CHINO BASIN WATERMASTER

II. BUSINESS ITEMS

B. PEACE II LEGAL DOCUMENTS

CHINO BASIN WATERMASTER

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KENNETH R. MANNING
Chief Executive Officer

STAFF REPORT

DATE: **September 27, 2007**

TO: **Advisory Committee Members**
Watermaster Board Members

SUBJECT: **Approval of Resolution 07-05 (Peace II Legal Instruments)**

SUMMARY

Recommendation – Staff recommends that the Advisory Committee and Board adopt Resolution 07-05, subject to the process described in this staff report, and direct Watermaster to file with the Court.

I. Resolution 07-05 (Peace II Legal Instruments)

The Peace II Legal Instruments are organized as attachments and exhibits to two primary documents: Watermaster Resolution 07-05 and the document titled the Peace II Agreement. To date staff and legal counsel have presented the Peace II Legal Instruments individually to the Pools, the Advisory Committee and the Board. However, the final approval by the Advisory Committee and Board of the legal instruments takes the form of approval of Watermaster Resolution 07-05, to which the balance of the Peace II Legal Instruments are attachments.

Following adoption of Resolution 07-05, Watermaster will transmit the Resolution and all attached documents to the Court for its review and approval, with a transmittal pleading to be distributed to the Pools and Advisory Committee and Board in October and a hearing to be scheduled in late November.

II. Proposed Socioeconomic Process

A. Within seven days following the Dr. Sunding's delivery of his expected final draft of the socioeconomic report contemplated by the Peace II Term Sheet, the members of the Appropriative Pool shall convene a collaborative process to agree upon recommendations that will be applied by Watermaster in addressing Watermaster's continuing duties under Exhibits H and I of the Judgment. This process will focus primarily on three areas as well as the considerations set forth in Section C.2 below that are thought to be material to the over-all distribution of costs and benefits of the OBMP among the members of the Appropriative Pool:

(1) Recharge Master Plan. Address the water, facilities and financing plan to equitably apportion of costs of recharge improvements and the specific measures that may be applicable to MZ#1 and remediation of subsidence;

(2) Desalters. Address yield preservation, replenishment, salt management, bonding capacity, and third party financing;

(3) Recycled Water. Address the cost of obtaining and making use of recycled water and the member's relative access to recycled water as a commodity.

B. No date has yet been scheduled for a Court hearing regarding the Peace II Measures. However, the participants acknowledge that their full commitment will be required to resolve potential differences and consequently they desire that this process be completed as soon as practicable. Notwithstanding their commitment to this process, all members of the Appropriative Pool reserve their respective rights to file responsive pleadings related to Watermaster's motion and a request for Court direction to proceed in accordance with Peace II Measures.

C. The parties will acknowledge and agree that as the Dr. Sunding report is moved through the Pool Process that although the Report may be final from Dr. Sunding's perspective:

1. There is a wide range of opinion regarding whether the Report addresses all the economic considerations that may be applicable to an evaluation of Watermaster's continuing duties under Exhibits H and I of the Judgment.

2. Without accepting or rejecting the relevance of any specific factors, members of the Appropriative Pool have suggested the potential importance of other considerations including but not limited to the following: the 1978 Judgment, apportionment of Operating Safe Yield, access to recharge water, access to recycled water; the CPUC, NEPA and the CEQA guidelines applicable to the measurement of socioeconomic impacts, agency ability to pay, and historical contributions by the parties.

September 21, 2007

WATERMASTER RESOLUTION
NO. 07-05

RESOLUTION OF THE CHINO BASIN WATERMASTER REGARDING THE PEACE II AGREEMENT AND THE OBMP IMPLEMENTATION PLAN

WHEREAS, the Judgment in the Chino Basin Adjudication, *Chino Municipal Water District v. City of Chino, et al.,* San Bernardino Superior Court No. 51010, created the Watermaster and directed it to perform the duties as provided in the Judgment or ordered or authorized by the court in the exercise of the Court's continuing jurisdiction;

WHEREAS, Watermaster has the express powers and duties as provided in the Judgment or as "hereafter" ordered or authorized by the Court in the exercise of the Court's continuing jurisdiction" subject to the limitations stated elsewhere in the Judgment;

WHEREAS, Watermaster, with the advice of the Advisory and Pool Committees has discretionary powers to develop an OBMP for Chino Basin, pursuant to Paragraph 41 of the Judgment;

WHEREAS, in June of 2000, the Parties to the Judgment executed the Peace Agreement providing for the implementation of the OBMP and Watermaster adopted Resolution 00-05 whereby it agreed to act in accordance with the Peace Agreement;

WHEREAS, the Court ordered Watermaster to proceed in accordance with the Peace Agreement and the OBMP Implementation, Exhibit "B" thereto;

WHEREAS, Watermaster adopted and the Court approved Chino Basin Watermaster Rules and Regulations in June of 2001;

WHEREAS, the Peace Agreement, the OBMP Implementation Plan and the Chino Basin Watermaster Rules and Regulations reserved Watermaster's discretionary powers in accordance with Paragraph 41 of the Judgment, with the advice from the Advisory and Pool Committees, and contemplated further implementing actions by Watermaster;

WHEREAS, the Judgment requires that Watermaster in implementing the Physical Solution, and the OBMP have flexibility to consider and where appropriate make adjustments after taking into consideration technological, economic, social and institutional factors in maximizing the efficient use of the waters of the Basin.

WHEREAS, the Parties to the Judgment provided input into the creation of a "Stakeholder Non-Binding Term Sheet" that articulated methods to maximize beneficial use of the Basin ("Peace II measures") was distributed to and considered by each of the Pools, the Advisory Committee and the Watermaster Board and subsequently transmitted to the Court;

WHEREAS, Watermaster will continue to require that to the extent any of the Peace II Implementing Measures constitute "projects" within the meaning of the California Environmental Quality Act ("CEQA"), compliance with CEQA will be required as a pre-condition of Watermaster's issuance of any final, binding approvals; and

WHEREAS, the actions articulated in the "Stakeholder Non-Binding Term Sheet" and contemplated herein to maximize the beneficial use of the groundwater and the Basin benefit the Basin and the Parties to the Judgment.

NOW, THEREFORE, IT IS HEREBY RESOLVED AND DETERMINED THAT:

1. Watermaster caused the completion of a preliminary engineering, hydrogeologic, and technical evaluation of the physical impacts to the Basin and to the Parties to the Judgment that may result from implementation of the Peace II measures. The preliminary evaluation was conducted by Mark Wildermuth of Wildermuth Environmental.

2. The Assistant to the Special Referee, Joe Scalmanini of Luhdorff & Scalmanini Consulting Engineers, transmitted his technical review in March of 2007 ("Report"). In relevant part, the Report states:

> "For planning level analysis, the existing model is a useful and applicable tool to simulate approximate basin response to management actions that involve the quantities and distribution of pumping and recharge in the basin. For example, for the most notable of its applications to date, which has been to conduct a planning level analysis of intended future hydraulic control, the model can be confidently utilized to examine whether groundwater conditions (levels) will form in such a way that hydraulic control will be achieved as result of basin re-operation and, if not, what other changes in basin operation are logically needed to achieve it." (Report at p. 37)

3. Watermaster caused the preparation of a specific project description set forth in Attachment "A" hereto for the purpose of conducting a more refined engineering, hydrogeologic and technical evaluation of the physical impacts to the Basin and to the Parties to the Judgment that may result from implementation of the Peace II measures.

4. Watermaster caused the completion of a macro socioeconomic analysis by Dr. David Sunding, a PhD in economics and professor at the University of California Berkeley set forth in Attachment "B" hereto. The macro analysis provided an evaluation of the macro costs and benefits to the parties as a whole that may be attributable to the Peace II measures.

5. Watermaster caused an update of the previously completed socioeconomic analysis conducted pursuant to the Judgment. The analysis was completed by Dr. Sunding, and it considered the positive and negative impacts of implementing the OBMP, the Peace Agreement, and the Peace II measures, including Watermaster assessments. The analysis also addressed the potential distribution of costs and benefits among the parties that were initiated

with the approval of the Peace Agreement. The study was completed in final draft form on September 13, 2007 and is set forth in Attachment "C" hereto. Each of the Parties to the Judgment has had the opportunity to comment on earlier drafts of the report and on the final draft of the report and to consider the analyses contained therein prior to Watermaster's approval of this Resolution 07-05.

9. Watermaster has caused the preparation of the 2007 Supplement to the Optimum Basin Management Program ("OBMP") addressing Watermaster's efforts to, among other things; pursue Hydraulic Control through Basin Re-Operation as set forth in Attachment "D" hereto.

10. Watermaster has prepared a summary of the cumulative total of groundwater production and desalting from all authorized Desalters and other activities authorized by the 2007 Supplement to the OBMP Implementation Plan as amended as provided in the Peace Agreement in a schedule that: (i) identifies the total quantity of groundwater that will be produced through the proposed Basin Re-Operation to obtain Hydraulic Control, and (ii) characterizes and accounts for all water that is projected to be produced by the Desalters for the initial Term of the Peace Agreement (by 2030) as dedicated water, New Yield, controlled overdraft pursuant to the Physical Solution or subject to Replenishment . This schedule is set forth in Attachment "E" hereto. Watermaster will modify its projections from time to time, as may be prudent under the circumstances.

11. More than fifteen months have passed since the Non-Binding Term Sheet was initially published by Watermaster in its current form and transmitted to the Court for its consideration and more than six months have passed following Watermaster's declaration that any party interested in participating in the development and construction of Future Desalters should identify their interest in making a proposal and no party has stepped forward and made a responsive proposal in lieu of the Western Municipal Water District proposal.

12. The Peace II measures collectively consist of:

(a) Watermaster's election to exercise its reserved discretion as provided in the Judgment, the Peace Agreement and the OBMP Implementation Plan, to amend the Watermaster Rules and Regulations as more fully set forth in Attachment "F" attached hereto and incorporated herein by this reference;

(b) Watermaster's execution and Court approval of the proposed Purchase and Sale Agreement with the Non-Agricultural (Overlying) Pool as more fully set forth in Attachment "G" attached hereto and incorporated herein by this reference;

(c) Watermaster's and the Court's approval of the proposed amendments to the Judgment as more fully set forth in Attachment "H", Attachment "I" and Attachment "J" attached hereto and incorporated herein by this reference;

(d) Watermaster's approval of and further agreement to act in accordance with the Peace II Agreement, including the provisions related to Future Desalters, as more fully set forth in Attachment "K" attached hereto, upon a further order of the

Court directing Watermaster to proceed in accordance with its terms;

(e) Watermaster's and the Court's approval of the 2007 Supplement to the OBMP Implementation Plan as they are more fully set forth in Attachment "D" attached hereto and incorporated herein by this reference; and

(f) Execution of the proposed Second Amendment to the Peace Agreement as more fully set forth in Attachment "L" attached hereto and incorporated herein by this reference, approval by Watermaster and a further order of the Court directing Watermaster to proceed in accordance with its terms.

13. The Overlying (Non-Agricultural), the Overlying (Agricultural) Pool, and the Appropriative Pool have approved the Peace II measures and recommended Watermaster's adoption of this Resolution 07-05

14. The Advisory Committee has approved the Peace II measures and recommended Watermaster's adoption of this Resolution 07-05.

15. In adopting this Resolution and by its agreement to implement the Peace II measures, Watermaster is not committing to carry out any project within the meaning of CEQA unless and until CEQA compliance has been demonstrated for any such project.

16. The Watermaster Board will transmit this Resolution 07-05, and the Peace II implementing measures, and the referenced Attachments to the Court along with other supporting materials and request the Court to approve the proposed Judgment Amendments and to further order that Watermaster proceed to further implement the 2007 Supplement to the OBMP as provided in the Peace II measures.

Date:_____ _____

for CHINO BASIN WATERMASTER

ATTACHMENT A

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September 21, 2007

Attachment "A"
Project Description
for the
2007 Amendment to the Chino Basin
Optimum Basin Management Program

Introduction

This document contains the project description for the Chino Basin desalting and re-operation programs that has been distilled from various planning investigations and was described in the Stakeholder Non-Binding Term Sheet. This document was prepared for use in: (a) Chino Basin Watermaster's evaluation of the potential actions to cause Material Physical Injury to the Basin or the Parties to the Judgment; (b) in connection with Watermaster's request for Court review and approval of proposed actions in further implementation of the Optimum Basin Management Program ("OBMP"); and (c) an environmental impact report to be prepared as part of the expansion of the desalters.

Requirements of the 2004 Amendment to the Water Quality Control Plan for the Santa Ana Watershed

Water quality objectives are established by the Regional Water Quality Control Board, Santa Ana Region ("Regional Board") to preserve the beneficial uses of the Chino Basin and the Orange County Basin located downstream of the Chino Basin. Prior to the 2004 Amendment, the Regional Water Quality Control Plan (Basin Plan) contained restrictions on the use of recycled water within the Chino Basin for irrigation and groundwater recharge. The pre-2004 Basin Plan contained TDS "anti-degradation" objectives that ranged from 220 to 330 mg/L over most of the Chino Basin. Ambient TDS concentrations slightly exceeded these objectives. There was no assimilative capacity for TDS; thus, the use of the Inland Empire Utilities Agency's ("IEUA") recycled water for irrigation and groundwater recharge would have required mitigation even though the impact of this reuse would not have materially impacted future TDS concentrations or impaired the beneficial uses of Chino Basin groundwater.

In 1995, the Regional Board initiated a collaborative study with 22 water supply and wastewater agencies, including Watermaster and the IEUA, to devise a new TDS and nitrogen (total inorganic nitrogen or TIN) control strategy for the Santa Ana Watershed. This study culminated in the Regional Board's adoption of the 2004 Basin Plan Amendment in January 2004 (Santa Ana Regional Water Quality Control Board, 2004). The 2004 Basin Plan Amendment included two sets of TDS objectives – antidegradation objectives that ranged between 280, 250 and 260 mg/L for Management Zones 1, 2, and 3, respectively; and a "maximum benefit"-based TDS objective of 420 mg/L for the Chino North Management Zone, which consists of almost all of Management Zones 1, 2, and 3. The relationship of the Management Zones that were developed for the OBMP and the "maximum benefit" based management zones is shown in Figure 1. Under the "maximum benefit"-based objective, the new TDS concentration limit for recycled water

that is to be used for recharge and other direct uses is 550 mg/L as a 12-month average. This discharge requirement has been incorporated into the IEUA's National Pollutant Discharge Elimination System (NPDES) permits for its wastewater treatment facilities.

In order for the IEUA and Watermaster to gain access to the assimilative capacity afforded by the "maximum benefit"-based objectives, the IEUA and Watermaster have to demonstrate that the maximum beneficial use of the waters of the State is being achieved. The 2004 Basin Plan Amendment contains a series of commitments that must be met in order to demonstrate that the maximum benefit is being achieved. These commitments include:

1. The implementation of a surface water monitoring program;
2. The implementation of groundwater monitoring programs;
3. The expansion of Desalter I to 10 million gallons per day (mgd) and the construction of a 10-mgd Desalter II
4. The commitment to future desalters pursuant to the OBMP and the Peace Agreement;
5. The completion of the recharge facilities included in the Chino Basin Facilities Improvement Program;
6. The management of recycled water quality;
7. The management of the volume-weighted TDS and nitrogen in artificial recharge to less than or equal to the maximum benefit objectives;
8. The achievement and maintenance of hydraulic control of subsurface outflows from the Chino Basin to protect the Santa Ana River water quality; and
9. The determination of the ambient TDS and nitrogen concentrations in the Chino Basin every three years.

The IEUA and Watermaster have previously demonstrated compliance with all of these requirements with the sole exception of hydraulic control. Hydraulic control is defined as the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. Hydraulic control ensures that the water management activities in the Chino North Management Zone do not result in material adverse impacts on the beneficial uses of the Santa Ana River downstream of Prado Dam. Achieving hydraulic control also maximizes the safe yield of the Chino Basin as required by Paragraph 30 and 41 of the Judgment. Two reports by Wildermuth Environmental, Inc. ("WEI"), prepared in 2006 at the direction of Watermaster, demonstrate that hydraulic control has not yet been achieved in the area between the Chino Hills and Chino Desalter I, well number 5 (WEI, 2006a and b).

Without hydraulic control, the IEUA and Watermaster will have to cease the use of recycled water in the Chino Basin and will have to mitigate the effects of using recycled water back to the adoption of the 2004 Basin Plan Amendment, which is December 2004. Table 1 shows the projected aggregate water supply plans for Chino Basin municipal water purveyors. The demand for recycled water in the Chino Basin is projected to reach from about 12,500 acre-ft/yr in 2005 to 58,000 acre-ft/yr in 2010, 68,000 acre-ft/yr in

2015, 79,000 acre-ft/yr in 2020 and 89,000 acre-ft/yr in 2025. Recycled water reduces the demand of State Water Project ("SWP") water by an equal amount, thereby reducing the demand on the Sacramento Delta and reducing energy consumption. Recycled water is a critical element of the OBMP and water supply reliability in the Chino Basin area.

Failure to achieve hydraulic control will lead to restrictions from the Regional Board on the use of imported SWP water for replenishment when the TDS concentration in SWP water exceeds the antidegradation objectives. The Regional Board produced a draft order that would treat the recharge of SWP water as a waste discharge. There would be no assimilative capacity if the Chino Basin antidegradation objectives were in force. Figure 2 shows the percent of time that the TDS concentration at Devil Canyon is less than or equal to a specific value based on observed TDS concentrations at the Devil Canyon Afterbay. This restriction will occur about 35, 52, and 50 percent of the time for Management Zones 1, 2, and 3, respectively. This will affect other basins in the Santa Ana Watershed, and the Regional Board is encouraging all basin managers to propose "maximum benefit"-based objectives similar to those in Chino Basin. With the "maximum benefit"-based TDS objective in the Chino Basin, there is assimilative capacity, and there would be no such restriction on the recharge of imported water.

The Regional Board is using its discretion in granting "maximum benefit" objectives even though hydraulic control has not been demonstrated. The Regional Board will continue to use "maximum benefit"-based objectives in the Chino Basin as long as the IEUA and Watermaster continue to develop and implement, in a timely manner, the OBMP desalter program as described in the project description below.

The Stakeholder Non-Binding Term Sheet: Peace II Implementing Measures

Under Watermaster oversight, the Chino Basin OBMP stakeholders have been engaged in, among other things, complying with the Peace Agreement provision regarding the planning and financing of the expansion of the OBMP desalting program to its full planned capacity generally referred to as Future Desalters (See Peace Agreement Article VII.). The stakeholders have been evaluating various alternatives since early 2004 and produced the Stakeholders' Non-Binding Term Sheet that was transmitted to the Court along with a request by Watermaster for further technical review by the Assistant to the Special Referee in May of 2006. The Assistant's review was completed in March of 2007.

The Non-Binding Term Sheet includes several items that will collectively further implement the existing OBMP Implementation Plan (Peace II Measures). The two items of interest to this project description are: the expansion of the desalting program and "Basin Re-Operation," which are both physically described in Section II, Refined Basin Management Strategy, subsections A and B; and Section IV, Future Desalters.

The construction of a new desalter well field will be sized and located to achieve hydraulic control. The desalter will produce at least 9 mgd of product water. New groundwater production for the expanded desalter program will occur in the Southern end

of the basin. Some of this new desalter supply will come from a new well field that will be constructed in a location among Desalter I wells 1 through 4 and west of these wells. These wells will be constructed to pump groundwater from the shallow part of the aquifer system, which is defined herein to be the saturated zone that occurs within about 300 feet of the ground surface. The total groundwater pumping for all of the desalters authorized in the term sheet will be about 40,000 acre-ft/yr.

"Re-operation" means the increase in controlled overdraft, as defined in the Judgment, from 200,000 acre-ft over the period of 1978 through 2017 to 600,000 acre-ft through 2030 with the 400,000 acre-ft increase allocated specifically to the meet the replenishment obligation of the desalters. Re-operation is required to achieve hydraulic control. Re-Operation and Watermaster's apportionment of controlled overdraft will not be suspended in the event Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been produced so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures to avoid Material Physical Injury and that equitable addresses this contingency, and (ii) Watermaster continues to demonstrate credible material progress toward obtaining sufficient capacity to recharge sufficient quantities of water to cause the Basin to return to a new equilibrium at the conclusion of the Re-Operation period. In addition to contributing to the achievement of hydraulic control, Re-operation will contribute to the creation of new yield. Watermaster has the discretion to apportion the 400,000 acre-feet increase in controlled overdraft under a schedule for re-operation that best meets the needs of the Parties and the conditions of the basin over the Initial Term of the Peace Agreement (before June 30, 2030).

The Project Description

The proposed project has two main features: the expansion of the desalter program such that the groundwater pumping for the desalters will reach 40,000 acre-ft and that the pumping will occur in amounts and at locations that contribute to the achievement of hydraulic control; and the strategic reduction in groundwater storage (re-operation) that, along with the expanded desalter program, significantly achieves hydraulic control.

The Expanded Desalting Program. A new well field, referred to as the Chino Creek Well Field (CCWF), will be constructed. The capacity of this well field could range from about 5,000 acre-ft/yr to 7,700 acre-ft/yr. The capacity of the CCWF will be determined during the design of the well field. Groundwater produced at the CCWF will be conveyed to Desalter I. The approximate location of the CCWF is shown in Figure 4. The capacity of Desalter I will not be increased; although, it is likely that the treatment systems at Desalter I will be modified to accommodate the chemistry of the raw water pumped from the CCWF. The product water capacity of Desalter I is about 14,200 acre-ft/yr which corresponds to a raw water pumping requirement of about 16,100 acre-ft/yr. The volume of groundwater pumping at existing Desalter I wells 13, 14, and 15 and conveyed to Desalter I will be reduced to accommodate new pumping at the CCWF.

The treatment capacity of Desalter II will be increased from 10,400 acre-ft/yr to about 21,000 acre-ft/yr, which corresponds to the raw water pumping requirement of 11,800 acre-ft/yr expanding to 23,900 acre-ft/yr. The increase in groundwater pumping for Desalter II will come in part from greater utilization of the existing Desalter II wells and the addition of new wells to the Desalter II well field from either the construction of new wells and/or connecting Desalter I wells 13, 14, and 15. The Desalter II treatment plant would be expanded to increase its capacity from 10,400 acre-ft/yr to 21,000 acre-ft/yr.

The new product water developed at Desalter II would be conveyed to the Jurupa Community Services District ("JCSD"), the City of Ontario, and/or Western Municipal Water District ("WMWD") through existing and new pipelines. The facilities required to convey this water include pipelines, pump stations, and reservoirs. The precise locations of these facilities are unknown at this time.

The most current working description of these facilities is contained a report that was prepared for the City of Ontario and WMWD, entitled Chino Desalter Phase 3 Alternatives Evaluation (Carollo, 2007). Currently (September 2007), the City of Ontario and the WMWD are working with the JCSD and others to refine the alternatives in the Carollo report. The assumed startup for the expanded desalters is January 2013.

Finally, 40,000 acre-ft/yr of groundwater is expected to be produced by all Existing and Future Desalters. The 40,000 acre-ft/yr value was determined from the prior desalter modeling investigations of WEI (WEI, 2006a and c). The parties that are engaged in developing the desalter expansion are planning for a total of 40,000 acre-ft/yr of desalter groundwater pumping. Watermaster, on behalf of the Parties, will review the desalter pumping requirements to achieve hydraulic control during the project evaluation in the summer of 2007.

Re-Operation. Through re-operation and pursuant to a Judgment Amendment, Watermaster will engage in controlled overdraft and use up to a maximum of 400,000 acre-ft to off-set Desalter replenishment through 2030. After the 400,000 acre-ft is exhausted and the period of Re-Operation is complete, Watermaster will recalculate the safe yield of the basin. The Re-Operation will have no impact on Operating Safe Yield or on the parties' respective rights thereto. For project evaluation purposes, the Re-Operation and controlled overdraft of 400,000 will be examined under two different schedules that bracket the range in expected schedules. The first schedule will be based on allocating the 400,000 acre-ft at a constant percentage of desalter pumping such that the 400,000 acre-ft is used up in a constant proportion of the desalter pumping through 2030. The second schedule will use the controlled overdraft to off-set desalter the applicable replenishment obligation completely each year until the 400,000 acre-ft is completely exhausted.

The New Yield as defined by the Peace Agreement, attributable to the authorized desalters and the reduction in storage from re-operation, will be assigned to the authorized desalters. The resulting replenishment obligation assigned to the authorized desalters will then be handled as any other replenishment obligation pursuant to the

Judgment. The New Yield is expected to come from a reduction in groundwater discharge from the Chino Basin to the Santa Ana River within the reservoir created by Prado Dam and from new induced recharge of the Santa Ana River upstream of Prado Dam.

Other Important Facility and Operational Plans that Will Occur Concurrently with the Proposed Project

Expansion of Artificial Recharge Capacity. Watermaster and the IEUA will need to expand artificial recharge capacity in the Chino Basin to meet future replenishment obligations. This will occur independently from the proposed project. Current supplemental water recharge capacity is about 70,000 acre-ft/yr. The required recharge capacity to meet future replenishment obligations is about 70,000 acre-ft, a capacity expansion of about 70,000 acre-ft/yr. This expansion will occur through construction of new spreading basins, improvements to existing spreading basins and stormwater retention facilities, aquifer storage and recovery wells. The proposed project will be analyzed without recharge expansion projects.

Expansion of Storage and Recovery Programs. Currently, there is only one groundwater storage program approved in the Chino Basin: the 100,000 acre-ft Dry Year Yield Program with the Metropolitan Water District of Southern California (Metropolitan). Metropolitan, the IEUA, and Watermaster are considering expanding this program an additional 50,000 acre-ft to 150,000 acre-ft over the next few years. Watermaster is also considering an additional 150,000 acre-ft in programs with non-party water agencies. The total volume of groundwater storage allocated to storage programs that could overlay the proposed project is about 300,000 acre-ft.

These storage programs, if not sensitive to the needs of hydraulic control, could cause groundwater discharge to the Santa Ana River and result in non-compliance with hydraulic control and a loss in safe yield. The proposed project will be analyzed with various levels of storage programs up to 150,000 acre-ft, utilizing various "put and take" strategies. There have been no planning investigations that articulate how the expansion from the 150,000 acre-ft program to the to the 300,000 acre-ft and thus this expansion is not included herein. Storage program operating strategies will be developed to assure hydraulic control.

References

Santa Ana Regional Water Quality Control Board, 2004, Resolution No R8-2004-0001, http://www.waterboards.ca.gov/santaana/pdf/04-01.pdf

Stakeholder Non-Binding Term Sheet, in the form transmitted to the Court, 2006

Wildermuth Environmental, Inc., 2006a. Draft Report, Analysis of Future Replenishment and Desalter Plans Pursuant to the Peace Agreement and Peace II Process, April 2006; prepared for the Chino Basin Watermaster.

Wildermuth Environmental, Inc., 2006b. Chino Basin Maximum Benefit Monitoring Program Annual Report, April 2006; prepared for the Chino Basin Watermaster and Inland Empire Utilities Agency.

Wildermuth Environmental, Inc., 2006c. Draft Report, Addendum to the Draft April 2006 Report, Analysis of Future Replenishment and Desalter Plans Pursuant to the Peace Agreement and Peace II Process, December 2006; prepared for the Chino Basin Watermaster.

Carollo Engineers, 2007. Chino Desalter Phase 3 Alternatives Evaluation, May 2007; Prepared for the City of Ontario and the Western Municipal Water District.

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Report on the Distribution of Benefits to Basin Agencies from the Major Program Elements Encompassed by the Peace Agreement and Non-Binding Term Sheet

Prepared by:
David L. Sunding, Ph.D.
Berkeley Economic Consulting, Inc.
2550 Ninth Street, Suite 102
Berkeley, CA 94710

September 13, 2007

1. Introduction and Summary of Findings

This report measures the costs and benefits to various Chino Basin agencies of the program elements encompassed by the Peace I and Peace II Agreements. Both agreements are considered relative to a baseline state of the world existing after the Judgment but prior to the Peace Agreement. The analysis examines net returns to the ten largest agencies that hold groundwater rights in the Basin over the time period 2007 to 2030. Together, these agencies account for over 91 percent of Basin safe operating yield.

Overall, the study shows that the two agreements produce substantial net benefits to Chino Basin agencies – over $904 million in present value terms. The provisions of the Peace II Agreement are especially valuable, as they account for $723 million (80 percent) of the total net benefit to the Basin agencies studied. Through the attainment of hydraulic control, the program elements in Peace II Agreement include the introduction of large quantities of recycled water in the Basin, which lessens the need to procure other supplies to meet growing demand for water. With respect to the distribution of net benefits across agencies, shown in the summary tables below, the main outcome is that all agencies benefit from the agreements, although the magnitude of the net benefit varies considerably among agencies.

	Total Net Benefit (1000s of 2007$)		
	Peace I vs. Baseline	*Peace II vs. Peace I*	*Peace II vs. Baseline*
City of Chino	$20,294	$75,671	$95,966
City of Chino Hills	$12,217	$61,320	$73,537
City of Ontario	$42,547	$189,724	$232,271
City of Upland	$9,442	$34,644	$44,086
Cucamonga Valley Water District	$60,667	$217,462	$278,128
Fontana Union Water Co.	$4,839	$25,429	$30,268
Monte Vista Water District	$7,025	$33,455	$40,480
San Antonio Water Company	$1,141	$5,995	$7,136
Jurupa CSD	$15,772	$19,482	$35,254
City of Pomona	$8,189	$59,348	$67,537
Total	**$182,133**	**$722,530**	**$904,663**

	Net Benefit per Acre-Foot (2007$)		
	Peace I vs. Baseline	*Peace II vs. Peace I*	*Peace II vs. Baseline*
City of Chino	$31.30	$116.70	$148.00
City of Chino Hills	$20.60	$103.38	$123.98
City of Ontario	$24.20	$107.91	$132.11
City of Upland	$17.46	$64.07	$81.54
Cucamonga Valley Water District	$32.92	$118.01	$150.93
Monte Vista Water District	$20.13	$95.88	$116.01
Jurupa CSD	$17.86	$22.06	$39.92
City of Pomona	$11.10	$80.47	$91.58
Overall Average	**$19.84**	**$78.69**	**$98.53**

In terms of total net benefit, two agencies, City of Ontario and Cucamonga Valley Water District, receive over half of all the net benefits resulting from the agreements. An important reason these agencies receive a large share of the net benefit from the agreements is due to their relative size: the two agencies combined account for approximately half of the consumer demand for Basin water.[1] Controlling for agency size on the basis of demand for Basin water, the net benefit resulting from the combined program elements in the Peace I and Peace II Agreements shows considerably less variation. The table above indicates that 7 of the 8 agencies with positive demand for Basin water receiving benefits ranging from $82 to $151 per acre –foot.[2]

2. Conceptual Framework

The model of groundwater value used in this report is standard in the academic literature and builds on the methodology used in the earlier aggregate study of Basin net benefits. The net benefits resulting from access to a groundwater resource are the gains from pumping (the demand for water) less the cost of extraction and conveyance, and a user cost component, which reflects the lost option value entailed by removing a unit of water from storage. The stream of annual net benefits is discounted back to current dollars using a discount factor predicated on the rate of interest, which is taken to be the current risk-free long-term rate of interest and is set at 4.5 percent per year.

Allocation of aggregate costs and benefits to individual agencies in the Basin is accomplished by a complex set of legal rules (e.g., shares of operating yield), cost-sharing arrangements that fund programs for Basin improvements through collective institutions, and market forces. The goal of this study is to measure net benefits to individual agencies under three scenarios: (i) a baseline case defined by the Judgment; (ii) a set of rules to operate the Basin and fund programs through collections as defined by the Peace Agreement; and (iii) an alternative set of rules that are

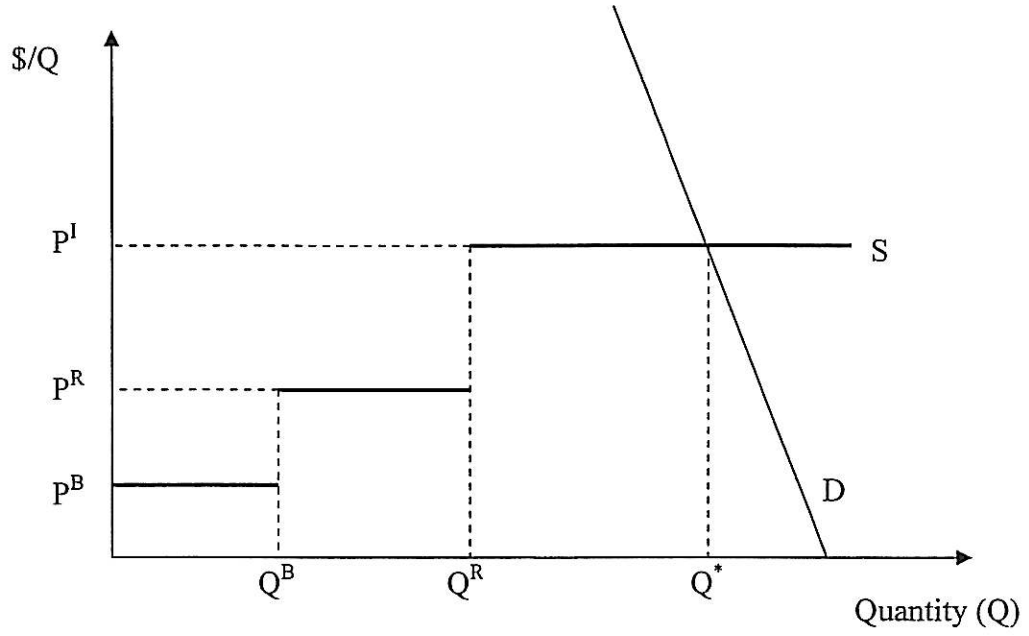
[1] Consumer demand for Basin water, which is met through some combination of Basin supply and water imports, is calculated for each agency as Urban Water Demand less available surface water and other groundwater supplies. Over the 2007-2030 period of study, the City of Ontario and Cucamonga Valley Water District are projected to meet consumer demand of 3.4 million acre-feet out of 6.9 million acre-feet (49 percent) of total consumer demand for Basin water.

[2] Fontana Union Water Company and San Antonio Water Company are not included in these calculations, because the available surface water and other groundwater supplies for these agencies exceed their Urban Water Demand.

designed to achieve hydraulic control and are defined in Peace II Agreement (as represented in the Non-Binding Term Sheet dated May 23, 2006).

