8. Recommended 2013 Recharge Master Plan Update

8.1. Introduction

[to be included in the subsequent draft]

8.2. Initial Project Screening

8.2.1. Production Sustainability Projects

Table 6-1 contains nine production sustainability projects that the Steering Committee and the Watermaster approved for initial screening. In contrast to the yield enhancement projects, the production sustainability projects were described conceptually and needed further development prior to screening and ranking. In the winter and spring of 2013, Watermaster staff encouraged capable appropriators to participate with the JCSD in projects that would supply the JCSD with water in-lieu of JCSD production from the parts of MZ3/MZ4/MZ5 where production sustainability is a concern. Members of the Steering Committee that could participate in production sustainability projects and Watermaster staff convened one meeting on March 20, 2013 to discuss various alternatives in which water could be provided to the JCSD and potentially to the CDA that would result in reduced production by the JCSD and potentially the CDA's Chino II desalter well field. From this meeting, subsequent discussions, and information provided by the City of Ontario and others, four project categories were identified: 1) transfer of CDA water from CDA members to the JCSD in lieu of JCSD production; 2) supply of water from other Appropriator parties through new connections among the parties, potentially including new wells and pipelines; 3) oversizing the proposed Ontario Groundwater Recovery Project (OGRP) and using the increased supply to reduce CDA Desalter II production; 4) and the use of JCSD ASR wells to seasonally increase groundwater levels in the JCSD well field area. Figure 8-1 shows the locations of the existing water distribution systems, wells, and the proposed OGRP in the parts of MZ3/MZ4/MZ5 where production sustainability is a concern. The production sustainability projects considered herein include:

1. The City of Ontario could sell the JCSD up to 5,000 acre-ft/yr of its CDA deliveries from the Chino II Desalter without the construction of new additional facilities. The sales price would be Ontario's cost of water from the CDA of $920 per acre-ft.[1] Ontario and the JCSD take their Desalter II deliveries from a common reservoir in the JCSD service area, and Ontario would forego its deliveries from this reservoir and sell some or all of its share of CDA allocation from the Chino II Desalter to the JCSD. This would be an interim supply until Ontario needs its capacity in the Chino II Desalter to meet its water supply needs. As an interim supply, this project could also be a proof-of-concept demonstration to determine the amount and timing of alternative supplies required to ensure production sustainability.

[1] CDA charge to the City of Ontario for fiscal 2013/14.

2. The City of Chino Hills and the Monte Vista Water District (MVWD) have proposed an in-lieu exchange project where the MVWD and Chino Hills would use more groundwater produced in Management Zone 1 and/or imported water, and Chino Hills would forego taking some of its 4,200 acre-ft/yr CDA Desalter I allocation, having that desalter water conveyed to the JCSD through existing CDA facilities. The JCSD would exchange annual production rights to Chino Hills and the MVWD equal to the amount of water supplied to the JCSD in this project. This proposal is modeled on the successful interim forbearance plan that was implemented during the development of the Management Zone 1 subsidence management plan. In addition to Chino Hills and the MVWD, the City of Chino could also participate in this project by taking more imported water and allowing some or all it's Desalter I allocation to go to the JCSD.

3. Other than through CDA facilities, there are no physical connections to the JCSD system from Chino Basin Appropriator parties that would permit a direct supply of water to the JCSD. A new connection would be required from the Ontario distribution system 1212 zone to the JCSD's 1100 zone. If this connection were constructed, Ontario could be a source of alternative supply as well as other Appropriators that could exchange water with the JCSD through Ontario's system. A new connection from the Cucamonga Valley Water District (CVWD) to the City of Ontario would be required to enable the CVWD to supply water to the JCSD. A new connection from the Fontana Water Company (FWC) to either the City of Ontario or directly to the JCSD would be required for the FWC to supply water to the JCSD. Other Appropriators may have the ability to connect to the City of Ontario to wheel water to the JCSD. Watermaster staff has encouraged the Appropriator parties that could participate in these water supply projects to review their capabilities and interests in participating in production sustainability projects and to provide Watermaster staff with alternative descriptions, operating plans, and costs. At the time this report was written, only three of the potential participants had provided alternatives to Watermaster staff. Watermaster staff has developed two generic in-lieu projects that attempt to bracket the range of such projects.

4. The City of Ontario has developed a project concept, the OGRP. The purpose of the OGRP is to produce groundwater near the southern leading edge of the South Archibald VOC plume, treat that water to remove the VOCs, treat it again at the Chino II Desalter for nitrate and TDS reduction, and subsequently serve it. The location of the OGRP wells and raw water pipeline is shown in Figure 8-1. Ontario has suggested that the OGRP could be oversized with the resulting surplus capacity used to reduce the CDA Desalter II groundwater production and thereby provide a sustainable supply of raw water to the CDA Desalter II and help to maintain higher groundwater levels in the JCSD well field area.

5. The JCSD has developed ASR wells that could be used to improve production sustainability but has not identified the water supply that would be used for injection or the magnitude and timing of that supply. As of the time of this report preparation, the JCSD has not provided Watermaster staff with a plan to improve

production sustainability with its ASR wells. Therefore, consideration of specific production sustainability projects utilizing the JCSD's ASR wells will not be included in the 2013 RMPU Amendment. Exclusion of the JCSD ASR project in the 2013 RMPU Amendment does not preclude them from future development and implementation before the next Recharge Master Plan update.

The water supply sources for the production sustainability projects include Chino Basin groundwater produced sufficiently far from the sustainability challenged area and imported water. For projects 2 and 3 described above, the JCSD would contribute its unused production rights to the Appropriator(s) that supplies them water to offset the water supply cost. The cost to produce and convey the water to the JCSD could be paid for by the JCSD or some other arrangement that could involve the Watermaster. Some or all the cost to produce and convey water to the JCSD would be offset by the JCSD's avoided cost to produce and convey its own water. Table 8-1a contains the list of production sustainability projects considered for evaluation and ranking. The JCSD ASR well project is not included in Table 8-1a for the reasons described above. Table 8-1a contains the project name, description, new supply generated by the project, capital cost estimate, supplemental water cost, annual costs, unit cost, and ratings for water quality and reliability.

8.2.2. Yield Enhancement Projects

Table 6-1 contains 41 yield enhancement projects that the Steering Committee and the Watermaster approved for initial screening. These projects involve the construction of new facilities and four proposals to increase the frequency of operations and maintenance. Watermaster, the IEUA, and WEI reviewed all of the projects based on the information that was readily available to define how each project would operate, to estimate their storm and recycled water recharge performance, and to estimate their cost. Certain projects listed in Table 6-1 were not analyzed as their projected unit costs were where higher than the initial screening level of $1,500 per acre-ft. Table 8-2a lists the projects that were advanced to detailed evaluation using the criteria described in Section 7. Table 8-2a contains the following for each project:

- Project identification number, project name, and project description
- Indications of when a project was combined with another project or projects to take advantage of increased yield or cost efficiencies
- Opportunities for IEUA and Watermaster joint participation pursuant to the Peace II Agreement
- Characterizations of the new recharge (new yield) created by the proposed projects
- Indications as to whether a project would be constructed for regulatory compliance purposes and whether a project was already constructed
- Capital cost opinions for stormwater improvements, annualized capital costs, operations and maintenance costs, total annual costs, and unit cost of stormwater recharge
- New recycled water recharge capacities and recycled water acquisition costs

- Capital cost opinions for recycled water, annualized capital costs, operations and maintenance costs, total annual costs, and unit cost of recycled water recharge
- New imported water recharge capacities and imported water acquisition costs
- Capital cost opinions for imported water, annualized capital costs, operations and maintenance costs, total annual costs, and unit cost of imported water recharge
- Total combined recharge capacities for all storm, recycled, and imported waters
- Indications of additional project benefits and contributions to production sustainability

The projected new stormwater recharge estimates are based on the updated and calibrated Wasteload Allocation Model (WLAM), which has been used in past recharge investigations and to support Watermaster's groundwater model.[2] The capital and operation and maintenance costs are based on the IEUA's recent experience in the construction and operations of the CBFIP projects and other construction projects. The IEUA also provided estimates of new recycled water recharge capabilities for some of the proposed projects listed in Table 8-2a. Appendix D contains detailed drawings and cost opinions for each project listed in Table 8-2a. In total, Table 8-2a contains 54 projects and combinations of projects. Some of the projects are mutually exclusive as indicated in the notes. Table 8-2a was vetted thoroughly by the Steering Committee in the period of April through June of 2013.

8.3. Project Evaluation and Ranking

8.3.1. Production Sustainability Projects

8.3.1.1. Application of Section 7 Criteria

Table 8-1a contains the five production sustainability projects that were selected for screening by the Steering Committee. The purpose of Table 8-1a is to provide a detailed characterization of the projects in tabular form. Table 8-1b lists the same projects and the criteria upon which they will be screened. Table 8-1c lists the production sustainability projects in their order of preference, based on the screening criteria of Section 7, and as described below.

8.3.1.1.1. Reliability

The water substituted for JSCD groundwater production must be at least as reliable as the current JCSD supplies. The production sustainability project must be sized, scalable, and sourced to ensure sustainability. The five projects listed in Table 8-1b are all assumed to use Chino Basin groundwater as a source supply, produced from parts of the Basin that are sustainable, and/or imported water treated at an existing treatment plant. Therefore, the reliability for all five projects will be high and equivalent. The amount and timing of supply required to ensure sustainability is currently unknown. Two or more of the projects listed in Table 8-1b could be combined to ensure sustainability.

