

**SPECIAL MEETING OF THE WATER RESOURCES COMMITTEE
OF THE BOARD OF DIRECTORS
WATER REPLENISHMENT DISTRICT OF SOUTHERN CALIFORNIA
4040 PARAMOUNT BOULEVARD, LAKEWOOD, CALIFORNIA 90712
12:00 P.M., THURSDAY, DECEMBER 11, 2008**

AGENDA

EACH ITEM ON THE AGENDA, NO MATTER HOW DESCRIBED, SHALL BE DEEMED TO INCLUDE ANY APPROPRIATE MOTION, WHETHER TO ADOPT A MINUTE MOTION, RESOLUTION, PAYMNET OF ANY BILL, APPROVAL OF ANY MATTER OR ACTION, OR ANY OTHER ACTION. ITEMS LISTED AS "FOR INFORMATION" MAY ALSO BE THE SUBJECT OF ANY "ACTION" TAKEN BY THE BOARD OR A COMMITTEE AT THE SAME MEETING.

- 1. DETERMINATION OF A QUORUM**
- 2. PUBLIC COMMENT**
- 3. WRD DROUGHT MANAGEMENT PLAN**
Staff Recommendation: For information.
- 4. WEST COAST BASIN OPERATING PLAN STUDY UPDATE**
Staff Recommendation: For information.
- 5. SOUTH MONTEBELLO IRRIGATION DISTRICT WELL MODIFICATION**
Staff Recommendation: Staff will make a recommendation to the Committee after all proposals are evaluated.
- 6. U.C. SANTA BARBARA 2009 RIO HONDO GROUNDWATER TRACER RESEARCH PROJECT**
Staff Recommendation: Enter into an agreement with the University of California Santa Barbara, subject to approval of form by District Counsel, for the 2009 Rio Hondo Groundwater Tracer Research Project.
- 7. NO-COST TIME EXTENSION FOR AGREEMENT WITH NELLOR ENVIRONMENTAL ASSOCIATES, INC.**
Staff Recommendation: Extend the termination date for the agreement with Nellor Environmental Associates, Inc, to December 31, 2009.
- 8. CONTRACT AMENDMENT FOR RECYCLED WATER MODELING AT THE DOMINGUEZ GAP BARRIER – GOLDER ASSOCIATES**
Staff Recommendation: Extend the termination date for the agreement with Golder Associates to December 31, 2009 and add \$13,400 to the contract amount for additional modeling services.
- 9. SALINE PLUME POLICY**
Staff Recommendation: For information.
- 10. WBMWD RECYCLED WATER PURCHASE AGREEMENT**
Staff Recommendation: For information.

11. DIRECTORS REPORTS, INQUIRIES, REVIEW OF DIRECTIONS TO STAFF

12. ADJOURNMENT

Posted by Abigail C. Andom, Deputy Secretary, December 8, 2008.

In compliance with the Americans with Disabilities Act (ADA), if special assistance is needed to participate in the Board meeting, please contact Deputy Secretary Abigail Andom at (562) 921-5521 for assistance to enable the District to make reasonable accommodations.

All public records relating to an agenda item on this agenda are available for public inspection at the time the record is distributed to all, or a majority of all, members of the Board. Such records shall be available at the District office located at 4040 Paramount Boulevard, Lakewood, California 90712.

Agendas and minutes are available at the District's website, www.wrd.org.



MEMORANDUM

ITEM NO. 3

Prepared by: Jason Weeks

Reviewed by: Bob Siemak

Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008

TO: WATER RESOURCES COMMITTEE

FROM: ROBB WHITAKER, GENERAL MANAGER

SUBJECT: WRD DROUGHT MANAGEMENT PLAN

BACKGROUND

Over the past several years, the availability of imported water supplies to southern California have been reduced for a number of reasons including dry conditions throughout the watersheds that supply imported water and legal and regulatory challenges, including issues related to the Delta Smelt. As a result, MWD initiated the development of a Water Supply Allocation Plan in July 2007, which was approved by its Board of Directors in February 2008.

Given this uncertainty in future imported water supplies, WRD's Water Resources Committee directed staff to update and expand the District's 1991 Drought Management Plan. Mr. Dick Rhone of Bookman-Edmonston was hired develop this plan which provides a clear outline of steps which could be implemented by WRD and other water agencies and purveyors in preparation for and in response to drought conditions.

These steps rely upon groundwater to help replace imported water in times of drought. The plan's steps are therefore intended to ensure that sufficient groundwater is available and agreements and infrastructure are in place to fully utilize the groundwater when needed.

Specifically, the WRD Drought Management Plan covers the following topics:

- Principles of Drought Management
- Historical Drought Management Activities
- Resources for Drought Management
- Long Range Drought Management Planning
- Judgment and Overpumping Basins
- Methods of Increasing Pumping
- Summary of Proposed Drought Management Activities

WRD DROUGHT MANAGEMENT PLANNING PHASES

The District's Drought Management Plan refers to four different phases of drought management planning, summarized below:

- Phase I – pre-drought activities; ensuring sufficient storage in basins to mitigate against reduced replenishment supplies.
- Phase II – drought period where short term four-month overpumping is implemented; the topic of discussion for this Water Resources Committee meeting.
- Phase III – drought period where longer term over-pumping is implemented; the topic of discussion for future Water Resources Committee meetings.

- Phase IV – basin recovery period.

PHASE II – FOUR-MONTH EMERGENCY OVERPUMPING PROVISIONS

The Judgments in the Central and West Basins allow for overpumping up to 27,000 acre-feet to occur for a period not to exceed four months; 17,000 acre-feet for the Central Basin and 10,000 acre-feet for the West Coast Basin. These provisions were added as a result of the 1976/77 drought which highlighted the difficulties in implementing changes in the Judgments in a short time frame.

A detailed description of the provisions for this emergency overpumping is provided in the Drought Management Plan. A synopsis of these provisions is provided below.