To understand the allocation of benefits among individual agencies in the appropriative pool most clearly, consider for the moment the case in which the appropriative pool comprises 100 percent of the Basin water. Figure 1 depicts the aggregate supply (S) and demand (D) schedules for this Basin. Aggregate demand is total water demand in the Basin, and the supply curve is a step function, ordered from the least expensive uses of water to the most expensive uses of water.[3] Many of the effects modeled in this study amount to changes in agencies' cost of meeting water demand. An arrangement or cost-sharing rule that reduces an agency's cost of service provides a net benefit to that agency and its ratepayers.

Figure 1. Conceptual Model: Aggregate Demand and Supply



The first step of the supply curve, which represents the least expensive water source, is groundwater pumped directly from the Basin. The extent of groundwater pumping in the Basin is limited by the steady-state ("safe") yield, which is represented in the figure by quantity Q^B. The cost per unit of Basin water is denoted by the (implicit) price P^B, which includes lift costs, conveyance costs, and user cost. The second step of the supply curve represents replenishment water. After the safe yield of the Basin is exhausted, additional groundwater pumping can occur provided that replenishment water is purchased to recharge the Basin. The effective capacity of the Basin is the sum of Basin safe yield and Basin recharge capacity, denoted by the quantity Q^R in the figure. (The recharge capacity of the Basin is given by the difference Q^R - Q^B.)

[3] In practice, the water supply function has multiple steps, with each step representing the various pumping and conveyance costs of a sequence of wells, and, for this reason, aggregate supply conditions are often approximated by an upwards-sloping, continuous supply function; however, the essential points of the model can be made more clearly by grouping water costs into common categories represented by each of the three steps.

Replenishment water is supplied to the Basin through replenishment water imports at the MWD replenishment rate, which is denoted in the figure by P^R. The third step in the supply function, the most-expensive source of water, is imported water for direct (consumptive) use. Imported water for direct use is available to agencies in the Basin at a price denoted by P^I, which reflects the cost of procuring new water supplies from outside the Basin. The cost of developing reliable sources of water outside the Basin may differ across agencies in practice according to the options available to each agency in developing outside water sources. The outside option for each agency in the present study, unless stated otherwise, is taken to have a cost equal to the Tier 2 MWD rate for untreated water.

The equilibrium quantity of water consumed is given by the intersection of supply and demand, which occurs at the quantity Q^* and the price P^I. The key to characterizing the distribution of benefits from policies that increase the effective yield from the Basin, either by expanding Basin safe yield or by augmenting Basin recharge capacity, is the understanding that economic values, as captured by prices, are realized on the margin of water use where supply intersects with demand (the third step in the figure). Gains from management of the Basin are created by replacing units of water at the third and most-expensive step of the supply function with less expensive sources of water. Because individual supplies are added together to get aggregate supply, the distribution of market benefits to individual agencies in response to Basin improvements depends on the composition of water use by each agency across each of the steps of supply, in effect where each agency is "located" on the supply schedule. In general, agencies who meet their meet urban water demand to a greater degree with marginal units of water (i.e., imported water for direct use) acquire a larger share of the benefits from Basin improvements than agencies that are less represented on this "extensive margin" of supply.[4]

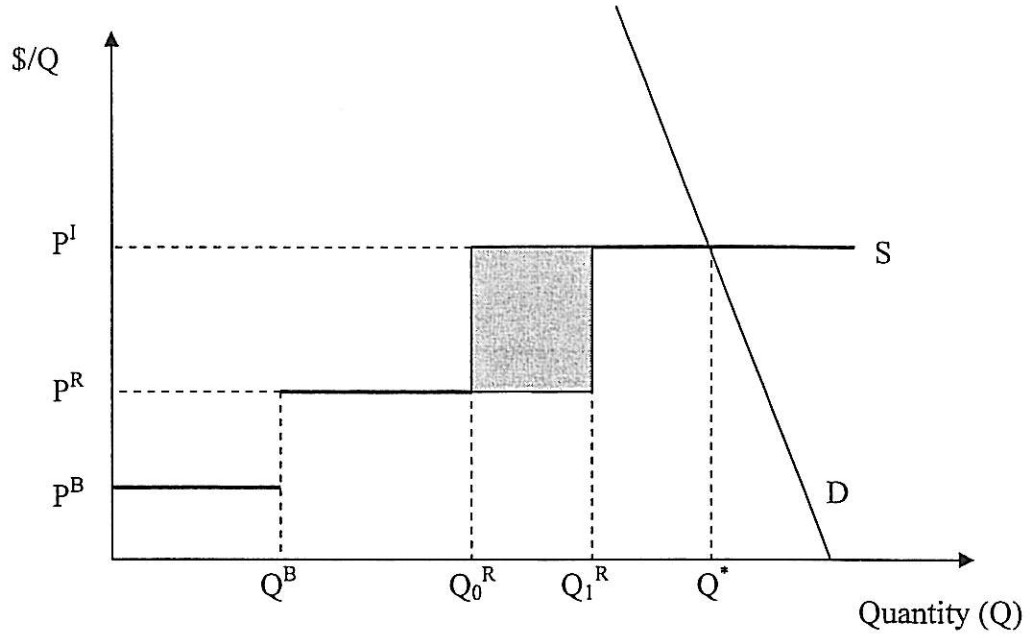
Consider a policy that increases the recharge capacity of the Basin. In general, such an effort has two effects that, taken together, can alter the net benefits received by water agencies: (i) increasing the Basin recharge capacity involves a fixed cost component that must be allocated among agencies according to some cooperative, cost-sharing rule; and (ii) increasing the Basin recharge capacity allows for greater use of replenishment water that can displace expensive Tier 2 water on the margin. The distribution of net benefits in the Basin is altered in cases where the market allocation of benefits from the increased use of replenishment water differs from the allocation of cost among individual agencies.

Figure 2 shows the gain from an increase in recharge capacity in the Basin. The increase in recharge capacity increases the effective yield in the Basin, which is depicted in the figure by the movement from Q_0^R to Q_1^R. The increased recharge capacity allows Basin agencies to incur additional replenishment obligations that displace $Q_1^R - Q_0^R$ units of imported water for direct use. The total producer benefit resulting from the increase in recharge capacity is represented by the shaded region in the figure, which sums the difference between the Tier 2 rate and replenishment rate for each additional unit of water that can be replenished.

[4] Generally, users disproportionately represented on the margin of supply represent agencies that incurred large increases in urban water demand subsequent to the assignment of safe operating yield and were forced to meet the increase in demand with relatively expensive sources of imported water.

96

Figure 2. Benefit of an Increase in Basin Recharge Capacity



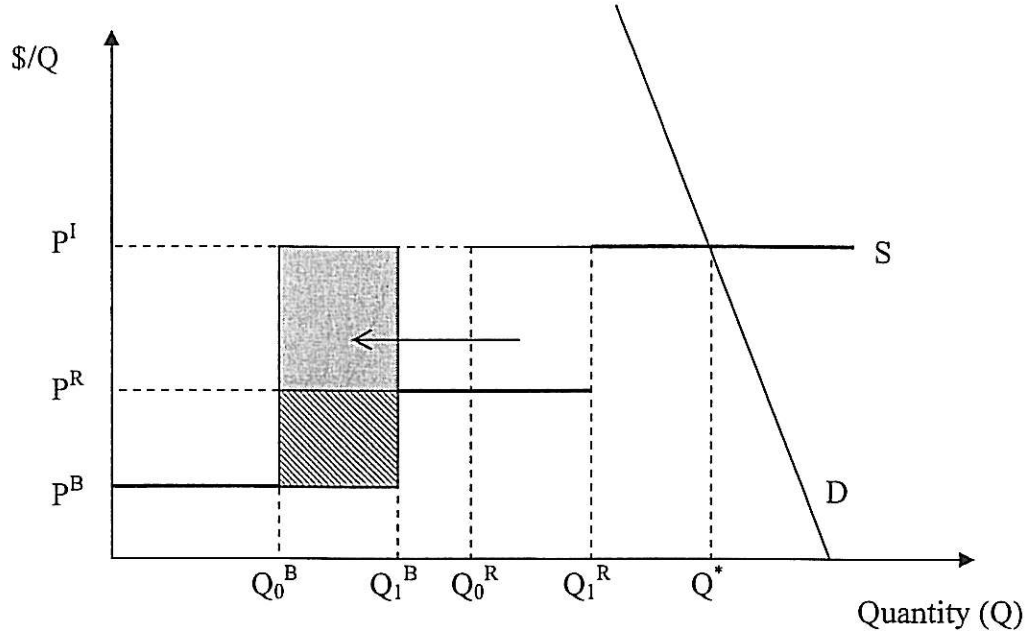
Among individual agencies in the Basin, the benefit of an increase in recharge capacity is distributed exclusively to agencies on the extensive margin of water supply. For this reason, the market return from an increase in recharge capacity can be distributed equally across agencies only in the case where the agencies have equal shares of the third step of water supply in the Basin. To illustrate this point, consider an agency that faces sufficiently small water demand relative to its share of Basin production rights that its urban water demand can be met each year entirely through the use of Basin safe yield. Such an agency would require the use of neither imported replenishment water nor imported water for direct use to meet its urban water demand, and would stand to receive no market benefit from participating in a cooperative policy designed to increase Basin recharge capacity. To the extent that cooperative assessments levied to recoup the cost of increasing Basin recharge capacity are based on relative share of operating yield, as opposed to being levied in proportion to the initial share of imported water deliveries for direct use across agencies, policies that increase Basin recharge capacity alter the distribution of net benefits.

Next, consider the benefit associated with an increase in Basin safe yield. Figure 3 shows the effect of an increase in Basin safe yield from Q_0^B to Q_1^B units. The increase in Basin safe yield extends the lowest step of the supply function and displaces $Q_1^B - Q_0^B$ units of replenishment water purchases. The value of the displaced replenishment water (net of the cost of Basin water) is shown by the cross-hatched region in the figure. The increase in Basin safe yield, in turn, increases the effective yield in the Basin (the sum of Basin yield and recharge capacity) from Q_0^R to Q_1^R, which is represented in the figure by a rightward shift in the replenishment step of supply. The increase in Basin safe yield therefore also displaces $Q_1^R - Q_0^R = Q_1^B - Q_0^B$ units of imported water on the extensive margin of supply, which provides an additional gain represented by the shaded region of the figure. The total market benefit to all agencies is represented by the sum of these two regions. The value of an increase in Basin safe yield is the difference between

97

the price of imported water for direct use and the procurement cost of Basin groundwater for each unit of additional water made available to Basin agencies.

Figure 3. Benefit of an Increase in Basin Safe Yield



The economic value of an increase in safe yield conveys upward into market benefit across both steps of supply. For this reason, policies which lead an increase in Basin safe yield are not only more valuable to agencies in the Basin than an increase in recharge capacity, but the benefits are also distributed more equally. As in the case of an increase in replenishment capacity, the ultimate repository of market value for a one-unit increase in safe yield is a unit of displaced water on the extensive margin of supply; however, this displacement now occurs with Basin safe yield rather than through the use of imported replenishment water. To see how the market benefits of a policy that increases Basin safe yield are distributed to individual agencies, consider again an agency that meets its urban water demand each year entirely through the use of Basin safe yield without the need for replenishment water or imported water for direct use. Unlike the case of an increase in replenishment capacity, the increase in Basin safe yield provides each agency with physical water assets (e.g., according to its share of Basin safe yield) that can be sold to other agencies in the transfer market. The gain to this agency following the increase in Basin safe yield depends on the price it receives in the transfer market, for instance if the transfer price is equal to the replenishment rate (P^R) then the agency acquires a share of the benefits in the cross-hatched region of the figure in proportion to its share of Basin safe yield. The remaining benefit of each unit of water provided as the share of safe yield to this agency is acquired by the water purchaser in the transfer market.

In sum, agencies that initially meet their urban water demand with a relatively large share of imported water for direct use receive the largest share of the market benefit from a policy that increases Basin safe yield. These agencies receive the full market value ($P^I - P^B$) for each unit of water displaced through their allocated share of the increase in Basin safe yield. To the extent

that agencies with an initially large share of imported water purchases for direct use participate in the transfer market, these agencies also acquire the difference between the Tier 2 water price and the transfer price for each unit of water purchased from agencies that are under-represented on the extensive margin of supply. If the transfer price of water is taken to be equal to the replenishment rate (P^R), then the market benefit represented by the shaded region of Figure 3 is divided among agencies according to their relative share of production on the extensive margin of supply, while the market benefit represented by the cross-hatched region of Figure 3 is divided among agencies according to their relative share of Basin safe yield.[5] Policies that expand Basin safe yield lead to redistributive effects on the net benefits received by individual agencies whenever the allocation of costs in the cooperative arrangement differ from this distribution of benefits provided in the market.

The above framework for calculating the distribution of net benefits from various program elements is applied to the Chino Basin as follows. First, the water yield in the Basin is calibrated to the relevant quantity supplied by the appropriative pool by netting out production by the overlying rights-holders from the Basin safe yield. This is essentially the distinction made in practice between "safe yield" and "safe operating yield" in the Basin. As it pertains to the calculation of net benefits to agencies with appropriative rights, policies that increase the Basin yield (as in Figure 3) now refer both to policies that directly increase Basin safe yield as well as to policies that redistribute the existing safe yield from overlying right-holders to members of the appropriative pool, for instance through net agricultural transfer.

Second, as defined by the framework above, net benefits are calculated for individual agencies according to calculations on the avoided cost of Tier 2 water purchases provided by program elements in the Peace I and Peace II agreements, respectively, relative to the baseline scenario.[6] Considering the change in cost from the introduction of new program elements suppresses the need to explicitly calculate components of cost that are common to the baseline, Peace I, and Peace II scenarios.

Third, the analysis abstracts from seasonal and annual cycles in water availability by considering expected values where possible. Seasonal cycles are smoothed in all scenarios by using annual data on demand and supply conditions facing agencies. Annual cycles are smoothed in all scenarios by treating each year as an average weather occurrence represented by the expectation that each 10-year future horizon in the model is comprised of 7 "wet" years, in which replenishment water is available to agencies in the Basin, and 3 "dry" years, in which replenishment water is not available.[7] Each year in the model thus has the interpretation of representing production decisions that are 30 percent dry and 70 percent wet. By smoothing annual production outcomes into an expected value framework, this implies that a replenishment

[5] This argument does not rely on the water transfer price being equal to the replenishment rate and applies to any water transfer pricing rule that divides the gains from exchange (defined here by the value $P^I - P^B$).

[6] An alternative scenario is also considered that denominates the avoided cost of imported water for direct use at the Tier 1 rate, which provides a bracketing condition on the range of outside options available to individual agencies for procuring reliable new sources of water at rates between the Tier 1 and Tier 2 MWD prices.

[7] The expected sequence of wet and dry years is based on the assumption that underlies program element 2 of the OBMP that "replenishment water is available 7 out of 10 years." (Implementation Plan: Optimal Basin Management Plan for the Chino Basin, p13: http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf.)

water step exists in the supply function in each year of the study, but that the length of the step is treated as 70 percent of the recharge capacity in the Basin.

Fourth, the net benefit of policies that increase the safe operating yield of the appropriative pool is distributed among individual agencies, in part, through water exchanges between agencies in the transfer market. Water transfers are specified to exchange units of water between agencies that are not adequately represented on the extensive margin of supply to agencies which are more highly represented on this margin. Specifically, the water price in the transfer market is fixed at the prevailing MWD replenishment rate in each period to divide these rents from exchange.

Finally, the net benefit returned to each agency under Peace I and Peace II rules relative to the baseline scenario is computed by coupling the market distribution of benefits, as outlined by the framework here, with the distribution of cost implied by the rules encompassed by each agreement. These rules are defined in the following description of scenarios.

3. Common Components

Several components common to all scenarios frame the overall analysis.

3.1. Agencies Considered

Because of the detailed calculations required to divide the net benefit created by each scenario among individual agencies in the study, the study encompasses only the ten largest water-holding agencies in the Basin (the cities of Chino, Chino Hills, Ontario, Pomona, and Upland, Fontana Union Water Company, Monte Vista Water District, Cucamonga Valley Water District, Jurupa Community Services District, and San Antonio Water Company). These ten agencies account for 91.2 percent of the Basin-wide safe operating yield.

3.2. Smoothing Across Hydrologic Years

Because production is smoothed across years, the patterns of local storage and local supplemental storage are also smoothed for each agency. This abstracts from the actual series of puts and takes that rely on temporal adjustments in water storage by accounting for the expected local storage need of individual agencies. (Recall that each year is a representative hydrologic year characterized by expected conditions that are 70 percent wet and 30 percent dry.) A single local storage account is constructed for each agency that combines local storage with local supplemental storage in all scenarios, and the local storage balance of each agency is adjusted each year to reflect the fact that replenishment water is available to meet replenishment obligations only 70 percent of the time.

For this reason, the annual amount held in storage for each agency is 3/7 ($3/7 = 10/7 - 1$) of the annual excess demand for water that cannot be met by the agency through the allocation of contemporaneous supply. The expected arrival time of a dry year in which replenishment water is not available is given by the mean of a Poisson process ($\mu = 10/3$), and the average holding time for a unit of water held in storage is half the expected arrival time of a dry year, which implies that the average annual amount of water held in local storage is 5/7 ($5/7 = 3/7*10/3*1/2$) of the annual excess demand for each agency that cannot be met through the allocation of contemporaneous water supply. In each year, the local storage account is reconciled with the storage balance in the previous year by adding the increment in local storage to the excess

100

demand for water for each agency. Local storage levels increase smoothly over time in the model for most agencies due to the projected increases in urban water demand.

3.3. Water Prices

Annual water prices and the discount factor that converts annual values into present value are common across all scenarios. The market rates used in 2007 are the current water rates listed by MWD ($427/AF for Tier 2 water, $238/AF for replenishment water), and a $13 surcharge is added to the replenishment rate to reflect the $251/AF charge currently paid by each agency for replenishment water procured through Watermaster. The price of water transactions in the transfer market is taken in each period to be the price of replenishment water.[8] The MWD rate forecast through 2012 is taken as the mean of the high- and low-rate forecasts provided by MWD over this horizon. Recycled water rates through 2011 are taken from IEUA projections provided in the 2007 IEUA Long-Run Plan of Finance, with a 25 percent non-member surcharge included for recycled water deliveries outside the IEUA service area (Jurupa Community Services District and the City of Pomona). The price of desalter water for urban supply is taken to be the price cap specified in section 7.6d of the Peace Agreement, which is $375 in 2007. All water rates outside the range of published forecasts are assumed to increase at a rate of 4.5 percent per year. The discount factor is also taken to be 4.5 percent.

3.4. Demand

Demand for Basin water for each agency is identical across all three scenarios. Agency-level demand for Basin water is calculated from data provided in the relevant 2005 Urban Water Management Plans (UWMP) by taking the projected demand (gross of conservation) compiled by each agency and converting this into a residual (Basin) demand component by netting out available supplies of surface water and other groundwater sources available to each agency.[9] In the case of Pomona, residual demand for Basin water is taken to be net of Puente and Spadra Basin recycled water, which implicitly assumes that this water would be available to Pomona irrespective of whether hydraulic control is attained in Chino Basin. Residual Basin water demand is linearized for each agency to recover values in the intervening years between the 5-year intervals reported in each UWMP. Residual demand for Fontana Union Water Co., which has rights but serves no subscribers, is zero in all scenarios, as is residual demand facing San Antonio Water Co., which has available surface water and other basin groundwater supply in excess of demand. The combined residual demand for the remaining agencies in the Basin is 215,996 AF in 2007 and increases over time with population growth projections to 337,246 AF in 2030. Among agencies with positive demand values, residual demand in 2007 ranges from a low of 12,753 AF for Monte Vista Water District to a high of 49,552 AF for the City of Ontario, and the residual water demand for the City of Ontario and Cucamonga Valley Water District over the entire horizon is about double the residual water demand of Pomona, 2-3 times greater than the City of Chino, City of Chino Hills, and Jurupa Community Services District, and 5-6

[8] The average water transaction price in the data provided in the Watermaster's 2006-2007 Assessment Packet is $177, which represents an approximate 30 percent discount below the current replenishment rate of $251. This observed price discount below the expected transfer price accords with the "wet year" transfer price that would arise in a representative hydrologic year that is 70 percent wet and 30 percent dry when the "dry year" transfer price is $422, a value bounded by the prevailing Tier 2 price of untreated water of $427.

[9] for IEUA members, these data are taken from the IEUA Urban Water Management Plan (2005), Table 2-7, and, for Jurupa Community Services District and the City of Pomona, these data are taken from the individual 2005 Urban Water Management Plans (2005) available on each agencies website.

times greater than the residual demand facing the City of Upland and Monte Vista Water District.

3.5. Desalter Production

Desalter production is treated as equal across all scenarios. Implicitly, this views the level and location of desalter activity to be determined by the requirements outlined by the Judgment.[10] An alternative approach would be to construct a baseline scenario in which agencies provide their own salt removal infrastructure. One difference between this alternative approach and the present one is that, under baseline conditions with individual desalting O&M costs would be roughly the same, whereas the capital costs of building desalter facilities would be larger by the amount of funding that became available in the Basin through grants made possible by the Peace Agreement.

The projected desalter water for urban supply sets a schedule of delivery to three agencies considered in the study (City of Chino, City of Chino Hills, and Jurupa). The desalter water for urban supply rises from 15,230 AF to 38,088 AF over the period 2007-2030 among agencies in the study, with the remaining desalter supply being delivered to the City of Norco and the Santa Ana River Water Company. Each unit of desalter water supply, including deliveries to the City of Norco and the Santa Ana River Water Company, creates a replenishment obligation for producers in the Basin, and this obligation is divided among agencies according to the various rules encompassed by each of the three scenarios considered (as described below).

3.6. Watermaster Assessments

Although the assessment fees levied by Watermaster differ across the scenarios according to the total cost of the program elements embodied in each scenario, the rules in which assessments are distributed across individual agencies are common to all scenarios. Specifically, appropriative pool assessments are based on each agency's calculated share of actual fiscal year production. Given that total production and the share of production by individual agencies encompasses only a subset of total Basin production (e.g., roughly 87 percent in 2007), this approach slightly over-estimates assessment costs in all scenarios by attributing 100 percent of the program cost to the ten agencies included in the study. Because the assessment costs used under the Peace I and Peace II scenarios include the baseline costs, as well as significant additional program costs, the over-allocation of assessment costs to individual agencies in the study provides a conservative estimate of the total benefit generated under Peace I and Peace II. The different components of the assessment costs were decomposed into program expenses from the 3-year assessment projections provided by Watermaster.[11] All cost components thereafter are assumed to increase at a rate of 4.5 percent.

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[10] Projected desalter production is taken from IEUA's UWMP (2005, Table 3-10 and Table 7-1), and includes the desalter production of Chino I, Chino I expansion, Chino II, and Desalter 3. The overall level of desalter activity, which grows to an ultimate production level of 43,000 AF by year 2025, an amount slightly below the 50,457 AF desalter production level anticipated by 2020 in the OBMP: (Implementation Plan: Optimal Basin Management Plan for the Chino Basin, Table 3, p59: http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf.)

[11] Personal correspondence with Watermaster staff (August 7, 2007).

4. Baseline Scenario

4.1. Basin Supply

In the baseline scenario, available Basin supply for each agency in each year is comprised of the agency's share of: (i) safe operating yield, (ii) projected desalter water for urban supply, and (iii) the net agricultural pool transfer. The safe operating yield is allocated to individual agencies based on the share of safe operating yield in the Basin defined by the Judgment.

The projected desalter water for urban supply is taken for the baseline case (as well as for the remaining scenarios) from projections available in the IEUA UWMP.[12] Desalter water for urban use is treated in the model both as a source of water supply in the Basin and as a replenishment obligation, where the replenishment obligation associated with each unit of desalter water supply is shared by agencies through the allocation of storage losses and replenishment assessments by Watermaster, which are calculated for the baseline case according to each agencies pro rata share of safe operating yield up to the available recharge capacity in the Basin and by in lieu recharge according to each agencies pro rata share of safe operating yield for any obligation above the available recharge capacity.

The net agricultural transfer to each agency in each year is calculated by taking a straight-line projection of land-use conversions between 2006 conditions reported in the 2006-2007 Watermaster Assessment Package, and assumed "full build-out conditions" in 2030 in which all acres in the agricultural pool eligible for conversion are converted.[13] For the baseline scenario, each converter is credited with 1.3 AF of Basin water for each acre converted, and the sum of water allocated to all land-use conversions and agricultural pool production in each year is deducted from the agricultural pool safe yield of 82,800 AF to get the net agricultural pool transfer to the appropriative pool in each year.[14] Among the ten largest members of the appropriative pool considered in the study, the net agricultural transfer increases from 46,265 AF to 71,377 AF over the 2007-2030 period, which accounts for approximately 92 percent of the total water transfer to the appropriative pool in each year.

Under baseline conditions, there is also an issue of timing of the agricultural pool transfer, with no early transfer of agricultural pool water being made to the appropriative pool prior to the Peace Agreement. Under the Judgment, the agricultural pool allocation was defined to be 414,000 AF in every 5 years. This implies a 4-year waiting period for the appropriative pool before any agricultural transfer takes place, followed by a large allocation of the cumulative agricultural pool under-production in year 5, and an annual stream of transfers thereafter based on a rolling horizon comprised of the previous 5 years agricultural pool under-production. In the

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[12] IEUA Urban Water Management Plan (2005), Tables 3-10 and 7-1.

[13] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Land Use Conversion Summary (p10): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf. Values after the conversion of all agricultural land eligible for conversion are based on Watermaster calculations (personal communication with Watermaster staff, July 12, 2007).

[14] Under baseline conditions, 1.3 AF of water is allocated to the appropriative pool based on share of safe operating yield in the baseline scenario. This value is not parsed out from the net agricultural transfer that occurs each year, because all water transfers between the agricultural pool and the appropriative pool are based on shares of safe operating yield and an amount greater than 1.3 AF per acre is transferred from the agricultural pool to the appropriative pool in each year.

baseline scenario, the agricultural pool transfer is calculated on an annual basis and timing lags in the delivery of water are suppressed. Differences in the actual timing of the water have no implications for the baseline values in the study, because the rate of water price inflation is taken to be equal to the discount rate, so that delays in water delivery have no implications for the present value calculation.

The sum of these components in each year gives Basin supply for each agency. This represents the first step of the supply function depicted in Figure 1.[15] In total, Basin supply among the ten largest agencies considered in the study rises from 116,044 AF to 164,014 AF over the 2007-2030 period, with the increase in supply generated through land use conversions and increased desalter water for urban supply. (This latter source of water supply is matched by an associated increase in the desalter replenishment obligation, as discussed below.)

4.2. Import Demand

Import demand for each agency in the Basin represents the amount of demand facing each agency that cannot be met with available Basin supplies (including supplies which can be purchased from other Basin agencies in the transfer market). Import demand for each agency, which must be met through some combination of replenishment water purchases and imported water purchases for direct use, is the sum of three components: (i) excess demand for water; (ii) storage account adjustments; and (iii) water transfers.

Excess demand for each agency in the Basin is calculated as residual demand less the available Basin supply. Excess demand for water is negative in each year for Fontana Union Water Co. and San Antonio Water Co., which implies that these agencies are water suppliers in the transfer market. In each year, approximately 70 percent of the excess demand for water in the Basin is derived from Cucamonga Valley Water District and the City of Ontario, which indicates a large water demand for Basin water among these agencies relative to their share of Basin supply.

In practice, the demand for water in dry years is met, in part, by smoothing the additional water supplies available in wet years across time through local storage. As discussed above, the model considers each year to be a representative year (30 percent dry and 70 percent wet), so that the annual amount of water held in local storage by each agency is 5/7 of the annual excess demand that cannot be met with contemporaneous supply. Local storage in the model, which represents the combined total held in local storage and local supplemental storage accounts in a representative year, increases over the period 2007-2030 from 83,706 AF to 141,565 AF among agencies in the study, where the growth in local storage over the period occurs in proportion to the 70 percent increase in excess demand for Basin water as population increases in the region.

Local storage accounts are not constructed for Fontana Union Water Co. and San Antonio Water Co., because these agencies have excess supply of water in each year above what is necessary to meet their urban water demands. In practice, these agencies may hold water in local storage to arbitrage expected differences in transfer prices between wet and dry years, but such arbitrage

[15] Because desalter water is not a unique source of supply, an accounting adjustment is made later to back out desalter water supplies from Basin supply by creating an off-setting replenishment obligation for each unit of desalter water used for urban supply.

opportunities are suppressed in the model, because variations in annual water availability are smoothed in the model to a basis of a representative hydrologic year.

In each year, a storage account adjustment is made for each agency by adding the incremental growth in local storage from the previous year's value to the excess demand for water. The amount of water held in local storage adjusts upward each year to meet the growth in excess demand, and this need for added storage to smooth increasing volumes of water between wet and dry years is deducted from contemporaneous water supply.

After storage account adjustments are made in each year, individual excess demand and individual excess supply conditions clear each year in the transfer market. Excess supply to be cleared in the transfer market in each year is comprised of sales by Fontana Union Water Co. and San Antonio Water Co., and, to a lesser extent, by Jurupa Community Services District beginning in 2021. Jurupa CSD becomes a net supplier of water in the transfer market due to the relatively large purchases of desalter water for urban supply in the data provided in IEUA's UWMP (2005). Water transfers are allocated from these suppliers to individual agencies with positive demand for transfer water in proportion to each agency's share of excess demand relative to total excess demand for water in the Basin. The total amount of water transacted in the Basin rises from 12,677 AF to 20,401 AF over the 2007-2030 period, and the largest buyers of transfer water in each period are Cucamonga Valley Water District and the City of Ontario.

4.3. Water Imports

Water is imported into the Basin to meet the sum of import demand for direct use and desalter replenishment requirements. Imported water is taken as replenishment water in each period up to the limit on recharge capacity in the Basin (i.e., the second step of the water supply relationship in Figure 1), and the residual quantity of imported water that cannot be met with replenishment water is taken as Tier 2 water imports. Under baseline conditions, the recharge capacity of the Basin is taken to be 29,000 AF per year, which represents the available spreading facilities discussed as pre-existing facilities in program element 2 of the OBMP.[16] Given the smoothing of production into the basis of representative hydrologic years, this implies that baseline conditions in the Basin can accommodate 20,300 AF of recharge per year (0.7*29,000 AF). This recharge capacity defines the limit to which imported water in the Basin can be taken at the lower MWD replenishment rate.[17]

Imported replenishment water in the Basin must first be taken to meet the replenishment obligation of the desalters. The desalter replenishment obligation under baseline conditions is desalter production for urban supply less a 2 percent storage loss component deducted from individual local storage accounts.[18] Under baseline conditions, the desalter replenishment obligation (net of the storage loss allocation) begins at 13,556 AF in 2007 and grows to 40,169 AF per year in 2030. In the year 2010, the desalter replenishment obligation rises to 22,604 AF,

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[16] Implementation Plan: Optimal Basin Management Plan for the Chino Basin, p13: http://www.cbwm.org/docs/legaldocs/Implementation_Plan.pdf.

[17] The increase in Basin recharge capacity, as described in the Recharge Master Plan (WEI, Black and Veatch 2001: http://www.cbwm.org/docs/rechdocs/rechmastplanphase2rep/chapters/pdf/) is a major program element considered in the Peace Agreement, both in terms of benefit and cost.

[18] Personal correspondence with Watermaster staff.

an amount in excess of the 20,300 AF recharge capacity of the Basin in the baseline scenario, and the replenishment obligation remains above the recharge capacity for the remainder of the time horizon. Over the period 2007-2009, the amount of recharge capacity in excess of the desalter replenishment requirement (e.g., 20,300 – 13,556 = 6,744 AF in 2007) is allocated to individual agencies in proportion to each agency's share of imported water demand relative to total imported water demand in the Basin. Over the period 2010-2030, the desalter replenishment obligation exceeds the recharge capacity of the Basin, and the remaining desalter replenishment obligation above 20,300 AF is met through in lieu production by individual agencies in the Basin. In the baseline scenario, the desalter replenishment obligation, both the portion met with replenishment water purchases and the portion taken as in lieu production, is met by individual agencies according to each agency's pro rata share of safe operating yield.[19]

Aggregate supply and demand are cleared each year on the third step of supply by reconciling effective Basin water supply (Basin supply plus Basin recharge) with import demand through purchases of Tier 2 water from MWD. Tier 2 MWD water purchases are allocated to individual agencies based on the share of each agency's imported water demand relative to total imported water demand in the Basin. Under baseline conditions, the total purchases of Tier 2 water among agencies in the Basin rises from 97,766 AF in 2007 to 200,097 AF in 2030, with the combined purchase share of Cucamonga Valley Water District and the City of Ontario—the two largest purchasers of imported water—representing between 62 percent and 73 percent of total Tier 2 water purchases in each year.

4.4. Water Procurement Costs

The total cost of water procurement to individual agencies is the sum of five components: (i) Tier 2 water purchases; (ii) transfer water purchases; (iii) desalter water purchases for urban supply; (iv) desalter replenishment costs; and (v) Watermaster general assessments on the appropriative pool. Water procurement costs associated with Basin production also exist, but these costs exist in all scenarios and consequently net out of the comparison of the various program net benefits.

For the purpose of allocating Watermaster assessments, Tier 2 water purchases are assumed to occur outside the framework of the cooperative organization. That is, the actual production level of each agency, as recorded by the Watermaster each fiscal year for the basis of assessments, does not include any production demands that an individual agency meets through Tier 2 purchases acquired from MWD. For this reason, a separate accounting calculation is made for actual production to recover the allocation of Watermaster assessment costs to individual agencies in each period. Actual production for each agency is residual demand for Basin water less Tier 2 water purchases less storage losses and adjustments to the storage account balance.

Watermaster replenishment assessments are levied to recover desalter replenishment costs (for units up to the 20,300 AF recharge capacity of the Basin) through replenishment water purchased from MWD each year. These costs are allocated to individual agencies according to each agencies pro rata share of safe operating yield.

Watermaster general assessments are levied under baseline conditions to cover the cost of administrative costs, exclusive of the OBMP costs and the special project costs that pertain to

[19] Personal correspondence with Watermaster staff (August 29, 2007).

Peace I and Peace II. In 2007, these costs account for $816 thousand of the projected $7.87 million costs to be levied for general assessments under prevailing Peace conditions. Under baseline conditions, moreover, only the appropriative pool share of general assessment costs is paid by the appropriative pool, which amounts to $624 thousand of the $816 thousand administrative costs in 2007, with the remaining share of costs paid by the overlying agricultural and non-agricultural pools. The costs attributed to the appropriative pool are allocated across to individual agencies according to each agency's share of actual production relative to total Basin production.