[2] Cite…[to be included in subsequent draft]

8.3.1.1.2. Cost

The capital costs vary greatly among the four projects and range from zero to about $10.6 million with unit costs ranging from $95 to $920 per acre-ft. There could be additional costs for the Max General In-Lieu and Min General In-Lieu projects if the water quality produced for these projects becomes degraded. There is also opportunity for the Appropriator(s) that constructs the new wells and conveyance facilities used in these projects to use these same facilities for their own use when not used to supply the JCSD.

8.3.1.1.3. Water Quality

The Ontario-CDA MZ3 In-Lieu, the Chino Hills/MVWD, and the OGRP projects will always produce potable water that can be used to replace JCSD groundwater production. For the Max General In-Lieu and Min General In-Lieu projects, water will be wheeled through an adjacent Appropriator's water system where it is assumed that the water will already be potable. The new wells associated with this project will presumably be sited to avoid water quality challenges and may in fact provide water quality benefits to the source agency. That said, future groundwater degradation could occur, necessitating treatment, and the level of risk is unknown.

8.3.1.1.4. Ease of Implementation

The facilities required to implement the Ontario-CDA MZ3 In-Lieu project and the Chino Hills/MVWD exist, and these projects could be initiated quickly after an agreement between the parties is negotiated.

The OGRP project, if implemented, is several years out and is dependent on 1) other entities[3] paying for the VOC treatment prior to delivery of the source water to the Chino II Desalter and 2) obtaining substantial grant funding. The JCSD would benefit from reduced Chino II Desalter pumping at the existing wells by about 2,900 acre-ft/yr and would not receive any new water directly from the project.

The Max General In-Lieu and Min General In-Lieu projects will require an agreement between the JCSD and the Appropriators that serve it water. Existing wells, potentially new wells, existing treatment plant capacity, or some combination of these will be required. Interconnections between the JCSD and the City of Ontario and potentially Ontario and other Appropriators will be required. There may also be other benefits to participating Appropriators that include increasing their groundwater production capacity (joint use of wells) and improving conveyance capacity within their own distribution systems. The agreement will need to consider the cost to construct and operate the improvements and economic consideration for the source water.

8.3.1.2. Ranking of Production Sustainability Projects

[3] These parties include Aerojet, Boeing, General Electric, and Lockheed Martin.

Table 8-1c shows a preliminary ranking of these projects by unit cost. The projects, in order of unit cost priority, are: the Min General In-Lieu project, the Chino Hills/MVWD project, the Max General In-Lieu project, the OGRP, and the Ontario-CDA MZ3 In-Lieu project. At the time this report was written, there were no cost estimates available for the Chino Hills/MVWD project, but it is believed to have an implementation cost less than the Max General In-Lieu and Min General In-Lieu projects. The Min General In-Lieu and Max General In-Lieu are ranked higher than the OGRP project even though their estimated unit cost is 50 percent greater ($150 per acre-ft versus $95 per acre-ft). The Min and Max General In-Lieu and Chino Hills/MVWD projects were rated higher than the OGRP project due to ease of implementation. The OGRP depends on substantial grant funding and cooperation with private entities, which cannot be assured. In contrast, the Max and Min General In-Lieu and Chino Hills/MVWD projects can be more readily implemented and may provide benefits to the Appropriators that participate. The unit cost of for the Ontario-CDA MZ3 in-Lieu project was rated last due to its unit cost of greater than $900 per acre-ft.

8.3.2. Yield Enhancement Projects

8.3.2.1. Application of Section 7 Criteria

Table 8-2b lists the list the yield enhancement projects and summarizes their features pursuant to the screening criteria articulated in Section 7 herein. Some projects have two variants where the difference is how excavation cost is accounted for in the construction cost. Projects with an "a" attached to their identification numbers have their excavation costs reduced by 90 percent under the assumption that sand and gravel operators will extract the materials at their cost. Table 8-2b summarizes the project economics in Table 8-2a and includes information on the water quality and institutional challenges of each project. Table 8-2c contains the final rankings based on the Section 7 criteria and input from the Steering Committee. The application of the criteria is described below.

8.3.2.1.1. Confidence in Recharge Estimate

The WLAM was calibrated for selected recharge basins where the IEUA develops recharge estimates based on observed data. The results of these calibration efforts are contained in Appendix D. Subsequently, recharge estimates were developed for the proposed yield enhancement projects included in Table 8-2a as well as for the no-project condition at the proposed recharge site. Pursuant to the screening and evaluation criteria contained in Section 7, new recharge is estimated as 90 percent of the difference between the recharge estimate for the proposed project and the estimate of recharge for the no-project condition. The recharge estimates provided by the application of the updated and calibrated model coupled with the reduction of the new recharge estimate by 10 percent produces a reliable and conservative estimate of new recharge.

The IEUA prepared estimates of recycled water recharge capacity for some of the proposed projects listed in Table 8-2a. These estimates are based on the availability of recycled water that is not currently being recharged and that will not be used to meet direct reuse

demands; therefore, the recycled water is considered highly reliable. The reliability of the new recharge estimates is equal among projects.

8.3.2.1.2. Location of Recharge

The locations of new storm and supplemental (imported and recycled) water recharge projects have been prioritized to assist Watermaster in its best efforts to balance recharge and discharge in every area and subarea of the basin. Prior modeling investigations (see Section 3) have demonstrated that the projected groundwater production plans could cause an imbalance in recharge and discharge in Management Zone 3 and the central part of Management Zone 2. Watermaster has been aware of this potential imbalance since 2007 and has, pursuant to the Peace Agreement and Court Order authorizing the Peace Agreement, conducted technical evaluations to develop guidance on the recharge of supplemental water.[4] Watermaster's current recommended supplemental water recharge plan[5] calls for Watermaster to prioritize supplemental water recharge as follows:

- Recharge the first 6,500 acre-ft/yr of supplemental water in Management Zone 1 pursuant to the Peace Agreement.
- Recharge Management Zone 3 up to its maximum supplemental water recharge capacity (current supplemental water recharge capacity is 12,700 acre-ft/yr).
- Recharge Management Zone 2 up to its maximum supplemental water recharge capacity (current supplemental water recharge capacity is 28,300 acre-ft/yr).
- Recharge Management Zone 1 up to its maximum supplemental water recharge capacity (current supplemental water recharge capacity is 42,100 acre-ft/yr)[6]

This priority scheme was developed to balance recharge and discharge at the management zone level when supplemental water recharge is being done. Watermaster recharges imported water primarily to replenish overproduction, to store imported water for the existing Dry-Year Yield program, and more recently for pre-emptive replenishment. The IEUA recharges recycled water in certain basins where the IEUA and Watermaster have a joint permit to recharge recycled water.

The yield enhancement projects are prioritized by management zone in Table 8-2c with the priorities that mirror the supplemental water recharge priority.

8.3.2.1.3. Expandability to Include Supplemental Water Recharge

The IEUA has identified recharge projects that could be used to recharge recycled water. These projects have been identified in Table 8-2a and feature prominently in Table 8-2c.

8.3.2.1.4. Cost

[4] Cite … [to be included in subsequent draft]
[5] 2009 Production Optimization and Evaluation of the Peace II Project Description (WEI, 2009)
[6] The supplemental water recharge capacities cited above are based on Table 6-3 in the 2010 Recharge Master Plan Update (WEI et. al., 2010).

Watermaster, the IEUA, and WEI developed Level-5[7] cost opinions for each of the projects listed in Table 8-2a. The backup for these cost opinions is included in Appendix D. For projects that consist of only operations and maintenance activities, the IEUA prepared annual cost estimates based on their experience in basin operation and maintenance.

Table 8-2c lists recommended projects based on the unit cost of stormwater recharge and shows both the new stormwater recharge and recycled water recharge. All projects with unit costs less than $600 per acre-ft are included as recommended projects.

8.3.2.1.5. Water Quality Challenges

Storm water is considered an impaired water source for surface waters. After filtration through the soil and unsaturated zone, storm water is considered to be of suitable quality for potable uses.

There are some instances where storm water recharge may cause or exacerbate groundwater quality challenges. Storm water and supplemental water recharge can cause groundwater mounding under recharge sites that can redirect movement of existing contaminant plumes. Figure 8-2 shows the location of all the recharge projects listed in Table 8-2a by identification number and the location of the significant water quality anomalies that Watermaster is concerned with.

An example of the impact of recharge on contaminant plumes can be seen in the location and direction of the General Electric (GE) Test Cell VOC plume located just north of the Ely Basins. The location of the GE Test Cell plume is shown in Figure 8-2. In the absence of the historical stormwater recharge at the Ely Basins, the GE Test Cell plume would have flowed in a south by southwest direction. The mounding under the Ely Basins has caused this plume to flow almost due west along the north side of the Ely Basins.

The following water quality challenges have been identified for specific yield enhancement projects listed in Table 8-2b.

Ely Basins. As mentioned above, historical recharge at the Ely Basins has deflected the GE Test Cell plume westward. The proposed project at the Ely Basins would increase recharge by about 220 acre-ft. Increasing recharge at this basin will continue this deflection with the possibility that the plume may migrate slightly more west than under historical recharge conditions. This concentration of VOCs in this plume appears to be decreasing at its leading edge due to natural in-situ processes. The proposed increase in recharge will likely not cause the plume to migrate into potable wells. Prior to the implementation of a project at the Ely Basins that would increase recharge, the implementing entity should conduct an investigation to determine whether or not increased recharge will exacerbate water quality challenges caused by the GE Test Cell plume.

