

Section 7 – Recharge Master Plan Update

This section contains the conclusions and recommendations of the RMPU. These conclusions and recommendations are grouped under the following subsections: Stormwater Management, Regional Stormwater Recharge Facilities, Supplemental Water for Replenishment, Supplemental Water Recharge Facilities, and Future RMPU Process. The nexus between the Court’s Requirement for the RMPU and the information presented in this report is summarized in Table 7-1.

7.1 Local Stormwater Management and Mitigation of the Loss of Safe Yield

Section 3 describes the range of new stormwater recharge that could result from implementing the 2010 MS4 permit. Based on the requirements of the permit, the expected new stormwater recharge could range from about 5,300 acre-ft/yr (if 50 percent of the stormwater required to be managed by the permit is recharged) to about 10,500 acre-ft/yr (if 100 percent of the stormwater required to be managed by the permit is recharged).

Section 3 also describes the new recharge potential of existing developed areas. Applying the same criteria from the MS4 permit to the developed areas yields, on average, between 19,000 acre-ft/yr and 38,000 acre-ft/yr of new recharge. Watermaster, working with the landuse control entities, should encourage development practices that will maximize the capture and recharge of stormwater. New recharge, as used herein, means the net new recharge created by the project. The following should be implemented by the CBWCD, the IEUA, Watermaster, and other stakeholders.

1. Watermaster should allocate new yield that is created by new recharge above that required by MS4 permit compliance to the owners of those projects that create new recharge. This will require the development of (a) new agreements involving the Watermaster, project owners, and others, and (b) the development of new practices and procedures that can quantify new recharge during project development and subsequently verify that the new recharge is occurring during the project lifetime.
2. Watermaster, working with the Parties, should encourage the construction of local recharge projects in developed areas that will increase the capture and recharge of stormwater. The recommendations for local stormwater recharge projects in developed areas are the same as those for newly developed areas, articulated above.
3. In implementing the above, Watermaster should form a committee—consisting of itself, the landuse control entities, the County Flood Control Districts, the CBWCD, the IEUA, and others—to develop the monitoring, reporting, and accounting practices that will be required to estimate local project stormwater recharge and new yield. This committee should be formed immediately, and the monitoring, reporting, and accounting practices should be developed as soon as possible.

7.2 Regional Stormwater Recharge Facilities

Section 3 describes the existing long-term average stormwater recharge from existing stormwater management facilities, including the CBFIP facilities constructed as part of the implementation of the OBMP. The long-term average annual stormwater recharge with the recharge facilities existing in 2009-10 is estimated to be about 13,600 acre-ft/yr, and this recharge will increase slightly over time with new development (See Table 3-8). This estimate is based on the *2006 Chino Basin Recharge Facilities Operation Procedures Manual* (GRCC, 2006) with some operating procedure modifications, provided by the IEUA. Section 5 describes the existing and potential stormwater management facilities and demonstrates that more new stormwater recharge is possible; although, the cost for some future recharge projects will be significant. WBE, the firm that authored Section 5, developed and analyzed several individual new and enhanced projects and project configurations. The embedded table in Section 5.5.8 summarizes the recharge performance and associated costs of the proposed new stormwater projects. WBE grouped these projects and configurations into five phases with the total recharge and unit cost of new stormwater recharge increasing with each phase. The recharge and unit cost of recharge for each phase is summarized below.

Phase	Range of Recharge		Range of Annual Cost		Range of Unit Cost	
	75% of Theoretical	Theoretical	WBE Cost Opinion	WBE Cost Opinion + 15%	Min	Max
	(ac-ft/yr)	(ac-ft/yr)			(\$/ac-ft)	(\$/ac-ft)
I	5,800	7,700	\$1,652,000	\$1,900,000	\$215	\$328
II	6,000	8,100	\$2,601,000	\$2,991,000	\$321	\$499
III	8,400	11,300	\$5,605,000	\$6,446,000	\$496	\$767
IV	10,200	13,600	\$14,800,000	\$17,039,000	\$1,088	\$1,670
Va	11,900	15,900	\$19,306,000	\$22,202,000	\$1,214	\$1,866
Vb	11,900	15,900	\$14,692,000	\$17,206,000	\$924	\$1,446

Through the RMPU workshop process, the stakeholder's expressed interest in pursuing Phases I through III as the unit cost of new stormwater recharge is comparable to the cost of imported supplies and new stormwater recharge will be more reliable than imported water. The implementation of Phases IV and V will be deferred until a future time as the projects in these phases are significantly more expensive.

