be considered in the environmental documentation process. Adequate resolution of these issues is needed prior to design and implementation of the larger demonstration project.

Accordingly, Metropolitan and Semitropic desire to enter into an agreement to perform technical and environmental evaluations of alternatives for the proposed agricultural water recovery program and the WDR revisions. Semitropic will be the lead agency and will be responsible for hiring and managing, subject to Metropolitan's review and approval, consultants to perform this evaluation. Metropolitan would reimburse Semitropic for the completion of a mutually agreed upon scope of work performed by consultants. Semitropic would bear the full cost of any of its internal staff cost and staff expenses. All proposed work to be performed by the consultants under this agreement shall be approved in writing by Metropolitan prior to commencement of the work. It is anticipated that subsequent agreements will be entered into by both agencies for future stages of program development and implementation.

### **Technical Approach for Demonstration Project**

The technical approach examined for the demonstration project includes the following: (1) collection of drain water from a small tile-drain system and from sumps; (2) pre-treatment to prevent membrane fouling; (3) desalting using reverse osmosis (RO) membranes; (4) return of treated water via exchange to the California

Aqueduct; and (5) brine disposal. Each element is described more fully below. A schematic of the proposed site location is shown in [Attachment 2](#).

**Sumps.** First, a series of shallow collection wells, or sumps, will intercept and capture excess agricultural flow and convey it to the treatment system. These new sumps will pump water from the shallow unconfined aquifer system, which is understood to be primarily recharged through excess irrigation flows. The new sumps will be designed to capture water only from the shallow groundwater zone thereby avoiding water stored in the water bank aquifer. The sumps will be constructed to a total depth of about 100 feet with perforations ranging from 10-90 feet below ground surface. In comparison, the existing wells in the vicinity are constructed to a total depth of about 500 feet, and the perforated depth ranges from 225–300 feet below ground surface.

**Pretreatment.** Given that the source water will be obtained through shallow wells with minimal passage through the ground, it is expected that the total suspended solids concentration and turbidity could be higher than that desirable for treatment by RO directly. Further, no data are yet available for concentrations of problematic constituents such as iron and manganese. Given these uncertainties, the proposed treatment plant includes pressure filters and chemical treatment for pretreatment followed by RO for dissolved solids removal.

**Desalting and return by exchange.** The RO system is proposed to recover 90 percent of the influent water feed. This recovery percentage will be revised, if necessary, as additional influent water quality data become available. A three-stage RO process will be used to achieve this recovery. The RO system is proposed to produce 9.4 million gallons per day (mgd) of permeate. A split stream approach will be used where 0.6 mgd of pretreated water will bypass the RO system to target a product water of 10 million gallons per day with total dissolved solids (TDS) of 300 mg/L for consistency with California Aqueduct water quality. The product water will be delivered to Semitropic's irrigation water supply conveyance system thus avoiding the need to adjust pH or stabilize the product water quality as would be required if the water were to be served directly for potable use. In normal conditions, the product water will be conveyed to a canal for use as agricultural irrigation water in-lieu of SWP supplies. During an event when Semitropic does not require SWP supplies, the product water could be conveyed through an existing canal network and ultimately delivered back to the California Aqueduct. The details of the water exchange between Metropolitan and Semitropic will be defined in the next stage of the project.

**Brine disposal.** The RO concentrate (or brine) disposal will be handled through an enhanced evaporation system using a spray evaporator. The spray evaporator would direct brine to approximately 25 acres of earthen-lined ponds where the product water would accumulate, evaporate to a slurry or sludge and then be routinely hauled to a landfill. An impermeable liner may be required to isolate the ponds from the shallow groundwater, depending upon the requirements of the waste discharge permit. A spray evaporator system was used as the basis for the conceptual design to minimize the volume and acreage needed for the brine ponds.

The highest evaporation rate would occur between May and September where evaporation rates of nearly 9 inches per month are expected. The evaporation ponds would provide adequate storage for the winter months when reduced evaporation occurs and rainfall contributes to the inflow. If needed, waterfowl hazing methods would also be deployed to discourage nesting or foraging in the managed evaporation ponds.

### **Timing and Urgency**

In keeping with the Board's directive to reduce and postpone expenses where possible during the ongoing economic crisis, Metropolitan staff closely analyzed the merits of proceeding with this project. The Semitropic Agricultural Water Recovery project is needed to increase available water supplies south of the Delta. Staff recommends moving forward with the project at this time. Staff recommends deferring further activities on the Tulare Lake Drainage District Agricultural Water Recovery project until more information is available. The project is categorized as a water supply project and has been reviewed with Metropolitan's updated CIP prioritization criteria.

