

**To:** Chino Basin Watermaster Stakeholders

**From:** Watermaster 2020 OBMP Update Team

**Subject:** 2020 OBMP Update: Scoping Report – Development of Activities for Consideration (Scoping Report)

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### 3. Scope of Work to Perform Proposed 2020 OBMP Update Activities

#### Activity CG

##### Description of Activity CG

Activities C and G, defined by the stakeholders, are both intended to address the need for infrastructure to optimize the use of water supplies. Activity C defined by the stakeholders is:

*Identify and implement regional conveyance and treatment projects/programs to enable all stakeholders to exercise their pumping rights and minimize land subsidence.*

Activity G defined by the stakeholders is:

*Optimize the use of all sources of water supply by improving the ability to move water across the basin and amongst stakeholders, prioritizing the use of existing infrastructure.*

The two activities were combined into Activity CG.

The parties have identified that there are basin management challenges, such as land subsidence and poor water quality, that could limit the ability to fully exercise their pumping rights using existing infrastructure. The intent of Activity CG is to optimize the use of all sources of water available to the parties to meet their demands despite these basin management challenges and potentially help to mitigate them.

Through the listening session process, the stakeholders identified the following as potential outcomes of performing Activity CG:

- Enable producers with infrastructure in MZ1 and MZ2 to obtain water through regional conveyance, which supports the management of groundwater levels to reduce the potential for land subsidence and ground fissuring.
- Enable the parties to increase pumping in areas currently constrained by poor water quality.
- Remove groundwater contaminants from the Chino Basin and thereby improve water quality.
- Protect and/or enhance safe yield.
- Maximize the use of existing infrastructure, which will minimize investments in new facilities.
- Provide infrastructure that can also be used to implement storage and recovery programs.

Activity CG has similar objectives to those of PE 5 of the 2000 OBMP – *Develop and Implement Regional Supplemental Water Program*. Recognizing that growth in the Chino Basin was going to result in a more than 30 percent increase in then-current water demands, PE 5 was included in the 2000 OBMP to improve regional conveyance and the availability of imported and recycled waters throughout the basin. The implementation plan for PE 5 was combined with PE 3 – *Develop and Implement Water Supply Plan for the Impaired Areas of the Basin* in the OBMP and Peace Agreement.

Early in the development of the PE 3/5 implementation plan, the stakeholders discussed the development of a regional water facilities plan that, when implemented, would enable the parties to maximize the use of imported water in years when Metropolitan has surplus water and to be able to rely completely on local supplies during years when Metropolitan supplies are low or completely interrupted due to planned or catastrophic outages. This plan involved the construction of new wells and groundwater treatment and regional conveyance improvements; the water produced in this plan would be used exclusively by the parties. The stakeholders ultimately did not include this plan in the 2000 OBMP IP, preferring at that time to focus on expanding groundwater desalting in the lower Chino Basin, increasing stormwater recharge, and implementing a large-scale recycled water program to maximize its reuse.

The IEUA and its member agencies are currently preparing the *2020 Integrated Water Resources Plan* (IRP), which will serve as a regional implementation strategy for long-term water resources management within IEUA's service area. The objective of the IRP is to ensure that the IEUA's water supplies over the next 25 years are reliable, cost-effective, and environmentally responsible. The 2020 IRP is in development, and there is a significant body of engineering planning being performed that can be leveraged to accomplish the objectives of Activity CG for all Chino Basin parties.

### Need and Function of Activity CG

In addition to Chino Basin groundwater, the sources of water available to the parties include:

- Imported water purchased from Metropolitan (through the IEUA and TVMWD) and the San Bernardino Valley Municipal Water District (Valley District).
- Non-Chino Basin groundwater from adjacent groundwater basins, including the Six, Spadra, Cucamonga, Rialto, Lytle, and Riverside Basins.
- Local surface water from San Antonio, Cucamonga, Day, Etiwanda, East Canyon, and Lytle Creeks, and some tunnels and springs located in the San Gabriel Mountains.
- Recycled water from the IEUA and the Los Angeles Sanitation District.

Watermaster periodically compiles the parties' future water supply plans. The data collected as part of that process represent the parties' best estimates of their demands and associated water supply plans. The most recent effort by Watermaster to characterize the water supply plans was during the development of the *Storage Framework Investigation*.<sup>1,2</sup> Exhibit CG-1 shows the historical (2015) and projected aggregate water demand and supply plan for all parties. Total water demand is projected to grow from about 290,000 afy in 2015 to about 420,000 afy by 2040, and increase of about 130,000 afy. The projected growth in water demand by the Appropriative Pool parties drives the increase in aggregate water demand as some Appropriative Pool parties are projected to serve new urban water demands created by the conversion of agricultural and vacant land uses to urban uses. Chino Basin groundwater and imported water together make up about 70 percent of the aggregate water supplies of the parties.

Each of the water sources shown in Exhibit CG-1 has its limitations; they are described below.

#### *Chino Basin groundwater and basin management issues*

Chino Basin groundwater is the largest source of supply used to meet the demands of the Watermaster parties. Exhibit CG-1 shows that Chino Basin groundwater makes up about 40 to 50 percent of the total aggregate supply. Groundwater pumping was about 147,000 afy in 2015 and is projected to increase to about 177,000 afy by 2040, an increase of about 30,000 afy. The ability to produce groundwater from the Chino Basin is limited by current basin management issues, such as ongoing land subsidence in MZ1 and parts of MZ2, pumping sustainability issues in the JCSD and CDA well field areas, and water quality.

*Land subsidence.* One of the earliest indications of land subsidence in the Chino Basin was the appearance of ground fissures within the City of Chino in MZ1. These fissures appeared as early as 1973, but an accelerated occurrence of ground fissuring ensued after 1991 and resulted in damage to existing infrastructure. The OBMP IP called for a management plan to reduce or abate the subsidence and fissuring problems to the extent that it may be caused by pumping in MZ1. Watermaster has been conducting land

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<sup>1</sup> The water demand and supply plans developed in 2017 were based in part on 2015 Urban Water Management Plans and updated to 2017 conditions. The Storage Framework Investigation can be found on Watermaster's website. [https://cbwm.syncedtool.com/shares/folder/9abb162877b999/?folder\\_id=1429](https://cbwm.syncedtool.com/shares/folder/9abb162877b999/?folder_id=1429)

<sup>2</sup> Watermaster is currently compiling future water supply plans for the Safe Yield Recalculation.

subsidence investigations in the Chino Basin since September 2000 to implement PE 4 of the OBMP IP.<sup>3</sup> The results of the investigations have indicated that the potential occurrence of pumping-induced land subsidence and ground fissuring is confined to MZ1 and MZ2. Watermaster has defined five specific Areas of Subsidence Concern within MZ1 and MZ2: the Managed Area, Northwest MZ1, Central MZ1, the Northeast Area, and the Southeast Area. Exhibit CG-2 shows the locations of the Areas of Subsidence Concern and recent measurements of land subsidence from 2011 to 2019.

For the Managed Area, Watermaster utilized the results of the land subsidence investigations to develop and implement a Subsidence Management Plan (SMP)<sup>4</sup> to minimize the potential for future subsidence and ground fissuring. The SMP established a specific groundwater level at a monitoring well in the Managed Area (the “Guidance Level” at well PA-7 at the Ayala Park Extensometer facility) and recommended that the pumpers with wells in the Managed Area manage their groundwater production such that the groundwater levels at PA-7 remain above the Guidance Level. The main pumpers in the Managed Area are the City of Chino Hills, City of Chino, and State of California. They have voluntarily managed their pumping as recommended in the SMP, and as a result, the rate of land subsidence has declined to de minimis levels within the Managed Area.

Exhibit CG-2 shows that the maximum rate of recent land subsidence from 2011-2019 has occurred in Northwest MZ1. Of particular concern is that the subsidence in Northwest MZ1 has occurred in a pattern of concentrated differential subsidence across the San Jose Fault—the same pattern of differential subsidence that occurred in the Managed Area during the time of ground fissuring in the 1990s. Ground fissuring is the main subsidence-related threat to infrastructure. Exhibit CG-2 also shows the occurrence of subsidence across broad areas in Central MZ1 and the Northeast Area during 2011-2019. Watermaster is monitoring and investigating the relationships between pumping, recharge, groundwater levels and land subsidence in Northwest MZ1, and investigating pumping and recharge strategies to minimize or abate the occurrence of the differential land subsidence. These efforts are being implemented pursuant to the *Work Plan to Develop a Subsidence-Management Plan for the Northwest MZ-1 Area*,<sup>5</sup> which is an appendix to the SMP.

The main groundwater producers in Northwest MZ1, Central MZ1, and the Northeast Area are the City of Pomona, the MVWD, Golden State Water Company (GSWC), the City of Chino, and the City of Ontario. Interim work performed in Northwest MZ1 to support the development of a subsidence management plan for this area suggests that land subsidence could be reduced or abated if recharge in Northwest MZ1 is increased by at least 20,000 afy, pumping is decreased by at least 20,000 afy, or some combination of both totaling about 20,000 afy.<sup>6</sup> Exhibit CG-3 is a time-series chart of groundwater pumping, wet-water recharge, and land subsidence (represented as negative vertical ground motion) in Northwest MZ1 from 1978-2019. Recent pumping in Northwest MZ1 has decreased significantly: 2017-2019 pumping averaged about 12,000 afy compared to about 19,000 afy since the implementation of the OBMP (2001-2016), a reduction of about 7,000 afy. The reduced pumping is mainly due to water quality issues. Additionally,

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<sup>2</sup> Detailed information on Watermaster’s land subsidence investigations, the causes of subsidence and ground fissuring, Watermaster’s subsidence management plan for the so-called “Managed Area” in the City of Chino, annual monitoring reports, and ongoing investigations to develop a subsidence management plan for Northwest MZ1 can be found on Watermaster’s website at:

[https://cbwm.syncedtool.com/shares/folder/9abb162877b999/?folder\\_id=1055](https://cbwm.syncedtool.com/shares/folder/9abb162877b999/?folder_id=1055)

<sup>4</sup> Chino Basin Watermaster. 2015. [Chino Basin Subsidence Management Plan](#). July 2015.

<sup>5</sup> Chino Basin Watermaster. 2015. [Work Plan to Develop a Subsidence Management Plan for the Northwest MZ-1 Area](#).

<sup>6</sup> Chino Basin Watermaster. 2017. *Task 3 and Task 4 of the Work Plan to Develop a Subsidence Management Plan for the Northwest MZ-1 Area: Development and Evaluation of Baseline and Initial Subsidence-Management Alternatives*.

recent wet-water recharge in Northwest MZ1 has increased: 2017-2019 recharge averaged about 15,000 afy compared to about 9,000 afy since the implementation of the OBMP (2001-2016), an increase of about 6,000 afy. Exhibit CG-3 shows that these recent decreases in pumping and increases in recharge, totaling about 13,000 afy, appear to coincide with reduced rates of land subsidence in Northwest MZ1. This suggests that reduced pumping and/or increased recharge can abate land subsidence in Northwest MZ1. If the subsidence management plan for the Northwest MZ1 area recommends a combination of reduced pumping and wet-water recharge to minimize and abate the ongoing land subsidence, the pumpers in this area who elect to reduce pumping in accordance with the plan may have difficulty in fully utilizing their water rights with existing infrastructure.

Pursuant to the Peace Agreement, new land subsidence is considered MPI and would require mitigation. New land subsidence refers to additional land subsidence caused by the reduction of pressure head in the coarse-grain sediments to levels lower than historical lows. Through the Watermaster's recent *Storage Framework Investigation*, a groundwater-elevation metric was defined as a minimum threshold for the occurrence of new land subsidence in MZ1.<sup>7</sup> Based on the modeling results of the *Storage Framework Investigation*, new land subsidence is not projected to occur through 2050 in MZ1 under Scenario 1A, which is based on the parties' best estimates of how future supplies would be used to meet demands. However, the investigation is limited to new land subsidence and does not address ongoing land subsidence in Northwest MZ1.

*Pumping sustainability.* The term *pumping sustainability*, as used herein, refers specifically to the ability to pump water from a specific well at a desired pumping rate, given the groundwater level at that well and its specific well construction and equipment details. The pumping sustainability metrics for all Appropriator wells were recently updated as part of the *Storage Framework Investigation*. Groundwater pumping at a well is presumed to be sustainable if the groundwater level at that well is greater than the sustainability metric. If the groundwater level falls below the sustainability metric, the owner will either need to lower the pumping equipment in their well or reduce the well's pumping rate. Groundwater levels at wells in the JCSD and CDA well fields and a part of the FWC service area are currently below the pumping sustainability metric and therefore have limited pumping capacity. Exhibit CG-4 shows the projected difference between the groundwater levels and the pumping sustainability metric in FY 2030 for Scenario 1A. Groundwater levels in Scenario 1A are projected to be above the pumping sustainability metric in 2030 over the entire basin except for the areas with existing pumping sustainability issues, identified by the red circles in Exhibit CG-4. This suggests that projected basin operations will not improve nor exacerbate pumping sustainability issues that currently exist in these areas and that the JCSD and CDA well fields and one well in the FWC service area will continue to have limitations on pumping due to groundwater levels.

*Water quality.* As described for Activity EF, throughout most of the Chino Basin, there are contaminants in groundwater that can limit its direct use for drinking water supply in the absence of treatment. The constantly evolving regulatory environment described under Activity EF, threatens the ability of the parties to pump groundwater. Some parties are not, or will not be, able to pump their groundwater rights due to the presence of contaminants and the lack of treatment facilities to comply with drinking water standards. For example, the regulatory-required response action for compliance with the new MCL for

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<sup>7</sup> The metric is based on historical groundwater levels and is represented as a groundwater level control surface throughout MZ1 that defines the likelihood of initiating new subsidence: if groundwater levels are higher than the metric, then new land subsidence would not occur; if groundwater levels fall below the metric, then new land subsidence could occur and cause MPI.

1,2,3-TCP is to shut-down pumping at wells with concentrations that exceed the MCL until a treatment plan is implemented.

Exhibit EF-2 shows the locations of active municipal supply wells, symbolized by the number of regulated drinking water contaminants that have been detected in exceedance of their respective primary MCLs. A subset of these wells are currently offline due to these exceedances. According to the interim results from IEUA's 2020 IRP, about 65,000 af, or 20 percent of its member agencies' total production capacity of 313,000 af, is currently offline due to water quality issues (note that this is inclusive of non-Chino Basin groundwater supplies).<sup>8</sup> Based on the 2020 IRP, the parties in the IEUA service area that are impacted by water quality such that some of their production capacity is offline or requires blending are the Cities of Chino, Chino Hills, Upland, and Ontario; the CVWD; the MWVD; and Fontana Water Company. Based on Exhibit EF-2, other parties that are impacted by water quality and have wells with one or more constituents that exceed an MCL are the City of Pomona, GSWC, JCSD, and Marygold Mutual Water Company. As new drinking water regulations come into effect, additional wells and/or parties will be impacted if there is no plan to address the contaminants.

#### *Imported water.*

Imported water is projected to account for about 20 to 30 percent of the aggregate water supplies of the parties, as shown in Exhibit CG-1. Imported water demand was about 63,000 afy in 2015 and is projected to increase to about 120,000 afy by 2040, an increase of about 58,000 af. The challenges to imported water include reliability of its supply and infrastructure and the local capacity to treat it for municipal supply.

*Supply reliability.* In January 2016, Metropolitan completed its *2015 Integrated Resources Plan Update* (2015 IRP)<sup>9</sup>, which reported that, if the plan is fully implemented, shortages of imported water supplies will occur about nine percent of the time under 2020 conditions, four percent of the time under 2025 conditions, and zero percent under 2030 conditions. "Shortage" is defined herein as Metropolitan's inability to fully meet its demands. If Metropolitan does not fully implement its 2015 IRP, shortages in Metropolitan supplies are projected to occur about 12 percent of the time under 2020 conditions, and the occurrence of a shortage is projected to increase to 80 percent under 2040 conditions. Therefore, by 2040, Metropolitan is assumed to be able to fully meet its demands 90 percent of the time (nine out of ten years) with the full implementation of its 2015 IRP and 20 percent of the time (one out five years) without it. As of this writing, the implementation of some projects identified in the 2015 IRP, such as the California WaterFix tunnel project, are uncertain. Failure to fully implement the 2015 IRP in a timely manner will result in less imported water available to the parties.

*Infrastructure reliability.* Metropolitan is planning to rehabilitate the Rialto Feeder pipeline, and according to its draft schedule, construction will occur from 2029 to 2033. During construction, continuous six- to nine-month shutdowns are planned to occur. Because the Rialto Feeder pipeline is the main source of imported water deliveries to the IEUA and TVMWD, long-term shutdowns will cause significant reductions in water supplies to the parties and will require them to rely more heavily on Chino Basin groundwater or other supplies during this period.

In addition to planned infrastructure shutdowns, catastrophic events, such as earthquakes, can cause unplanned outages. Metropolitan recently published its three primary goals to contribute to seismic resilience: (1) conducting a Rialto Feeder pipeline alternative supply needs study, (2) completing a re-

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<sup>8</sup> IEUA and Intera. (2019). *Integrated Water Resources Plan Draft Scenario Modeling Results presentation*. June 26, 2019.

<sup>9</sup> Metropolitan. (2016). *Integrated Water Resources Plan: 2015 Update*. January 2016.

evaluation of its emergency storage needs, and (3) completing a comprehensive evaluation of its storage programs.<sup>10</sup> According to Metropolitan, the latest projections for the worst case scenario under a seismic catastrophic event suggest that the Metropolitan’s East Branch of the SWP, which includes the Rialto Feeder pipeline, can be repaired within 12 to 24 months. This means, that under such an event, the parties would be required to find alternative sources of water to meet 20 to 30 percent of their total demands for up to two consecutive years.

*Capacity limitations.* The capacity to treat imported water to meet future municipal supply demands is limited for some parties in the Chino Basin. The Water Facilities Authority (WFA) treats imported water purchased from the IEUA at the Agua de Lejos treatment plant (WFA plant) and delivers it to the Cities of Chino, Chino Hills, Ontario, and Upland, and the MVWD. Each of these WFA member agencies has a contracted share of the plant’s total capacity of 81 million gallons per day (mgd), which is equivalent to 90,700 afy. The WFA plant’s current capacity is less than its rated capacity of 81 mgd due to solids handling limitations.<sup>11</sup> According to the WFA, the current capacity of the WFA plant is about 40 mgd in the summer months and about 20 mgd in the winter months. This suggests that even when imported water is available to the WFA, there is a limitation in the ability to treat the water and deliver it for municipal use.

*Other supply reliability issues*

Other reliability issues that can affect the parties include:

- Non-Chino-Basin groundwater supplies. Non-Chino-Basin groundwater is projected to account for 16 to 18 percent of the parties’ aggregate water supplies. This source of water is not available to all the parties. The reliability of non-Chino-Basin groundwater depends on water quality, water rights, and infrastructure to convey it to a parties’ water systems.
- Local surface water supplies. Local surface water is projected to account for 3 to 5 percent of the aggregate water supplies of the parties. This water source is not available to all parties. The reliability of local surface water depends on the hydrologic characteristics of the individual supplies, water quality, water rights, and infrastructure to convey it from points of diversion to a party’s water system.
- Recycled water supply. Recycled water is projected to account for about 7 to 8 percent of the aggregate water supplies of the parties. The challenges to maximizing the reuse of recycled water are described under Activity D and include: timing of recycled water availability, salt and nutrient management, water quality regulations, and the Santa Ana River Judgment.
- Climate change. Climate change is likely to result in higher temperatures, longer dry periods, and shorter more intense wet periods, which can ultimately affect the availability and management of all water supply sources. For example, shorter more intense precipitation periods are expected to result in reduced recharge, and longer dry periods are expected to result in reduced imported water supplies (as occurred with SWP supplies in the recent drought from 2013 to 2016).

*Summary*

The water demands of the Chino Basin Parties are expected to increase by 44 percent by 2040, and as illustrated above, there are numerous challenges to the reliability of the supplies and the infrastructure that deliver them. Many of the challenges are interrelated and compounding. And, the impacts to individual parties and associated costs to manage them are not equal. For example, the reliability of imported water (and other non-groundwater supplies) not only affects the imported water supply but also the groundwater supplies that are dependent on imported water for blending. According to draft

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<sup>10</sup> Metropolitan. (2018). *Seismic Resilience, First Biennial Report*. February 2018.

<sup>11</sup> Email from Terry Catlin, April 10, 2018.

results from IEUA’s 2020 IRP, about 37,000 af, or 12 percent of its member agencies’ total production capacity of 313,000 af, is currently dependent on imported water for blending.<sup>12</sup> The parties that require blending are: the MVWD, CVWD, FWC, and the Cities of Pomona, Upland, Chino, Chino Hills, Ontario.

In the Chino Basin, prolonged reductions in groundwater pumping due to land subsidence, groundwater sustainability, or groundwater contamination have the effect of reducing safe yield, potentially contributing to the loss of hydraulic control and the spread of contamination. The ability to convey water from areas that are not subject to these limitations to areas that are may provide flexibility to the parties to pump their respective Chino Basin groundwater rights.

Activity CG will require a planning process that will ensure that the recommended infrastructure that results from it will meet the parties’ needs. To do this, the planning process should answer the following questions:

- 1) How do the parties define reliability? How can this be quantified?
- 2) What is the desired level of reliability? How is it articulated at the regional and individual party levels? For example, the level of reliability could be articulated as: the ability to meet all or a percentage of the potable water demands of the parties under a full interruption of SWP supplies delivered by Metropolitan.
- 3) What are the other benefits of optimization desired by the parties? How can such benefits be quantified?
- 4) What existing/planned infrastructure could be used to optimize the use of all sources of water and how would it be used?
- 5) What new infrastructure would be required to achieve the desired level of reliability and other benefits?
- 6) How would the existing/planned/new infrastructure be operated to achieve the desired level of reliability and other benefits?
- 7) Are the capital and O&M costs of optimization less than the cost to agencies to manage the supply and infrastructure challenges on their own?
- 8) What institutional arrangements are necessary to operate the facilities to achieve the benefits?

As previously mentioned, the IEUA is currently developing the 2020 IRP, which will serve as a regional implementation strategy for long-term water resources management within IEUA’s service area. As part of this work, the IEUA retained INTERA to model the existing major infrastructure of the IEUA’s service area and develop scenarios to identify opportunities and vulnerabilities in the existing infrastructure of its member agencies. The IRP is in development, and there is a significant body of work being performed by the IEUA and its member agencies that can be leveraged to accomplish the objectives of Activity CG for all of the parties. The IEUA is also currently conducting preliminary engineering and planning for the CBP, which is a large storage and recovery program to provide regional, dry-year water supplies and associated infrastructure and to create environmental benefits in the Sacramento-San Joaquin Delta. The project concepts envisioned in the CBP could meet, at least in part, the objectives of Activity CG. Regardless, the work currently in development can be leveraged to reduce the cost of implementing Activity CG.

In order to optimize the use of all sources of water and identify and implement water supply reliability projects, Watermaster and the IEUA should convene a Water Supply Reliability Committee for the purposes of accomplishing the objectives of Activity CG for all parties. The scope of work is described below.