[7] Cite …[to be included in subsequent draft]

CSI Storm Water Basin. The proposed project at the CSI Storm Water Basin is projected to increase storm water recharge by about 80 acre-ft/yr. This new recharge could be increased if the conservation storage is increased beyond that considered herein. The primary water quality concerns are the mobilization of contaminants in the unsaturated zone adjacent to the recharge site should the recharge migrate horizontally to the west and the acceleration of existing contaminants already in the saturated zone towards the City of Ontario's wells. Watermaster has an existing Material Physical Injury (MPI) opinion that the existing recharge at the CSI Storm Water Basin has the potential to cause MPI to the Chino Basin and a Party. However, continued surveillance by the DTSC and future plume management required by the DTSC may be sufficient to ensure that downstream impacts of the plume migration, if any, will be mitigated to a level to protect the Basin and the Parties. Prior to the implementation of a project at the CSI Storm Water Basin that would increase recharge, the implementing entity should conduct an investigation to determine whether or not increased recharge will exacerbate water quality challenges caused by soil and groundwater contamination adjacent to the recharge site and potentially accelerate contamination in the saturated zone towards the City of Ontario's wells.

Wineville Basin. The leading edge of the former Kaiser Steel Mill plume is located near the northern portion of the Wineville Basin with the plume projected to move in a south by southwest direction under or slightly west of the Wineville Basin. The former Kaiser Steel Mill plume, as delineated in 2008 during a Watermaster and IEUA study of water quality in MZ3, is characterized predominantly by high TDS and total organic carbon (TOC) concentrations (WEI, 2008). Sampling and analysis for this study concluded that from 1997 to 2007, maximum TDS concentrations ranged from 250 to 1,090 mg/L, and TOC concentrations ranged from <0.1 to 20 mg/L at wells within the former Kaiser Steel Mill plume. Additionally, two triple-nested wells (MZ3-1 and MZ3-2) were installed down gradient of the plume to track plume migration. High concentrations of TOC detected in MZ3-1 extended the Kaiser Steel Mill plume extent to the southeast towards the JCSD well field. Certain VOCs have been detected in the middle portion of the plume substantially north of the Wineville Basin. Since 2007, Watermaster has performed annual sampling at the leading edge of the former Kaiser Steel Mill plume at the two MZ3 triple-nested monitoring wells and at one former Kaiser Steel monitoring well (KOSF-1). TDS and TOC concentrations at these wells have remained stable or decreased since 2007. In the absence of increased recharge at the Wineville Basin, the former Kaiser Steel Mill plume would likely migrate south-southwest towards the CDA wells and potentially the JCSD wells. Increased recharge at the Wineville Basin will create a mound that will divert the Kaiser Steel Mill plume west of the Wineville Basin towards the CDA wells. Prior to the implementation of a recharge project at the Wineville Basin, the implementing entity should conduct an investigation to determine whether or not increased recharge will exacerbate the water quality challenges caused by the Kaiser Steel Mill plume.

8.3.2.1.6. Institutional Challenges

The common institutional challenges to implement the projects listed in Table 8-2a consist of the following:

- Determination of a lead entity for CEQA and to implement the projects
- Determination of who pays and who benefits
- Obtaining access to recharge sites and the ability to construct and operate recharge facilities
- Modification of the IEUA-Watermaster recharge permit to include more recharge basins and to increase recycled water recharge amounts at existing basins

Table 8-2b includes the institutional challenges at specific basins above and beyond those listed above.

8.4. Final Project Recommendations and Implementation Plan

8.4.1. Production Sustainability Projects

8.4.1.1. Recommended Projects

Upon reviewing all available information, the Steering Committee has recommended that the Watermaster proceed with the Min General In-Lieu project due to its lowest potential capital and unit costs with all other criteria being equal. The Steering Committee sees great promise in the Chino Hills/MVWD project and encourages the City of Chino Hills, the MVWD, the CDA, the JCSD, and Watermaster to pursue this project if the City of Chino Hills and the MVWD produce a feasible formal proposal after the 2013 RMPU Amendment report is finalized.

8.4.1.2. Implementation Plan

8.4.1.2.1. Year 1 – 2014

In the first year, the following agreements will be negotiated and completed:

Continue Refinement of Production Sustainability Projects. The objective of this work is to define the magnitude and timing of water deliveries to the JCSD to ensure production sustainability. During this year, technical investigations will be done to define the magnitude and timing of water deliveries to the JCSD to ensure production sustainability and to identify and refine alternative sources of supply. The end product of this work will be an optimized JCSD groundwater production plan, up to three alternative water supplies that will enable the JCSD to reduce groundwater production to sustainable levels, and a recommended project. This work will be done by the JCSD and participating Appropriators and facilitated by Watermaster.

8.4.1.2.2. Year 2 – 2015

Develop an Implementation Agreement among the Parties Participating in the Production Sustainability Project. The objective of this agreement is to define the roles of the parties that would participate in the recommended production sustainability project; in the planning, permitting, design, and implementation of the yield enhancement projects;

and the cost allocations. This work will be done by the JCSD and participating Appropriators and facilitated by Watermaster.

Appropriative Pool Cost Allocation Agreement. The objective of this agreement is to define how the Appropriative pool parties would participate in a production sustainability agreement and what if any production sustainability project costs will be borne by the Appropriators.

8.4.1.2.3. Years 3 and 4 – 2016 and 2017

Preliminary Design of Recommended Production Sustainability Project. If new facilities are required, then one of the parties to the implementation agreement will contract for preliminary design. The level of design will be such that it enables the preparation of environmental documentation pursuant to the California Environmental Quality Act (CEQA), provides information for identifying and acquiring construction and related permits, and produces cost estimates. This work will start in January 2016 and be completed in September 2016.

Prepare Environmental Documentation. One of the parties to the implementation agreement will be the lead agency and contract for the preparation of environmental documentation. The lead agency will determine the type of environmental documentation and subsequently prepare it. This work will start in July 2016 and be completed in June 2017.

Prepare Final Designs and Acquire Permits. One of the parties will contract for the development of final designs and acquire permits. This work will begin in July 2017 and be completed by December 2017.

8.4.1.2.4. Year 5 – 2018

Construct 2013 RMPU Amendment Production Sustainability Project. One of the parties will contract for the construction of the recommended production sustainability projects and construct the project during calendar 2018.

8.4.1.3. Financing Plan

[to be included in a subsequent draft]

8.4.2. Yield Enhancement Projects

8.4.2.1. Recommended Projects

Table 8-2c contains the yield enhancement projects ranked using the Section 7 criteria and based on the input from the Steering Committee. The projects are listed by management zone in order of increasing unit cost. The steering committee recommended that all projects with unit costs of less than $600 per acre-ft be considered for implementation.

There are seven projects recommended for construction that will increase stormwater recharge by 5,000 acre-ft/yr, increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $400 per acre-ft and the capital cost is about $26,000,000.

8.4.2.2. Implementation Plan

8.4.2.2.1. Year 1 – 2014

The following agreements will be completed in the first year.

Watermaster and the IEUA Project Implementation Agreement. The objective of this agreement is to define the roles of Watermaster and the IEUA in the planning, permitting, design, and implementation of the yield enhancement projects, and the cost allocations.

Appropriative Pool New Yield and Cost Allocation Agreement. The objectives of this agreement are to determine which appropriators wish to participate in the yield enhancement projects, the allocation of yield and cost among this group of appropriators, and the waiver of new yield and cost by appropriators that choose not to participate in the new yield enhancement projects.

Flood Control and Water Conservation Agreement. The parties to this agreement include San Bernardino County, Watermaster, and the IEUA. The objectives of this agreement are to define the terms and conditions to jointly construct new conservation works on County and IEUA properties and to conduct flood control and water conservation activities on those same properties. The agreement will define the project sites, facility improvements, construction and maintenance cost allocations, user fees, operating criteria (with flood control taking priority over conservation for joint use facilities), and other conditions.

The County will require Watermaster and the IEUA to fund County investigations to demonstrate that certain conservation improvements at flood control facilities will not reduce flood protection or if flood protection is reduced, that additional improvements will be made by Watermaster and the IEUA such that the level of flood protection is not diminished with conservation improvements.

In addition to these agreements the Watermaster will have to submit a Petition for Change with the State Water Resources Control Board for some of the projects shown in 8-2c that are not included in the Watermaster's current diversion permits. The duration of the change process is unknown but will likely be more than one year.

8.4.2.2.2. Years 2 and 3 – 2015 and 2016

Preliminary Design of Recommended Yield Enhancement Projects. The level of design will be such that it enables the preparation of environmental documentation pursuant to the California Environmental Quality Act (CEQA), provides information for identifying and

acquiring construction and related permits, and produces updated new yield and cost estimates. This work will start in January 2015 and be completed in September 2015.

Prepare Environmental Documentation. CEQA will cover the recommended project in Table 8-2c at the project level and the deferred projects at a programmatic level and based on the project descriptions contained herein. This work will start in July 2015 and be completed in June 2016.

8.4.2.2.3. Years 3 and 4 – 2016 and 2017

Prepare Final Designs and Acquire Permits. This work will begin in July 2016 and be completed by December 2017.