1. Pumpers who are water purveyors with connections to Metropolitan may sign contracts with WRD to exceed their Allowed Pumping Allocation (Central Basin) or Adjudicated Right (West Coast Basin)
2. Metropolitan Board of Directors must, by resolution, find that there is an emergency which can be alleviated by overpumping.
3. Board of Directors of Both WRD and CBMWD (Central Basin) and WBMWD (West Coast Basin) must, by resolutions, concur with Metropolitan. In the case of the West Coast Basin a determination must be made that overpumping will not adversely effect the integrity of the Basin or seawater intrusion barrier.
4. Specific water elevation levels at key wells must be met in the Central Basin.
5. WRD must set a public hearing and notify all parties 5 days prior to hearing for Central Basin and 10 days prior to hearing for West Coast Basin. At the close of hearing, WRD Board may decided to proceed with agreements.
6. Agreements, among other things, will :
 - Be uniform,
 - Be offered to purveyors with MWD connections,
 - All start on the same date and terminate within 4 months,
 - Include a commitment to pay WRD a price for the water such that its cost is equal to the C/WBMWD treated non-interruptible imported water price.

ALLOCATION OF EMERGENCY OVERPUMPING PROVISIONS

The allocation method for the 27,000 acre-feet of emergency overpumping was not addressed in the Judgment amendments. If total requests are less than the emergency overpumping allocation for each basin, each pumper will be granted their requested overpumping allocation. In the event that this emergency overpumping does become necessary and the requests exceed 17,000 acre-feet for the Central Basin or 10,000 acre-feet for the West Coast Basin, District staff has developed the following proposed guidelines for allocating this emergency pumping.

1. A pumper's maximum allocation will be based on their imported water demand as a percentage of the total imported water demand for those entities that have requested emergency pumping. This percentage is multiplied by either 17,000 for the Central Basin or 10,000 for the West Coast Basin to arrive at their maximum allocation.

2. If a pumpers request is less than their maximum allocation, the remaining balance is distributed proportionally among those pumpers whose request exceeds their maximum allocation.

District staff will provide the Committee with an overview of the allocation model and a schedule of possible implementation of overpumping provisions should MWD implement its Water Supply Allocation Plan.

A copy of a draft planning timeline is attached. As shown on this timeline, the earliest the overpumping would occur would likely be March 2010; however, there are a series of events that must occur prior to that date.

FISCAL IMPACT

None.

STAFF RECOMMENDATION

For information.

WRD DROUGHT MANAGEMENT PLANNING TIMELINE

		2010																			
		DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	
MWD	Initial SVP Culinary Advisory Committee (General)																				
MWD	WRD monitors precipitation and conditions with MWD, CBMWD and WBMWD to determine if a WCB Judgment that there is an emergency which can be alleviated by overpumping.																				
MWD	MWD Board Advisory Committee (if necessary)																				
MWD	WRD Board by consent with MWD.																				
MWD	WRD outreach to pumpers with MWD connections to determine if a WCB Judgment that there is an emergency which can be alleviated by overpumping (10,000 in West Coast Basin, 17,000 in Central Basin).																				
MWD	WRD coordinates closely with WBMWD and CBMWD on outreach efforts.																				
MWD	For Central Basin, WRD makes elevations at four weeks (180T, 1854F, 1812P and 1825B) forced an average elevation of 43.7 feet.																				
MWD	WRD Public Hearing on whether to proceed with agreements.																				
MWD	5 day mailed notification for CB.																				
MWD	10 day mailed notification for WCB.																				
WRD	WRD develops Four Month Overpumping agreements with interest parties to be effective March 1 through June 30, based included in the Judgment.																				
WRD	The cost of the water produced under the Four Month Overpumping agreements will be the CWB/MWD Rate, plus the WRD RA, less the incremental pumping cost and less the WRD BA.																				
WRD	Effective date for Four Month Overpumping Agreements. WRD works closely with participants to determine possible need for monthly rehabilitation.																				
WRD	WRD initiates dialog with participants on principles for access pumping groups (over four months). Suggested principles included: requirement of conservation plans, pricing, reporting, encouragement of exchanges, governance, etc.																				
WBMWD	WBMWD Board Advisory Committee (if necessary)																				
WBMWD	WBMWD Board Advisory Committee (if necessary)																				
CBMWD	CBMWD Board Advisory Committee (if necessary)																				

DRAFT
FOR DISCUSSION PURPOSES ONLY



MEMORANDUM

ITEM NO. 4

Prepared by: Jason Weeks

Reviewed by: Bob Siemak

Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008

TO: WATER RESOURCES COMMITTEE

FROM: ROBB WHITAKER, GENERAL MANAGER

SUBJECT: WEST COAST BASIN OPERATING PLAN STUDY UPDATE

BACKGROUND

In June 2007, WRD and its consultant, CH2MHILL completed a Study of Alternative Operational Scenarios for the West Coast Basin (Study). A primary assumption in the evaluation of alternative operational scenarios was that MWD would have replenishment water available, on average, 7 out of 10 years. MWD now estimates that replenishment water will be available only 3 out of 10 years as a result of the reduced availability of imported water supplies to southern California for various hydrologic, legal and regulatory reasons.

Due to this shift in the availability of imported replenishment water supplies, the Water Resources Committee requested that District staff coordinate with CH2MHILL regarding a possible update to this Study. District staff is working with CH2MHILL to develop a draft scope of work and budget, as well as potential areas of focus for an updated study. District staff will provide the Committee with an update on development of this scope of work and budget for an update to the Study.

FISCAL IMPACT

None.

STAFF RECOMMENDATION

For information.



MEMORANDUM

ITEM NO. 5

Prepared by: Phuong Ly

Reviewed by: Ted Johnson

Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008

TO: WATER RESOURCES COMMITTEE

FROM: ROBB WHITAKER, GENERAL MANAGER

SUBJECT: SOUTH MONTEBELLO IRRIGATION DISTRICT WELL MODIFICATION

SUMMARY

The use of recycled water versus imported water in the Montebello Forebay currently saves WRD nearly \$13 million each year compared to imported water costs. Recycled water for groundwater recharge also provides increased reliability to the groundwater supply. The California Department of Public Health's (DPH) draft regulations for groundwater recharge using recycled water requires the recycled water to be underground for at least 6 months before being pumped out for potable use. The DPH used a distance of 500 feet from the point of recharge (the spreading grounds) to assume compliance with the 6 month rule. This put 23 potable wells near the spreading grounds in potential violation of this 6 month rule. This "distance" approach did not account for the vertical depths of the wells and the nature of the aquifers in the area. In 2003, WRD developed and performed a groundwater tracer test on behalf of the affected pumpers and determined that 21 of the 23 wells passed the 6-month test, despite their proximity to the spreading grounds. This tracer test saved the District and the pumpers up to \$40 million if these wells required replacement.