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<sup>12</sup> IEUA and Intera. (2019). Integrated Water Resources Plan Draft Scenario Modeling Results presentation. June 26, 2019.



## Scope of Work for Activity CG

The scope of work to develop and implement Activity CG consists of six tasks.

- Task 1 – Form the Water Supply Reliability Committee, define objectives, and refine scope
- Task 2 – Characterize water demands, water supply plans, and existing/planned infrastructure and its limitations
- Task 3 – Develop planning, screening, and evaluation criteria
- Task 4 – Describe water supply reliability opportunities
- Task 5 – Develop reconnaissance-level engineering design and operating plan
- Task 6 – Plan, design, build water reliability alternatives

The tasks are described below.

*Task 1 – Form the Water Supply Reliability Committee, define objectives, and refine scope.* In this task, a Water Supply Reliability Committee will be convened. The Committee's initial tasks are: (1) to clearly articulate and obtain consensus on the objectives for optimizing the use of all sources of water; (2) to define reliability, benefits, and performance criteria for the parties; and (3) to refine the preliminary scope of work, schedule, and cost defined for Tasks 2 through 6 to fully leverage the existing data and planning efforts of Watermaster, the IEUA, and others. Four Committee meetings will be conducted to accomplish these tasks. In step (2), the Committee will address the following questions:

- 1) How do the parties define reliability? How can this be quantified?
- 2) What is the desired level of reliability? How is it articulated at the regional and the individual party levels?
- 3) What are the other benefits of optimization desired by the parties? How can such benefits be quantified?

*Task 2 – Characterize water demands, water supply plans, and existing/planned infrastructure and their limitations.* The objectives of this task are: (1) to characterize the water demands and supply plans of the parties; (2) to characterize existing/planned infrastructure to convey, treat, and distribute the supplies to meet demands; and (3) to identify opportunities and limitations in the existing/planned infrastructure consistent with the objectives of Activity CG defined in Task 1. The water demands and supply plans will be characterized on a monthly basis for various climate conditions. One committee meeting and one individual meeting with each participating party will be conducted to review the characterization of water demands and supply plans and existing/planned infrastructure. Two additional meetings will be conducted to identify opportunities and limitations in the existing/planned infrastructure consistent with the objectives of Activity CG defined in Task 1.

*Task 3 – Develop planning, screening, and evaluation criteria.* The objective of this task is to develop the criteria that will be used to evaluate water reliability projects in Tasks 4 and 5. Criteria to evaluate potential projects will include:

- Watermaster criteria that include no potential MPI, balance of recharge and discharge, and others;
- qualitative criteria that include institutional complexity and others; and
- quantitative criteria that include business case evaluations, expressed as net present value, unit cost, and others.

*Task 4 – Describe water supply reliability opportunities.* The objectives of this task include identifying potential water supply reliability project alternatives, screening them using the screening criteria developed in Task 3, and developing project alternatives for detailed evaluation. Three meetings will be

conducted to develop a list of potential projects that can be implemented, to review the screening of these projects, and to select projects to evaluate in Task 5. In executing this task, the Committee will address the following questions:

- 4) What existing/planned infrastructure could be used to optimize the use of all sources of water and how would it be used?
- 5) What new infrastructure would be required to achieve the desired level of reliability and other benefits?

*Task 5 – Develop reconnaissance-level engineering design and operating plan.* The objective of this task is to characterize the performance and costs of the water supply reliability alternatives developed in Task 4. A reconnaissance-level engineering design and operating plan will be developed for each alternative. Each alternative design will include the approximate size, location, and alignment of major infrastructure, and will describe any potential implementation barriers for the project. A cost opinion will be determined for each alternative. This task includes evaluating alternatives based on the alternative evaluation criteria developed in Task 3, describing how the alternative could be implemented and financed, and recommending an alternative for implementation. The deliverable of this task will be a technical report that summarizes the work performed under Tasks 1 through 5, and it will include a plan to pay for the preliminary design and CEQA documentation of the recommended alternative. Five meetings will be conducted to review the design and estimated benefit of the recommended alternative; review the evaluation of the projects, based on the criteria developed in Task 3; and review the recommended list of projects for implementation; review the implementation plan; and review the technical report. In executing this task, the Committee will address the following questions:

- 6) How would the existing/planned/new infrastructure be operated to achieve the desired level of reliability and other benefits?
- 7) Are the capital and O&M costs of optimization less than the cost to agencies to manage supply and infrastructure challenges on their own?
- 8) What institutional arrangements are necessary to operate the facilities to achieve the benefits?

*Task 6 – Plan, design, build water reliability alternatives.* The objective of this task is to implement the recommendations of the technical report. This task includes (1) developing and implementing necessary agreements between participating parties, (2) preparing the preliminary design of the recommended alternative, (3) preparing the environmental documentation for the recommended alternative and other alternatives that will tier-off the 2020 OBMP Update PEIR, (4) preparing a financial plan for constructing the recommended alternative, (5) preparing final design of the recommended alternative, (6) acquiring permits for constructing and operating the recommended alternative, and (7) constructing the recommended alternative.

#### Cooperative Efforts with Appropriate Entities to Implement Activity CG

This is a basin-wide activity that involves the parties, the IEUA, the TVMWD, and the WMWD. Watermaster or the IEUA could convene the Water Supply Reliability Committee process. The IEUA would be the appropriate entity to lead the implementation of Activity CG on behalf of all the parties. In this role, the IEUA would contract for planning and engineering services as required and coordinate with Watermaster and the parties. Watermaster would ensure that Activity CG implementation is consistent with the Judgment, Peace Agreements and other agreements, and the Watermaster Rules and Regulations.

#### Implementation Actions, Schedule, and Costs for Activity CG

The recommended schedule to complete the scope of work described herein is described below:

**Year one (FY 2020/21).**

- Convene Water Supply Reliability Committee, define reliability and other benefits, and refine scope of work, schedule, and budget (Task 1).

**Year two (FY 2021/22).**

- Characterize the water demand, water supply plans, and existing/planned infrastructure and its limitations; and identify conceptual facilities and operational improvements that achieve reliability and other benefits defined in Task 1 (Task 2).
- Develop planning, screening, and evaluation criteria for water supply reliability projects (Task 3).
- Develop water reliability alternatives for evaluation (Task 4).

**Year three (FY 2022/23).**

- Conduct reconnaissance-level engineering study for the alternatives (Task 5).

**Years four through seven (FY 2023/24 to FY 2026/27).**

- Recommend alternative for implementation (Task 5).
- Prepare final report, documenting work performed in Tasks 1 through 5 (Task 5).
- Watermaster, the IEUA, and other potential partners develop a Project Implementation Agreement. The objective of this agreement is to define the roles of each partner in the planning, permitting, design, and implementation of the projects, and the cost allocations.
- Preliminary Design of Recommended Projects. The level of design will be such that it enables the preparation of environmental documentation pursuant to CEQA and provides information for identifying the permits required for construction and operation.
- Prepare Environmental Documentation for Alternatives. CEQA will cover the recommended alternative and other alternatives at the project level, based on the project descriptions developed in Task 5. This documentation will tier-off from the 2020 OBMP Update PEIR. Watermaster will conduct an MPI analysis in parallel with the CEQA process.

**Years eight and nine (FY 2027/28 and 2028/29):**

- Prepare final designs and acquire permits for the selected alternative.

**Years ten and beyond (FY 2029/30+):**

- Construct recommended alternative.

Exhibit CG-5 shows the estimated budget-level engineering cost to complete Tasks 1 and 2 which is about \$305,000. The cost of Tasks 3 through 6 cannot be estimated until the completion of Task 2. And, because the IEUA is currently conducting its 2020 IRP (the scope of work for which overlaps with scope recommended herein), the cost may be lower than estimated if its work is leveraged.

Some of the facilities and associated operating plans identified under this activity may overlap with those envisioned in Activity EF and/or Activity B. If Activity EF and/or B and CG move forward, there will be cost savings related to facilities planning.

## Activity K

### Description of Activity K

Activity K defined by the stakeholders is:

*Develop a management strategy within the salt and nutrient management plan to ensure the ability to comply with the dilution requirements for recycled water recharge.*

The objective of Activity K is to determine if compliance with recycled water recharge dilution requirements, defined in Watermaster and the IEUA's maximum-benefit SNMP, can be achieved under existing management plans, and if not, to develop a plan to achieve compliance.

Through the listening session process, the stakeholders identified the following as potential outcomes of performing Activity K:

- Enable the continued and expanded recharge of recycled water, which will:
  - protect water quality,
  - improve water-supply reliability, especially during dry periods, and
  - protect/enhance safe yield.

The 2000 OBMP included PE 7—*Develop and Implement Salt Management Plan*—to characterize current and future salt and nutrient conditions in the basin and to subsequently develop and implement a plan to manage them. Such a management strategy was necessary to address historical salt and nutrient accumulation from agricultural operations and to support the aggressive expansion of recycled water recharge and reuse envisioned in PE 2 and PE 3/5. Recognizing that implementing the recycled water reuse program would require large scale treatment and mitigation of salt loading under the then-current antidegradation objectives for total dissolved solids (TDS) and nitrate, defined in the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), Watermaster and the IEUA petitioned the Regional Board to establish a maximum-benefit-based salt and nutrient management plan (maximum-benefit SNMP) that involved (1) increasing the TDS and nitrate objectives for the Chino-North groundwater management zone<sup>13</sup> (GMZ) to numerically higher values to enable recycled water reuse without mitigation or treatment and (2) committing to a program of salt and nutrient management activities and projects (“maximum benefit commitments”) that ensure the protection of the beneficial uses of the Chino-North GMZ and downgradient water resources (the Santa Ana River and the Orange County GMZ). The maximum benefit commitments included the implementation of a monitoring, analysis, and reporting program to track TDS and nitrate trends; the construction and future expansion of the Chino Basin Desalters to attain hydraulic control of the Chino-North GMZ to protect the Santa Ana River; the construction of recharge facilities to increase storm and recycled water recharge; and a commitment to future treatment of recycled water and/or groundwater, as needed, to protect beneficial uses and comply with the maximum-benefit TDS and nitrate objectives. These are all activities that were planned to be implemented under the OBMP. The maximum-benefit SNMP was incorporated into the Basin Plan in January 2004.

Activity K, as envisioned by the stakeholders, would entail an expansion on the existing analysis requirements in the maximum-benefit SNMP to incorporate a forward-looking assessment of the ability to comply with the maximum-benefit commitments. It would set up Watermaster and the IEUA to more proactively prepare a compliance plan as opposed to reacting to a trigger event that requires short-term, time-certain response actions.

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<sup>13</sup> The Chino-North GMZ has a maximum-benefit TDS objective of 420 mg/l and is a combination of the Chino-1, Chino-2, and Chino-3 antidegradation GMZs that have lower TDS objectives ranging from 250 to 280 mg/l.

## Need and Function of Activity K

### *Maximum-benefit SNMP commitments*

Implementation of the maximum-benefit SNMP is a regulatory requirement of the Basin Plan. It's also incorporated into Watermaster and the IEUA's recycled water recharge program permit (R8-2007-0039) and the IEUA's recycled water discharge and direct reuse permit (R8-2015-0021; NPDES No. CA 8000409). There are nine maximum-benefit commitments included in the Basin Plan and recycled water permits:

1. The development and implementation of a surface-water monitoring program
2. The development and implementation of a groundwater monitoring program
3. The expansion of the Chino-I Desalter to 10 million gallons per day (mgd) and the construction of the Chino-II Desalter with a design capacity of 10 mgd
4. The additional expansion of desalter capacity to a total capacity of 40 mgd pursuant to the OBMP and the Peace Agreement
5. The construction of the recharge facilities included in the Chino Basin Facilities Improvement Program
6. The management of recycled water quality to ensure that the IEUA agency-wide, 12-month running average wastewater effluent quality does not exceed 550 mg/l for TDS and 8 mg/l for total inorganic nitrogen (TIN)
7. The management of the basin-wide, volume-weighted TDS and nitrate concentrations of artificial recycled, storm, and imported waters to concentrations that are less than or equal to the maximum-benefit objectives as a five-year rolling average
8. The achievement and maintenance of hydraulic control of groundwater outflow from the Chino Basin, specifically from the Chino-North GMZ, to protect the water quality of the Santa Ana River and downstream beneficial uses
9. The periodic redetermination of "current" ambient TDS and nitrate concentrations of the Chino Basin GMZs (every three years).

Additionally, Watermaster and the IEUA are required to prepare an annual report to the Regional Board on the status of compliance with the maximum-benefit commitments. If the maximum-benefit commitments are not met to the Regional Board's satisfaction, the antidegradation objectives would apply for regulatory purposes. The application of the antidegradation objectives would result in a finding of no assimilative capacity for TDS and nitrate in the Chino-North GMZ, and the Regional Board would require mitigation for recycled water discharges to Chino-North that exceed the antidegradation objectives. Furthermore, the Regional Board would require that Watermaster and the IEUA mitigate the effects of discharges of recycled water that took place in excess of the antidegradation objectives under the maximum benefit objectives retroactively to January 2004. The mitigation for past discharges would be required to be completed within a ten-year period following the Regional Board's finding that the maximum-benefit commitments were not met.

### *Current compliance with the recycled water dilution requirements of the maximum-benefit SNMP*

Commitment number 7 of the maximum-benefit SNMP is the stakeholders' stated focus of Activity K. This commitment defines a compliance limit that if met, allows for the continued recharge of recycled water without mitigation. Hereafter, the limit will be referred to as the "dilution limit." Commitment number 7 requires that recycled water recharge be limited to the amount that can be blended, on a basin-wide,

volume-weighted basis, with other sources of supplemental recharge to achieve five-year running-average concentrations that are less than or equal to the dilution limits. The dilution limits are the maximum-benefit objectives: 420 mg/l for TDS and 5 mg/l for nitrate (as nitrogen). If the five-year, volume-weighted TDS or nitrate concentrations (hereafter, dilution metrics) exceeds the dilution limits, then Watermaster and the IEUA must develop a plan to come into compliance. Compliance options could include, but are not limited to, increasing the recharge of low-salinity supply sources (storm or imported waters), desalting recycled water to reduce salinity, or desalting groundwater as a salt offset.

Watermaster and the IEUA annually analyze and report on “current” compliance with the dilution limit as part of the *Chino Basin Maximum Benefit Annual Report*. The most recent annual report was submitted to the Regional Board in April 2019 and reported on compliance through December 2018.<sup>14</sup> Exhibits K-1 and K-2 are time-series charts that characterize compliance with the dilution limit since the recycled water recharge program began in 2005. The exhibits show the monthly recharge volumes and TDS and nitrate concentrations of each recharge source, the dilution metrics, and the dilution limits. Note that because recycled water recharge began in July 2005, the first five-year period for which the dilution metric was computed was July 2005 through June 2010.

Exhibits K-1 and K-2 illustrate that the TDS and nitrate dilution limits have never been exceeded. From June 2010 to December 2016, the TDS dilution metric increased from about 203 to 354 mg/l. During the same period the nitrate dilution metric increased from 1.1 to 3.0 mg/l. After December 2016, the TDS and nitrate dilution metrics decreased to 281 mg/l and 2.0 mg/l, respectively. As of 2018, the five-year, volume-weighted TDS dilution metric was 139 mg/l less than the dilution limit, and the nitrate dilution metric was 3 mg/l below the dilution limit.

#### *Threats to compliance with the dilution limits*

As suggested by Exhibit K-1, the primary threats to compliance with the TDS dilution limit are the availability of imported and storm waters for recharge. Increases in the TDS concentration of recycled water is also a threat to compliance but to a lesser degree. The threat of exceeding the nitrate dilution limit is far less given that the nitrate concentration of the recycled water recharge is typically less than the nitrate dilution limit of 5 mg/l.

Imported water is a low-TDS source of recharge and has an important influence on the dilution metric. As shown in Exhibit K-1, the TDS concentration of imported water used for recharge ranged from 87 to 367 mg/l. In mid-2016, the rate of increase of the TDS dilution metric rose significantly from about 1.3 mg/l per month to 12 mg/l per month through October 2016 when the metric peaked at 354 mg/l. In October 2016, the five-year dilution metric calculation included almost no imported water recharge: the last significant period of imported water recharge occurred in May through September of 2011 (3,700 to 7,800 af). After peaking in October 2016, the dilution metric for TDS began to decrease and stabilize due to a large imported water recharge event that occurred from October 2016 through January 2018 (46,000 total af). A similar trend was observed for the dilution metric for nitrate, as shown in Exhibit K-2. These observations demonstrate the importance of imported water recharge to compliance with the dilution metric.

Stormwater is a more consistent source of recharge, but it occurs in smaller volumes than imported water recharge. Over the most recent five-year period (January 2014 to December 2018), the total volume of stormwater recharge was 39,000 af compared to 47,000 af of imported water. And, while stormwater TDS concentrations are typically low in the wet winter months (50 to 150 mg/l), the TDS of dry-weather flows

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<sup>14</sup> WEI. (2019). *Optimum Basin Management Program Chino Basin Maximum Benefit Annual Report 2018*. April 2019.

diverted to recharge in summer months are typically greater than 300 mg/l. The implementation of the 2013 RMPU is expected to increase the annual average stormwater recharge volume, but even with increased recharge capacity, multiyear drought conditions with limited stormwater recharge opportunities could lead to compliance challenges.

During drought conditions there is: a reduction in the amount of high-quality stormwater recharge; limited or no availability of imported water for recharge; an increase in the TDS concentrations of imported water, if it is available for recharge; and a concomitant increase in the TDS concentrations of the recycled water. Not only are the two primary sources of low-TDS water less available during drought periods, but the source water quality of municipal water supplies is also higher in TDS due to increases in imported water TDS and indoor water conservation practices. Exhibit K-1 shows the influence of the most recent statewide drought, which occurred over 2013 to 2016, on the dilution metric. During this time the dilution metric for TDS steadily increased from about 210 mg/l to 350 mg/l. This analysis demonstrates the meaningful impact that drought has on compliance with the dilution metric and indicates that climate change, which is expected to result in longer, drier droughts, could potentially threaten future compliance with the dilution limit.

#### *Other maximum-benefit SNMP compliance challenges*

There are other metrics in the maximum-benefit SNMP commitments that would require the evaluation of potential salt offset projects to achieve compliance. Commitment number 6 requires that when the IEUA's agency-wide, 12-month, running-average recycled water effluent TDS concentrations exceeds 545 mg/l for three consecutive months or the TIN concentrations exceeds 8 mg/l in any one month, Watermaster and the IEUA must submit a water quality improvement plan and schedule to the Regional Board. The plan must demonstrate how the 12-month running-average IEUA agency-wide recycled water effluent will remain in compliance with its discharge permit limits of 550 mg/l and 8 mg/l for TDS and TIN, respectively.

Exhibit K-3 shows the monthly and 12-month running-average IEUA agency-wide effluent TDS and TIN concentrations for 2005 through 2018. In 2015, the 12-month running-average IEUA agency-wide TDS concentration in recycled water approached the 545 mg/l trigger that would require the IEUA and Watermaster to submit a water quality improvement plan and schedule. In analyzing the available data, the IEUA determined that the primary drivers for the increasing recycled water TDS concentration were the increase in the TDS concentration of the water supplies used by its member agencies and an increase of the TDS waste increment from indoor water conservation.

Although the 12-month running-average IEUA agency-wide TDS concentration declined from the 2015 peak before triggering the 545 mg/l limit, it was an important indicator that the TDS concentration of recycled water is likely to approach or exceed the recycled water compliance limit during the next prolonged dry period and trigger the planning for recycled water quality improvements. In May 2017, recognizing the potential cost of implementing recycled water quality improvements for what might be only short-term exceedances of the 545 mg/l limit trigger, Watermaster and the IEUA petitioned the Regional Board to consider updating the maximum-benefit SNMP to incorporate a revised 12-month compliance metric for recycled water effluent (commitment number 6) specifically to allow a longer-term averaging period. The Regional Board agreed that an evaluation of the recycled water compliance metric is warranted and directed Watermaster and the IEUA to develop a technical scope of work to demonstrate the potential impacts of the revised compliance metric. The work began in September 2017 and is ongoing as of the writing of this Scoping Report. If the investigation finds that changing the recycled water compliance metric will not impact beneficial uses in the Chino Basin or cause downgradient water supplies to exceed water quality objectives, then it is likely that the alternative recycled water compliance metric

will be approved. If approved, the Regional Board would amend the Basin Plan and the IEUA’s permits to incorporate the revised maximum benefit commitments.

The primary objectives of the technical work to support the maximum-benefit SNMP and permit updates are: to develop and use an updated groundwater solute transport model to evaluate the TDS and nitrate concentrations of the Chino Basin, to define alternative salinity management scenarios, and to project the future TDS and nitrate concentrations of the Chino Basin for each scenario. The results will be used to develop a regulatory compliance strategy that includes a longer-term average period for recycled water TDS concentrations that is acceptable to the Regional Board. The Regional Board has indicated that in accepting a proposal to modify the recycled water compliance limit, it will require Watermaster and the IEUA to add a new maximum-benefit commitment to the Basin Plan that involves updating the TDS and nitrate projections every five years.

The compliance approach being pursued by Watermaster, the IEUA, and the Regional Board illustrates that the Regional Board may be willing to consider adopting an alternative dilution metric—e.g. a longer averaging period—for recycled and supplemental water recharge so long as there are no unmitigated impacts to beneficial uses. The work that is being performed to support the maximum-benefit SNMP update can be directly leveraged to achieve the objective of Activity K.

*Process required to evaluate potential future dilution compliance challenges*

To achieve the objective of Activity K, it is necessary to prepare projections of the dilution metric to evaluate potential compliance challenges and to determine if and when it will be necessary to develop a plan to achieve compliance. The table below summarizes the planning data that are needed to prepare such projections and the existing Watermaster or IEUA programs that produce the planning data.<sup>15</sup>

Planning Data	Existing Watermaster and IEUA Efforts that Compile or Produce the Required Planning Data
Recycled water recharge volumes	Projections prepared through the RMPU process.
Recycled water quality	There is no current effort to prepare this projection at the requisite level of detail on a regular basis, but it can be calculated from projections of water supply quality; such a projection was just completed to support the maximum-benefit SNMP update.
Imported water recharge volumes	Projections prepared through the RMPU process.
Imported water recharge quality	There is no current effort to prepare this projection at the requisite level of detail, but it can be estimated based on historical data; such a projection was just completed to support the maximum-benefit SNMP update.
Stormwater recharge volumes	Projections prepared through the RMPU process.
Stormwater recharge quality	Estimates can easily be produced based on historical data.

<sup>15</sup> Some additional planning data not listed here would also be required to run the Chino Basin Groundwater Model, which is updated and recalibrated at least every five years.



Planning Data	Existing Watermaster and IEUA Efforts that Compile or Produce the Required Planning Data
Groundwater supply volumes	Water supply plans of the parties are compiled at least once every five years for various Watermaster and IEUA efforts.
Groundwater supply quality	There is no current effort to prepare this projection at the requisite level of detail, which requires the use of a numerical groundwater solute transport model; such a model was just built to support the maximum-benefit SNMP update and is being used to prepare groundwater quality projections.
Other water supply volumes	Water supply plans of the parties are compiled at least once every five years for various Watermaster and IEUA efforts.
Other water supply quality	There is no current effort to prepare this projection at the requisite level of detail, but it can be estimated based on historical data; such a projection was just completed to support the maximum-benefit SNMP update.