Based on the most current information, the recharge projects described in Phases I through III are estimated to produce a long-term average annual stormwater recharge increase of 8,400 acre-ft/yr to 11,300 acre-ft/yr at cost of about \$500 to \$800 per acre-ft. The new yield from these projects will reduce the future replenishment obligation by the amount of new yield.

Several issues will need to be resolved to refine, design, and implement these projects. Substantial planning work will be required to implement the Phase I through III projects to ensure that the recharge potential of the projects can be realized. In addition to environmental documentation, this planning work will involve the development of a financing plan, engineering investigations, and the development of an agreement with the SBCFCD regarding the modification and operation of stormwater facilities. The CBWCD, IEUA, and

Watermaster should conduct further analyses of the Phase I through III projects to refine the projects, to develop a financing plan, and to develop an implementation plan. This planning work should begin as soon as practical and could be accomplished within three years. The schedule to implement the Phase I through III projects would be developed during the proposed planning work, and the construction of these projects could be completed within five years of completing the proposed planning work.

During the preparation of the RMPU, an independent effort to develop a new multipurpose stormwater management and recreation facility East of Archibald Avenue and south of Deer Creek commenced. Herein, this project is referred to as the Turner Basins/Guasti Park project. The specifics of this project are still unknown. However, hydrologic simulations were conducted, based on a project description that was received in April 2010 using the same model and procedure (see Appendix C, *Summary of the R4 Model for the Chino Basin*) that was used to analyze the potential new stormwater recharge projects described in Section 5. Based on the April 2010 project concept drawings, the potential new stormwater recharge was estimated to be about 1,300 acre-ft/yr. This basin could also be used to recharge supplemental water. A cost opinion to construct and operate this proposed project is not available. Recharge in this location will help manage groundwater levels in the Ontario-CVWD production depression area.

7.3 Supplemental Water for Replenishment

The RMPU must be submitted to the Court by July 1, 2010, which is one year earlier than when retail water agency UWMPs are due and six months earlier than when wholesale water agency UWMPs are due. In lieu of having updated groundwater projections from the 2010 UWMPs, two groundwater production projections were developed in the RMPU to bound the possible groundwater production projections. These production projections are discussed in Section 4 of this report and are shown in Tables 4-1 through 4-2. The means to satisfy these estimated replenishment projections are described in Section 6. Section 6 also discusses the availability and reliability of the traditional water supplies used for replenishment and the possibility of new supplemental water sources. The conclusions and recommendations developed from this analysis are described below.

1. Watermaster needs to acquire supplemental water to meet its replenishment and Peace Agreement obligations and the dilution requirements for the recharge of recycled water. These sources will include unused production rights from members of the Appropriative Pool, imported water from Metropolitan, and, if necessary, other non-Metropolitan imported water.
2. Because of the environmental and legal challenges involved in importing water from the Sacramento and San Joaquin Delta and the Colorado River, Watermaster should consider preemptive replenishment. Preemptive replenishment would limit the CURO to a sustainable level. Under such a scheme, Watermaster would estimate replenishment obligations for some future period, purchase supplemental water when available in advance of a replenishment obligation, bank that water in the Chino Basin, and use that water for subsequent replenishment. Watermaster

would revise the replenishment projection every year based on planning information provided by the parties and actual overproduction and replenishment. Watermaster should set an upper limit on the CURO and use this limit with the replenishment projections to guide its water acquisition activities.

3. Watermaster, upon reviewing the 2010 UWMPs and supply projections from Metropolitan, should make a determination of the need for non-Metropolitan imported water. This review should take place between July 2011 and December 2011, and this RMPU should be updated in January 2012.
4. If a need for non-Metropolitan imported water is determined, Watermaster should take action to acquire that water. Watermaster should go through this process at the conclusion of each UWMP report period or more frequently if statewide water supply conditions change significantly from those assumed in the then current RMPU. Potential sources of non-Metropolitan imported water are summarized in Section 6 of this RMPU and include: groundwater and surface water supplies from the Central Valley, conveyed to the Chino Basin through SWP and Metropolitan facilities; groundwater from the Antelope Valley, conveyed to the Chino Basin through SWP and Metropolitan facilities; groundwater and surface water supplies from the Colorado River Basin, conveyed to the Chino Basin through Metropolitan facilities; groundwater and surface water supplies in the Santa Ana Watershed that can be supplied to the Chino Basin directly or by exchange; and recycled water from RIX and the WRCRWAP. The importation of non-Metropolitan water is a very complex and expensive proposition—the planning of which is beyond the scope of this RMPU. The process to acquire and move imported water from the Central Valley is described in Appendix D, *Sierra Water Group Task Report for Supplemental Water Sources* (SWG, 2010).
5. Under the 2008 IEUA/Watermaster groundwater production projection, Watermaster will need to begin preemptive replenishment to manage the CURO to less than 100,000 acre-ft and to meet the MZ1 6,500 acre-ft/yr requirement. Significant replenishment water acquisition will be necessary after 2014/15—about five years from now.