Two production wells did not pass the test and face replacement unless modifications can be made. These wells are owned by South Montebello Irrigation District and existed prior to our current permitted use of recycled water in the spreading grounds. In an effort to bring these wells in compliance without the expense of replacement, the Board approved modifications in 2005 to one of the wells (Well #5). This work successfully increased the recycled water travel time from 2 months to 6 months, making the well in compliance. The cost of this work was approximately \$120,000, including both the well modification and the tracer test performed separately by the University of California Santa Barbara (UCSB). Based on this success, we now want to repeat the work at the other well, known as Well #3. The work involves pulling out the pump, installing a "packer", and reinstalling the pump which should cause the well to draw groundwater only from the deeper and older parts of the aquifer, thereby increasing the recycled water travel time like it did for Well #5.

Benefits to District:

- Demonstrate technology to increase travel time to a well.
- Significant cost savings versus installation of a new well (10% of the cost for a new well).
- Keeps a well in production next to a groundwater recharge facility using recycled water.

Scope of Required Services:

- Pull out existing pump.
- Inspect condition of the well and perform rehabilitation work if necessary.
- Design a new pumping system to draw water from only the lower portion of the well.
- Install the new pumping system.
- Perform a pumping test to ensure the equipment and well are working properly.
- Submit a report of the work.

A separate contract will be issued with the UCSB to perform the tracer work. WRD staff will perform the monitoring of the well to determine if the modifications worked to increase travel time beyond 6 months.

Staff issued requests for proposals on November 6, 2008 to the following pre-qualified firms specializing in water well pump work in the local area:

- General Pump Company (GPC)
- South West Pump & Drilling, Inc. (South West)
- Layne Christensen Company (Layne)
- Water Well Supply, Inc.

A job walk was held on November 17. Proposals were due on November 26. Proposals were received from GPC, South West, and Layne.

FISCAL IMPACT

Staff is evaluating the proposals and will bring a recommendation to the Committee. This is a Professional Services contract, and therefore award will be based equally on four criteria, including Project Approach and Schedule, Cost Estimate, Project Team, and Experience. Proposals from the three firms totaled between \$42,000 and \$57,500. Because it is common to encounter unexpected conditions when working on water supply wells, Staff will be recommending a 15% contingency on the recommended firm. The total amount is to be determined, based on the Staff recommendation. This is a budgeted item.

STAFF RECOMMENDATION

Staff will make a recommendation to the Committee after all proposals are evaluated.



MEMORANDUM

ITEM NO. 6

Prepared by: Ted Johnson

Reviewed by: Phuong Ly

Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008

TO: WATER RESOURCES COMMITTEE

FROM: ROBB WHITAKER, GENERAL MANAGER

SUBJECT: U.C. SANTA BARBARA 2009 RIO HONDO GROUNDWATER TRACER RESEARCH PROJECT

SUMMARY

This item is related to the previous Water Resources Committee agenda item on the South Montebello Irrigation District. The California Department of Public Health's (DPH) draft regulations for groundwater recharge using recycled water requires the recycled water to be underground for at least 6 months before being pumped out for potable use. The DPH used a distance of 500 feet from the point of recharge (the spreading grounds) to assume compliance with the 6-month rule. This put 23 potable wells near the spreading grounds in potential violation of this 6-month rule. This "distance" approach did not account for the vertical depths of the wells and the nature of the aquifers in the area. In 2003, WRD developed and performed a groundwater tracer test in conjunction with the University of California Santa Barbara (UCSB) to measure the actual recharge water travel times to the wells and determined that 21 of the 23 wells passed the 6-month test. This tracer test saved the District and the pumpers up to \$40 million if all of these wells required replacement.

However, two production wells did not pass the test and face replacement unless modifications could be made to increase travel time to them. In an effort to bring these wells in compliance without the expense of replacement, the Board approved modifications in 2005 to one of the wells and a repeat of the tracer test was performed by UCSB. The modifications were successful to increase the travel time from 2 months to 6 months, making the well in compliance. Based on this success, WRD now wants to repeat the work at the other well, known as Well #3.

Benefits to District:

- Demonstrate technology to increase travel time to a well.
- Significant cost savings versus installation of a new well (10% of the cost for a new well).
- Keeps a well in production next to a groundwater recharge facility using recycled water.

Scope of Required Services by UCSB:

- Sample Well #3 and other nearby production and monitoring wells before adding a tracer to document background conditions (see attached proposal).
- After a heavy rain fills the Rio Hondo Spreading Grounds, add the DPH-approved

groundwater tracer Sulfur Hexafluoride (SF6) to the northern ponds that are nearest Well #3.

- WRD staff will re-sample the wells for a period of 1 year to allow time for the tracer to reach the wells, and UCSB will analyze the samples for SF6 to determine arrival time to the wells.
- Prepare a draft and final report of findings.

FISCAL IMPACT

The proposal and cost estimate by UCSB are attached. The cost is estimated at \$38,673. Their cost in 2004/2005 was \$29,749. The increase is due to higher staff and analytical costs by UCSB, and an increase in the amount of work (more wells to test and analyze and report on). Staff also recommends a 10% contingency on the project for a total project cost of \$42,500. This is a budgeted item.

STAFF RECOMMENDATION

Enter into an agreement with the University of California Santa Barbara, subject to approval of form by District Counsel, for the 2009 Rio Hondo Groundwater Tracer Research Project.

Title of Project: 2009 Rio Hondo-Groundwater Tracer Study

Principal Investigators: Jordan F. Clark
Professor
Dept. of Earth Science
University of California
Santa Barbara, CA 93106
(805) 893-7838
jfclark@geol.ucsb.edu

Duration: 18 months (Jan 1, 2009-June 30, 2010)

Total Funds Requested: \$38,673 (see attached budget for details)

1. PROJECT OBJECTIVES

The 2009 Rio Hondo Groundwater Tracer Study is intended to directly determine groundwater transit times from the northern Rio Hondo Spreading Grounds (RHSG) to nearby production and monitoring wells. It will be conducted in conjunction with the Water Replenishment District of Southern California (WRD) and coordinated with modifications to Well# 200065 designed to isolate different portions of the screen at the well. The experiment will test the hypothesis that the travel time of recharge water from the RHSG to Well#200065 can be increased from 16 weeks (4 months) as defined in the 2003 and 2005 experiments to beyond 26 weeks (6 months) following well modifications. Additional production wells and monitoring wells will also be sampled to compare with the results from the earlier tests. The experiment will follow similar procedures of the 2003 and 2005 tracer experiments, which are described by McDermott et al. (2008).

