RICHARDS, WATSON & GERSHON
A Professional Corporation
JAMES L. MARKMAN (BAR NO. 43536)
jmarkman@rwglaw.com
KYLE H. BROCHARD (BAR NO. 293369)
kbrochard@rwglaw.com
JACOB C. METZ (BAR NO. 341565)
jmetz@rwglaw.com
350 South Grand Avenue, 37th Floor
Los Angeles, California 90071
Telephone: 213.626.8484
Facsimile: 213.626.0078

Attorneys for Cross-Defendant
INDIAN WELLS VALLEY GROUNDWATER AUTHORITY

SUPERIOR COURT OF THE STATE OF CALIFORNIA

COUNTY OF ORANGE, CIVIL COMPLEX CENTER

MOJAVE PISTACHIOS, LLC, et al., Plaintiffs, v. INDIAN WELLS VALLEY WATER DISTRICT, et al. , Defendants.	Case No. 30-2021-01187275-CU-OR-CJC (Related to Case Nos.: 30-2021-01187589-CU-WM-CXC; 30-2021-01188089-CU-WM-CXC; 30-2022-01239487-CU-MC-CJC; 30-2022-01239479-CU-MC-CJC; 30-2022 01249146-CU-MC-CJC) **INDIAN WELLS VALLEY GROUNDWATER AUTHORITY AND CITY OF RIDGECREST'S PHASE 2 CLOSING TRIAL BRIEF**
AND CROSS-COMPLAINTS AND RELATED ACTIONS.	Action Filed: November 19, 2019 Trial Date: June 8, 2026 (Phase 2) Hon. William D. Claster [Exempt from filing fees pursuant to Govt. Code § 6103]

RICHARDS WATSON GERSHON
ATTORNEYS AT LAW - A PROFESSIONAL CORPORATION

ALESHIRE & WYNDER, LLP
KEITH LEMIEUX, State Bar No. 161850
klemieux@awattorneys.com
PHILLIP W. HALL, State Bar No. 230019
phall@awattorneys.com
ALEX LEMIEUX, State Bar No. 302602
alemieux@awattorneys.com
2659 Townsgate Rd., Suite 226
Westlake Village, California 91361
Telephone: (805)495-4770
Facsimile: (805)495-2787

Attorneys for Cross-Defendant
CITY OF RIDGECREST

RICHARDS WATSON GERSHON
ATTORNEYS AT LAW - A PROFESSIONAL CORPORATION

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I. INTRODUCTION

The Indian Wells Valley Groundwater Authority (the "Authority") and the City of Ridgecrest (the "City") submit this closing brief on the Phase 2 question, the safe yield of the Indian Wells Valley Groundwater Basin (the "Basin"). Safe yield is the maximum quantity of water that can be withdrawn from a groundwater basin each year, on a long-term average, without the basin being depleted.

Here, the Basin has been studied since 1913, with more than 20 studies estimating the natural recharge to the Basin. Since 1989, every study and report—prior to this trial—estimated natural recharge to the Basin at between about 6,000 and 10,000 acre-feet per year ("AFY"[1]), save one 1996 interim report based on an open basin theory that has since been disproven. As the Basin has become better understood, the estimates of recharge have declined. (Ex. 955-22 to 23; Ex. 4-10 to -11; Ex. 80-19 to 24; TR 06/22/2026, p. 1592:15-19.[2]) That is until this lawsuit was filed.

Based on those studies, by neutral scientists and engineers trying to better understand the Basin, including work performed for the groundwater sustainability plan and periodic evaluation, the Authority's independent expert has opined that the Basin's safe yield is likely within a range of 6,100 and 8,400 AFY with 7,650 AFY being a reasonable estimate. The Large Pumpers in the Basin, those who previously agreed the long-term average recharge was around 7,650 AFY, now opine that the safe yield is actually double.

So how did we get here? Prior to the lawsuit, the Authority's 2020 Groundwater Sustainability Plan (the "GSP") determined the long-term average natural recharge to the Basin was 7,650 AFY. That determination was made only after years of work with a Technical Advisory Committee ("TAC") that included representatives for the large pumpers present in this lawsuit,

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[1] Unless otherwise stated, every quantity of water is an annual figure in acre-feet ("AF") or acre-feet per year ("AFY"); an acre-foot is the volume that covers one acre to a depth of one foot, about 326,000 gallons.

[2] Citations to "TR" are to the reporter's transcripts from trial or a pretrial hearing, which shall be followed by the date of the hearing, page, and line; exhibit citations give the trial exhibit number and the stamped page; filings are cited by their register-of-actions number ("ROA"). The Phase 2 opening brief of the Authority and the City is cited as the "Authority Opening Brief," and the opening brief of the District, Searles, and Meadowbrook as the "TWG Opening Brief."

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including some of the same consultants that testified in this phase. The TAC members and the Authority's water resources manager reviewed the prior studies of the Basin and agreed that working with Desert Research Institute ("DRI") to update a groundwater model previously developed for use by United States for Naval Air Weapons Station-China Lake ("NAWS") was the best tool to evaluate and manage the Basin. Experts for the Meadowbrook Dairy entities (Teasdale) and the Indian Wells Valley Water District (Parker) were part of the TAC and the model ad-hoc committee that reviewed and advised on the changes to the model, which culminated with a calibrated groundwater model that validated a long-term average recharge value of 7,650 AFY. The GSP set the sustainable yield at 7,650 AFY, while acknowledging that additional losses in storage would still occur as a result of evapotranspiration. The California Department of Water Resources ("DWR") reviewed the GSP, determined it was based on the best available science and data, and approved the GSP. That model (the "2020 GSP Model") has since been significantly upgraded to the one used in Phase 2 (the "2025 DRI Model").

Then came time to implement the GSP. That meant fees imposed to fund the acquisition of a water importation project. This lawsuit followed in which those who must reduce their extractions or pay fees for the import project now seek to argue there is more water available for extraction than any researcher has previously suggested.

After the lawsuit was filed, the same consultants that previously agreed that the average long-term recharge in the basin was 7,650 AFY, now opined that the safe yield of the Basin is between 14,300 to 15,400 AFY. The Indian Wells Valley Water District (the "District"), Searles Valley Minerals Inc. ("Searles"), and the Meadowbrook Dairy entities ("Meadowbrook"), the largest extractors in the Basin, parties that call themselves the Technical Working Group (referred to herein as the "TWG" or "Large Pumpers"), have offered no credible evidence that would support a safe yield figure higher than 7,650 AFY, in fact it very well could be lower. Sixty years of study, including multiple groundwater models, and the continuously growing cones of depression under the pumping centers all support the Authority and the United States position.

The Large Pumpers have reached higher numbers using a base period that is not representative of long term conditions—instead representing a wet period—that was chosen only

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after Meadowbrook's expert told their attorney they would compare safe yield values over different base periods. Those experts (Parker and Teasdale) rely on a loss of storage analysis using a Thiessen Polygon approach. Such an analysis is a back-of-the-napkin approach that is highly sensitive to base period and specific yield (Sy) values used in the calculation. That method is used to estimate storage loss or safe yield only when no other options are available. That is not the case here, where the 2025 DRI Model provides a far more robust tool. Moreover, the Sy used in their analysis is derived from models. If the model's calculation of Sy is reliable, use the model. If the model is not reliable, then the Sy is not reliable and the follow-down estimate of safe yield from the polygon approach will be wrong.

Further, their polygon methods assume the basin is bath tub, with all of the aquifer accessible to all extractions; it is not. The Basin is fractured with numerous faults severally impeding flow from one area to another, and the majority of wells are clustered in one area, unable to access water in the El Paso region or northeast are of the Basin. Moreover, the TWG's polygon calculations cannot be reproduced because they do not identify where they are missing data, where they intentionally omitted data, or how they filled these gaps. Lastly, Mr. Teasdale read depth-to-water measurements at Meadowbrook's wells as if they were water level elevations, and so calculated water levels that were falling as stable or rising, in multiple polygons, resulting in incorrect calculations. (TR 06/22/2026, pp. 1517:13-1518:25.)

Those same experts also consulted in the creation of a new groundwater model (the "Ramboll Model"), which the Large Pumpers claim is well calibrated and supports their opinions. It is not, and does not. That model uses recharge inputs from a version of the Basin Characterization Model ("BCM") that is not calibrated to the Indian Wells Valley, and which the TAC and the District's own expert previously recognized was not the best tool for this Basin. The Ramboll Model also assumes and then adds multiple anthropogenic sources of recharge to the aquifer, but there is no evidence these sources actually recharge the Basin. In fact, the evidence suggests they do not. Moreover, if they do reach the aquifer, it will take more than 100 years from when they were released. The Ramboll Model does not account for this lag time, instead wrongly placing anthropogenic sources at the aquifer immediately. As a result of forcing more recharge into

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the model than reasonably occurs in this Basin, the Ramboll Model, in every time step, computes groundwater levels of about 20 feet above the land surface across the dry China Lake playa. The model also simulates groundwater levels over 1,000 feet above land surface in the northwestern corner of the Basin where subflow from Rose Valley is believed to occur. When a no pumping simulation was performed to see if the model could replicate predevelopment conditions, the model simulated a perennial lake in the desert that has not existed for more than 10,000 years.

The 2025 DRI Model is the best science and technology available to estimate safe yield in this Basin. That model, consistent with numerous previous models by different developers, supports long-term average recharge in the Basin of 7,650 AFY. No new data has been collected or technology utilized that would support a safe yield number higher than this. In fact, if you use a balanced base period (1990-2015), and you remove just the unverified agricultural return flows, the Ramboll Model estimates a safe yield of between 7,790 AFY and 8,290 AFY (TR 06/16/2026, pp. 1079:5-1081:15), removing the other unproven, and unlikely to occur, man-made sources of recharge further reduces the safe yield to between 6,470 - 6,970 AFY. The inputs to Large Pumpers own model further proving the reasonableness of the 7,650 AFY used in the GSP, and the unreasonableness of the Large Pumpers' inflated safe yield opinions.

The question that is being asked in this phase is whether the Large Pumpers have proven that the Basin yields twice as much water as what everyone else previously found? They have not. The Court is assigning a Special Master to provide an opinion of safe yield. The Court has asked for someone "looking at both the change in storage method and the modeling and the various flaws that both sides have pointed out in the various methods." (TR 06/29/2026, p. 2173:21-2174:6.) It also asked that the Special Master consider "the potential bias of some of the experts depending on who they're testifying for." (TR 06/29/2026, p. 2174:20-24.)

All experts agree that safe yield cannot be higher than total recharge "over the same period of evaluation." (TR 06/15/2026, p. 923:13-16.) And all experts that reviewed and testified about the models agree that the Ramboll Model simulates flooded cells on the playa, and more work needs to be done on that model. (TR 06/16/2026, p. 1088:17-19; TR 06/16/2026, p. 1113:26-1114:2.) Mr. Parker and Mr. Teasdale, who now support 14,300 and 15,400 AFY based in part on the Ramboll

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Model that needs more work, previously agreed, prior to the lawsuit, to calibrate the model used for SGMA with a recharge of 7,650 AFY—significantly less than what was used in the Ramboll Model. (TR 06/09/2026, p. 309:6-16; TR 06/22/2026, p. 1559:19-1560:7.)