7.4 Supplemental Water Recharge Facilities

1. No new recharge facilities will be required to meet Watermaster’s replenishment obligations through the planning period, provided that the Riverside Corona Feeder is completed within the next ten years. The Riverside Corona Feeder could supply treated SWP water to the JCSD in lieu of groundwater production, which would achieve replenishment and improve the balance of recharge and discharge in the JCSD area. Watermaster should monitor the progress of the Riverside Corona Feeder and adjust future RMPUs to reflect its efficacy.
2. Provided that the Parties construct ASR wells for their own use, Watermaster should consider the use of these wells for replenishment purposes to achieve an improved balance of recharge and discharge in the specific areas identified in the

2009 Production Optimization and Evaluation of the Peace II Project Description (WEI, 2009b). Specifically, this ASR replenishment should be targeted in the Pomona-MVWD production depression area and the Ontario-CVWD production depression area. Currently, the MVWD has four ASR wells that could be used for this purpose, and the CVWD and Ontario have plans to eventually construct ASR wells.

3. Watermaster should use in-lieu recharge to achieve an improved balance of recharge and discharge in the specific areas identified in the *2009 Production Optimization and Evaluation of the Peace II Project Description* (WEI, 2009b), including the MZ1 managed area, the Pomona-MVWD production depression area, the JCSD well field area, and the Ontario-CVWD production depression area.

7.5 Future RMPU Process

The December 21, 2007 Court order requires the completion of this RMPU by July 1, 2010 and, at a minimum, every five years thereafter. The RMPU process is very sensitive to projected groundwater production. By statute, groundwater production projections are prepared for UWMPs every five years and in years ending in “0” or “5.” Watermaster, the CBWCD, and the IEUA should review the groundwater production projections from the retail water purveyors’ 2010 UWMPs after their completion in June 2011¹³ to update the groundwater production projections included herein and revise the conclusions and recommendations of the 2010 RMPU to comport with the 2010 UWMPs. The conclusions in Section 6 regarding the acquisition of supplemental water for replenishment and new supplemental water recharge facilities should be updated in fiscal 2011-12. Decisions regarding the acquisition of supplemental water for replenishment and new supplemental water recharge facilities should be deferred until that time.

The next RMPU should be completed no later than December 2016, and subsequent RMPUs should be completed, at a minimum, every five years thereafter. This will ensure that the most up-to-date groundwater production estimates are included in future RMPUs.

¹³ The deadline for completing the 2010 UWMPs for retail water agencies was extended by special legislation to June 30, 2011 for the 2010 UWMP. Subsequent UWMPs are required to be submitted to the DWR by December 31st of the year due.