The specific goals of this study are:

I) Inject sulfur hexafluoride (SF₆) tracer and quantify its concentration in the northern RHSG over a period of one to two weeks. SF₆, a non-toxic and non-reactive gas, is an ideal tracer of groundwater flow (Wilson and Mackay, 1993, 1996; Gamlin et al., 2001; Clark et al., 2004). It has been used recently by the UCSB group to directly determine the travel time from recharge basins to production and monitoring wells at a number of sites in southern California, including the San Gabriel and Rio Hondo spreading grounds. During the 2003 San Gabriel and Rio Hondo experiment, SF₆ was injected three times (every 2 to 6 days) into the spreading basins by bubbling for 20 to 30 minutes at one location. Periodic sampling of the basins showed that mean concentrations in the northern Rio Hondo ponds ranged between about 10 and 60 pmol/l (1 pmol = 10⁻¹² moles or 0.15 ng of SF₆). The ponds were relatively well mixed; the standard deviation of the spatially distributed samples was generally less than 10% of the mean. Similar results were seen during the 2005 experiment.

SF₆ will be injected into the six northern Rio Hondo spreading ponds (#1E, #2E, #3E, #4E, #5E, and #7E) by bubbling following the procedures used during the earlier experiments. The tracer concentration will be monitored in the surface water during the course of the one to two week injection period by personnel from WRD.

II) Travel times of the tracer will be determined by sampling groundwater at Well#s 200065 (above and below the packer), 200061 (above and below the packer), and the nearby monitoring wells 100904, 100905, 100906, 100907, 100830, 100834. Initially, samples will be collected monthly in triplicate by personnel from WRD and sent to UCSB for analysis. During the 2003 experiment, SF₆ was first detected at Well# 200065 after 16 weeks and was observed in all subsequent samples. The concentration maximum was 0.7 pmol/l or about 2% of

the mean concentration observed in the spreading basins and was observed at week 52. These results were confirmed during the 2005 experiment.

The purpose of coordinating the tracer experiment with the well modifications is to gain a better understanding of the relationship between depth and arrival time. In particular, we have hypothesized that the early arrival of tracer at Well# 200065 is due to very young water flowing into the top of the well screen as was seen at Well# 200061. The travel time to the lower portion of the screen is most likely much longer and we expect it to be greater than 6 months. By isolating the upper and lower portions of Well# 200065, we should be able to determine whether or not the very recent recharge water is being produced from only the upper portion of the well screen. The final sampling plan will be developed with personnel from WRD. Background samples will be collected prior to tracer addition from all wells, then biweekly or monthly for the duration of the experiment so that these results can be compared with the 2003 and 2005 experimental results.

2. SPECIFIC APPROACH

The methodology to be used during the proposed tracer study was developed by Dr. Jordan Clark at UCSB (e.g., Gamlin et al., 2001; Clark et al., 2004; McDermott et al., 2008). During the initial phase of the proposed project, SF₆ will be injected into surface water in the northern RGSG ponds following a large storm event between February and April 2009 when the ponds are full. During the second phase, groundwater samples will be collected at selected wells by WRD staff and analyzed for the tracer at UCSB so that travel times can be determined.

Because it is vital to know the initial conditions of the recharge water, SF₆ surveys in the recharge area will be conducted daily during the injection. Each survey will consist of collecting 25-30 samples evenly distributed throughout the spreading area. More than 100 SF₆ samples will be analyzed during the initial phase of the proposed project.

The SF₆ samples will be analyzed using a head space method similar to that described by Clark et al (2004). In the field, pre-weighed 15 ml Vacutainer™ will be partially filled (about 8 ml of water). These containers will be sent to UCSB where they will be weighed (to determine the sample size) and carefully filled with ultra-high purity nitrogen gas (so that the final pressure is equal to 1 atmosphere). The head space gas will be injected through a column of Mg(ClO₄)₂ (to remove water vapor) into a small sample loop of known volume (about 1.5 ml). Subsequently, the gas in the sample loop will be flushed into a gas chromatograph equipped with an electron capture detector with ultra-high purity nitrogen carrier gas. SF₆ will be separated from other gases with a Molecular Sieve 5a column held at room temperature. The detector response is determined by running gas standards purchased from Scott-Marrin, Inc. Error on

duplicate measurements is typically $\pm 5\%$. Laboratory experiments have shown that SF₆ samples can be stored for at least 6 months without appreciable loss of SF₆ in Vacutainer™.

3. BUDGET JUSTIFICATION

Jordan Clark is the lead PI and will assume overall responsibility for the proposed work. He has used SF₆ as a tracer in ground and surface waters in more than a dozen experiments. The graduate student technician will assist with the field operation and with the laboratory work at UCSB.

Direct costs of this project include laboratory salary for the PI and laboratory assistant, supplies for the analysis of SF₆ (nitrogen gas for the GC, vacutainers, replacement gas standard, tubing, etc.), miscellaneous field supplies (SF₆ tracer gas, tubing, replacement pump, etc.) travel to the field area, WRD for discussions, and to a national meeting to present the experimental results. The analytical costs for SF₆ are based on the number of days in the laboratory rather than the number of samples to be analyzed. The marginal cost of running additional samples is small because the majority of the time spent in the laboratory is used to run standards and ensure that the analytical background is sufficiently low. Travel costs include per diem and car rental for 2 people to work in the field during the initial phase of this project and 2 trips to WRD to attend meetings and discuss the results.

4. REPORTING

Two progress and a final report will be prepared. The first progress report will be due one month after the completion of the first part of the experiment (injection and background monitoring of the SF concentrations in the groundwater), the second will be due nine months after the beginning of the tracer injection period, and the final report will be due two months after the completion of the experiment. Drafts of the reports will be delivered to WRD for review prior to their submission.