8.4.2.2.4. Years 5 and 6 – 2018 and 2019

Construct 2013 RMPU Amendment Projects. The recommended projects will be constructed over the two-year period of 2018 and 2019.

8.4.2.3. Financing Plan

The financing plan for the yield enhancement projects consists of the following elements:

- Identify the IEUA and Watermaster cost share. Watermaster and the IEUA will determine each party's cost share based on the benefit to the parties. This will be negotiated and memorialized in an agreement as identified in the Implementation Plan above.
- Identify grant-funding share. The IEUA, Watermaster, and the Appropriators will combine their efforts to secure grant funding and low-interest financing from the State Water Resources Control Board, the DWR, and others.
- Allocation of cost and benefit among the Appropriators. Members of the Appropriative pool will determine the allocation of cost and new yield benefits from the recommended recharge projects. In the absence of a new agreement to allocate cost and new yield benefits, Watermaster will assume that cost and new yield will be allocated to the Appropriator parties based on their share of operating safe yield.
- Application of pay-as-you-go for the soft costs of all efforts through completion of the CEQA process. All costs associated with the development of implementing agreements, preliminary design, proof-of-concept, and completion of the CEQA process will be paid for through Watermaster assessments.
- Obtain bond financing for the construction of recharge improvements. The IEUA, the TVMWD, the WMWD, and certain Appropriator parties will use their bonding capacity to obtaining financing to construct the recommended projects.

A detailed financing plan will be developed in a process running in parallel to the development of the implementation agreements.

DRAFT Table 8-1a

Project Data for MZ3/MZ4/MZ5 Sustainability Projects[1]

Project	Benefiting Management Zone	Summary of Key Project Features	New Supply (acre-ft/yr)	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Other Annual Cost ($/acre-ft)	Supplemental Water Acquisition Cost ($)	Total Annual Cost ($)	Unit Cost ($/acre-ft)	Reliability of the Water Supply	Production Sustainability Score[4]
Min General In-Lieu	3	Construct two wells and related conveyance to move non-MZ3 groundwater or imported water to the JCSD.	5,800	$ 5,440,000	$ 354,000	$ 524,000	$ -	$ -	$ 878,000	$ 151	High	2
Max General In-Lieu	3	Construct four wells and related conveyance to move non-MZ3 groundwater or imported water to the JCSD.	11,600	$ 10,640,000	$ 692,000	$ 1,048,000	$ -	$ -	$ 1,740,000	$ 150	High	2
Chino Hills/MVWD Exchange Project	3	Chino Hills forgoes taking Desalter I water and provides that water to the JCSD. Chino Hills makes up the exchanged supply from MZ1 groundwater production or imported water treated at the WFA plant.	2,800	$ -	$ -	(see note 5 below)	$ -	$ -	(see note 5 below)		High	2
OGRP Project[2]	3	Installation of one well and extend OGRP raw water conveyance.	2,900	$ 4,222,500	$ 275,000	$ -	$ -	$ -	$ 275,000	$ 95	High	2
Ont-CDA MZ3 In-Lieu[3]	3	Ontario sale of 5,000 acre-ft/yr of their CDA water to the JCSD using existing connections.	5,000	$ -	$ -	$ -	$ 920	$ -	$ 4,600,000	$ 920	High	2

[1] The amount and timing of in-lieu supply required to ensure sustainability is unknown, but based on the sensitivity analysis discussed in Section 3 of this report, it could range between about 4,000 to 10,000 acre-ft/yr.

[2] The total estimated costs for the well and pipeline were derived from Table 9 of the Ontario Groundwater Recovery Project engineering report (Carollo, 2013). The production rate was assumed to be 2,000 gpm (2,900 acre-ft/yr at an operating factor of 90%).

[3] The Other Annual Cost for the CDA MZ3 In-Lieu project is the Fiscal Year 2013/14 gross cost/AF for Ontario before the MWD contribution. Source is Exhibit A of the June 6, 2013 CDA Special Board of Directors Meeting Agenda. Note that this cost does not reflect a credit for the avoided cost of pumping by JCSD.

[4] The production sustainability score is a tool to characterize a project's contribution to production sustainability in areas with sustainability challenges. Per the evaluation criteria described in Section 7, the score will be as follows: 0 – does not contribute to production sustainability, 1 – contributes minimally to production sustainability (a necessary but not sufficient condition of sustainability), and 2 – contributes significantly to production sustainability (a necessary and sufficient condition of sustainability).

[5] Annual and unit costs are unknown. The cost to produce and convey water to the JCSD could be paid for by the JCSD or some other arrangement that could involve the Watermaster. Some or all the cost to produce and convey the water to the JCSD would be offset by the JCSD's avoided cost to produce and convey its own water.

DRAFT Table 8-1b

Screening of MZ3/MZ4/MZ5 Sustainability Projects[1]

Project	New Supply (acre-ft/yr)	Unit Cost ($/acre-ft)	Capital Cost ($)	Reliability of the Water Supply	Water Quality Challenges	Ease of Implementation
Min General In-Lieu[2]	5,800	$ 151	$ 5,440,000	High	None[2]	b
Max General In-Lieu[2]	11,600	$ 150	$ 10,640,000	High	None[2]	b
Chino Hills/MVWD Exchange Project	2,800	(See note 5 on Table 8-1a)		High	None[2]	d
OGRP Project	2,900	$ 95	$ 4,222,500	High	None	c
Ont-CDA MZ3 In-Lieu	5,000	$ 920	$ -	High	None	a

[1] The amount and timing of in-lieu supply required to ensure sustainability is unknown and may be as much as 5,000 to 10,000 acre-ft/yr based on the sensitivity analysis described in Section 3.

[2] The water supplied will be wheeled through adjacent agency's water system where it is assumed that the water will already be potable. The new wells associated with this project will presumably be sited to avoid water quality challenges and may in fact provide water quality benefits to the source agency. That said, future groundwater degradation could occur necessitating treatment.

[3] Assumes that the water supply cost is offset by the JCSD's avoided production and annual transfer of an equal amount of water from their own production rights.

[a] Requires an agreement between the City of Ontario and the JCSD. Ontario's position is that they will need to be compensated for their cost of the water.

[b] Requires an agreement between the JCSD and others to construct, operate, and pay for the improvements.

[c] Requires an agreement with non-Watermaster Parties that are adversarial to the project to cover VOC treatment costs and is dependent on grant funding.

[d] Requires an agreement between the City of Chino Hills, the MVWD, the CDA, and the JCSD.

DRAFT Table 8-1c
Ranked MZ3/MZ4/MZ5 Sustainability Projects

Project	New Supply (acre-ft/yr)	Unit Cost ($/acre-ft)	Capital Cost ($)
Recommended Projects			
Min General In-Lieu	5,800	$ 151	$ 5,440,000
Total of Recommended Projects	Up to 5,800	$ 151	$ 5,440,000
Other Projects			
Chino Hills/MVWD Exchange Project	2,800	(See note 5 on Table 8-1a)	$ -
OGRP Project	2,900	$ 95	$ 4,222,500
Max General In-Lieu	11,600	$ 150	$ 10,640,000
Ont-CDA MZ3 In-Lieu	5,000	$ 920	$ -