**Table 7-1
Comparison of the Court's RMPU Requirements and How Those Requirements are Addressed in the RMPU**

Requirement		How Requirement is Met in the RMPU	
		Where in RMPU	Specific Actions
1	Baseline conditions must be clearly defined and supported by technical analysis. The baseline definition should encompass factors such as pumping, demand, recharge capacity, total Basin water demand, and availability of replenishment water.	Sections 4, 6, and 7	Section 4 describes total projected water demand and the associated water supply plans based on projections by the IEUA and Watermaster. Section 6 describes the supplemental water recharge capacity and the availability of supplemental water for replenishment and, in particular, reviews the ability to acquire water for replenishment from Metropolitan. Section 7 contains specific recommendations for the acquisition of supplemental water through the next recharge master plan update.
2	Safe Yield should be estimated annually, though it is recognized that it is not to be formally recalculated until 2011. Watermaster should develop a technically defensible approach to estimating Safe Yield annually.	Section 3	Section 3 describes the computation of safe yield and presents a recommended method to compute safe yield during 2010-11 and subsequent years. Watermaster will likely use its discretion to determine when to recompute safe yield after 2010-11.
3	Measures should be evaluated to lessen or stop the projected Safe Yield decline. All practical measures should be evaluated in terms of their potential benefits and feasibility.	Sections 3, 5, and 7	Section 3 describes the causes of a declining safe yield and suggests that the safe yield could drop from the current value of 140,000 acre-ft/yr to 129,000 acre-ft/yr by 2030. Section 3 also describes the expected increase in safe yield of 5,300 acre-ft/yr to 10,500 acre-ft/yr due to compliance with the 2010 MS4 permits. Section 5 includes descriptions of new stormwater recharge projects that could yield between 10,000 to 15,000 acre-ft/yr. Most of the projects described in Section 5 will require more detailed planning and new agreements with the Counties to determine their ultimate feasibility. Section 7 summarizes the recommended next steps in estimating and crediting the new recharge from the implementation of MS4 and in the implementation of the proposed new stormwater recharge projects.
4	Evaluations and reporting of the impact of Basin Re-Operation on groundwater storage and water levels should be done on an annual basis.		Strictly speaking, this is not an RMPU issue and is not covered in the 2010 RMPU. Watermaster analyzes the impact of Basin Re-Operation on groundwater storage and water levels in the southern part of the Basin annually and basin wide every two years. The data and results of these analyses are published in the Hydraulic Control Monitoring Report each year (on or before April 15) and the State of the Basin Report every two years.
5	Total demand for groundwater should be forecast for 2015, 2020, 2025, and 2030. The availability of imported water for supply and replenishment, and the availability of recycled water should be forecast on the same schedule. The schedules should be refined in each Recharge Master Plan update. Projections should be supported by thorough technical analysis.	Sections 4 and 6	Section 4 contains the demand for groundwater forecasted for 2010, 2015, 2020, 2025, 2030, and 2035. Section 6 describes the availability of imported water for supply and replenishment as forecasted through 2030, based on the draft <i>2009 SWP Delivery Reliability Report</i> (DWR, 2010). Section 6 also describes the current and future recycled water recharge projections from the IEUA.
6	The Recharge Master Plan must include a detailed technical comparison of current and projected groundwater recharge capabilities and current and projected demands for groundwater. The Recharge Master Plan should provide guidance as to what should be done if recharge capacity cannot meet or is projected not to be able to meet replenishment needs. This guidance should detail how Watermaster will provide sufficient recharge capacity or undertake alternative measures so that Basin operation in accordance with the Judgment and the Physical Solution can be resumed at any time.	Section 6	Section 6 describes the recharge capacity of existing spreading basins, existing ASR wells, future ASR wells, and existing in-lieu recharge capacity. Section 6 concludes that Watermaster, given present knowledge and agreements, will not be replenishment constrained by recharge capacity. That is, Watermaster has enough installed recharge capacity to meet current and future replenishment obligations through 2030.
7	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 technical work to make this demonstration was done in 2009 and is reported separately in <i>2009 Production Optimization and Evaluation of the Peace II Project Description</i> (WEI, 2009), which has been posted to the RMPU website rmp.wildermuthenvironmental.com .
8	Contain recharge estimations and summaries of the projected water supply availability as well as the physical means to accomplish the recharge projections.	Sections 3, 4, 5, and 6	Section 3 contains recharge projections for stormwater for existing facilities and new recharge from the 2010 MS4 permit. Section 4 contains a schedule of the future recharge requirements for Watermaster to meet its replenishment obligations. Section 5 contains descriptions of new recharge projects, recharge performance, and cost and implementation issues. Section 6 describes the supplemental water supplies available to Watermaster to meet its replenishment obligation and new supplemental water recharge projects that could be implemented to provide Watermaster with additional recharge capacity and supplemental water, and flexibility in meeting its replenishment obligation.
9	Reflect an appropriate schedule for planning, design, and physical improvements as may be required to provide reasonable assurance that sufficient Replenishment capacity exists to meet the reasonable projections of Desalter Replenishment obligations following the implementation of Basin Re-Operation.	Section 7	Section 7 describes the recommended recharge master plan. This section describes the means to stop the projected loss of safe yield, increase stormwater recharge, and acquire supplemental water for replenishment purposes. No new recharge facilities are required to meet replenishment obligations. Detailed scheduling of new stormwater recharge facilities should be deferred until additional planning information is developed to refine these projects. The decision to acquire new supplemental water sources should be deferred until updated groundwater production projections become available in late 2011-12. The RMPU should be updated in the second half of 2011-12 and subsequent years ending in "1" and "6."