4.5. Summary of Baseline Outcomes

Table 1 provides a breakdown of the projected outcome for the eight largest producers under baseline conditions in the year 2015. Total urban water demand for these producers is 293,214 AF in 2015. Total residual demand, which is the difference between urban water demand and the Basin supply available to each agency, is 273,430 AF. Available Basin water supply, the sum of the shares of safe operating yield, net agricultural transfer (inclusive of land-use conversions), and desalter water for urban supply, is 123,554 AF in the year 2015. The total water transfers of 13,089 AF reflect sales by Fontana Union Water Company and San Antonio Water Company to the remaining producers encompassed by the study. The net storage acquisition of 1,022 AF reflects the change in the local storage balance between the year 2014 (106,032 AF) and the year 2015 (107,054 AF). This increment in the water held in local storage, which must be met by in lieu production by agencies, adds to residual demand for water in the Basin, and the difference between this term and the sum of available Basin water supply and water purchases in the transfer market results in a combined import demand among producers of 137,809 AF.

Total desalter production in the year 2015 is 34,122 AF, which exceeds the available recharge capacity of the Basin, so that imported water demand is met entirely with Tier 2 water purchases.[20] Actual production among these eight agencies (123,250 AF) is the difference between residual demand for Basin water, Tier 2 purchases from MWD, in lieu recharge taken to meet the desalter replenishment obligation, storage losses (2% of local storage = 2,141 AF), and the net storage acquisition. Watermaster administrative assessments are in 2015 are $1.2 million, of which $957 thousand is paid by agencies in the appropriative pool.

[20] An additional 3,905 AF of desalter water production is projected for the Santa Ana River Water Company and City of Norco, who are not considered in this study.

Table 1: Year 2015 Outcome Under the Baseline Scenario

	Appropriator								
Component	Chino	Chino Hills	Ontario	Upland	Cucamonga	Monte Vista	Jurupa	Pomona	**Total**
Urban Water Demand	26,200	24,700	66,600	22,500	72,500	14,100	36,350	30,264	**293,214**
Available Surface Water	0	0	0	5,200	3,000	0	500	0	**8,700**
Available Other Groundwater	0	0	0	3,800	5,400	0	0	1,884	**11,084**
Residual Demand	*26,200*	*24,700*	*66,600*	*13,500*	*64,100*	*14,100*	*35,850*	*28,380*	**273,430**
Safe Operating Yield	4,034	2,111	11,374	2,852	3,619	4,824	2,061	11,216	**42,092**
Net Ag Transfer	8,916	2,398	8,660	1,875	2,980	3,228	12,840	7,371	**48,268**
Desalter Water Supply	5,000	4,200	5,000	0	0	0	19,922	0	**34,122**
Available Supply	*17,950*	*8,709*	*25,033*	*4,727*	*6,600*	*8,052*	*33,896*	*18,587*	**123,554**
Net Storage	487	280	717	-122	1,039	108	-1,653	166	**1,022**
Transfers	758	1,411	3,668	750	5,078	534	26	864	**13,089**
Import Demand	*7,979*	*14,860*	*38,616*	*7,901*	*53,461*	*5,622*	*275*	*9,095*	**137,809**
Local Storage	5,893	11,422	29,690	6,266	41,072	4,320	1,396	6,995	**107,054**
Tier 2 Purchases	7,979	14,860	38,616	7,901	53,461	5,622	275	9,095	**137,809**
Actual Production	17,512	9,328	25,067	4,589	9,889	7,210	33,343	16,312	**123,250**
Watermaster Assessments	$97	$52	$139	$26	$55	$40	$185	$91	**$685**

Notes:

1. All figures in acre-feet except Watermaster assessments.
2. Watermaster assessments are expressed in real terms (1,000s of 2007$.)

5. Peace I Scenario

The Peace Agreement introduced various program elements in the Basin that were not present under baseline conditions. The main components of the Peace Agreement considered here that altered net benefits in the Basin are: (i) an increase in Basin recharge capacity from 29,000 AF to 134,000 AF; (ii) a change in the rules for land use conversion; (iii) transfer of agricultural pool assessments to the appropriative pool; (iv) the introduction of a storage and recovery program; (v) an increase in stormwater recovery from 5,000 AF per year to 12,000 AF per year; and (v) the Pomona credit. This section describes the changes that occurred through these program elements to alter net benefits received by individual agencies in relation to the earlier discussion of the baseline outcome detailed above.

5.1. Basin Supply

Under the set of Basin programs encompassed by the Peace Agreement, three factors led to changes in available Basin supply: (i) increased stormwater capture; (ii) a change in the water allocation resulting from land use conversions (including "early transfer"); and (iii) the introduction of the Dry Year Yield program for storage and recovery through MWD. The increased stormwater capture is represented by an annual increase in Basin supply by 12,000 AF of "new yield" in exchange for tying up 12,000 AF of recharge capacity.

The net agricultural transfer to each agency under Peace conditions increased the return to each converter from 1.3 AF of Basin water for each acre converted to 2.0 AF of Basin water for each acre converted. An early transfer program of 32,800 AF per year to the appropriative pool was also introduced, which ultimately led to an over-allocation of agricultural pool water to the appropriative pool.[21] The net agricultural pool allocation to individual agencies replicates the Watermaster calculation in each year, given the projected pattern of land use conversion calculated through 2030. The agricultural pool transfer provides a credit of 2.0 AF per acre for all land-use conversions taking place after the signing of the Peace Agreement and credits earlier conversions at the 1.3 AF per acre rate and the early transfer to members of the appropriative pool is based on each agency's share of safe operating yield. Because the sum of these two components and the projected agricultural pool production level after land-use conversions have been made exceeds the 82,800 AF of available agricultural pool water in every year, each agency is charged a replenishment obligation for the amount of over-allocated agricultural pool water in proportion to each agency's share of safe operating yield. This is equivalent to deducting the over-allocation of agricultural pool water from the 32,800 AF early transfer after land use conversions take place and dividing this residual amount of water (e.g., 32,800 – 4,270 = 28,530 AF in Fiscal Year 2006-2007) pro rata among members of the appropriative pool.

In total, the net agricultural pool transfer to the appropriative pool is the same under baseline and Peace rules (49,831 AF in 2007 and 76,909 AF in 2030). Among appropriators considered in the

[21] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Land Use Conversion Summary (p10): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf. In the Fiscal Year 2006-2007 Final Assessment Package provided by the Watermaster, the amount of over-allocation was 4,270 AF (3,893 AF of which is incurred as a replenishment obligation to agencies encompassed by the study), and the model projects this total to increase through the process of future land use conversions to 5,127 AF in 2030 (4,674 AF of which is incurred as a replenishment obligation to agencies encompassed by the study).

study, which encompass 91.2 percent of safe operating yield but 100 percent of land use conversions, the change in land-use conversion rules under the Peace Agreement provides a slightly larger net agricultural transfer among agencies considered than under baseline conditions (e.g., 71,673 AF after all conversions take place compared to 71,377 AF under baseline rules). The outcome for individual agencies under the Peace rules for net agricultural pool transfer relative to the baseline scenario is discussed later.

The DYY storage and recovery program alters the allocation of Basin water supply by allowing individual agencies to purchase water from MWD in wet years and store it for use in subsequent dry years. The effective rate paid to MWD for DYY water inputs, net of subsidies paid to the participating agencies, is approximately equal to the current replenishment rate,[22] and the annual MWD replenishment rate is used in each period to price DYY water inputs to individual producers. The present analysis considers the value of the currently-approved 150,000 AF storage and recovery program.[23] Although further expansion beyond this level has been discussed, the study does not consider the potential expansion of this program to 500,000 AF nor the possibility for sales of this water to take place outside the Basin. The increase in the DYY program from 100,000 AF to 150,000 AF is assumed to take place immediately in the year 2007. To adjust the implied pattern of puts and takes of a 150,000 AF storage and recovery program to the smooth production horizon of a representative hydrologic year, we assume that water production in the DYY program is limited to 50,000 AF in each dry year. Given a 0.3 probability of a dry year, this implies an average of 15,000 AF of water is made available in the Basin each year through the DYY program. The distribution of the DYY program storage across individual agencies is given by the table of DYY shift obligations provided by IEUA for the current DYY-100 program, and these values are scaled upwards proportionately to 150,000 AF.[24] It is assumed that there is no storage loss for units of water placed in storage.[25] In effect, this implies that participating agencies in the DYY program purchase 15,000 AF of water in a representative hydrologic year at MWD replenishment rates and covert this amount into 15,000 AF of reliable Basin supply through the use of existing recharge facilities.

Among the ten largest agencies considered in the study, Basin supply under Peace conditions rises from 137,416 AF in 2007 to 185,692 AF in 2030. This reflects an approximate increase of 26,000 AF per year relative to baseline conditions (under baseline conditions, Basin supply is 111,486 AF in 2007 and 159,496 AF in 2030), and the source of the additional Basin supply under the Peace Agreement amounts to the roughly 11,000 AF increased stormwater yield (the share of the 12,000 AF "new yield" acquired by the ten largest agencies) plus the 15,000 AF recovery of DYY storage water.

5.2. Import Demand

Import demand for each agency in the Basin is calculated in the same manner as the baseline case. As noted above, this involves deducting Basin supply from the Basin water demand facing each agency to get excess demand, correcting excess demand to account for the dynamic adjustments that occur in local storage accounts, and then reconciling excess supply and excess

[22] Personal communication with IEUA staff.
[23] Personal communication with Watermaster staff.
[24] IEUA Urban Water Management Plan (2005), Table 6-5.
[25] Personal correspondence with Watermaster staff.

demand among individual agencies in the Basin through water transactions in the transfer market.

Two major changes occur under Peace in the resulting evaluation of import demand. First, import demand is now lower each year than under baseline conditions by the approximate 26,000 AF of additional Basin supply that is available each year. This ultimately defrays Tier 2 water purchases as the supply-side of the model is built upwards to the third step of supply. Second, the amount of water held in the local storage account of individual agencies decreases, for instance by 17,769 AF in 2007 (83,706 AF in the baseline versus 65,937 AF under Peace.) Much of this difference in local storage balances is the result of participation in the DYY program crowding-out storage activities that would otherwise take place in local storage accounts.

5.3. Water Imports

As in the baseline case, annual water imports must flow into the Basin to meet the sum of import demand and replenishment requirements, where the Basin replenishment requirements now include 12,000 AF of stormwater recharge and 15,000 AF of replenishment water purchases for the DYY program in addition to the desalter replenishment obligation. Imported replenishment water represents the second step of the water supply relationship in Figure 2, and this step is elongated under Peace by the increase in Basin recharge capacity to 134,000 AF. Given the smoothing of production, this implies that Basin recharge capacity is 93,800 AF per year (0.7*134,000 AF) in a representative hydrologic year. Of this amount, 27,000 AF per year of recharge capacity is now used to accommodate the combined requirements of stormwater recharge and DYY program recharge, and a substantial share of the remaining recharge capacity is used to fulfill the replenishment obligation of the desalters. The desalter replenishment obligation in each year is defined in the same manner as in the baseline scenario to be desalter production less storage losses of 2 percent deducted from the local storage accounts of producers in the Basin.[26]

Under Peace conditions the need for imported Tier 2 water is smaller than under the baseline. Three main effects drive this change: (i) the recharge capacity of the Basin can now accommodate the entire desalter replenishment obligation each year without requiring agencies to engage in in-lieu recharge; (ii) the amount of annual Basin over-production that can be sustained in the Basin is larger by the amount of the increase in recharge capacity; and (iii) the reduction in local storage reduces the allocation of Basin storage losses to the desalter. The first two components produce direct value to agencies on the extensive margin of supply by defraying Tier 2 purchases (as depicted in Figure 2). The third component, the change in the designation of storage losses against the replenishment obligation of the desalters, creates no economic benefit to the Basin and is purely redistributional in its effects, because the change in the designation of storage losses does not alter the physical recharge capacity of the Basin. An individual agency that incurs a one-unit storage loss gives up a unit of water from local storage, and the value of this unit of water is distributed back to other agencies in the form of a credit against the desalter replenishment obligation.

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[26] Peace Agreement, Article 5.2b(xii).

Under Peace conditions, the amount of replenishment water that is purchased from MWD in each representative hydrologic year is 81,800 AF (93,800 AF of recharge capacity less the 12,000 AF stormwater recharge). This 81,800 AF of replenishment water, which is purchased at MWD replenishment rates, is allocated first to meet the 15,000 AF per year replenishment water requirement for DYY participants and to meet the replenishment obligation of the desalter, with the remaining recharge capacity in each year allocated among individual agencies according to each agency's imported water demand relative to total imported water demand in the Basin.

As in the baseline scenario, imported water demand in excess of the recharge capacity of the Basin is cleared each year in the Peace I scenario on the third step of supply through purchases of Tier 2 water from MWD. Tier 2 MWD water purchases, as in the baseline case, are allocated to individual agencies based on the share of each agency's imported water demand relative to total imported water demand in the Basin.

Under peace conditions, the total purchases of Tier 2 water among agencies in the Basin rise from 25,692 AF in 2007 to 127,710 AF in 2030, a decline of approximately 72,000 AF per year relative to the baseline scenario. This decline in Tier 2 water purchases is approximately equal to the increase in recharge capacity under the Peace Agreement and represents a replacement of Tier 2 water purchases with replenishment water purchases at the lower MWD rate in each year. Cucamonga Valley Water District and the City of Ontario, the two largest buyers of imported water in both the baseline and Peace I, receive the largest share of the net benefit of this offset in Tier 2 water, because of their disproportionate representation on the extensive margin of supply.

5.4. Water Procurement Costs

The total cost of water procurement to individual agencies is the sum of eight components: (i) Tier 2 water purchases; (ii) transfer water purchases; (iii) desalter water purchases for urban supply; (iv) replenishment water purchases; (v) desalter replenishment costs; (vi) Watermaster general assessments on the appropriative pool; (vii) Watermaster general assessments on the agricultural pool paid by the appropriative pool; and (viii) the Pomona credit. The first three components of water procurement cost are calculated in the same manner as in the baseline case, with the exception that the total quantities of Tier 2 purchases and transactions in the transfer market differ.[27]

Desalter replenishment costs are recovered through Watermaster replenishment assessments in an amount equal to the cost of replenishment water purchased from MWD to meet the replenishment obligation of the desalters each year. As in the baseline case, these costs are allocated to individual agencies according to each agencies pro rata share of safe operating yield.[28]

Replenishment water purchases allocated to individual agencies related to the DYY program are levied back on individual agencies in proportion to their storage claims in the program, as detailed above. Any remaining recharge capacity in excess of the amount needed to fulfill DYY

[27] Changes in the pattern of Tier 2 water purchases and water transfers that occur across scenarios and over time within each scenario can have equilibrium effects on market prices; however, price changes in these markets are not considered in the scope of the present study.

[28] Personal correspondence with Watermaster staff (August 29, 2007).

contributions and the replenishment obligation of the desalters and DYY is allocated in each year to individual agencies according to each agency's imported water demand relative to total imported water demand in the Basin.

The total costs recovered through Watermaster general assessments for the program elements in the Peace I scenario include OBMP assessments, special project assessments, and recharge debt payments. The additional OBMP and special project assessments in the Peace I scenario amount to a total $7.05 million out of the $7.87 million (90 percent) in total Watermaster expenses in 2007, and these additional costs of implementing the program elements in the Peace I scenario rise to $13.8 million in 2030. As in the baseline scenario, the allocation of all appropriative pool general assessments to individual agencies is made based on each agency's share of safe operating yield in the Basin.

The Peace Agreement negotiated the transfer of all general assessment fees from the agricultural pool to the appropriative pool. The total assessment fees paid by the agricultural pool, which are now assumed by members of the appropriative pool, amount to $1.1 million in 2007 and decline to $460 thousand in 2030 due to land use conversions that result in a decline in agricultural water use as a share of total Basin safe yield. In total, the general assessments paid by the appropriative pool inclusive of the transfer of agricultural pool assessments increase ten-fold from $624 thousand in the baseline scenario to $6.3 million under Peace conditions in 2007 and the assessment costs in the Peace I scenario remain at least 7 times as large as the costs attributable to baseline conditions in the Basin throughout the production horizon. The agricultural pool share of Watermaster assessment fees is paid by individual agencies in the appropriative pool according to the agency's share of the net agricultural transfer in each year.[29]

Finally, the Pomona credit of $66,667 per year is paid every year by each agency in proportion to the agency's share of safe operating yield.

5.5. Comparison of Baseline and Peace Agreement Outcomes

Under the terms of the Peace Agreement, the present value of the net benefit of the program elements for the ten agencies encompassed by the study is $182 million. The main component associated with this increased net benefit is the displacement of Tier 2 water with new Basin yield and replenishment water. Under baseline conditions, the present value of total Tier 2 water purchases over the 2007-2030 period is $1.53 billion, whereas, under Peace conditions, the present value of Tier 2 water purchase over the period decreases to $931 million. This decrease in Tier 2 water under Peace conditions was replaced with replenishment water at the lower MWD rate, and the combined cost of imported water in the Peace I scenario decreased by $310 million in present value terms (from $2.06 billion under baseline conditions to $1.75 billion under Peace conditions). This benefit was acquired at the expense of an increase in the present value of assessment costs from $16.7 million to $146 million.

[29] For details on this calculation and the distribution of general appropriative pool assessments based on pro rata share of safe operating yield, see Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Pool 3 Assessments Summary (p5): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf.

Table 2 provides a breakdown of the projected outcomes under Peace conditions in the year 2015 for the eight largest producers in the study. A comparison of these outcomes with those that emerge under baseline conditions in Table 1 provides a useful profile of the essential differences in Basin performance under each scenario. Residual demand for Basin water is identical in each scenario. This quantity corresponds to the value Q* in Figure 1. The safe operating yield of the agencies considered is the same in both cases, as is desalter water for urban supply. The net agricultural pool allocation to the appropriative pool is slightly higher under Peace (48,848 AF relative to 48,268 AF under baseline rules). This is because the agencies considered in the study represent 91 percent of Basin production and nearly 100 percent of the land use conversions, which are credited with a larger water allocation under Peace. Available Basin supply in the Peace I scenario is accordingly higher by the sum of this component and the 15,000 AF of supply available to agencies through the DYY program, which leads to a commensurate reduction in imported water demand.

The level of local storage is lower under Peace by approximately the 15,000 AF of storage that is now accounted for in the DYY program. Replenishment purchases are now possible due to the increase in Basin recharge capacity, and the agencies combine to purchase 31,533 AF of replenishment water in the year 2015.

In total, Tier 2 water use falls from 137,809 AF under baseline conditions (inclusive of the purchases required by in lieu recharge) to 82,658 AF under Peace conditions. This decrease in Tier 2 water imports reflects the displacement of Tier 2 water purchases through a combination of new Basin yield and increased replenishment water purchases made possible by the expansion of Basin recharge capacity.

Actual production among these eight agencies is higher in the Peace I scenario by 36,953 AF in the year 2015 (160,203 AF vs. 123,250 AF in the baseline scenario). This increment in Basin production represents the effective increase in Basin recharge capacity available to these producers after accounting for the combined 27,000 AF of recharge capacity utilized by stormwater and DYY program recharge.

Table 2: Year 2015 Outcome Under Peace I Scenario

	Appropriator								
Component	Chino	Chino Hills	Ontario	Upland	Cucamonga	Monte Vista	Jurupa	Pomona	**Total**
Urban Water Demand	26,200	24,700	66,600	22,500	72,500	14,100	36,350	30,264	**293,214**
Available Surface Water	0	0	0	5,200	3,000	0	500	0	**8,700**
Available Other Groundwater	0	0	0	3,800	5,400	0	0	1,884	**11,084**
Residual Demand	*26,200*	*24,700*	*66,600*	*13,500*	*64,100*	*14,100*	*35,850*	*28,380*	**273,430**
Safe Operating Yield	4,034	2,111	11,374	2,852	3,619	4,824	2,061	11,216	**42,092**
New Yield	883	462	2,489	624	792	2,455	451	2,489	**10,645**
Net Ag Transfer	10,558	2,173	7,210	1,467	2,460	2,553	16,658	5,769	**48,848**
Desalter Water Supply	5,000	4,200	5,000	0	0	0	19,922	0	**34,122**
Storage & Recovery	527	658	3,671	1,364	5,160	1,801	909	909	**15,000**
Available Supply	*21,001*	*9,604*	*29,744*	*6,308*	*12,032*	*10,234*	*39,074*	*20,349*	**148,346**
Net Storage	428	288	771	-107	1,058	133	0	225	**2,797**
Transfers	726	1,985	4,854	914	6,854	516	-3,224	1,065	**13,690**
Import Demand	*4,901*	*13,399*	*32,773*	*6,171*	*46,272*	*3,483*	*0*	*7,192*	**114,191**
Local Storage	3,713	10,783	26,326	5,137	37,191	2,761	0	5,737	**91,649**
Replenishment Purchases	1,353	3,700	9,050	1,704	12,778	962	0	1,986	**31,533**
Tier 2 Purchases	3,548	9,699	23,723	4,467	33,494	2,521	0	5,206	**82,658**
Actual Production	21,653	11,373	34,071	7,119	18,142	10,695	35,850	21,299	**160,203**
Watermaster Assessments	$849	$401	$1,258	$267	$629	$411	$1,353	$795	**$5,963**

Figure 1 compares the benefit received by each agency from reduced water procurement costs to the increase in assessment cost that result from the implementation of the program elements in the Peace I scenario. The assessment costs associated with implementing the program elements considered in the Peace I scenario are represented by an overall increase from $16.7 million to $146 million in present value terms. The program benefits in present value terms in the Peace II scenario are reflected in the decrease in water procurement costs from $2.1 billion under baseline conditions to $1.8 billion in the Peace I scenario.

In terms of the total benefit, two agencies, City of Ontario and Cucamonga Valley Water District, receive the largest share of the benefits resulting from the Peace I program elements, while the assessment costs are distributed more equally among producers. In total, the City of Ontario and Cucamonga Valley Water District together receive 46 percent of the benefit of decreased water procurement costs and incur 32 percent of the increase in assessment costs. An important reason these agencies receive a large share of the net benefit from the agreements is due to a scale effect in the annual level of residual demand for Basin water, for instance in 2015 these two agencies combined account for 48 percent of residual demand for Basin water (130,700 AF out of 273,430 AF).

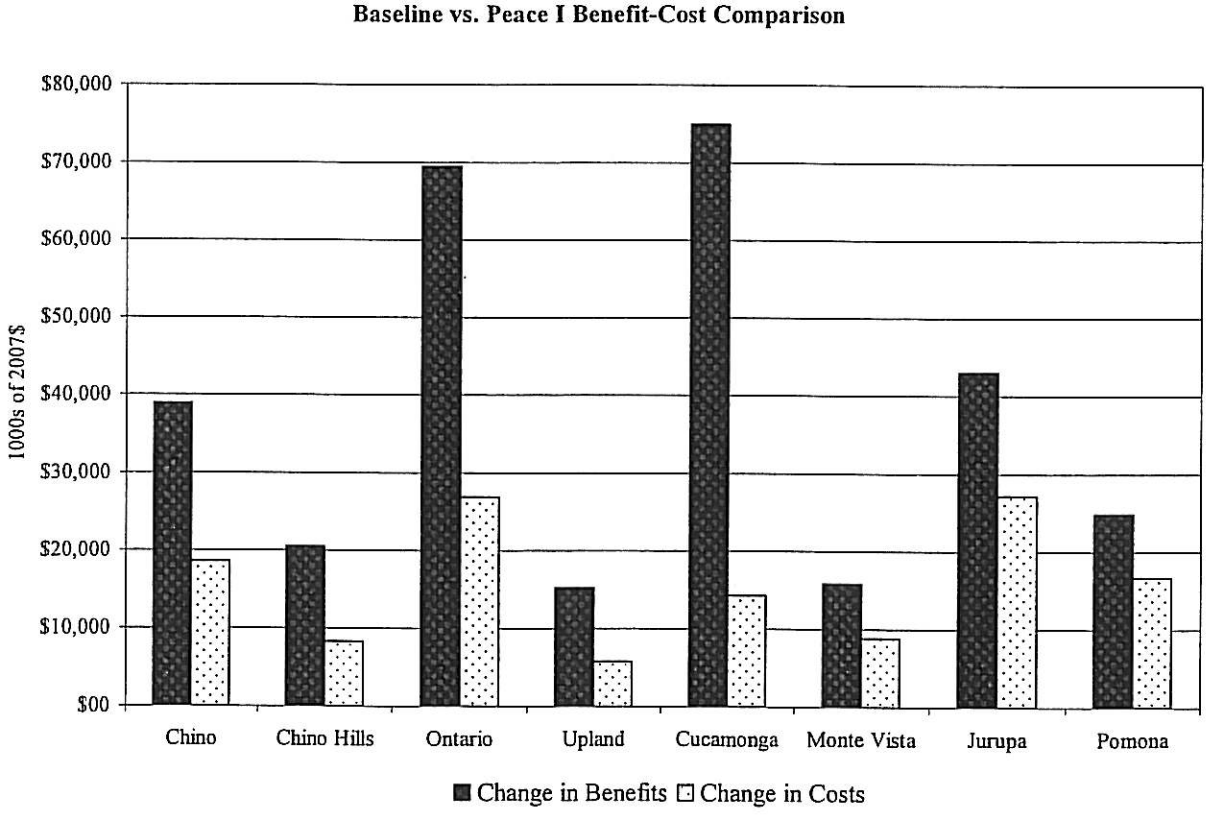

Figure 1

Distribution of Net Benefit, Peace I vs. Baseline ($/per AF)

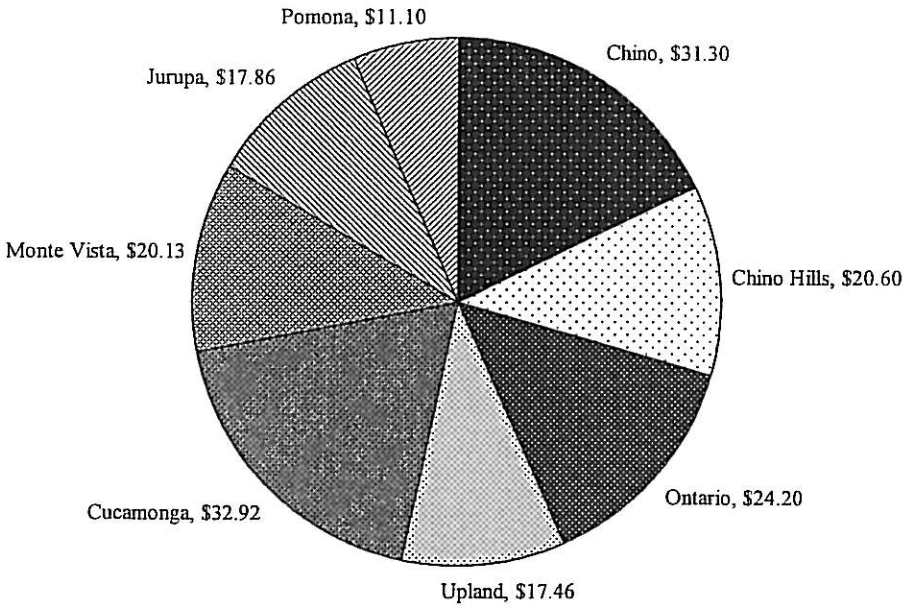

Figure 2

Figure 2 shows the distribution of net benefits per acre-foot of residual water demand across individual agencies in the Basin resulting from the program elements in the Peace I scenario. Fontana Union Water Company and San Antonio Water Company are not included in these calculations, because the available surface water and other groundwater supplies for these agencies exceed their total demand. Controlling for agency scale on the basis of residual demand for Basin water among the remaining producers, the net benefit resulting from the combined program elements in the Peace II Agreement is grouped between $11.10/AF for the City of Pomona to $32.92/AF for Cucamonga Valley Water District. Overall, the present value of the net benefit to all parties over the 24 year horizon resulting from a move from baseline conditions to Peace conditions is $182 million and the total residual demand for water over this period is 6.9 million AF, which implies an average return of $19.84 per acre-foot to the agencies encompassed by the study.

6. Peace II Scenario

The Peace II scenario introduces several major program elements in the Basin that build on the existing conditions under Peace. The main components of the Peace II scenario that alter market values in the Basin relative to the Peace I scenario are: (i) hydraulic control, which provides 400,000 AF of cumulative forgiveness and SAR inflow of 9,900 AF per year in the Basin; (ii)

the production of recycled water; (iii) a change in the allocation of the replenishment obligation associated with over-production in the agricultural pool transfer; (iv) a transfer of overlying non-agricultural pool water to the appropriative pool; and (v) a transfer of the Pomona credit from Basin agency to Three Valleys. This section describes the changes that occurred through these program elements to alter net benefits received by individual agencies in relation to the earlier discussion of the existing program elements in Peace Agreement.

6.1. Basin Supply

Under the set of programs encompassed by the Peace II Agreement, five factors led to changes in available Basin supply relative to prevailing conditions under Peace: (i) a change in the water allocation resulting from land use conversions; (ii) the influx of recycled water (for direct use and groundwater recharge), (iii) the transfer of 49,178 AF of overlying non-agricultural water to the appropriative pool; (iv) 9,900 AF per year of inflow from the Santa Ana River (SAR), eventually rising to 12,500 AF per year; and (v) 400,000 AF of cumulative forgiveness for Basin over-production. Unlike the program elements implemented in the Peace I scenario, all elements of the Peace II scenario (with the exception of the transfer of the Pomona credit to Three Valleys) fundamentally alter supply conditions on the lowest step of the supply relationship by contributing new sources of Basin yield.

The net agricultural transfer to each agency in the Peace II scenario maintains the return to each converter of 2.0 AF of Basin water for each acre converted and the early transfer of 32,800 AF per year to the appropriative pool, but alters the allocation rule for the replenishment obligation for the amount of over-allocated agricultural pool water. Under Peace II rules, the replenishment obligation for over-allocated agricultural pool water is made on the basis of a weighted average of the share of safe operating yield and share of cumulative land-use conversions for each agency (the "proportion of water available for reallocation (PAR)") rather than in proportion to each agency's share of safe operating yield in the Peace I scenario. By placing greater weight on land use conversions, a greater share of the replenishment obligation for over-allocated agricultural pool water is placed on land-use converters. For instance, the combined share of safe operating yield of the two largest land-use converters in the Basin—City of Chino and Jurupa Community Services District—is approximately 10 percent, whereas the combined PAR share of these agencies in Fiscal Year 2006-2007 is 38 percent.[30]

The use of significant quantities of recycled water is made possible in the Basin by the attainment of hydraulic control.[31] Recycled water projections for direct use in the Basin increase from 11,924 AF in 2007 to 60,450 AF in 2030 and recycled water use for groundwater recharge rises over the period from 3,443 AF to 35,000 AF.[32, 33] The recycled water price charged by

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[30] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Land Use Conversion Summary (p10): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf.

[31] Personal correspondence with IEUA staff.

[32] Projections on recycled water deliveries for direct use and on total recycled water for groundwater recharge is provided for IEUA members in IEUA Urban Water Management Plan (2005), Table 3-13. The projections on recycled water deliveries for direct use to non-IEUA members as well as the distribution of recycled water deliveries for groundwater recharge across individual agencies are based on personal communication with IEUA staff (July 11, 2007).

[33] In no case does the amount of recycled water used for recharge exceed the DHS-approved dilution rates.

IEUA for recycled water deliveries in each period is viewed as sufficient to recover the fully amortized capital and operating costs of their recycled water operations.[34]

The amount of transfer of overlying non-agricultural water to the appropriative pool is taken to be 49,178 AF, which is the ending total balance in the pool 2 local storage account in the Watermaster final assessment package for fiscal year 2006-2007.[35] This amount of water is allocated proportionally in four equal installments over the four-year period 2007-2010 to agencies in the appropriative pool according to their share of safe operating yield, and the price in each period is set at 92 percent of the prevailing MWD replenishment rate.[36]

Finally, in meeting the goal of hydraulic control in the Peace II scenario, two sources of water are created: (i) the Santa Ana River (SAR) inflow is calculated to generate 9,900 AF of new Basin yield each year, eventually rising to 12,500 AF per year; and (ii) 400,000 AF of cumulative overdraft is necessary in the Basin over the period 2007-2030.[37] Both the 9,900 AF per year of SAR inflow and the allocation of the 400,000 AF of cumulative forgiveness are allocated to meet the replenishment obligation of the desalters. The dynamic path of forgiveness for the desalter obligation follows the most-rapid depletion path defined by the aggregate study, which assumes that the Basin overdraft occurs to whatever extent is necessary to meet the replenishment obligation of the desalters (net of storage losses and SAR inflow). Under the most-rapid depletion path, hydraulic control is achieved on the cumulative overdraft of 400,000 AF from the Basin in the year 2024, which raises the SAR inflow from 9,900 AF to 12,500 AF over the remaining period 2025-2030.

6.2. Import Demand

The demand for imported water for each agency in the Basin is calculated in the same manner as in the Peace scenario. In terms of the resulting values, the influx of new Basin water supply in response to recycled water use alter the resulting evaluation of import demand relative to the prevailing conditions under Peace in two significant ways. First, import demand is now lower each year relative to the outcome under Peace conditions by the amount of new Basin supply. This water ultimately defrays Tier 2 water purchases as the supply side of the model is built upwards and aggregated across each step towards the extensive margin of supply. As these supplies are developed, available supply in the Basin rises to 266,134 AF by the year 2030, an increase of 80,442 AF above the Peace I scenario and 106,678 AF above the baseline conditions.

Second, the amount of water held in local storage by individual agencies decreases to account for the effect of these new, reliable water sources in the Basin and the corresponding reduction in the need to smooth out the cyclical components of water supplies with puts and takes. As recycled water supplies are developed in the Basin, the need for local storage decreases; for instance, the total amount of water held in local storage in the Basin in 2030 decreases from 141,565 AF under baseline conditions, to 129,259 AF in the Peace I scenario, to 80,500 AF in the Peace II scenario.

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[34] IEUA, Operating and Capital Program Budget, Fiscal Year 2007/08, Volume 1 (July 2007), p231.
[35] Watermaster, Fiscal Year 2006-2007 Final Assessment Package, Pool 2 Water/Storage Transactions (p12): http://www.cbwm.org/docs/financdocs/Assessment%20Package%20FY%202006-2007%20Final.pdf.
[36] Non-Binding Term Sheet, item IX.C.
[37] Personal correspondence with staff at Wildermuth Environmental.