DRAFT Table 8-2a
Project Data for Yield Enhancement Projects

Project ID	Project Combinations	Group[1]	Project	Man. Zone	Summary of Key Project Features	Potential Cost Share if Mutually Agreed?	Storm Water Recharge								Recycled Water Recharge							Imported Water Recharge							All Recharge			Additional Benefit	Production Sustainability Score[6]
							Baseline Storm Water Recharge (acre-ft/yr)	New Storm Water Recharge (acre-ft/yr)	Constructed for Regulatory Compliance?	Project Complete?	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	New Recycled Water Recharge (acre-ft/yr)	Recycled Water Acquisition Cost[4]	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	Recycled Water Recharge Unit Cost[4]	New Imported Water Recharge (acre-ft/yr)	Imported Water Acquisition Cost[4]	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	Imported Water Recharge Unit Cost[4]	Total New Storm and Supplemental Water (acre-ft/yr)	Total Capital Cost ($)	Total Unit Cost of All New Recharge		
Proposed Projects in Table 6-1 that Were Analyzed in Detail																																
1		i	Montclair Basins	1	Transfer water between Montclair Basins and deepen MC 4	N	1,188	71	N	N	$ 5,450,000	$ 354,500	$ 2,631	$ 357,131	$ 4,997	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	71	$ 5,450,000	$ 4,997		0
1a		i	Montclair Basins	1	Transfer water between Montclair Basins and deepen MC 4	N	1,188	71	N	N	$ 5,050,000	$ 328,500	$ 2,631	$ 331,131	$ 4,633	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	71	$ 5,050,000	$ 4,633		
2		i	Montclair Basins	1	New drop inlet structures to MC 2 and MC 3	N	1,188	248	N	N	$ 1,440,000	$ 93,700	$ 9,132	$ 102,832	415	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	248	$ 1,440,000	$ 415		0
3		i	Montclair Basins	1	Automate inlet to MC 3[7]	N	1,188	0	N	N	$ 50,000	$ 3,300	$ (6,000)	$ (2,700)	$ -	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 50,000	$ -	y[19]	0
4		i	Montclair Basins	1	Construct low-level drains from Basin 1 to 2 and 2 to 3	N	1,188	0	N	N	$ 790,000	$ 51,400	$ -	$ 51,400	$ -	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 790,000	$ -		0
5		i	North West Upland Basin	1	Increase drainage area and basin enlargement	N	29	93	N	N	$ 5,490,000	$ 357,100	$ 3,441	$ 360,541	$ 3,858	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	93	$ 5,490,000	$ 3,858		0
5a		i	North West Upland Basin	1	Increase drainage area and basin enlargement	N	29	93	N	N	$ 4,640,000	$ 301,800	$ 3,441	$ 305,241	$ 3,266	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	93	$ 4,640,000	$ 3,266		
6		i	Princeton Basin	2	Basin enlargement and increased drainage area[22]	N	48	0	N	N	$ -	$ -	$ -	$ -	#DIV/0!	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -		0
7		ii	San Sevaine Basins	2	Construct pump station, pump water from SS 5 to SS 3, and construct internal berm in SS 5[7]	Y	1,177	642	N	N	$ 1,775,000	$ 115,500	$ 23,641	$ 139,141	$ 217	1,911	$ 372,645	$ 1,775,000	$ 115,500	$ 45,311	$ 279	0	$ -	$ -	$ -	$ -	$ -	$ -	2,553	$ 3,550,000	$ 263		0
8		ii	San Sevaine Basins	2	Extend IEUA recycled water pipeline to SS 3 and construct internal berm in SS 5[7]	Y	1,177	345	N	N	$ 1,310,000	$ 85,200	$ 12,719	$ 97,919	$ 283	1,911	$ 372,645	$ 1,310,000	$ 85,200	$ 45,311	$ 503,156	$ 263	0	$ -	$ -	$ -	$ -	$ -	$ -	2,256	$ 2,620,000	$ 266		0
9		i	San Sevaine Basins	2	Construct internal berms in SS 1 and SS 2 and install a gate between SS 1 and SS 2	N	1,177	0	N	N	$ 300,000	$ 19,500	$ -	$ 19,500	$ -	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	0	$ 300,000	$ -	y[20]	0
10		i	San Sevaine Basins	2	Increase CB13T capacity and power supply	N	1,177	0	N	N	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	1,235	$ 766,935	$ 1,980,000	$ 128,800	$ 29,283	$ 925,018	$ 749	1,235	$ 1,980,000	$ 749		0
11		i	Victoria Basin	2	Abandon the mid-level outlet and extend the lysimeters	Y	439	43	N	N	$ 75,000	$ 4,900	$ 1,576	$ 6,476	$ 151	120	$ 23,400	$ 75,000	$ 4,900	$ 2,845	$ 31,145	$ 260	0	$ -	$ -	$ -	$ -	$ -	$ -	163	$ 150,000	$ 231		0
12		ii	Lower Day Basin (2010 RMPU)	2	Inlet improvements, rebuilding embankment, elimination of mid-level outlet	N	395	789	N	N	$ 2,480,000	$ 161,300	$ 29,041	$ 190,341	$ 241	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	789	$ 2,480,000	$ 241		0
13		ii	Lower Day Basin	2	Install gate on mid-level outlet	N	395	75	N	N	$ 600,000	$ 39,000	$ 2,777	$ 41,777	$ 554	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	75	$ 600,000	$ 554		0
14		i	Turner Basin	2	Raise Turner 2 spillway[7]	N	1,226	66	N	N	$ 890,000	$ 57,900	$ 2,426	$ 60,326	$ 916	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	66	$ 890,000	$ 916		1
15		i	Ely Basin	2	Basin enlargement and increased drainage area	N	1,103	221	N	N	$ 9,120,000	$ 593,300	$ 8,122	$ 601,422	$ 2,726	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	221	$ 9,120,000	$ 2,726		0
15a		i	Ely Basin	2	Basin enlargement and increased drainage area	N	1,103	221	N	N	$ 3,200,000	$ 208,200	$ 8,122	$ 216,322	$ 981	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	221	$ 3,200,000	$ 981		
16		i	Ontario Bioswale Project	2	New bioswale	N	0	8	Y	Y	$ 650,000	$ 42,300	$ 277	$ 42,577	$ -	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	8	$ 650,000	$ -		0
17		i	Lower San Sevaine Basin (2010 RMPU)	2	New basin	N	0	1,221	N	N	$ 22,715,000	$ 1,477,600	$ 44,947	$ 1,522,547	$ 1,247	500	$ 97,500	$ 22,715,000	$ 1,477,600	$ 11,855	$ 1,586,955	$ 3,174	0	$ -	$ -	$ -	$ -	$ -	$ -	1,721	$ 45,430,000	$ 1,807		0
17a		i	Lower San Sevaine Basin (2010 RMPU)	2	New basin	Y	0	1,221	N	N	$ 11,275,000	$ 733,500	$ 44,947	$ 778,447	$ 638	500	$ 97,500	$ 11,275,000	$ 733,500	$ 11,855	$ 842,855	$ 1,686	0	$ -	$ -	$ -	$ -	$ -	$ -	1,721	$ 22,550,000	$ 942		0
18		i	CSI Storm Water Basin	3	Deepen basin by 10 feet	N	72	81	N	N	$ 900,000	$ 58,500	$ 2,998	$ 61,498	755	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	81	$ 900,000	$ 755		0
18a		i	CSI Storm Water Basin	3	Deepen basin by 10 feet	N	72	81	N	N	$ 440,000	$ 28,600	$ 2,998	$ 31,598	$ 388	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	81	$ 440,000	$ 388		0
19		iii	Wineville Basin (2010 RMPU)	3	Gate the low-elevation outlet, replace embankment with dam, and construct a pneumatic gate on the spillway[9]	Y	5	2,157	N	N	$ 3,140,000	$ 204,300	$ 79,438	$ 283,738	$ 132	630	$ 122,850	$ 3,140,000	$ 204,300	$ 14,938	$ 342,088	$ 543	0	$ -	$ -	$ -	$ -	$ -	$ -	2,787	$ 6,280,000	$ 225		2
19a		iii	Wineville Basin (2010 RMPU)	3	Gate the low-elevation outlet, replace embankment with dam, and construct a pneumatic gate on the spillway[9]	Y	5	2,157	N	N	$ 2,445,000	$ 159,100	$ 79,438	$ 238,538	$ 111	630	$ 122,850	$ 2,445,000	$ 159,100	$ 14,938	$ 296,888	$ 471	0	$ -	$ -	$ -	$ -	$ -	$ -	2,787	$ 4,890,000	$ 192		2
20		iii	Jurupa Basin	3	Inlet improvements and CB-18 turnout modifications	N	234	421	N	N	$ 1,900,000	$ 123,600	$ 15,516	$ 139,116	$ 330	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	421	$ 1,900,000	$ 330	y[21]	2
21		ii	RP3 Basin Improvements (2010 RMPU)	3	Inlet improvements and enlargement	N	628	406	N	N	$ 22,044,000	$ 1,434,000	$ 14,931	$ 1,448,931	$ 3,573	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	406	$ 22,044,000	$ 3,573		2
21a		ii	RP3 Basin Improvements (2010 RMPU)	3	Inlet improvements and enlargement	N	628	406	N	N	$ 13,464,000	$ 875,900	$ 14,931	$ 890,831	$ 2,197	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	406	$ 13,464,000	$ 2,197		
22		ii, iii	RP3 Basin Improvements (2013 RMPU)	3	Increase conservation storage[10]	Y	628	137	N	N	$ 2,645,000	$ 172,100	$ 5,062	$ 177,162	$ 1,289	2,905	$ 566,475	$ 2,645,000	$ 172,100	$ 68,879	$ 807,454	$ 278	0	$ -	$ -	$ -	$ -	$ -	$ -	3,042	$ 5,290,000	$ 324		2
22a		ii, iii	RP3 Basin Improvements (2013 RMPU)	3	Increase conservation storage[10]	N	628	137	N	N	$ 1,855,000	$ 120,700	$ 5,062	$ 125,762	$ 915	2,905	$ 566,475	$ 1,855,000	$ 120,700	$ 68,879	$ 756,054	$ 260	0	$ -	$ -	$ -	$ -	$ -	$ -	3,042	$ 3,710,000	$ 290		2
23	Includes PID's 19,20,22	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	2010 RMPU Proposed Wineville Basin Improvements, Wineville 20 cfs PS to Jurupa, Improved Jurupa Basin Inlet, 40 cfs PS to RP3 Basin with Proposed 2013 RMPU RP3	Y	867	3,166	N	N	$ 11,662,000	$ 758,600	$ 311,014	$ 1,069,614	$ 338	3,535	$ 689,325	$ 11,662,000	$ 758,600	$ 83,817	$ 1,531,742	$ 433	0	$ -	$ -	$ -	$ -	$ -	$ -	6,701	$ 23,324,000	$ 388		2
23a	Includes PID's 19,20,22	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	2010 RMPU Proposed Wineville Basin Improvements, Wineville 20 cfs PS to Jurupa, Improved Jurupa Basin Inlet, 40 cfs PS to RP3 Basin with Proposed 2013 RMPU RP3	Y	867	3,166	N	N	$ 10,657,000	$ 693,300	$ 311,014	$ 1,004,314	$ 317	3,535	$ 689,325	$ 10,657,000	$ 693,300	$ 83,817	$ 1,466,442	$ 415	0	$ -	$ -	$ -	$ -	$ -	$ -	6,701	$ 21,314,000	$ 369		2
24		i	Vulcan Pit	3	Construct new inflow and outflow structures[11]	Y	0	857	N	N	$ 13,850,000	$ 901,000	$ 31,548	$ 932,548	$ 1,088	840	$ 163,800	$ 13,850,000	$ 901,000	$ 19,917	$ 1,084,717	$ 1,291	0	$ -	$ -	$ -	$ -	$ -	$ -	1,697	$ 27,700,000	$ 1,189		1
25		i	Sierra	3	Deepen basin by 10 feet	N	12	64	N	N	$ 1,000,000	$ 65,100	$ 2,351	$ 67,451	$ 1,056	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	64	$ 1,000,000	$ 1,056		1
25a		i	Sierra	3	Deepen basin by 10 feet	N	12	64	N	N	$ 490,000	$ 31,900	$ 2,351	$ 34,251	$ 536	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	64	$ 490,000	$ 536		1
26		i	Sultana Avenue	3	Deepen basin by 10 feet	N	89	7	N	N	$ 1,026,200	$ 66,800	$ 258	$ 67,058	$ 9,556	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	7	$ 1,026,200	$ 9,556		1
26a		i	Sultana Avenue	3	Deepen basin by 10 feet	N	89	7	N	N	$ 502,200	$ 32,700	$ 258	$ 32,958	$ 4,697	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	7	$ 502,200	$ 4,697		1
27		i	Declez Basin	3	Reconstruct existing embankment and install a gate on the low level outlet[12]	N	674	241	N	N	$ 4,070,000	$ 264,800	$ 8,877	$ 273,677	$ 1,135	0	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$ -	241	$ 4,070,000	$ 1,135		2
Operations and Maintenance[13]																																
28		ii	Banana Basin (annual cleaning)	3	Increase frequency of basin maintenance (increased infiltration rate to 0.6 ft/day)	Y	317	11	N	N			$ 3,183	$ 3,183	$ 294	130	$ 25,350	$ -	$ -	$ 38,159	$ 63,509	$ 489	0	$ -	$ -	$ -	$ -	$ -	$ -	141		$ 474		0
29		ii	Banana Basin (semiannual cleanings)	3	Increase frequency of basin maintenance (increased infiltration rate to 0.72 ft/day)	Y	317	31	N	N			$ 15,192	$ 15,192	$ 495	155	$ 30,225	$ -	$ -	$ 76,744	$ 106,969	$ 690	0	$ -	$ -	$ -	$ -	$ -	$ -	186		$ 658		0
30		ii	Declez Basin (annual cleaning)	3	Increase basin maintenance frequency (increased infiltration rate to 0.66 ft/day)	Y	674	16	N	N			$ 6,537	$ 6,537	$ 409	178	$ 34,710	$ -	$ -	$ 72,735	$ 107,445	$ 604	0	$ -	$ -	$ -	$ -	$ -	$ -	194		$ 588		0
31		ii	Declez Basin (semiannual cleanings)	3	Increase basin maintenance frequency (increased infiltration rate to 0.78 ft/day)	Y	674	47	N	N			$ 32,923	$ 32,923	$ 701	210	$ 40,950	$ -	$ -	$ 147,109	$ 188,059	$ 896	0	$ -	$ -	$ -	$ -	$ -	$ -	257		$ 860		0
32		ii	Ely Basin (annual cleaning)	2	Increase maintenance frequency (increased infiltration rate to 0.27 ft/day)	Y	1,103	44	N	N			$ 29,450	$ 29,450	$ 668	217	$ 42,315	$ -	$ -	$ 144,868	$ 187,183	$ 863	0	$ -	$ -	$ -	$ -	$ -	$ -	261		$ 830		0
33		ii	Ely Basin (semiannual cleanings)	2	Increase maintenance frequency (increased infiltration rate to 0.33 ft/day)	Y	1,103	128	N	N			$ 127,949	$ 127,949	$ 997	258	$ 50,310	$ -	$ -	$ 257,342	$ 307,652	$ 1,192	0	$ -	$ -	$ -	$ -	$ -	$ -	386		$ 1,128		0
34		ii	Hickory Basin (annual cleaning)	2	Increase frequency of basin maintenance (increased infiltration rate to 0.44 ft/day)	Y	353	7	N	N			$ 3,812	$ 3,812	$ 518	148	$ 28,860	$ -	$ -	$ 76,622	$ 105,482	$ 713	0	$ -	$ -	$ -	$ -	$ -	$ -	155		$ 703		0
35		ii	Hickory Basin (semiannual cleanings)	2	Increase frequency of basin maintenance (increased infiltration rate to 0.52 ft/day)	Y	353	20	N	N			$ 17,640	$ 17,640	$ 877	175	$ 34,125	$ -	$ -	$ 153,435	$ 187,560	$ 1,072	0	$ -	$ -	$ -	$ -	$ -	$ -	195		$ 1,052		0
Proposed Projects in Table 6-1 that Were Not Analyzed																																
36			Turner Expansion	2	Basin improvements to the basins east of Archibald Ave and new basins adjacent to Turner 4[14]																													
37			Upland Basin	1	Construct low level drain[15]																													
38			College Heights	1	Construct internal berms to reduce seepage to the Upland basin[16]																													
39			Lower Cucamonga Basin	2	Basin enlargement for distribution[17]																													
40			Management Zones 2 and 3 Capture, Pump and Recharge	2,3	Capture water in MZ-2 and 3 basins low in the system and pump to basins higher in the system[17]																													
41			Jurupa Basin	3	Inlet improvements and basin enlargement[17]																													
42			RP3 Basins	3	Inlet improvements[18]																													
43			Alder Basin	3	Deepen basin[17]																													

1. The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; iv- the project includes the "iii" group.
2. The results of this table provide an estimate of the cost per acre-ft of recharge. These estimates are reconnaissance level (level 5) estimates, and additional technical work needs to be done to assure feasibility.
3. The IEUA recycled water recharge rate was assumed to be $195 an acre-ft per Table 2-9.
4. The WWD imported water recharge rate was assumed to be untreated Tier 1 Service at a price of $621 an acre-ft per Table 2-9.
5. The production sustainability score is a tool to characterize a project's contribution to production sustainability in areas with sustainability challenges. In simple terms, the score is as follows: 0 – does not contribute to production sustainability; 1 – contributes minimally to production sustainability (a necessary but not sufficient condition of sustainability); 2 – contributes significantly to production sustainability (a necessary and sufficient condition of sustainability).
6. The automation of the inlet gate and flume data to MC 1 results in a reduction of O&M.
7. With a 40% RWC limitation, an additional 1,911 acre-ft/yr of recycled water can be recharged.
8. The Baseline for the Turner 2 Spillway Project and the Turner Expansion includes the recharge from Turner 1, 2, 3, and 4.
9. The results from the Wineville proof-of-concept project may render the project infeasible. Recycled water recharge was estimated to be 630 acre-ft/yr, assuming an infiltration rate of 0.10 ft/day over 30 acres.
10. The RWC limitation at RP3 is 12,800 acre-ft/yr.
11. Recycled water recharge based upon an estimated 0.1 ft/day infiltration at 40-acres for 7-months of operations. Actual RWC is unknown; recharge based upon an assumed RWC at 25% with the following flows: 840 AFY storm water, 1,800 AFY underflow, and diluent water the same at Banana Basin. The project includes the price of land at $14 million.
12. Recycled water recharge operations will not benefit from the increased operating level. Basin recharge footprint is constrained by surrounding geology and engineered berm. Basin is not RWC limited and will not benefit from increased SW capture or footprint.
13. Based on available information, it can be assumed that basin infiltration can be increased 10 to 20% with annual cleaning and 20 to 50 % with cleaning twice a year. Field data needs to be established to determine optimum cleaning frequencies per basin.
14. The Turner Basin expansion project was not included because it is currently under construction.
15. The Upland Basin Project was removed by the IEUA because the basin performs well, and limited cleaning is needed.
16. The College Heights project does not affect stormwater recharge.
17. The projects did not pass the screening criteria and were not considered.
18. The recharge gained by the 2010 RMPU RP3 inlet improvement is comparable to the current recharge at RP3.
19. Reduces the amount of lost water due to basin inlet constraints and clogging.
20. Will increase the amount of time water can be recharged in SS-1 by solving the vector control issues.
21. Will allow the Jurupa Basin to accept an additional 15 cfs from the CB 18 if Hickory and Banana Basins were offline.
22. The SBCFCD did not allow the City of Ontario to connect the new 5th Street storm drain to the Princeton Basin. The SBCFCD required improvements to the Princeton Basin such as enlarging the basin by purchasing the adjacent property, deepening the basin, and enlarging the outlet structures in order to allow the diversion of the 15th St storm drain to the Princeton Basin. These costs made the improvement infeasible. The City of Ontario connected the 60" storm drain to the West Cucamonga channel to the south of the Princeton Basin. This information was not presented until after the model runs and cost estimates were completed.

a) The project includes excavation costs, and the capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