This action appropriates \$350,000 and authorizes studies and environmental documentation to determine the environmental and technical feasibility of the project. See [Attachment 1](#) for the Financial Statement and [Attachment 2](#) for the Location Map.

These projects are consistent with Metropolitan's goals for sustainability by enhancing water supply deliveries in the future.

### **Project Milestone**

December 2009 - Completion of the environmental documentation and technical studies

### **Policy**

Metropolitan Water District Administrative Code Section 4203: To meet its public water supply objectives in the future, Metropolitan will vigorously pursue the development of water transfers.

### **California Environmental Quality Act (CEQA)**

CEQA determination for Option #1:

The proposed action is statutorily and categorically exempt under the provisions of CEQA and the State CEQA Guidelines. The proposed action involves the funding of basic data collection and resource evaluation activities as part of planning and feasibility studies for the permitting and licensing of facilities with no possibility of significantly impacting the physical environment or resulting in a serious or major disturbance to an environmental resource. These studies would be conducted for possible future actions which a public agency has not yet approved, adopted, or funded. In addition, the proposed action involves minor modifications in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees. Accordingly, the proposed action is statutorily exempt (Section 15262 of the State CEQA Guidelines) and also qualifies for Class 1, Class 4 and Class 6 Categorical Exemptions (Sections 15301, 15304 and 15306 of the State CEQA Guidelines).

The CEQA determination is: Determine that pursuant to CEQA, the proposed action qualifies under a statutory exemption (Section 15262 of the State CEQA Guidelines) and three Categorical Exemptions (Class 1, Section 15301; Class 4, Section 15304; and Class 6, Section 15306 of the State CEQA Guidelines).

CEQA determination for Option #2:

None required

### **Board Options**

#### **Option #1**

Adopt the CEQA determination and

- a. Authorize the General Manager to enter into an agreement with the Semitropic Water Storage District to complete environmental review and technical studies for San Joaquin Valley Agricultural Water Recovery Demonstration Project; and
- b. Authorize an appropriation of \$350,000 to complete the planned work.

**Fiscal Impact:** \$350,000 in unbudgeted capital funds. A preliminary estimate of the capital cost for the treatment system is \$44.5 million for an 11,000 AF per year facility that could be operated over a 20-year period.

**Business Analysis:** The dual challenge of reducing agricultural drainage while increasing water supply provides an opportunity for Metropolitan to partner with agricultural districts to create a new water supply. The yield for this initial demonstration project is up to 11,000 AF per year.

#### **Option #2**

Do not proceed with environmental documentation for the San Joaquin Valley Agricultural Water Recovery Project at this time.

**Fiscal Impact:** None

**Business Analysis:** This option will forego the opportunity to develop and evaluate an agricultural water recovery project, which could provide a multiple year supply south of the Delta.

**Staff Recommendation**

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Option #1

  
James F. Green  
Manager, Water System Operations

7/27/2007  
Date

  
Jeffrey Nightlinger  
General Manager

7/31/2009  
Date

**Attachment 1 – Financial Statement**

**Attachment 2 – Location Map**

BLA #6544

**Financial Statement for San Joaquin Valley Agricultural Water Recovery Program**

A breakdown of Board Action No. 1 for Appropriation No. 15461 for the San Joaquin Valley Agricultural Water Recovery Program is as follows:

	<b>Previous Total Appropriated Amount (N/A)</b>	<b>Current Board Action No. 1 (July 2009)</b>	<b>New Total Appropriated Amount</b>
Labor			
Studies, Investigations, and Preliminary Design		\$ 50,000	\$ 50,000
Materials and Supplies		-	-
Incidental Expenses		-	-
Professional/Technical Services		-	-
Equipment Use		-	-
Contracts		250,000	250,000
Remaining Budget		50,000	50,000
<b>Total</b>	<b>\$ -</b>	<b>\$ 350,000</b>	<b>\$ 350,000</b>

**Funding Request**

<b>Program Name:</b>	San Joaquin Valley Agricultural Water Recovery Program		
<b>Source of Funds:</b>	Revenue Bonds, Replacement and Refurbishment or General Funds		
<b>Appropriation No.:</b>	15461	<b>Board Action No.:</b>	1
<b>Requested Amount:</b>	\$ 350,000	<b>Capital Program No.:</b>	N/A
<b>Total Appropriated Amount:</b>	\$ 350,000	<b>Capital Program Page No.:</b>	N/A
<b>Total Program Estimate:</b>	\$ 44,500,000	<b>Program Goal:</b>	N/A