The quantity of water transactions in the water transfer market rises significantly as the number of agencies selling water increases with the influx of recycled water supplies. This changes the distribution of net benefits, both directly by the allocation of recycled water supplies based on proximity of users (rather than according to the share of safe operating yield) and indirectly by reducing the number of agencies that procure water on the extensive margin of supply.

6.3. Water Imports

An important outcome in the Peace II scenario as a result of hydraulic control is the decrease in Tier 2 water purchases relative to both the baseline and Peace I scenarios. Unlike the case of the Peace I scenario, in which the decline in Tier 2 purchases was largely offset by an increase in assessment costs to support the increase in recharge capacity, the avoided Tier 2 water purchases in the Peace II scenario are associated either with negligible costs (SAR inflow and forgiveness for Basin over-draft) or with the relatively low cost associated with recycled water, which is valued at IEUA recycled water rates. These differences are characterized in the discussion below.

In addition, the level of water imports increases slightly in the Peace II scenario, because of a reduction in the storage loss component allocated to meet the desalter replenishment obligation. In the Peace II scenario, the desalter replenishment obligation is taken to be desalter production less storage losses of 1 percent from the local storage accounts of producers in the Basin.[38]

6.4. Water Procurement Costs

All program costs that form the basis for Watermaster assessments in the Peace I scenario (as described above) are considered in the Peace II scenario, with the exception of the Pomona credit, which is no longer paid by appropriators in the Basin and is instead paid by Three Valleys Municipal Water District.[39] The removal of this fee from Watermaster assessments leads to an increase in net benefit to agencies in the Basin by $66,667, and this is returned to agencies in proportion to each agency's share of safe operating yield. The increase in net benefit is offset by a proportional increase in cost for Three Valleys Municipal Water District, and the present value of this stream of payments over the period 2007-2030 at the prevailing rate of discount (4.5 percent) is $1.0 million.

Recycled water costs are allocated to each agency using the recycled water prices provided by IEUA, as discussed above. The desalter replenishment obligation, which begins in the year 2024 after the 400,000 AF of over-draft credits are exhausted, is met in the Peace II scenario through Watermaster replenishment assessments as follows. Half of the desalter replenishment obligation is met by individual agencies according to pro rata shares of safe operating yield, as in the Peace I scenario, and the remaining half of the desalter replenishment obligation is met according to each agency's share of actual production relative to total production in the Basin.[40] This latter portion of the Watermaster replenishment assessments accords with the method of allocating Watermaster general assessments to the appropriative pool in all three scenarios considered. The

[38] Non-Binding Term Sheet, Item VI.B.1.
[39] Non-Binding Term Sheet, item VII.A.
[40] Personal correspondence with Watermaster staff (August 29, 2007).

method for calculating the remaining water procurement costs for each agency is identical to the method described above for the Peace I scenario.

6.5. Comparison of Baseline, Peace I, and Peace II Outcomes

Relative to baseline conditions, the present value of total net benefit among the ten agencies encompassed by the study for the program elements contained in the Peace II scenario is $904.6 million, which represents an additional net benefits of $722.5 million relative to the outcome of the Peace I scenario.

The main factor associated with this increased net benefit is the displacement of Tier 2 water with recycled water, SAR in-flow, and, in the period 2007-2024, with forgiveness for 400,000 AF of Basin over-draft to attain hydraulic control. Under peace I conditions, the present value of total Tier 2 water purchases over the period 2007-2030 is $931 million, whereas, in the Peace II scenario, the present value of Tier 2 water purchases over the period is $271 million. This decrease in Tier 2 water costs in the Peace II scenario was replaced with a combination of 400,000 AF of forgiveness for Basin over-draft and recycled water at the lower IEUA recycled water rate.[41] The combined present value of cost of imported water and recycled water inputs in the Peace II scenario is $1.0 billion, which represents a substantial reduction in the present value of water procurement cost from $1.75 billion in the Peace I scenario.

Table 3 depicts the projected outcomes to individual agencies in the Peace II scenario for the year 2015. A comparison of these outcomes with those that emerge in the baseline scenario in Table 1 and the Peace I scenario in Table 2 provides a useful profile of the essential differences in Basin performance under Peace II conditions. Residual demand, which corresponds to the value Q* in Figure 1, is identical in all three scenarios, as is the safe operating yield of the agencies and desalter production. The net agricultural pool transfer to the appropriative pool (48,530 AF) is between the values that emerge in the Peace I scenario (48,848 AF) and the baseline scenario (48,268 AF). Relative to the outcome under Peace I conditions, the new rules for assessing replenishment obligations for the over-allocated agricultural pool water redistribute the net returns away from the major land-use converters in the Basin (in particular, the City of Chino and Jurupa Community Services District).

Available Basin supply in the Peace II scenario in the year 2015 (208,199 AF) is considerably higher than the available Basin supply in the baseline scenario (123,554 AF) and Peace I scenario (148,346 AF), which leads to a commensurate reduction in imported water demand. Virtually the entire difference in imported water demand between the Peace I scenario and the Peace II scenario is the result of the 60,171 AF addition of recycled water (direct use plus groundwater replenishment).

The level of local storage in the Peace II scenario in, 53,293 AF, is lower than local storage levels in the baseline (107,054 AF) and Peace I scenarios (91,649 AF) due to the large influx of

[41] The allocation of the 400,000 AF of forgiveness to meet the replenishment obligations of the desalters is implicitly valued at the Tier 2 rate, because each unit of forgiveness that is credited against the desalter replenishment obligation, which is valued directly in the model at the replenishment rate, "frees up" a unit of recharge capacity that allows a unit of Tier 2 water to be displaced on the extensive margin of supply.

reliable Basin water through the development of the recycling program and the acquisition of SAR inflow. This greater availability of Basin water supply also facilitates a richer pattern of water transfers in the Peace II scenario.

In total, Tier 2 water purchases in the year 2015 are 10,186 AF, which represents a substantial reduction from the 137,089 AF of Tier 2 water purchases that take place under baseline conditions (inclusive of the purchases required by in lieu recharge) and the 82,658 AF under Peace I conditions. Replenishment water purchases increase in the Peace II scenario from 31,533 AF in the Peace I scenario to 41,800 AF in the Peace II scenario. The increase in replenishment imports reflects the replacement of 35,267 AF of replenishment obligations in the Peace I scenario with SAR inflow and desalter forgiveness in the year 2015, less the 20,671 AF claim on recharge facilities associated with the groundwater recharge component of the recycled water program in the Peace II scenario. The decrease in Tier 2 water imports of 72,430 AF between the Peace I and Peace II scenario is the result of the displacement of Tier 2 water purchases with a combination of recycled water, SAR in-flow, and allowed over-draft.

Actual production among these eight agencies in the year 2015 (182,170 AF) is higher in the Peace II scenario than in the Peace I scenario (160,203 AF) and the baseline scenario (121,138 AF). This increment in Basin production relative to the Peace I scenario represents the increase in Basin supply resulting from the use of recycled water for groundwater recharge as well as small adjustments in storage loss and net storage requirements.[42]

Finally, notice in the comparison of Tier 2 purchases by individual agencies in Tables 1-3 that the distribution of Tier 2 water purchases across individual agencies in the Basin differs in all three scenarios relative to the distributions of safe operating yield and the distribution of actual production. These elements together comprise the basis for the allocation of collective Basin net benefits to individual agencies, with the division of market benefits from Basin improvement activities determined by each agency's share of Tier 2 water purchases, and the allocation of cost determined through Watermaster formulas that are based either on a individual agency's share of actual production to total Basin production or on a individual agency's share of safe operating yield. Differences in the distributions of these three key values across individual agencies in the Basin are responsible for inequalities in the distribution the net benefit from the various program elements that improve the management of Chino Basin water resources.

[42] Recycled water for direct use offsets urban water demand, but does not otherwise influence Basin production.

Table 3: Year 2015 Outcome Under Peace II Scenario

	Appropriator								
Component	Chino	Chino Hills	Ontario	Upland	Cucamonga	Monte Vista	Jurupa	Pomona	**Total**
Urban Water Demand	26,200	24,700	66,600	22,500	72,500	14,100	36,350	30,264	**293,214**
Available Surface Water	0	0	0	5,200	3,000	0	500	0	**8,700**
Available Other Groundwater	0	0	0	3,800	5,400	0	0	1,884	**11,084**
Residual Demand	*26,200*	*24,700*	*66,600*	*13,500*	*64,100*	*14,100*	*35,850*	*28,380*	**273,430**
Safe Operating Yield	4,034	2,111	11,374	2,852	3,619	4,824	2,061	11,216	**42,092**
New Yield	883	462	2,489	624	792	2,455	451	2,489	**10,645**
Net Ag Transfer	10,103	2,176	7,559	1,581	2,560	2,739	15,599	6,215	**48,530**
Desalter Water Supply	5,000	4,200	5,000	0	0	0	19,922	0	**34,122**
Storage & Recovery	527	658	3,671	1,364	5,160	1,801	909	909	**15,000**
Recycled Water, Direct Use	6,300	4,000	8,800	0	15,900	500	2,500	1,500	**39,500**
Recycled Water, Replenishment	2,402	2,188	5,590	2,450	5,304	1,070	1,667	0	**20,671**
Available Supply	*29,248*	*15,796*	*44,482*	*8,871*	*33,336*	*11,990*	*42,181*	*22,294*	**208,199**
Net Storage	0	69	527	-153	5	94	0	217	**759**
Transfers	-3,048	2,784	7,026	1,389	9,546	684	-6,331	1,955	**14,004**
Import Demand	*0*	*6,190*	*15,619*	*3,087*	*21,223*	*1,520*	*0*	*4,347*	**51,986**
Local Storage	0	6,360	15,798	3,306	21,974	1,507	0	4,347	**53,293**
Replenishment Purchases	0	4,977	12,559	2,482	17,064	1,222	0	3,495	**41,800**
Tier 2 Purchases	0	1,213	3,060	605	4,158	298	0	852	**10,186**
Actual Production	19,900	14,516	42,550	10,227	26,762	12,159	33,350	22,706	**182,170**
Watermaster Assessments	$707	$447	$1,368	$327	$804	$411	$1,129	$753	**$5,946**

Figure 3 compares the benefit received by each agency from reduced water procurement costs to the increase in assessment cost that result from the implementation of the program elements in the Peace II scenario. The program costs in the Peace II scenario do not differ substantively from program costs in the Peace I scenario, and represent an overall increase from $17 million to $143.2 million in present value terms. The program benefits in present value terms in the Peace II scenario are reflected in the decrease in water procurement costs from $2.1 billion under baseline conditions to $1.1 billion in the Peace II scenario.

City of Ontario and Cucamonga Valley Water District receive the largest share of the benefits resulting from the Peace II program elements, while the assessment costs resulting from the Peace II program elements are notably smaller and distributed more equally across the agencies. In total, the City of Ontario and Cucamonga Valley Water District together receive 56 percent of the benefit of decreased water procurement costs and incur 39 percent of the increase in assessment costs.

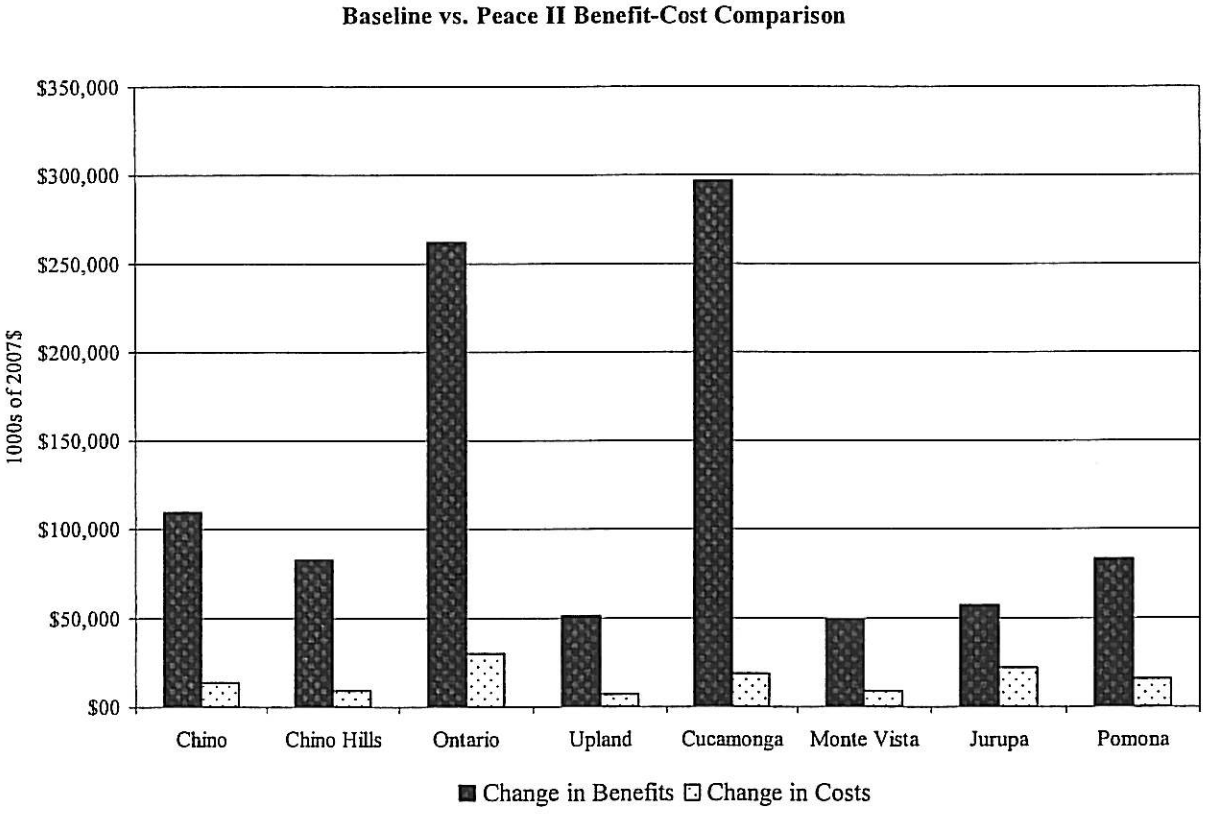

Figure 3

Distribution of Net Benefit, Peace II vs. Baseline ($/per AF)

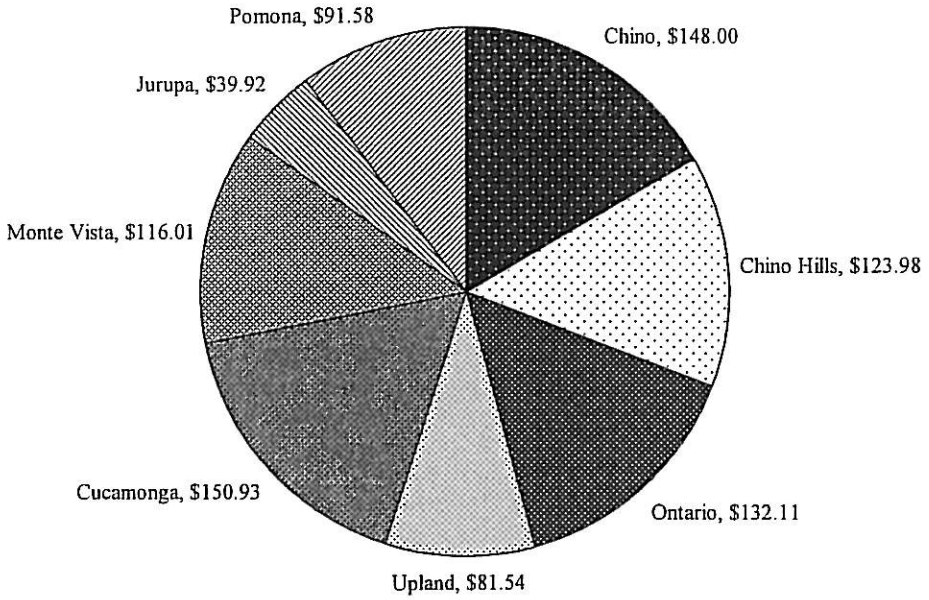

Figure 4

Figure 4 depicts the distribution of net benefits per acre-foot of residual water demand across individual agencies in the Basin resulting from the program elements in the Peace II scenario. Overall, the present value of the net benefit to all parties over the 24 year horizon resulting from a move from baseline conditions to Peace conditions is $905 million and the total projected water demand over this period is 9.1 million AF, which implies an average return of $98.53 per acre-foot to the agencies encompassed by the study.

Noting, as before, that Fontana Union Water Company and San Antonio Water Company have available surface water and other groundwater supplies in excess of their demand, and controlling for agency scale on the basis of residual demand for Basin water among the remaining producers, the net benefit resulting from the combined program elements in the Peace II Agreement lies between $39.92/AF for Jurupa CSD to $150.93 for Cucamonga Valley Water District.

The net benefit/AF received by Jurupa Community Services District is significantly smaller than the net benefit/AF received by other producers, because of systematic differences in the way this agency meets consumer water demand. Jurupa Community Services District is disadvantaged in the ability to capitalize on program elements that improve Basin performance by the large share of desalter water for urban water supply it receives, which cannot be defrayed by the development of new Basin supplies, and by a negligible reliance on imported water from MWD.

Among the remaining agencies, the Cities of Pomona and Upland receive a smaller share of the net benefit/AF, while Monte Vista Water District, the Cities of Chino, Ontario, Upland, and Chino Hills, and Cucamonga Valley Water District each receive a net benefit/AF above $116/AF.

7. Alternative Scenarios

This section examines the sensitivity of the results to variations in various assumptions underlying the model. In theory, each of the factors considered here has the potential to change the relative rankings among agencies with respect to benefits per acre-foot. For example, increasing the cost of capital will tend to elevate the ranking of agencies that receive benefits in early years. These sensitivity analyses are intended to bracket actual results and measure the sensitivity of outcomes to changes in assumptions.

Five parameters are varied and the model results are recalculated in each case. The alternative scenarios considered are: (i) variation in the share of the desalter replenishment obligation attributed to the appropriative pool in the baseline case; (ii) variation in the discount rate; (iii) variation in Urban Water Demands; (iv) variation in the availability of Tier 1 water to agencies in the Basin; and (v) increases in effective recycled water prices due to the long-run average cost of recycled water infrastructure improvements.

The model results are most sensitive to the scenario in which all Tier 2 water purchases in the model are replaced with Tier 1 water purchases at the lower MWD rate. The results of this scenario are shown in Table 4. This scenario provides a bracketing assumption on the value of the outside water options available to agencies and it is unlikely that each agency can meet annual increases in urban water demand every year with a continued expansion of Tier 1 purchases. To the extent that individual agencies differ in their access to Tier 1 water, moreover, market forces would lead to a displacement of Tier 2 water purchases on the extensive margin of supply before any displacement occurs of Tier 1 water purchases, so that a model that considered a relatively equal mix of Tier 1 and Tier 2 water supplies would not result in values near the mid-point between the Tier 1 scenario and the Tier 2 scenario. Nonetheless, the total net benefit in the Basin under Peace II scenario remains high—$611.7 million ($88.89/AF)—even when the entire increase in Basin supply is valued at the displacement cost of Tier 1 water.

The model results are fairly robust to variations in the remaining parameters. In total, the net benefit of the Peace II program elements varies across the scenarios in a range between $806.7 million - $864.4 million ($87.87/AF - $104.22/AF) in each scenario, relative to the $904.6 million ($98.53/AF) at baseline levels of the parameters.

Table 4: Tier 2 Replaced By Tier 1

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$8,549	$77,828	$13.18	$120.03
City of Chino Hills	$18	$46,218	$0.03	$77.92
City of Ontario	$1,451	$148,970	$0.83	$84.73
City of Upland	$328	$27,599	$0.61	$51.04
Cucamonga Valley Water District	$14,025	$175,240	$7.61	$95.10
Fontana Union Water Co.	$1,451	$26,880		
Monte Vista Water District	($2,090)	$27,005	($5.99)	$77.39
San Antonio Water Company	$342	$6,337		
Jurupa CSD	$10,611	$29,242	$12.01	$33.11
City of Pomona	($5,720)	$46,453	($7.76)	$62.99
Total	**$28,965**	**$611,773**	**$3.15**	**$66.63**

Table 5: 50% of Desalter Obligation Paid by Ag Pool

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$15,450	$91,122	$23.83	$140.53
City of Chino Hills	$9,681	$71,001	$16.32	$119.70
City of Ontario	$28,888	$218,613	$16.43	$124.34
City of Upland	$6,017	$40,661	$11.13	$75.20
Cucamonga Valley Water District	$56,320	$273,782	$30.56	$148.57
Fontana Union Water Co.	($2,836)	$22,592		
Monte Vista Water District	$1,232	$34,687	$3.53	$99.41
San Antonio Water Company	($669)	$5,326		
Jurupa CSD	$13,297	$32,779	$15.06	$37.11
City of Pomona	($5,280)	$54,068	($7.16)	$73.31
Total	**$122,101**	**$844,632**	**$13.30**	**$91.99**

Table 6: 5.5% Discount Rate

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$17,681	$84,906	$27.27	$130.95
City of Chino Hills	$11,108	$65,916	$18.73	$111.13
City of Ontario	$38,234	$207,227	$21.75	$117.86
City of Upland	$8,595	$39,560	$15.90	$73.16
Cucamonga Valley Water District	$54,862	$247,990	$29.77	$134.57
Fontana Union Water Co.	$4,231	$26,907		
Monte Vista Water District	$6,265	$36,087	$17.95	$103.42
San Antonio Water Company	$997	$6,343		
Jurupa CSD	$13,877	$31,426	$15.71	$35.58
City of Pomona	$7,315	$60,400	$9.92	$81.90
Total	**$163,165**	**$806,761**	**$17.77**	**$87.87**

Table 7: 10% Conservation

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$18,131	$88,819	$31.07	$152.20
City of Chino Hills	$13,070	$70,172	$24.48	$131.45
City of Ontario	$44,196	$223,937	$27.93	$141.52
City of Upland	$8,602	$39,805	$17.68	$81.80
Cucamonga Valley Water District	$64,718	$268,848	$39.02	$162.10
Fontana Union Water Co.	$4,989	$30,656		
Monte Vista Water District	$6,205	$37,920	$19.76	$120.75
San Antonio Water Company	$1,176	$7,227		
Jurupa CSD	$15,189	$33,707	$19.11	$42.40
City of Pomona	$6,788	$63,259	$10.23	$95.30
Total	**$183,064**	**$864,350**	**$22.07**	**$104.22**

Table 8: 50% Increase in Recycled Water Price

	Net Benefit (1000s of $)		Net Benefit/AF	
	Peace I vs. Baseline	*Peace II vs. Baseline*	*Peace I vs. Baseline*	*Peace II vs. Baseline*
City of Chino	$20,294	$88,913	$31.30	$137.13
City of Chino Hills	$12,217	$69,270	$20.60	$116.78
City of Ontario	$42,547	$220,779	$24.20	$125.57
City of Upland	$9,442	$42,215	$17.46	$78.07
Cucamonga Valley Water District	$60,667	$262,234	$32.92	$142.30
Fontana Union Water Co.	$4,839	$30,268		
Monte Vista Water District	$7,025	$39,277	$20.13	$112.56
San Antonio Water Company	$1,141	$7,136		
Jurupa CSD	$15,772	$31,962	$17.86	$36.19
City of Pomona	$8,189	$66,517	$11.10	$90.19
Total	**$182,133**	**$858,571**	**$19.84**	**$93.51**

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Analysis of Aggregate Costs and Benefits of Hydraulic Control, Basin Re-Operation and Desalter Elements of Non-Binding Term Sheet

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Summary

The report measures the economic costs and benefits of achieving hydraulic control through re-operation of the Chino Basin. Various scenarios are considered in the analysis, with scenarios chosen to reflect uncertainty regarding future values of water, the time path of annual overdrafts selected to dewater the basin, and the use of the resulting induced inflow from the Santa Ana River. As shown in Table 1, depending on the scenario chosen, the net benefits of achieving hydraulic control through basin re-operation range between $283.1 million and $438.8 million in 2006 dollars.

1. Introduction

Hydraulic control refers to the elimination or reduction to negligible quantities of discharge from the Chino North Management Zone to the Santa Ana River. Basin re-operation is defined as the increase in controlled overdraft as defined in the Judgment from 200,000 acre-feet over the period 1978 through 2017, to 600,000 acre-feet through 2030 with the 400,000 acre-feet allocated specifically to meet the replenishment obligation of the desalters.

2. Framework

The model of groundwater value used in this report is standard in the academic literature.[1] The net benefits in each period resulting from access to a groundwater resource are the gains from pumping (i.e., the demand for water) minus the costs of extraction in the current period and a "user cost" term that reflects the change in future consumption possibilities resulting from current choices. The stream of annual net benefits is then discounted back to current dollars using a discount factor predicated on the rate of interest.

[1] Brozovic, N., D. Sunding and D. Zilberman, "Optimal Management of Groundwater Over Space and Time." *Frontiers in Water Resource Economics*. D. Berga and R. Goetz, eds. New York: Springer-Verlag, 2005; Gisser, M., and Sanchez, D.A. "Competition versus Optimal Control in Groundwater Pumping." *Water Resources Research* (1980): 638-642; Brown, G., Jr., and Deacon, R. "Economic Optimization of a Single-Cell Aquifer." *Water Resources Research* (1975): 557-564.

The interest rate used in the analysis is 5.5%. This rate corresponds to the current risk-free long-term rate of interest, a relevant rate for public agencies with good credit. The discount factor for a payment occurring in some future period t is then $(1.055)^{-t} \approx e^{-0.055t}$.

Let y_t denote groundwater produced during period t, and x_t equal the stock of groundwater at beginning of period t. The value of the groundwater resource is then

$$Value = \sum_{t=0}^{\infty} (1+r)^{-t} \left[B(y_t) - C(x_t, y_t) \right],$$

where $B(y_t)$ denotes the benefits from groundwater production in period t, and $C(x_t, y_t)$ is the cost of extraction and recharge. In an economic optimization model, the problem is to find the time path of production and stock that maximizes the present value of access to the aquifer, subject to physical constraints such as the equation of motion $x_{t+1} = x_t + g(x_t, y_t) - y_t$ (where $g(x_t, y_t)$ denotes natural and artificial recharge) and regulatory constraints such as water quality objectives and requirements to operate the basin in a steady-state condition.

Viewed this way, basin re-operation and its alternatives can be modeled as different evolutions of production, stock and recharge. The net benefit of a particular basin re-operation strategy versus a baseline that maintains the current stock of groundwater is the difference of present value resulting from a particular choice of these policy variables.

The study period extends indefinitely into the future, but the period between the present and 2030 is modeled in more detail. This feature results from the fact that the Peace Agreement lasts until 2030, and more detailed environmental and water use modeling is available to this date. As described below, terminal values are assigned to key parameters from 2031 on, and at this point the groundwater system in the Chino Basin is assumed to enter into a steady state, with no expected change in production, groundwater elevation or recharge amounts.

Table 2 displays the assumptions made about groundwater production from the Chino Basin. All figures in the table are common to all scenarios considered, and thus these assumptions are not the basis for differences in value between scenarios. The table shows groundwater production increasing steadily throughout the study period. Desalter production is also increasing throughout the study period. Operating yield is set at 145,000 acre-feet through 2017, at which point it declines to 140,000 acre-feet annually. Finally, new stormwater recharge is assumed to be 12,000 acre-feet annually.

It is necessary to describe a scenario without basin re-operation in order to calculate the net benefits, if any, from this type of strategy. Table 3 displays the physical consequences of such an alternative. If the basin is not de-watered, then hydraulic control will not be achieved, and there will be water quality costs as a result. One such consequence is that relatively high-quality water must be used for recharge. In particular, the Basin would lose the ability to use relatively inexpensive recycled water for replenishment purposes

and would be forced to use water purchased from MWD instead.[2] Thus, Table 3 shows that the entire replenishment obligation for both normal and desalter production is met through the purchase of replenishment water from MWD.

In the event that hydraulic control is achieved, there are two types of benefits to the Chino Basin as a whole. The first benefit relates to water quality. As discussed above, if hydraulic control is achieved, then recycled water can be used for 30% of the total Basin replenishment obligation, up to an assumed capacity of 30,000 acre-feet annually.[3] The second benefit is that lowering the groundwater elevation in the Basin induces an inflow of water from the Santa Ana River. Specifically, forgiving a reduction in the stock of groundwater in the Basin results in an average of 9,900 acre-feet annually until the 400,000 acre-feet of depletion credits are exhausted, and then 12,500 acre-feet annually thereafter. This natural recharge is new yield in the Basin; as discussed below, it can be used either for reducing the desalter replenishment obligation or as an asset in its own right.

3. Scenarios

The valuation model is implemented under a variety of assumptions about how re-operation will occur, how the Santa Ana River inflows are treated, and the level of future water prices. This section describes the construction of alternative scenarios.

Implementation of Basin Re-Operation

The basic principle of basin re-operation is that it is a means of achieving hydraulic control by increasing cumulative overdraft by 400,000 acre-feet through 2030. Overdraft is to be achieved by forgiving the replenishment obligation of the desalters by some annual amount over a defined period of time. This general principle is silent about *how* the total quantity of forgiveness of desalter replenishment is to be allocated over time.

This analysis considers two possible implementation scenarios. The first scenario, termed the straightline alternative, envisions an annual overdraft of 20,346 acre-feet occurring until 2030, at which time the annual overdraft would fall to zero and the system is assumed to enter into a new steady-state from 2031 onward. The second scenario, called the most rapid depletion path alternative, sets the annual overdraft to eliminate the desalter replenishment obligation for as long as possible.

Tables 4 and 7 display annual overdraft amounts under these two alternatives for implementing basin re-operation. As described, the straightline alternative entails constant annual overdraft quantities, resetting to zero from 2031 onwards. The most rapid

[2] Alternatively, recycled water would have to be desalted prior to recharge. Costs are not available at this time for this option.

[3] Assumptions provided by Watermaster staff. If hydraulic control is achieved, it may be possible to increase this limit. In this case, the benefits resulting from basin re-operation would increase.

depletion path reaches a maximum annual overdraft of 30,289 acre-feet before dropping to zero in 2020.

Allocation of Induced Santa Ana River Inflow

A second dimension along which the scenarios vary is with regard to the allocation of Santa Ana River inflows induced by the reduction of the groundwater stock. A total of 12,500 acre-feet of new yield is assumed to result from the dewatering, and the scenarios differ in terms of the use of this new yield. One scenario allocates all Santa Ana River inflows from re-operation to reducing the desalter replenishment obligation. An alternative scenario treats these inflows as a resource to be used for any purpose; consequently, desalter replenishment obligations are higher under this assumption.

Tables 5 and 6 relate to the straightline depletion case and show replenishment obligations and sources under the two Santa Ana River inflow allocation alternatives. In Table 5, new yield is allocated to desalter replenishment, and the desalter replenishment obligation is negligible in the near term and reaches a maximum of 9,943 acre-feet during the study period. In Table 6, by contrast, total replenishment obligations are higher since the new yield can be used for any chosen purpose.

Tables 8 and 9 show replenishment obligations under the most rapid depletion path scenario. Results are similar as in the straightline depletion scenario, with the exception that desalter replenishment is forestalled until 2025 if new yield is allocated to this purpose.

Future Water Prices

Given the important role of relative prices in the economic analysis, and given uncertainties regarding the evolution of water values in Southern California, the analysis considers two alternative scenarios regarding future water prices. These scenarios are taken from MWD and are commonly referred to as the high rate and low rate scenarios. MWD scenarios cover Tier 1 and Tier 2 water, as well as replenishment water. The high rate scenario has the Tier 2 rate growing at an annual rate of 3.11% for the next five years, and then by 4.50% from 2011 to 2030. The replenishment rate grows at 6.94% through 2011, and then at 4.50% to 2030. In the low rate scenario, the Tier 2 rate grows by 2.28% annually for the next five years, and then by 3.00% from 2011 to 2030. The replenishment rate is assumed to grow by 4.79% through 2011, and by 3.00% thereafter.

The current price of recycled water for replenishment is assumed to be $69 per acre-foot.[4] In the high rate scenario, this price was assumed to grow at the same rate of inflation as

[4] One public comment received after the July 26, 2006 presentation stated that the actual price paid for recycled water should be used in the analysis. While this price is not yet known, it is likely to exceed $69 per acre-foot. Note, however, that this study considers the aggregate costs and benefits of elements of the non-binding term sheet. Thus, changes in the price of recycled water have distributional as opposed to efficiency effects, that is, they change the relative level of benefits enjoyed by the parties in the Chino Basin rather than affecting the total level of benefits.

the Tier 2 and MWD replenishment prices: 4.50%. Similarly, the recycled water price grows by 3.00% annually in the low rate scenario.

4. Other Effects of Basin Re-Operation

An additional benefit of hydraulic control is a reduction in storage losses. Measuring the value of reduced storage losses is conditioned on several factors that are not fully known at present. Of course, the ex post performance of any groundwater storage program depends on the sequence of puts and takes, which depend in turn on the sequence of wet and dry years. Based on conversations with Watermaster staff, the groundwater storage program is assumed to be 400,000 acre-feet over the study period, but may range from 300,000 to 500,000 acre-feet.[5] Calculations provided by Wildermuth Environmental detail the relationship between average storage over the life of the MWD Dry Year Yield program and associated losses at 0.66 and 2 percent. Table 12 summarizes cumulative losses through 2028, together with present values calculated using the high and low rate scenarios for MWD replenishment rates as described above.

Assuming 2 percent loss and a 400,000 acre-foot storage program, the present value of reduced storage losses is $24.9 million in 2006 dollars in the high rate scenario and $20.4 million in the low rate scenario. These calculations are performed ex ante, and the actual magnitude of reduced storage losses will depend on factors including the size of the storage program, the percentage storage loss, the timing of puts and takes, and the actual replenishment rates charged by MWD. For the purpose of aggregating reduced storage loss benefits with other benefits and costs of basin re-operation, we will assume a 400,000 acre-foot storage program for both the high and low rate scenarios with storage losses equal to half of the amounts in Table 12 (recall that storage losses could range from 0 to 2 percent). The corresponding values of reduced storage losses are $12.4 million and $10.2 million for the high and low rate scenarios, respectively.