Throughout this brief the Authority and City seek to lay out relevant evidence and testimony, as well as the legal analysis. But the Special Master should not take our words for it, or confine its review just to pages that we, or the Large Pumpers, cite. A thorough review and analysis of all of the evidence, including data that has been collected and assumptions that have been tested, will lead the Special Master to opine, and the Court to find that the safe yield of the Basin is, at most, 7,650 AFY, consistent with the GSP, DWR approval, and decades of independent studies performed by people that were simply trying to better understand the Basin.

II. STATEMENT OF FACTS

A. The Parties

In Phase 2, the parties are divided into two camps. On one side is the Authority, the United States, and the City (collectively, "Public Entities") who estimate the Basin's safe yield to be around 7,650 AFY. That figure is the GSP's sustainable yield, which DWR reviewed and approved. (Ex. 108-38 to 40; Ex. 936-1, 6-7, 9, 28.) It falls within the range of every published estimate of the Basin's natural recharge since 1989, and no groundwater model developed for the Basin before this lawsuit was filed calibrated with more than about 9,850 AFY of natural recharge. (Ex. 955-22 to 23, Table 10; Ex. 4-10 to 11; Ex. 1281; TR 06/24/2026, p. 1931:3-9.)

On the other side are three of the largest pumpers in the Basin, the District, Meadowbrook, and Searles, who call themselves the TWG and are referred to here as the Large Pumpers. Mojave Pistachios, the fourth member of the TWG, did not participate in Phase 2. In water year 2025, urban pumping in the Basin was approximately 5,980 AF, agricultural pumping approximately 8,700 AF, and industrial pumping approximately 2,820 AF, out of total pumping of approximately 20,200 AF. (Ex. 955-36, Table 14.) The Large Pumpers contend the safe yield is between 12,329 and 18,200 AFY—roughly double the DWR-approved sustainable yield. (Ex. 85-54, Table 3-3; Ex. 106-36, 40; Ex. 123, pp. 9, 37-38.)

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1. The Public Entities

a. Indian Wells Valley Groundwater Authority

The Authority was formed in 2016 pursuant to SGMA to serve as the groundwater sustainability agency ("GSA") for the Basin. (Ex. 108-29 to 30, 66; Ex. 955-6.) The Authority is comprised of five voting members—City of Ridgecrest, County of Inyo, County of Kern, County of San Bernardino, and Indian Wells Valley Water District—who make up its Board of Directors. (Ex. 108-30, 66; Ex. 955-6.)

The Authority is not a water user and does not have an interest in the safe yield being higher or lower; its only purpose is to sustainably manage the Basin. As the Court of Appeal explained, the Authority has "the Herculean tasks of creating a [GSP] for what the record suggests is an overdrafted basin; fairly allocating a limited amount of groundwater between a number of competing users; and calculating an equitable way to fund the importation of water from other sources." (*Mojave Pistachios, LLC v. Superior Court* (2024) 99 Cal.App.5th 605, 613 ("*Mojave*").)

In this phase of trial, the Court heard testimony from the Authority's water resource manager, Stetson Engineers, through Steve Johnson and Jean Moran, as well as the Authority's retained expert Dr. Todd Kincaid.

Mr. Johnson and Ms. Moran testified regarding the Authority's work related to SGMA. Ms. Moran explained the work done leading up the GSP, including with the TAC and the model ad-hoc group, as well as work done since the GSP to fill data gaps, including with the Technical Modeling Group (in which the Large Pumpers declined to participate) that led to the updated 2025 DRI Model. (TR 06/08/2026, p. 164:8 - TR 06/09/2026, p. 399:24; Ex. 14, 22, 36, 927, 972, 998, 952, 962.) That work is also detailed in the Authority's annual reports, periodic evaluation, and the Technical Report, which, along with the GSP are all in the record. (See Ex. 108-111 (GSP), 117, 980, 983, 987, 989-991, 994 (GSP Appendices); 359 and 936 (DWR Approval letter); 944-950, 575-576 (Annual Reports); 929 (Periodic Evaluation); 955 (Technical Report).) Ms. Moran testified on days 1 and 2, Mr. Johnson testified briefly on Day 2.

In its GSP and periodic evaluation, the Authority has set the sustainable yield for the Basin at 7,650 AFY, and identified projects and management actions for sustainability. (Ex. 108-38 to 59;

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Ex. 929-65 to 67.) The Authority notes that modeling indicates extractions of 7,650 AFY will result in continued overdraft and resulting groundwater loss in storage, due to significant evapotranspiration and bare soil evaporation, that are inconsistent with a safe yield definition. (Ex. 929-38 to 39, 60-62; Ex. 108-39 to 40.)

Dr. Kincaid has a Ph.D in Karst Geohydrology from the University of Wyoming, and a Masters in Hydrology and a Bachelors in Geology from the University of Florida. He is an expert in hydrogeologic modeling and hydrogeology, and has been working in the field for nearly 3 decades. Dr. Kincaid reviewed more than 20 studies of the Basin published over the last 60 years, none of which were prepared for the purpose of litigation, as well as the expert reports and code for the groundwater flow model disclosed in this litigation—2025 DRI Model and Ramboll Model. It is Dr. Kincaid's opinion that the safe yield of the Basin must be less than the total natural inflows. He opined that the long-term average total natural inflows to the Basin are likely between 7,200 - 9,900 AFY, and the safe yield is likely between 6,100 AFY to 8,400 AFY, because the faulted nature of the Basin inhibits the ability of the users to extract all available inflows in the current conditions, and a certain amount of discharge to the playa must remain to present poor quality water from migrating to pollute the principal aquifer. (Ex. 80 [expert report], 84 [responsive report], 1000 [presentation slides-demonstratives], 1204 [CV]; testimony, TR 06/22/2026, pp. 1583:10 - 06/23/2026, all - 06/24/2026, p. 1940:24.)

b. United States

NAWS and Department of Interior - Bureau of Land Management ("BLM") own approximately 80% of the land (302,095 acres) overlying the Basin. (Ex. 955-7 to -8, Table 2.) NAWS China Lake is a major military installation for research, development, test, and evaluation ("RDT&E"), encompassing over 1.1 million acres and nearly 20,000 square miles of restricted airspace. Established in 1943, NAWS developed rapidly and has played an important role in developing high explosive components and flight testing for the Manhattan Project in addition to the original Navy rocket program. From 1959-1976, NAWS consistently used more than 6,000 AFY of groundwater, with use peaking just short of 8,000 AFY in 1970. In the Phase 1 trial, the Court limited the Navy's federal reserved water right to 2,008 AFY. (ROA 1837, pp. 4, 38.)

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In this phase of trial the Court heard testimony from the United States's expert, Dr. Sean McKenna. A summary of Dr. McKenna's testimony is provided in Section VII.B.

c. City of Ridgecrest

The City of Ridgecrest is a member of the Authority and uses water within the City for the purpose of irrigating city parks, including landscaping, and sports fields. (Ex. 108-30, 152-153; Ex. 24-175.)

2. The Large Pumpers

The Authority worked closely and collaboratively with the Large Pumpers—identified below—and other interested parties in the Basin, to develop the GSP and determine the safe/sustainable yield of the Basin. The Authority formed the TAC and the Policy Advisory Committee ("PAC"), which met regularly to assist with the development of the GSP. (TR 06/08/2026, pp. 171:9, 220:24-26, 223:12-18; TR 06/09/2026, p. 274:19-23.) The Large Pumpers each had their own expert representative on the TAC to review and conduct a thorough evaluation of the technical aspects of the GSP, including the safe yield. (Ex. 36, p. 1; TR 06/08/2026, p. 227:3-6.) The Large Pumpers' representatives unanimously agreed during GSP development that natural recharge to the Basin was between 4,100 to 7,700 AFY. (Ex. 36, p. 1; TR 06/17/2026, p. 1341:14-23.) The District voted to approve the GSP and voted to adopt the Authority's Sustainable Yield Report to provide further information to the public regarding the calculation of the sustainable yield. (Ex. 929-68; *Mojave*, *supra*, 99 Cal.App.5th at 618.) Only after the Authority began implementing the GSP by imposing fees to fund the importation of water did the Large Pumpers initiate this adjudication and contend the safe yield was much higher. As the Court has noted, their motivation is to usurp the GSP and evade the Authority's attempts to sustainably manage the Basin. (ROA 1465, p. 4 ["Plainly, Mojave and other large pumpers are hoping that the implementation of a physical solution in this adjudication proceeding will eliminate this and other fees"].)

a. Indian Wells Valley Water District

The District is a county water district that provides potable water to residential, industrial and commercial customers within its boundaries. (District's Initial Disclosure (May 17, 2024), p.

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5.) Between 2011 and 2020, the District's reported average amount of groundwater extracted was 6,763 AFY. (*Id*., p. 4) As discussed further below, the District has funded or participated in multiple studies of the Basin prior to initiating this adjudication, and all of those studies concluded that recharge to the Basin and safe yield of the Basin were lower than the District now contends.

In this phase of trial, the Court heard testimony from the three District experts, Tim Parker, Dr. Matthew Tonkin, and Dr. Vivek Beddekar. The District also called Anthony Brown, who has been retained by Mojave Pistachios and participated in the TWG for a time. A summary of these testimonies is provided in Section VII. C.

b. Searles Valley Minerals

Searles is a minerals recovery and manufacturing company. (Searles' Initial Disclosure (Nov. 13,2024), pp. 4-5.) Searles extracts groundwater from the Basin for use in its minerals recovery and manufacturing operations and to supply potable water for the Searles Domestic Water Company, a wholly-owned subsidiary of Searles providing treated water for domestic use to residents and business in Trona. (*Ibid*.) Between 2011 and 2020, the Searles extracted between 2,217 - 2,861 AFY. (*Id*., p. 4.) Searles filed for Chapter 11 bankruptcy on June 15, 2026, in the U.S. Bankruptcy Court for the District of Delaware.

In this phase of trial, the Court heard testimony from the Searles expert Lauren Wicks. A summary of Ms. Wicks' testimony is in Section VII.C.

c. Meadowbrook Dairy Entities

Meadowbrook farms land overlying the Basin and is one of its largest agricultural producers; in water year 2024 it was the largest agricultural pumper in the Basin, reporting 4,546 AF. (Ex. 108-33; Ex. 955-0011; Ex. 949-0100.)

In this phase of trial the Court heard testimony from Meadowbrook's expert Mr. Eddie Teasdale. A summary of Mr. Teasdale's testimony is in Section VII.C.

3. Non-Participating Phase 2 Parties

a. Mojave Pistachios

Mojave Pistachios is a Large Pumper and a member of the TWG, but did not participate in the Phase 2 trial. Mojave Pistachios owns or leases approximately 3,229 acres of land across 83

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parcels overlying the Basin. Just under 1,600 acres are planted with pistachio trees. In 2013, Mojave began planting its pistachio trees and extracted 325 AF in 2013; it now uses approximately between 3,000 - 4,000 AFY. (Ex. 949-100.)

b. Small Pumpers

It is estimated that there are 932 groundwater production wells located in the Basin. (Ex. 108-90, Table 2-5.) The overwhelming majority of these wells—an estimated 832 (89%)—are private domestic wells that are estimated to pump 1 AF of groundwater per year or less. These 832 "small pumpers" extract approximately 832 AFY.[3] (Ex. 955-35.) This represents approximately 4% of the 20,840 AF of extractions estimated in 2024, but 11% of the 7,650 AF safe/sustainable yield. (Ex. 949-41, Table 6-1; Ex. 955-36, Table 14.)