The planning data would be used to prepare projections of: municipal water supply and quality, imported water quality, recycled water quality, groundwater quality, and ultimately the TDS and nitrate dilution metrics. The projections would be done assuming a range of future cultural conditions (land use changes, population growth, etc.) and climate conditions. These projections would be analyzed to produce best-case and worst-case five-year, ten-year, 15-year, and 20-year recharge projections for imported and storm waters. The best- and worst-case projections of the dilution metric would be appended to the historical record to produce a bracketed series of dilution metric time histories to evaluate the risk of exceeding the dilution metric over a range of potential climate conditions in the short (5-year) and long (20-year) term.

If there is no projected compliance challenge in the next five to ten years, then no additional work would be needed to develop a compliance plan. It would be necessary to update the planning data and modeling tools to evaluate projections at a minimum of every five years. A five-year frequency is consistent with the State Board’s 2018 amendments to the SNMP guidelines within its Recycled Water Policy.<sup>16</sup>

If a compliance challenge is projected, then it will be necessary to develop a plan to ensure compliance with the blending metric in the future. As previously noted, the compliance plan could include treatment of the recycled water, increased recharge of high-quality imported water and/or stormwater, increase in groundwater desalting as a salt offset, or an update to the maximum-benefit SNMP to change the compliance metric to a longer averaging period. For the latter, it would first be necessary to demonstrate to the Regional Board that a change to the compliance metric will not harm beneficial uses.

*Alignment of Activity K with the current investigation to support the update to the maximum-benefit SNMP*

All of the above steps to analyze compliance challenges with the dilution metric are currently being performed in support of the update to the maximum-benefit SNMP. Watermaster and the IEUA anticipate that the compliance strategy for the SNMP update will be finalized during FY 2020/2021. When completed

<sup>16</sup> The *Water Quality Control Policy for Recycled Water* is available at: [https://www.waterboards.ca.gov/water\\_issues/programs/water\\_recycling\\_policy/](https://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/)

the potential compliance challenges with the dilution limit will be known and a range of compliance plans will have been evaluated at a conceptual level. Thus, it may not be necessary to perform any work pursuant to Activity K, unless it is determined that some form salt offset is required. If no compliance challenges arise, or remain at the completion of the SNMP update, no significant work would need to be performed pursuant to Activity K for at least five years. If a salt offset is required, Watermaster and the IEUA would need to begin reconnaissance-level engineering planning in FY 2021/22.

### *Summary*

In order to achieve the objectives of Activity K to ensure the ability to comply with the maximum-benefit SNMP dilution metric in the future, Watermaster and the IEUA should expand the existing analysis and reporting efforts to periodically (every five-years), prepare future projections of recharge volumes and quality to determine if there is a compliance challenge, and if necessary, evaluate compliance alternatives. Projections of the dilution metric and an evaluation of compliance challenges in the future are currently being developed for the investigation to support the update to the maximum-benefit SNMP described above. The scope of work to implement Activity K can leverage that work.

### *Scope of Work for Activity K*

The scope of work to achieve the objectives of Activity K—*Develop a management strategy within the salt and nutrient management plan to ensure the ability to comply with the dilution requirements for recycled water recharge*—consists of five tasks:

- Task 1 – Prepare projection to evaluate compliance with recycled water dilution requirements
- Task 2 – Identify alternative compliance strategies
- Task 3 – Evaluate alternative compliance strategies
- Task 4 – Implement the alternative compliance strategy
- Task 5 – Periodically reevaluate compliance with dilution requirements

*Task 1 – Prepare projection to evaluate compliance with recycled water recharge dilution requirements.* The objective of this task is to prepare projections of compliance with the dilution metric for TDS and nitrate in the maximum-benefit SNMP and determine if there is a compliance challenge in the future. In this task, all planning data will be compiled, Watermaster’s groundwater solute transport model will be updated and used to estimate future groundwater and recycled water quality, and projections of the dilution metric will be prepared. The planning data will be used to evaluate the dilution metric for best-case and worst-case recharge conditions over a twenty-year period. If there are no projected compliance challenges within the next five years, then Tasks 2 through 4 will not need to be performed. If there is a compliance challenge within the next five years, then Tasks 2 through 4 will need to be performed. Task 5 would be performed regardless of the outcome.

*Task 2 – Identify alternative compliance strategies.* The objective of this task is to identify potential alternative compliance strategies to address foreseeable challenges with complying with the dilution limit in the future. This task includes the following subtasks:

- Develop planning, screening, and evaluation criteria for projects to comply with the maximum-benefit SNMP dilution limit.
- Identify potential alternative compliance strategies.
- Perform initial screening of the alternative compliance strategies based on the evaluation criteria.
- Select alternative compliance strategies to evaluate in Task 3.

*Task 3 – Evaluate alternative compliance strategies.* The objective of this task is to characterize the performance and costs of the alternative compliance strategies defined in Task 2. A reconnaissance-level

engineering design and operations will be developed for each alternative. The reconnaissance-level engineering work will include a description of the activity, description of facilities (if required), its ability to comply with the dilution limits, its impact on the TDS and nitrate concentrations of the Chino Basin, and the estimated cost to implement the project alternatives. The projects will be evaluated and ranked based on the criteria developed in Task 2, and an alternative compliance strategy will be selected. The deliverable for this task will include a technical document that describes the reconnaissance-level engineering design and operations, the selected alternative compliance strategy, and the scope of work and cost estimate to implement the selected alternative compliance strategy.

*Task 4 – Implement the alternative compliance strategy.* The objective of this task is to implement the selected alternative compliance strategy. This task includes (1) developing and implementing necessary agreements between participating parties; (2) preparing a Basin Plan amendment, if necessary; (3) preparing preliminary designs of the recommended projects; (4) preparing the environmental documentation for the recommended projects (this will tier-off from the 2020 OBMP Update PEIR); (5) preparing financial plans to construct the recommended projects; (6) preparing final designs of the recommended projects; (7) acquiring necessary permits for constructing and operating the recommended projects; and (8) constructing the recommended projects.

*Task 5 – Periodically re-evaluate compliance with dilution requirements.* The objective of this task is to proactively evaluate future compliance with the maximum-benefit SNMP recycled water dilution limit to address any foreseen compliance challenges. The task includes two efforts:

- (1) Prepare projections of the dilution metric on a five-year frequency. This includes updating the model, collecting planning data, preparing the requisite projections (see Task 1), and evaluating if there is a compliance challenge. If it is determined that there is a compliance challenge, then Tasks 2 through 4 will be performed. If it is determined that there is not a compliance challenge, this evaluation will be redone in another five years.
- (2) Annually report on current and future compliance with the dilution limit. Annual reporting of current compliance with the dilution metric is already done in the Chino Basin Maximum Benefit Annual Reports. This task would simply involve expanding that reporting discussion to include a comparison of the current dilution metric to the bracketed projections of the dilution metric prepared in Task 1. If the current dilution metric suggests there is a potential compliance challenge that was not predicted by Task 1, Watermaster and the IEUA would initiate a process to determine if additional evaluation of compliance alternatives is warranted.

#### Cooperative Efforts with Appropriate Entities to Implement Activity K

As co-permittees to the maximum-benefit SNMP and recycled water recharge program, this activity involves Watermaster and the IEUA. Similar to the existing implementation of the maximum-benefit SNMP, Watermaster would lead the technical and reporting efforts, and any engineering planning work would be led by IEUA.

#### Implementation Actions, Schedule, and Costs for Activity K

As previously described, all the work required in Task 1 is currently being performed as part of Watermaster and the IEUA's investigation to support an update to the maximum-benefit SNMP to change the recycled water TDS compliance metric to a longer averaging period. Watermaster and the IEUA anticipate that the compliance strategy for the maximum-benefit SNMP update will be completed during FY 2020/21. When completed the potential compliance challenges with the dilution limit will be known, and a range of compliance plans will have been evaluated at a conceptual level. Thus, it may not be necessary to perform any work pursuant to Activity K unless it is determined that some form salt offset

project is required to address near-term compliance challenges. If no compliance challenges are identified or are resolved through the completion of the SNMP update, no significant work would need to be performed pursuant to Activity K for at least five years. If a salt offset project is required to address anticipated near-term compliance challenges, Watermaster and the IEUA will need to begin reconnaissance-level engineering planning in FY 2021/22 (Tasks 2 through 4).

The recommended schedule to complete the scope of work described herein is described below:

**Year one (FY 2020/21):**

- Wait for Watermaster and the IEUA to complete the maximum-benefit SNMP update.

**Year two (FY 2021/22):**

- Identify alternative compliance strategies, if needed (Task 2).
- Start the evaluation of alternative compliance strategies, if needed (Task 3).
- Report the annual dilution metric compared to dilution limits and projections (Task 5).

**Year three (FY 2022/23):**

- Complete the evaluation of alternative compliance strategies, if needed (Task 3).
- Select preferred compliance plan and begin preparing implementation agreements, if needed (Task 4).
- Report the annual dilution metric compared to dilution limits and projections (Task 5).

**Year four (FY 2023/24)**

- Begin implementation the of compliance plan, if needed (Task 4).
- Report the annual dilution metric compared to dilution limits and projections (Task 5).

**Year five and beyond (FY 2023/24+):**

- Reevaluate compliance with dilution requirements every five years (Task 5).

Exhibit K-4 shows the estimated budget-level engineering cost to complete Tasks 1 through 5. Given the ability to leverage the existing work being performed by Watermaster and the IEUA, there is no cost (\$0) to perform Task 1. A cost estimate for Task 2 through 4 cannot be prepared because the outcome of the SNMP update is not yet known. It is premature to estimate the cost for performing the five-year update of the projections in Task 5, and there is no increased cost to performing the additional recommended annual reporting.

## Activity L

### Description of Activity L

Activity L defined by the stakeholders is:

*Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance.*

The objective of Activity L is to refine the monitoring and reporting requirements of Watermaster to ensure that the objectives of each requirement are being met efficiently at a minimum cost. Through the listening session process, the stakeholders identified the following desired outcomes for Activity L:

- Ensure full compliance with regulatory requirements.

- Ensure full support of basin management initiatives.
- Enable the parties to monitor the performance of the OBMP IP and related Court orders and regulatory obligations.
- Ensure cost efficiency.

The OBMP IP included PE 1 – *Develop and Implement Comprehensive Monitoring Program*. PE 1 was included in the OBMP to provide the information necessary to support the implementation of all other OBMP program elements and to evaluate their performance. The types of monitoring programs called for by PE 1 in the OBMP IP included:

- Groundwater-level monitoring
- Groundwater-quality monitoring
- Groundwater-production monitoring
- Surface-water discharge and quality monitoring (including managed artificial recharge)
- Ground-level monitoring
- Well construction, abandonment, and destruction

Activity L has identical objectives and desired outcomes to those of PE 1 because Watermaster continues to need data and information to comply with regulations, to fulfill its obligations under its agreements and Court orders, to comply with its requirements under CEQA, and to assess the performance of the evolving OBMP IP, including the 2020 OBMP Update. Financial resources to conduct these monitoring and reporting programs are limited, so through Activity L, the parties desire to ensure cost efficiency in Watermaster’s monitoring and reporting programs.

#### Need and Function of Activity L

##### *Watermaster monitoring and reporting programs*

Data and information acquired in Watermaster’s monitoring and data-collection programs are used to prepare reports and data deliverables that are required by regulations and Watermaster’s obligations under its agreements, Court orders, and CEQA. The table below is a list of each Watermaster monitoring and reporting requirement and the regulatory entities that require the monitoring and reporting.

Monitoring and Reporting Requirement	Regulatory Entity					
	Court	State Board	Regional Board	California DFW	California DWR	CEQA
Water Rights Compliance Annual Report		X		X		
SGMA Annual Report for Adjudicated Basins					X	
Biannual Evaluation of the Cumulative Effect of Transfers	X					
Biannual Evaluation of the Balance of Recharge and Discharge	X					
Annual Finding of Substantial Compliance with the Recharge Master Plan	X					

Monitoring and Reporting Requirement	Regulatory Entity					
	Court	State Board	Regional Board	California DFW	California DWR	CEQA
Annual Report of Compliance with SB 88 and SWRCB Regulations for Measurement and Reporting of Diverted Surface Water		X				
Safe Yield Recalculation	X					
Recharge Master Plan Update (RMPU)	X					
State of the Basin Report	X					
California Statewide Groundwater Elevation Monitoring Program (CASGEM)					X	
Chino Basin Maximum Benefit Annual Report			X			
Annual Report of the Prado Basin Habitat Sustainability Committee						X
Water Recycling Requirements for the Chino Basin Recycled Water Groundwater Recharge Program			X			
Annual Report of the Ground-Level Monitoring Committee	X					
OBMP Semi-Annual Status Reports	X					

Exhibit L-1 is a comprehensive description of each monitoring and reporting requirement listed in the table above, the associated data types required to meet the reporting requirement, the data analyses performed, the reporting content, and past efforts by Watermaster to reduce the scope and cost of the monitoring and/or reporting requirements.

The scope of the monitoring programs under PE 1 have evolved over time to satisfy new requirements associated with regulations and Watermaster obligations under its agreements, Court orders, and CEQA. In some instances, the monitoring programs have expanded to satisfy new basin-management initiatives and regulations. In some instances, the scope of the monitoring programs has been reduced with periodic reevaluation and redesign to achieve the monitoring objectives with reduced cost.

The following summarizes each of Watermaster’s existing monitoring and data-collection programs. Watermaster compiles, checks, and stores the data collected under most of these programs in a centralized environmental database. The database and the database-management procedures ensure the quality and accuracy of the data, allow for efficient data exploration and analysis, and include standardized reports and data exports in formats for regulatory data deliverables or further analysis (e.g. creation of model input files).

**Groundwater-production monitoring.** Since 1978, Watermaster has collected information to estimate total groundwater production from the Chino Basin. Watermaster uses groundwater-production data to quantify and levy assessments pursuant to the Judgment. Estimates of production are also essential inputs to recalibrate Watermaster’s groundwater flow model, which is used to inform redeterminations of the

Safe Yield of the Chino Basin, evaluate the state of Hydraulic Control, perform Material Physical Injury assessments, and support many other Watermaster initiatives. The Watermaster Rules and Regulations require groundwater producers that produce in excess of 10 afy to install and maintain meters on their well(s). Well owners that pump less than 10 afy are considered “minimal producers” and are not required to meter or report to the Watermaster. Exhibit L-2 depicts the groundwater-production monitoring program as of 2018. Members of the Appropriative and Overlying Non-Agricultural Pools and CDA record their own meter data and submit them to Watermaster staff on a quarterly basis. For Agricultural Pool wells, Watermaster performed a well-metering program to equip Agricultural Pool wells with in-line flow meters, where feasible. Watermaster staff visit and record production data from the meters at these wells on a quarterly basis. For the remaining unmetered Agricultural Pool wells, including minimal producer wells, Watermaster applies a “water duty” method to estimate their production on an annual basis. Watermaster continues its efforts to implement the well-metering program and improve its methods to estimate pumping at un-metered wells.

**Groundwater-level monitoring.** Watermaster’s groundwater-level monitoring program supports many Watermaster management functions, including: the periodic assessment of Safe Yield, groundwater model development and recalibration, evaluating the cumulative impacts of transfers and the balance of recharge and discharge, subsidence management, material physical injury assessments, estimation of storage change, other scientific demonstrations required for groundwater management, and many regulatory requirements, such as the demonstration of hydraulic control and the triennial recomputation of ambient water quality. The wells within the southern portion of the Basin were selected for inclusion in the monitoring program to assist in Watermaster’s analyses of Hydraulic Control, land subsidence, desalter impacts to private well owners, and riparian vegetation in the Prado Basin. The density of groundwater-level monitoring near the CDA well fields is greater than in outlying areas because hydraulic gradients are expected to be steeper near the CDA well fields, and these data are needed to assess the state of Hydraulic Control. In FY 2017/2018, about 1,300 wells comprised Watermaster’s groundwater-level monitoring program. Exhibit L-3 depicts the groundwater-level monitoring network of wells. At about 1,050 of these wells, well owners measure water levels and provide data to Watermaster. These well owners include municipal water agencies, private water companies, the California Department of Toxic Substance Control (DTSC), the County of San Bernardino, and various private consulting firms. The remaining 250 wells are private or dedicated monitoring wells that are mostly located in the southern portion of the Basin. Watermaster staff measures water levels at these wells once a month or with pressure transducers that record water levels once every 15 minutes. Wells monitored by transducers were preferentially selected to support Watermaster’s monitoring programs for Hydraulic Control, Prado Basin habitat sustainability, land subsidence, and others where such high-frequency data are necessary to fulfill program objectives.

**Groundwater-quality monitoring.** The Watermaster’s groundwater-quality monitoring program supports compliance for two maximum-benefit commitments: the triennial ambient water quality recomputation and the analysis of Hydraulic Control. Groundwater-quality data are also used for Watermaster’s biennial State of the Basin report, to support ground-water modeling, to characterize non-point source contamination and plumes associated with point-source discharges, to characterize groundwater/surface-water interactions in the Prado Basin area, and to characterize basin-wide trends in groundwater quality. Exhibit L-4 depicts the groundwater-quality monitoring network of wells. The groundwater-quality monitoring program relies on municipal producers, government agencies, and others to supply groundwater-quality data on a cooperative basis. Watermaster supplements these data through its own sampling and analysis program at private wells and monitoring wells in the area generally south of State Route 60. These wells include:

- *Private Wells:* Watermaster collects groundwater quality samples at about 85 private wells, located predominantly in the southern portion of the Basin. The wells are sampled at various frequencies based on their proximity to known point-source contamination plumes. 77 wells are sampled on a triennial basis, and eight wells near contaminant plumes are sampled on an annual basis.
- *Watermaster/IEUA Monitoring Wells:* Watermaster collects groundwater quality samples at 22 multi-nested monitoring sites located throughout the southern Chino Basin. There are a total of 53 well casings at these sites. These include nine HCMP monitoring sites constructed to support the demonstration of Hydraulic Control, nine sites constructed to support the Prado Basin Habitat Sustainability Program (PBHSP), and four sites that fill spatial data gaps near contamination plumes in MZ3. Each nested well site contains up to three wells in the borehole. The HCMP and MZ3 wells are sampled annually. The PBHSP wells are sampled quarterly to triennially.
- *Other Wells:* Watermaster collects samples from four near-river wells quarterly. The data are used to characterize the interaction of the Santa Ana River and groundwater in this area. These shallow monitoring wells along the Santa Ana River consist of two former USGS wells and two Santa Ana River Water Company wells.

For the period 2013 to 2018, water quality data were obtained from a total of 1,357 wells within and adjacent to the Chino Basin. Of those, 650 wells were sampled during FY 2017/2018.

**Surface-water and climate monitoring.** Watermaster’s surface-water and climate monitoring program supports many Watermaster management functions, including: groundwater model development and recalibration, the periodic assessment of Safe Yield, evaluating the cumulative impacts of transfers and the balance of recharge and discharge, material physical injury assessments, recharge master planning, the PBHSP, compliance with the recycled-water recharge permit, and the maximum benefit program, among others. Exhibit L-5 depicts the surface-water and climate monitoring network of surface-water discharge sites and atmospheric monitoring stations. Much of these data are collected from publicly available datasets, including POTW discharge data, USGS stream gaging station data, and precipitation and temperature data measured at public weather stations or downloaded from spatially gridded datasets. Watermaster collects stormwater, imported water, and recycled water recharge data from the IEUA. Watermaster also collects quarterly surface-water quality samples from two sites along the Santa Ana River to support the Maximum Benefit program.

**Ground level monitoring.** The Watermaster’s ground-level monitoring program is conducted pursuant to the Chino Basin Subsidence Management Plan. The objective of the plan is to minimize or abate the occurrence of land subsidence and groundwater fissuring within the Chino Basin. Exhibit L-6 depicts the ground-level monitoring program, which is focused across the western portion of Chino Basin within defined Areas of Subsidence Concern—areas of Chino Basin that are susceptible to land subsidence. The ground-level monitoring program consists of the following:

- Watermaster conducts high-frequency, piezometric level monitoring at about 60 wells as part of its ground-level monitoring program. A pressure-transducer/data-logger is installed at each of these wells and records one water-level measurement every 15 minutes. Data loggers also record depth-specific piezometric levels at the piezometers located at Watermaster’s Ayala Park Extensometer and Chino Creek Extensometer facilities once every 15 minutes.
- Watermaster installed two extensometers in the MZ1 Managed Area to support the MZ1 Interim Monitoring Program and two extensometers in the Southeast Area understand the effects of pumping at the newly constructed Chino Creek Well Field. Both extensometer facilities record the vertical component of aquifer system compression and expansion once every 15 minutes,



synchronized with the piezometric measurements, to understand the relationships between piezometric changes and aquifer-system deformation.

- Watermaster monitors vertical ground-motion via traditional elevation surveys at benchmark monuments and via remote sensing (InSAR) techniques established during the IMP. Elevation surveys are typically conducted in the MZ1 Managed Area, Northwest MZ1 Area, Northeast Area, and Southeast Area once per year. Vertical ground-motion data, based on InSAR, are collected about every two months and analyzed once per year.
- Watermaster monitors horizontal ground-surface deformation across areas that are experiencing differential land subsidence to understand the potential threats and locations of ground fissuring. These data are obtained by electronic distance measurements (EDMs) between benchmark monuments in two areas: across the historical zone of ground fissuring in the MZ1 Managed Area and across the San Jose Fault Zone in Northwest MZ1.

Watermaster convenes a Ground-Level Monitoring Committee (GLMC) annually to review and interpret data from the ground-level monitoring program. The GLMC prepares annual reports that include recommendations for changes to the monitoring program and/or the Subsidence Management Plan, if such changes are demonstrated to be necessary to achieve the objectives of the plan.

**Biological monitoring.** The Watermaster’s biological monitoring program is conducted pursuant to the adaptive monitoring program (AMP) for the Prado Basin Habitat Sustainability Program (PBHSP). The objective of the PBHSP is to ensure that groundwater-dependent riparian habitat in Prado Basin will not incur unforeseeable significant adverse effects due to implementation of the Peace II Agreement. Exhibit L-7 depicts the Riparian Habitat Monitoring Program (RHMP) for the PBHSP. It produces a time series of data and information on the extent and quality of the riparian habitat in the Prado Basin over a historical period that includes both pre- and post-Peace II implementation. Two types of monitoring and assessment are performed: regional and site-specific. Regional monitoring and assessment are appropriate because the main potential stress associated with Peace II activities is the regional drawdown of groundwater levels. The intent of site-specific monitoring and assessment is to verify and complement the results of the regional monitoring.

- Regional monitoring of riparian habitat: Regional monitoring and assessment of the riparian habitat is performed by mapping the extent and quality of riparian habitat over time using: (i) multi-spectral remote-sensing data, Normalized Difference Vegetation Index (NDVI), and (ii) air photos.
- Site-specific monitoring of riparian habitat: Site-specific monitoring performed in the Prado Basin includes field vegetation surveys and seasonal ground-based photo monitoring. The most current vegetation survey conducted for the PBHSP was performed by the United State Bureau of Reclamation (USBR) in 2016, consisting of 38 sites in the Prado Basin: 24 previously established USBR sites and 14 new sites primarily located near the PBHSP monitoring wells.

Watermaster convenes the Prado Basin Habitat Suitability Committee (PBHSC) annually to review and interpret data from the RHMP. The PBHSC prepares annual reports that include recommendations for RHMP and other monitoring for the PBHSP, if such changes are demonstrated to be necessary to achieve the objectives of the PBHSP.

**Water-supply and water-use monitoring.** Watermaster compiles water supply and use data from the parties to support two required reporting efforts: the Watermaster Annual Report to the Court and annual reporting requirements for adjudicated basins pursuant to the Sustainable Groundwater Management Act (SGMA). Monthly water use volumes for supply sources other than Chino Basin groundwater are collected from the parties; this includes groundwater from other basins, recycled water, imported water,

and native surface water. This data is collected and compiled twice per year to support fiscal year reporting for the Annual Report and water year reporting for the SGMA.

**Planning information.** Watermaster periodically compiles future water supply plans from the parties. The data collected as part of that process represents the parties' best estimates of their demands and associated water supply plans and are used for future planning investigations (e.g. safe yield recalculations and recharge master plan updates). The data collected includes:

- Water supply plans of the Watermaster parties, including:
  - Projected total water demand
  - Projected amount of each water supply by source to meet the projected water demand
  - Monthly distribution of demand and water supplies used to meet the demand
  - Projected groundwater pumping at each currently active well and future planned wells
  - Groundwater pumping schedules (well use priorities and capacities)
  - Pumping capacities, required pumping combinations, and sustainable pumping levels (pumping sustainability metric) at each well
- Assumptions for how:
  - Managed storage will be used to meet replenishment obligations.
  - Lands currently in agricultural uses will be converted to urban uses.
  - Additional potential conservation above that currently required for new land development will occur.
- Future projections of location and magnitude of storm and Supplemental Water recharge

**Well construction, abandonment, and destruction.** Watermaster maintains a database on wells in the Basin and Watermaster staff makes periodic well inspections. Watermaster staff sometimes finds a new well while implementing its monitoring programs. Watermaster needs to know when new wells are constructed as part of its administration of the Judgment. Valuable information for use in managing the Chino Basin is developed when wells are constructed, including: well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data. Well owners must obtain permits from the appropriate county and state agencies to drill a well and to put the well in use. Watermaster has developed cooperative agreements with the Counties of Los Angeles, Orange, Riverside, and San Bernardino, and DDW to ensure that the appropriate entities know that a new well has been constructed. Watermaster staff makes best efforts to obtain well design, lithologic and geophysical logs, groundwater level and quality data, and aquifer stress test data. The presence of abandoned wells is a threat to groundwater supply and a physical hazard. Watermaster staff periodically reviews its database, makes appropriate inspections, consults with well owners, maintains a list of abandoned wells in the Chino Basin, and provides this list to the counties for follow-up and enforcement. The owners of the abandoned wells are requested to properly destroy their wells following the ordinances developed by the county in which the abandoned well is located.

#### *Considerations for updating the monitoring and reporting programs*

Financial resources are limited, and the parties desire to conduct these monitoring and reporting programs to satisfy each requirement efficiently at minimum cost. As documented in Exhibit L-1, the scope of Watermaster's monitoring and reporting programs has evolved over time with new or changing regulations, obligations, and management initiatives.

Watermaster staff and its engineer continually review and revise the monitoring programs to collect the minimum data necessary to meet the objectives of the monitoring and reporting requirements. In some

instances, Watermaster convenes special committees to analyze monitoring data and develop recommendations for revisions to the programs. What has not been performed by Watermaster in the recent past is a comprehensive review of all monitoring and reporting programs in an open stakeholder process.

To achieve the parties' desire to satisfy all monitoring and reporting requirements at minimum cost, Activity L should begin with a comprehensive review of each of Watermaster's requirements for monitoring and reporting and a discussion of if and how the programs could be revised. The review should be performed in an open stakeholder process should consider:

- the objectives of the monitoring and reporting program,
- the minimum datasets required to meet the objectives,
- the prospective loss of private (or other) wells that are currently used in the Watermaster's monitoring programs and how they can be cost-effectively replaced over time,
- the methods used to analyze the data, and
- the reporting frequency and content.

In some cases, revision of the monitoring and reporting programs will require Court approvals, regulatory approvals, or modification/amendment to CEQA documents.

Ultimately, Activity L will produce a *Monitoring and Reporting Work Plan* that documents the programs and will be used to define the Watermaster's annual monitoring scope and budget. The *Monitoring and Reporting Work Plan* will be updated as needed to respond to changed conditions within any of the programs with opportunity for input and feedback from the parties.

#### Scope of Work for Activity L

The scope of work for Activity L – *Perform the appropriate amount of monitoring and reporting required to fulfill basin management and regulatory compliance* consists of the following tasks:

- Task 1 – Convene Monitoring and Reporting Committee and prepare the *Monitoring and Reporting Work Plan*
- Task 2 – Implement recommendations in *Monitoring and Reporting Work Plan*
- Task 3 (recurring future task) – Conduct monitoring and reporting programs and prepare annual updates to *Monitoring and Reporting Work Plan*

*Task 1 – Convene Monitoring and Reporting Committee and prepare the Monitoring and Reporting Work Plan.* The objectives of this task are to:

- Update the parties on all Watermaster monitoring and reporting requirements associated with regulations and obligations under its agreements, Court orders, and CEQA.
- Review the current monitoring and reporting programs that are designed to satisfy all Watermaster requirements.
- Develop recommendations for a revised monitoring and reporting program, including a scope of work and cost estimates to implement the recommendations.
- Document all Watermaster monitoring and reporting programs in a *Monitoring and Reporting Work Plan*. For each monitoring program, the work plan will include: a statement of objectives/requirements, the monitoring program to satisfy the requirements, the methods for evaluating data, the frequency for data analysis and reporting, and a schedule for initiating future updates to the plan, including construction of new monitoring wells (if needed).
- Prepare a technical memorandum to document the recommendations and a proposed process to revise the monitoring and reporting programs that require specific regulatory and/or Court

approvals for modification. The memorandum will describe the anticipated cost savings that the parties will realize if the revisions to the monitoring and reporting programs are approved. The memorandum will be titled: *Recommended Revisions to Watermaster’s Non-Discretionary Monitoring and Reporting Programs*.

A series of six committee meetings will be conducted over an 18-month period to achieve these objectives.

*Task 2 – Implement recommended revisions to Watermaster’s non-discretionary monitoring and reporting programs.* In this task, the plan described in the *Recommended Revisions to Watermaster’s Non-Discretionary Monitoring and Reporting Programs* will be implemented. This task will likely require technical demonstrations to the appropriate regulatory body (e.g. Regional Board, the Court, etc.) to gain approval for revisions to the monitoring program, report content, and/or report frequency. This task may be a multi-step, multi-year process to implement all recommended revisions. The results of this task will result in future updates to the *Monitoring and Reporting Work Plan*. Updates will be incorporated as they are approved.

*Task 3 (recurring future task) – Bi-Annual review of scope of work and cost to implement the Monitoring and Reporting Work Plan in the subsequent fiscal year.* In the first quarter of every other calendar year, the Monitoring and Reporting Committee will meet to review any changes to the *Monitoring and Reporting Work Plan* and the scope of work and budget for the subsequent fiscal year. The work plan updates and subsequent fiscal year budget will incorporate the recommendations made by special committees (such as the Ground-Level Monitoring Committee), any approved changes resulting from work performed in Task 2, and other changed conditions of the monitoring and reporting programs. The annual review can also include discussion and consideration of additional recommendations for efficiencies suggested by the parties.

#### Cooperative Efforts with Appropriate Entities to Implement Activity L

This is a basin-wide activity that involves the parties. Watermaster’s role will be to convene the Monitoring and Reporting Committee; to coordinate and administer its activities and meetings; to ensure that the recommendations derived from this effort are consistent with the Judgment, Peace Agreements and other agreements, Court orders, state and federal regulations, and CEQA requirements; and to execute the *Recommended Revisions to Watermaster’s Non-Discretionary Monitoring and Reporting Programs*.

#### Implementation Actions, Schedule, and Costs for Activity L

The recommended schedule to complete the scope of work is described below:

##### **Year one and two (FY 2020/21 and 2021/22):**

- Convene Monitoring and Reporting Committee and prepare the *Monitoring and Reporting Work Plan*.
- Prepare memorandum: *Recommended Revisions to Watermaster’s Non-Discretionary Monitoring and Reporting Programs*.

##### **Year three and beyond (FY 2022/2023+):**

- Implement *Recommended Revisions to Watermaster’s Non-Discretionary Monitoring and Reporting Programs*.
- Perform bi-annual review of scope of work and cost to implement the *Monitoring and Reporting Work Plan*.

Exhibit L-8 shows the estimated budget-level cost opinion to complete Task 1, which is about \$165,000. The cost of Tasks 2 and 3 cannot be estimated until the completion of Task 1.

## Activities H, I, and J

### Description of Activities H, I, and J

Activities H, I, and J as defined by the stakeholders are intended to equitably allocate and minimize the cost of OBMP implementation. The fourth goal of the 2000 OBMP and the 2020 OBMP Update is to *Equitably Finance the OBMP*. As described in Section 3 of this Scoping Report, the intent of this goal is to identify and use efficient and equitable methods to fund OBMP implementation. Three of the activities defined by the stakeholders address equity and cost.

Activity H is to:

*Develop an equitable distribution of costs/benefits of the OBMP Update and include in the OBMP Update agreements*

Activity I is to:

*Develop regional partnerships to implement the OBMP Update and reduce costs and include in the OBMP Update agreements*

Activity J is to:

*Continue to identify and pursue low-interest loans and grants or other external funding sources to support the implementation of the OBMP Update*

Through the listening session process, the stakeholders identified the following desired outcomes from Activities H, I, and J:

- Provide transparency as to the benefits of the OBMP Update activities, including identification of who benefits.
- Clearly identify Watermaster's roles in OBMP implementation and the associated future assessment costs to the parties.
- Provide information needed to plan financial resources, such as cost projections similar to a Master Plan process.
- A formal process to revisit the OBMP implementation plan and adjust priorities and schedules as necessary to address changed conditions.
- Improve readiness to apply for grants as they become available.
- Increase the likelihood that the OBMP will be implemented.
- Keep the cost of OBMP implementation as low as possible by obtaining grants and low-interest loans.

As noted above, the fourth goal of the 2000 OBMP is to equitably finance the OBMP, however there were no PEs in the OBMP IP related to this goal. The Peace and Peace II Agreements and OBMP project implementation agreements established cost allocations for certain activities. The benefit and cost allocations included in these agreements were based on negotiations among the parties and encouraged the use of grant funding to build projects. These funding agreements were deemed equitable when they were developed, and they are in use today. Together, the management framework of the OBMP IP and implementation agreements enabled the parties to obtain tens of millions of dollars in grants and other outside funding to implement the 2000 OBMP.

Need and Function of Activities of H, I, and J  
*Benefits of the OBMP*

To support the parties’ consideration of the Peace II Agreement, Watermaster contracted with Dr. David L. Sunding to prepare the *Report on the Distribution of Benefits to Basin Agencies from the Major Program Elements Encompassed by the Peace Agreement and Non-Binding Term Sheet*. The economic analysis estimated the costs and benefits of the implementation of the PEs encompassed by the Peace I and Peace II Agreements to the ten Chino Basin appropriator parties with the largest water rights in the Judgment (they are listed in the table below). These ten parties account for 91.2 percent of the operating safe yield. The allocation of aggregate costs and benefits to the individual agencies in the Basin was computed based on a complex set of legal rules (such as share of operating safe yield), cost-sharing arrangements for implementation, and market forces. The estimated net present value benefits, expressed in 2007 dollars (2007\$), to the parties were primarily based on the value of (1) the gains in pumping created by implementation of the agreements and (2) the offset of the purchase of Tier 2 supplies from Metropolitan for replenishment. The study estimated that together the Peace I and Peace II Agreements would provide over \$904 million dollars in net present value benefits to the parties (2007\$) for the implementation period of 2007 to 2030. The following table summarizes the net benefits to the ten agencies, as reported by Sunding:

Party	Net Benefit (2007\$)
Chino	\$95,966,000
Chino Hills	\$73,537,000
Ontario	\$232,271,000
Upland	\$44,086,000
CVWD	\$278,128,000
Fontana	\$30,268,000
MVWD	\$40,480,000
SAWCo	\$7,136,000
Jurupa	\$35,254,000
Pomona	\$67,537,000
Total	\$904,663,000
Average	\$90,466,300

Based, at least in part, on these expected benefits, the parties executed the Peace II Agreement.

During the listening session process, some stakeholders expressed opinions that the distribution of benefits projected by the Sunding work had not come to fruition, that there is a lack of clarity as to the distribution of benefits of the various PEs in the OBMP IP, and that the allocation of the cost of OBMP implementation may not be equitable. And, some stakeholders have expressed concern about participating in new or expanded efforts without first understanding the benefits received to date,

performing an analysis of potential future benefits, and assessing the equitable allocation of benefits and costs.

Since the Sunding report was published, no additional work has been done to quantify the benefits that have resulted from OBMP implementation or to update the projection of benefits based on changed conditions. In 2013, the Appropriative Pool parties discussed performing an updated economic analysis, but ultimately, they elected not to do it.

#### *Costs of the OBMP*

The costs of OBMP implementation include, among others:

- Watermaster expenses for engineering work to implement the OBMP IP, including implementation costs of certain projects (e.g. monitoring/reporting and construction of extensometers and monitoring wells)
- Watermaster expenses for other project costs, including recharge debt payments, improvement projects, recharge operations and maintenance costs, recharge, and the Pomona Credit
- Desalter replenishment and related monitoring expenses
- IEUA recycled water recharge costs
- Individual agency costs for water management activities impacted by the OBMP

As previously noted, the Peace and Peace II Agreements and OBMP project implementation agreements established cost allocations for certain activities. Watermaster-related costs for OBMP implementation are assessed annually as part of the Assessment Package. No calculation of the total OBMP costs incurred to date has been performed.

#### *Benefits and costs of the 2020 OBMP Update*

Some of the tasks within the 2020 OBMP Update activities provide broad benefit to the parties and are essential to the Watermaster to do its job to implement the Physical Solution. Some 2020 OBMP Update activities could result in the construction of projects that will provide benefits to all stakeholders or may only provide benefits to a subset of stakeholders.

Based on the scopes of work described herein for the 2020 OBMP Update activities (A, B, CG, D, EF, K and L), there are at least 2-4 years of scoping and preliminary engineering work that would need to be performed to evaluate and select projects envisioned by the 2020 OBMP Update activities and to develop the level of detail required to quantify the benefits and costs from project implementation. Exhibit HIJ-1 illustrates the four phases of work and associated schedule for each of the 2020 OBMP Update activities, assuming that all activities would be initiated in July 2020.<sup>17</sup> The phases shown are: (1) scoping, (2) evaluation of the need for projects, (3) project alternatives evaluation, and (4) project implementation. The exhibit also illustrates the go-no-go decision points to proceed with the activity.

The detail required to quantify the benefits and costs of projects (including ongoing needs for monitoring and assessment) would be developed during the project alternatives evaluation phase. Once the benefits and costs for projects are quantified, the parties will be able to review them, consider whether or not they want to participate in projects that provide benefits to participants only, and establish equitable cost allocations for the implementation actions that provide specific benefits.

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<sup>17</sup> This exhibit is for demonstrative purposes as the parties have yet to select the final activities for inclusion in the OBMP Update or define a scheduled to implement them.

*Grant funding and regional partnerships to minimize the costs of OBMP implementation*

In the future, it is anticipated that it will become increasingly difficult to secure grants and low-interest loans due to increased competition. Most grant and low-interest loan programs require, or heavily favor, projects that are within watersheds and groundwater basins with adopted integrated regional management plans, groundwater sustainability plans, or their equivalents. The 2020 OBMP Update is equivalent to a regional water resources and groundwater management plan. The first three phases of each activity described in the prior subsection and shown in Exhibit HIJ-1 should be completed to maximize the ability to be competitive when applying for grants and low-interest loans, or in securing regional funding partners. Assessing cost/benefit at a level of detail appropriate to meet the needs of the stakeholders in establishing equitable cost allocations during the project alternatives evaluation phase will enable the parties (1) to evaluate projects in a manner that is comprehensive and clear and (2) to enter into regional partnerships and apply for grant opportunities with greater certainty as to the expected benefits and costs.

*Scope of Work for Activities H, I, and J*

The objectives for Activities H, I, and J can be efficiently met by incorporating tasks within the other activities to characterize the benefits and costs of the projects produced by the activities. This section describes how the scopes of work of the other 2020 OBMP Update activities can accomplish the objectives of Activities H, I, and J.

As described throughout this Scoping Report, each activity has tasks related to identifying and evaluating project alternatives to achieve the activity's objectives (e.g. project evaluation). The project evaluation phase includes the following generalized steps:

1. Develop planning, screening, and evaluation criteria for projects
2. Identify the potential project alternatives
3. Develop reconnaissance-level engineering design and operating plans for each alternative
4. Develop an engineering cost opinion for each alternative
5. Describe how each alternative could be implemented and financed
6. Evaluate project alternatives based on the evaluation criteria
7. Select the preferred project alternative

At such time that each activity reaches the project evaluation phase, the scope of work for project evaluation should include a process to articulate and value the benefits of interest to the stakeholders in establishing equitable cost allocations, considering whether a project has broad basin management benefits and the benefits to specific parties. Examples of benefits include new yield, water supply reliability, and water quality improvements. The project benefits to analyze and value would be defined during the first step to develop criteria for selecting projects. In step five, the alternative evaluation would include a characterization of implementation benefits and costs (Watermaster expenses and other costs) and their allocation to participants under various levels of participation and cost allocation methods. The benefit and cost projections, together with the other engineering analyses, could then be used by the parties to select a cost allocation method, prepare projections of costs to support planning of financial resources for implementation, and develop a project implementation agreement that will clearly establish the allocation of benefits and costs to each party. With regard to the identification and valuation of benefits, the parties could address this on a case-by-case (project-by-project) basis, or by developing and agreeing to a standard set of benefits to analyze and quantify for every project to achieve equitable cost allocations.



The steps to achieve an equitable allocation of benefits and costs should be addressed in the implementation agreement that will be developed by the parties to implement the 2020 OBMP Update. The 2020 OBMP implementation agreement could be designed to ensure that the desired extent of cost/benefit assessments are performed to support equitable cost allocations, to anticipate and accommodate the development of project implementation agreements that define the project-specific cost/benefit allocation, and to periodically update cost projections for implementation of the 2020 OBMP Update activities and associated projects to support planning of financial resources.

#### Cooperative Efforts with Appropriate Entities to Implement Activities H, I, and J

The parties that will participate in projects developed through the implementation of the 2020 OBMP Update activities would need to agree to an allocation of costs for the implementation of the projects and document the allocation in the project implementation agreements. Watermaster's role will be to assess certain costs associated with implementation. Watermaster will continue to assess the costs of ongoing OBMP implementation efforts that provide broad benefits to the parties pursuant to existing agreements and would allocate costs of the implementation of new activities/projects based on the new implementation agreements developed for the 2020 OBMP Update.

#### Implementation Actions, Schedule, and Costs for Activities H, I, J

Other than the performance of tasks associated with the assessment of benefits and costs within each 2020OBMP Update activity, there are no separate implementation actions associated with this activity as the future implementation agreements will make such considerations. Depending on the types of benefits that need to be quantified and valued to define equitable cost allocations, the project evaluation costs estimated herein for Activities A and D could be higher. (Note that these are the only two activities that have budget-level cost-estimates for project evaluation).

The *2020 OBMP Update: Implementation Plan Report*, which is the next work product of the 2020 Update, will include an implementation plan and schedule for each of the 2020 OBMP Update activities selected for implementation by the stakeholders and a projection of associated Watermaster costs to support the planning of financial resources for implementation.

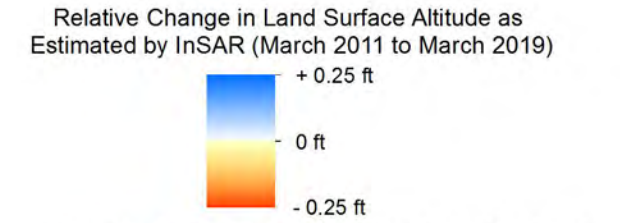
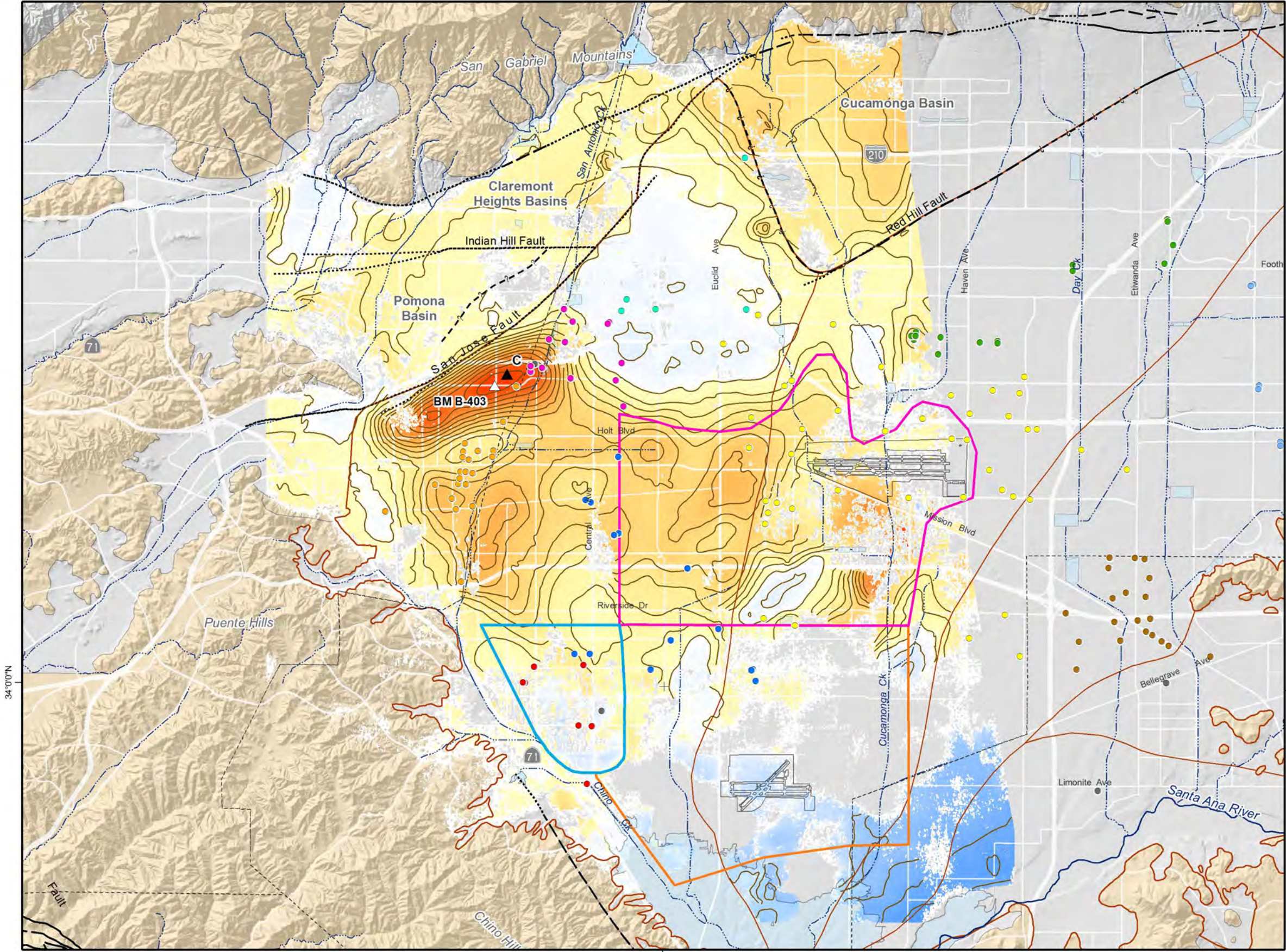
**Exhibit CG-1**  
**Aggregate Water Supply Plan for Watermaster Parties**

Water Source	2015	2020	2025	2030	2035	2040
Volume (af)						
Chino Basin Groundwater	147,238	145,904	153,804	157,716	168,987	176,652
Non-Chino Basin Groundwater	51,398	55,755	63,441	64,999	66,691	68,483
Local Surface Water	8,108	15,932	15,932	18,953	18,953	18,953
Imported Water from Metropolitan	53,784	86,524	93,738	100,196	102,166	109,492
Other Imported Water	8,861	9,484	10,095	10,975	11,000	11,000
Recycled Water for Direct Reuse	20,903	24,008	24,285	26,583	29,836	33,223
Total	290,292	337,607	361,295	379,422	397,633	417,803
Percentage						
Chino Basin Groundwater	51%	43%	43%	42%	42%	42%
Non-Chino Basin Groundwater	18%	17%	18%	17%	17%	16%
Local Surface Water	3%	5%	4%	5%	5%	5%
Imported Water from Metropolitan	19%	26%	26%	26%	26%	26%
Other Imported Water	3%	3%	3%	3%	3%	3%
Recycled Water for Direct Reuse	7%	7%	7%	7%	8%	8%
Total	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Source: Storage Framework Investigation - WEI, 2018



117°40'0"W



▲ Location of InSAR with Time Series of Ground Surface Elevation  
 △ Location of Benchmark with Time Series of Ground Surface Elevation

Appropriative Pool Pumping Wells

- City of Chino
- City of Chino Hills
- City of Ontario
- City of Pomona
- City of Upland
- Cucamonga Valley Water District
- Fontana Water Company
- Jurupa Community Services District
- Monte Vista Water District
- Other Appropriators

Areas of Subsidence Concern

- Northwest MZ-1
- Central MZ-1
- Managed Area
- Northeast Area
- Southeast Area

OBMP Management Zones (1-5)

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



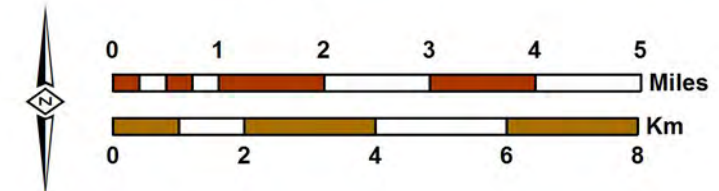
34°0'0"N

34°0'0"N

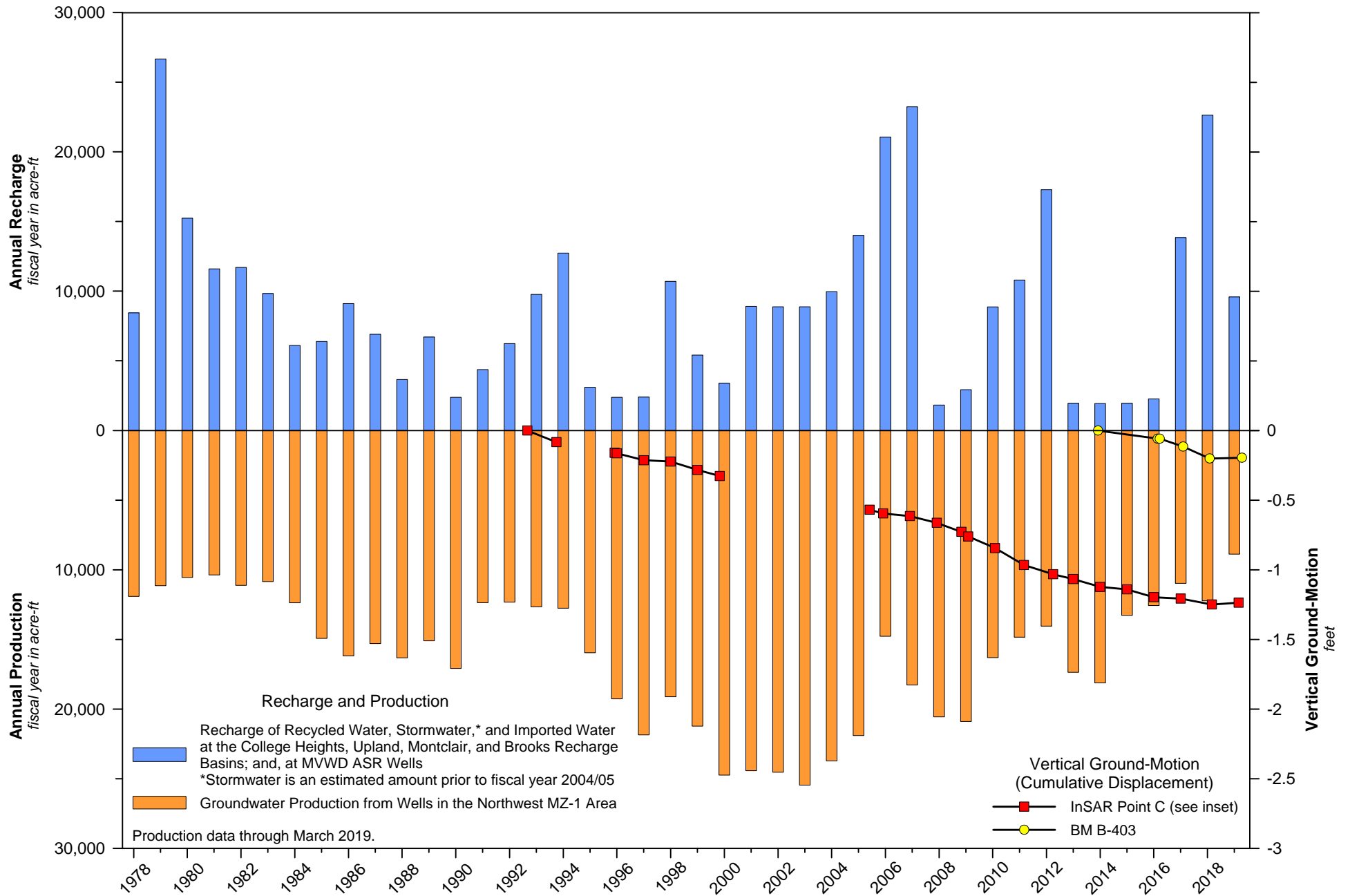
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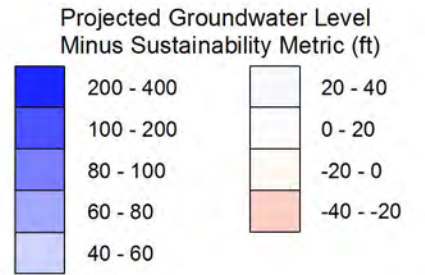
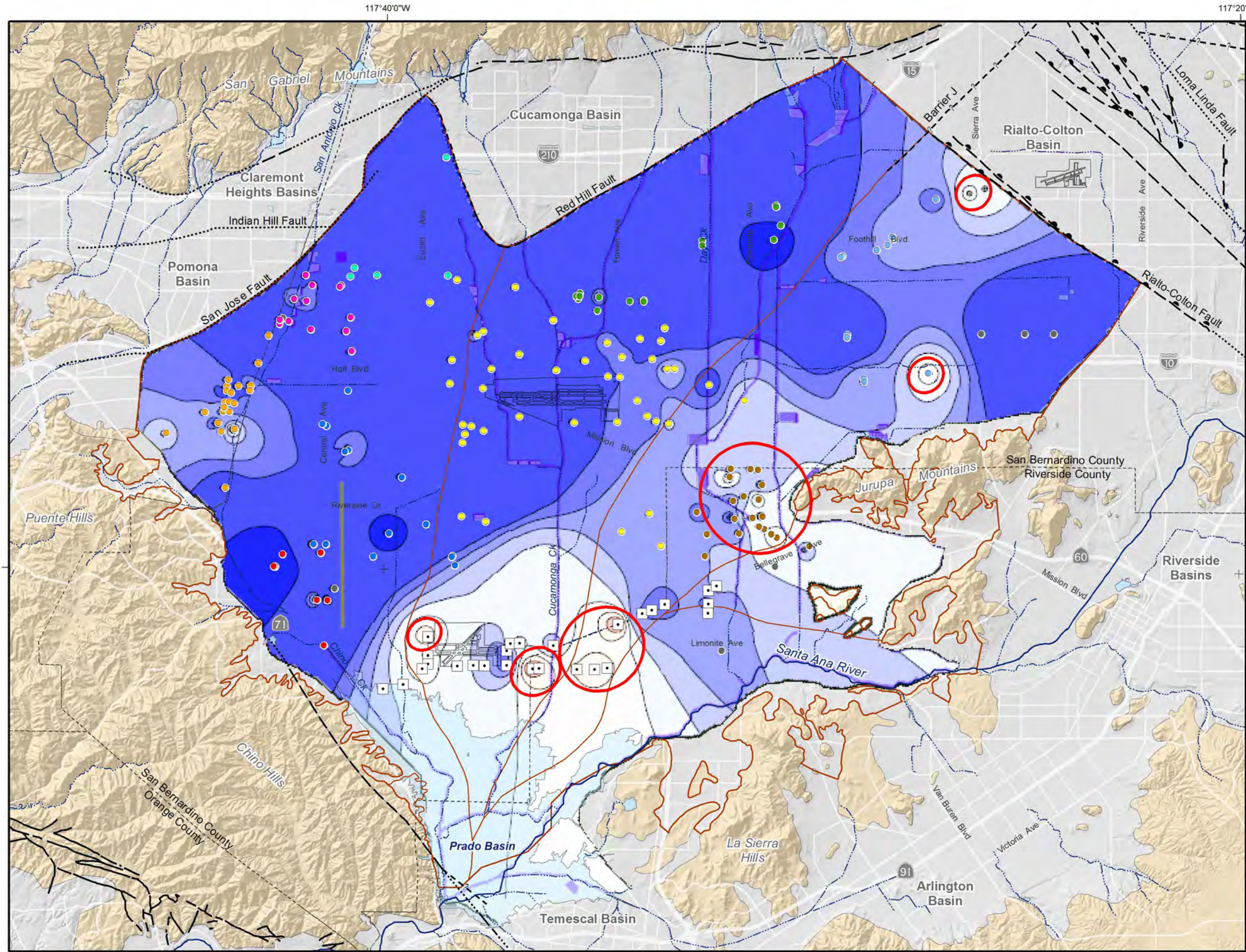


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 Date: 8/20/2019  
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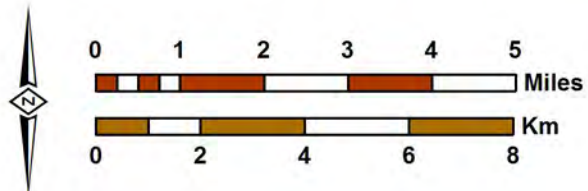


Areas of Land Subsidence  
 2011-2019





- Area below pumping sustainability metric
- Appropriative Pool Pumping Wells**
  - City of Chino
  - City of Chino Hills
  - City of Ontario
  - City of Pomona
  - City of Upland
  - Cucamonga Valley Water District
  - Fontana Water Company
  - Jurupa Community Services District
  - Monte Vista Water District
  - Other Appropriators
- Chino Desalter Well
- OBMP Management Zones
- 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
  - Location Concealed
  - Location Uncertain
  - Approximate Location of Groundwater Barrier



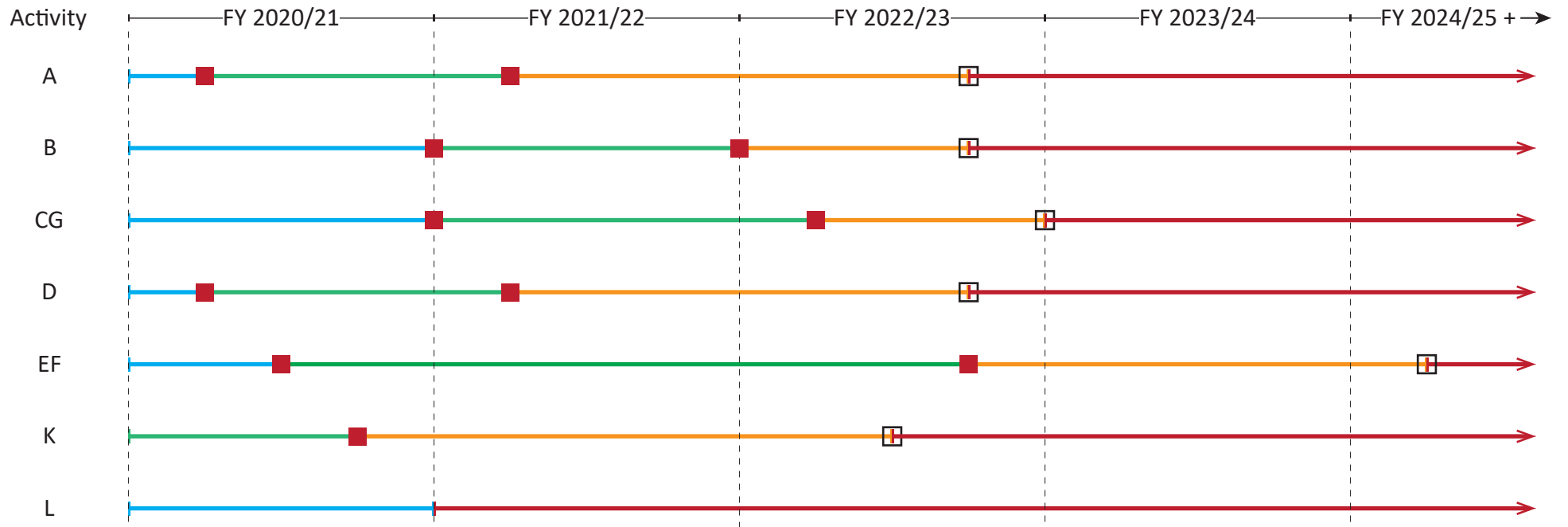
**Exhibit CG-5  
Cost-Estimate and Schedule to Implement Activity CG OBMP Update**

Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
<b>Task 1 Convene the Water Supply Reliability Committee, define objectives, and refine scope of</b> · Convene Water Supply Reliability Committee · Define objectives of Activity CG · Define reliability and other benefits expected from Activity CG · Refine scope described in TM1 · Refine detailed cost and schedule	\$95,000	\$95,000												
<b>Task 2 Characterize water demands, water supply plans and existing/planned infrastructure and their</b> · Characterize the water supplies and future water demands · Characterize exiting infrastructure to convey, treat, and distribute the supplies to meet the demands · Identify limitations to the existing infrastructure	\$210,000				\$70,000	\$140,000								
<b>Task 3 Develop planning, screening, and evaluation</b> · Develop criteria to evaluate project cost and benefit · Review and finalize criteria	\$ TBD							\$ TBD						
<b>Task 4 Describe water supply reliability opportunities</b> · Identify potential projects · Select projects for reconnaissance level study	\$ TBD								\$ TBD					
<b>Task 5 Develop reconnaissance-level engineering design and operating plan</b> · Characterize potential water supply reliability projects · Evaluate Projects · Prepare finance plan for soft-costs · Prepare implementation plan	\$ TBD									\$ TBD				\$ TBD
<b>Task 6 Plan, design, and build water supply reliability alternatives</b> · Prepare preliminary design report and CEQA documentation · Prepare finance plan for project implementation · Obtain permits and agreements and prepare final design · Construct selected projects	\$ TBD													\$ TBD
<b>Total Cost and Cost by FY</b>	<b>\$305,000</b>	<b>\$165,000</b>				<b>\$140,000</b>				<b>\$TBD</b>				<b>\$ TBD</b>