Achieving hydraulic control through basin re-operation will also result in higher pumping costs since forgiveness of the desalter replenishment operation is intended to lower the groundwater elevation in certain regions. The information needed to calculate the present value of increased pumping costs includes the quantity-weighted average change in lift in the Basin resulting from re-operation, the energy requirement per unit lift and energy costs per kilowatt-hour. Wildermuth Environmental provided the weighted average changes in groundwater elevation. The price of electricity is assumed to be $0.14/kwh, and the pumping efficiency is taken to be 75 percent. The California Energy Commission forecasts that commercial and agricultural electricity rates charged by investor-owner utilities operating in California will decline slightly in nominal terms until 2013, when

[5] The Peace Agreement provides that there is Target Storage of 500,000 acre-feet *in excess* of then existing storage, whereas this report only considers the Safe Harbor quantity of 500,000 acre-feet of storage in total. In some sense, there is a tradeoff between the decision to pursue max-benefit and the feasibility of obtaining the higher amount of storage. It should also be noted, however, that the basin is at the limit of shift capacity for export, and expansion of recharge to achieve greater storage is costly. Further, the PEIR only considered an additional 250,000 acre-feet of storage.

their forecast terminates.[6] This analysis assumes that nominal electricity prices are constant.

Combining this information, increased pump lift costs have a present value of $14.9 million in the straightline depletion scenario. In the rapid pulldown scenario, re-operation has a larger impact on the present value of energy costs since the groundwater elevation is reduced to the same level but at an earlier date. Increased energy costs have a present value of $19.4 million in this scenario. Both calculations include increased energy costs in the new basin steady state achieved after 2030.

5. Results

Table 1 summarizes the results of the economic analysis. The figures in the table are the net benefits resulting from access to the Chino Basin aquifer under the alternative management and price scenarios described in the previous section. In all cases, basin re-operation results in aggregate net benefits. However, there are significant differences in net benefits depending on the realization of future water prices and the use of Santa Ana River inflows induced by reducing the stock of groundwater. The rapidity with which basin re-operation is implemented matters less.

When Santa Ana River inflow is allocated to desalter replenishment and overdraft occurs in constant annual amounts to 2030, basin re-operation results in gains of between $283.1 and $391.4 million in present value terms, depending on the growth of water prices and how the replenishment credit is used over time. These gains result from the ability to use recycled water for a fraction of recharge if hydraulic control is achieved, the value of new yield, and the value of the forgiven desalter replenishment.[7]

Since new yield is reliable, in any case more reliable than a supply of replenishment water, allocating it to desalter replenishment would seem to be inefficient. The Tier 2 rate is well above the price of replenishment water, which is a weighted average of the MWD replenishment rate and the price of recycled water. When Santa Ana River inflows are decoupled from replenishment obligations, the gains from straightline basin re-operation are between $341.9 and $438.8 million.

There is a small increase in the net benefits of basin re-operation when the most rapid overdraft strategy is implemented. Several factors explain this result. First, in the most rapid depletion scenario, the 30,000 acre-foot constraint on annual recycling recharge binds more frequently. Accordingly, less recycled water is recharged over the study

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[6] http://www.energy.ca.gov/electricity/rates_iou_vs_muni_nominal/medium_commercial.html; http://www.energy.ca.gov/electricity/rates_iou_vs_muni_nominal/agricultural.html

[7] Another potential source of loss is the option value of the water taken from the groundwater stock. That is, water used to avoid desalter replenishment is water that is not available in the event of a major disruption in surface water supplies to the region. Given the difficulty of describing and quantifying these future states of nature, option values have not been calculated. However, conversations with Watermaster staff indicate that dewatering will not result in any meaningful loss of operational flexibility since the percentage depletion of the aquifer envisioned through re-operation is relatively small.

period under this scenario. Second, while the most rapid depletion strategy delays replenishment, it also hastens the date at which a large replenishment obligation occurs once the desalter replenishment forgiveness of 400,000 acre-feet is exhausted.[8] Given the relatively low real discount rate used in this study (i.e., the nominal discount rate minus the rate of growth of water prices), it is not surprising that dynamic factors such as this do not have a large effect on net benefits.

[8] This study has not considered the capital and operating costs of expanding recharge capacity. Allocating Santa Ana River inflows to desalter replenishment delays the date at which capacity is exceeded, as does the most rapid depletion strategy.

Table 1: Net Benefits of Hydraulic Control, Basin Re-Operation and Desalter Production

(Figures in millions of 2006 dollars)

Gain Over Baseline: SAR Inflow Allocated to Desalter Replenishment

	High Rate	*Low Rate*
Straightline	388.6	283.1
Most Rapid	391.4	288.4

Gain Over Baseline: SAR Inflow Unallocated

	High Rate	*Low Rate*
Straightline	436.2	341.9
Most Rapid	438.8	347.7

Source: Calculated.

Table 2: Production, Operating Yield and Stormwater Recharge

Year	*Total Production*	*Chino Desalter Production*	*Operating Yield*	*New Stormwater Recharge*
2006	223,505	30,019	145,000	12,000
2007	230,566	31,923	145,000	12,000
2008	237,634	33,827	145,000	12,000
2009	244,702	35,731	145,000	12,000
2010	251,874	37,748	145,000	12,000
2011	251,768	38,980	145,000	12,000
2012	251,661	40,212	145,000	12,000
2013	251,551	41,445	145,000	12,000
2014	251,557	42,789	145,000	12,000
2015	250,216	42,789	145,000	12,000
2016	250,427	42,789	145,000	12,000
2017	250,640	42,789	145,000	12,000
2018	250,851	42,789	140,000	12,000
2019	251,060	42,789	140,000	12,000
2020	251,270	42,789	140,000	12,000
2021	254,049	42,789	140,000	12,000
2022	256,827	42,789	140,000	12,000
2023	259,605	42,789	140,000	12,000
2024	262,384	42,789	140,000	12,000
2025	265,163	42,789	140,000	12,000
2026	266,133	42,789	140,000	12,000
2027	267,104	42,789	140,000	12,000
2028	268,074	42,789	140,000	12,000
2029	269,044	42,789	140,000	12,000
2030	270,014	42,789	140,000	12,000

Source: Wildermuth Environmental.

Table 3: Replenishment Obligations and Sources – No Basin Re-Operation

Year	*Normal Production Replenishment Obligation*	*Chino Desalter Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	36,487	30,019	66,505	0
2007	41,643	31,923	73,566	0
2008	46,806	33,827	80,634	0
2009	51,970	35,731	87,702	0
2010	57,126	37,748	94,874	0
2011	55,788	38,980	94,768	0
2012	54,448	40,212	94,661	0
2013	53,107	41,445	94,551	0
2014	51,768	42,789	94,557	0
2015	50,427	42,789	93,216	0
2016	50,638	42,789	93,427	0
2017	50,851	42,789	93,640	0
2018	56,062	42,789	98,851	0
2019	56,271	42,789	99,060	0
2020	56,482	42,789	99,270	0
2021	59,260	42,789	102,049	0
2022	62,038	42,789	104,827	0
2023	64,816	42,789	107,605	0
2024	67,595	42,789	110,384	0
2025	70,374	42,789	113,163	0
2026	71,344	42,789	114,133	0
2027	72,315	42,789	115,104	0
2028	73,285	42,789	116,074	0
2029	74,255	42,789	117,044	0
2030	75,225	42,789	118,014	0

Source: Calculated.

Normal Production Replenishment Obligation = Total Production – Desalter Production – Operating Yield – New Stormwater Recharge

Desalter Replenishment Obligation = Desalter Production

Table 4: Overdraft and SAR Inflow – Straightline Depletion Scenario

Year	*Annual Overdraft*	*Cumulative Overdraft*	*SAR Inflow*
2006	16,000	16,000	9,900
2007	16,000	32,000	9,900
2008	16,000	48,000	9,900
2009	16,000	64,000	9,900
2010	16,000	80,000	9,900
2011	16,000	96,000	9,900
2012	16,000	112,000	9,900
2013	16,000	128,000	9,900
2014	16,000	144,000	9,900
2015	16,000	160,000	9,900
2016	16,000	176,000	9,900
2017	16,000	192,000	9,900
2018	16,000	208,000	9,900
2019	16,000	224,000	9,900
2020	16,000	240,000	9,900
2021	16,000	256,000	9,900
2022	16,000	272,000	9,900
2023	16,000	288,000	9,900
2024	16,000	304,000	9,900
2025	16,000	320,000	9,900
2026	16,000	336,000	9,900
2027	16,000	352,000	9,900
2028	16,000	368,000	9,900
2029	16,000	384,000	9,900
2030	16,000	400,000	9,900

Sources: Annual and Cumulative Overdraft: Assumed; SAR Inflow, Wildermuth Environmental.

Table 5: Replenishment Obligations and Sources – Straightline Depletion Scenario with SAR Inflow Allocated to Desalter Replenishment

Year	*Normal Production Replenishment Obligation*	*Chino Desalter Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	36,487	4,119	28,424	12,182
2007	41,643	6,023	33,366	14,300
2008	46,806	7,927	38,314	16,420
2009	51,970	9,831	43,261	18,541
2010	57,126	11,848	48,282	20,692
2011	55,788	13,080	48,208	20,660
2012	54,448	14,312	48,133	20,628
2013	53,107	15,545	48,056	20,595
2014	51,768	16,889	48,060	20,597
2015	50,427	16,889	47,121	20,195
2016	50,638	16,889	47,269	20,258
2017	50,851	16,889	47,418	20,322
2018	56,062	16,889	51,065	21,885
2019	56,271	16,889	51,212	21,948
2020	56,482	16,889	51,359	22,011
2021	59,260	16,889	53,304	22,845
2022	62,038	16,889	55,249	23,678
2023	64,816	16,889	57,194	24,512
2024	67,595	16,889	59,139	25,345
2025	70,374	16,889	61,084	26,179
2026	71,344	16,889	61,763	26,470
2027	72,315	16,889	62,443	26,761
2028	73,285	16,889	63,121	27,052
2029	74,255	16,889	63,801	27,343
2030	75,225	16,889	64,480	27,634

Source: Calculated.

Normal Production Replenishment Obligation = Total Production – Desalter Production – Operating Yield – New Stormwater Recharge

Desalter Replenishment Obligation = Desalter Production – Annual Overdraft – SAR Inflow

Recycling Replenishment = min[0.3*(Normal Production Replenishment Obligation + Desalter Replenishment Obligation), 30,000]

MWD Replenishment = Normal Production Replenishment Obligation + Desalter Replenishment Obligation - Recycling Replenishment

Table 6: Replenishment Obligations and Sources – Straightline Depletion Scenario with SAR Inflow Unllocated

Year	*Total Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	50,505	35,354	15,152
2007	57,566	40,296	17,270
2008	64,634	45,244	19,390
2009	71,702	50,191	21,511
2010	78,874	55,212	23,662
2011	78,768	55,138	23,630
2012	78,661	55,063	23,598
2013	78,551	54,986	23,565
2014	78,557	54,990	23,567
2015	77,216	54,051	23,165
2016	77,427	54,199	23,228
2017	77,640	54,348	23,292
2018	82,851	57,995	24,855
2019	83,060	58,142	24,918
2020	83,270	58,289	24,981
2021	86,049	60,234	25,815
2022	88,827	62,179	26,648
2023	91,605	64,124	27,482
2024	94,384	66,069	28,315
2025	97,163	68,014	29,149
2026	98,133	68,693	29,440
2027	99,104	69,373	29,731
2028	100,074	70,074	30,000
2029	101,044	71,044	30,000
2030	102,014	72,014	30,000

Source: Calculated.

Total Replenishment Obligation = Total Production – Operating Yield – Annual Overdraft – New Stormwater Recharge

Recycling Replenishment = min[0.3*Total Replenishment Obligation, 30,000]

MWD Replenishment = Total Replenishment Obligation - Recycling Replenishment

Table 7: Overdraft and SAR Inflow – Most Rapid Depletion Scenario

Year	*Annual Overdraft*	*Cumulative Overdraft*	*SAR Inflow*
2006	20,119	20,119	9,900
2007	22,023	42,141	9,900
2008	23,927	66,069	9,900
2009	25,831	91,900	9,900
2010	27,848	119,748	9,900
2011	29,080	148,828	9,900
2012	30,312	179,141	9,900
2013	31,545	210,685	9,900
2014	32,889	243,574	9,900
2015	32,889	276,463	9,900
2016	32,889	309,352	9,900
2017	32,889	342,241	9,900
2018	32,889	375,130	9,900
2019	24,870	400,000	9,900
2020	0	400,000	12,500
2021	0	400,000	12,500
2022	0	400,000	12,500
2023	0	400,000	12,500
2024	0	400,000	12,500
2025	0	400,000	12,500
2026	0	400,000	12,500
2027	0	400,000	12,500
2028	0	400,000	12,500
2029	0	400,000	12,500
2030	0	400,000	12,500

Sources: Annual and Cumulative Overdraft: Assumed; SAR Inflow: Wildermuth Environmental.

Table 8: Replenishment Obligations and Sources – Most Rapid Depletion Scenario with SAR Inflow Allocated to Desalter Replenishment

Year	*Normal Production Replenishment Obligation*	*Chino Desalter Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	36,487	0	25,541	10,946
2007	41,643	0	29,150	12,493
2008	46,806	0	32,764	14,042
2009	51,970	0	36,379	15,591
2010	57,126	0	39,988	17,138
2011	55,788	0	39,051	16,736
2012	54,448	0	38,114	16,335
2013	53,107	0	37,175	15,932
2014	51,768	0	36,238	15,530
2015	50,427	0	35,299	15,128
2016	50,638	0	35,447	15,191
2017	50,851	0	35,596	15,255
2018	56,062	0	39,243	16,819
2019	56,271	8,019	45,003	19,287
2020	56,482	30,289	60,739	26,031
2021	59,260	30,289	62,684	26,865
2022	62,038	30,289	64,629	27,698
2023	64,816	30,289	66,574	28,532
2024	67,595	30,289	68,519	29,365
2025	70,374	30,289	70,663	30,000
2026	71,344	30,289	71,633	30,000
2027	72,315	30,289	72,604	30,000
2028	73,285	30,289	73,574	30,000
2029	74,255	30,289	74,544	30,000
2030	75,225	30,289	75,514	30,000

Source: Calculated.

Normal Production Replenishment Obligation = Total Production – Desalter Production – Operating Yield – New Stormwater Recharge

Desalter Replenishment Obligation = Desalter Production – Annual Overdraft – SAR Inflow

Recycling Replenishment = min[0.3*(Normal Production Replenishment Obligation + Desalter Replenishment Obligation), 30,000]

MWD Replenishment = Normal Production Replenishment Obligation + Desalter Replenishment Obligation - Recycling Replenishment

Table 9: Replenishment Obligations and Sources – Most Rapid Depletion Scenario with SAR Inflow Unllocated

Year	*Total Replenishment Obligation*	*MWD Replenishment*	*Recycling Replenishment*
2006	46,387	32,471	13,916
2007	51,543	36,080	15,463
2008	56,706	39,694	17,012
2009	61,870	43,309	18,561
2010	67,026	46,918	20,108
2011	65,688	45,981	19,706
2012	64,348	45,044	19,305
2013	63,007	44,105	18,902
2014	61,668	43,168	18,500
2015	60,327	42,229	18,098
2016	60,538	42,377	18,161
2017	60,751	42,526	18,225
2018	65,962	46,173	19,789
2019	74,190	51,933	22,257
2020	99,270	69,489	29,781
2021	102,049	72,049	30,000
2022	104,827	74,827	30,000
2023	107,605	77,605	30,000
2024	110,384	80,384	30,000
2025	113,163	83,163	30,000
2026	114,133	84,133	30,000
2027	115,104	85,104	30,000
2028	116,074	86,074	30,000
2029	117,044	87,044	30,000
2030	118,014	88,014	30,000

Source: Calculated.

Total Replenishment Obligation = Total Production – Operating Yield – Annual Overdraft – New Stormwater Recharge

Recycling Replenishment = min[0.3*Total Replenishment Obligation, 30,000]

MWD Replenishment = Total Replenishment Obligation - Recycling Replenishment

Table 10: Prices – High Price Scenario

Year	*Tier 2 Price*	*Replenishment Price*	*Recycling Price*
2006	427	238	69
2007	427	238	72
2008	459	275	75
2009	473	297	79
2010	486	314	82
2011	497	331	86
2012	519	346	90
2013	543	361	94
2014	567	378	98
2015	593	395	103
2016	619	412	107
2017	647	431	112
2018	676	450	117
2019	707	471	122
2020	739	492	128
2021	772	514	134
2022	807	537	140
2023	843	561	146
2024	881	587	152
2025	920	613	159
2026	962	641	166
2027	1,005	669	174
2028	1,050	700	182
2029	1,098	731	190
2030	1,147	764	198

Source: Metropolitan Water District of Southern California.

Table 11: Prices – Low Price Scenario

Year	*Tier 2 Price*	*Replenishment Price*	*Recycling Price*
2006	427	238	69
2007	427	238	71
2008	450	261	73
2009	457	268	75
2010	463	282	78
2011	477	300	80
2012	491	309	82
2013	506	318	85
2014	521	328	87
2015	537	338	90
2016	553	348	93
2017	570	358	96
2018	587	369	98
2019	604	380	101
2020	622	391	104
2021	641	403	107
2022	660	415	111
2023	680	428	114
2024	700	441	117
2025	722	454	121
2026	743	467	125
2027	765	481	128
2028	788	496	132
2029	812	511	136
2030	836	526	140

Source: Metropolitan Water District of Southern California.

Table 12: Expected Value of Reduced Storage Losses

Program Size	*Losses*	*Present Value - High Rate*	*Present Value - Low Rate*
300,000	80,175	18,647,350	15,290,827
400,000	106,900	24,863,133	20,387,769
500,000	133,626	31,079,149	25,484,903

Source: Wildermuth Environmental.

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September 21, 2007

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2007 SUPPLEMENT TO THE IMPLEMENTATION PLAN OPTIMUM BASIN MANAGEMENT PROGRAM FOR THE CHINO BASIN

INTRODUCTION

This document describes the supplement to the implementation plan for the Chino Basin Optimum Basin Management Program (OBMP), as determined through the 2007 "Peace II" process.

PROGRAM ELEMENT 1 DEVELOP AND IMPLEMENT COMPREHENSIVE MONITORING PROGRAM

A. Production Monitoring Program

All active wells (except for minimum user wells) are now metered. Watermaster reads the production data from the meters on a quarterly basis and enters these data into Watermaster's relational database.

B. Surface Water Discharge and Quality Monitoring

Water Quality and Quantity in Recharge Basins. Watermaster measures the quantity and quality of storm and supplemental water entering the recharge basins. Pressure transducers or staff gauges are used to measure water levels during recharge operations. In addition to these quantity measurements, imported water quality values for State Water Project water are obtained from the Metropolitan Water District of Southern California (MWDSC) and recycled water quality values for the RP1 and RP4 treatment plant effluents are obtained from IEUA. Watermaster monitors the storm water quality in the eight major channels (San Antonio, West Cucamonga, Cucamonga, Deer Creek, Day Creek, San Sevaine, West Fontana, and DeClez) usually after each major storm

event. Combining the measured flow data with the respective water qualities enables the calculation of the blended water quality in each recharge basin, the "new yield" to the Chino Basin, and the adequate dilution of recycled water.

Surface Water Monitoring in Santa Ana River (SAR). Watermaster measures the discharge of the river and selected water quality parameters to determine those reaches of the SAR that are gaining flow from Chino Basin and/or, conversely, those reaches that are losing flow into the Chino Basin. These bi-weekly flow and water quality measurements are combined with discharge data from permanent USGS and Orange County Water District (OCWD) stream gauges and discharge data from publicly owned treatment works (POTWs). These data are used in groundwater modeling to assess the extent of hydraulic control.

HCMP Annual Report

In January 2004, the RWQCB amended the Water Quality Control Plan (Basin Plan) for the Santa Ana River Basin to incorporate an updated total dissolved solids (TDS) and nitrogen (N) management plan. The Basin Plan Amendment includes both "antidegradation" and "maximum benefit" objectives for TDS and nitrate-nitrogen for the Chino and Cucamonga groundwater management zones. The application of the "maximum benefit" objectives relies on Watermaster and the IEUA's implementation of a specific program of projects and requirements, which are an integral part of the OBMP. On April 15, 2005, the RWQCB adopted resolution R8-2005-0064; thus approving the Surface Water Monitoring Program and Groundwater Monitoring Program in support of maximum benefit commitments in the Chino and Cucamonga Basins. Watermaster and the IEUA completed the 2006 Annual Report, which summarizes the results for those two programs, and submitted it to the RWQCB on April 16, 2007 in partial fulfillment of maximum benefit commitments.

Chino Basin Recycled Water Groundwater Recharge Program

The IEUA, Watermaster, Chino Basin Water Conservation District, and San Bernardino County Flood Control District jointly sponsor the Chino Basin Recycled Water Groundwater Recharge Program. This is a comprehensive water supply program to enhance water supply reliability and improve the groundwater quality in local drinking water wells throughout the Chino Groundwater Basin by increasing the recharge of stormwater, imported water, and recycled water. The recharge program is regulated under RWQCB Order No. R8-2005-0033 and Monitoring and Reporting Program No. R8-2005-0033.

Monitoring Activities. Watermaster and the IEUA collect weekly and bi-weekly water quality samples from basins that are actively recharging recycled water and from lysimeters installed within those basins. Monitoring wells located down gradient of the recharge basins are sampled every two weeks during the reporting period for a total of about 100 samples.

Construction Activities. Lysimeters and monitoring wells associated with the RP-3, DeClez, and Ely Basins were installed in fiscal year (FY) 2006/07.

C. Ground Level Monitoring Program

Watermaster developed a multifaceted land surface monitoring program to develop data for a long-term management plan for land subsidence in Management Zone 1 (MZ-1). The monitoring program consisted of three main elements:

- An aquifer system monitoring facility consisting of multiple depth piezometers and a dual bore extensometer.
- The application of synthetic aperture radar interferometry (InSAR) to measure historical land surface deformation.
- Benchmark surveys to measure land surface deformation, "ground truth" the InSAR data, and evaluate effectiveness of the long term management plan.

Following two years of data collection and analysis, Watermaster submitted the MZ-1 Summary Report in October 2005, which contained Guidance Criteria to minimize subsidence and fissuring. The Guidance Criteria included a listing of Managed Wells and their owners subject to the criteria, a map of the so-called Managed Area, an initial threshold water level (Guidance Level) of 245 feet below the top of the PA-7 well casing, and a plan for ongoing monitoring and notification. Since October 2005, the MZ-1 Summary Report and the Guidance Criteria contained therein have been discussed extensively by the parties involved, and were adopted by the Watermaster Board at its May 2006 Meeting. The final MZ-1 Subsidence Management Plan was adopted by the Watermaster Board at its June 2007 Meeting.

The MZ-1 monitoring program continues unabated. Water level monitoring expanded to the central regions of MZ-1 with the installation of transducers/data loggers at selected wells owned by the City of Chino, the Monte Vista Water District, and the City of Pomona. This expansion of the water level monitoring program is the initial effort to better understand the mechanisms behind ongoing land subsidence in this region.

PROGRAM ELEMENT 2 -- DEVELOP AND IMPLEMENT COMPREHENSIVE RECHARGE PROGRAM

INTRODUCTION

Construction on the Chino Basin Facilities Improvement Project (CBFIP) Phase I was completed by December 31, 2005 at a cost of $38M; 50% from a SWRCB Proposition 13 Grant, and 25% each from Watermaster and the IEUA. A CBFIP Phase II list of projects was developed by Watermaster and the IEUA, including monitoring wells, lysimeters, recycled water connections, SCADA system expansions, three MWDSC turnouts, and berm heightening and hardening. At a cost of approximately $15M, these Phase II facilities will be financed through a 50% Grant from DWR and 25% each from Watermaster and the IEUA.

In FY 2005-2006, the CBFIP Phase I facilities were able to recharge 49,000 AF of storm and supplemental water. By the start of FY 2009-2010, most of the basins will be able to operate on a 12 months per year basis with combinations of storm, imported, and recycled water, with occasional downtime for silt and organic growth removal. Operations and basin planning are coordinated through the Groundwater Recharge Coordinating Committee (GRCC) which meets monthly.

Update to the Recharge Master Plan. The Recharge Master Plan will be updated as frequently as necessary and not less than every five (5) years, to reflect an appropriate schedule for planning, design, and physical improvements as may be required to offset the controlled mining at the end of the Peace Agreement and the end of forgiveness for Desalter replenishment.

Coordination. Watermaster will ensure that the members of the Appropriative Pool will coordinate the development of their respective Urban Water Management Plans and Water Supply Master Plans with Watermaster as follows.

(a) Watermaster will obtain from each Appropriator that prepares an Urban Water Management Plan and Water Supply Plan copies of their existing and proposed plans.

(b) Watermaster will use the Plans in evaluating the adequacy of the Recharge Master Plan and other OBMP Implementation Plan program elements.

(c) Each Appropriator will provide Watermaster with a draft in advance of adopting any proposed changes to their Urban Water Management Plans and in advance of adopting any material changes to their Water Supply Master Plans respectively in accordance with the customary notification routinely provided to other third parties to offer Watermaster a reasonable opportunity to provide informal input and informal comment on the proposed changes.

(d) Any party that experiences the loss or the imminent threatened loss of a material water supply source will provide reasonable notice to Watermaster of the condition and the expected impact, if any, on the projected groundwater use.

Suspension. To ameliorate any long-term risks attributable to reliance upon un-replenished groundwater production by the Desalters, the annual availability of any portion of the 400,000 acre-feet set aside for forgiveness, is expressly subject to Watermaster making an annual finding it is in substantial compliance with the revised Watermaster Recharge Master Plan pursuant to Paragraph 7.3 above.

Acknowledgment re 6,500 Acre-Foot Supplemental Recharge. The Parties have made the following acknowledgments regarding the 6,500 Acre-Foot Supplemental Recharge:

(e) A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To promote the goal of equal access to groundwater within all areas and sub-areas of the Chino Basin, Watermaster has committed to use its best efforts to direct recharge relative to production in each area and sub-area of the Basin and to achieve long-term balance between total recharge and discharge. The Parties acknowledge that to assist Watermaster in providing for recharge, the Peace Agreement sets forth a requirement for Appropriative Pool purchase of 6,500 acre-feet per year of Supplemental Water for recharge in Management Zone 1 (MZ1). The purchases have been credited as an addition to Appropriative Pool storage accounts. The water recharged under this program has not been accounted for as Replenishment water.

(f) Watermaster was required to evaluate the continuance of this requirement in 2005 by taking into account provisions of the Judgment, Peace Agreement and OBMP, among all other relevant factors. It has been determined that other obligations in the Judgment and Peace Agreement, including the requirement of hydrologic balance and projected replenishment obligations, will provide for sufficient wet-water recharge to make the separate commitment of Appropriative Pool purchase of 6,500 acre-feet unnecessary. Therefore, because the recharge target as described in the Peace Agreement has been achieved, further purchases under the program will cease.

Watermaster will independently determine whether to require wet-water recharge within MZ1 to maintain hydrologic balance and to provide equal access to groundwater. Watermaster will conduct its recharge in a manner to provide hydrologic balance within, and will emphasize recharge in MZ1. Accordingly, the Parties acknowledge and agree that each year Watermaster shall continue to be guided in the exercise of its discretion concerning recharge by the principles of hydrologic balance.

Hydraulic Control. In accordance with the purpose and objective of the Physical Solution to "establish a legal and practical means for making the maximum reasonable beneficial use of the waters of the Chino Basin" (paragraph 39) and the identified Basin Management Parameters, Watermaster will manage the Basin to secure Hydraulic Control through controlled overdraft for a period of approximately 23 (twenty-three) years (Re-Operation). Hydraulic Control ensures that the water management activities in the Chino North Management Zone do not cause materially adverse impacts to the beneficial uses of the Santa Ana River downstream of Prado Dam. "Hydraulic Control" means the reduction of groundwater discharge from the Chino

North Management Zone to the Santa Ana River to de minimus quantities. The Chino North Management Zone is more fully described and set forth in Exhibit 1 to this Appendix I.

Re-Operation. Independent of Watermaster determinations regarding Operating Safe Yield and without effect on or regard for the parties' respective rights thereto in any year, Re-Operation of the Basin through the managed withdrawal of groundwater from the Basin is required to achieve and maintain Hydraulic Control. Given the expected water quality, increased yield and economic benefits associated with Hydraulic Control, a Re-Operation through coordinated and controlled overdraft is a prudent and efficient use of the Basin resources *to the extent* groundwater is required to achieve and maintain Hydraulic Control. "Re-operation" means the potential increase in the accumulated overdraft from 200,000 acre-feet previously authorized under Exhibit I over the period 1978 through 2017 to 600,000 acre-feet through 2030, with the 400,000 acre-feet increase being expressly allocated to meet the replenishment obligation of the Desalters. Accordingly, a cumulative change in storage of up to 400,000 acre-feet greater than initially authorized by the original Judgment may result. However, the use of water pumped pursuant to Re-operation is subject to the following limitations:

(a) Future Desalter Groundwater Production Facilities. Future Desalter groundwater production facilities will emphasize Production from the southern end of the Basin.

(b) The Material Physical Injury. Controlled overdraft must not cause material physical injury to any Party or the Basin.

(c) Proposed Schedule. An initial schedule for Re-Operation, including annual and cumulative quantities to be pumped through Re-Operation will be developed. Watermaster may modify the proposed schedule from time to time as it may be prudent under the circumstances, but only after first obtaining Court approval.

(d) Annual Accounting. Watermaster will prepare an annual summary accounting of the cumulative total of groundwater production and desalting from all authorized desalters and other activities authorized by the Optimum Basin Management Program in a schedule that: (i) identifies the total change in groundwater storage that will result from the Re-Operation; and (ii) characterizes and accounts for all water that is projected to be produced by all authorized desalters.

(e) Recharge and Replenishment Compliance. Watermaster must be in substantial compliance with its then existing recharge and replenishment plans and obligations, and will make an annual finding whether or not it is in compliance.

(f) Replenishment. Groundwater produced by Desalters in connection with Re-Operation to achieve Hydraulic Control will be replenished through, inter alia, the water

made available through controlled overdraft.

(g) Suspension. Re-Operation and Watermaster's apportionment of controlled overdraft will not be suspended in the event that Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been produced so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures to avoid Material Physical Injury and that equitably addresses this contingency, and (ii) Watermaster continues to demonstrate a credible material progress toward obtaining sufficient capacity to recharge sufficient quantities of water to cause the Basin to return to a new equilibrium at the conclusion of the Re-Operation.

(h) Definition of Desalters. "Desalters" means the Chino I Desalter, the Chino I Expansion, the Chino II Desalter and Future Desalters, consisting of all the capital facilities' and processes that remove salt from the Basin water, including extraction wells, transmission facilities for delivery of groundwater to the Desalter. Desalter treatment and delivery facilities for the desalted water include pumping and storage facilities and treatment and disposal capacity in the Santa Ana Regional Interceptor.

PROGRAM ELEMENT 3 DEVELOP AND IMPLEMENT WATER SUPPLY PLAN FOR THE IMPAIRED AREAS OF THE BASIN, PROGRAM ELEMENT 5 DEVELOP AND IMPLEMENT REGIONAL SUPPLEMENTAL WATER PROGRAM

Construction on the Chino I Desalter Expansion and the Chino II Desalter facilities was completed in February 2006 and an application has been made for $1.6 M in Proposition 50 funds to add 8 MGD of ion exchange capacity to the Chino II Desalter. As currently configured, the Chino I Desalter provides 2.6 MGD of treated (air stripping for VOC removal) water from Wells Nos. 1-4, 4.9 MGD of treated (ion exchange for nitrate removal) water from Wells Nos. 5-15, and 6.7 MGD of treated (reverse osmosis for nitrate and TDS removal) water from Wells Nos. 5-15 for a total of 14.2 MGD (16,000 AFY). The Chino II Desalter provides 4.0 MGD of ion exchange treated water and 6.0 MGD of reverse osmosis treated water from 8 additional wells for a total of 10.0 MGD (11,000 AFY).

Consultants to the City of Ontario and Western Municipal Water District recently completed their evaluation of three alternative configurations for expansion of the Chino Desalters. Their results are presented in the report "Chino Desalter Phase 3 Alternatives Evaluation," dated May 2007. Essentially, they found that the preferred alternative would be to construct a 10.5 mgd (10,600 AFY) expansion to the existing Chino II Desalter, with raw water coming from the existing Wells Nos. 13, 14, and 15. A new Chino Creek Well Field, required for hydraulic

control of the basin, would replace the raw water lost from the Wells Nos. 13, 14, and 15. Negotiations are currently underway between the City of Ontario, WMWD, and JCSD to determine capacity allocations and cost sharing for the new facilities.

PROGRAM ELEMENT 4 DEVELOP AND IMPLEMENT COMPREHENSIVE GROUNDWATER MANAGEMENT PLAN FOR MANAGEMENT ZONE 1 (MZ1)

The occurrence of subsidence and fissuring in Management Zone 1 is not acceptable and should be reduced to tolerable levels or abated. The OBMP calls for a management plan to reduce or abate the subsidence and fissuring problems to the extent that it may be caused by production in MZ1.

In October 2005, Watermaster completed the MZ-1 Summary Report, including the Guidance Criteria. Since then the impacted parties have had numerous meetings to transform the Summary Report into a Long-term Management Plan. The Summary Report and the Guidance Criteria were adopted by the Watermaster Board in May 2006, and the Long-term Management Plan was adopted in June 2007.

PROGRAM ELEMENT 6 DEVELOP AND IMPLEMENT COOPERATIVE PROGRAMS WITH THE REGIONAL BOARD AND OTHER AGENCIES TO IMPROVE BASIN MANAGEMENT, and PROGRAM ELEMENT 7 SALT MANAGEMENT PROGRAM

On going discussions are being held with the RWQCB and the San Bernardino County Department of Airports in order to determine the engineering solution and costs for remediating the TCE plume at the Chino Airport. The consulting engineer for the SBCDA is currently characterizing the extent of off-site contamination and investigating remedial alternatives. For the Ontario Airport (OIA) plume, the Potentially Responsible Parties (PRPs) have been working with Watermaster to quantify the depth and extent of the TCE plume. At the Stringfellow site, the consultants to DHS have been investigating whether the perchlorate plume from the site adds to the existing perchlorate levels in the Santa Ana River, or whether the perchlorate plume is diverted towards the Chino II Desalter well field. Lastly, Watermaster continues to monitor the activities of General Electric's (GE) remediation at the Flat Iron facility and their efforts to develop a new location for recharge of their treated effluent.