5. REFERENCES

- Clark, J. F., G. B. Hudson, M. L. Davisson, G. Woodside, and R. Herndon (2004) Geochemical imaging of flow near an artificial recharge facility, Orange County, CA. *Ground Water*, 42, 167-174.
- Cook, P. G. and D. K. Solomon (1997) Recent advances in dating young ground water: chlorofluorocarbons, ³H/³He and ⁸⁵Kr. *Journal of Hydrology* 191, 245-265.
- Gamlin, J. D., J. F. Clark, G. Woodside, and R. Herndon (2001) Tracing groundwater flow patterns in an area of artificial recharge using sulfur hexafluoride. *Journal of Environmental Engineering, ASCE*. 127, 171-174.

- McDermott, J. A., D. Avisar, T. Johnson, and J. F. Clark (2008) Groundwater travel times near spreading ponds: Inferences from geochemical and physical approaches. *Journal of Hydrologic Engineering, ASCE*, 13, 1021-1028.
- Wilson, R. D. and D. M. Mackay (1993) The use of sulphur hexafluoride as a conservative tracer in saturated sandy media. *Ground Water*, 31, 719-724.
- Wilson, R. D. and D. M. Mackay (1996) SF₆ as a conservative tracer in saturated media with high intragranular porosity or high organic carbon content. *Ground Water*, 34, 241-249.

Budget

P.I.s:	Jordan F. Clark
AGENCY:	WRD
PERIOD:	1/1/09 to 6/30/10
TITLE:	2009 Rio Hondo-Groundwater Tracer Study

SALARIES:		Year 1
Jordan F. Clark, Associate Professor II		
1 mos. @ 100% @	\$8,644	\$8,644
Lab Assistant III		
400 hr. @	@ \$20/hr	\$8,000
Total Salaries:		\$16,644

BENEFITS:		
Jordan F. Clark, Associate Professor II		
\$8,644 @ 12.7% *		\$1,098
Resident Graduate Student Researcher III, TBN		
\$8,000 @ 22% *		\$1,760
Total Benefits:		\$2,858

TOTAL SALARIES & BENEFITS: \$19,502

TRAVEL

Travel for Field Work and Meetings	\$2,000
Travel to National Meeting	\$1,500
Total Travel:	\$3,500

OTHER DIRECT COSTS:

Chemical Analyses and other laboratory supplies	\$1,000
Field Supplies	\$500
Computer Supplies	\$500
Telephone, shipping, etc	\$500
Total Other Direct Costs:	\$2,500

TOTAL DIRECT COSTS: \$25,502

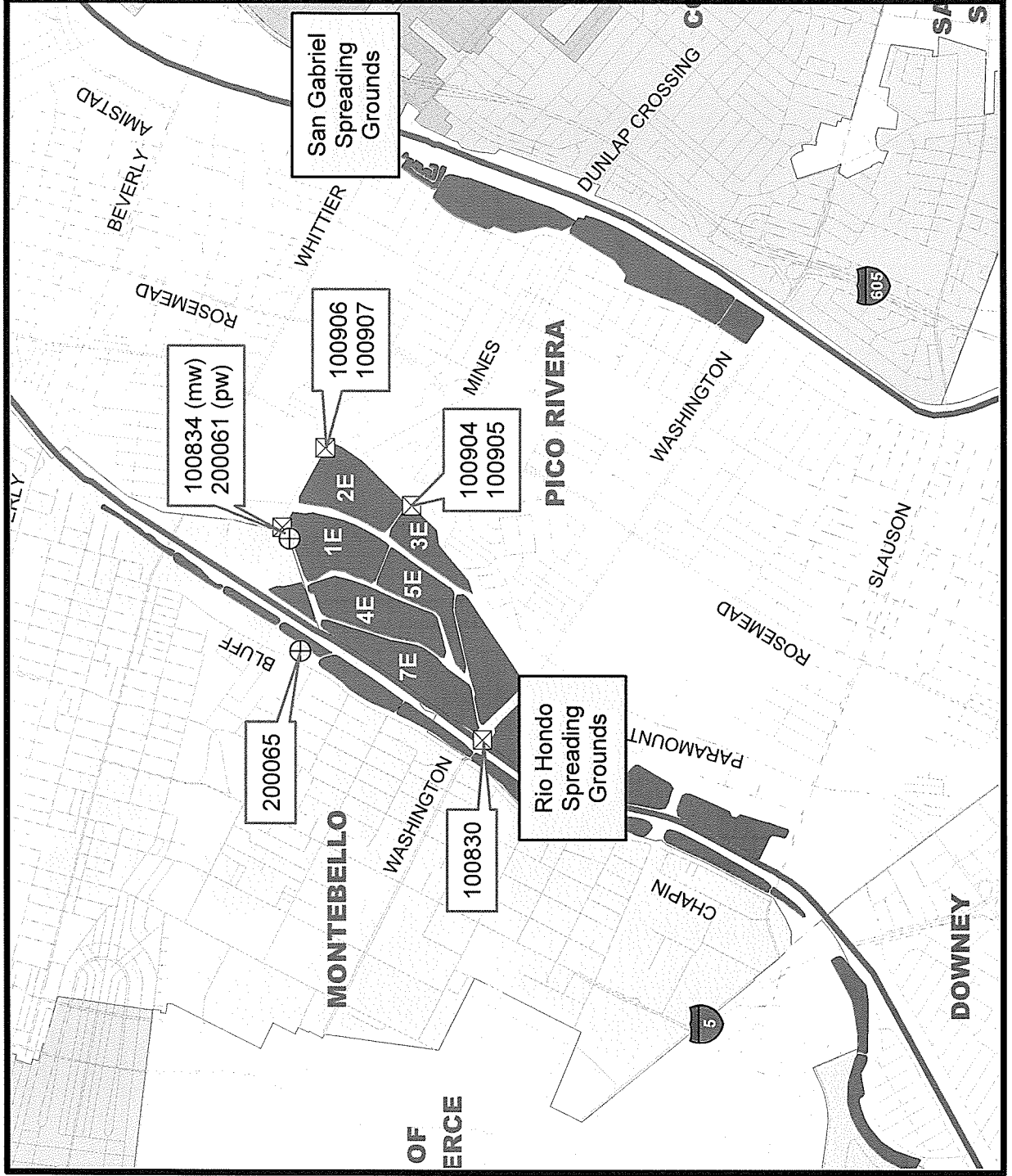
INDIRECT COSTS:

\$25,502 @ 51.5% \$13,134

TOTAL REQUEST:	\$38,636
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* Based on employee's actual benefit rate.