None of the small pumpers participated in Phase 2. Many of small pumpers may not be aware of the scope and implications of this comprehensive adjudication, and may lack the means to retain counsel. Their absence from this adjudication is concerning because the continued overdraft of the Basin and the lowering of groundwater levels will likely affect the small pumpers first in a significant way. The Authority's shallow well impact analysis results indicated that approximately 22 shallow wells would be impacted by 2030 due to the chronic lowering of groundwater levels and reduction of groundwater in storage. (929-38, 81.)

Since the GSP was adopted, pumping has fallen, but not enough to stop the condition of overdraft. It is estimated that between 2011 and 2015 groundwater extractions in the Basin averaged 27,740 AFY, and another 4,850 AFY was lost to evapotranspiration. (Ex. 108-39.) Since the GSP was adopted in 2020, extractions have dropped to 20,840 AF in water year 2024, still 2.7 times the GSP's sustainable yield of 7,650 AFY. (Ex. 949-41 to 42, Tables 6-1, 6-2; Ex. 955-36, Table 14.) And pumping depressions under the largest pumpers continue to grow. (Compare Ex. 929-220 [2010 contour map]; p. 221 [2015 contour map]; and p. 222 [2023 contour map]; TR 6/08/2026, pp. 208:5-214:1 [Moran testimony regarding growing cones of depression and

[3] The estimated 832 private domestic wells include 377 wells that are listed in the Kern County Health Department Well Permit Database, as well as an estimated 455 other wells. The 455 well estimate is based on an analysis of developed residential parcels located outside of a water provider's service area.

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overdraft].)

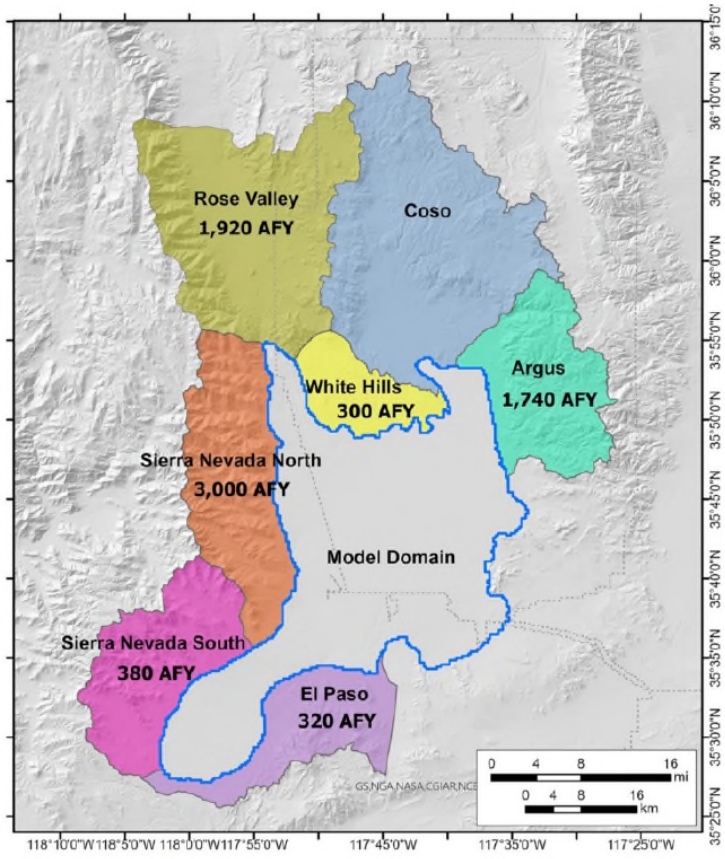
The Large Pumpers account for most of that pumping. In water year 2024, the District reported 5,908 AF, Searles 2,809 AF, and Meadowbrook 4,546 AF, a total of 13,263 AF, or about 64 percent of the Basin's estimated production. (Ex. 949-100.) The Large Pumpers want a higher safe yield because they do not want to reduce their pumping or be subject to the GSP's management actions and overdraft mitigation. (ROA 1465, p. 4.)

B. The Indian Wells Valley Groundwater Basin Is a Closed Basin Whose Safe Yield Is Limited by Natural Inflows

The Indian Wells Valley is a closed desert basin of approximately 382,000 acres at the northwestern edge of the Mojave Desert, bounded by the Sierra Nevada on the west, the Coso Range on the north, the Argus Range on the east, and the El Paso Mountains on the south. (Ex. 955-0007, -0050.) The Basin's groundwater is the sole supply of potable water for the surrounding communities and is necessary for domestic users to sustain their livelihoods, and even more fundamentally, to inhabit their homes. (Ex. 955-0012.)

The primary source of recharge in the Basin is mountain-front recharge. Snow and rain falling at higher elevations run down the canyons, sink into the coarse gravels at the mountain fronts, where the water enters the aquifer, and groundwater then moves slowly toward the lowest point of the valley, the China Lake playa. (Ex. 955-019 to 20; Ex. 929-222 [contour map]; Ex. 108-38, 141, 148; Ex. 363-23.) Most experts also believe the Basin receives some amount of recharge as underflow from Rose Valley. However, the amount is highly uncertain, with estimates varying widely, and the USGS has opined that little, if any, such underflow occurs due to geologically recent basalts, which force most of the groundwater to the surface as it crosses between basins. (Ex. 955-18, 22-23; Ex. 363-23; Ex. 108-141.) The Authority relies on the larger end of the estimated range.

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(Ex. 24-135, Figure 1 [average recharge distribution in 2025 DRI Model].)

Only about two to five inches of rain fall on the valley floor each year, and none of the models nor recharge studies of the Basin include this rainfall recharging the aquifer because it is widely believed that all of that water is lost to ET. (TR 06/24/2026, pp. 1937:9-19, 1961:7-15, 1966:7-22; TR 06/16/2026, p. 967:4-8.)

Before pumping began in the Basin, the groundwater in the aquifers had accumulated over the span of thousands of years from the persistent contributions of mountain-front recharge as has been revealed through the age-dating of groundwater across the Basin. Once the aquifers filled, groundwater began discharging from the aquifers in the playa where it left the Basin by rising to the surface and evaporating or through transpiration by the salt-tolerant plants that grow there. Every description of the Basin in the record, from Kunkel and Chase in 1969 through the GSP and the Technical Report, places the Basin's natural discharge at the playa. (Ex. 1002-7; Ex. 108-141; Ex. 955-20, -25.) It is also believed that a very small amount of groundwater, between approximately 50 and 200 AFY, may leave as underflow to Salt Wells Valley to the east. (Ex. 955-

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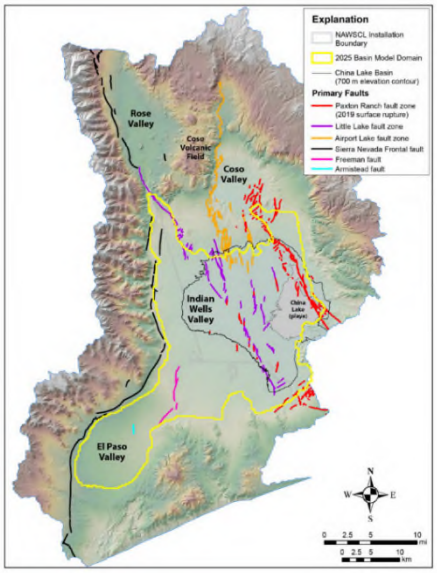
49, Table 20; Ex. 1002-7; Ex. 97-56; Ex. 108-141; TR 06/22/2026, p. 1607:15-18.) No witnesses testified otherwise.

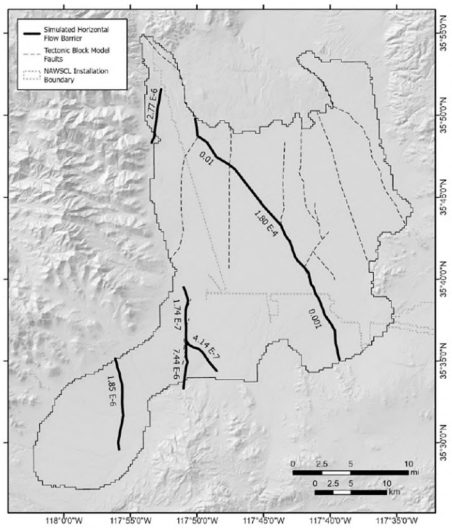
Beneath the valley floor the Basin fill consists of clay, silt, sand, and gravel laid down by streams and by the lakes that once occupied the valley, to depths that locally reach 2,000 feet or more. (Ex. 955-13 - 15; Ex. 108-142; Ex. 110-27; Ex. 1002-6.) The Basin contains two aquifers. The shallow aquifer is coarse near the Sierra Nevada and grades to interbedded silt and clay toward the center of the Basin, where it includes the lacustrine (lake bed) and playa deposits; beneath and around the playa the water is highly saline. The deep/principal aquifer, which supplies most of the Basin's pumping, is also gravel, sand, silt, and clay. (Ex. 955-015 to 16; Ex. 108-142 to 143; Ex. 1002-06; Ex. 97-31 to 32; Ex. 85-15; TR 06/22/2026, p. 1593:13-25.)

Between the two aquifers, spanning approximately 147 square miles of the central Basin, lies a thick unit of lacustrine silt and clay of low permeability, which was mapped from borehole logs in the 1960s, again in the 1990s, and most recently with an airborne electromagnetic survey. In the west and southwest of the Basin the two aquifers are strongly connected. Elsewhere the principal/deep aquifer is beneath the clay unit. (Ex. 955-15 to 16, 32; Ex. 108-142 to 143; Ex. 24-33 to 34; Ex. 97-32; Ex. 110-27; Ex. 929-33; TR 06/22/2026, pp. 1605:4-1606:11.)

The Basin also contains numerous faults. The Little Lake fault, the El Paso fault, and the other mapped faults act as partial to effective barriers that compartmentalize the Basin and restrict horizontal groundwater flow but likely foster upward groundwater flow from the deep/principal aquifer to the playa. (Ex. 955-18; Ex. 108-36, 141; Ex. 97-67, Table 5-3; Ex. 929-33.)