MZ-3 Monitoring Program.
The former Kaiser plume has been incorporated into an overall monitoring program for the MZ-3 area. The MZ-3 monitoring program is also assessing the groundwater quality impairment from

total dissolved solids (TDS), nitrate, and perchlorate. Quarterly samples will now be collected from all 4 wells to help recharacterize the Kaiser plume.

Ontario International Airport (OIA) Volatile Organic Chemical Plume.
Watermaster has provided water quality, water level, and well construction data from more than 400 private wells and 200 public wells to the RWQCB, which in turn forwarded the database to the PRPs pursuant to their request. Subsequently the PRPs submitted their sampling work plan and health and safety plan for the well installation and sampling.

Chino Airport VOC Plume.
Watermaster met with the RWQCB, the San Bernardino County Department of Airports, and their consultant Tetra Tech on April 18, May 25, and June 26, 2007 to discuss a joint remediation of the VOC plume from the airport. Such a joint remediation would help address other issues in the southwestern portion of Chino Basin such as maintenance of hydraulic control and the provision of high quality drinking water in an area of increasing demand. As a result of these meetings, Watermaster agreed to provide a database containing well construction information, water quality, water levels, and production for wells located southwest of the Chino airport. In addition, Watermaster provided results from sampling all the wells in this location to provide up-to-date analytical data on all the possible contaminants in these wells. These data are being reviewed with Tetra Tech to begin the engineering of appropriate remedial actions.

GE Flat Iron Remediation.
Finally, with respect to the GE Flat Iron remediation, GE conducted a screening of options for the disposal of treated effluent from their operational pump and treat facilities. Currently, GE discharges their effluent into the Ely Basins, where it percolates back into the groundwater. However, this operation limits Watermaster's ability to recharge recycled water into the Ely Basins and, consequently, Watermaster has asked that GE develop alternative disposal means. As a result of their screening, GE has decided to investigate, in detail, the construction of groundwater injection wells that would be operated in conjunction with their own recharge basin. GE completed their planning in December 2006 and began detailed design based upon the RWQCB's approval of the concept.

TDS and Nitrogen Monitoring Pursuant to the 2004 Basin Plan Amendment
Pursuant to the 2004 Basin Plan Amendment and the Watermaster/IEUA permit to recharge recycled water, Watermaster and the IEUA have conducted and will continue to conduct groundwater and surface water monitoring programs. Quarterly HCMP reports that summarize data collection efforts will continue to be submitted to the RWQCB.

September 21, 2007

PROGRAM ELEMENT 8 DEVELOP AND IMPLEMENT GROUNDWATER STORAGE MANAGEMENT PROGRAM, PROGRAM ELEMENT 9 DEVELOP AND IMPLEMENT STORAGE AND RECOVERY PROGRAMS

Currently, there is only one groundwater storage program approved in the Chino Basin: the 100,000 acre-ft Dry-Year Yield Program with the Metropolitan Water District of Southern California (MWD). The MWD, IEUA, and Watermaster are considering expanding this program by an additional 50,000 acre-ft to 150,000 acre-ft over the next few years. Watermaster is also considering an additional 150,000 acre-ft in programs with non-party water agencies.

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Attachment "E"
Desalter Replenishment with Most Rapid Depletion of the Re-Operation Account
(acre-ft/yr)

Fiscal Year	Desalter Pumping	New Yield	Re-Operation			Residual Replenishment Obligation
			Replenishment Allocation for Desalter III	Replenishment Allocation to CDA	Balance	
					400,000	0
2006 / 2007	28,700	8,610	0	20,090	379,910	0
2007 / 2008	28,700	8,610	0	20,090	359,820	0
2008 / 2009	28,700	8,610	0	20,090	339,730	0
2009 / 2010	28,700	8,610	0	20,090	319,640	0
2010 / 2011	28,700	8,610	0	20,090	299,550	0
2011 / 2012	28,700	8,610	0	20,090	279,460	0
2012 / 2013	34,050	10,215	5,000	18,835	255,625	0
2013 / 2014	39,400	11,820	10,000	17,580	228,045	0
2014 / 2015	39,400	11,820	10,000	17,580	200,465	0
2015 / 2016	39,400	11,820	10,000	17,580	172,885	0
2016 / 2017	39,400	11,820	10,000	17,580	145,305	0
2017 / 2018	39,400	11,820	10,000	15,305	120,000	2,275
2018 / 2019	39,400	11,820	10,000		110,000	17,580
2019 / 2020	39,400	11,820	10,000		100,000	17,580
2020 / 2021	39,400	11,820	10,000		90,000	17,580
2021 / 2022	39,400	11,820	10,000		80,000	17,580
2022 / 2023	39,400	11,820	10,000		70,000	17,580
2023 / 2024	39,400	11,820	10,000		60,000	17,580
2024 / 2025	39,400	11,820	10,000		50,000	17,580
2025 / 2026	39,400	11,820	10,000		40,000	17,580
2026 / 2027	39,400	11,820	10,000		30,000	17,580
2027 / 2028	39,400	11,820	10,000		20,000	17,580
2028 / 2029	39,400	11,820	10,000		10,000	17,580
2029 / 2030	39,400	11,820	10,000		0	17,580
Totals	876,050	262,815	175,000	225,000		213,235

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Desalter Replenishment with Proportional Depletion of the Re-Operation Account

(acre-ft/yr)

Fiscal Year	Desalter Pumping	New Yield	Re-Operation			Residual Replenishment Obligation
			Replenishment Allocation for Desalter III	Replenishment Allocation to CDA	Balance	
					400,000	0
2006 / 2007	28,700	8,610	0	7,371	392,629	12,719
2007 / 2008	28,700	8,610	0	7,371	385,258	12,719
2008 / 2009	28,700	8,610	0	7,371	377,886	12,719
2009 / 2010	28,700	8,610	0	7,371	370,515	12,719
2010 / 2011	28,700	8,610	0	7,371	363,144	12,719
2011 / 2012	28,700	8,610	0	7,371	355,773	12,719
2012 / 2013	34,050	10,215	5,000	8,745	342,028	10,090
2013 / 2014	39,400	11,820	10,000	10,119	321,908	7,461
2014 / 2015	39,400	11,820	10,000	10,119	301,789	7,461
2015 / 2016	39,400	11,820	10,000	10,119	281,670	7,461
2016 / 2017	39,400	11,820	10,000	10,119	261,551	7,461
2017 / 2018	39,400	11,820	10,000	10,119	241,431	7,461
2018 / 2019	39,400	11,820	10,000	10,119	221,312	7,461
2019 / 2020	39,400	11,820	10,000	10,119	201,193	7,461
2020 / 2021	39,400	11,820	10,000	10,119	181,073	7,461
2021 / 2022	39,400	11,820	10,000	10,119	160,954	7,461
2022 / 2023	39,400	11,820	10,000	10,119	140,835	7,461
2023 / 2024	39,400	11,820	10,000	10,119	120,715	7,461
2024 / 2025	39,400	11,820	10,000	10,119	100,596	7,461
2025 / 2026	39,400	11,820	10,000	10,119	80,477	7,461
2026 / 2027	39,400	11,820	10,000	10,119	60,357	7,461
2027 / 2028	39,400	11,820	10,000	10,119	40,238	7,461
2028 / 2029	39,400	11,820	10,000	10,119	20,119	7,461
2029 / 2030	39,400	11,820	10,000	10,119	0	7,461
Totals	876,050	262,815	175,000	225,000		213,235

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DISCRETIONARY ACTIONS
TO AMEND WATERMASTER RULES AND REGULATIONS

Pursuant to the Judgment, the Peace Agreement and Watermaster Rules and Regulations, Watermaster will undertake the following actions:

I. Agricultural Pool Reallocation

A. Section 6.3(c) of the Watermaster Rules and Regulations shall be amended to read:

"(c) In the event actual Production from the Agricultural Pool does not exceed 82,800 acre-feet in any one year or 414,000 acre-feet in any five years but total allocation from all the uses set forth in section 6.3(a) above exceeds 82,800 in any year, the amount of water made available to the members of the Appropriative Pool under section 6.3(a) shall be reduced pro rata in proportion to the benefits received by each member of the Appropriative Pool through such allocation. This reduction shall be accomplished according to the following procedure:

1. All of the amounts to be made available under 6.3(a) shall be added together. This amount shall be the "Potential Acre-Feet Available" for Reallocation.

2. Each Appropriative Pool member's requested share of the Potential Acre-Feet Available for Reallocation shall be determined. This share shall be expressed as a percentage share of the Potential Acre-Feet Available for Reallocation.

3. Each Appropriative Pool member's share of the Potential Acre-Feet Available for Reallocation shall be reduced pro rata according to the percentage determined in 2 above."

B. Section 6.3(d) of the Watermaster Rules and Regulations shall be added to read:

"(d) In the event actual Production from the Agricultural Pool does not exceed 82,800 acre-feet in any one year or 414,000 acre-feet in any five years and total Production from all the uses set forth in section 6.3(a) above does not exceed 82,800 acre-feet in any year, the amount of surplus water made available to the members of the Appropriative Pool shall be allocated according to the formula described in 6.3(c)."

C. Section 9.6 of the Watermaster Rules and Regulations will be amended to include an articulated rule of construction that: "This provision will be construed by as permitting Watermaster to accept new voluntary agreements only to the extent that such voluntary agreements occur within areas eligible for conversion as described in Attachment 1 to the Judgment, previously added to the Judgment as an amendment by Order of the Court dated November 17, 1995."

D. By Resolution, Watermaster will ratify all current Watermaster accounting practices with regard to Land Use Conversions, Assignments, voluntary agreements, Early Transfer, and reallocation of surplus Agricultural Pool water and continue to implement such provisions in a consistent manner.

II. Storage

A. By Resolution, Watermaster has previously established a uniform loss percentage for all water held in storage at 2 percent, until it may be recalculated based upon the best available scientific information.

B. Watermaster will impose a uniform loss against all water in storage in an amount of 2 (two) percent where the Party holding the storage account: (i) has previously contributed to the implementation of the OBMP as a Party to the Judgment, is in compliance with their continuing covenants under the Peace Agreement or in lieu thereof they have paid or delivered to Watermaster "financial equivalent" consideration to offset the cost of past performance prior to the implementation of the OBMP and (ii) promised continued future compliance with Watermaster Rules and Regulations. Where a Party has not satisfied the requirement of B(i) and B(ii) Watermaster will assess a 6 (six) percent loss. Following a Watermaster determination that Hydraulic Control has been achieved, Watermaster will assess losses of less than one 1 percent where the Party satisfies B(i) and B(ii).

C. Section 8.1(f)(iii) a) and b) of Watermaster Rules and Regulations will be amended to substitute the date of July 1, 2010 for July 1, 2005.

D. Section 8.2(a), (b), (g), (h) of Watermaster Rules and Regulations will be amended to substitute the date of July 1, 2010 for July 1, 2005.

III. Errors

A. A new Section 3.3. of Watermaster Rules and Regulations and shall read as follows:

"3.3 Error Corrections. All reports or other information submitted to Watermaster by the parties shall be subject to a four-year limitations period regarding the correction of errors contained in such submittals. In addition, all information generated by Watermaster shall be subject to the same four-year

limitations period. All corrections to errors shall apply retroactively for no more than four years."

IV. Further Conforming Changes.

A. After consultation with the stakeholders, Watermaster may make further conforming changes to its Rules and Regulations to eliminate any inconsistencies with the Peace II measures and to more effectively implement the measures from time to time.

Date: _____ _____

For CHINO BASIN WATERMASTER

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PURCHASE AND SALE AGREEMENT FOR THE PURCHASE OF WATER BY WATERMASTER FROM OVERLYING (NON-AGRICULTURAL) POOL

THIS AGREEMENT (Agreement) is dated 27th day of September, 2007, regarding the Chino Groundwater Basin.

RECITALS

WHEREAS, the Peace Agreement expressly authorized a transfer of water from the Overlying (Non-Agricultural) Pool to Watermaster for use as replenishment for the Desalters and for use in connection with a Storage and Recovery Program;

WHEREAS, Watermaster is evaluating its replenishment needs under the Judgment and several Storage and Recovery opportunities;

WHEREAS, Watermaster desires to purchase and the Overlying (Non-Agricultural) Pool desires to sell, all of the Non-Agricultural Pool water held in storage as of June 30, 2007;

WHEREAS, Watermaster is proposing an amendment to the Overlying (Non-Agricultural) Pool Pooling Plan set forth in Exhibit "G" to the Judgment whereby members of the Pool may offer water for purchase by Watermaster and thence the members of the Appropriative Pool under the process set forth therein;

NOW THEREFORE, in consideration of the mutual promises specified herein and by conditioning their performance under this Agreement upon the conditions precedent set forth herein, and for other good and valuable consideration, the Parties agree as follows:.

A. Peace Agreement Transfer. This purchase and sale agreement is in accordance with Section 5.3(e) of the Peace Agreement that provides that "parties to the Judgment with rights within the Non-Agricultural (Overlying) Pool shall have the additional rights to Transfer their rights to Watermaster for the purposes of Replenishment for a Desalter or for a Storage and Recovery Program."

B. Quantity. The quantity of water being made available to Watermaster by the Non-Agricultural (Overlying) Pool on a one-time basis ("Storage Transfer Quantity") is equivalent to the total quantity of water held in storage by the members of the Overlying (Non-Agricultural) Pool held in storage on June 30, 2007 ("Storage Quantity"), less a ten percent dedication for the purpose of Desalter Replenishment, less the quantity of water transferred pursuant to paragraph I below ("Special Transfer Quantity").

C. **Notice.** Within twenty-four months of the final Court approval of this Agreement ("Effective Date"), and only with the prior approval of the Appropriative Pool, Watermaster will provide written **Notice of Intent to Purchase** the Non-Agricultural (Overlying) Pool water pursuant to Section 5.3(a) of the Peace Agreement, which therein identifies whether such payment will be in connection with Desalter Replenishment or a Storage and Recovery Program.

D. **Payment.** Commencing thirty (30) calendar days from the Notice of Intent to Purchase ("Payment Date") Watermaster will pay to the Non-Agricultural Overlying Pool for each acre-foot of the Storage Transfer Quantity in accordance with the following schedule as the schedule is adjusted for inflation by the consumers price index ("cpi") for San Bernardino County from May 31, 2006 until the Payment Date.:

1. $215 times 1/4 of the Storage Transfer Quantity on the Payment Date.
2. $220 times 1/4 of the Storage Transfer Quantity on the first anniversary of the Payment Date.
3. $225 times 1/4 of the Storage Transfer Quantity on the second anniversary of the Payment Date
4. $230 time 1/4 of the Storage Transfer Quantity on the third anniversary of the Payment Date.

However, all payments provided for herein, including inflation adjustments, are subject to an express price cap and will not exceed ninety-two (92) percent of the then prevailing MWD replenishment rate in any year.

E. **Dedication to Desalter Replenishment.** Upon Watermaster's issuance of its written **Notice of Intent to Purchase**, and Watermaster's tender of its initial payment on the Payment Date, ten (10) percent of the Storage Quantity will be dedicated for replenishment of Desalter production without compensation. Watermaster will receive but will not pay for this dedication.

F. **Use and Distribution.** Watermaster will take possession of the water made available pursuant to this Agreement and make use of and distribute the water made available in a manner consistent with Section 5.3(e) of the Peace Agreement.

G. **Condition Precedent.** This Agreement and the Parties performance hereunder are expressly conditioned upon Court approval of this Agreement.

H. **Early Termination.** This Agreement will expire and be of no further force and effect if: Watermaster does not issue its **Notice of Intent to Purchase** in accordance with Paragraph D above within twenty-four (24) months of Court approval. Upon Watermaster's failure to satisfy the condition subsequent, the rights of the Non-Agricultural (Overlying) Pool will remain unaffected and without prejudice as result of their having executed this Agreement except that in the event of Early Termination, the Storage Transfer Quantity, will then be made available for purchase by Watermaster and thence the members of the Appropriative Pool in accordance with Paragraph 9.(iv) of Amended Exhibit G, the Overlying (Non-Agricultural) Pool,

Pooling Plan, including the requirement of a ten percent dedication towards Desalter replenishment.

I. **One Time Transfer in Furtherance of the Physical Solution and in Aid of Desalter Replenishment ("Special Transfer Quantity").** In consideration of the Overlying (Non-Agricultural) Pool members' irrevocable commitment made herein and it the Peace II Measures Watermaster will purchase and immediately make available the quantity of ____ acre-feet (less a ten percent dedication to Watermaster for Desalter Production) to the San Antonio Water Company (SAWCO) and Vulcan Materials, a member of the Overlying (Non-Agricultural) Pool under terms established as between those parties. This One Time Transfer is in addition to and without prejudice to the discretionary rights of the members of the Overlying (Non-Agricultural) Pool to make available and Watermaster and members of the Appropriative Pool to purchase water as Physical Solution transfers. No member of the Appropriative Pool, other than SAWCO assumes any responsibility for the purchase of this Special Transfer Quantity from Vulcan.

IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated: NON-AGRICULTURAL OVERLYING POOL

By _____

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JUDGMENT AMENDMENT
to Paragraph 8

The Paragraph 8 of the Judgment shall be amended to read as follows:

"8. The parties listed in Exhibits "C" and "D" are the owners or in possession of lands which overlie Chino Basin. As such, said parties have exercised overlying water rights in Chino Basin. All overlying rights owned or exercised by parties listed in Exhibits "C" and "D" have, in the aggregate, been limited by prescription except to the extent such rights have been preserved by self-help by said parties. Aggregate preserved overlying rights in the Safe Yield for Agricultural Pool use, including the rights of the State of California, total 82,800 acre-feet per year. Overlying rights for non-agricultural pool use total 7,366 acre-feet per year and are individually decreed for each affected party in Exhibit "D." No portion of the Safe Yield of Chino Basin exists to satisfy unexercised overlying rights and such rights have all been lost by prescription. However, uses may be made of Basin water on overlying lands which have no preserved overlying rights pursuant to the Physical Solution herein. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom for the term of the Peace Agreement except that the members of the Overlying (Non-Agricultural) Pool shall have the right to Transfer or lease their quantified Production rights: (i) within the Overlying (Non-Agricultural) Pool; (ii) to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000; or (iii) in accordance with the Overlying-(Non-Agricultural) Pool Pooling Plan set forth in Exhibit "G."

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JUDGMENT AMENDMENT
TO EXHIBIT G

Exhibit G, the Overlying (Non-Agricultural) Pool Pooling Plan will be amended to revise Paragraph 5 to read as follows:

"5. Assessments.

(a) Replenishment Assessments. Each member of this Pool shall pay an assessment equal to the cost of replenishment water times the number of acre feet of production by such producer during the preceding year in excess of (a) his decreed share of the Safe Yield, plus (b) any carry-over credit under Paragraph 7 hereof.

(b) Administrative Assessments. In addition, the cost of the allocated share of Watermaster administration expense shall be recovered on an equal assessment against each acre-foot of production in the pool during such preceding fiscal year or calendar quarter; and in the case of Pool members who take substitute groundwater as set forth in Paragraph 8 hereof, such producer shall be liable for its share of administration assessment, as if the water so taken were produced, up to the limit of its decreed share of Safe Yield.

(c) Special Project OBMP Assessment. Each year, every member of this Pool will dedicate ten (10) percent of their annual share of Operating Safe Yield to Watermaster or in lieu thereof Watermaster will levy a Special Project OBMP Assessment in an amount equal to ten percent of the Pool member's respective share of Safe Yield times the then-prevailing MWD Replenishment Rate.

(1) The first priority for the use of any water dedicated or revenue collected from any Special Project OBMP Assessment will be for Watermaster to offset Desalter production or to purchase Replenishment water to offset any Production by the Desalters.

(2) In the event that there is no unmet replenishment obligation attributable to Desalters, Watermaster will earmark the water dedicated or revenue collected from any Special Project OBMP Assessment for distribution to any member(s) of the Appropriative Pool that Watermaster may determine have received a disproportionately small portion of the benefits obtained from recycled water and other OBMP-related salt management strategies. With advice and consultation of the Pools and the Advisory Committee, Watermaster has discretion to establish a grant program to distribute any available revenues among individual members of the Appropriative Pool to ensure an equitable distribution of the benefits attributable to recycled water."

And to renumber Paragraph 9 as Paragraph 10 and add Paragraph 9 to read as follows:

"9. Physical Solution Transfers. All overlying rights are appurtenant to the land and cannot be assigned or conveyed separate or apart therefrom except that for the term of the Peace Agreement the members of the Overlying (Non-Agricultural) Pool shall have the discretionary right to Transfer or lease their quantified Production rights and carry-over water held in storage accounts in quantities that each member may from time to time individually determine as Transfers in furtherance of the Physical Solution: (i) within the Overlying (Non-Agricultural) Pool; (ii) to Watermaster in conformance with the procedures described in the Peace Agreement between the Parties therein, dated June 29, 2000; (iii) in conformance with the procedures described in Paragraph I of the Purchase and Sale Agreement for the Purchase of Water by Watermaster from Overlying (Non-Agricultural Pool dated June 30, 2007; or (iv) to Watermaster and thence to members of the Appropriative Pool in accordance with the following guidelines and those procedures Watermaster may further provide in Watermaster's Rules and Regulations:

(a) By December 31 of each year, the members of the Overlying (Non-Agricultural) Pool shall notify Watermaster of the amount of water each member shall make available in their individual discretion for purchase by the Appropriators. By January 31 of each year, Watermaster shall provide a Notice of Availability of each Appropriator's pro-rata share of such water;

(b) Except as they may be limited by paragraph 9(e) below, each member of the Appropriative Pool will have, in their discretion, a right to purchase its pro-rata share of the supply made available from the Overlying (Non-Agricultural) Pool at the price established in 9(d) below. Each Appropriative Pool member's pro-rata share of the available supply will be based on each Producer's combined total share of Operating Safe Yield and the previous year's actual Production by each party;

(c) If any member of the Appropriative Pool fails to irrevocably commit to their allocated share by March 1 of each year, its share of the Overlying (Non-Agricultural) Pool water will be made available to all other members of the Appropriative Pool according to the same proportions as described in 9(b) above and at the price established in Paragraph 9(d) below. Each member of the Appropriative Pool shall complete its payment for its share of water made available by June 30 of each year.

(d) Commensurate with the cumulative commitments by members of the Appropriative Pool pursuant to (b) and (c) above, Watermaster will purchase the surplus water made available by the Overlying (Non-Agricultural) Pool water on behalf of the members of the Appropriative Pool on an annual basis at 92% of the then-prevailing "MWD Replenishment Rate" and each member of the Appropriative Pool shall complete its payment for its determined share of water made available by June 30 of each year.

(e) Any surplus water cumulatively made available by all members of the Overlying (Non-Agricultural) Pool that is not purchased by Watermaster after completion of the process set forth herein will be pro-rated among the members of the Pool in proportion to the total quantity offered for transfer in accordance with this provision and may be retained by the Overlying (Non-Agricultural) Pool member without prejudice to the rights of the members of the Pool to

make further beneficial us or transfer of the available surplus.

(f) Each Appropriator shall only be eligible to purchase their pro-rata share under this procedure if the party is: (i) current on all their assessments; and (ii) in compliance with the OBMP.

(g) The right of any member of the Overlying (Non-Agricultural) Pool to transfer water in accordance with this Paragraph 9(a)-(c) in any year is dependent upon Watermaster making a finding that the member of the Overlying (Non-Agricultural) Pool is using recycled water where it is both physically available and appropriate for the designated end use in lieu of pumping groundwater.

(h) Nothing herein shall be construed to affect or limit the rights of any Party to offer or accept an assignment as authorized by the Judgment Exhibit "G" paragraph 6 above, or to affect the rights of any Party under a valid assignment."

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Attachment "J"

JUDGMENT AMENDMENT
to Exhibit I

Exhibit "I" "ENGINEERING APPENDIX" is amended to read as follows:

1. **Basin Management Parameters.** In the process of implementing the physical solution, Watermaster shall consider the following parameters:

(a) Pumping Patterns. Chino Basin is a common supply for all persons and agencies utilizing its waters. It is an objective in management of the Basin's waters that no producer be deprived of access to said waters by reason of unreasonable pumping patterns, nor by regional or localized recharge of replenishment water, insofar as such result may be practically avoided.

(b) Water Quality. Maintenance and improvement of water quality is a prime consideration and function of management decisions by Watermaster.

(c) Economic Considerations. Financial feasibility, economic impact and the cost and optimum utilization of the Basin's resources and the physical facilities of the parties are objectives and concerns equal in importance to water quantity and quality parameters.

2. **Hydraulic Control and Re-Operation.** In accordance with the purpose and objective of the Physical Solution to "establish a legal and practical means for making the maximum reasonable beneficial use of the waters of the Chino Basin" (paragraph 39) including but not limited to the use and recapture of reclaimed water (paragraph 49(a)) and the identified Basin Management Parameters set forth above, Watermaster will manage the Basin to secure and maintain Hydraulic Control through controlled overdraft.

(a) **Hydraulic Control.** "Hydraulic Control" means the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. The Chino North Management Zone is more fully described and set forth in Attachment I-1 to this Engineering Appendix. By obtaining Hydraulic Control, Watermaster will ensure that the water management activities in the Chino North Management Zone do not cause materially adverse impacts to the beneficial uses of the Santa Ana River downstream of Prado Dam.

(b) **Re-Operation.** "Re-Operation" means the controlled overdraft of the Basin by the managed withdrawal of groundwater for the Desalters and the potential increase in the cumulative un-replenished Production from 200,000 acre-feet authorized by paragraph 3 below, to 600,000 acre feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution.

[1] The increase in the controlled overdraft herein is separate from and in addition to the 200,000 acre-feet of accumulated overdraft authorized in paragraph 3(a) and 3(b) below over the period of 1978 through 2017.

[2] "Desalters" means the Chino I Desalter, the Chino I Expansion, the Chino II Desalter and Future Desalters, consisting of all the capital facilities and processes that remove salt from Basin water, including extraction wells and transmission facilities for delivery of groundwater to the Desalter. Desalter treatment and delivery facilities for the desalted water include pumping and storage facilities and treatment and disposal capacity in the Santa Ana Regional Interceptor.

[3] The groundwater Produced through controlled overdraft pursuant to Re-Operation does not constitute New Yield or Operating Safe Yield and it is made available under the Physical Solution for the express purpose of satisfying some or all of the groundwater Production by the Desalters until December 31, 2030. ("Period of Re-Operation").

[4] The operation of the Desalters, the Production of groundwater for the Desalters and the use of water produced by the Desalters pursuant to Re-Operation are subject to the limitations that may be set forth in Watermaster Rules and Regulations for the Desalters.

(5) Watermaster will update its Recharge Master Plan and obtain Court approval of its update, to address how the Basin will be contemporaneously managed to secure and maintain Hydraulic Control and operated at a new equilibrium at the conclusion of the period of Re-Operation. The Recharge Master Plan shall contain recharge projections and summaries of the projected water supply availability as well as the physical means to accomplish recharge projections. The Recharge Master Plan may be amended from time to time with Court approval.

(6) Re-Operation and Watermaster's apportionment of controlled overdraft in accordance with the Physical Solution will not be suspended in the event that Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been Produced without Replenishment, so long as: (i) Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures that will avoid unreasonable and unmitigated material physical harm to a party or to the Basin and that equitably distributes the cost of any mitigation attributable to the identified contingencies; and (ii) Watermaster is in substantial compliance with a Court approved Recharge Master Plan.

3 **Operating Safe Yield.** Operating Safe Yield in any year shall consist of the Appropriative Pool's share of Safe Yield of the Basin, plus any accumulated overdraft of the Basin which Watermaster may authorize under 3(a) and 3(b) below. In adopting the Operating Safe Yield for any year, Watermaster shall be limited as follows:

(a) Accumulated Overdraft. During this Judgment and Physical Solution, the overdraft accumulated from and after the effective date of the Physical Solution and resulting from an excess of Operating Safe Yield over Safe Yield shall not exceed 200,000 acre feet.

(b) Quantitative Limits. In no event shall Operating Safe Yield in any year be less than the Appropriative Pool's share of Safe Yield, nor shall it exceed such share of Safe Yield by more than 10,000 acre-feet. The Initial Operating Safe Yield is hereby set at 54,834 acre-feet per year. Operating Safe Yield shall not be changed upon less than five (5) years' notice by Watermaster.

Nothing contained in this paragraph shall be deemed to authorize directly or indirectly, any modification of the allocation of shares in Safe Yield to the overlying pools, as set forth in Paragraph 44 of the Judgment.

4. Groundwater Storage Agreements. Any agreements authorized by Watermaster for Storage of supplemental water in the available groundwater storage capacity of Chino Basin shall include, but not be limited to:

(a) The quantities and term of the storage right.

(b) A statement of the priority or relations of said right, as against overlying or Safe Yield uses, and other storage rights.

(c) The procedure for establishing delivery rates, schedules and procedures which may include:

[1] spreading or injection, or

[2] in lieu deliveries of supplemental water for direct use.

(d) The procedures for calculation of losses and annual accounting for water in storage by Watermaster.

(e) The procedures for establishment and administration of withdrawal schedules, locations and methods.

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Map Re-Operation

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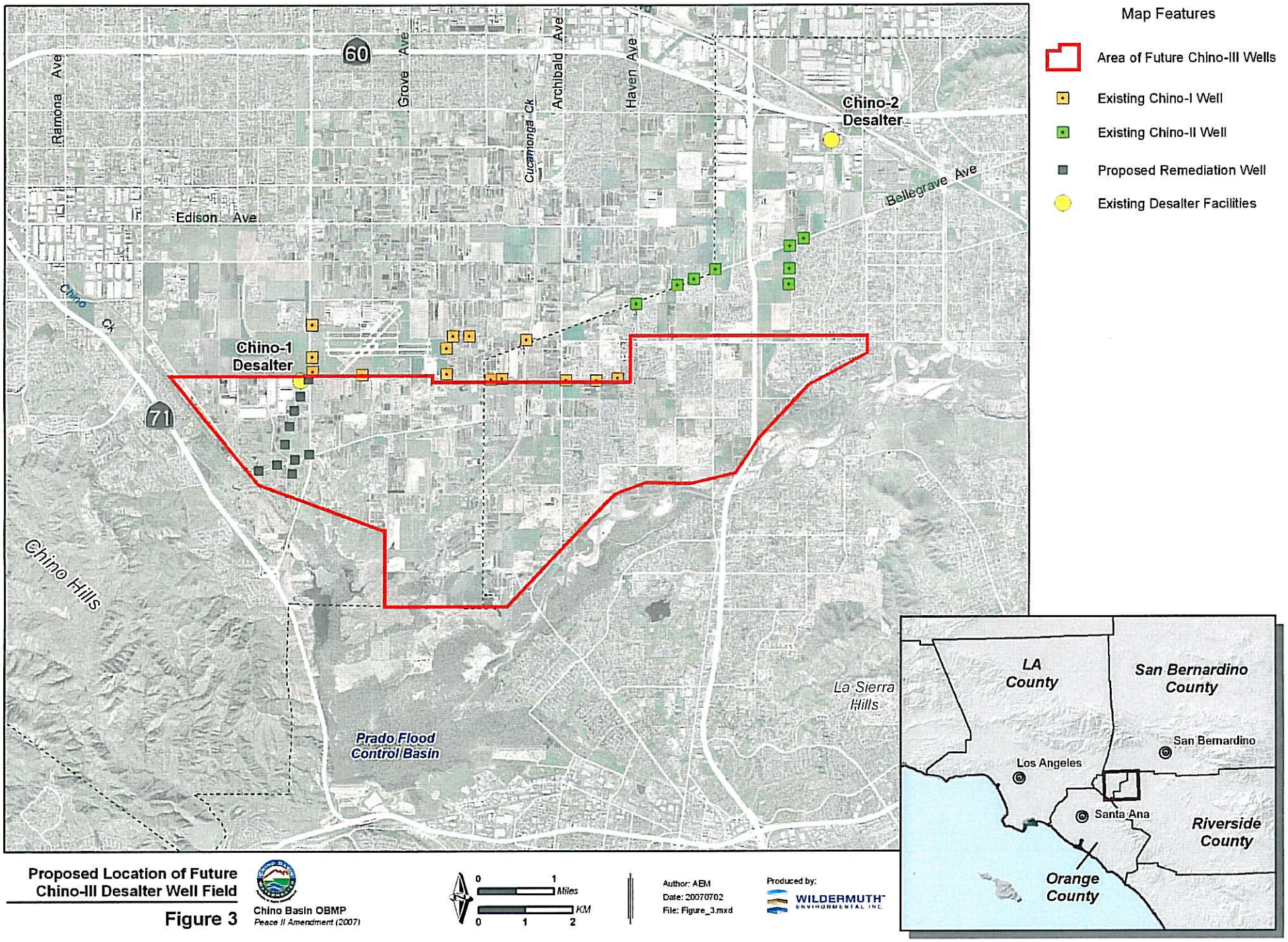

Proposed Location of Future Chino-III Desalter Well Field

Figure 3

Chino Basin OBMP
Peace II Amendment (2007)

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PEACE II AGREEMENT:
PARTY SUPPORT FOR WATERMASTER'S OBMP IMPLEMENTATION PLAN, –
SETTLEMENT AND RELEASE OF CLAIMS
REGARDING FUTURE DESALTERS

WHEREAS, paragraph 41 of the Judgment entered in *Chino Basin Municipal Water District v. City of Chino* (San Bernardino Superior Court Case No. 51010) grants Watermaster, with the advice of the Advisory and Pool Committees, "discretionary powers in order to implement an Optimum Basin Management Program ("OBMP") for the Chino Basin";

WHEREAS, the Parties to the Judgment executed an agreement resolving their differences and pledging their support for Watermaster actions in accordance with specific terms in June of 2000 ("Peace Agreement");

WHEREAS, Watermaster approved Resolution 00-05, and thereby adopted the goals and objectives of the OBMP, the OBMP Implementation Plan and committed to act in accordance with the terms of the Peace Agreement;

WHEREAS, pursuant to Article IV, paragraph 4.2, each of the parties to the Peace Agreement agreed not to oppose Watermaster's adoption and implementation of the OBMP Implementation Plan attached as Exhibit "B" to the Peace Agreement;

WHEREAS, the Peace Agreement, the OBMP Implementation Plan and the Chino Basin Watermaster Rules and Regulations contemplate further actions by Watermaster in furtherance of its responsibilities under paragraph 41 of the Judgment and in accordance with the Peace Agreement and the OBMP Implementation Plan;

WHEREAS, the Parties to the Peace Agreement made certain commitments regarding the funding, design, construction and operation of Future Desalters;

WHEREAS, after receiving input from its stakeholders in the form of the Stakeholder's Non-Binding Term Sheet, Watermaster has proposed to adopt Resolution 07-05 attached as Exhibit "A" hereto to further implement the OBMP through a suite of measures commonly referred to and herein defined as "Peace II Measures", including but not limited to the 2007 Supplement to the OBMP, the Second Amendment to the Peace Agreement, amendments to Watermater's Rules and Regulations, the purchase and sale of water within the Overlying (Non-Agricultural) Pool and certain Judgment amendments; and

NOW, THEREFORE, in consideration of the mutual promises specified herein and by conditioning their performance under this Agreement upon the conditions precedent set forth in Article III herein, the Watermaster Approval, and Court Order, and for other good and valuable consideration, the Parties agree as follows:

ARTICLE I
DEFINITIONS AND RULES OF CONSTRUCTION

1.1 Definitions.

(a) "Desalters" means Desalters and Future Desalters collectively, as defined in the Peace Agreement.