TBD -- To be determined

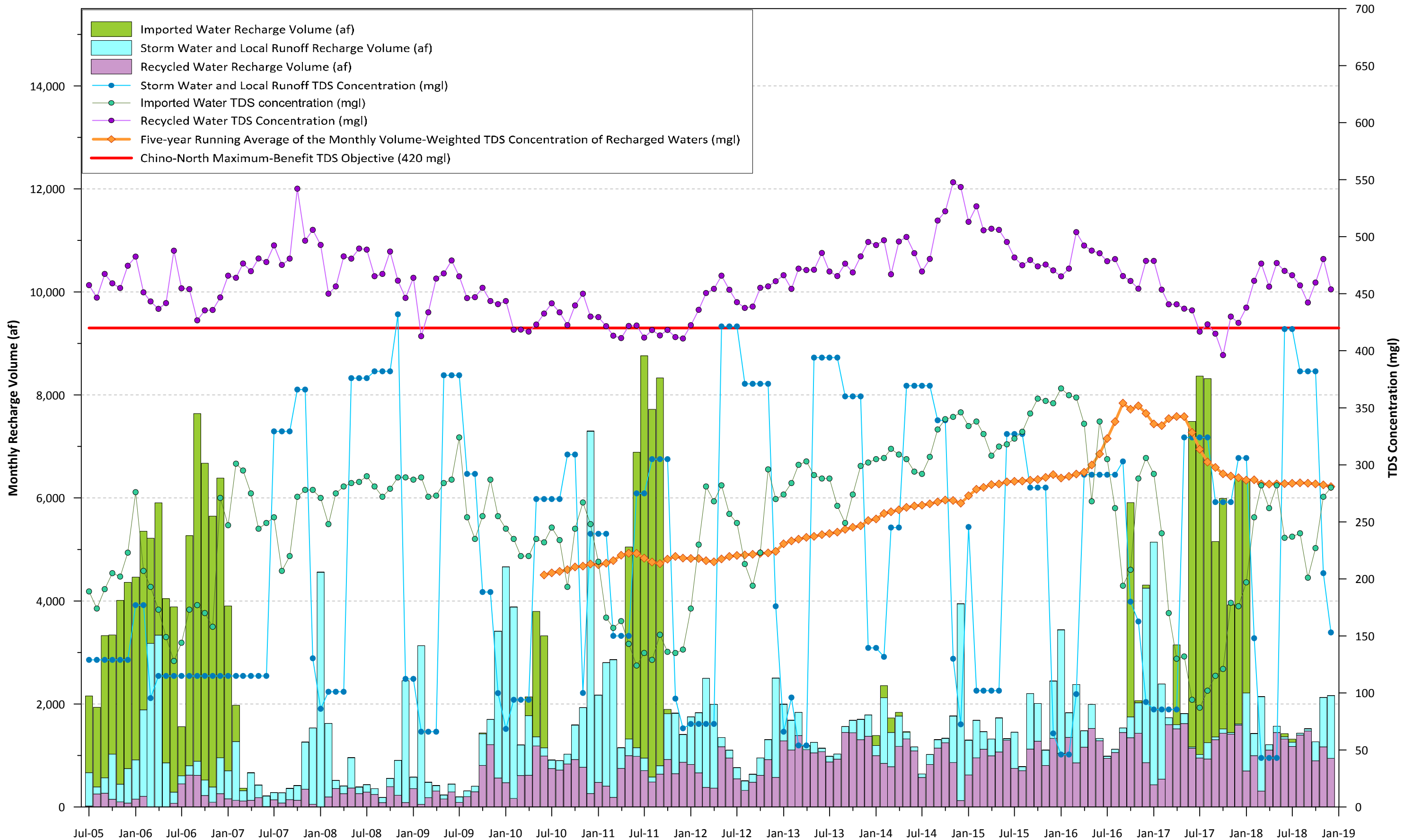


## Exhibit HIJ-1 Process and Schedule to Implement the OBMP Update Activities



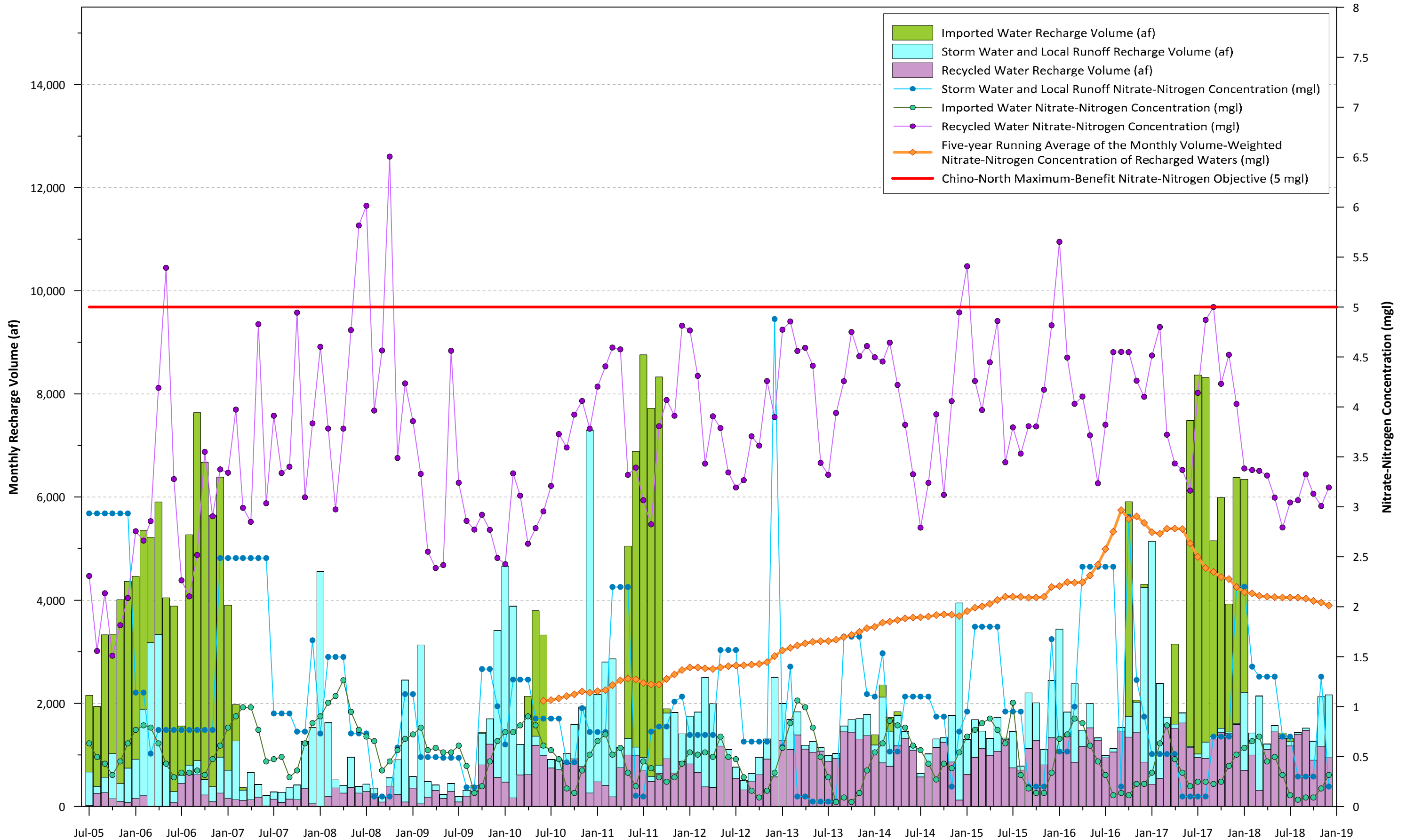
### Key

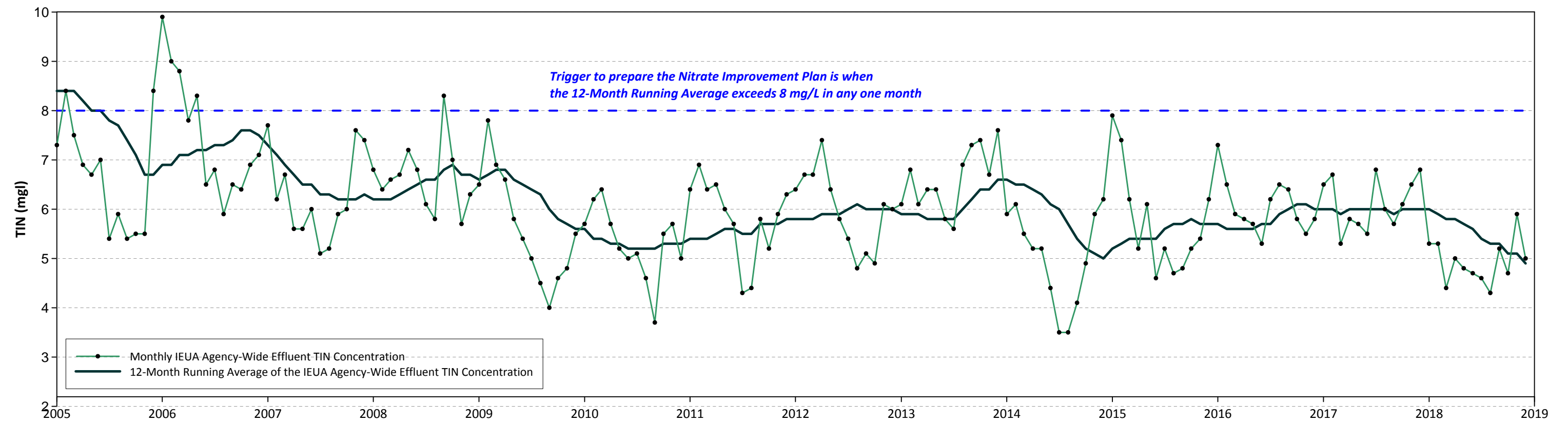
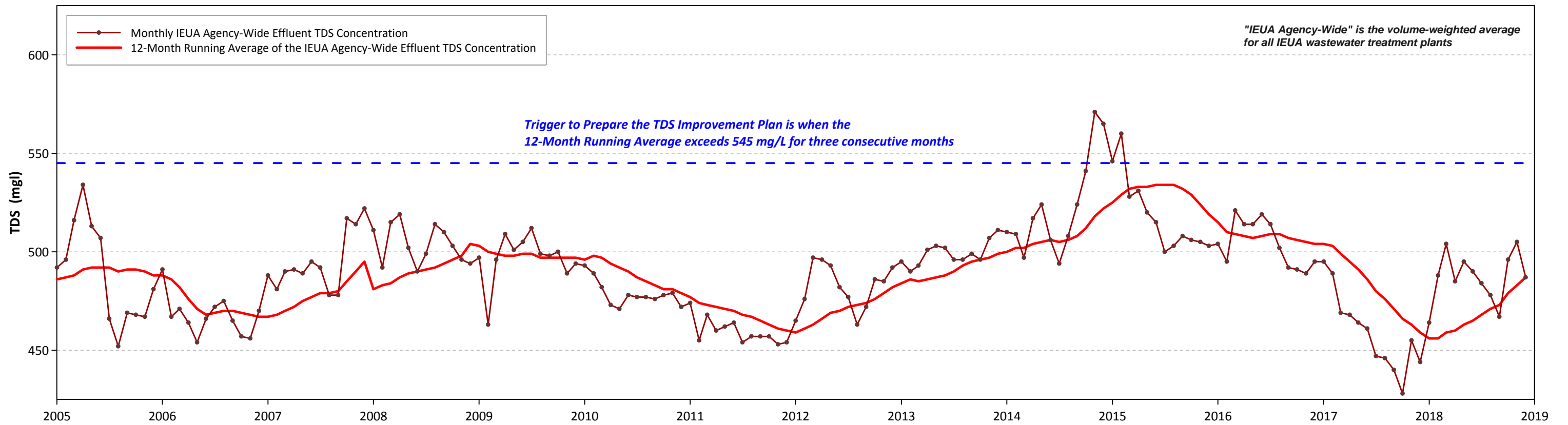
- ▬ Scoping effort
- ▬ Evaluation of need for projects
- ▬ Project Evaluation
- ▬ Implementation
- Go-no-go decision points to proceed with activity
- Go-no-go decision to select projects for implementation



**Volume and Total Dissolved Solids (TDS) Concentrations of Recharge Water Sources in the Chino Basin 2005-2018**







**Exhibit K-4  
Cost Estimate and Schedule to Implement Activity K**

Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
<b>Task 1 Prepare projection to evaluate compliance with recycled water recharge dilution requirements.</b> · Prepare projections · Evaluate projections for future wet and dry periods within 5 and 10 years · Determine the if there is a compliance challenge	\$0	\$0												
<b>Task 2 Identify alternative compliance strategies</b> · Identify potential compliance strategies · Select projects for reconnaissance level study	\$ TBD					\$ TBD								
<b>Task 3 Evaluate alternative compliance strategies</b> · Characterize alternative compliance startegies · Rank alternatives · Prepare finance plan for soft-costs · Prepare report	\$ TBD								\$ TBD	\$ TBD				\$ TBD
<b>Task 4 Implement the alternative compliance strategy</b> · Prepare preliminary design report and CEQA documentation · Prepare finance plan for project implementation · Obtain permits and agreements and prepare final design · Construct selected projects	\$ TBD													\$ TBD
<b>Task 5 Periodically re-evaluate compliance with dilution requirements</b> · Prepare projections of the dilution metric on a five-year frequency · Annually report current and future compliance with the dilution limit	\$ TBD													\$ TBD
<b>Total Cost and Cost by FY</b>	<b>\$0</b>	<b>\$0</b>				<b>\$ TBD</b>				<b>\$ TBD</b>				<b>\$ TBD</b>

TBD -- To be determined



Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types										Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN				
<p><b>Water Rights Compliance Monitoring.</b> Pursuant to Term 20 of Watermaster's Water Rights Permit 21225 and an agreement with the California Department of Fish and Wildlife (DFW), Watermaster must prepare an annual report of estimates of monthly changes in discharge in each tributary to the Santa Ana River that resulted from diversions of storm water and dry-weather flow for recharge in the Chino Basin. The annual report covers the 12-month period of July 1 through June 30, and is submitted to the DFW by October 1 of each year.</p>				X							<p>Watermaster Engineer prepares the report with review and input from Watermaster Counsel, which includes the following efforts:</p> <ol style="list-style-type: none"> <li>1. Measured data and Watermaster's surface-water model are used to estimate the discharge in flood control channels that cross the Chino Basin and the diversions for recharge.</li> <li>2. To compute the differences in discharge caused by the diversions for recharge, the discharge from the tributaries to the Santa Ana River is estimated with and without the Watermaster diversions.</li> </ol>	<p>A letter report is prepared, including text and exhibits, that describes the data, methods, and results of the analysis.</p>	<p>This report has become standardized and the scope has been reduced to the minimum required for compliance. The cost to complete this work has not increased over the last four years.</p>
<p><b>Sustainable Groundwater Management Act (SGMA).</b> The SGMA requires that the Watermaster of an adjudicated basin identified in WC Section 10720.8(a) submit specific data, information, and annual reports for the previous water year to the California Department of Water Resources (DWR) by April 1.</p> <p>Pursuant to SGMA WC Section 10720.8(f), Watermaster is required to submit:</p> <p>(A) Groundwater elevation data unless otherwise submitted pursuant to WC Section 10932</p> <p>(B) Annual aggregated data identifying groundwater extraction</p> <p>(C) Surface water supply used for or available for use for groundwater recharge or in-lieu use</p> <p>(D) Total water use</p> <p>(E) Change in groundwater storage</p> <p>(F) The annual report submitted to the court</p>	X	X		X					X		<p>Watermaster Engineer prepares a technical memorandum, which includes the following efforts:</p> <p>Item (A) is already submitted for the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, so no further data is reported pursuant to SGMA. Items (B), (C), (D) and (F) are compiled from the appropriators, the IEUA, and Watermaster.</p> <p>Item (E) is completed using the Chino Basin groundwater model to simulate storage change over the past water year.</p>	<p>A technical memorandum explicitly documenting the information for required items (A) through (F). The memorandum is included in the agenda packets for review by the Watermaster Pools, Advisory Committee, and Board. The memorandum and its contents are then submitted to the DWR via its online Adjudicated Basin Annual Reporting System.</p>	<p>Watermaster provides the minimum information required by DWR</p>
<p><b>Biannual Evaluation of the Cumulative Effect of Transfers.</b> Pursuant to the Peace Agreement, page 20, Section 5.1 (e) (iv); the OBMP Implementation Plan, page 21, paragraph 11 (d); and the Rules and Regulations, page 51, Section 9.3, Watermaster will evaluate for the potential for any Material Physical Injury that may result from the cumulative effects of transfers of water in storage or any water rights proposed in place of physical recharge of water to the Chino Basin. The purpose of this evaluation is to provide guidance to Watermaster for future recharge activities. Reporting on this evaluation is required biannually beginning on July 1, 2003.</p>	X	X		X					X		<p>Watermaster Engineer performs this evaluation:</p> <ol style="list-style-type: none"> <li>1. If necessary, re-calibrate the Chino Basin groundwater-flow model for the prior two years.</li> <li>2. Evaluate Watermaster assessment packages to determine which transfers resulted in an avoided wet-water replenishment and prepare a hypothetical historical model scenario that replaces transfers with wet-water replenishment.</li> <li>3. Simulate the hypothetical historical model scenario with the groundwater-flow model over the period of the Peace Agreement (since 2000).</li> <li>4. Compare the results of the new model simulation with the calibrated model results to characterize the cumulative effects of transfers since the Peace Agreement.</li> </ol>	<p>Watermaster's Engineer prepares one report that documents: (i) any model updates that were performed, (ii) the evaluation of the Balance of Recharge and Discharge, and (iii) the evaluation of the Cumulative Effects of Transfers. The evaluation of the Cumulative Effects of Transfers characterizes the differences in: water levels (especially in areas where low water levels and subsidence are a concern); storage; the achievement and maintenance of hydraulic control; Santa Ana River discharge at Prado Dam; and the developed yield of the Chino Basin.</p>	
<p><b>Biannual Evaluation of the Balance of Recharge and Discharge.</b> Pursuant to Section 7 of the Rules and Regulations, page 35, 7.1 (b) (iii) and (iv) and the Peace Agreement, page 20, Section 5.1 (e) (iii), Watermaster will conduct an evaluation of the hydrologic balance of recharge and discharge in the Chino Basin. The purpose of this evaluation is to provide guidance to Watermaster for future recharge activities to promote the goal of equal access to groundwater in each area and sub-area of the Chino Basin. Reporting on this evaluation is required biannually beginning on July 1, 2003.</p>									X		<p>Watermaster Engineer performs this evaluation:</p> <ol style="list-style-type: none"> <li>1. Use the same version of the groundwater-flow model that is used for the evaluate of the Cumulative Effect of Transfers.</li> <li>2. Prepare an updated planning scenario that includes groundwater production projections to comport with the latest Urban Water Management Plans, the IEUA-TVMWD-WMWD planning projections, state mandated water conservation, and climate change projections.</li> <li>3. Simulate the updated planning scenario with the groundwater-flow model over long-term future period.</li> <li>4. Evaluate the model results with respect to changes in water levels, the areal balance of recharge and discharge and provide Watermaster with recommendations on the future locations and magnitudes of supplemental water recharge necessary to improve the balance of recharge and discharge.</li> </ol>	<p>Watermaster's Engineer prepares one report that documents: (i) any model updates that were performed, (ii) the evaluation of the Balance of Recharge and Discharge, and (iii) the evaluation of the Cumulative Effects of Transfers. The evaluation of the Balance of Recharge and Discharge characterizes long-term changes in water levels across the Chino Basin under the plans of the Parties and the Watermaster, and characterizes the balance of recharge and discharge.</p>	<p>Watermaster completed this work in 2003, 2005 and 2015 -- four reports were skipped. Watermaster evaluates the balance of recharge and discharge in other efforts that include 2007 Peace II engineering work, 2009 Production Optimization investigation, 2013 RMPU, Safe Yield reset, Storage Framework Investigation and the forthcoming 2020 Safe Yield reset.</p>



Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost	
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN				
<p><b>Annual Finding of Substantial Compliance with the Recharge Master Plan.</b> Pursuant to Sections 7.3 and 8.1 of the Peace II Agreement, Watermaster must make an annual finding that it is in substantial compliance with a Court-approved Recharge Master Plan, particularly regarding the sufficiency of Replenishment capability to satisfy reasonable projections of future Desalter Replenishment obligations following the completion of Basin Re-Operation and its associated forgiveness of Desalter Replenishment obligations.</p>				X						X	<p>Watermaster Engineer performs this work:</p> <ol style="list-style-type: none"> <li>1. Describe Watermaster's projections of future Replenishment obligations based on the most recent production plans of the Parties. These production plans are typically extracted from Watermaster's most current groundwater modeling efforts.</li> <li>2. Describe Watermaster's projections of future Replenishment capacity as documented in the Recharge Master Plan and/or current RMP implementation efforts.</li> <li>3. Compare the projections of Replenishment obligations vs. Replenishment capacity to assess compliance with the Recharge Master Plan.</li> </ol>	<p>A letter report is prepared to document the data, methods, and findings of the evaluation of substantial compliance with the Recharge Master Plan.</p>	<p>This report has become standardized, updated content derived from other Watermaster work resulting in reduced scope and reduced cost.</p>
<p><b>Annual Report of Compliance with SB 88 and SWRCB Regulations for Measurement and Reporting of Diverted Surface Water.</b> Watermaster holds three diversion permits, issued by the SWRCB, that provide authorization to Watermaster to divert and recharge storm and dry-weather discharge. Watermaster reports annually on the amount of water diverted for recharged to the SWRCB pursuant to its permits and SWRCB regulations in Title 23, Chapter 2.7.</p> <p>SB 88 was signed into law by Governor Brown on June 24, 2015. Sections 15 through 18 of that law add new measurement and reporting requirements for a substantial number of diverters, including the Chino Basin Watermaster. Watermaster must demonstrate to the SWRCB its compliance with SB88. Reports are due annually by April 1, the reporting period is calendar year.</p>				X							<p>Watermaster Engineer performs this work:</p> <ol style="list-style-type: none"> <li>1. Collect, compile, and summarize estimates of diversion and recharge volumes for the calendar year for each point of diversion for each permit. Much of these data and information are borrowed from the data collected and analyzed for Watermaster's <i>Water Rights Compliance Reporting</i> report.</li> <li>2. Collect information from IEUA on the measurement scheme for each point of diversion (device, accuracy, methods of measurement and calculation, recording frequency). Evaluate each point of diversion for compliance with SB88. If any point of diversion is not in compliance with SB88, develop and document a plan to comply.</li> </ol>	<ol style="list-style-type: none"> <li>1. Prepare a progress report of the estimates of diversion and recharge volumes for the calendar year for each point of diversion, and submit the estimates to the SWRCB electronically on its website.</li> <li>2. To comply with SB 88, Watermaster must annually report the following in addition to (1.) above: <ul style="list-style-type: none"> <li>• Information on the device or method used to calculate the amount of water diverted.</li> <li>• Water diversion measurement, either direct diversion or diversion to storage, including the type of device(s) used, additional technology used, who installed the device(s), and any alternative method(s) used in measuring water diversion.</li> </ul> </li> </ol>	<p>As to the progress report, this work has been reduced to filling out a form on SWRCB water rights portal. As to SB88 compliance, this is a new regulation and Watermaster staff has approached regulations in a way to minimize compliance cost.</p>
<p><b>Safe Yield Recalculation.</b> Pursuant to the OBMP Implementation Plan and Section 6.5 of Watermaster's Rules and Regulations, Watermaster is required to recalculate and reset the Safe Yield of the Chino Basin in fiscal year 2010/11 and every ten years thereafter. The purpose of the recalculation and reset is to prevent overdraft, and continue to operate the Chino Basin pursuant to the Physical Solution of the Judgment.</p>	X	X	X	X	X	X		X	X		<p>Watermaster Engineer performs the analysis, and prepares the report. Pursuant to the Safe Yield Reset Technical Memorandum, the methodology to recalculate Safe Yield is:</p> <ol style="list-style-type: none"> <li>1. Collect new hydrogeologic information collected since the last model calibration and all the historical hydrologic and water use data, revise conceptual and numerical models and recalibrate groundwater model.</li> <li>2. Update existing and projected cultural conditions and determine if future projections will be based on: (a) long-term historical record of precipitation falling or (b) precipitation projections based on Global System Models to estimate the long-term average net recharge to the Basin.</li> <li>3. Update pumping projections and all recharge and discharge components that are input to the models.</li> <li>4. With the information generated in [1] through [3] above, use the groundwater-flow model to project the net recharge for existing current and projected future cultural conditions.</li> <li>5. Qualitatively evaluate whether the groundwater production at the net recharge rate estimated in [4] above will cause or threaten to cause "undesirable results" or "Material Physical Injury". If so, identify mitigation measures or an alternative Safe Yield to prevent "undesirable results" or "Material Physical Injury."</li> </ol>	<p>The report documents the data collected, the model re-calibration, and the analyses performed to calculate net recharge and Safe Yield.</p>	<p>Watermaster developed a task memorandum in 2015 entitled <i>Methodology to Reset Safe Yield Using Long-Term Average Hydrology and Current and Projected Future Cultural Conditions</i> that defines the methodology for the recently approved Safe Yield. This methodology was used to develop the scope and budget for the 2020 Safe Yield reset work and reduces the cost of the 2020 Safe Yield reset relative to the past effort.</p>



Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
<p><b>Recharge Master Plan Update (RMPU).</b> The 2010 RMPU was prepared pursuant to requirements of the Peace II Agreement and the December 2007 Court Order that approved and directed Watermaster to implement the Peace II Agreement. The Court directed Watermaster to amend the 2010 RMPU to include updated information on water demands and future replenishment projections. Watermaster completed this amendment on time in September 2013. In approving the 2013 RMPU amendment, the Court directed Watermaster to prepare recharge master plan updates on a five-year cycle. Subsequently, the 2018 RMPU was completed in October 2018 and the next report due in 2023 and every five years thereafter.</p>				X					X	<p>The requirements of the work to be performed in the RMPU are defined in the Peace Agreements and the 2007 report of the Special Referee (see the introduction to the 2013 RMPU amendment) Watermaster Engineer conducts the assessment, which includes:</p> <ol style="list-style-type: none"> <li>1. Collect data related to basin management including future groundwater pumping plans, stormwater management, planned supplemental water recharge, legislation and regulations that affect recharge and prepare an assessment of how the water management has changed since the last RMP.</li> <li>2. Prepare an assessment of the future replenishment obligations.</li> <li>3. Inventory all existing recharge facilities, update their performance information, estimate the supplemental water recharge capacity of each facility and assess: (a) the adequacy of existing recharge facilities to meet future replenishment obligations and recharge goals and (b) the adequacy of existing recharge facilities to enable Watermaster to balance recharge and discharge.</li> <li>4. Develop and analyze new projects to mitigate deficits identified in 3 above and identify new stormwater projects to increase basin yield.</li> <li>5. Develop and apply criteria to screen and prioritize the recharge projects identified in 4 above and make recommendations for their implementation.</li> <li>6. Prepare implementation plan.</li> </ol>	<p>The report documents the RMPU requirements, the data collected and planning assumption, the existing recharge capabilities, the need for additional supplemental water recharge capacity, project alternatives, screening and prioritization of alternatives and recommendations on project implementation..</p>	<p>This report has become standardized and the scope has been reduced to the minimum required for compliance, resulting in reduced cost relative to the 2010 and 2013 reports.</p>
<p><b>State of the Basin Report.</b> Pursuant to Section 2.21 of the Rules and Regulations and the November 15, 2001 Court Order, Watermaster prepares a State of the Basin report every two years to describe the status of individual OBMP related activities and document how the basin has physically responded during OBMP implementation (i.e. since September 2000). The report is typically finalized by June 30.</p>	X	X	X	X	X				X	<p>Watermaster Engineer prepares this report. Most of the data and information utilized to prepare the report are acquired from other Watermaster monitoring and reporting efforts. Text, tables, charts, and maps are prepared to characterize: hydrology, production, recharge (replenishment and other recharge), groundwater levels and quality, point-source groundwater contamination, land subsidence, hydraulic control, desalter planning and engineering, and production meter installation.</p>	<p>The report includes annotated maps, charts, and tables that characterize the physical state of the basin and how it has changed since 2000. The report is published as a tabloid-sized map atlas and a PDF file for online viewing.</p>	<p>This report has evolved over time from a complex engineering report to simpler, graphically-intense and more readable report. In this process the scope and cost to produce the report was reduced.</p>
<p><b>California Statewide Groundwater Elevation Monitoring Program (CASGEM).</b> Pursuant to Water Code section 10920, Watermaster must measure and report groundwater-elevation data from a subset of wells to the Department of Water Resources' CASGEM website twice per year (January 1 and July 1) for the Chino (8-2.01) and Cucamonga (8-2.02) Groundwater Subbasins of the Upper Santa Ana Valley Groundwater Basin (8-2).</p>		X								<p>Watermaster Engineer reviews time-series charts of groundwater elevations from a defined set of 37 wells in the Chino Basin and nine (9) wells in the Cucamonga Basin, and selects and compiles monthly measurements for a six-month period (summer/fall and winter/spring) that are representative of non-pumping water levels. This effort is performed in HydroDaVE Explorer. The selected data is exported from HydroDaVE in a file format for seamless upload to the CASGEM website.</p>	<p>The selected groundwater elevations for summer/fall and winter/spring are uploaded to the CASGEM website twice per year.</p>	<p>Watermaster staff reports the required groundwater-elevation data directly from its database to minimize effort and cost.</p>



Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
<p><b>Chino Basin Maximum Benefit Annual Report.</b> This annual report is required by the Regional Board pursuant to Chapter 5 of the Basin Plan and Order No R8-2012-0026. There are a total of nine (9) maximum benefit commitments required of the Watermaster and IEUA in exchange for obtaining elevated TDS and nitrate objectives for the Chino-North Groundwater Management Zone. The Maximum Benefit commitments are:</p> <ol style="list-style-type: none"> <li>1. The implementation of a surface-water monitoring program.</li> <li>2. The implementation of a groundwater monitoring program.</li> <li>3. The expansion of the Chino-I Desalter to 10 million gallons per day (mgd) and the construction of the Chino-II Desalter with a design capacity of 10 mgd.</li> <li>4. The additional expansion of desalter capacity (20 mgd) pursuant to the OBMP and the Peace Agreement.</li> <li>5. The completion of the recharge facilities included in the Chino Basin Facilities Improvement Program.</li> <li>6. The management of recycled water quality to ensure that the agency-wide, 12-month running average wastewater effluent quality does not exceed 550 mg/L and 8 mg/L for TDS and total inorganic nitrogen (TIN), respectively.</li> <li>7. The management of basin-wide, volume-weighted TDS and nitrogen concentrations in artificial recharge to less than or equal to the maximum-benefit objectives.</li> <li>8. The achievement and maintenance of the "hydraulic control" of groundwater outflow from the Chino Basin to protect Santa Ana River water quality.</li> <li>9. The determination of ambient TDS and nitrogen concentrations of Chino Basin groundwater every three years.</li> </ol> <p>The purpose of the annual report is to describe and document compliance with the Maximum Benefit commitments. The report is due by April 15th, and the reporting period is the calendar year.</p>	X	X	X	X					X	<p>Watermaster Engineer prepares the report, including the following efforts:</p> <ol style="list-style-type: none"> <li>1. Collect, check, and upload groundwater-level, groundwater-quality, and surface water-quality data to Watermaster databases. These data are used in the analyses required to demonstrate Hydraulic Control and compute ambient water quality.</li> <li>2. Review and summarize CDA progress reports on completion of the desalter well fields to achieve 40,000 afy of groundwater-production.</li> <li>3. Calculate: (i) the 12-month running average of IEUA's effluent TDS concentration to determine whether it has exceeded 545 mg/L for 3 consecutive months, and (ii) the 12-month running average of IEUA's effluent TIN concentration to determine whether it has exceeded 8 mg/L in any one month.</li> <li>4. Calculate: the 5-year running volume-weighted concentration of TDS and nitrate in recharged recycled water, supplemental water, and new storm water, and determine if the average is less than the TDS and nitrate Maximum Benefit objectives of the Chino-North GMZ.</li> <li>5. Use groundwater-elevation contours prepared in the State of the Basin Report (every 2 years) to show the extent of Hydraulic Control.</li> <li>6. Use Watermaster's groundwater-flow model (updated and recalibrated every five years) to determine if the volume of groundwater flowing past the desalter well field is <i>de minimis</i> (&lt;1,000 afy).</li> <li>7. Report on the status of the Recomputation of ambient groundwater quality for the Chino Basin groundwater management zones, which is performed once every three years (for TDS and nitrate-nitrogen).</li> <li>8. Utilize data from the Santa Ana River Watermaster's Annual Reports to characterize the influence of rising groundwater from the Chino Basin on the flow and quality of the Santa Ana River.</li> </ol>	<p>Text and exhibits that describe the status of compliance with the Maximum Benefit commitments.</p> <p>The data collected each calendar year are submitted to the Regional Board as an attachment to the report.</p>	<p>In 2012 Watermaster staff took the lead to substantially reduce the monitoring and reporting effort required under Maximum Benefit. In particular, the surface-water monitoring and quarterly reporting components of the program were virtually eliminated and the scope of annual reporting was reduced to eliminate redundancies. These efforts resulted in an estimated \$250,000 per year in cost savings (2012\$).</p>
<p><b>Annual Report of the Prado Basin Habitat Sustainability Committee.</b> The monitoring and mitigation requirements of the Peace II CEQA SEIR (Biological Resources/Land Use &amp; Planning—Section 4.4-3) call for the IEUA, Watermaster, and the Orange County Water District to form the Prado Basin Habitat Sustainability Committee (PBHSC) to ensure that the Peace II Agreement actions will not significantly or adversely impact the Prado Basin riparian habitat. One of the responsibilities of the PBHSC is to prepare annual reports by June 30 of each year.</p>	X	X	X	X		X	X		X	<p>Watermaster Engineer prepares the annual report, which includes the following efforts:</p> <ol style="list-style-type: none"> <li>1. Preparation of maps and data graphics that characterize the extent and quality of the riparian habitat in Prado Basin.</li> <li>2. Preparation of maps and data graphics that characterize the trends in groundwater levels, climate and weather, surface water, and other factors that can affect the riparian habitat. This information is compared to the changes in the extent and quality of the riparian habitat to identify cause-and-effect relationships.</li> <li>3. Groundwater-level change maps from existing results of Watermaster's groundwater-flow modeling are used to identify prospective areas of concern for the riparian habitat.</li> </ol>	<p>Summary of activities conducted for the PBHSC.</p> <p>Documentation of measured loss or prospective loss of riparian habitat (if any) with attribution of cause.</p> <p>Recommendations for ongoing monitoring and a scope of work and budget for the following fiscal year.</p> <p>Recommended adaptive management actions, if any, required to mitigate any measured loss or prospective loss of riparian habitat that is attributable to the Peace II activities.</p>	<p>After the completion of the first report in 2016, Watermaster identified efficiencies in monitoring and reporting, reducing the cost by almost 50 percent.</p>



Exhibit L-1

Chino Basin Watermaster -- Monitoring and Reporting Requirements, Data Types, Analyses Performed, Report Contents, and Past Efforts to Reduce Scope/Cost

Purpose/Requirement/Schedule	Data Types									Analyses Performed	Report Content	Past Efforts to Reduce Scope and Cost
	GWP	GWL	GWQ	SW	GL	GEOL	BIO	WS/WU	PLAN			
<p><b>Water Recycling Requirements for the Chino Basin Recycled Water Groundwater Recharge Program.</b> IEUA and Watermaster have a permit from the Regional Water Quality Control Board (Order R8-2007-0039, amended as R8-2009-0057) for recycled water recharge at 13 sites in the Chino Basin (Phase I and Phase II). The permit requires implementation of a monitoring and reporting program, and the submittal of the following reports: Quarterly and Annual Groundwater Recharge (GWR) Monitoring Reports, five-year Engineering Reports, and Basin Start-up Period Reports.</p>	X	X	X	X						<p>IEUA staff performs the analyses and prepares the reports. The analyses include the following efforts:</p> <p>Collect recycled water, diluent water, and groundwater data and compare to regulatory limits and specifications in the permit; report on recharge operations and any non-compliance events due to water quality, including records of any operational problems, plant upset and equipment breakdowns or malfunctions, and any diversions of off specification recycled water and the locations of final disposal; report of corrective or preventive action(s) taken; certification that no groundwater has been pumped for domestic water supply use from the buffer zone that extends 500 feet and 6-months underground travel time from the recharge basin(s) where recycled water is applied; mass balance calculations to ensure bleeding is occurring in the aquifer; and estimates of approximate travel times of recharged recycled water in the aquifer at each basin.</p> <p>Watermaster, as the co-permittee, has its Engineer provide technical support and review and comment on all reports before they are submitted to the permitting agencies.</p>	<p>Quarterly GWR Monitoring Reports: Summaries of the data in tabular form to demonstrate compliance with permit limits and specifications. Summary of recharge operations and any operational problems and preventive and/or corrective actions taken.</p> <p>Annual GWR Reports: Summaries of recycled water and groundwater monitoring efforts for the year. Demonstration of recycled water recharge and diluent water in-aquifer blending by 120-month mass-balance calculations presented in Recycled Water Contribution (RWC) Management Plans and analysis of monitoring well water quality data. Estimates of approximate travel times of recharged recycled water in the aquifer.</p> <p>Five-year Engineering Reports: Address all project changes over the last five years.</p> <p>Basin Start-up Period Reports: Determination of percolation rates, soil aquifer treatment efficiency, lysimeter monitoring program, and initial maximum average RWC limits.</p>	<p>This report has become standardized and the scope has been reduced to the minimum required for compliance, resulting in reduced cost.</p>
<p><b>Annual Report of the Ground-Level Monitoring Committee.</b> The MZ-1 Subsidence Management Plan (MZ-1 Plan) was developed by the MZ-1 Technical Committee (now named the Ground-Level Monitoring Committee) and approved by Watermaster in October 2007. In November 2007, the Court approved the MZ-1 Plan and ordered its implementation. The MZ-1 Plan was updated in 2015 and is now called the Chino Basin Subsidence Management Plan (SMP). Pursuant to the SMP, Watermaster prepares an annual report that includes the results of ongoing monitoring efforts, interpretations of the data, and recommended adjustment to the SMP, if any.</p>	X	X		X	X	X			X	<p>Watermaster Engineer prepares the annual report, which includes the following efforts:</p> <p>Preparation and interpretation of maps and graphics of data generated from the Ground-Level Monitoring Program including: the basin stresses of groundwater pumping and recharge, and the basin responses of changes in groundwater levels, aquifer-system deformation, and ground motion.</p>	<p>Background information on the program.</p> <p>Summary of activities conducted for the Ground-Level Monitoring Program.</p> <p>Analysis and interpretation of data.</p> <p>Conclusions and recommendations for ongoing monitoring and a scope of work and budget for the following fiscal year.</p> <p>Recommended updates to the SMP, if any.</p>	<p>The GLMC meets annually to review data and develop an appropriate scope of work for the monitoring program for the subsequent year. The monitoring program has continually evolved to identify and implement efficiencies, address the concerns of the GLMC, and meet the requirements of the SMP.</p>
<p><b>OBMP Semi-Annual Status Reports.</b> Pursuant to the July 13, 2000 Court Order that approves Watermaster's adoption of the Peace Agreement and the OBMP Implementation Plan, Watermaster is required to prepare semi-annual status reports to the Court on OBMP implementation. The purpose of the report is to provide the Court with updates on progress in implementing the OBMP.</p>	X	X	X	X	X	X	X	X	X	<p>Watermaster staff, with the assistance of Watermaster Engineer and Counsel, prepare text descriptions of activities that were conducted to implement the OBMP for the prior six months.</p>	<p>Descriptions of activities that implement the OBMP program elements for the prior six months.</p>	<p>This report has become standardized and the scope has been reduced to the minimum required for compliance, resulting in reduced cost.</p>
<p><b>Semi-Annual Reports to the Watermaster Pools, Advisory Committee, and Board meetings.</b> The Parties have requested semi-annual reports that summarize the status of: (i) the groundwater contaminant plumes in the Chino Basin and (ii) the activities of the Ground-Level Monitoring Committee.</p>	X	X	X		X					<p>Watermaster Engineer prepares text descriptions of activities performed during the previous quarter.</p>	<p>A text description of status of each of the known plumes within the Chino Basin and the activities of the Ground-Level Monitoring Committee.</p>	<p>This report has become standardized and the scope has been reduced to the minimum required for compliance, resulting in reduced cost.</p>

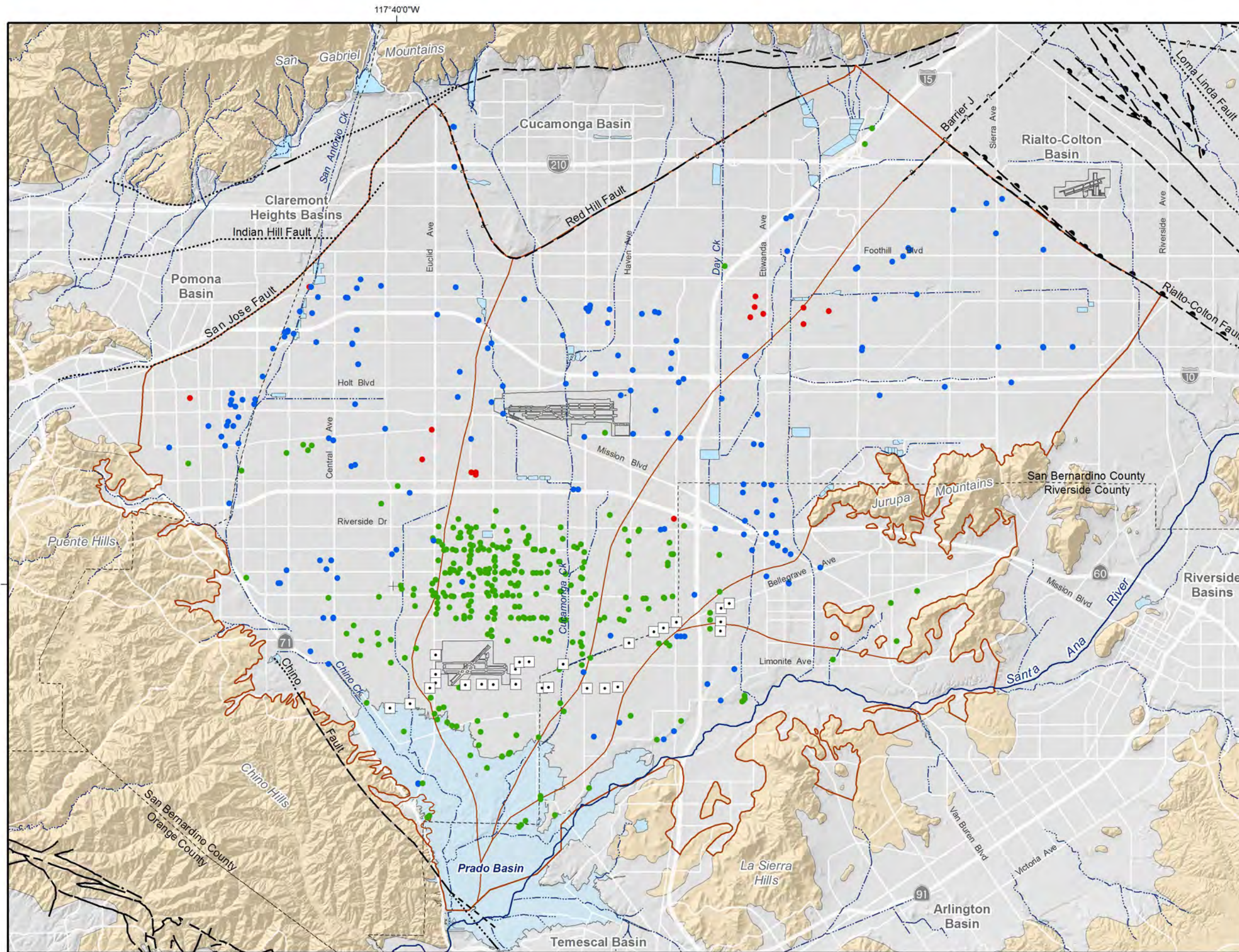
Key for Data Types:  
 GWP -- Groundwater-production monitoring  
 GWL -- Groundwater-level monitoring  
 GWQ -- Groundwater-quality monitoring

SW -- Surface-water and climate monitoring  
 GL -- Ground-level (subsidence) monitoring  
 GEOL -- Well construction, abandonment, and destruction monitoring

BIO -- Biological monitoring  
 WS/WU -- Water-supply and water use monitoring  
 PLAN -- Planning information





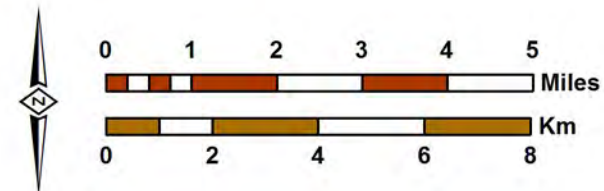


- Groundwater Production Wells by Pool
- Agricultural Pool (Pool 1 - 276 Wells)
  - Overlying Non-Agricultural Pool (Pool 2 - 13 Wells)
  - Appropriative Pool (Pool 3 - 143 Wells)
  - Chino Basin Desalter Authority (25 Wells)

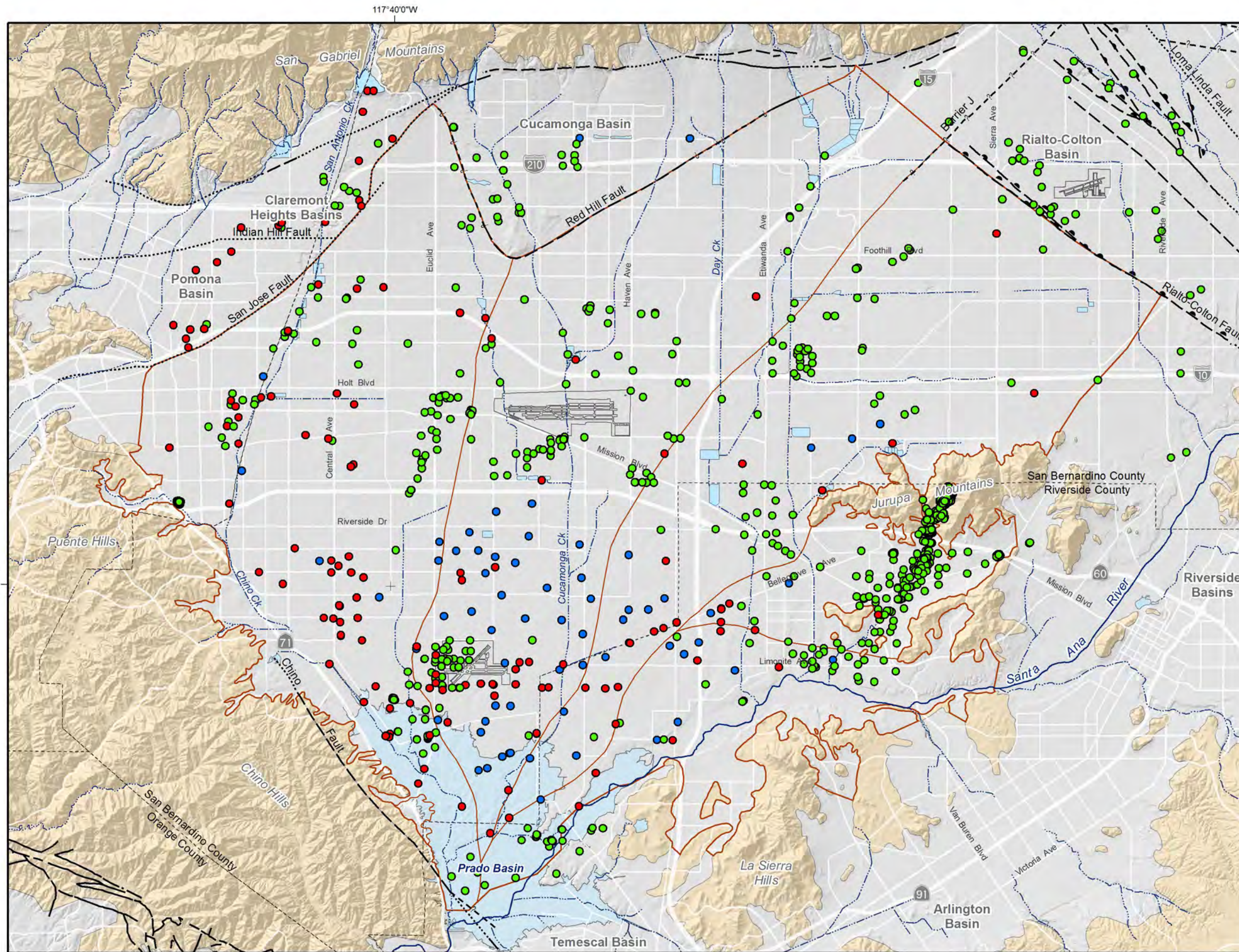
- OBMP Management Zones
- Streams & Flood Control Channels
- Flood Control & Conservation Basins
- Geology**
- Water-Bearing Sediments**
- Quaternary Alluvium
- Consolidated Bedrock**
- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
- Faults**
- Location Certain
- Location Approximate
- Location Concealed
- Location Uncertain
- Approximate Location of Groundwater Barrier



Author: SO  
 Date: 8/22/2019  
 File: Exhibit\_L2\_Groundwater Prod\_.mxd



**Groundwater-Production Monitoring**  
 Fiscal Year 2017/2018



Groundwater-Level Monitoring Program  
Wells symbolized by Measurement Frequency

- Measurement by CBWM Staff - Monthly (69 wells)
- Measurement by Transducer - Every 15 Minutes (177 wells)
- Measurement by Owner at Various Frequencies (1,077 wells)



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



Prepared by:



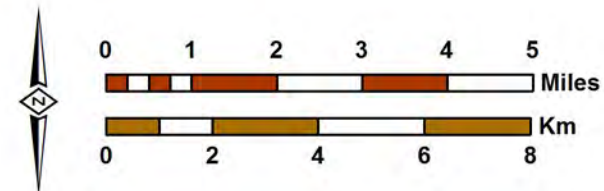
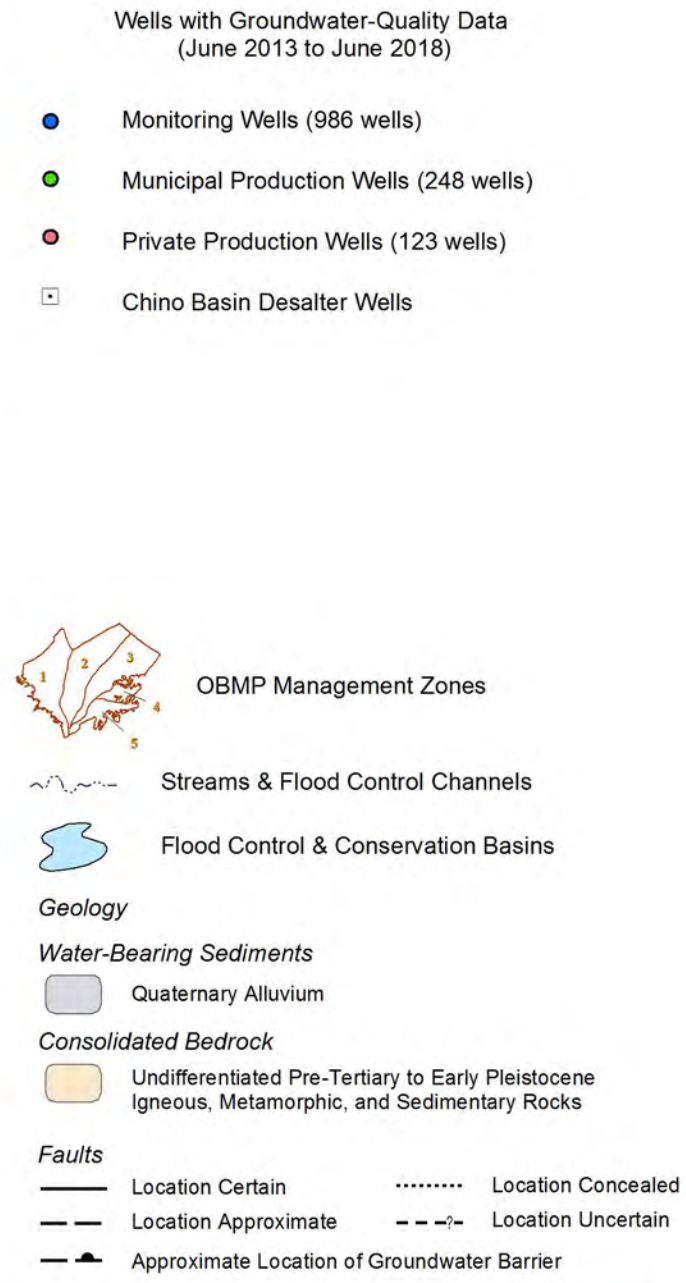
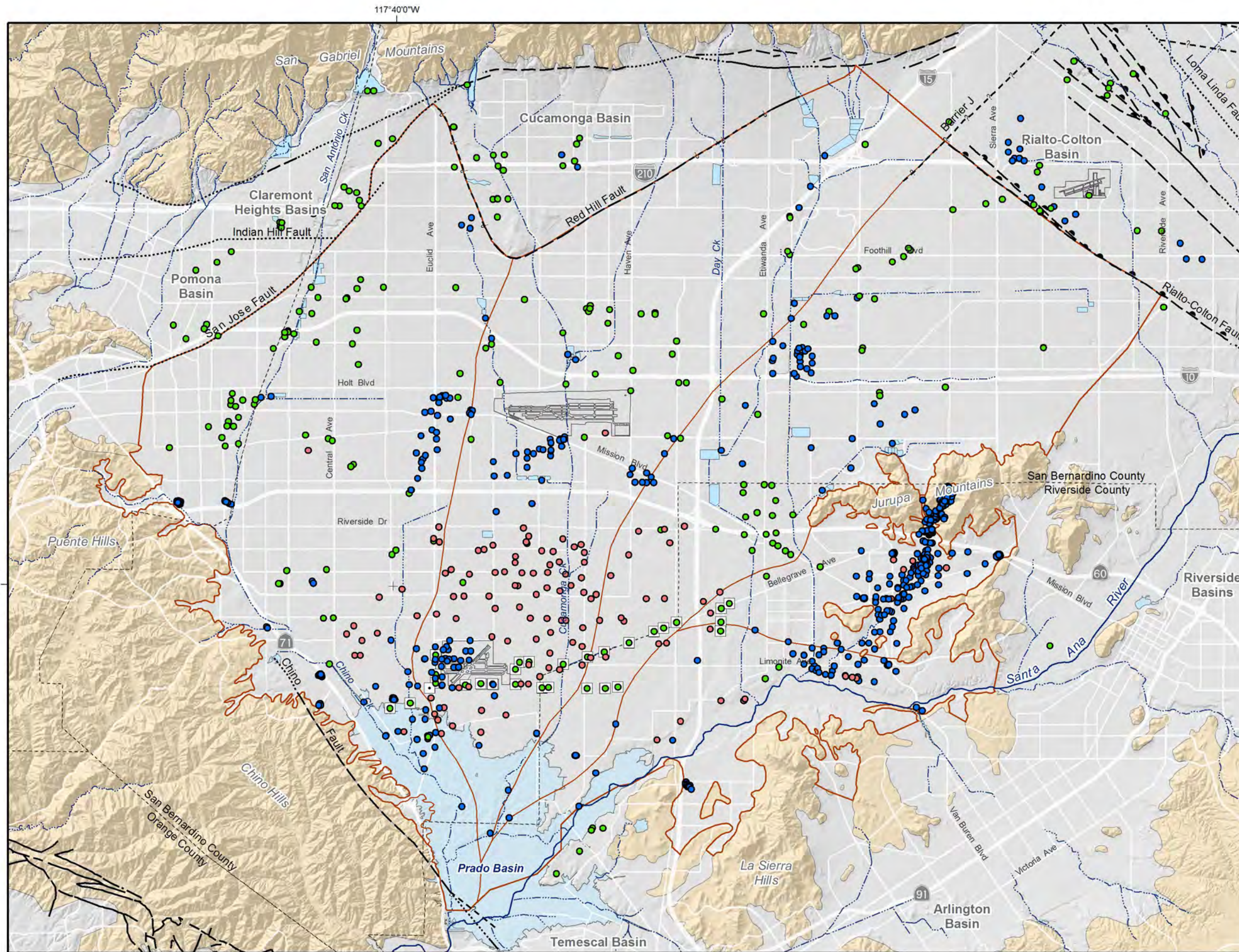
Author: SO  
Date: 8/22/2019  
File: Exhibit\_L3\_GWL.mxd

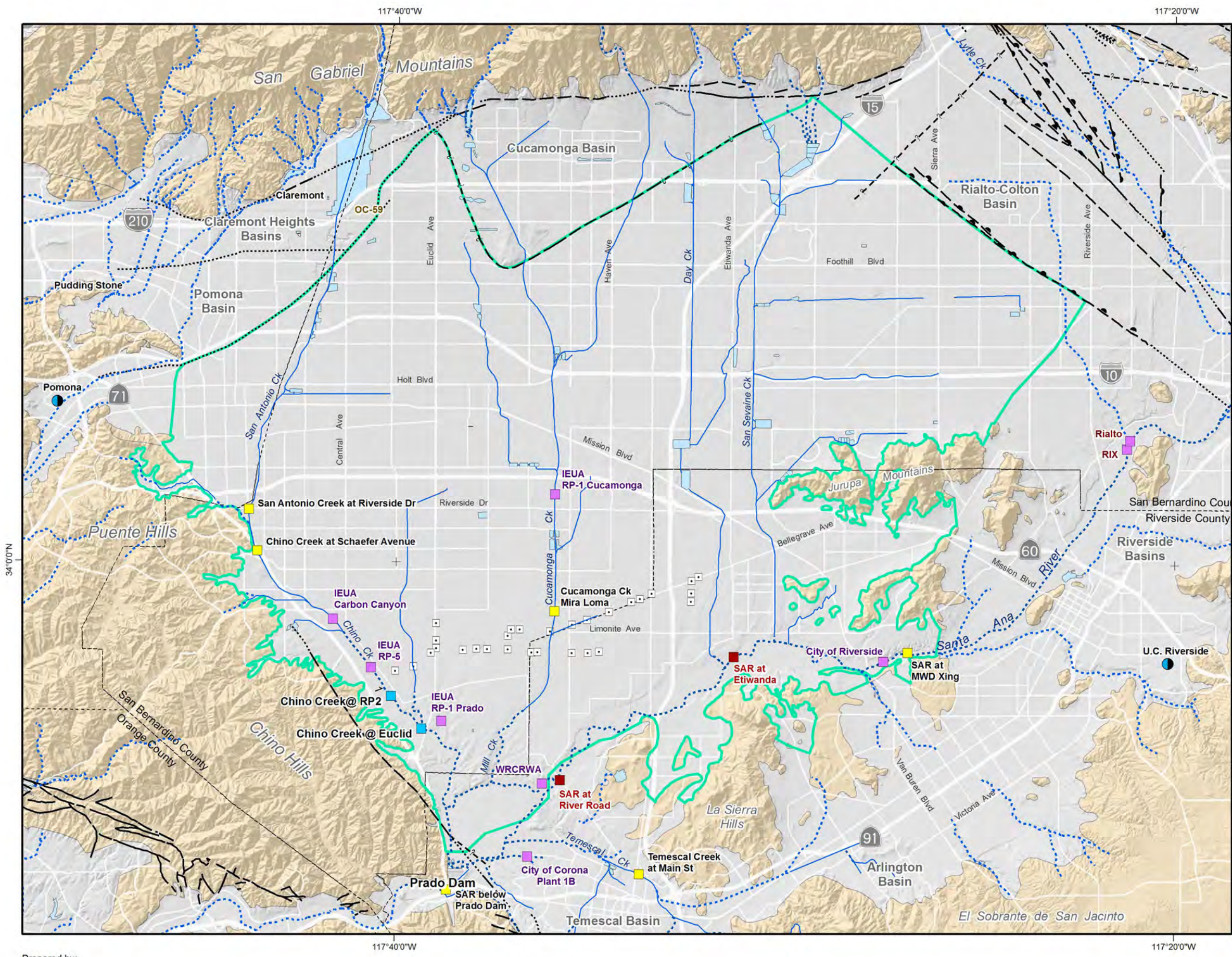


Prepared for:  
**OBMP 2020 Update**  
Scoping Report



**Groundwater-Level Monitoring**  
Well Location and Measurement Frequency  
Fiscal Year 2017/2018

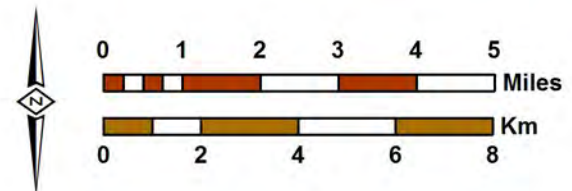




- Surface-Water Monitoring Program**
- POTW Discharge Outfall
  - USGS Stream Gage Station
  - Maximum-Benefit Monitoring Program Site
  - PBHSP Site
- Climate Monitoring Program**
- CIMIS Stations (Temperature and Evaporation)
  - Chino Basin - Area to Extract Grided Data from PRISM and NEXRAD Data Sets (Precipitation)
- Hydrology**
- Concrete-Lined Channels
  - - - Unlined Rivers and Streams
  - Flood Control & Conservation Basins
  - Chino Basin Desalter Authority Well
- Geology**
- Water-Bearing Sediments**
- Quaternary Alluvium
- Consolidated Bedrock**
- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks
- Faults**
- Location Certain
  - - - Location Concealed
  - · - · Location Approximate
  - - - ? - - - Location Uncertain
  - - - Approximate Location of Groundwater Barrier

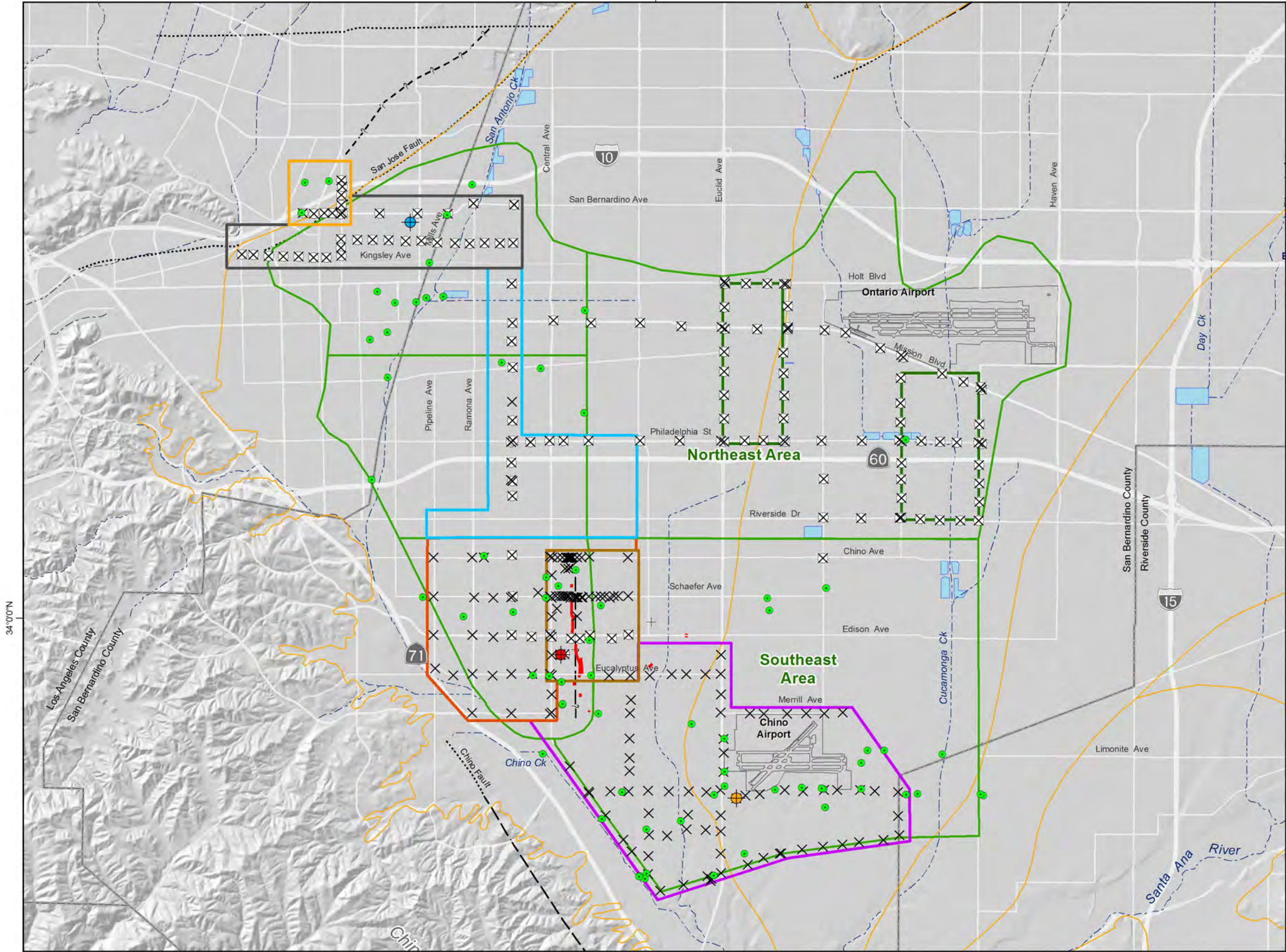


Author: SO  
 Date: 8/22/2019  
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**Surface-Water and Climate Monitoring**

117°40'0"W



Ground-Level Monitoring Network Facilities

- Ayala Park Extensometer
- Chino Creek Extensometer
- Pomona Extensometer
- Well Equipped with Pressure Transducer (2018/19)
- Ground-Level Survey Benchmark
- Ground-Level Survey Benchmark (Measured in April 15, 2019)

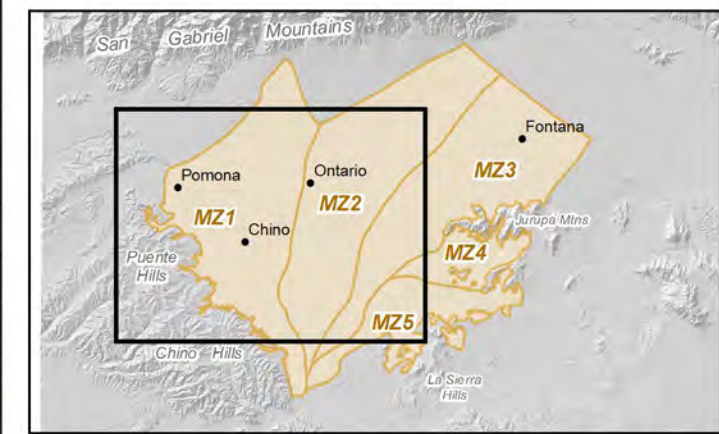
Ground-Level Survey Areas

- Managed Area
- Fissure Zone Area
- Central Area
- Northwest Area
- San Jose Fault Zone Area
- Northeast Area
- Southeast Area

- Areas of Subsidence Concern
- Flood Control and Conservation Basins

Fault (solid where accurately located; dashed where approximately located or inferred; dotted where concealed)

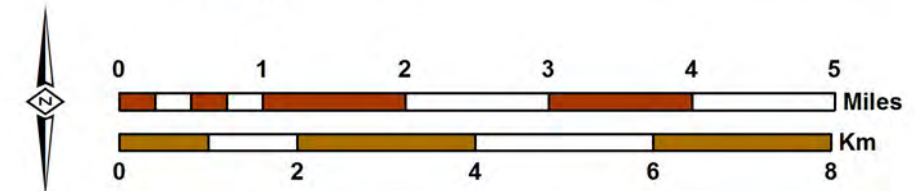
- Ground Fissures
- Approximate Location of the Riley Barrier



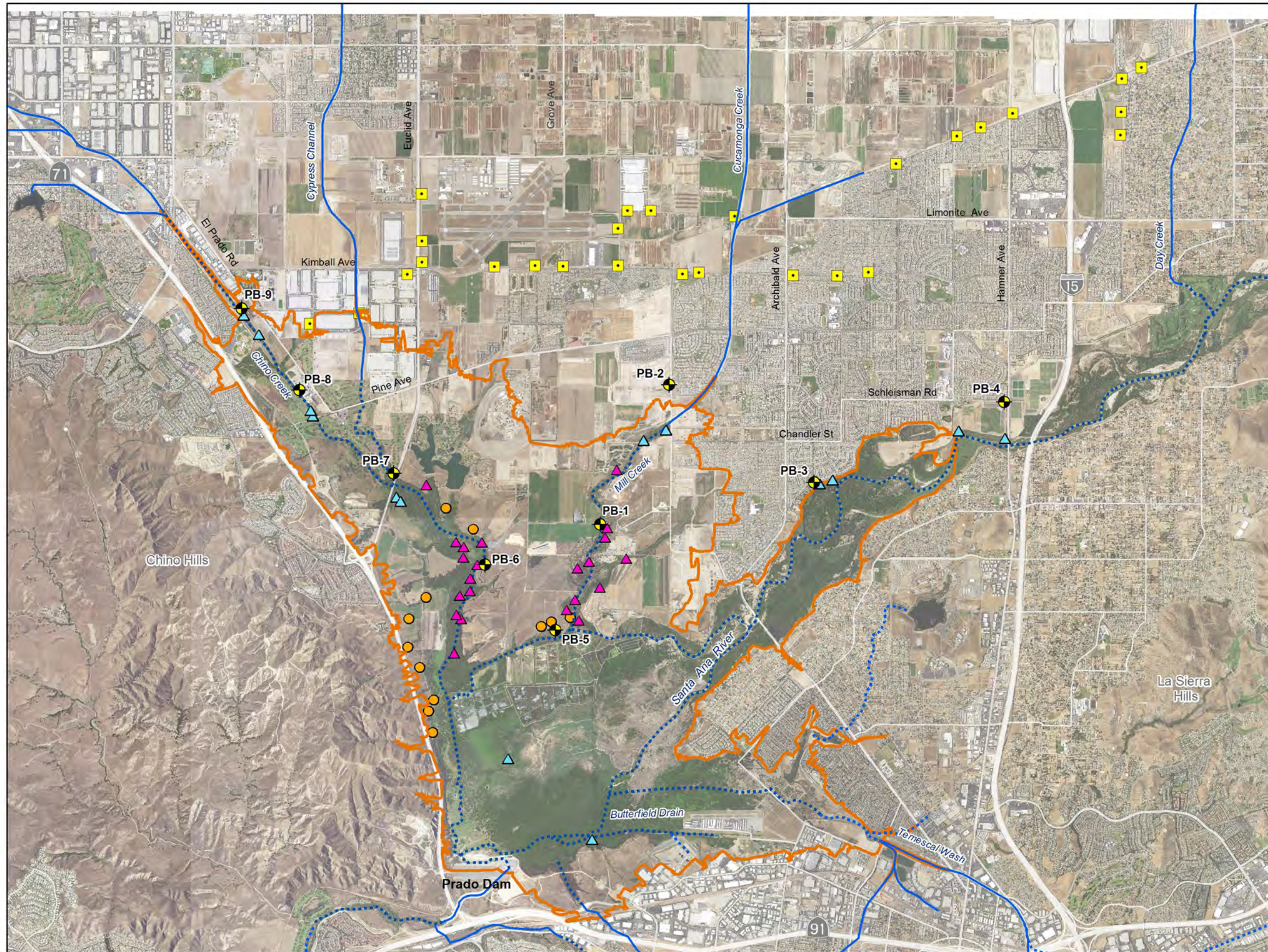
117°40'0"W



Author: NWS  
 Date: 8/22/2019  
 File: Exhibit\_L6\_Ground-Level Mon.mxd



**Ground-Level Monitoring Network**  
*Western Chino Basin*



Riparian Habitat Monitoring Program

Site-Specific Monitoring

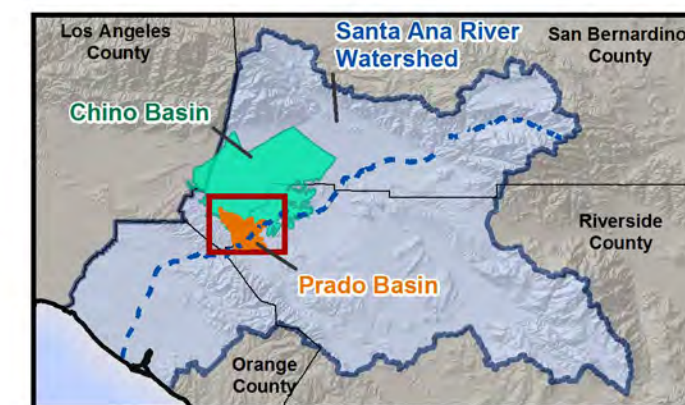
- ▲ USBR Vegetation Surveys 2007, 2013, and 2016
- ▲ USBR Vegetation Surveys 2016
- OCWD Photo Stations (2010 - 2016)

Regional Monitoring

- Prado Basin Management Zone (Prado Basin) - Area of Interest for Analysis of NDVI and Air Photos.

- Chino Basin Desalter Authority Well
- PBHSP Monitoring Well
- Concrete-Lined Channels
- Unlined Rivers and Streams

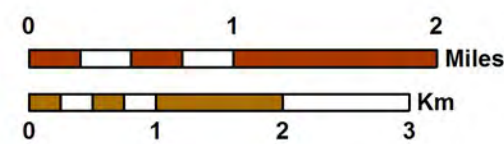
Aerial Photo: USDA, 2016. Mosaic of photos from June 2, 2016 to June 14, 2016



Prepared by:



Author: SO  
Date: 8/22/2019  
File: Exhibit\_L7\_Bio\_Monitoring



Prepared for:  
**OBMP 2020 Update**  
Scoping Report



**Biological Monitoring**

**Exhibit L-8  
Cost Estimate and Schedule to Implement Activity L**

Task and Subtask Description	Engineering Cost	FY 2020/21				FY 2021/22				FY 2022/23				FY 2023/24 and beyond	
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
<b>Task 1 Convene Monitoring and Reporting Committee and prepare the Monitoring and Reporting Work Plan</b>  · Convene Monitoring and Reporting Committee · Conduct (5) meetings to prepare Work Plan and develop recommended revisions · Prepare Monitoring and Reporting Work Plan · Prepare memorandum: Recommended Revisions to Watermaster’s Non-Discretionary Monitoring and Reporting Programs	\$125,000	\$60,000				\$65,000									
<b>Task 2 Implement Recommended Revisions to Watermaster’s Non-Discretionary Monitoring and Reporting Programs</b>	\$ TBD													\$ TBD	\$ TBD
<b>Task 3 Annual review of scope of work and cost to implement the Monitoring and Reporting Work Plan in the Subsequent Fiscal Year</b>	\$ TBD													\$ TBD	\$ TBD
<b>Total Cost and Cost by FY</b>	<b>\$125,000</b>	<b>\$60,000</b>				<b>\$65,000</b>				<b>\$ TBD</b>				<b>\$ TBD</b>	

TBD -- To be determined