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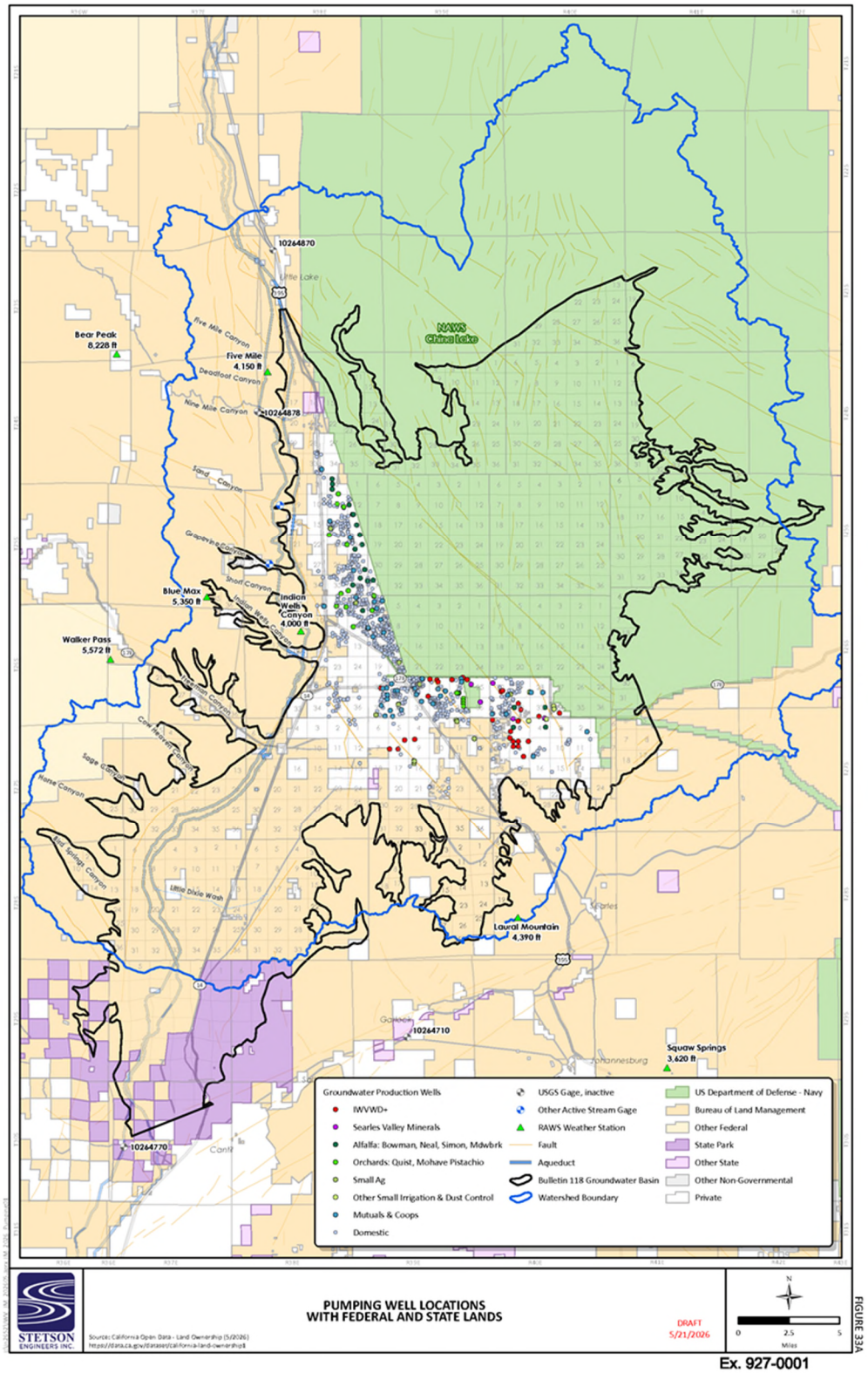




(Right - Ex. 24-25 [Figure 3-1 [Map showing 2025 DRI Model domain in relation to the primary fault zones with historical fault activity in watershed]; Left - Ex. 24-73, Figure 5-7 [Locations of faults simulated as barriers to flow in 2025 DRI Model];)

The majority of the Land overlying the Basin is controlled by the NAWS or BLM. (Ex. 927.) Extraction wells for the remainder of the population are located south or west of NAWS, and north of the Little Lake Fault. On the following page is a map of the Basin with the NAWS land in green, BLM land in orange, and private land in white. As can be seen on the map the vast majority of the extractions at issue in this litigation are located south and west of the playa, and NAWS, and north of the Little Lake fault. This map does not show the depiction of the Navy's wells, the location of which are DoD Critical Infrastructure Security Information. The locations were revealed to the Phase 2 parties under a protective order, and are considered in the analysis described herein.

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Ex. 927-0001

(Ex. 927; TR 06/08/2026, pp. 175:3-178:22.)

The water budget of a closed basin is simple in principle. As Dr. Sean McKenna, the United

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States' expert, put it, "[j]ust like a bank account, what goes in has to equal what goes out or there's a change in the storage." (TR 06/24/2026, p. 1953:17-22.) Before wells were drilled, inflows and outflows were equal and storage was steady. The Authority estimates that pre-development budget at 7,650 AFY in and 7,650 AFY out, 7,601 of it by evapotranspiration and 49 by underflow. (Ex. 955-48, Table 20.) When pumping began, a new outflow was added.

The Basin has been persistently overdrafted *for more than six decades*. Annual extractions regularly exceed 25,000 AFY and "groundwater levels in the Basin have been steadily declining since 1945." (*Mojave Pistachios*, *supra*, 99 Cal.App.5th at p. 614.) For example, between 2011 and 2015 groundwater extractions in the Basin averaged 27,740 AFY, and another 4,850 AFY was lost to evapotranspiration. (Ex. 108-39, -154.) Such conditions prompted DWR to designate the Basin as a high-priority basin subject to critical conditions of overdraft.(*Mojave*, *supra*, 99 Cal.App.5th at 617; Ex. 955-42.)[4] The 2025 Periodic Evaluation found the Basin remains in overdraft, losing between about 14,000 and 17,500 AF of storage a year from 2020 through 2024. (Ex. 108-156, Table 3-6; Ex. 929-37, 101, 112; Ex. 955-41, 50.)

The safe yield cannot exceed the natural recharge. Every acre-foot pumped above recharge must come from storage. Every expert who addressed the point agreed. Mr. Brown, Mojave Pistachios' consultant, wrote in his own paper that "over a period of years, safe yield must equal the amount of water entering the basin (i.e., recharge) minus basin outflows." (TR 06/08/2026, pp. 112:25-113:8, 121:4-7.) Dr. McKenna testified that safe yield "cannot be larger than the recharge." (TR 06/24/2026, p. 2052:10-11.)

C. The Basin Has Been Studied for more than a Century

The Basin has been studied for more than a century. Where a study measured something, such as the discharge at the playa or the water levels, and a model was constructed that had to reproduce the measured values, and test its assigned recharge against those measured values, the result is a finding that is entitled to be weighed. Where a study assumed a quantity, such as anthropogenic recharge without any evidence or analysis as to whether it actually reaches the

[4] Of California's 515 groundwater basins, only 21 are designated by DWR as experiencing critical conditions of overdraft.

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principal aquifer and, if so, when it arrives, the quantity is an unverified assumption and should be treated as such. Moreover, the only possible validation for such assumed values would be an improvement in the ability of a model constructed with the assumed additional recharge to calibrate (reproduce) measured quantities such as groundwater levels measured in wells across the Basin. That has not occurred here. The historical studies are described below, and for each the measured or tested finding is separated from an unverified assumed component. That is how Dr. Kincaid read them, and it formed the foundation for his opinion and testimony. He "evaluated and studied each component and determined which of those components [he] thought were reasonable," on "a component-by-component basis," and omitted only the component later rejected or disproven—inflows from the Sierra granite—and anthropogenic sources, which no evidence has traced to the aquifer. (TR 06/24/2026, p. 1934:8-22; Ex. 80.)

1. 1912-1969 - the First Studies and Signs of Overdraft

a. Lee (1913) and Thompson (1929)

The first study of the Basin's groundwater was published by C.H. Lee in 1913. (Ex. 1275; Ex. 1002-76.) Lee mapped the soils and the water-using vegetation around the China Lake playa, and identified evapotranspiration at the playa as the way water leaves the Basin. (Ex. 955-22 to 23; Ex. 21-20, 29.) His calculation of evapotranspiration—27,000 AFY—is far higher than any later measurement, and every later investigator, the TWG included, treats 27,000 AFY as too large. (Ex. 955-23; Ex. 4-10; Ex. 21-20 to 21.) Thompson's 1929 estimate of 49,000 AFY was an estimate of runoff rather than recharge and has also been rejected. (Ex. 4-10 - 11 [TWG states, "Considered an outlier due to limitations of the study"]; Ex. 955-0022; TR 06/10/2026, pp. 600:6-602:26.)

b. Kunkel and Chase (1969)

The United States Geological Survey ("USGS") published the first modern study of the Basin in 1969, and it is the foundational report on which nearly every later study builds. (Ex. 1002; TR 06/23/2026, p. 1648:16-19.) It is perhaps the most authoritative of the studies that have been performed. (TR 06/23/2026, pp. 1648:16-19, 1652:8-14; TR 06/24/2026, pp. 1865:2-4, 1866:1-2.)

Working in the early 1950s, and building on the mapping work published by Lee in 1913, Kunkel and Chase mapped the groundwater-dependent vegetation (phreatophytes) around the

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China Lake playa both in the field and from aerial photographs. They also installed monitoring wells across the playa to measure the depth to water beneath each vegetation zone. They then applied an empirical relationship between depth to water and evapotranspiration developed by H.F. Blaney. From that work they estimated the Basin's natural discharge, and so its natural supply, at about 8,000 AFY under the conditions of 1953, after pumping had lowered the water table beneath the playa. Using water level data from 1912, they were also able to estimate the evapotranspiration occurring at that time—11,000 AFY. (Ex. 1002-7; Ex. 21-20 to -21; TR 06/23/2026, pp. 1650:9-1651:24; TR 06/24/2026, p. 1865:5-9.) Kunkel and Chase also performed a separate analysis using an analytical flow equation using estimates of transmissivity and a calculation of the gradient to estimate 15,000 AFY of underflow at a midpoint in the valley. (Ex. 1002-063 - 68.)

Kunkel and Chase estimated that about 1,000 AFY of discharge to the playa is needed to preserve upward gradient beneath the playa, and prevent poor quality saline water from reaching the principal aquifer. (Ex. 1002; TR 06/24/2026, p. 1873:13-16.) Subtracting the 1,000 AFY that must continue to discharge to the playa to maintain the upward gradient from each of the recharge estimates, and averaging the two numbers, Kunkel and Chase estimated the Basin's perennial yield at 12,000 AFY. (TR 06/24/2026, pp. 1875:18-1876:8; TR 06/23/2026, pp. 1797:21-1798:1.)

Kunkel and Chase's study has been built upon by nearly every subsequent researcher, with further analysis resulting in lower estimates. Their second figure, 15,000 AFY, came from an analytical flow equation that Dutcher and Moyle criticized four years later, and that Dr. Kincaid described as "too simple to be valid" for a faulted, heterogeneous basin. (TR 06/23/2026, pp. 1656:3-14, 1662:1-1663:1.) Saint-Amand, discussed below, found the transmissivity values used by Kunkel and Chase were not correct, and using the correct values calculated underflow at 7,200 AFY. (Ex. 1023-30 [Saint-Amand criticizing transmissivity values].)

Further studies suggest the 11,000 AFY figure is also likely too high. It rests on evapotranspiration rates drawn from a general relationship between depth to water and plant cover, with, as DRI later wrote, "no site-specific data … to validate the approach." When DRI measured evapotranspiration on the playa in 2014 and 2015 it concluded the rates used by Kunkel and Chase "may be overestimated by 33 to 67 percent." (Ex. 21-21, -32; TR 06/23/2026, p. 1705:14-19.)

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Dr. Kincaid's opined that an estimate built from measured discharge is the least uncertain kind of estimate of a basin's total natural inflow, but that "doesn't mean that the number itself was correct," and that the models built after 1969 tested the 11,000 AFY figure and found it too high. (TR 06/23/2026, pp. 1666:18-1667:7, 1707:22-26, 1813:17-23; TR 06/24/2026, p. 1866:1-9.)