(b) "Hydraulic Control" means "the reduction of groundwater discharge from the Chino North Management Zone to the Santa Ana River to de minimus quantities. The Chino North Management Zone is defined in the 2004 Basin Plan amendment (RWQCB resolution R8-2004-001) attached hereto as Exhibit "B."

(c) "Leave Behind" means a contribution to the Basin from water held in storage within the Basin under a Storage and Recovery Agreement that may be established by Watermaster from time to time that may reflect any or all of the following: (i) actual losses; (ii) equitable considerations associated with Watermaster's management of storage agreements; and (iii) protection of the long-term health of the Basin against the cumulative impacts of simultaneous recovery of groundwater under all storage agreements.

(d) Re-Operation" means the controlled overdraft of the Basin by the managed withdrawal of groundwater Production for the Desalters and the potential increase in the cumulative un-replenished Production from 200,000 authorized by paragraph 3 of the Engineering Appendix Exhibit I to the Judgment, to 600,000 acre feet for the express purpose of securing and maintaining Hydraulic Control as a component of the Physical Solution.

(e) Unless otherwise expressly provided herein, all definitions set forth in the Peace Agreement and the Judgment are applicable to the terms as they are used herein.

1.2 Rules of Construction.

(a) Unless the context clearly requires otherwise:

(i) The plural and singular forms include the other;

(ii) "Shall," "will," "must," and "agrees" are each mandatory;

(iii) "May" is permissive;

(iv) "Or" is not exclusive;

(v) "Includes" and "including" are not limiting; and

(vi) "Between" includes the ends of the identified range.

(b) Headings at the beginning of Articles, paragraphs and subparagraphs of this Agreement are solely for the convenience of the Parties, are not a part of this Agreement and shall not be used in construing it.

(c) The masculine gender shall include the feminine and neuter genders and vice versa.

(d) The word "person" shall include individual, partnership, corporation, limited liability company, business trust, joint stock company, trust, unincorporated association, joint venture, governmental authority, water district and other entity of whatever nature.

(e) Reference to any agreement (including this Agreement), document, or instrument means such agreement, document, instrument as amended or modified and in effect from time to time in accordance with the terms thereof and, if applicable, the terms thereof.

(f) Except as specifically provided herein, reference to any law, statute or ordinance, regulation or the like means such law as amended, modified, codified or reenacted, in whole or in part and in effect from time to time, including any rules and regulations promulgated thereunder.

ARTICLE II
COMPLIANCE WITH CEQA

2.1 Project Description. The proposed project description regarding the design, permitting, construction and operation of Future Desalter, securing Hydraulic Control through Basin Re-Operation is set forth in Exhibit "__" attached hereto.

2.2 Acknowledgment of IEUA as the Lead Agency for CEQA Review. IEUA has been properly designated as the "Lead Agency" for the purposes of completing environmental assessment and review of the proposed project.

2.3 Commitments are Consistent with CEQA. The Parties agree and acknowledge that no commitment will be made to carry out any "project" under the amendments to the OBMP and within the meaning of CEQA unless and until the environmental review and assessment that may be required by CEQA for that defined "project" have been completed.

2.4 Reservation of Discretion. Execution of this Agreement is not intended to commit any Party to undertake a project without compliance with CEQA or to commit the Parties individually or collectively to any specific course of action, which would result in the present approval of a future project.

2.5 No Prejudice by Comment or Failure to Comment. Nothing contained in environmental review of the Project, or a Party's failure to object or comment thereon, shall limit any Party's right to allege that "Material Physical Injury" will result or has resulted from the implementation of the OBMP or its amendment.

ARTICLE III
CONDITIONS PRECEDENT

3.1 Performance Under Articles IV-XII is Subject to Satisfaction of the Conditions Precedent. Each Party's obligations under this Agreement are subject to the satisfaction of the following conditions precedent on or before the dates specified below, unless satisfaction or a specified condition or conditions is waived in writing by all other Parties:

(a) Watermaster approval of Resolution 07-05 in a form attached hereto as Exhibit "A," including the following Attachments thereto

(i) the amendments to the Chino Basin Watermaster Rules and Regulations set forth in Attachment "F" thereto.

(ii) the 2007 Supplement to the OBMP Implementation Plan set forth in Attachment "D" thereto.

(iii) the amendments to the Judgment set forth in Attachments "H, I, and J" thereto.

(iv) the Second Amendment to the Peace Agreement set forth in Attachment "L" thereto.

(v) the Purchase and Sale Agreement for the Purchase of Water by Watermaster From the Overlying (Non-Agricultural) Pool as set forth in Attachment G thereto.

(b) The execution of the proposed Second Amendment to the Peace Agreement by all Parties to the Peace Agreement .

(c) Court approval of the proposed Judgment Amendments and a further order of the Court directing Watermaster to proceed in accordance with the terms of the Peace II Measures as embodied in Resolution 07-05.

ARTICLE IV
MUTUAL ACKNOWLEDGEMENT AND COVENANTS

4.1 Acknowledgment of Peace II Measures. The collective actions of Watermaster set forth in Watermaster Resolution 07-05 and the Attachments thereto (Peace II Measures) constitute further actions by Watermaster in implementing the OBMP in accordance with the grant and limitations on its discretionary authority set forth under paragraph 41 of the Judgment

4.2 Non-Opposition. No Party to this Agreement shall oppose Watermaster's adoption of Resolution 07-05 and implementation of the Peace II measures as embodied therein including the Judgment Amendments, Amendments to the Peace Agreement, the 2007 Supplement to the OBMP Implementation Plan and Amendments to the Chino Basin Watermaster's Rules and Regulations or to Watermaster's execution of memoranda of

agreement that are not materially inconsistent with the terms contained therein. Notwithstanding this covenant, no party shall be limited in their right of participation in all functions of Watermaster as they are provided in the Judgment or to preclude a Party to the Judgment from seeking judicial review of Watermaster determinations pursuant to the Judgment or as otherwise provided in this Agreement.

4.3 Consent to Amendments. Each Party expressly consents to the Judgment amendments and modifications set forth in Watermaster's Resolution 07-05.

4.4 Non-Agricultural Pool Intervention. The Parties acknowledge and agree that any Party to the Judgment shall have the right to purchase Non-Agricultural overlying property within the Basin and appurtenant water rights and to intervene in the Non-Agricultural Pool.

ARTICLE V
FUTURE DESALTERS

5.1 Purpose. Watermaster plans to coordinate and the Parties to the Judgment plan to arrange for the physical capacity and potable water use of water from the Desalters. Desalters in existence on the effective date of this Agreement will be supplemented to provide the required capacity to cumulatively produce approximately 40,000 acre-feet per year of groundwater from the Desalters by 2012.

5.2 2007 Supplement to the OBMP Implementation Plan. The OBMP Implementation Plan will be supplemented as set forth in the 2007 Supplement to the OBMP Implementation Plan to reflect that Western Municipal Water District ("WMWD"), acting independently or in its complete discretion with the City of Ontario ("Ontario") or the Jurupa Community Services District ("Jurupa") or both, will exercise good faith and reasonable best efforts to arrange for the design, planning, and construction of Future Desalters in accordance with the 2007 Supplement to the OBMP Implementation Plan, to obtain Hydraulic Control, further Re-Operation and support the Future Desalters.

5.3 Implementation. WMWD, acting independently or in its complete discretion with Ontario, Jurupa, or both, will exercise good faith and reasonable best efforts to arrange for the design, planning, and construction of Future Desalters in accordance with the 2007 Supplement to the OBMP Implementation Plan, to account for Hydraulic Control, Re-Operation and Future Desalters.

(a) WMWD, acting independently or in its complete discretion with Ontario or Jurupa or both, will exercise good faith and reasonable best efforts to proceed in accordance with the timeline for the completion of design, permitting, finance and construction as attached hereto as Exhibit "1."

(b) WMWD, acting independently or in its complete discretion with the City of Ontario or the Jurupa Community Services District or both, will provide quarterly progress reports to Watermaster and the Court.

5.4 Project Description. The Future Desalters will add up to 9 mgd to existing Desalters. This will include production capacity from new groundwater wells that will be located in

the Southerly end of the Basin, as depicted in Exhibit "C" attached hereto and incorporated herein by this reference. The final design and construction of Future Desalters *may* depend on the terms and conditions that may be freely arrived at by fair bargaining among WMWD and the Chino Basin Desalter Authority ("CDA") or whether it is required to build stand-alone facilities or both. There are material yield benefits to the Parties to the Judgment that are achieved by obtaining Hydraulic Control through Basin Re-Operation. The extent of these benefits is somewhat dependent upon the final location of new production facilities within the southerly end of the Basin. Accordingly, Watermaster will ensure that the location of Future Desalter groundwater production facilities will achieve both Hydraulic Control and maximize yield enhancement by their location emphasizes groundwater production from the Southerly end of the Basin.

5.5 Implementing Agreements. Within twenty-four (24) months of the effective date, WMWD, acting independently or in its complete discretion with the City of Ontario or the Jurupa Community Services District or both, will exercise good faith and reasonable best efforts to complete final binding agreement(s) regarding Future Desalters that includes the following key terms:

(a) Arrangements for WMWD's purchase of product water from CDA;

(b) Arrangements with CDA, Jurupa and other Chino Basin parties for the common use of existing facilities, if any;

(c) Arrangement with the owners of the SARI line;

(d) Arrangements with the Appropriative Pool regarding the apportionment of any groundwater produced as controlled overdraft in accordance with the Physical Solution between Desalters I, Desalters II on the one hand and the Future Desalters on the other hand;

(e) WMWD's payment to Watermaster to reimburse Parties to the Judgment for their historical contributions towards the OBMP, if any;

(f) The schedule for approvals and project completion.

5.6 Reservation of Discretion. Nothing herein shall be construed as committing WMWD, or any members of CDA to take any specific action(s) to accommodate the needs or requests of the other, Watermaster, or any Party to the Judgment, whatever the request may be.

5.7 Condition Subsequent. WMWD's obligation to execute a binding purchase agreement with CDA or to independently develop the Future Desalters is subject to the express condition subsequent that the total price per acre-foot of water delivered must not be projected to exceed the sum of the following: (i) the full MWD Tier II Rate; (ii) the MWD Treatment Surcharge calculated in terms of an annual average acre-foot charge; and (iii) $150 (in 2006 dollars) per acre-foot of water delivered to account for water supply reliability.

(a) The full acre-foot cost to Western for Capital and O&M (assuming the priority allocation of controlled overdraft), includes:

(i) the delivery of the desalted water to its Mockingbird Reservoir or directly to the City of Norco,

(ii) any applicable ongoing Watermaster assessments, payments to CDA and Jurupa and for SARI utilization.

(b) Provided that if third-party funding, grants and a MWD subsidy under the Local Resources Program or otherwise should reduce Western's costs to an amount which is $75 (in 2006 dollars) below the cap described in paragraph 5.5, Western will transmit an amount equal to fifty (50) percent of the amount less than the computed price cap less $75 (in 2006 dollars) to Watermaster.

(c) Western may elect to exercise its right of withdrawal under this paragraph 5.7within 120 days following the later of: (1) completion of preliminary design; or (2) the certification of whatever CEQA document is prepared for the project, but not later than sixty (60) days thereafter and in no event after a binding water purchase agreement has been executed.

5.8 Limitations. The operation of the Future Desalters will be subject to the following limitations:

(a) Well Location. New groundwater production facilities for the Future Desalters will be located in the southern end of the Basin to achieve the dual purpose of obtaining Hydraulic Control and increasing Basin yield.

(i) New wells will be constructed in the shallow aquifer system among Desalter I wells No. 1 through 4 and west of Desalter I.

(ii) So long as these wells produce at least one-half of the Future Desalter groundwater, the Future Desalters shall be entitled to first priority for the allocation of the 400,000 acre-feet of controlled overdraft authorized by the Judgment Amendments to Exhibit I.

(b) Export. The export of groundwater from the Basin must be minimized. WMWD will present a plan for export minimization to the Watermaster for review and approval prior to operation of the Future Desalters.

(i) Watermaster will account for water imported and exported by WMWD.

(ii) Watermaster will prepare an initial reconciliation of WMWD's imports and exports at the end of the first ten (10) years of operation and every year thereafter to determine whether a "net export" occurred.

(iii) WMWD will pay an assessment, if any, on all "net exports" in accordance with Judgment Exhibit "H," paragraph 7(b) after the initial reconciliation is completed at the end of the first ten (10) years of operation.

ARTICLE VI
GROUNDWATER PRODUCTION BY AND REPLENISHMENT FOR DESALTERS

6.1 Acknowledgment. The Parties acknowledge that the hierarchy for providing Replenishment Water for the Desalters is set forth in Article VII, paragraph 7.5 of the Peace Agreement, and that this section controls the sources of water that will be offered to offset Desalter Production.

6.2 Peace II Desalter Production Offsets. To facilitate Hydraulic Control through Basin Re-Operation, in accordance with the 2007 Supplement to the OBMP Implementation Plan and the amended Exhibits G and I to the Judgment, additional sources of water will be made available for purposes of Desalter Production and thereby some or all of a Replenishment obligation. With these available sources, the Replenishment obligation attributable to Desalter production in any year will be determined by Watermaster as follows:

(a) Watermaster will calculate the total Desalter Production for the preceding year and then apply a credit against the total quantity from:

(i) the Kaiser account (Peace Agreement Section 7.5(a).);

(ii) dedication of water from the Overlying (Non-Agricultural) Pool Storage Account or from any contribution arising from an annual authorized Physical Solution Transfer in accordance with amended Exhibit G to the Judgment;

(iii) New Yield (other than Stormwater (Peace Agreement Section 7.5(b));

(iv) any declared losses from storage in excess of actual losses enforced as a "Leave Behind";

(v) Safe Yield that may be contributed by the parties (Peace Agreement Section 7.5(c));

(vi) any Production of groundwater attributable to the controlled overdraft authorized pursuant to amended Exhibit I to the Judgment.

(b) To the extent available credits are insufficient to fully offset the quantity of groundwater production attributable to the Desalters, Watermaster will levy a Replenishment Assessment among the members of the Overlying (Non-Agricultural) Pool and the Appropriative Pool as follows.

(i) A Special OBMP Assessment against the Overlying (Non-Agricultural) Pool equivalent to a Replenishment Assessment as more specifically described in amendment to Exhibit "G" to the Judgment. The Replenishment Assessment will be assessed pro-rata on each member's share of Safe Yield, followed by

(ii) A Replenishment Assessment against the Appropriative Pool, pro-rata based on each Producer's combined total share of Operating Safe Yield and the previous year's actual production. Desalter Production is excluded from this calculation. However, if there is a material reduction in the net cost of Desalter product water to the purchasers of product water, Watermaster may re-evaluate whether to continue the exclusion of Desalter Production but only after giving due regard to the contractual commitment of the parties.

(iii) The quantification of any Party's share of Operating Safe Yield does not include the result of any land use conversions.

(c) The rights and obligations of the parties, whatever they may be, regarding Replenishment Assessments attributable to all Desalters and Future Desalters in any renewal term of the Peace Agreement are expressly reserved and not altered by this Agreement.

ARTICLE VII
YIELD ACCOUNTING

7.1 New Yield Attributable to Desalters. Watermaster will make an annual finding as to the quantity of New Yield that is made available by Basin Re-Operation including that portion that is specifically attributable to the Existing and Future Desalters. Any subsequent recalculation of New Yield as Safe Yield by Watermaster will not change the priorities set forth above for offsetting Desalter production as set forth in Article VII, Section 7.5 of the Peace Agreement. For the initial term of the Peace Agreement, neither Watermaster nor the Parties will request that Safe Yield be recalculated in a manner than incorporates New Yield *attributable to the Desalters* into the determination of Safe Yield so that this source of supply will be available for Desalter Production rather than for use by individual parties to the Judgment.

7.2 Apportionment of Controlled Overdraft. Within twelve (12) months of the court approval and no later than December 1, 2008, with facilitation by Watermaster, WMWD and the Appropriative Pool will establish by mutual agreement the portion of the 400,000 acre-feet of the controlled overdraft authorized by the amendment to Exhibit "I" to the Judgment will be allocated among the Desalters and pursuant to a proposed schedule.

(a) To the extent the groundwater wells for the Future Desalters pump at least fifty (50) percent groundwater from the southern end of the Basin as set forth in Exhibit "2" the *Future Desalters* will be entitled to first priority to the controlled overdraft authorized by the amendment to Exhibit "I" to the Judgment.

(b) WMWD and the Appropriative Pool will exercise good faith and reasonable best efforts to arrive at a fair apportionment. Relevant considerations in establishing the apportionment include, but are not limited to: (i) the nexus between the proposed expansion and achieving Hydraulic Control;(ii) the nexus between the project and obtaining increased yield; (iii) the identified capital costs; (iv) operating and maintenance expenses; and (iv) the availability of third-party funding.

(c) The parties will present any proposed agreement regarding apportionment to Watermaster. Watermaster will provide due regard to any agreement between WMWD and the Appropriative Pool and approve it so long as the proposal phases the Re-Operation over a reasonable period of time to secure the physical condition of Hydraulic Control and will achieve the identified yield benefits while at the same time avoiding Material Physical Injury or an inefficient use of basin resources.

(d) If WMWD and the Appropriative Pool do not reach agreement on apportionment of controlled overdraft to Future Desalters, then no later than August 31, 2009, the members of the Appropriative Pool will submit a plan to Watermaster that achieves the identified goals of increasing the physical capacity of the Desalters and potable water use of approximately 40,000 acre-feet of groundwater production from the Desalters from the Basin no later than 2012. The Appropriative Pool proposal must demonstrate how it has provided first priority to the Future Desalters if the conditions of paragraph 7.2(a) are met.

(e) Watermaster will have discretion to apportion the controlled overdraft under a schedule that reflects the needs of the parties and the need for economic certainty and the factors set forth in Paragraph 7.2(a) above. Watermaster may exercise its discretion to establish a schedule for Basin Re-Operation that best meets the needs of the Parties to the Judgment and the physical conditions of the Basin, including but not limited to such methods as "ramping up," "ramping down," or "straight-lining."

(i) An initial schedule will be approved by Watermaster and submitted to the Court concurrent with Watermaster Resolution 07-05. .

(ii) Watermaster may approve and request Court approval of revisions to the initial schedule if Watermaster's approval and request are supported by a technical report demonstrating the continued need for access to controlled overdraft, subject to the limitations set forth in amended Exhibit "I" to the Judgment and the justification for the amendment.

7.3 Suspension. An evaluation of Watermaster's achievement of Basin outflow conditions, achievement of Hydraulic Control and compliance with Regional Board orders will be completed annually by Watermaster. Re-Operation and Watermaster's apportionment of controlled overdraft will not be suspended in the event that Hydraulic Control is secured in any year *before* the full 400,000 acre-feet has been produced so long as: (i)

Watermaster has prepared, adopted and the Court has approved a contingency plan that establishes conditions and protective measures to avoid Material Physical Injury and that equitably distributes the cost of any mitigation attributable to the identified contingencies, and (ii) Watermaster is in substantial compliance with a Court approved Recharge Master Plan as set forth in Paragraph 8.1 below.

7.4 Storage: Uniform Losses. The Parties acknowledge that Watermaster has assessed a two (2)-percent loss on all groundwater presently held in storage to reflect the current hydrologic condition. As provided in the Peace Agreement, Watermaster will continue to maintain a minimum 2 (two) percent loss until substantial evidence exists to warrant the imposition of another loss factor. However, the Parties further acknowledge and agree that losses have been substantially reduced through the OBMP Implementation Plan and the operation of Desalters I and II and that once Hydraulic Control is achieved outflow and losses from the Basin will have been limited to de minimis quantities. Therefore, Watermaster may establish uniform losses for all water held in storage based on whether the Party has substantially contributed to Watermaster reducing losses and ultimately securing and maintaining Hydraulic Control. .

(a) Pre-Implementation of the Peace Agreement. The uniform annual loss (leave behind) of six (6) percent will be applied to all storage accounts to address actual losses, management and equitable considerations arising from the implementation of the Peace Agreement, the OBMP Implementation Plan, the 2007 Supplement to the OBMP Implementation Plan, including but not limited to the Desalters and Hydraulic Control unless the Party holding the storage account: (i) has previously contributed to the implementation of the OBMP as a Party to the Judgment, is in compliance with their continuing covenants under the Peace Agreement or in lieu thereof they have paid or delivered to Watermaster "financial equivalent" consideration to offset the cost of past performance prior to the implementation of the OBMP and (ii) promised continued future compliance with Watermaster Rules and Regulations. In the event that a Party satisfies 7.4(a)(i) and7.4(a)(ii) they will be assessed a minimum loss of two (2) percent against all water held in storage to reflect actual estimated losses. Watermaster's evaluation of the sufficiency of any consideration or financial equivalency may take into account the fact that one or more Parties to the Judgment are not similarly situated.

(b) Post-Hydraulic Control. Following Watermaster's determination that it has achieved Hydraulic Control and for so long as Watermaster continues to sustain losses from the Basin to the Santa Ana River at a de minimis level (less than one (1) percent), any Party to the Judgment (agency, entity or person) may qualify for the Post-Hydraulic Control uniform loss percentage of less than 1 percent if they meet the criteria of 7.4(a)(i) and 7.4(a)(ii) above.

7.5 Allocation of Losses. Any losses from storage assessed as a Leave Behind in excess of actual losses ("dedication quantity") will be dedicated by Watermaster towards groundwater Production by the Desalters to thereby avoid a Desalter replenishment obligation that may then exist *in the year* of recovery. Any dedication quantity which is not required to offset Desalter Production in the year in which the loss is assessed, will be

made available to the members of the Appropriative Pool. The dedication quantity will be pro-rated among the members of the Appropriative Pool in accordance with each Producer's combined total share of Operating Safe Yield and the previous year's actual production. However, before any member of the Appropriative Pool may receive a distribution of any dedication quantity, they must be in full compliance with the 2007 Supplement to the OBMP Implementation Plan and current in all applicable Watermaster assessments.

ARTICLE VIII
RECHARGE

8.1 Update to the Recharge Master Plan. Watermaster will update and obtain Court approval of its update to the Recharge Master Plan to address how the Basin will be contemporaneously managed to secure and maintain Hydraulic Control and subsequently operated at a new equilibrium at the conclusion of the period of Re-Operation. The Recharge Master Plan shall contain recharge estimations and summaries of the projected water supply availability as well as the physical means to accomplish recharge the projections. Specifically, the Plan will reflect an appropriate schedule for planning, design, and physical improvements as may be required to provide reasonable assurance that following the full beneficial use of the groundwater withdrawn in accordance with the Basin Re-Operation and authorized controlled overdraft, that sufficient Replenishment capability exists to meet the reasonable projections of Desalter Replenishment obligations. The Recharge Master Plan will be updated and amended as frequently as necessary with Court approval and not less than every five (5) years. ,

8.2 Coordination. The members of the Appropriative Pool will coordinate the development of their respective Urban Water Management Plans and Water Supply Master Plans with Watermaster as follows.

(a) Each Appropriator that prepares an Urban Water Management Plan and Water Supply Plans will provide Watermaster with copies of their existing and proposed plans.

(b) Watermaster will use the Plans in evaluating the adequacy of the Recharge Master Plan and other OBMP Implementation Plan program elements.

(c) Each Appropriator will provide Watermaster with a draft in advance of adopting any proposed changes to their Urban Water Management Plans and in advance of adopting any material changes to their Water Supply Master Plans respectively in accordance with the customary notification routinely provided to other third parties to offer Watermaster a reasonable opportunity to provide informal input and informal comment on the proposed changes.

(d) Any party that experiences the loss or the imminent threatened loss of a material water supply source will provide reasonable notice to Watermaster of the condition and the expected impact, if any, on the projected groundwater use.

8.3 Continuing Covenant. To ameliorate any long-term risks attributable to reliance upon un-replenished groundwater production by the Desalters, the annual availability of any portion of the 400,000 acre-feet set aside as controlled overdraft as a component of the Physical Solution, is expressly subject to Watermaster making an annual finding it is in substantial compliance with the revised Watermaster Recharge Master Plan pursuant to Paragraphs 7.3 and 8.1 above.

8.4 Acknowledgment re 6,500 Acre-Foot Supplemental Recharge. The Parties make the following acknowledgments regarding the 6,500 Acre-Foot Supplemental Recharge:

(a) A fundamental premise of the Physical Solution is that all water users dependent upon Chino Basin will be allowed to pump sufficient waters from the Basin to meet their requirements. To promote the goal of equal access to groundwater within all areas and sub-areas of the Chino Basin, Watermaster has committed to use its best efforts to direct recharge relative to production in each area and sub-area of the Basin and to achieve long-term balance between total recharge and discharge. The Parties acknowledge that to assist Watermaster in providing for recharge, the Peace Agreement sets forth a requirement for Appropriative Pool purchase of 6,500 acre-feet per year of Supplemental Water for recharge in Management Zone 1 (MZ1). The purchases have been credited as an addition to Appropriative Pool storage accounts. The water recharged under this program has not been accounted for as Replenishment water.

(b) Watermaster was required to evaluate the continuance of this requirement in 2005 by taking into account provisions of the Judgment, Peace Agreement and OBMP, among all other relevant factors. It has been determined that other obligations in the Judgment and Peace Agreement, including the requirement of hydrologic balance and projected replenishment obligations, will provide for sufficient wet-water recharge to make the separate commitment of Appropriative Pool purchase of 6,500 acre-feet unnecessary. Therefore, because the recharge target as described in the Peace Agreement has been achieved, further purchases under the program will cease.

(c) The parties acknowledge that, regardless of Replenishment obligations, Watermaster will independently determine whether to require wet-water recharge within MZ1 to maintain hydrologic balance and to provide equal access to groundwater. Watermaster will conduct its recharge in a manner to provide hydrologic balance within, and will emphasize recharge in MZ1. Accordingly, the Parties acknowledge and agree that each year Watermaster shall continue to be guided in the exercise of its discretion concerning recharge by the principles of hydrologic balance.

ARTICLE IX

9.1 Basin Management Assistance. Three Valleys Municipal Water District ("TVMWD") shall assist in the management of the Basin through a financial contribution of $300,000 to study

the feasibility of developing a water supply program within Management Zone 1 of the Basin or in connection with the evaluation of Future Desalters. The study will emphasize assisting Watermaster in meeting its OBMP Implementation Plan objectives of concurrently securing Hydraulic Control through Re-Operation while attaining Management Zone 1 subsidence management goals. Further, TVMWD has expressed an interest in participating in future projects in the Basin that benefit TVMWD. If TVMWD wishes to construct or participate in such future projects, TVMWD shall negotiate with Watermaster in good faith concerning a possible "buy-in" payment

ARTICLE X
SETTLEMENT AND RELEASE

10.1 Settlement. By its execution of this Agreement, the Parties mutually and irrevocably, fully settle their respective claims, rights and obligations, whatever they may be, regarding the design, funding, construction and operation of Future Desalters as set forth in and arising from Article VII of the Peace Agreement.

10.2 Satisfaction of Peace Agreement Obligation Regarding Future Desalters. The Parties individual and collective responsibilities arising from the Part VII of the Peace Agreement and the OBMP Implementation Plan regarding the plan, design, permit, construction and operation of Future Desalter, whatever they may be, are unaffected by this Agreement. However, upon the completion of a 10,000 AFY (9 mgd) expansion of groundwater production and desalting from Desalter II as provided for herein, the Parties will be deemed to have satisfied all individual and collective pre-existing obligations arising from the Peace Agreement and the OBMP Implementation Plan, whatever they may be, with regard to Future Desalters as described in Part VII of the Peace Agreement and the OBMP Implementation Plan.

10.3 Satisfaction of Pomona Credit. In recognition of the ongoing benefits received by TVMWD through the City of Pomona's anion exchange project, as its sole and exclusive responsibility, TVMWD will make an annual payment to Watermaster in an amount equal to the credit due the City of Pomona under Peace Agreement Paragraph 5.4(b) ("the Pomona Credit").

(a) Within ninety (90) days of each five-year period following the Effective Date of this Agreement, in its sole discretion TVMWD shall make an election whether to continue or terminate its responsibilities under this paragraph. TVMWD shall provide written notice of such election to Watermaster.

(b) Watermaster will provide an annual invoice to TVMWD for the amount of the Pomona Credit.

(c) Further, in any renewal term of the Peace Agreement, TVMWD will continue to make an equivalent financial contribution which TVMWD consents to Watermaster's use for the benefit of MZ1, subject to the same conditions set forth above with respect to TVMWD's payment of the "Pomona Credit".

(d) In the event TVMWD elects to terminate is obligation under this Paragraph, the Peace Agreement and the responsibility for satisfying the Pomona Credit will remain unchanged and unaffected, other than as it will be deemed satisfied for each five-year period that TVMWD has actually made the specified payment.

10.4 Release. Upon WMWD's completion of a 10,000 AFY (9 mgd) expansion of groundwater production and desalting in a manner consistent with the parameters set forth in this Agreement, each Party, for itself, its successors, assigns, and any and all persons taking by or through it, hereby releases WMWD and IEUA from any and all obligations arising from WMWD's and IEUA's responsibility for securing funding, designing, and constructing Future Desalters as set forth in or arising exclusively from Article VII of the Peace Agreement and the Program Elements 3, 6, and 7, OBMP Implementation Plan only, and each Party knowingly and voluntarily waives all rights and benefits which are provided by the terms and provisions of section 1542 of the Civil Code of the State of California, or any comparable statute or law which may exist under the laws of the State of California, in or arising from WMWD's and IEUA's responsibility for securing funding, designing, and constructing Future Desalters as set forth in or arising exclusively from Article VII of the Peace Agreement and the OBMP Implementation Plan only. The Parties hereby acknowledge that this waiver is an essential and material term of this release. The Parties, and each of them, acknowledge that Civil Code section 1542 provides as follows:

A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS OR HER FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH IF KNOWN BY HIM OR HER MUST HAVE MATERIALLY AFFECTED HIS OR HER SETTLEMENT WITH THE DEBTOR.

Each Party understands and acknowledges that the significance and consequence of this waiver of Civil Code section 1542 is the waiver of any presently unknown claims as described above, and that if any Party should eventually suffer additional damages arising out of the respective claim that Party will not be able to make any claim for those additional damages. Further, all Parties to this Agreement acknowledge that they consciously intend these consequences even as to claims for such damages that may exist as of the date of this Agreement but which are not known to exist and which, if known, would materially affect the Parties' respective decision to execute this Agreement, regardless of whether the lack of knowledge is the result of ignorance, oversight, error, negligence, or any other cause.

10.5 Reservation of Rights. Nothing herein shall be construed as precluding any party to the Judgment from seeking judicial review of any Watermaster action on the grounds that Watermaster has failed to act in accordance with the Peace Agreement as amended, this Agreement, the Amended Judgment, the OBMP Implementation Plan as amended and applicable law.

ARTICLE XI
TERM

11.1 Commencement. This Agreement will become effective upon the satisfaction of all conditions precedent and shall expire on the Termination Date.

11.2 Termination. This Agreement is coterminous with the initial term of the Peace Agreement and will expire of its own terms and terminate on the date of the Initial Term of the Peace Agreement.

ARTICLE XIII
GENERAL PROVISIONS

12.1 Construction of this Agreement. Each Party, with the assistance of competent legal counsel, has participated in the drafting of this Agreement and any ambiguity should not be construed for or against any Party on account of such drafting.

12.2 Awareness of Contents/Legal Effect. The Parties expressly declare and represent that they have read the Agreement and that they have consulted with their respective counsel regarding the meaning of the terms and conditions contained herein. The parties further expressly declare and represent that they fully understand the content and effect of this Agreement and they approve and accept the terms and conditions contained herein, and that this Agreement is executed freely and voluntarily.

12.3 Counterparts. This Agreement may be executed in counterparts. This Agreement shall become operative as soon as one counterpart hereof has been executed by each Party. The counterparts so executed shall constitute on Agreement notwithstanding that the signatures of all Parties do not appear on the same page.