Production and Monitoring Wells Used for 2009 Tracer Test





MEMORANDUM

ITEM NO. 7

Prepared by: Ted Johnson

Reviewed by: Hoover Ng

Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008

TO: WATER RESOURCES COMMITTEE

FROM: ROBB WHITAKER, GENERAL MANAGER

SUBJECT: NO-COST TIME EXTENSION FOR AGREEMENT WITH NELLOR ENVIRONMENTAL ASSOCIATES, INC.

SUMMARY

On January 11, 2008, the Board entered into an agreement with Nellor Environmental Associates, Inc. (NEA) to provide professional consulting services associated with regulatory aspects of increasing the use of recycled water in the Montebello Forebay and other water recycling permit issues. Ms. Margaret Nellor, President of NEA, has nearly 30 years of experience in the environmental field, and was formerly with the Los Angeles County Sanitation Districts (LACSD) in which she was in charge of water reclamation permits and associated research programs activities of the LACSD plants. She has a wide array of experiences as noted on the attached Statement of Qualifications. In particular, she provided technical assistance that resulted in the successful adoption of the petition to the State Water Resources Control Board to remove the use of notification levels as enforceable effluent limits for the Alamitos Barrier Recycled Water Project.

Ms. Nellor has greatly assisted WRD with many tasks during the past year, including assisting staff in preparing technical reports, memoranda, and other correspondence and documents related to GRIP (Groundwater Replenishment Improvement Program), as well as helping staff strategize on numerous meetings throughout the year with the California Department of Public Health and Regional Water Quality Control Board.

The contract for NEA was for \$20,000 and is set to expire on December 31, 2008, but there are still approximately \$10,000 in funds left under her contract and there is still work for her to do. Therefore, Staff is requesting a no-cost time extension until December 31, 2009.

FISCAL IMPACT

None.

STAFF RECOMMENDATION

Extend the termination date for the agreement with Nellor Environmental Associates, Inc, to December 31, 2009.



MEMORANDUM

ITEM NO. 8

Prepared by: Ted Johnson

Reviewed by: Hoover Ng

Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008

TO: WATER RESOURCES COMMITTEE

FROM: ROBB WHITAKER, GENERAL MANAGER

SUBJECT: CONTRACT AMENDMENT FOR RECYCLED WATER MODELING AT THE DOMINGUEZ GAP BARRIER – GOLDER ASSOCIATES

SUMMARY

On December 7, 2007, the District entered into an agreement with Golder Associates to perform groundwater modeling services to predict how far recycled water has traveled in the West Coast Basin due to injection at the Dominguez Gap Barrier. This work is required annually by the Regional Water Quality Control Board, Los Angeles Office (RWQCB). Golder also performed other modeling services such as code conversion and calibration.

Golder's contract expires December 6, 2008, however additional modeling work is needed. The District is required to modify operations at the barrier by 2011. The original intent was to construct a blend station so that a mix of 50/50 recycled water to MWD water was injected by 2011. However, due to two successful 100% recycled injection permits being issued since Dominguez Gap started (West Coast Barrier and Talbert Barrier in Orange County), and because of the rising price and limited availability of MWD water for injection, and due to WRD's implementation of the Water Independence Network (WIN) program, the District is now exploring options to go to 100% recycled water at the Dominguez Gap Barrier instead of just a 50/50 blend. Therefore, modeling runs are needed to predict how this change may alter conditions in the aquifers and forecast arrival times to nearest drinking water wells. In addition, the 2008 RWQCB permit compliance report will be due March 1, 2009, and the modeling is needed for this report.

Staff recommends continuing the work with Golder Associates as their work to date has been high quality, timely, and relatively low cost. They are also the most familiar with the model. A copy of their proposal is attached.

FISCAL IMPACT

The fee for the modeling work is estimated at \$12,200, plus a 10% contingency fee for a total authorized amount of \$13,400 and is budgeted for FY 2008-0 budget.

STAFF RECOMMENDATION

Extend the termination date for the agreement with Golder Associates to December 31, 2009 and add \$13,400 to the contract amount for additional modeling services.



Golder Associates Inc.

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December 3, 2008

Our Ref.: 063-1204.200

Water Replenishment District of Southern California
4040 Paramount Boulevard
Lakewood, California 90712

Attention: Ted Johnson, C.HG.

**RE: PROPOSAL FOR ADDITIONAL MODELING SIMULATIONS
RECYCLED/IMPORTED WATER INJECTION AT THE
DOMINGUEZ GAP BARRIER, LOS ANGELES COUNTY, CALIFORNIA**

Dear Ted:

Golder Associates Inc. (Golder) appreciates the opportunity to present this proposal to the District to perform additional model simulations using the Dominguez Gap Barrier Model (the model). Golder developed the model in 2006-07, and used the model to simulate one future barrier operation condition in 2008. This condition involved the following five phases:

- October 2005 and January 2006 – the model simulated actual barrier injection rates and all wells injected only imported water.
- February 2007 – December 2007 – the model simulated actual barrier injection, plus total recycled and imported water; all injection wells received the same percentage of each water type during this period.
- January 2008 – September 2008 - the model assumed that the barrier would inject a total of 10 cfs each month, and that the monthly distribution of recycled/imported water would be the same as that recorded during the same months in 2007.
- October 2008 to September 2011 – the barrier would continue to inject 10 cfs with the western wells receiving 100 percent recycled water and the eastern wells receiving 100 percent
- October 2011 to September 2054 - the barrier would continue to inject 10 cfs but all wells would receive a 50/50 blend of recycled/imported water types.

The model predicted future groundwater levels and the percentage of recycled water in the primary aquifers at monthly (until October 2011) and quarterly (thereafter) time steps. The District now wishes to evaluate the results for operational variations. Golder has developed the following work scope to assist the District with this task.

Task 1 – Project Management

Golder will manage the project to meet the objectives identified for each task. Management of this project will include preparation of monthly invoices including cover letters explaining the charges incurred, progress of the project, and highlighting any changes in scope, budget or schedule.

Task 2 – Simulate Three Recycled/Imported Injection Water Scenarios

This task will consist of using the existing Dominguez Gap Barrier Model to simulate three barrier operational scenarios. These are as follows:

1. Delay the start of the 50/50 blend (Phase 4 above) until October 2015.
2. Continue to operate by injecting 100 percent recycled water along the western arm and 100 percent imported water along the eastern arm between October 2008 and September 2055. That is, no 50/50 blend occurs during the simulation period.
3. Commence with 100% recycled water injection over the entire barrier starting in October 2015.

For each scenario, the actual monthly barrier injection (rates and recycled water percentages) up until December 2008 will be simulated. The remaining monthly and annual injection rates will remain the same as the original scenario. No changes will be made to the basin pumping or boundary conditions. The model will use the MODFLOW code to solve the groundwater flow transiently and the solute transport code MT3D to predict the recycled water percentage in the main production aquifers (Gage, Lynnwood and Silverado). We have assumed that the District will provide barrier injection data (rates and recycled percentage totals) for 2008. The model output results will consist of:

- (1) Up to four recycled percentage maps for each aquifer for each scenario, and
- (2) One time versus percentage chart for the main municipal supply wells in the area for each scenario.

Task 3 – Prepare Technical Reports

Upon completion of Task 2, Golder will initially prepare a brief letter report that will include the model results for the period up until December 2008. The District will use these results as part of their 2008 permit compliance report. Subsequently, Golder will prepare a full technical memorandum summarizing our activities, findings, limitations and recommendations of the entire modeling task. This scope also assumes that Golder's project manager will review the draft letter and report with District staff via a phone call prior to finalizing.

STAFFING

The key Golder Associates staff that will perform the above work scope will be as follows:

- Bob Anderson, L.Hg. – Principal in Charge. Bob will be responsible for overseeing the project, and provide QA/QC support.
- Stephen Thomas, C.HG. – Project manager/hydrogeologist. Stephen will conduct the main portion of the modeling and prepare the technical reports.
- Jeff Schneider. Staff engineer. Jeff will assist with modeling and report preparation.

COST ESTIMATE

All work will be conducted on a time and materials basis with the following rates not to exceed **\$12,200**. The following is a cost estimate breakdown by task:

Task 1: Project Management	\$ 1,000
Task 3: Simulate Recycled-Imported Injection Water Scenarios	\$ 5,700
Task 4: Prepare Technical Reports	\$ 4,900
Other non-labor costs (all tasks)	<u>\$ 600</u>

PROJECT TOTAL: \$12,200

This estimate is based on the following rates:

<u>Staff Rates:</u>	<u>Hourly Rate</u>
Principal	\$185
Associate	\$165
Senior	\$145
Project	\$115
Staff	\$ 95
Graphics/CAD	\$ 85
Support (word processing, administrative)	\$ 75
 <u>Expenses:</u>	
Communication fee	5%
Expenses	10%

SCHEDULE

We will complete the work under the following schedule:

Task 2 – Simulate Recycled/Imported Injection Water Scenarios. We will complete this task within three weeks of receipt of authorization to proceed.

Task 3 – Prepare Technical Reports. We will deliver the initial letter report within one week of completion of the first model scenario, and the draft technical memorandum within two weeks of completion of Task 2.

AUTHORIZATION

Golder Associates Inc. is pleased to present this proposal and we look forward to your favorable response. We assume that this work will be carried out under terms and conditions that were included in our recent contract (*Professional Services Agreement*, dated December 7, 2007) between the Water Replenishment District of Southern California and Golder Associates Inc. We will not begin work until we receive formal authorization from you.

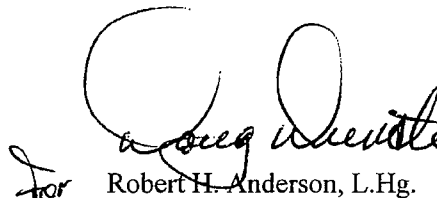
If there are any questions or points that you would like to discuss, please do not hesitate to give me a call. We appreciate the opportunity to offer this proposal for your consideration.

Sincerely,

GOLDER ASSOCIATES INC.



Stephen D. Thomas, C.HG.
Senior Hydrogeologist, Project Manager



for Robert H. Anderson, L.Hg.
Principal

RHA/SDT/ngs



MEMORANDUM

ITEM NO. 9

Prepared by: Nancy Matsumoto
Reviewed by: Ted Johnson
Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008
TO: WATER RESOURCES COMMITTEE
FROM: ROBB WHITAKER, GENERAL MANAGER
SUBJECT: SALINE PLUME POLICY

Staff has been working with the Groundwater Quality Committee on a saline plume policy and presented it to that committee on November 25, 2008. A summary will be presented at the Water Resources Committee for information. The Policy is intended to help the District evaluate to what extent, if any, it will expand its efforts to remediate the large volume of saltwater contamination that exists in the West Coast Basin.

The following tasks were completed this year to prepare the Policy:

- **Select Locations for Surface Geophysical Surveys:** The previous (2000–2006 data) saline plume map was reviewed, and location data gaps were identified. Next, these data gaps were cross-referenced with aerial photos, street maps and field surveys to select several dozen sites appropriate for surface geophysical surveys.
- **Complete Surface Geophysical Surveys:** WRD and the District's consultant completed surface geophysical surveys at 37 locations in the West Coast Basin. The raw survey data, which indicated the presence or absence of either saline groundwater or tight clayey sediments, were subsequently modeled and interpreted using the closest DWR cross-sections and monitoring and production well logs, to refine the mapping of the saline plume.
- **Conduct Comprehensive Chloride Data Collection/Well Sampling Round:** The District collected recent (Fall 2008) chloride data from as many wells in the saline plume region as possible. In cases where recent chloride data were not readily available and wells were accessible, WRD sampled the wells to obtain chloride data.
- **Prepare Updated Saline Plume Maps:** Utilizing the abovementioned chloride data and geophysical survey data, WRD prepared saline plume maps for the Gage, Silverado, and Lower San Pedro Aquifers.
- **Identify and Evaluate Issues:** Staff held extensive internal and interagency meetings to identify key issues associated with developing a Saline Plume Policy, and addressed those issues in the subsequent Policy report.
- **Prepare Cost Estimates:** Staff researched costs for various saline plume remediation alternatives, and prepared planning-level cost estimates for each alternative.
- **Prepare Saline Plume Policy Report:** Staff prepared a draft comprehensive Saline Plume Policy Report that outlines the history of the saline plume in the West Coast Basin, previous plume mapping and remediation efforts, current issues and alternatives for remediating the plume, cost estimates for remedial alternatives, and the recommended alternative.