2. 1971–1989: The First Model Test and the Early Water Budgets

a. Bloyd and Robson (1971) - The District's first model

Two years after Kunkel and Chase, the USGS, in cooperation with the District and the Navy, built the first computer model of the Basin. (Ex. 1011-2, 8, 11; TR 06/23/2026, pp. 1687:7-1688:5, 1689:7-11.) The stated purpose was "to make a quantitative hydrologic study of the Indian Wells Valley area and to make available to the cooperators a working hydrologic model for use as a management tool," and the scope included "[e]stimating and verifying hydrologic parameters that are necessary inputs to the ground-water model." (Ex. 1011-8.) Dr. Kincaid described the purpose as twofold, "to provide a test on the Kunkel and Chase estimate of 11,000 acre-feet per year of total inflow into the basin and to develop and provide a groundwater model that could be used as a management tool for the basin." (TR 06/23/2026, p. 1687:7-12.)

The model was a two-dimensional model that represented the Basin as two aquifers, deep and shallow. "Where the shallow aquifer occurs, the underlying deep aquifer is confined or artesian," and flow between them under steady-state conditions was "assumed in one direction, deep to shallow." (Ex. 1011-6.) Near the playa, "the deep aquifer discharges into the shallow aquifer and is lost from the Basin as ET. This discharge is the only significant source of steady-state discharge from the deep aquifer," and "[e]vaporation from the playa surfaces and transpiration from local phreatophyte growth are the only significant sources of steady-state discharge from the shallow aquifer." (Ex. 1011-18.) As with subsequent models, the model assumed "no recharge from deep percolation of precipitation on the valley floor." (Ex. 1011-35.)

Bloyd and Robson modeled three periods, a steady state, 1953, and 1968. (Ex. 1011-20; TR 06/23/2026, p. 1687:15-19.) For the steady state they used the water levels of 1920–21, "the oldest data available in sufficient quantities to construct a contour map," which was "assumed to approximate steady-state conditions because little ground-water development had taken place in the

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basin before that time." (Ex. 1011-18, 37, 52.) The contour map came from measurements at roughly thirty wells. (TR 06/23/2026, p. 1690:7-17.) Kunkel and Chase's evapotranspiration estimate was used as "the initial estimate of total average annual discharge from the shallow aquifer," which was then used as the recharge to both aquifers for the steady-state version. (Ex. 1011-28.) The authors used a "trial-and-error process … to make changes in the steady-state recharge values until the head configuration determined by the model was in agreement with the water-level contour map drawn from available water-level measurements of wells." (Ex. 1011-37.) The result provided a "verified steady-state recharge and discharge of 9,850 acre-feet per year for the deep aquifer." (Ex. 1011-7, 28.) As Dr. Kincaid summarized: "through their calibration process, they determined 11,000 acre-feet per year to be too high, and they reduced the total inflow to the basin to 9,850 in order to produce what they classified as an acceptable calibration." (TR 06/23/2026, p. 1689:13-18.)

The two later periods, 1953 and 1968, added pumping and assumed that discharge to Navy sewage ponds recharged the Basin. That recharge input to the model peaked at 809 AF in 1956 and fell to 173 AF in 1968, an average of about 300 AFY. (Ex. 1011-7, 20, 43, Table 6, 44; Ex. 4-10 ["Average percolation from wastewater treatment ponds from 1954-1968 is 300 AFY"].) The study assumed the ponds provide recharge because they believed the shallow aquifer was larger than in past, but acknowledge that because of "the paucity of water-level data … the extent of the shallow aquifer before the sewage ponds is not known." (Ex. 1011-20.) Bloyd and Robson provide no data or modeling results indicating that the ponds would recharge the principal aquifer. Later studies have opined that it does not reach the principal aquifer, and is a water quality problem waiting to happen, not a current source of recharge. (See Ex. 614-81, (Todd Engineers) ["Some of the percolated water emerges at Lark Seep … remainder flows through the shallow groundwater system to China Lake playa and is consumed by evapotranspiration"]; Ex. 1025-55 (Saint-Amand) ["Seepage from the ponds … will eventually aggravate contamination problems by forcing salty water from the so called "shallow" aquifer down and out into the good water below and to the south"].)

The models' 9,850 AFY is the first calibrated finding of the Basin's natural inflow. No

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calibrated model of the Basin since has used natural recharge above about 9,850 AFY. (TR 06/24/2026, pp. 1931:3-9, 1938:18-1939:1.)

b. Dutcher and Moyle (1973)

Although published two years after the Bloyd and Robson report, Dutcher and Moyle's compilation of the Basin's geology and hydrology was prepared in 1968 as the input for the Bloyd and Robson model. (Ex. 1012-9 to 10; Ex. 1011-19, 52.) The USGS prepared the report in cooperation with DWR, as part of continuing studies with the Navy, and the District "in order to construct and use a ground-water basin model of Indian Wells Valley," and the report describes its data as "the substantial initial input to such a model." (Ex. 1012-9 to -10.) Bloyd and Robson calibrated against the 1920–21 and 1953 water-level maps prepared by Dutcher and Moyle. (Ex. 1011-19, -52, -59.) Dutcher and Moyle built no model of their own, and their report does not mention the model's result. (Ex. 1012; TR 06/23/2026, p. 1661:13-25.)

The report's description of the Basin is the one every later study has used. The Basin is "virtually a closed basin." Its alluvial fill, locally 2,000 feet thick, grades from sand and gravel to silt and clay beneath the lower valley, and groundwater discharges by evapotranspiration at the playas. (Ex. 1012-6.) The fill "ha[s] been cut by several major and numerous minor faults," and "several of these act as partial barriers to ground-water movement." (*Id.*) The faults "restrict the movement of ground water between the recharge areas on the west and the discharge, or playa, areas on the east" and "subdivide the basin into a series of ground-water subunits." (Ex. 1012-14 to 15.) The barriers slow the water without stopping it. Groundwater moves "across the several ground-water subunits of the basin separated by faults, to the areas of ground-water discharge by evapotranspiration on or near the playas," and the earliest water-level maps show "small water-level displacements … at each barrier as the water moved toward the playas where it was discharged." (Ex. 1012-21.)

Dutcher and Moyle adopted Kunkel and Chase's 11,000 AFY natural-discharge estimate, as the Basin's perennial yield without retesting it. (Ex. 1012-30; Ex. 955-22 to -23; TR 06/23/2026, pp. 1661:20-25, 1708:1-4; TR 06/24/2026, p. 1881:12-16.) Their method defined perennial yield as the natural discharge, and the report makes no use of Kunkel and Chase's 15,000 AFY analytical

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estimate. (Ex. 1012-30.) They then reduced the 11,000 AFY to a "developable yield" of 10,000 AFY, determining that "not less than 1,000 [AFY] would be required to maintain a hydraulic gradient toward the playa area … to prevent a reversal of the gradient and consequent deterioration of the water quality at established well fields by flow of water of poor quality from beneath the playas." (Ex. 1012-7, 30-31.) Measured against that figure, pumpage in 1966 "was about 12,400 acre-feet … or about 2,400 acre-feet greater than the estimated developable yield," total discharge by pumping and evapotranspiration "was at least 20,000 acre-feet or about twice the perennial yield." (Ex. 1012-7, 23, 29, 31; TR 06/24/2026, p. 1882:11-13.) Their conclusion was that "pumping ground water at the present rate cannot be continued indefinitely. Eventually pumpage must be reduced or water must be imported into the valley." (Ex. 1012-31.) They estimated usable storage in the upper 200 feet at 2,200,000 AF. (Ex. 1012-25, 31.) Their yield figures do not include man-made recharge. (Ex. 955-22.)

Three findings in the report are important to the safe-yield determination. The faulting that compartmentalizes the Basin was documented in 1973—and has been confirmed in the Technical Report, the GSP, and the airborne electromagnetic survey—and the report explains why that structure does not undercut a discharge-based recharge estimate, the water crosses the barriers and leaves at the playas, so the discharge there measures all of it. (Ex. 1012-7, 14-15,18-22; Ex. 955-18; Ex. 108-36, -141; Ex. 929-33.) The 1,000 AFY reserve against deterioration of water quality indicates the safe yield must be less than natural inflow. (Ex. 1012-7; TR 06/23/2026, p. 1797:13-22; TR 06/24/2026, pp. 1875:18-1876:3.) And the finding that pumping exceeded the developable yield by 1966 is the earliest documentation of the overdraft. (Ex. 108-156, Table 3-6; Ex. 955-41, -0050; Ex. 929-0112.)

c. Saint-Amand (1986)

In 1986, Saint-Amand, a consultant to the NAWS, prepared a report evaluating the water supply of the Basin, projecting future supply and recommending measures to conserve and develop sources. (Ex. 1023-4.) Saint-Amand estimated that natural recharge was probably around 11,000 AFY, but acknowledged it "may be a bit lower", and estimated the "perennial yield" under then-existing condition as 7,000 AFY or less. (Ex. 1023-36 to 37.)

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Reviewing Kunkel and Chase's work, Saint-Amand found the decision to use the 1920 and 1921 water table contours to estimate recharge was appropriate and that the 1,000 to 2,000 AFY of pumping that was occurring would not affect their results. (Ex. 1023-30.) However, Saint-Amand found their analytical estimate of 15,000 AFY of recharge used a "procedure for adjusting transmissivity" that was "not customary and leads to an estimate of transmissivity that is high by a factor of about 2. A value of 7,200 [AFY] is obtained using figures and transmissivity actually observed from pumping tests." (*Id*.) He did a similar correction to an underflow analysis of Dutcher and Moyle. (*Id*., p. 31.)

Saint-Amand also reviewed the groundwater model prepared by Bloyd and Robson and opined as follows:

> *Bloyd and Robson estimated total inflow in 1971 as 9,850 [AFY]. That is probably the best estimate of our annual recharge by means of flow calculation*.

(Ex. 1023-36.)

Evaluating different recharge estimates Saint-Amand noted that "Evaporative measurements are usually used in desert basins and, although imperfect, are the best indicators of discharge." (Ex. 1023-36.) He compared differing values, found that "recharge to the valley probably lies between 8,000 and 14,000 [AFY]"; used "an average of 11,000 [AFY] as the recharge" for his analysis; and noted the recharge number needed to be further reduced to determine perennial yield—which he defined as "the amount of water that can be consumed in perpetuity without destroying the utility of the aquifer or without eventually depleting the water." (*Id*., at 37.) He first reduced the recharge number by 1,000 AFY because "residual water must be left for evaporation so water does not flow back from the playa [where contaminated salty water exists] to the wells." (*Id*.) Then, 3,000 more because the existing pumping pattern could not capture recharge from the north and northeast of the playa, **opining that the perennial yield** of the Basin under the conditions then existing **was "7,000 [AFY] or less**." (*Id*., emphasis added.)

It must be noted that in two places—page 41, Table 6, and page 42, Figure 15—Saint-Amand has an entry for agricultural seepage of 2,000 AFY returning to the Basin. However, there is no discussion anywhere as to how that number was derived or where there was any evidence that

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agricultural return flows reach the principal aquifer underlying the Basin. Notably, in his perennial yield analysis, Saint-Amand did not mention, and apparently did not credit, return flows of any kind. (Ex. 1023-36 to 37.)

3. 1989-2016- better understanding, lower recharge assumptions

Between 1989 and 2016 the Basin was studied by DWR, the USGS, the Bureau of Reclamation, Kern County, the District, and the Navy. Three of those studies tested a recharge figure in a calibrated groundwater model. The natural-recharge findings and the assumed components are set out study by study.

a. Bean (1989)

Robert Bean's 1989 report for DWR was commissioned to evaluate whether the Basin is "open," receiving underflow through the Sierra Nevada granite, or closed. (Ex. 1025-6 to 7.) Bean made no new measurements, and did not build a new model. (*Id*., pp. 3-9; TR 06-23-2026, p. 1817:22-26.) Bean estimated total supply at 15,100 AFY. (Ex. 955-0022, Table 10) Of that, 10,100 AF was natural recharge from mountain-front recharge (9,700) and underflow from Rose Valley (400), taken from the Bloyd and Robson and Berenbrock-draft estimates and from Bean's own transmissivity calculation. The rest was 2,500 AF of groundwater flow from the granitic rocks of the Sierra Nevada, which Bean allowed for by analogy to another basin while acknowledging that no such supply had been demonstrated, 900 from aqueduct leakage, 100 from geothermal leakage, and 1,500 AF from 'human activity", each an estimate that he assumes will recharge the Basin. (Ex. 1025-29 to 37; Ex. 80-52.)

Bean estimated that, under 1985 conditions, the Basin was about 15,900 AF in overdraft, and he estimated consumptive use to be 23,800. (Ex. 1025-40, 44, 47.) That means that if 1985 was indicative of average long-term conditions, the **safe yield would be 7,900 AFY**. It must be noted that 1985 was *not* an average year. Dr. McKenna testified 1980-1985 was "the wettest six-year period" on record between then and the present. (TR 06/24/2026, pp. 2055:2-12.) The TWG's own experts agree that it is a wet period. (TR 6/16/2026, p. 961:25 - 962:1 (Tonkin) [period was "a little wetter"]; Ex. 97-39, Figure 4-1.)

b. Berenbrock and Martin (1991) - The District's second model

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Berenbrock and Martin of the USGS built the Basin's second groundwater model, also in cooperation with the District and the Navy. (Ex. 641-1, 45; TR 06/23/2026, pp. 1686:20-24, 1690:20-1691:6.) Building off of Bloyd and Robson's two-dimensional mode, Berenbrock and Martin developed a three-dimensional model using the prior data set, and updated data. (Ex. 641-8.) Like the prior model, the stead-state version of the new model used water-level measurements from 1920 and 1921, which they believed to "best represent steady-state conditions because pumpage was minimal, water levels are believed to have stabilized to the pumpage, and data were sufficient to permit reasonable simulation." (Ex. 641-43.) The transient period for the model was calibrated to 1920-1985. (Ex. 641-45.)

The models natural recharge used Bloyd and Robson's calibrated mountain-front recharge––6,280 AFY from the Sierra Nevada, 3,170 AFY from the Coso and Argus Ranges, and 400 AFY from the El Paso Mountains—totaling 9,850 AFY. (Ex. 641-20, 40-43.) Although the report does not discuss Rose Valley, the distribution of recharge in the model extends up the Sierra's on the west and up to where inflow from Rose Valley is now believed to occur. (Ex. 641-34, Figure 11; TR 06/24/2026, pp. 1925:6-1926:8.)

c. Bureau of Reclamation and Watt (1993)

The Bureau of Reclamation, the District, a predecessor to Searles, and the Navy, drilled ten test wells to about 2,000 feet between 1990 and 1992 to collected water-level, water-quality, and transmissivity data. (Ex. 1027-3, 7-8, 57-59.) The Technical Report, with recharge appendices by Reclamation hydrologist Dennis E. Watt, was published in December 1993. (Ex. 1027-3, 5, 135, 145.) The Project re-ran the Berenbrock and Martin model, and came to doubt that model's recharge quantity as too high. (Ex. 1027-87; TR 06/23/2026, p. 1831:8-19.)

The report states that the 10,000 AFY recharge amount then in use was based on Kunkel and Chase's empirical estimate of playa evapotranspiration, that rates measured on other playas are much lower, and that the 10,000 AFY "may be too high by a factor of two or more," and it predicted that the Maxey-Eakin method would give 2,000 to 3,000 AFY. (Ex. 1027-89 to 90, p. 108-111.) Appendix I distributed the models' total among the watersheds, "assuming the total recharge to the Valley is 9,850 acre-feet per year (as used in the groundwater models)." The

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Technical Report's 9,850 AFY for Watt is that assumed total, which Dr. Kincaid described on cross-examination as a distribution summing to 9,900. (Ex. 1027-139 to 140; Ex. 955-22 to -23; TR 06/23/2026, p. 1837:1-13.)

d. Gillespie and Thyne (1996)

Gillespie and Thyne's 1996 interim report is an outlier. Using Darcy's law with hydraulic conductivities from slug tests in the Bureau's new wells, they calculated groundwater flux of 4,800 AFY in the north, 3,200 AFY in the northwest, and 33,500 AFY in the southwest, and hypothesized that the southwestern flow came from outside the Basin. (Ex. 1028-2 to 3, 5-6.) The authors cautioned that, given the uncertainty in the slug-test conductivities, "the recharge estimates may have an error of as much as +/- one order of magnitude." (Ex. 1028-0005.) Their own precipitation-based estimate for the same season was only 7,761 AF. (Ex. 1028-5; Ex. 80-52.) The Large Pumpers' experts admit that Gillespie and Thyne's exceedingly high recharge estimate is an outlier. (Ex. 4-10 to 11; Ex. 955-22 to 23, Table 10; TR 06/23/2026, p. 1816:14-25.)

e. Brown and Caldwell (2009) - the District's third model

The District commissioned another model of the Basin from Brown and Caldwell in 2009. (Ex. 67-2; TR 06/29/2026, p. 2090:7-12.) Development of the three-dimensional, MODFLOW-2000-based, finite difference, numerical groundwater flow model was overseen by a Flow Model Committee made up of the District, Searles Valley Minerals, and the Navy. (Ex. 67-7.) This was the third groundwater model the District took part in developing for the Basin following Bloyd and Robson, and Berenbrock and Martin.

Like the prior models, this model used a 1920s steady state period. (Ex. 67-22 to 23.) The initial conceptual water budget was 11,000 AFY—9,500 AFY of mountain front recharge, and 1,500 AFY of subflow from Rose Valley and Coso Basins. (Ex. 67-23, pp. 18-19.) For mountain-front recharge Brown and Caldwell started by computing precipitation falling above 4,500 feet, 62,701 AFY, and, "[a]ssuming that previous estimates of total basin inflow by the USGS and others, which range from 9,000 to 11,000 AFY, are reasonable," took 15 percent of it, about 9,400 AFY. (Ex. 67-18.) They then observed that past estimates of subflow from Rose Valley vary from a few hundred to between 2,000 and 3,000 AFY. (*Id.*, p. 19.) The conceptual water budget was

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closed with 10,000 AFY of assumed ET and 1,000 AF of extractions from wells. (*Id.* p. 23.)

The model could not be calibrated using the 11,000 AFY of presumed inflows. (Ex. 67-34.) "Overall, it was necessary to reduce recharge by approximately 2,000 AFY from the conceptual estimate to successfully calibrate the model. All of this reduction occurred within the El Paso Sub-Basin," while some inflow was increased in the northeast edges of the model. (*Id.*) The calibrated steady-state budget is 7,521 AFY of mountain-front recharge and 1,300 AFY of subflow against 7,822 AFY of evapotranspiration and 1,000 AFY of pumping. (*Id.*, Table 5-1.) The transient water budgets for 1953, 1985, and 2026, were the same. (*Id.*, p. 35, Table 5-2.)

"One of the most significant results of the [model and study] has been the estimation and refinement of the basin water budget." (Ex. 67-44.) "[A] comparison of storage versus basin groundwater pumping suggests that over 80% of present day pumping is derived from aquifer dewatering. … Since approximately 1980, the annual change in groundwater storage (overdraft) has averaged approximately 20,000 AFY and is estimated to total approximately 900,000 acre-feet since 1920, the bulk of which has occurred since the 1950s." (*Id.*) Another important result of the Brown and Caldwell modeling effort was the determination that the southern portion of the Basin (the El Paso subbasin) receives and conveys significantly less water than the northern areas. (*Id.*, pp. 15, 33-34,

f. Todd Engineers (2014)

In 2014, Kern County funded a comprehensive review of the prior research by Todd Engineers. (Ex. 614; Ex. 955-12.) Todd estimated natural recharge at 5,040 to 7,840 AFY from the mountain fronts plus 1,000 AFY from Rose Valley, for a total of 6,040 to 8,840 AFY. (Ex. 955-22 to -23; TR 06/23/2026, p. 1704:10-22.) Todd listed, but did not count in that total, 80 AFY of leakage from the District's distribution system and 1,600 to 2,100 AFY of potential return flows from irrigation. The Todd report does not cite to any evidence indicating return flows from those sources reach the aquifer, nor did it attempt to calculate how long it would take for return flows to reach the aquifer. The report also concluded that the wastewater percolating from the treatment ponds is held above the principal aquifer by the clay, so that "essentially none" of it contributes to the yield of the principal aquifer. (Ex. 955-22; Ex. 21-28.) Todd reviewed the higher estimates of

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Rose Valley inflow and adopted the 1,000 AFY that Brown and Caldwell had used. (Ex. 21-24.)

g. DRI and the Navy (McGraw, 2016)

In 2016 the Navy funded DRI's review of every prior recharge study and development of a new groundwater model for the Basin. (Ex. 21; Ex. 955-12.) DRI installed an eddy covariance station on the China Lake playa in September 2014 and measured actual evapotranspiration from the bare playa—about 4.5 inches a year and possibly as little as 2.4. From that measurement, DRI concluded that Kunkel and Chase's prior evapotranspiration estimate of 11,000 AFY, "may be overestimated by 33 to 67 percent." (Ex. 21-21, 32.) DRI also remapped the vegetation of the discharge zone finding little change from Lee's 1912 map, apart from greasewood along the margins. (Ex. 21-29 to -30.)

Separately, DRI estimated recharge from precipitation using two empirical methods, Anderson regression (4,085 AFY best estimate) and Epstein method (9,265 AFY), and compiled the prior studies, finding the mean mountain-block recharge from all studies was 8,900 AFY. (Ex. 21-23, 25, 27.)

DRI then tested the range of results in a two-dimensional steady-state model calibrated to the 1920 water levels, adjusting the magnitude and the distribution of recharge "until they got a calibrated model," arriving at a natural inflow of 7,650 AFY, with 1,500 AFY from the northern Sierra Nevada, 2,100 from the southern Sierra Nevada, 2,400 from Rose Valley, 1,600 from the Coso and Argus Ranges, and 50 from the El Paso Mountains. (Ex. 21-27 to 28, 35; TR 06/23/2026, pp. 1704:26-1706:22; TR 06/24/2026, p. 1911:4-21; TR 06/16/2026, p. 1010:9-15.)

Like the Boyd and Robson, Berenbrock and Martin, and the Brown and Caldwell models before it, DRI then model calibrated a three-dimension model to 1920 water levels. DRI adopted Todd's conclusion that essentially none of the percolated wastewater reaches the principal aquifer, attributed 80 AFY to leakage from the District's system, treated reinfiltration of pumped water as a reduction in net pumping, identified Bean's 2,500 AFY of granitic underflow as largely disproven, and noted that aqueduct leakage and pond percolation had been "postulated ... but not accepted as significant sources of water." (Ex. 21-20 to 21, 28.)

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4. 2016-2020 - The GSP Is Adopted Following an Extensive Public Process, Including Input From the Technical Advisory Committee, Comprised of Representatives of all Phase 2 Parties

a. SGMA's Regulatory Scheme

In 2014, the California Legislature enacted SGMA to provide for the sustainable management of California's groundwater basins. (*Mojave Pistachios, LLC v. Superior Court* (2024) 99 Cal.App.5th 605, 616 ("*Mojave*").) SGMA requires overdrafted basins designated by DWR as medium- or high-priority to be managed under a groundwater sustainability plan ("GSP") designed to ensure the basin operates within its sustainable yield by 2040. (Wat. Code, §§ 10720.7, subd. (a); 10720.8; 10727; 10723-10724.) SGMA authorized the creation of GSAs to develop and implement GSPs to manage the overdrafted basins. (Wat. Code, § 10723–10724.) Every GSP must include, among other things, a water budget and sustainable yield calculation. (See Wat. Code, §§ 10727.2; 10727.4; 23 CCR, §§ 354 -354.44.) Because of its technical expertise, DWR is delegated the important duty of reviewing and approving GSPs to determine if they comply with the requirements of SGMA. (23 CCR § 355.2.)

b. GSP Development and Safe Yield Determination

(i) The TAC agrees on a long-term average recharge of 7,650

SGMA took effect in 2015, and the Indian Wells Valley was one of twenty-one basins DWR designated as critically overdrafted. (Ex. 998-10; *Mojave*, *supra*, 99 Cal.App.5th at p. 617.) The Authority is the Basin's exclusive GSA. (Ex. 108-30; Ex. 955-0006.) In 2017 it retained Stetson Engineers as its Water Resources Manager to develop the GSP, and it created the TAC, a committee of credentialed hydrogeologists, to advise on the technical work. (TR 06/08/2026, pp. 171:9, 220:24-26, 223:12-18.)

The TAC's work was public. Its meetings were open, followed the Brown Act, were recorded, and its minutes, presentations, and handouts were posted on the Authority's website. (TR 06/08/2026, pp. 223:22-224:7; TR 06/09/2026, p. 297:24-25; Ex. 36, p. 1.) It met approximately thirty times during preparation of the GSP, held multiple model workshops, and took field trips. (TR 06/09/2026, p. 274:19-23.) Its chair was Adam Bingham, Searles' representative, and its

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members included Mr. Teasdale, for Meadowbrook, Mr. Parker, for the District, as well as a representative for Mojave (Wade Major). (TR 06/08/2026, p. 227:3-6; Ex. 36, p. 1.)

In February 2018 the Water Resources Manager asked the TAC's members for written comments on the water budget, and specifically whether they agreed the Basin was in overdraft. (Ex. 998-5, 10.) Mr. Parker, Mr. Teasdale, and Dr. Don Decker (the small pumpers representative on the TAC) each submitted responses to Ms. Jean Moran of Stetson, who was running the TAC. (Ex. 998.) Mr. Parker answered that "[t]he basin is currently unsustainable," and that the shortfall was "considerable." He also wrote:

> "Recharge should be based on the best available information and science – which based on the literature and recent work should turn out to be the USGS Recharge Study using the Basin Characterization Model – uncertainty should be applied to bracket final results – additionally, a careful assessment of the assumptions that went into the BCM should be conducted and used to qualify the results as necessary and appropriate."

(Ex. 998-12, 13; TR 06/10/2026, pp. 483:26-484:1, 568:3-21.)

At the time, the USGS was working locally calibrating a version of the BCM to the Basin.

Mr. Teasdale, for Meadowbrook, wrote that water budgets and the base period should "be arrived at through consensus among the TAC and with the Water Resources Manager," that the sustainable yield should be calculated "over a base period representative of long-term conditions in a basin," that "[t]he flow model would be the most robust tool to determine sustainable yield," and that "the IWV groundwater basin does presently appear to be experiencing overdraft." (Ex. 998-5, 9, 11.) A third TAC member, Dr. Don Decker, on behalf of the small pumpers, answered that the Basin "is without any doubt in CRITICAL OVERDRAFT." (Ex. 998-0001.[5])

In the spring of 2018 the TAC formed a Model Ad Hoc group, consisting of Mr. Parker, Mr. Teasdale, Dr. Decker, DRI's modelers, Stetson, and the Navy, to work through the model

[5] Dr. Decker is a retired physicist the worked at NAWS, and has studied the Basin for decades. (See Ex, 1023, (Saint-Amand Report), p. 42 ["In 1984 … Dr. Donald L Decker, an NWC physicist … reestimated the consumptive use of water."].)

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inputs with DRI's scientists. (TR 06/09/2026, p. 284:9-14.) At the group's first workshop, on June 28, 2018, the participants reviewed eleven prior recharge estimates element by element, DRI presented the result of its 2016 two-dimensional model, and a draft figure from the USGS's then-unfinished recharge study was also considered. (Ex. 952; TR 06/09/2026, pp. 285:1-6, 286:5-7, 291:13-25, 292:2-4.) Asked by the Court whether there was a consensus to use the USGS draft, Ms. Moran of Stetson Engineers answered, that the consensus was "To not use it." (TR 06/09/2026, pp. 294:17-295:15, 385:12-20.)

On July 19, 2018, the TAC met in public to hear the results of the first workshop. The minutes show "Mr. Teasdale summarized the Workshop and expressed how extremely productive the Ad Hoc format was," and that "[t]he TAC agreed with approach on recharge with bookends 4,100 to 7,700 AFY, as long as there are uncertainty bars also." (Ex. 36, p. 1; TR 06/09/2026, p. 299:20-23; TR 06/17/2026, p. 1339:11-23.) Mr. Teasdale confirmed at trial that he agreed with the bookends. (TR 06/17/2026, p. 1341:14-23.) DRI then calibrated the model as agreed and presented the results to the Ad Hoc group on August 29, 2018, with Mr. Parker and Mr. Teasdale participating. (Ex. 962; TR 06/09/2026, pp. 303:16-306:9.) Ms. Moran testified to the outcome. "The consensus was to use 7,650 for the recharge value." (TR 06/09/2026, p. 306:17-19.) Mr. Parker's own notes, which he submitted to the full TAC, confirm it:

> The Model Ad Hoc reached consensus on the following:
>
> • Use 7,650 for recharge, understanding this is best guess based on available data, and that recharge will be re-assessed and refined long-term through GSP update process
>
> • Change HC value in Brown Road area
>
> • Recalibrate model and run with 7,650 AFY annual recharge

(Ex. 962-8.)

Ms. Moran confirmed that both Mr. Parker and Mr. Teasdale agreed to calibrate the model with a long-term average recharge value of 7,650. (TR 06/09/2026, p. 309:6-16.) Shown his own note at trial, Mr. Teasdale said: "What I recall was we had to make a decision on recharge. 7,650 was the starting point. ... So it sounds about right." (TR 06/22/2026, p. 1560:2-7.) On January 9, 2019, Mr. Teasdale transmitted to the Water Resources Manager his own proposed modeling

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scenario for the GSP, which carried "Recharge (7,650 AFY)" through every stage of the scenario to 2033. (Ex. 119-52 to 53.)

The model the TAC reviewed, the 2020 GSP Model, was DRI's three-dimensional update of the model it had built for the Navy in 2016. It was calibrated to the water levels measured in 132 wells in 1920 and then through the historical period, with a relative error of 0.84 percent. The TAC reviewed its calibration in a series of meetings in 2018 and 2019. (Ex. 108-173 to 174; Ex. 955-0028 to -0030; TR 06/24/2026, p. 1931:3-9.)

(ii) The Balanced Hydrologic Period, 1990-2015

The GSP also identified the hydrologic period that represents the Basin's long-term conditions. The Basin lies in the rain shadow of the Sierra Nevada mountains. Storms from the Pacific drop most of their moisture on the western slope of the mountain. The valley floor generally receives two to five inches of precipitation a year, while the mountains that surround the Basin receive up to twenty inches and are the primary source of recharge to the Basin. (TR 06/08/2026, pp. 172:6-173:20; Ex. 955-19; Ex. 97-39.) The GSP model divides those mountain watersheds, the Sierra Nevada, the Argus and Coso Ranges, the El Paso Mountains, and Rose Valley, into recharge zones. (Ex. 990, pp. 13-14, Fig. 4.) Three precipitation stations lie within or beside those zones, Haiwee in the Rose Valley zone, Indian Wells Canyon in the Sierra Nevada North zone, and Laurel Mountain near the El Paso zone; the other stations in the region sit west of the watershed divide or on the valley floor, where the China Lake station averages 3.42 inches a year. (Ex. 97-39.)

In 2018 Stetson Engineers prepared cumulative departure-from-mean curves for the two stations with long records, Haiwee (in Rose Valley) and China Lake (on the valley floor). Because rain on the valley floor is not the water that recharges the Basin, Stetson gave the greater weight to Haiwee, which lies within the recharge area. (Ex. 955-48.) A twenty-six year period from 1990 through 2015 was identified as a balanced hydrologic period, one that begins and ends in balance and contains both wet and dry years. (Ex. 108-177; Ex. 955-48; Ex. 990, pp. 15, 50, 68.) The GSP used the period to scale the model's 7,650 AFY of recharge year by year and to build the fifty-one-year planning hydrology that SGMA requires. (Ex. 108-177; Ex. 990, pp. 15, 50; Ex. 24, pp. 134, 138.) The Technical Report adopts 1990 through 2015 as the base period for its balanced-condition

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water budget. (Ex. 955-49 to 50, Table 22.)

(iii) Sustainable Yield and GSP Adoption

The GSP was adopted in January 2020 with natural recharge of 7,650 AFY and a "Current Sustainable Yield" of the same amount. (Ex. 108-38 to 40; Ex. 955-21, Table 9.) The vote was four to one. The lone dissent came from Inyo County's member over an unrelated water-import proposal, not the District. (Ex. 929-68; Ex. 108-30.)

Mr. Teasdale submitted one pre-adoption comment on which the Large Pumpers now rely, a November 2019 observation that water levels at one well near North Brown Road had not changed since about 2010 while pumping in that area was, by his estimate, "greater than 15,000 AFY," so that "the sustainable yield in the North Brown Road area could be greater than 15,000 AFY." (Ex. 119-15.) At trial he explained the inference. "[I]t has to be more than what's being pumped if water levels aren't changing." (TR 06/17/2026, p. 1353:21-22.)1353:21-22.) The water levels in that area have not stayed the same. The Authority's 2025 periodic evaluation maps the cone of depression beneath the northwest agricultural fields in 2010, 2015, and 2023, and Ms. Moran testified that the same contour encompassed about 2,800 acres in 2010, that the 2015 measurements show "roughly a doubling in size of the ag field cone of depression," and that the cones of depression "are still getting larger" although pumping has decreased. (Ex. 929-220 to -222, Figures 4-2 to 4-4; TR 06/08/2026, pp. 208:19-210:4, 213:14-19.)

c. DWR's Approval of the GSP

After a nearly two-year review, DWR approved the GSP in 2022. DWR concluded the GSP "demonstrates a thorough technical understanding of the basin based on best available science and information." (Ex. 936-7.) Specifically, DWR concluded:

> "The Authority developed historical, current, and predicted water budgets using information from studies and investigations, previous groundwater flow models, and historical data, all of which were also used to develop the Numerical Model. **The water budget components in the Plan, including an assessment of sustainable yield and change in storage (i.e., conditions of overdraft), were developed using the best available tools and information available** at the time of preparing the GSP and substantially comply with the requirement outlined in the GSP Regulations."

(Ex. 936-0022.)