IN WITNESS THEREOF, the Parties hereto have set forth their signatures as of the date written below:

Dated:

CITY OF BANANA

By _____

Exhibit "1"

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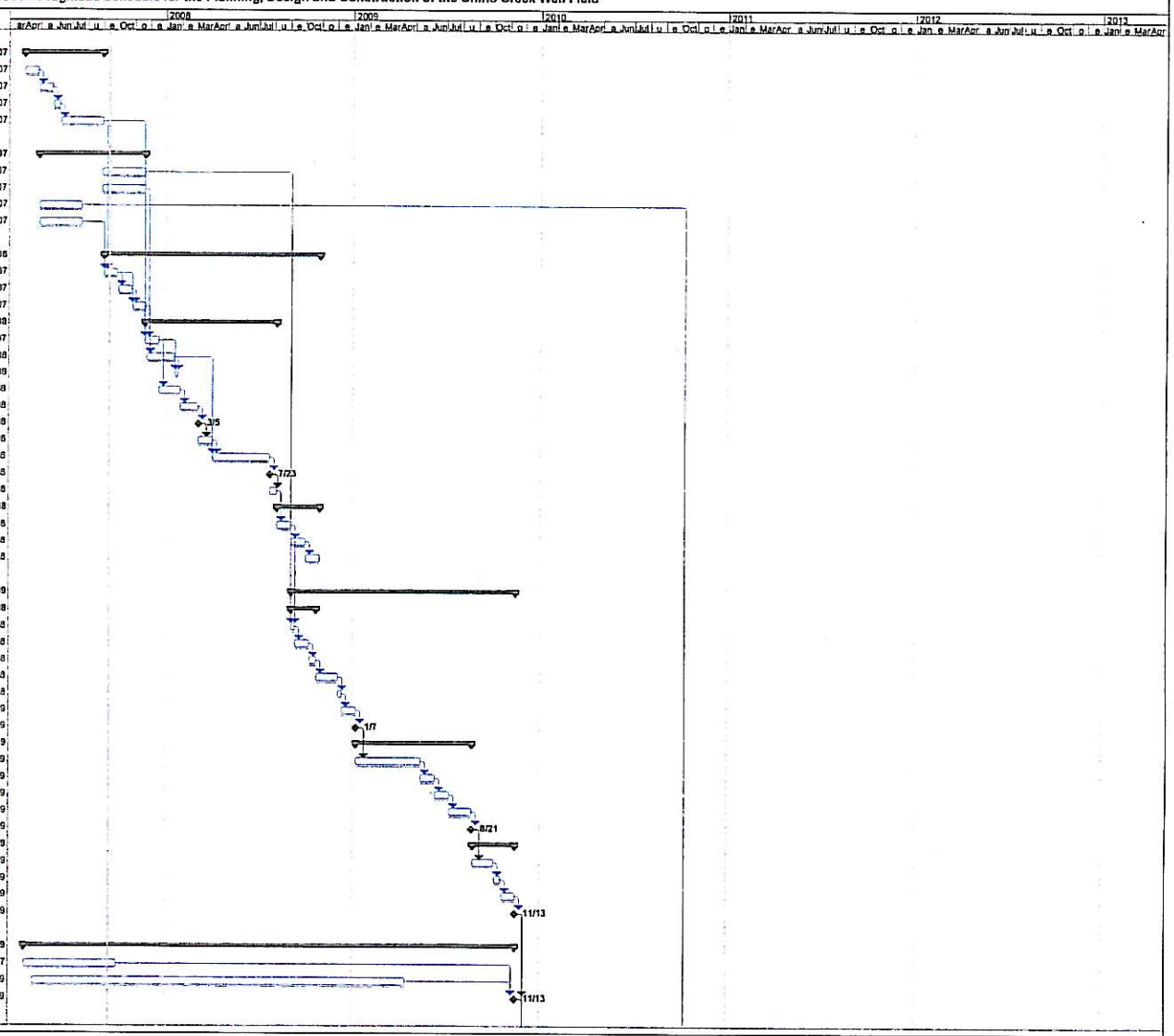
Schedule A -- Pragmatic Schedule for the Planning, Design and Construction of the Chino Creek Well Field

ID	Task Name	Duration	Start	Finish
1				
2	**Prepare Project Description**	**110 days**	**Mon 4/2/07**	**Fri 8/31/07**
3	Prepare Draft Project Description	20 days	Mon 4/2/07	Fri 4/27/07
4	Circulate and Revise Draft Project Description	20 days	Mon 4/30/07	Fri 5/25/07
5	Finalize Draft Project Description	10 days	Mon 5/28/07	Fri 6/8/07
6	Prepare Screening-level Initial Study	60 days	Mon 6/11/07	Fri 8/31/07
7				
8	**Select Consultants**	**146 days**	**Mon 4/30/07**	**Wed 11/21/07**
9	Select CEQA Consultant	60 days	Thu 8/30/07	Wed 11/21/07
10	Select Well Design Consultant	60 days	Thu 8/30/07	Wed 11/21/07
11	Select Facilities Design Consultant	60 days	Mon 4/30/07	Fri 7/20/07
12	Select Program Manager	60 days	Mon 4/30/07	Fri 7/20/07
13				
14	**Select Well Sites**	**393 days**	**Mon 9/3/07**	**Wed 10/29/08**
15	Develop Three Well Field Alternatives	20 days	Mon 9/3/07	Fri 9/28/07
16	Determine Property Ownership in Each Well Field Alternative	20 days	Mon 10/1/07	Fri 10/26/07
17	Select Alternative Well Sites	20 days	Mon 10/29/07	Fri 11/23/07
18	**Implement Well Site Investigation Program**	**185 days**	**Thu 11/22/07**	**Wed 8/6/08**
19	Develop Investigation Plan	20 days	Thu 11/22/07	Wed 12/19/07
20	Negotiate Access to Test Sites	40 days	Mon 11/26/07	Fri 1/18/08
21	Obtain Permits	5 days	Mon 1/21/08	Fri 1/25/08
22	Prepare Bid Package	30 days	Thu 12/20/07	Wed 1/30/08
23	Advertise	25 days	Thu 1/31/08	Wed 3/5/08
24	Select Contractor	0 days	Wed 3/5/08	Wed 3/5/08
25	Negotiate Contract	20 days	Thu 3/6/08	Wed 4/2/08
26	Construct Test Wells, Run Stress Test and WQ Tests	80 days	Thu 4/3/08	Wed 7/23/08
27	Characterize Production Requirements and Water Quality	0 days	Wed 7/23/08	Wed 7/23/08
28	Revise Well Field Design	10 days	Thu 7/24/08	Wed 8/6/08
29	**Prepare Well Field Predesign Report**	**60 days**	**Thu 8/7/08**	**Wed 10/29/08**
30	Prepare Draft Report	20 days	Thu 8/7/08	Wed 9/3/08
31	Circulate and Revise Predesign Report	20 days	Thu 9/4/08	Wed 10/1/08
32	Finalize Predesign Report	20 days	Thu 10/2/08	Wed 10/29/08
33				
34	**CEQA Process for Chino Creek Well Field**	**312 days**	**Thu 9/4/08**	**Fri 11/13/09**
35	**Prepare Final Project Description**	**35 days**	**Thu 9/4/08**	**Wed 10/22/08**
36	Prepare Final Project Description	5 days	Thu 9/4/08	Wed 9/10/08
37	Circulate and Revise Final Project Description	20 days	Thu 9/11/08	Wed 10/8/08
38	Finalize Project Description	10 days	Thu 10/9/08	Wed 10/22/08
39	Prepare Initial Study	30 days	Thu 10/23/08	Wed 12/3/08
40	Prepare Notice of Preparation (NOP)	5 days	Thu 12/4/08	Wed 12/10/08
41	Circulate NOP	20 days	Thu 12/11/08	Wed 1/7/09
42	Conduct Public Meeting Regarding NOP	0 days	Wed 1/7/09	Wed 1/7/09
43	**Prepare Draft EIR**	**152 days**	**Thu 1/8/09**	**Fri 8/21/09**
44	Prepare Administrative Draft EIR	90 days	Thu 1/8/09	Wed 5/13/09
45	Circulate and Review Administrative Draft	20 days	Thu 5/14/09	Wed 6/10/09
46	Prepare Draft EIR	20 days	Thu 6/11/09	Wed 7/8/09
47	Review Period for Draft EIR	32 days	Thu 7/9/09	Fri 8/21/09
48	Public Review Meeting	0 days	Fri 8/21/09	Fri 8/21/09
49	**Finalize EIR**	**60 days**	**Mon 8/24/09**	**Fri 11/13/09**
50	Prepare Response to Comments	30 days	Mon 8/24/09	Fri 10/2/09
51	Circulate and Review Responses to Comments	10 days	Mon 10/5/09	Fri 10/16/09
52	Prepare Final EIR	20 days	Mon 10/19/09	Fri 11/13/09
53	Certify Final EIR	0 days	Fri 11/13/09	Fri 11/13/09
54				
55	**Select Well Field Alternative**	**685 days**	**Mon 4/2/07**	**Fri 11/13/09**
56	Negotiate Chino Airport/County Contribution	130 days	Mon 4/2/07	Fri 9/28/07
57	Negotiate OIA PRPs Contribution	520 days	Wed 4/18/07	Tue 4/14/09
58	Select Well Field	0 days	Fri 11/13/09	Fri 11/13/09
59				



Project: 20070329 Schedule A Chino C
Date: Wed 9/12/07

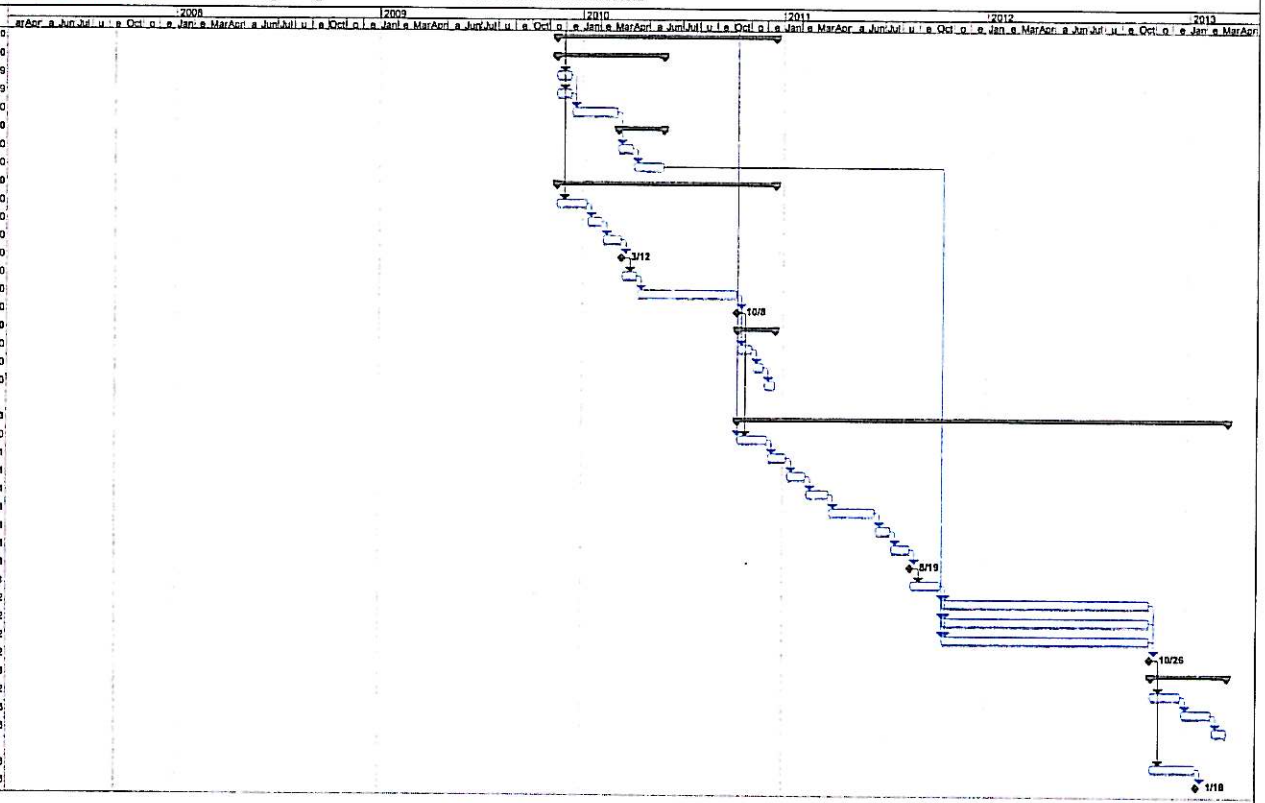
Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

Chino Basin Watermaster
Inland Empire Utilities Agency

Wildermuth Environmental, Inc.

Schedule A -- Pragmatic Schedule for the Planning, Design and Construction of the Chino Creek Well Field

ID	Task Name	Duration	Start	Finish
60	**Final Design of Well Field**	**285 days**	**Mon 11/16/09**	**Fri 12/17/10**
61	**Obtain Wells Sites**	**140 days**	**Mon 11/16/09**	**Fri 5/28/10**
62	Prepare Legal Descriptions	20 days	Mon 11/16/09	Fri 12/11/09
63	Establish Value	20 days	Mon 11/16/09	Fri 12/11/09
64	Negotiate Site Acquisition	60 days	Mon 12/14/09	Fri 3/5/10
65	**Obtain Raw Water Pipeline Easements**	**60 days**	**Mon 3/8/10**	**Fri 5/28/10**
66	Prepare Legal Description	20 days	Mon 3/8/10	Fri 4/2/10
67	Negotiate Easements	40 days	Mon 4/5/10	Fri 5/28/10
68	**Prepare Final Well Field Design**	**285 days**	**Mon 11/16/09**	**Fri 12/17/10**
69	Prepare Plans and Specifications for Wells	40 days	Mon 11/16/09	Fri 1/8/10
70	Prepare Bid Package	20 days	Mon 1/11/10	Fri 2/5/10
71	Advertise	25 days	Mon 2/8/10	Fri 3/12/10
72	Select Contractor	0 days	Fri 3/12/10	Fri 3/12/10
73	Negotiate Contract	20 days	Mon 3/15/10	Fri 4/9/10
74	Construct Six New Wells	130 days	Mon 4/12/10	Fri 10/8/10
75	Finalize Well Production and WQ Characteristic	0 days	Fri 10/8/10	Fri 10/8/10
76	**Prepare Well Construction Report**	**50 days**	**Mon 10/11/10**	**Fri 12/17/10**
77	Prepare Draft Well Construction Report	20 days	Mon 10/11/10	Fri 11/5/10
78	Circulate and Review Draft	15 days	Mon 11/8/10	Fri 11/26/10
79	Finalize Well Construction Report	15 days	Mon 11/29/10	Fri 12/17/10
80				
81	**Design and Construct Pipeline, Wellhead, and Treatment Plant Improvements**	**635 days**	**Mon 10/11/10**	**Fri 3/15/13**
82	Prepare 30 Percent Design Report	40 days	Mon 10/11/10	Fri 12/3/10
83	Prepare 50 Percent Design Report	25 days	Mon 12/6/10	Fri 1/7/11
84	Prepare 70 Percent Design Report	25 days	Mon 1/10/11	Fri 2/11/11
85	Prepare Final Design Report	30 days	Mon 2/14/11	Fri 3/25/11
86	Prepare Plans and Specifications	60 days	Mon 3/28/11	Fri 6/17/11
87	Prepare Bid Package	20 days	Mon 6/20/11	Fri 7/15/11
88	Advertise	25 days	Mon 7/18/11	Fri 8/19/11
89	Select Contractor	0 days	Fri 8/19/11	Fri 8/19/11
90	Negotiate Contracts	40 days	Mon 8/22/11	Fri 10/14/11
91	Construct Raw Water Pipeline	270 days	Mon 10/17/11	Fri 10/26/12
92	Construct Wellhead Improvements	270 days	Mon 10/17/11	Fri 10/26/12
93	Construct Desalter I Improvements	270 days	Mon 10/17/11	Fri 10/26/12
94	Construction Complete	0 days	Fri 10/26/12	Fri 10/26/12
95	**Prepare Construction Report**	**100 days**	**Mon 10/29/12**	**Fri 3/15/13**
96	Prepare Draft Construction Report	40 days	Mon 10/29/12	Fri 12/21/12
97	Circulate and Review Draft	40 days	Mon 12/24/12	Fri 2/15/13
98	Finalize Construction Report	20 days	Mon 2/18/13	Fri 3/15/13
99				
100	Start Up Testing of Improvements	60 days	Mon 10/29/12	Fri 1/18/13
101	Start of Regular Operations	0 days	Fri 1/18/13	Fri 1/18/13

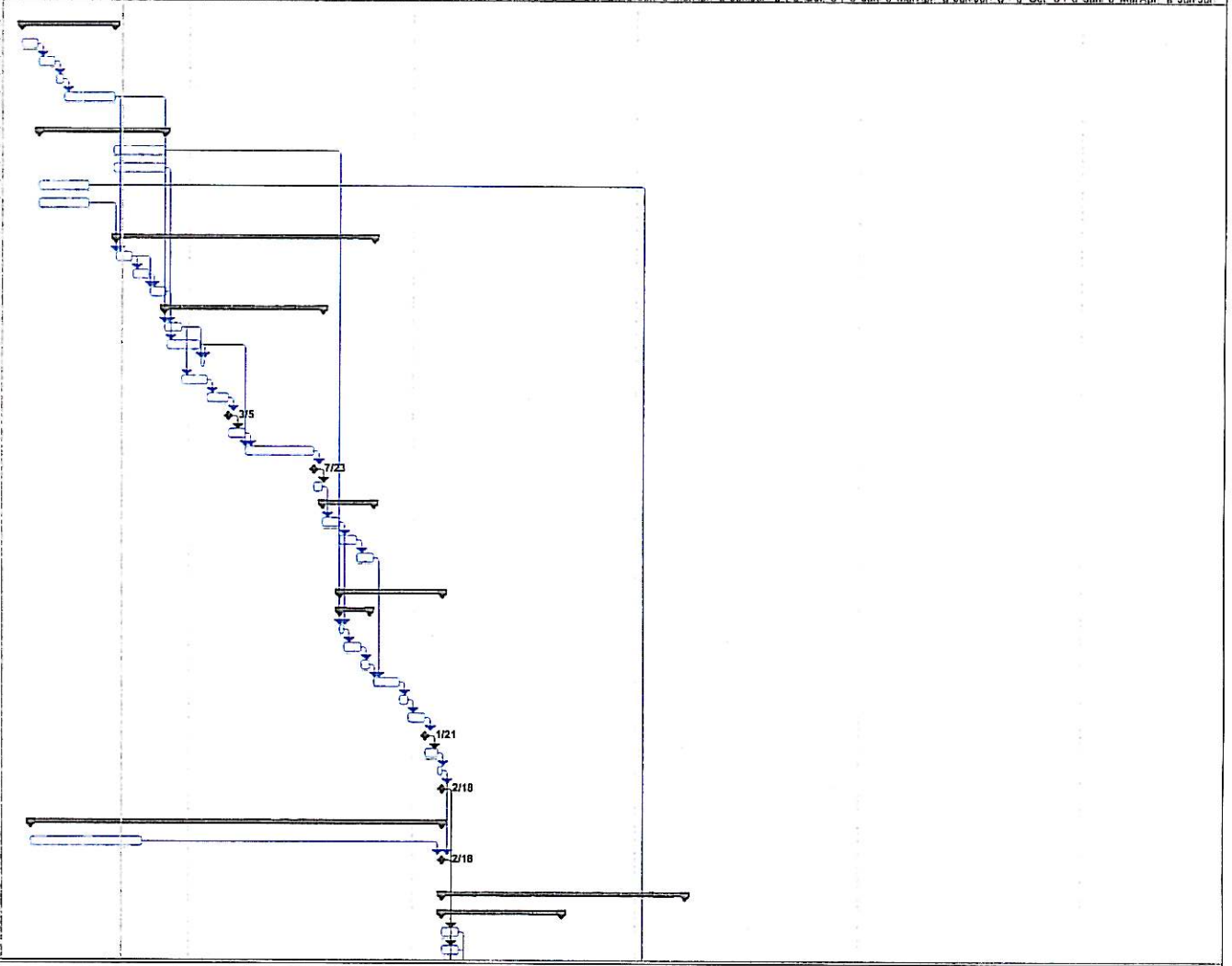


Project: 20070329 Schedule A Chino C
Date: Wed 9/12/07

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

Schedule B – Accelerated Schedule for the Planning, Design and Construction of the Chino Creek Well Field

ID	Task Name	Start
1		
2	**Prepare Project Description**	**Mon 4/2/07**
3	Prepare Draft Project Description	Mon 4/2/07
4	Circulate and Revise Draft Project Description	Mon 4/30/07
5	Finalize Draft Project Description	Mon 5/28/07
6	Prepare Screening-Level Initial Study	Mon 6/11/07
7		
8	**Select Consultants**	**Mon 4/30/07**
9	Select CEQA Consultant	Thu 8/30/07
10	Select Well Design Consultant	Thu 8/30/07
11	Select Facilities Design Consultant	Mon 4/30/07
12	Select Program Manager	Mon 4/30/07
13		
14	**Select Well Sites**	**Mon 9/3/07**
15	Develop Three Well Field Alternatives	Mon 9/3/07
16	Determine Property Ownership in Each Well Field Alternative	Mon 10/1/07
17	Select Alternative Well Sites	Mon 10/29/07
18	**Implement Well Site Investigation Program**	**Thu 11/22/07**
19	Develop Investigation Plan	Thu 11/22/07
20	Negotiate Access to Test Sites	Mon 11/26/07
21	Obtain Permits	Mon 1/21/08
22	Prepare Bid Package	Thu 12/20/07
23	Advertise	Thu 1/31/08
24	Select Contractor	Wed 3/5/08
25	Negotiate Contract	Thu 3/6/08
26	Construct Test Wells, Run Stress Test and WQ Tests	Thu 4/3/08
27	Characterize Production Requirements and Water Quality	Wed 7/23/08
28	Revise Well Field Design	Thu 7/24/08
29	**Prepare Well Field Predesign Report**	**Thu 8/7/08**
30	Prepare Draft Report	Thu 8/7/08
31	Circulate and Revise Predesign Report	Thu 9/4/08
32	Finalize Predesign Report	Thu 10/2/08
33		
34	**CEQA Process for Chino Creek Well Field**	**Thu 9/4/08**
35	**Prepare Final Project Description**	**Thu 9/4/08**
36	Prepare Final Project Description	Thu 9/4/08
37	Circulate and Revise Final Project Description	Thu 9/11/08
38	Finalize Project Description	Thu 10/9/08
39	Prepare Initial Study	Thu 10/30/08
40	Prepare Mitigated Negative Declaration	Thu 12/11/08
41	Circulate Mitigated Negative Declaration	Thu 12/25/08
42	Conduct Public Meeting Regarding Mitigated Negative Declaration	Wed 1/21/09
43	Prepare Response to Comments	Thu 1/22/09
44	Prepare Final Mitigated Negative Declaration	Thu 2/12/09
45	IEUA Adopts Mitigated Negative Declaration	Wed 2/18/09
46		
47	**Select Well Field Alternative**	**Wed 4/18/07**
48	Negotiate Chino Airport/County Contribution	Wed 4/18/07
49	Select Well Field	Wed 2/18/09
50		
51	**Final Design of Well Field**	**Thu 2/19/09**
52	**Obtain Wells Sites**	**Thu 2/19/09**
53	Prepare Legal Descriptions	Thu 2/19/09
54	Establish Value	Thu 2/19/09

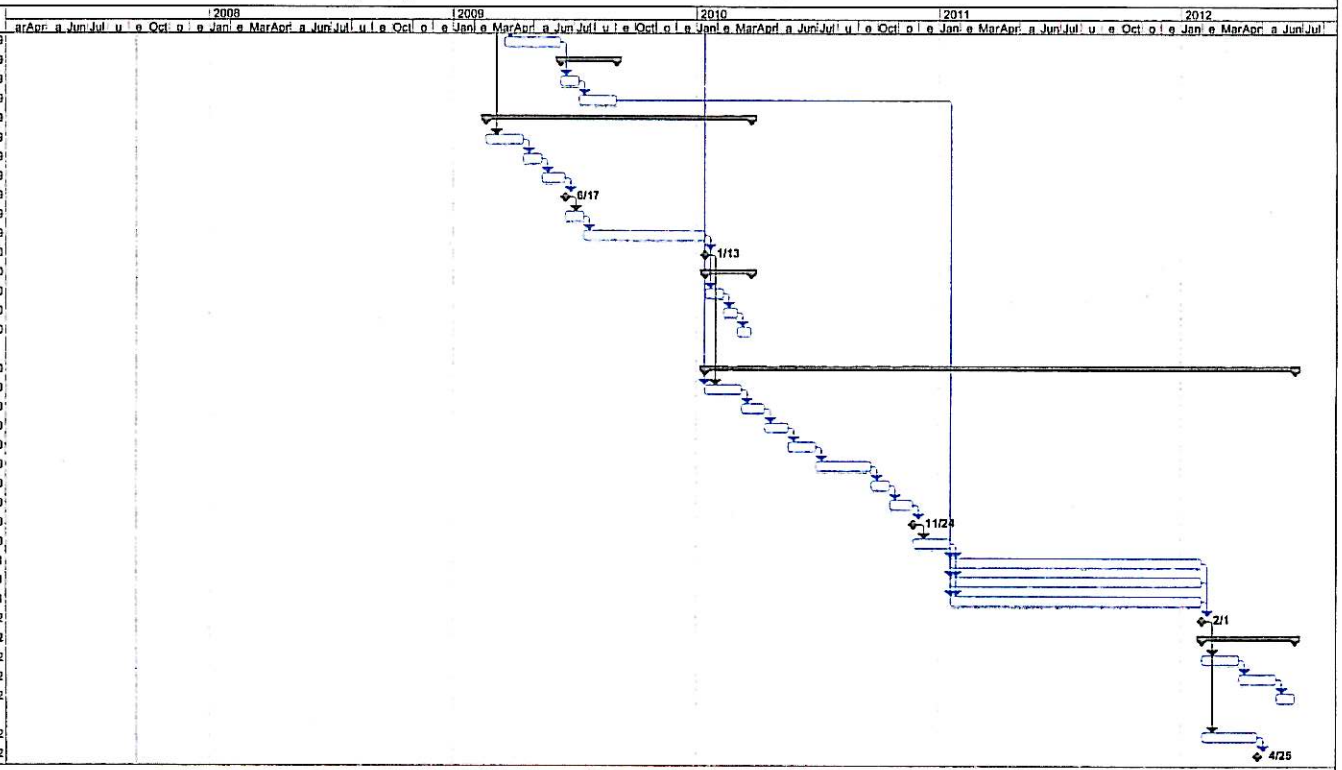


Project: 20070329 Schedule B Chino C
Date: Wed 9/12/07

Task | Progress | Summary | External Tasks | Split
Split | Milestone | Project Summary | External MileTask

Schedule B -- Accelerated Schedule for the Planning, Design and Construction of the Chino Creek Well Field

ID	Task Name	Start
55	Negotiate Site Acquisition	Thu 3/19/09
56	**Obtain Raw Water Pipeline Easements**	**Thu 6/11/09**
57	Prepare Legal Description	Thu 6/11/09
58	Negotiate Easements	Thu 7/9/09
59	**Prepare Final Well Field Design**	**Thu 2/19/09**
60	Prepare Plans and Specifications for Wells	Thu 2/19/09
61	Prepare Bid Package	Thu 4/16/09
62	Advertise	Thu 5/14/09
63	Select Contractor	Wed 6/17/09
64	Negotiate Contract	Thu 6/18/09
65	Construct Six New Wells	Thu 7/16/09
66	Finalize Well Production and WQ Characteristics	Wed 1/13/10
67	**Prepare Well Construction Report**	**Thu 1/14/10**
68	Prepare Draft Well Construction Report	Thu 1/14/10
69	Circulate and Review Draft	Thu 2/11/10
70	Finalize Well Construction Report	Thu 3/4/10
71		
72	**Design and Construct Pipeline, Wellhead, and Treatment Plant Improvemer**	**Thu 1/14/10**
73	Prepare 30 Percent Design Report	Thu 1/14/10
74	Prepare 50 Percent Design Report	Thu 3/11/10
75	Prepare 70 Percent Design Report	Thu 4/15/10
76	Prepare Final Design Report	Thu 5/20/10
77	Prepare Plans and Specifications	Thu 7/1/10
78	Prepare Bid Package	Thu 9/23/10
79	Advertise	Thu 10/21/10
80	Select Contractor	Wed 11/24/10
81	Negotiate Contracts	Thu 11/25/10
82	Construct Raw Water Pipeline	Thu 1/20/11
83	Construct Wellhead Improvements	Thu 1/20/11
84	Construct Desalter I Improvements	Thu 1/20/11
85	Construction Complete	Wed 2/1/12
86	**Prepare Construction Report**	**Thu 2/2/12**
87	Prepare Draft Construction Report	Thu 2/2/12
88	Circulate and Review Draft	Thu 3/29/12
89	Finalize Construction Report	Thu 5/24/12
90		
91	Start Up Testing of Improvements	Thu 2/2/12
92	Start of Regular Operations	Wed 4/25/12



Project: 20070329 Schedule B Chino C
Date: Wed 9/12/07

Task | Progress | Summary | External Tasks | Split
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Exhibit "2"

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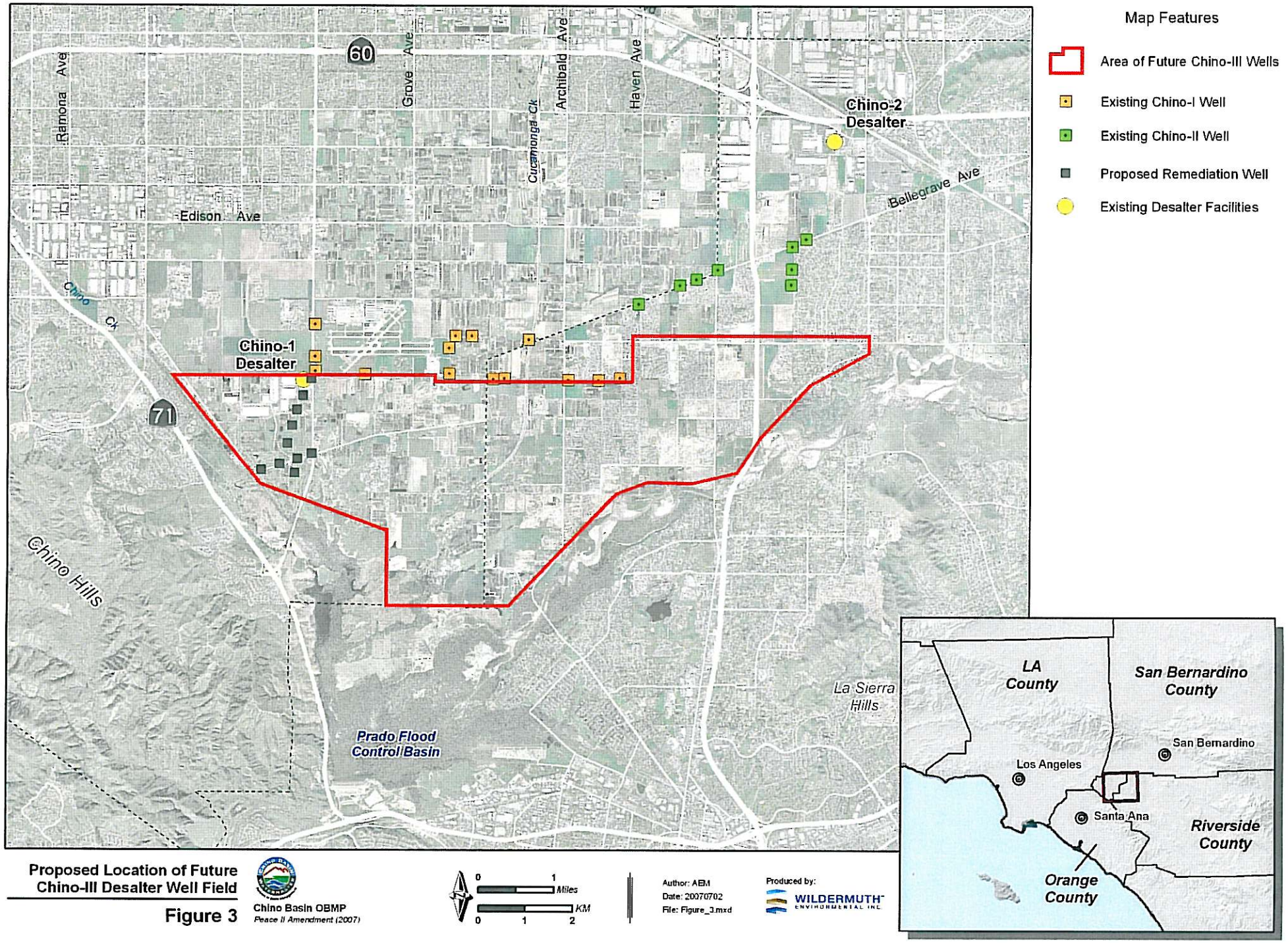

Proposed Location of Future Chino-III Desalter Well Field

Figure 3

Chino Basin OBMP
Peace II Amendment (2007)

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ATTACHMENT "L"

SECOND AMENDMENT TO PEACE AGREEMENT

THIS SECOND AMENDMENT TO PEACE AGREEMENT ("AGREEMENT") is dated the ____ of September 2007 regarding the Chino Groundwater Basin.

RECITALS

A. The Parties entered into that certain "Peace Agreement" dated June 29, 2000. The Peace Agreement was approved by the Court in San Bernardino Superior Court Case No. RCV 51010.

B. The Parties entered into a First Amendment to the Peace Agreement on September 2nd of 2004 regarding the deletion of Salt Credits and the Stormwater Component of New Yield.

NOW THEREFORE, in consideration of the covenants and conditions herein contained, and for other good and valuable consideration the receipt of which is hereby acknowledged, the Parties agree as follows:

AGREEMENT

Section 1. **OBMP Credits Modified.** The Peace Agreement § 5.4(d) will be amended to read:

(d) Watermaster shall adopt reasonable procedures to evaluate requests for OBMP credits against future OBMP Assessments or for reimbursement. Any Producer or party to the Judgment, including but not limited to the State of California, may make application to Watermaster for reimbursement or credit against future OBMP Assessments for any capital or operations and maintenance expenses incurred in the implementation of any project or program, including the cost of relocating groundwater Production facilities, that carries out the purposes of the OBMP and specifically relates to the prevention of subsidence in the Basin, in advance of construction or that is prospectively dedicated to service of the stated goals of the OBMP. Watermaster shall exercise reasonable discretion in making its determination, considering the importance of the project or program to the successful completion of the OBMP, the available alternative funding sources, and the professional engineering and design standards as may be applicable under the circumstances. However, Watermaster shall not approve such a request for reimbursement or credit against future OBMP Assessments under this section where the Producer or party to the Judgment was otherwise legally compelled to make the improvement.

Section 2. **Increase the Limit on Storage of Local Supplemental Water** The current cap of 50,000 acre-feet of Storage of Supplemental Water described in paragraph 5.2(b)(iv) and 5.2(b)(vii) of the Peace Agreement shall be increased from 50,000 to 100,000 acre-feet. Any Party to the Judgment may make Application to Watermaster to store Supplemental Water pursuant to the terms of section 5.2(b) of the Peace Agreement except that the rebuttable presumption applicable to Local Storage Agreements described in Peace Agreement paragraph 5.2(b)(v) shall no longer be in effect with regard to such applications.

Section 3. **Effect of Amendment.** Except as amended hereby, the Peace Agreement remains in full force and effect.

IN WITNESS WHEREOF, the Parties hereto have set forth their signatures as of the date written below: