

July 13, 2021

Mr. John Schatz, Esq.
P.O. Box 7775
Laguna Niguel, CA 92607

Re: Review of West Yost 2021/22 Scope of Work Regarding the Chino Basin Watermaster Safe Yield Reset Methodology and Recommended Modifications

Dear Mr. Schatz,

At the request of the Chino Basin Watermaster Appropriative Pool (AP), I have prepared this letter summarizing my review of the Chino Basin Watermaster's (Watermaster's) scope of work to support implementation of the San Bernardino County Superior Court's (the Court's) Order for the Safe Yield Reset process. The draft scope of work, as developed by Watermaster's engineer West Yost, is described in "*Account 7614 – PE8/9: Storage Management/Conjunctive Use - Support Implementation of the Safe Yield Court Order*" of the Watermaster 2021/22 Fiscal Year budget. This scope of work includes three tasks:

1. Update the Safe Yield Methodology
2. Annual Data Collection and Evaluation
3. Support Peer Review Process

The AP has asked me to review the proposed scope of work and render an opinion as to whether it is consistent with the Court's Order for the Safe Yield Reset Process.¹ To that end, my opinions presented herein are based on a review of the following documents:

- Section 4.4 Safe Yield Reset Methodology of the Court's Order for the Safe Yield Reset Process¹
- Draft Watermaster Summary of Proposed Engineering Services and Cost Estimates for Fiscal Year 2021/22; Account 7614 – PE8/9: Storage Management/Conjunctive Use - Support Implementation of the Safe Yield Court Order

¹ Chino Basin Municipal Water District v. City of Chino et al., San Bernardino Superior Court Case No. RCV 51010. Notice of Rulings after Hearing on Watermaster's Motion Regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6. Dated April 28, 2017.

- West Yost’s detailed Draft Work Breakdown describing the individual tasks for updating the Safe Yield Reset Methodology
- TH&Co’s Technical Review of the Models and Methodology Used as a Basis for the 2020 Safe Yield Reset (letter to John Schatz dated April 23, 2020)

I have also had two phone conversations with Garrett Rapp of West Yost to get additional detail and clarity regarding their initial draft proposed scope of work.

Conclusion Regarding Scope of Work Consistency with Court Order

In evaluating whether the West Yost scope of work is consistent with the Court’s Order for the Safe Yield Reset process, my primary frame of reference is Section 4.4 of the Court’s Order, which states, *“In furtherance of the goal of maximizing the beneficial use of the waters of the Chino Basin, Watermaster, with the recommendation and advice of the Pools and Advisory Committee, may supplement the Reset Technical Memorandum’s methodology to incorporate future advances in best management practices and hydrologic science as they evolve over the term of this order.”* By use of the term “may,” the Order suggests that modifications to the Safe Yield Reset Methodology are optional. Supplemental changes to the methodology deemed appropriate or necessary could include any of several “best management practices” or advances in “hydrologic science,” which could encompass a broad range of topics.

Based on my review of West Yost’s proposed scope of work in support of implementing the Safe Yield Court Order, and specifically Task 1 (Task 3 in the detailed work breakdown), it appears that they have developed it, at least in part, in response to recommendations I made on behalf of the AP after reviewing the models and methodology used to reset the Safe Yield in 2020.² One of the recommendations I made in that letter was that the Watermaster should conduct a predictive uncertainty analysis on the Safe Yield estimate to “provide the basin managers a sense as to the potential variability in the estimate, for use in making decisions” (pg. 4, 2nd paragraph). Watermaster’s Task 1 scope of work includes (in part):

- The Consultant will define proposed approaches to apply the state-of-the-art practice to address model uncertainty in updating the Safe Yield and perform a preliminary assessment of their applicability to the Chino Basin.
- The Consultant will quantify the computational tractability of performing up to three proposed approaches to modeling uncertainty. This includes estimating the time and resources necessary to automate the creation and implementation of model ensembles, perturbing model parameters, and post-processing data for each of the proposed approaches.

² TH&Co, 2020. Technical Review of the Models and Methodology Used as a Basis for the 2020 Safe Yield Reset. Letter Report Submitted to John Schatz on April 23, 2020.



In the sense that this scope of work is in response to the recommendation of the AP and reflects future advances in best management practices and hydrologic science, it is consistent with Section 4.4 of the Court Order for the Safe Yield Reset Process.

Recommended Modifications to the Draft Scope of Work

The detailed scope of work for Task 1, as provided by West Yost, includes several tasks that are, in my opinion, the responsibility of the consultant and should not be included. The detailed breakdown for Task 1 (which is Task 3 in the detailed breakdown) is as follows:

Task 3	Update Safe Yield Reset Methodology (CO Paragraph 4.4)
3.01	Define initial conceptual approaches to address modeling uncertainty
3.02	Prepare internal TM based on findings in 3.01
3.03	Review TM with WM staff
3.04	Review literature to assess state-of-the-art modeling methods
3.05	Prepare internal TM documenting and comparing state-of-the-art methods
3.06	Review TM with WM staff
3.07	Develop alternatives for addressing uncertainty and implementation approaches
3.08	Prepare internal TM documenting alternatives developed in 3.07
3.09	Review TM with WM staff
3.10	Quantify computational tractability
3.11	Prepare internal TM documenting computational cost and time estimates developed in 3.08
3.12	Review TM with WM staff
3.13	Prepare draft methodology TM #1 for peer review
3.14	Review TM with WM staff
3.15	Revise and finalize TM, send to Watermaster parties
3.16	Prepare powerpoint presentation and agenda for first peer review workshops
3.17	Review powerpoint with WM staff
3.18	Revise and finalize powerpoint
3.19	Conduct peer review workshops #1/2
3.20	Prepare draft responses to peer review comments
3.21	Review responses with WM staff
3.22	Finalize responses to peer review comments

Subtasks 3.04 through 3.06 (yellow highlighted tasks) involve research into state-of-the-art modeling methods, tasks that would typically be conducted by the consultant outside the formal scope of work as part of their own internal research and development. Subtasks 3.10 through 3.12 involve the consultant testing analysis approaches with their equipment to develop computational costs and schedules, a process that should also be the responsibility of the consultant. In my opinion, these research and development tasks should not be included in the Task 1 (Task 3) scope of work. Based on the detailed draft scope of work/cost estimate provided to TH&Co, removal of these tasks would reduce the Task 1 budget by \$82,006.



Regarding the scope of work in Task 2, all of the subtasks shown below will eventually be needed and/or beneficial to update the groundwater flow model for reevaluating the Safe Yield:

2	<i>Collect data and prepare initial data collection report for FY2020/21 data (CO Paragraph 4.5)</i>
2.01	Inventory existing data and typical data needs from Parties
2.02	Collect and tabulate data from AP Parties' 2020 UWMPs
2.03	Coordinate with WM staff for stakeholder meetings
2.04	Prepare materials for stakeholder meetings
2.05	Conduct stakeholder meetings/workshops
2.06	Debrief with WM staff after stakeholder meetings
2.07	Coordinate with WM to develop documentation on groundwater pumping records and estimates
2.08	Collect current land use data and associated supporting data and information
2.09	Compare current land use data to projections from 2020 SYR
2.10	Prepare technical memorandum characterizing land use data
2.11	Collect data on water use practices
2.12	Prepare exhibits and text characterizing water use data
2.13	Collect groundwater pumping data
2.14	Prepare exhibits and text comparing historical groundwater pumping to past projections
2.15	Collect data to update status of regional water infrastructure
2.16	Prepare exhibits and text to describe regional infrastructure
2.17	Develop draft report
2.18	Prepare for and conduct peer review meetings on report
2.19	Respond to comments on report
2.20	Complete final report

While the Court Order specifies annual data collection for many of the Task 2 Subtasks proposed by West Yost (e.g. groundwater pumping and cultural conditions), Subtasks 2.09 and 2.14 (yellow highlighted) are analysis tasks that, based on the description above, do not appear to be necessary now to advise “prudent management discretion.”³ Further, it will be more meaningful to conduct these analyses closer to model calibration for the next Safe Yield Reset when more data are available for comparison. I recommend Subtasks 2.09 and 2.14 be removed from the scope of work.

Regarding Task 3 Support Peer Review Process, the scope of work with respect to level of effort provided by West Yost is consistent with previous peer review efforts and typical of Watermaster process. While I don’t have any comments regarding the hours, the current plan to develop the scope of work internally within Watermaster, then present it to the Appropriative Pool via a series of workshops in the Spring of 2022 after the methodology has been developed is problematic. By

³ Chino Basin Municipal Water District v. City of Chino et al., San Bernardino Superior Court Case No. RCV 51010. Notice of Rulings after Hearing on Watermaster’s Motion Regarding 2015 Safe Yield Reset Agreement, Amendment of Restated Judgment, Paragraph 6. Dated April 28, 2017. Section 4.5 (c).



limiting outside technical input until after the methodology is drafted could result in peer review input that requires significant additional work, and cost, that can be avoided if technical input is provided throughout the development. I'm sensitive to Watermaster's concern that having too many representatives involved in the process can slow it down. My recommendation is that the Watermaster include one technical representative from the Pools to participate in the development of the Safe Yield Reset methodology from the beginning to ensure that the APs concerns are addressed and to avoid delays during the peer review process prior to implementation.

In summary, I recommend removing the following subtasks from the Watermaster 2021/22 scope of work for Account 7614 to Support Implementation of the Safe Yield Court Order:

Task 1 (Task 3 of West Yost Detail) Update Safe Yield Methodology

3.04 Review literature to assess state-of-the-art modeling methods	\$26,024
3.05 Prepare internal TM documenting and comparing state of the art Methods	\$13,012
3.10 Quantify computational tractability	\$34,204
3.11 Prepare internal TM documenting computational cost and time estimates developed in 3.08	<u>\$8,766</u>
Subtotal Task 1:	\$82,006

Task 2 Annual Data Collection and Evaluation

2.09 Compare current land use data to projections from 2020 SYR	\$11,008
2.14 Prepare exhibits and text comparing historical groundwater pumping to past projections	<u>\$9,036</u>
Subtotal Task 2:	\$20,044

I appreciate the opportunity to provide consulting services to the Chino Basin Watermaster Appropriative Pool. If you have any questions, don't hesitate to contact me at (714) 394-4449.

Sincerely,



Thomas Harder, P.G., C.HG.
Principal Hydrogeologist

