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TECHNICAL MEMORANDUM

DATE: October 11, 2023

Project No.: 941-80-23-31
SENT VIA: EMAIL

TO: Chino Basin Watermaster Parties and Interested Stakeholders of the Water Quality Committee

FROM: Veva Weamer and Samantha Adams, West Yost

SUBJECT: Development of a Water Quality Management Plan

BACKGROUND AND OBJECTIVES

The purpose of the technical memorandum (TM) is to provide the Chino Basin Watermaster (Watermaster) parties and prospective Water Quality Committee (WQC) participants background on water quality activities performed by Watermaster pursuant to the 2000 Optimum Basin Management Program (OBMP) and introduce the proposed scope and schedule for developing the *Water Quality Management Plan* (WQMP) envisioned in the 2020 OBMP Update (2020 OBMPU).

This TM documents: (i) background on the Judgment and OBMP related to water quality; (ii) how water quality been addressed under the OBMP since 2000; (iii) current water quality management opportunities that can benefit from a WQMP; (iv) an initial vision for reconvening the Watermaster's WQC to develop a WQMP; and (v) the proposed scope and schedule to develop the WQMP.

Judgment, OBMP, and Water Quality

Paragraph 41 of the Chino Basin Judgment gave Watermaster the discretionary authority to develop an OBMP for the Chino Basin, including both water quantity and water quality considerations. Watermaster, with direction from the Court, began developing the OBMP in 1998 as a collaborative stakeholder process and completed it in July 2000 (2000 OBMP). The 2000 OBMP established basin management goals and identified the impediments to achieving the goals and the necessary actions to remove the impediments to achieve the goals. The management actions were logically grouped into sets of coordinated activities called Program Elements (PEs). One of the goals of the 2000 OBMP was to "Protect and Enhance Water Quality" to ensure the protection of the long-term beneficial uses of Chino Basin groundwater. The 2000 OBMP included multiple PEs to protect and enhance water quality:

- PE 1—*Develop and Implement Comprehensive Monitoring Program*. PE 1 is a comprehensive monitoring program, including the collection of basin-wide water quality, to collect the data necessary to support the implementation of the other PEs.
- PE 3—*Develop and Implement a Water Supply Plan for Impaired Areas*. PE 3 provided for the construction and operation of regional groundwater desalters—the Chino Basin Desalters—to pump and treat high-salinity groundwater in the southern part of the basin to maintain and enhance safe yield and meet increasing municipal water demands.

- PE 6—*Develop and Implement Cooperative Programs with the Regional Board and Other Agencies to Improve Basin Management*. PE 6 was designed to assess water quality trends in the basin, evaluate the impact of OBMP implementation on water quality, determine whether point and non-point contamination sources are being addressed by water quality regulators, and enable collaboration with water quality regulators to identify and facilitate the cleanup of soil and groundwater contamination.
- PE 7—Develop and Implement Salt Management Plan. PE 7 included actions to characterize current and future salt and nutrient conditions in the basin and to subsequently develop and implement a plan to manage them. The Chino Basin Desalters in PE 3 became an integral management strategy of the Chino Basin Salt and Nutrient Management Plan developed under PE 7.

In 2020, the Watermaster completed the 2020 OBMPU through a collaborative stakeholder process to review and refine the goals, impediments, actions, and PEs of the OBMP.[1] Through the 2020 OBMPU development process, the stakeholders concluded that the goals and PEs defined in the 2000 OBMP are still relevant today and identified additional management activities necessary to achieve the goals of the 2020 OBMPU. Two of the 2020 OBMPU activities address groundwater quality, including contaminants of emerging concern:

- Develop and implement a water-quality management plan to address current and future water-quality issues and protect beneficial uses.
- Develop strategic regulatory-compliance solutions that achieve multiple benefits in managing water quality.

The specific action defined for PE 6 to encapsulate these activities within the 2020 OBMPU is the development of a WQMP that addresses emerging contaminants of concern and provides for the long-term maximum beneficial use of the basin. The WQMP envisioned in the 2020 OBMPU is intended to address emerging contaminants of concern to better prepare the parties for addressing compliance with new State and Federal drinking water regulations, individually or collaboratively.

Water Quality Management Under PE 6: 2000 to 2022

To support the development and implementation of the 2000 OBMP, Watermaster conducted a comprehensive basin-wide water quality monitoring program from 1999-2001 to characterize the spatial distribution of key water quality constituents. The comprehensive water quality monitoring program included compiling water quality data collected by Appropriators (and other cooperators) in the Chino Basin and adjacent basins, and performing water quality sampling at all accessible private wells in the southern portion of the basin. During this time, Watermaster performed water quality sampling at 602 private wells. Data from this comprehensive water quality monitoring program established a baseline on the state of groundwater quality at the start of OBMP implementation. These data also became the foundation for achieving the objectives of PE 6: to assess water quality trends in the basin, to evaluate the impact of OBMP implementation on water quality, and to determine whether point and non-point contamination sources are being addressed by water quality regulators.

[1] 2020 OBMPU Update Report

Since 2000, Watermaster's groundwater quality monitoring efforts under PE 1 have periodically been refined, as needed, to: assess trends over time for key constituents (such as total dissolved solids [TDS] and nitrate); support the detection and delineation of water quality plumes; and define the spatial distribution of contaminants of concern, such as perchlorate, hexavalent chromium, and 1,2,3-trichloroethene (1,2,3- TCP), and collaborate with the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) in its efforts to work with dischargers to facilitate the cleanup of groundwater contamination.

In 2003, the WQC was convened to coordinate the activities performed under PE 6, including the review of water quality conditions in the Chino Basin and development of cooperative strategies and plans to improve water quality in the basin in collaboration with the Santa Ana Water Board. The WQC met intermittently through 2010. The main activities of the WQC during that time included (1) investigations to characterize and address point and non-point sources of groundwater contamination in the Chino Basin, and (2) collaboration with the Santa Ana Water Board in its efforts to facilitate the cleanup of groundwater contamination. Some of the significant groundwater quality investigations performed under the guidance of the committee included:

- Characterization of groundwater contamination in OBMP management zone 3 (MZ-3) near the former Kaiser Steel Mill and Alumax facilities.
- Tracking investigations and actions to define the source, extent, and responsible party of the Chino Airport trichloroethylene (TCE) plume.
- Identification of potential sources and responsible parties for the South Archibald TCE plume.
- Characterization of perchlorate concentrations in the Chino Basin and identification of legacy sources of perchlorate contamination.

Prior to the startup of the WQC, the Chino Airport and South Archibald plumes in the southern part of the Chino Basin were of unknown origin and were in areas that could impact groundwater quality pumped by the existing and/or proposed Chino Basin Desalter wells. The WQC's investigations contributed to the definitive identification of responsible parties and the issuance of cleanup and abatement orders by the Santa Ana Water Board for both plumes. More recently, the responsible parties for the Chino Airport and South Archibald plumes have each initiated remedial strategies to treat the contaminated groundwater associated with these plumes by using the Chino Basin Desalters, expanding the use of this water quality treatment program for multiple benefits and cost sharing for involved parties. The potential to use the Chino Basin Desalters to support cleanup of additional contaminants was first recognized as a management strategy in the 2000 OBMP.

Due in part to the coordinated efforts of the WQC, grant funding was secured for water quality implementation actions of the 2000 OBMP:

- The Inland Empire Utilities Agency (IEUA) received $250 thousand in grant funds from the California Department of Water Resources (DWR) to perform a monitoring investigation in MZ-3, including the construction of two multi-port monitoring wells. This study was coordinated with the WQC studies on contamination in MZ-3 and perchlorate source characterization.
- The Chino Basin Desalter Authority (CDA) and IEUA received over $85 million in federal and state grant funds for the Chino Basin Desalter Phase III expansion project that is being used for portions of the remediation of the Chino Airport and South Archibald plumes identified by the WQC.

After the WQC discontinued its meetings in 2010, Watermaster continued to assist the Santa Ana Water Board with the investigation and regulation of point source contaminant sites in the Chino Basin and performed monitoring and analysis for contaminants related to point-source and non-point source contamination, as needed. The ongoing water quality monitoring and analysis performed by Watermaster as of 2023 includes:

- Conducting annual water quality sampling at key monitoring wells and private wells.
- Preparing annual or semiannual status reports on the monitoring and remediation of point-source contaminant sites, including the Chino Airport plume, South Archibald plume, General Electric (GE) Test Cell plume, GE Flatiron plume, former Kaiser Steel Mill Facility, CIM plume, Stringfellow plume, and Milliken Landfill plume.
- Preparing updated delineations of the spatial extent of the contaminant plumes every two years.
- Reporting on water quality trends and findings in the OBMP State of the Basin Reports, which are prepared and submitted to the Court every two years.

Water Quality Management Challenges and Opportunities

Throughout most of the Chino Basin, there are contaminants in groundwater that can limit its direct use for drinking water supply if treatment is not implemented. Since the implementation of the 2000 OBMP, the State Water Resources Control Board Division of Drinking Water (DDW) has adopted three new Primary Maximum Contaminant Levels (MCLs) for drinking water including perchlorate, hexavalent chromium, and 1,2,3-TCP[2]. The implementation of these regulations has impacted pumping by municipal water agencies in the Chino Basin. The most recently established MCL is for 1,2,3-TCP which was adopted by the DDW in 2017. The MCL for 1,2,3-TCP is a significantly stringent MCL (low concentration in parts per trillion) and upon adopted of the MCL it required municipal agencies to immediately initiate monitoring and comply with the MCL. There were multiple municipal agencies in the Chino Basin that had to immediately restrict or cease pumping at wells to comply with the 1,2,3-TCP MCL. Prior to the adoption of the MCL for 1,2,3-TCP, monitoring for the presence of 1,2,3-TCP in groundwater was limited or nonexistent, including at many of the wells with concentrations that were found to exceed the MCLs. As such, some agencies were not prepared to quickly comply with the new MCL.

The DDW and the federal Environmental Protection Agency (EPA) continue to monitor and evaluate other emerging contaminants of concern in drinking water to determine if MCLs are needed. Most recently, per- and poly-fluorinated compounds (PFAS) have been the subject of review, and both DDW and EPA have set stringent health based advisory levels (i.e. notification levels, response levels, health advisory levels, and proposed MCLs). The DDW and EPA are both working towards developing and adopting final MCLs for certain PFAS chemicals. The process to review and establish new drinking water regulations for emerging contaminants of concern will continue as new contaminants are discovered (or the ability to detect them improves). It should be expected that water-quality regulations will continue to be more restrictive. To prepare for the challenges of complying with potential future MCLs, it is important for

[2] Drinking water is regulated by the DDW. The enforceable drinking water standards to protect the public from potential negative health effects are Primary MCLs set by the DDW. Water supplies that exceed MCLs cannot be used for drinking water without treatment (blending is the most common treatment).

municipal water supply agencies to understand which emerging contaminants of concern are candidates for regulation, potential regulatory limits, and the occurrence of those contaminants in groundwater and other water supplies.

With each new or increased MCL, the ability to put groundwater to beneficial use is increasingly constrained and the affected municipal water supply agencies must determine how to adjust pumping operation to comply, such as implement treatment of groundwater from impacted wells or shut down the pumping wells. It is likely that the initial response actions for compliance with new MCLs will be to shut down pumping at wells with concentrations that exceed the MCL until a treatment plan is developed and implemented, which could take years. There may be multiple impacted water supply agencies in the Chino Basin that are simultaneously facing these decisions and issues, the additive impact of which could result in the inability to pump groundwater rights and alter where groundwater is pumped in the Chino Basin. Such changes in the parties' pumping in response to drinking water regulations can impact other important basin management issues in the Chino Basin, such as: the Safe Yield, maintenance of hydraulic control, groundwater recharge, the movement of point source contaminant plumes, and groundwater storage programs.

In this way, water quality is not a standalone basin management issue and is connected to all other Watermaster basin management activities such as the determination of Safe Yield, Recharge Master Plan, Storage Management Plan, Storage and Recovery Master Plan, Chino Basin Maximum Benefit Salt and Nutrient Management Plan, and Subsidence Management Plan. Thus, how agencies respond to water quality regulations, individually or collectively, could impact any of these programs. For example, reduced pumping in southern Chino Basin could impact the ability to maintain hydraulic control, the maintenance of which is required to enable the recycled water recharge program. "Impacts" could also include new or enhanced opportunities (e.g. projects or operational changes) for multi-benefit solutions that enhance the parties' abilities to pump their water rights. Optimizing the management of the basin under the OBMP necessitates an understanding of groundwater quality relative to emerging contaminants of concern and how the various management actions will interact with the performance of other programs.

Water Quality Management Plan

For the reasons described above, the concept of developing a WQMP as a strategic approach to understanding the potential opportunities and impacts of complying with new drinking water regulations was identified as a new activity under PE 6 of the 2020 OBMPU. The objectives of a WQMP are to better position the parties to optimally protect beneficial uses and their ability to pump their groundwater rights, and enhance Watermaster's ability to factor in water quality management considerations across its various programs and management actions under the OBMP. This strategic and coordinated approach to water quality would build on what was accomplished under PE 6 of the 2000 OBMP.

The WQMP concept envisioned in the 2020 OBMPU included: (1) performing a current water-quality assessment, including performing expanded monitoring for emerging constituents, (2) identifying potential alternative projects for water quality improvements, (3) developing reconnaissance-level engineering evaluations for design and operation of potential projects, (4) selecting project(s) for implementation and preparing an implementation plan, and (5) preparing a final WQMP. Since this initial description of the WQMP in the 2020 OBMPU, further considerations and conversations between Watermaster and the parties are affirming the need for a strategic framework to optimally manage water quality, but the scope of the WQMP does not necessarily need to include reconnaissance-level engineering design and operating plan evaluations for projects, nor the selection of projects. Rather, the scope and depth of the plan should be defined by the parties through reconvening the WQC.

As envisioned now, a WQMP would provide the parties with a strategic framework for reconvening the WQC to address some or all the following: (1) informing stakeholders on the available data and information on water quality; (2) regularly educating and sharing information on potential future water quality regulations; (3) systematically assessing emerging contaminants being considered for regulation and performing monitoring to characterize contaminant occurrence where data is not available; (4) tracking available grant funding and loan opportunities; (5) identifying opportunities for multi-agency and/or multi-benefit projects; (6) discussing/assessing potential impacts of operational/management responses to water quality regulations on other Watermaster management efforts; (7) establishing annual scope of work and budgets for WQC activities; and (8) conducting other activities of interest to the stakeholders. The WQMP should be an adaptive plan that can change to address evolving water quality issues and opportunities, as needed. The regional collaboration and planning of the WQMP increases the ability and success in obtaining grant funds or low-interest loans for conducting investigations and/or for the design and construction of facilities for treatment.

WQC

Based on the successes of the WQC in implementing PE6 of the 2000 OBMP, it was identified that reconvening the WQC would be the ideal approach to guide the development and implementation of the WQMP. The WQC should be comprised of representatives from interested parties and stakeholders that can guide the development and implementation of a WQMP and make recommendations to the Pools, Advisory Committee, and Board.

Watermaster will hold a kick-off meeting to reconvene the WQC on October 18, 2023 and will plan to hold two to three additional WQC meetings in fiscal year 2023/24. The goal is for the WQC to develop refined goals and objectives for the WQMP, refine the scope of work to develop the WQMP to accomplish the objectives, define an initial emerging contaminants monitoring program, and discuss any other water quality topics that the committee determines important on water quality management in the Chino Basin. The WQMP will ultimately serve as a framework for the ongoing activities and meetings of the WQC.

PROPOSED SCOPE OF WORK FOR DEVELOPING A WATER QUALITY MANAGEMENT PLAN

The proposed scope to develop a Water Quality Management Plan includes the following tasks:

1. Convene the Water Quality Committee, define objectives, and refine scope of work;
2. Develop and implement an initial emerging-contaminants monitoring plan;
3. Perform a water quality assessment and prepare a scope to develop and implement a Water Quality Management Plan;
4. Develop Water Quality Management Plan

As noted previously, this is refined from the scope initially described in the 2020 OBMPU, which included tasks to identify potential projects, conduct reconnaissance-level studies of projects, and select, plan, design and build project/s as part of the plan. This proposed scope removes those tasks because the precise scope of the WQMP is dependent on the objectives and scope developed by the WQC and outcome of the previous tasks (1-3). Work to identify potential projects, conduct reconnaissance-level studies of projects, and select, plan and implement project/s, can become implementation actions of the WQMP.

SCHEDULE AND NEXT STEPS

Table 1 shows the anticipated schedule to develop the WQMP over the next three fiscal years through June 2026. The WQC kick-off meeting for Task 1 will take place on October 18, 2023 at 1:00 pm. Future committee meetings are planned to take place approximately every quarter until the WQMP is finalized by the end of Q2 2026.

At the WQC kick-off meeting, the participants will be asked to provide initial input on goals and objectives for the WQC and WQMP.

Table 1. Schedule to Develop a Water Quality Management Plan

Task	2023 Q4	2024 Q1	2024 Q2	2024 Q3	2024 Q4	2025 Q1	2025 Q2	2025 Q3	2025 Q4	2026 Q1	2026 Q2
1 - Convene the Water Quality Committee, define objectives, and refine scope of work											
2 - Develop and implement an initial emerging-contaminants monitoring plan											
3 - Perform a water quality assessment and prepare scope to develop and implement a Water Quality Management Plan											
4 - Develop Water Quality Management Plan											