DRAFT Table 8-2b
Screening of Yield Enhancement Projects

Project ID	Project	Management Zone	Capital Cost	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	New Yield	Recycled Water	Unit Cost	Water Quality Challenges	Institutional Challenges
1	Montclair Basins	1	$ 5,450,000	$ 354,500	$ 2,644	$ 357,144	71	0	$ 4,997		c
1a	Montclair Basins	1	$ 5,050,000	$ 328,500	$ 2,644	$ 331,144	71	0	$ 4,634		c
2	Montclair Basins	1	$ 1,440,000	$ 93,700	$ 9,176	$ 102,876	248	0	$ 415		c
3	Montclair Basins	1	$ 50,000	$ 3,300	$ -	$ 3,300	0	0	--		c
4	Montclair Basins	1	$ 790,000	$ 51,400	$ -	$ 51,400	0	0	--		c
5	North West Upland Basin	1	$ 5,490,000	$ 357,100	$ 3,458	$ 360,558	93	0	$ 3,858		c, g
5a	North West Upland Basin	1	$ 4,640,000	$ 301,800	$ 3,458	$ 305,258	93	0	$ 3,267		c, g
6	Princeton Basin	2	$ -	$ -	$ -	$ -	0	0	--		c
7	San Sevaine Basins	2	$ 1,775,000	$ 115,500	$ 23,756	$ 139,256	642	1,911	$ 217		c, e,f
8	San Sevaine Basins	2	$ 2,620,000	$ 170,400	$ 12,781	$ 183,181	345	1,911	$ 530		c, e
9	San Sevaine Basins	2	$ 300,000	$ 19,500	$ -	$ 19,500	0	0	--		c
10	San Sevaine Basins	2	$ 1,980,000	$ 128,800	$ -	$ 128,800	0	0	--		c
11	Victoria Basin	2	$ 75,000	$ 4,900	$ 1,584	$ 6,484	43	120	$ 151		c, e,f
12	Lower Day Basin (2010 RMPU)	2	$ 2,480,000	$ 161,300	$ 29,182	$ 190,482	789	0	$ 242		c
13	Lower Day Basin	2	$ 600,000	$ 39,000	$ 2,791	$ 41,791	75	0	$ 554		c
14	Turner Basin	2	$ 890,000	$ 57,900	$ 2,438	$ 60,338	66	0	$ 916		c
15	Ely Basin	2	$ 9,120,000	$ 593,300	$ 8,162	$ 601,462	221	0	$ 2,727	b	
15a	Ely Basin	2	$ 3,200,000	$ 208,200	$ 8,162	$ 216,362	221	0	$ 981	b	
16	Ontario Bioswale Project	2	$ 650,000	$ 42,300	$ 279	$ 42,579	8	0	$ 5,652		
17	Lower San Sevaine Basin (2010 RMPU)	2	$ 45,430,000	$ 2,955,300	$ 45,165	$ 3,000,465	1,221	500	$ 2,458		d, e
17a	Lower San Sevaine Basin (2010 RMPU)	2	$ 22,550,000	$ 1,466,900	$ 45,165	$ 1,512,065	1,221	500	$ 1,239		d, e
18	CSI Storm Water Basin	3	$ 900,000	$ 58,500	$ 3,012	$ 61,512	81	0	$ 756	b	g
18a	CSI Storm Water Basin	3	$ 440,000	$ 28,600	$ 3,012	$ 31,612	81	0	$ 388	b	g
19	Wineville Basin (2010 RMPU)	3	$ 6,280,000	$ 408,500	$ 79,824	$ 488,324	2,157	630	$ 226	b	
19a	Wineville Basin (2010 RMPU)	3	$ 4,890,000	$ 318,100	$ 79,824	$ 397,924	2,157	630	$ 184	b	
20	Jurupa Basin	3	$ 1,900,000	$ 123,600	$ 15,591	$ 139,191	421	0	$ 330		
21	RP3 Basin Improvements (2010 RMPU)	3	$ 22,044,000	$ 1,434,000	$ 15,004	$ 1,449,004	406	0	$ 3,573		
21a	RP3 Basin Improvements (2010 RMPU)	3	$ 13,464,000	$ 875,900	$ 15,004	$ 890,904	406	0	$ 2,197		
22	RP3 Basin Improvements (2013 RMPU)	3	$ 2,645,000	$ 172,100	$ 5,087	$ 177,187	137	2,905	$ 1,289		f
22a	RP3 Basin Improvements (2013 RMPU)	3	$ 1,855,000	$ 120,700	$ 5,087	$ 125,787	137	2,905	$ 915		f
23	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	$ 23,324,000	$ 1,517,300	$ 311,014	$ 1,828,314	3,166	3,535	$ 577		d,e
23a	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	$ 21,314,000	$ 1,386,500	$ 311,014	$ 1,697,514	3,166	3,535	$ 536		d, e
24	Vulcan Pit	3	$ 27,700,000	$ 1,801,900	$ 31,701	$ 1,833,601	857	840	$ 2,140		d, e, g
25	Sierra	3	$ 1,000,000	$ 65,100	$ 2,362	$ 67,462	64	0	$ 1,057		g
25a	Sierra	3	$ 490,000	$ 31,900	$ 2,362	$ 34,262	64	0	$ 537		g
26	Sultana Avenue	3	$ 1,026,200	$ 66,800	$ 260	$ 67,060	7	0	$ 9,556		g
26a	Sultana Avenue	3	$ 502,200	$ 32,700	$ 260	$ 32,960	7	0	$ 4,697		g
27	Declez Basin	3	$ 4,070,000	$ 264,800	$ 8,920	$ 273,720	241	0	$ 1,135		
28	Banana Basin (annual cleaning)	3					11	130	$ 294		
29	Banana Basin (semiannual cleanings)	3					31	155	$ 495		
30	Declez Basin (annual cleaning)	3					16	178	$ 409		
31	Declez Basin (semiannual cleanings)	3					47	210	$ 701		
32	Ely Basin (annual cleaning)	2					44	217	$ 668		
33	Ely Basin (semiannual cleanings)	2					128	258	$ 997		
34	Hickory Basin (annual cleaning)	2					7	148	$ 518		
35	Hickory Basin (semiannual cleanings)	2					20	175	$ 877		

a) The project includes excavation costs, and the capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Key to Water Quality Challenges

b) A water quality challenge has been identified with this project. (See text for a more detailed explanation)

Key to Institutional Challenges

c) An agreement will be required with the property owner to construct and operate stormwater recharge facilities. Other agreements with resource agencies may also be required. The time required to negotiate and approve these agreements could range from one to two years.

d) This basin is not currently included in the Watermaster/IEUA recharge permit. Therefore, the existing permit will need to be amended to include recycled water at this basin. The time required to prepare the Title 22 engineering and regulatory process is about two years.

e) The project includes a recycled water recharge component. The IEUA has discretion as to whether to participate or not in this project.

f) At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared. The capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

g) The Watermaster will have to submit a Petition for Change with the State Water Resources Control Board for the project because it is not included in the Watermaster's current diversion permits.

DRAFT Table 8-2c
Ranked Yield Enhancement Projects

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 440,000	$ 31,612
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 497	$ 19,392,000	$ 1,261,000
25a	i	Sierra	64	0	$ 537	$ 490,000	$ 34,262
Total MZ3			**3,311**	**2,905**	**$ 495**	**$ 20,322,000**	**$ 1,326,875**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
Total MZ2			**1,474**	**2,031**	**$ 228**	**$ 4,330,000**	**$ 336,222**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**5,033**	**4,936**	**$ 413**	**$ 26,092,000**	**$ 1,765,973**
Other Projects							
19a	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 4,890,000	$ 397,924
20	iii	Jurupa Basin	421	0	$ 330	$ 1,900,000	$ 139,191
8	ii	San Sevaine Basins	345	0	$ 530	$ 2,620,000	$ 183,181
13	ii	Lower Day Basin	75	0	$ 554	$ 600,000	$ 41,791
22a	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	0	$ 915	$ 1,855,000	$ 125,787
21a	ii	RP3 Basin Improvements (2010 RMPU)	406	0	$ 2,197	$ 13,464,000	$ 890,904

Note - color shading within each MZ indicates mutually exclusive projects.

1. The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

2. At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

3. PID 23a includes PID 19a, 20, and 22a and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only PID 22a. The capital costs associated with PIDs 19a and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in PID 22a. The recycled water recharge associated with PID 19a was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of PID 23a is about $17,440,000.

4. The total capital cost for PID 11 is about $150,000.

5. The total capital cost for PID 12 is about $3,550,000.

a- The project includes excavation costs, and the capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

DRAFT Table 8-3

Ranked Yield Enhancement Projects with Capital Cost Breakdown and Amortization Cost

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Direct Construction Cost	Engineering and Admin Costs	Total Capital Cost	Annual Amortization Cost		Annual Costs for Pay-As-You-Go for All Soft Costs						
									Finance All Costs	Finance Construction Costs Only	Fiscal 2015	Fiscal 2016	Fiscal 2017	Fiscal 2018	Fiscal 2019	Fiscal 2020	Fiscal 2021
Recommended MZ3 Projects																	
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 291,000	$ 150,000	$ 441,000	$ 29,000	$ 19,000							
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements	3,166	2,905	$ 497	$ 17,513,000	$ 1,879,000	$ 19,392,000	$ 1,261,000	$ 1,139,000							
25a	i	Sierra	64	0	$ 537	$ 323,000	$ 167,000	$ 490,000	$ 32,000	$ 21,000							
Total MZ3			**3,311**	**2,905**	**$ 495**				**$ 1,322,000**	**$ 1,179,000**							
Recommended MZ2 Projects																	
11	i	Victoria Basin	43	120	$ 151	$ 65,000	$ 9,750	$ 74,750	$ 5,000	$ 4,000							
7	ii	San Sevaine Basins	642	1,911	$ 217	$ 1,614,000	$ 161,500	$ 1,775,500	$ 115,000	$ 105,000							
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,158,000	$ 324,000	$ 2,482,000	$ 161,000	$ 140,000							
Total MZ2			**1,474**	**2,031**	**$ 228**				**$ 281,000**	**$ 249,000**							
Recommended MZ1 Projects																	
2	i	Montclair Basins	248	0	$ 415	$ 1,251,900	$ 188,000	$ 1,439,900	$ 94,000	$ 102,876							
Total MZ1			**248**	**0**	**$ 415**				**$ 94,000**	**$ 102,876**							
Total Recommended Projects			**5,033**	**4,936**	**$ 413**	**$ 23,215,900**	**$ 2,879,250**	**$ 26,095,150**	**$ 1,697,000**	**$ 1,530,876**	**$ 100,000**	**$ 300,944**	**$ 300,944**	**$ 773,775**	**$ 773,775**	**$ 322,406**	**$ 322,406**

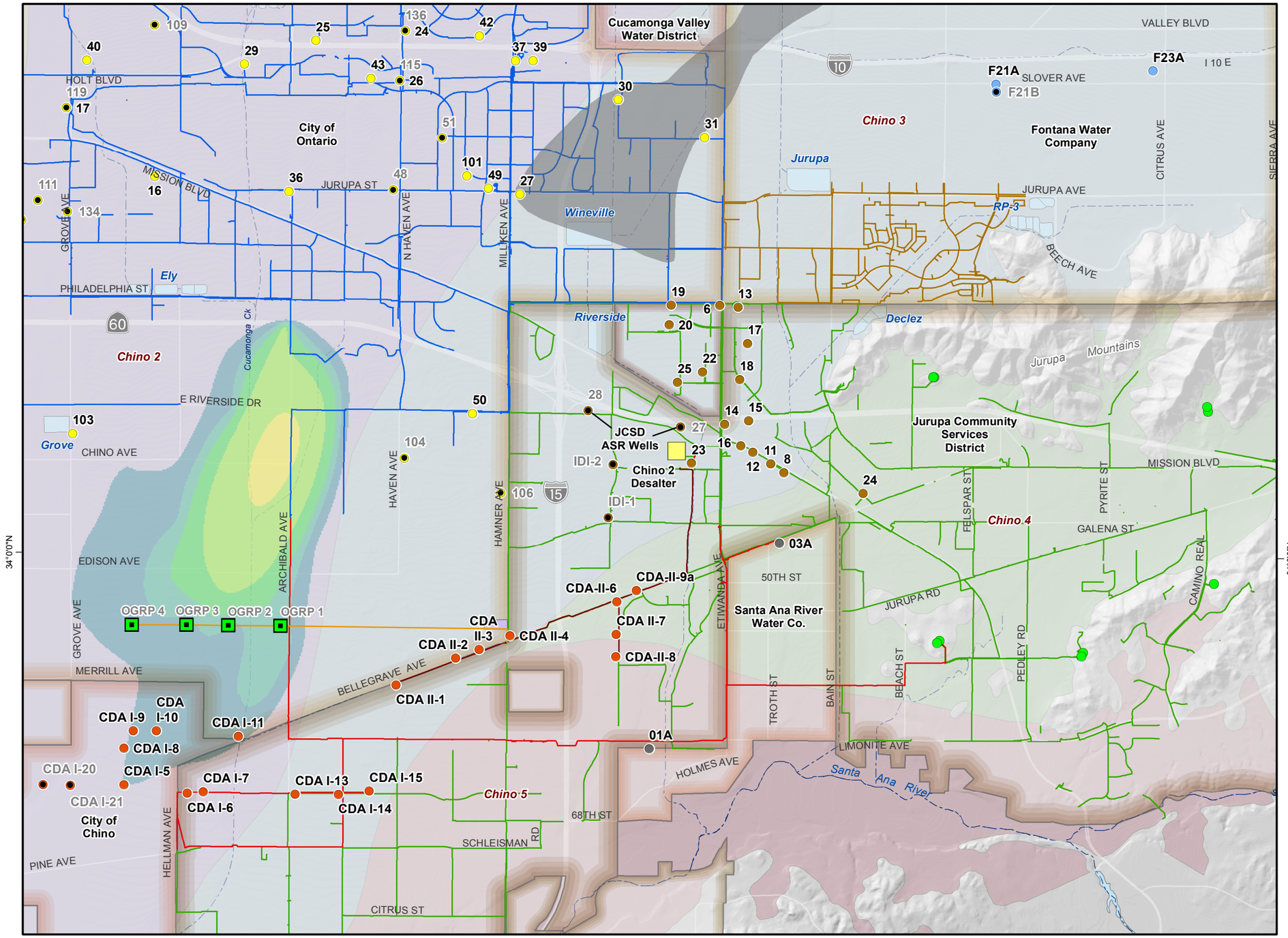
$200,000 CEQA cost as a lump sum. Project-level for the projects listed above and programmatic level for all other unique projects in Table 8-2c.

$100,000 Watermaster cost to negotiate implementation agreements, legal costs and staff time

15% Preliminary engineering as a fraction of E&A

60% Final design as a fraction of E&A

25% CMS as a fraction of E&A



Water Supply Infrastructure

- City of Ontario Potable Water Mainlines
- JCSD Potable Water Mainlines
- FWC Potable Water Mainlines
- CDA Desalter I Product Water Pipeline
- CDA Desalter II Raw Water Pipeline
- JCSD Storage Reservoir
- OGRP Well
- OGRP Convyance Pipelines

Archibald South
VOC Concentration (ug/L)

- > 0 and ≤ 5
- > 5 and ≤ 10
- > 10 and ≤ 20
- > 20 and ≤ 50
- > 50 and ≤ 100

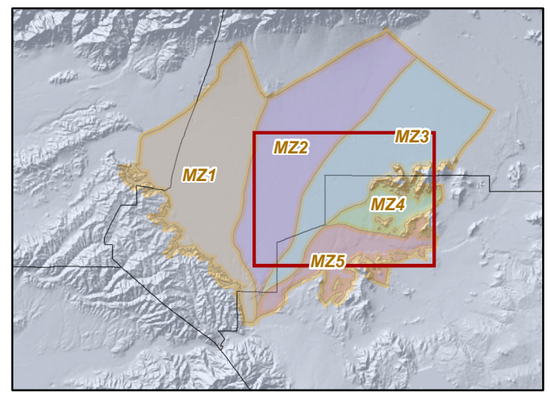
Production Wells

- Chino Desalter Authority
- City of Ontario
- Fontana Water Company
- Jurupa Community Services District
- Other Appropriators

Note: A black dot and gray label indicates that the well is not currently active but will be in the future or is a planned well

Other Features

- Flood Control and Conservation Basins



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0 1 Miles
0 2 Kilometers

DRAFT

2012 Recharge Masterplan Update

In-Lieu Recharge/Exchange Project Configurations Submitted by Steering Committee Members

Figure 8-1

117°40'0"W

117°20'0"W

34°0'0"N

San Gabriel Mountains

Cucamonga Fault Zone

Cucamonga Basin

Claremont Basin

Pomona Basin

Rialto-Colton Basin

Puente Hills

Chino Hills

Arlington Basin

La Sierra Hills

Temescal Basin

El Sobrante de San Jacinto

Riverside Basins

San Antonio Ck

Indian Hill Fault

San Jose Fault

Red Hill Fault

Upland Landfill

Haven Ave

Day Ck

Euclid Ave

Central Ave

Etiwanda Ave

Sierra Ave

Riverside Ave

Barrier J

Lytle Ck

Loma Linda Fault

San Jacinto Fault

Rialto-Colton Fault

Foothill Blvd

Holt Blvd

Riverside Dr

Mission Blvd

Limonite Ave

Bellegrave Ave

Van Buren Blvd

Victoria Ave

Cucamonga Ck

Chino Ck

Chino Fault

Santa Ana River

San Bernardino County

Orange County

Riverside County

Rialto (Perchlorate)

Former Kaiser Steel Mill - CCG (Metals, VOCS)

Former-Kaiser Steel Mill Plume (TDS, TOC)

Former Alumax Facility (TDS)

Pomona Area Plume

GE Flatiron Plume

GE Test Cell Plume

Milliken Landfill Plume

Archibald South Plume

Chino Institute for Men Plume

Chino Airport Plume

Former Crown Coach Facility

Stringfellow Plume (VOC)

Stringfellow Plume (Perchlorate)

Prado Flood Control Basin

7-10

12,13

11

17

26

24

5

1-4

6

14

18

20,23

21,22,23

25

16

15

19,23

27

VOC Concentration (ug/L)

- > 0 and ≤ 5
- > 5 and ≤ 10
- > 10 and ≤ 20
- > 20 and ≤ 50
- > 50 and ≤ 100
- > 100 and ≤ 200
- > 200 and ≤ 500
- > 500

The VOC plumes shown on this map are generalized illustrations of the estimated spatial extent of TCE or PCE, based on maximum concentration measured over the 5-year period of August 2007 to July 2012. Interpretations of plume extent and boundary delineation were made based on measured concentrations and local groundwater flow patterns.

Other plumes (labeled by name and dominant contaminant)

1 Yield Enhancement Project (Project ID is for locational reference from Table 8-2b)

OBMP Management Zones

Chino Desalter Well

Streams & Flood Control Channels

Flood Control & Conservation Basins

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

Delineation of Groundwater Contamination Plumes and Point-Sources of Concern in Relation to the Yield Enhancement Projects

Figure 8-2

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Date: 20130612

File: Figure_8-_WQ.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2013 Amendment to the 2010 RMPU