- **Install and Sample New WRD Nested Monitoring Wells (in progress):** WRD has identified potential locations for two new monitoring wells based on the information obtained above. These wells, when installed, will not only give additional information on the geology and salt content of the groundwater at the time of drilling, but will provide long term (20 years or more) monitoring information on the saline plume. Staff is working to secure access for drilling and installation of the new wells.

Questions the Investigations and Policy were meant to Answer:

- What is the current configuration of the plume and is it still moving?
- Does the plume remain a threat to any production wells in the basin?
- What are the pros and cons of remediating the plume?
- Should WRD have a role in continued plume management and remediation, and if so, to what extent?

Findings/Conclusions to Date (Draft): Based on Staff analysis, the following is provided:

- Updated saline plume maps have been completed and will be passed out at the meeting. These are the most comprehensive maps to date. Current estimate is that approximately 650,000 AF of groundwater has been impacted by chloride concentrations above 250 mg/L.
- The plume continues to move eastward at a rate of approximately 250 ft/yr. Chloride concentrations are increasing in wells as the plume moves. Production wells in the basin are still threatened by the plume.
- Benefits to remediation include contamination removal, restoration of a usable groundwater basin, new water supply, and safety to wells currently not impacted.
- Drawbacks to remediation include treatment cost, long time frame, possible increased barrier injection demands, and legal/institutional hurdles.
- WRD could take no role, a partial role, or a full aggressive role for plume remediation. WRD currently has a partial role with the Goldsworthy Desalter.
- The saline plume is a large contamination source impacting West Coast Basin groundwater. In the highly impacted zones, the water cannot be used without treatment. WRD is responsible for groundwater supply and quality in the West Coast Basin. Therefore, it is Staff's recommendation that WRD should continue and increase its role in the plume's management and remediation.
- Staff believes that the Goldsworthy Desalter should be expanded to address the relatively high levels of contamination in this area. The relatively high contamination in the Lower San Pedro aquifer southwest of the Goldsworthy Desalter should also be investigated in more detail for possible remediation. Continued monitoring and additional investigations should be performed to design the most cost-effective remediation system, and funding and partnering opportunities should be explored. Securing future pumping rights or adjudication exemptions to extract and treat the salty groundwater must also be completed.

Next Steps: Staff recommends that this information be discussed in more detail with the Committees, then presented at a stakeholder group for input before bringing the policy the Board for discussion.

FISCAL IMPACT

None.

STAFF RECOMMENDATION

For information.



MEMORANDUM

ITEM NO. 10

Prepared by: Jim McDavid

Reviewed by: Bob Siemak

Approved by: Robb Whitaker

DATE: DECEMBER 11, 2008

TO: WATER RESOURCES COMMITTEE

FROM: ROBB WHITAKER, GENERAL MANAGER

SUBJECT: WBMWD RECYLED WATER PURCHASE AGREEMENT

SUMMARY

WRD continues to pursue and evaluate projects and practices that will further the goals of the Water Independence Network (WIN) program. One such opportunity is to provide additional recycled water to the West Coast Barrier (WCB) system to alleviate the need for imported (MWD Tier 1) water currently used to meet a portion of the barrier needs by using 100% recycled water for the WCB. Currently, WCB is operated using a 75% recycled water and 25% imported water blend. California Department of Health and the Los Angeles Regional Water Quality Control Board have already approved the use of 100% recycled water at the WCB.

WRD and West Basin Municipal Water District (WBMWD) entered into the current Agreement for Supply of Recycled Water dated January 27, 2003. Based on the Agreement, the parties set forth terms and conditions under which WBMWD would sell and WRD would purchase up to 12,500 AFY of recycled water from the Edward C. Little Water Recycling Facility (ECLRF) for injection at the WCB, which is 75% of the barrier demand.

WBMWD has recently completed a preliminary design report for the expansion of the ECLRF. This expansion will make available an additional 4,480 acre-feet per year (AFY) of recycled water. Staff from WRD and WBMWD has worked together to structure a new agreement under which WRD would purchase this additional recycled water. This will allow for up to 16,980 AFY of recycled water to be delivered to the WCB from the ECLRF, thereby meeting the total anticipated replenishment demands at the barrier. The use of locally produced recycled water to meet the total replenishment requirements of the barrier will secure a reliable and locally sustainable source for the future.

The attached draft agreement was developed based on direction provided by the Joint Ad Hoc Committees from both agencies' Boards. This new agreement was presented to the Joint Ad-Hoc Committee at a meeting held December 5, 2008. Some of the major points of the new agreement include:

- The agreement is for twenty-five years.
- This agreement will supersede and negate all previous agreements.
- WBMWD will design, finance, and construct the facilities to meet the expected demand for 100% recycled water to the barrier (16,980 acre-feet per year).

- An increase in recycled water used for barrier injection is consistent with the goals set forth in the WRD's Water Independence Network (WIN) program.
- An increase in recycled water used for barrier injection and a corresponding decrease in imported water is consistent with the WBMWD's Water Reliability 2020 Program.
- WRD will secure a 16,980 acre-feet per year capacity interest in the facility.
- WBMWD will own, operate, and maintain the facilities to produce and distribute recycled water to the barrier.
- WBMWD will establish a single commodity rate for all recycled barrier injection water.
- WBMWD will recoup all its capital expenses for this expansion project through a monthly capital recovery fee.
- WRD may, at its own discretion, provide funding for up to 50% of the capital costs for this project up front, with a corresponding reduction to the monthly capital recovery fee.
- WRD will enjoy the benefit of purchasing barrier injection water for an additional twenty-five years at the commodity rate (less the monthly capital recovery fee).

FISCAL IMPACT

The supply water for the WCB currently consists of approximately 12,500 AFY of recycled water and approximately 4,000 AFY of imported water. The current rate structure for the recycled water portion of the WCB needs is expected to increase over time in an even and controlled manner. On the other hand, the current rate structure for the imported water portion of the WCB needs is expected to undergo a significant increase in the near future due to market and political issues relating to supply. Last year, imported water costs increased by over 14% and a similar, if not higher increase, is anticipated for next year. By meeting the entire replenishment needs of the WCB using recycled water, future budgetary allocations for the WCB replenishment supply will be more stable and can be better anticipated. The initial costs for WCB supply water under this new agreement will not result in an increase to the Replenishment Assessment as compared to the existing arrangement. Future costs are expected to be less than those under the existing agreement as costs for recycled water will be less than those for imported water.

STAFF RECOMMENDATION

For information.