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The staff report recited the plan's finding that "the total inflow into the Basin" is "7,650 acre-feet per year." (Ex. 936-0009.) DWR further found that the GSP's water budgets and model "rely on a variety of reports and studies conducted by various groups over a number of years, that the Department regards to be consistent with the best available information and science." (Ex. 936-28.) DWR noted, as the GSP itself had, that data gaps remained, and that the Authority planned to fill them. (Ex. 936-3, -21 to -22.)

5. 2020-2026 - The Lawsuit, and Large Pumpers Attempt to Undermined SGMA

a. The Replenishment Fee is Adopted, and the Adjudication Follows

On August 21, 2020, the Authority adopted Ordinance 03-20, which imposed a replenishment fee of $2,130 per acre-foot on groundwater extractions other than federal and de minimis pumping, to fund the imported-water project and the mitigation of shallow wells damaged by overdraft. (Ex. 929-0065, -0157.) Searles and Mojave Pistachios sued over the fee and the GSP the following month, and the District filed its cross-complaint in this action seeking a comprehensive adjudication of the Basin. When the Court set this trial in August 2024, it observed that "large users of groundwater are facing severe financial consequences," and that "[p]lainly, Mojave and other large pumpers are hoping that the implementation of a physical solution in this adjudication proceeding will eliminate this and other fees." (ROA 1465, p. 4.)

b. The Large Pumpers' Consultants Leave the SGMA Process and Begin Working Behind Closed Doors

The Authority, meanwhile, continued its public process, seeking to fill data gaps and update the groundwater model. The Navy allowed the Authority to continue to use the DRI model but conditioned access to the model on a Configuration Management Plan, which the Authority completed in 2021 and began to implement in 2022. (TR 06/09/2026, p. 313:3-14; Ex. 929, pp. 1501-1511.) On May 10, 2022, the Water Resources Manager sent the TAC's members, including Mr. Parker and Mr. Teasdale, the list of model "configuration items" to be reviewed and asked for their recommendations. (Ex. 920.) Nine days later, Meadowbrook withdrew from the Policy Advisory Committee and withdrew Mr. Teasdale from the TAC, citing the "pending Basin

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Adjudication." (Ex. 921; TR 06/22/2026, p. 1566:7-25.) In Mr. Teasdale's words, "I left because counsel told me to leave." (TR 06/22/2026, p. 1568:25-26.) Mr. Parker left the TAC at about the same time, "in conjunction, I think, with this filing of this adjudication. There was concern about conflict." (TR 06/10/2026, p. 518:11-16.) Mr. Parker never identified what that conflict would be.

Within weeks, the District, Searles, Meadowbrook, and Mojave Pistachios formed the TWG. (TR 06/10/2026, p. 599:9-19.) The TWG meetings were not public. Mr. Parker explained that the group was formed because "we disagreed with the recharge, a foundational element in managing this basin," and because the wanted "you know, results that we could defend. We knew where this was going at that point." (TR 06/10/2026, pp. 532:17-22, 533:5-11.) Mr. Teasdale's firm billed its June 2022 work under the heading "Meadowbrook Dairy – Litigation Support," and admitted the only litigation he supports for Meadowbrook is this case. (TR 06/22/2026, pp. 1512:21-1513:23.) Ms. Wicks, Searles' consultant, said of the group's safe-yield work, "This was not done for SGMA." (TR 06/15/2026, p. 754:16-17.)

c. Testing Safe Yields Over Periods and the TWG's Papers

In August 2022 Mr. Teasdale e-mailed Ms. Wicks's potential topics for their meeting, including "extending baseline period from 1990 to 2020." Dr. Yeh ran the cumulative-departure analysis and reported that "the period from 1991 to 2014 looks promising: it starts at the end of the dry cycle (seven-year drought from '84 to '90) and ends with a dry period. The average precipitation is similar to the long-term average, and it includes wet and dry conditions." (Ex. 92; TR 06/22/2026, pp. 1576:12-1577:14.)

Mr. Teasdale then e-mailed Meadowbrook's attorney: "**We'll see how this base period safe yield value compared** with 2016-2021 and can share preliminary results with you next week." (Ex. 92-1, emphasis added.) The TWG did not use that base period in this trial nor could Mr. Teasdale say what the safe yield value was for it, or if it was ever calculated. Instead, the Large Pumpers used a base period of 2014 through 2023, which as discussed below, is a wet not a balanced period. (Ex. 3-6; TR 06/22/2026, p. 1578:14-16.) None of the TWG experts at trial testified about the safe yield values over a 1991 to 2014 base period.

In March 2024, Searles said "[b]ased on best available science and substantial technical

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work, the safe yield of the Basin is 13,400 acre-feet annually." (ROA 1243, p. 7, fn. 5.) On August 5, 2024, the Court set the Phase 2 trial. (ROA 1465.) On September 4, 2024, the TWG released its safe yield paper, which reported a range of 14,300 to 17,000 AFY depending on which specific-yield ("Sy") values were used. (Ex. 3-7.)

Its storage paper, authored by Mr. Brown, acknowledged that "[t]here is limited direct empirical data on Sy obtained from previous studies on the Basin." (Ex. 5-29.) Its appendix on prior studies compiled the estimates described above, prior estimates, added assumed man-made components to them, and arrived at an "average" total recharge of 14,000 AFY. (Ex. 4-17, Table 2.) The same appendix acknowledged that any return flows "would likely take many decades to reach the groundwater surface," that recharge from the wastewater ponds should be estimated at zero. It also reviewed a change in storage analysis from the Authority's 2020 Annual Report that used Thiessan Polygons, and found the year-by-year storage-change estimates "vary significantly year to year (over three orders of magnitude)" and do not correlate with pumping or precipitation. (Ex. 4-15, 17, 34.)

d. The Ramboll Model

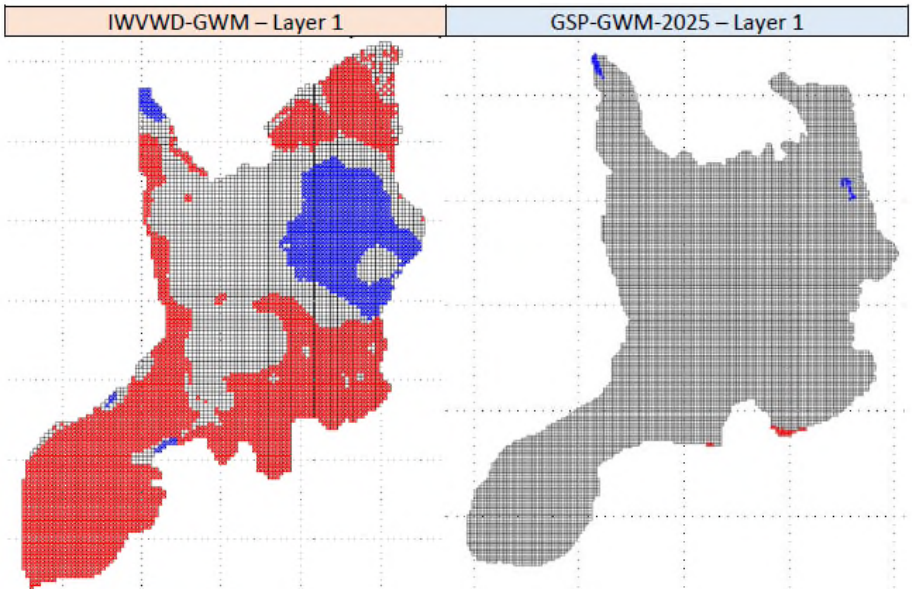
Ramboll built the Ramboll Model for the District after the TWG was formed, with Mr. Parker as the project's principal, and produced it at the end of April 2025. (Ex. 97; TR 06/10/2026, p. 564:16-19; TR 06/17/2026, p. 1224:2-12.) It receives its mountain-front recharge as an input from the statewide version of the BCM, adds surface recharge, adds underflow from Rose Valley averaging 2,600 AFY, and adds several sources of man-made recharge totaling about 2,600 AFY. It is calibrated to a steady state using average recharge and reduced pumping from the 1980–1985 period, and transient from 1986–2023. (Ex. 97-8 to 9, 45 to 48, 80; TR 06/15/2026, p. 874:8-9; TR 06/16/2026, pp. 980:11-15, 1016:5-9.)

The District retained Dr. Tonkin and Dr. Bedekar in late February 2025, after the model had been built and the decision to draw its recharge from the statewide BCM had been made. Dr. Tonkin's assignment was "advising on the Ramboll model." Dr. Bedekar joined as well and recommended a change to the model's geology that Ramboll "did incorporate," and had "less than two months" with the model before it was produced in this litigation. (TR 06/15/2026, pp. 769:7-

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10, 940:10-21; TR 06/16/2026, pp. 967:9-13, 1036:11-14, 1123:18-23; TR 06/17/2026, pp. 1223:11-1224:12.) Dr. Tonkin's safe-yield figures are the sum of the model's inflows, and Mr. Teasdale's and Ms. Wicks's storage-change calculations use its specific-yield values. (Ex. 123, pp. 9, 37-38; Ex. 91-12.)

Although the Ramboll Model's published calibration statistics appear good on the surface, the model has serious deficiencies. (Ex. 80-34 to 40.) Most problematic is the large number of "flooded" cells in the Ramboll Mode. These are areas that the Ramboll Model is simulating heads above land surface in areas where no such water exists. This includes a large lake on the China Lake playa, where the model simulates groundwater heads 20 feet above the land surface, and in the northwest corner of the model domain near Rose Valley, where the model simulates water levels 1,000 feet above sea level.[6] (Ex. 80-34 to 35.) Below is a comparison of dry and flooded cells between the Ramboll Model on the left, and the 2025 DRI Model on the right.



(Ex. 80-35.)

[6] The TWG tries to hand wave this significant defect by saying the ModFlow code switches to a confined simulation when water levels rise above the land surface, and they are not actually simulating a lake. But that does not solve the problem. The fact remains the model simulates water levels above the land surface where they do not exist, over a large portion of the model, in every time step.

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e. The 2025 DRI Model

The Authority updated its model under the Configuration Management Plan through its Technical Modeling Group, DRI, Stetson, and the Navy. (TR 06/09/2026, pp. 313:3-14, 398:6-16.) The 2025 DRI Model incorporated the airborne electromagnetic survey of the Basin's clay layer and faults, which the District itself had commissioned, revised the evapotranspiration zones, moved to monthly stress periods, and was recalibrated against more than three times as many water-level measurements as the 2020 GSP Model, with about half the error. (Ex. 955-0027 to -0031, -0050; Ex. 24, Table 5-1; Ex. 1200, pp. 30-31 & Tables 5-6; TR 06/16/2026, pp. 996:16-997:1.) The group reconsidered the recharge, redistributed it among the mountain fronts, and kept the total at 7,650 AFY. (Ex. 955-0048, Table 20; TR 06/09/2026, pp. 398:17-399:6.) The Technical Report refers to the model as the 2025 GSP Model. Dr. McKenna and Dr. Kincaid relied on it, and Dr. McKenna's work with it can be reproduced from disclosed materials. (TR 06/29/2026, p. 2159:13-26.)

f. The USGS's Locally Calibrated Recharge Study (2026)

In 2026. the USGS completed the recharge study that Mr. Parker had recommended in 2018, a version of the BCM calibrated to the Basin's stream gauges and climate stations, and published its final report. (Ex. 363-23.) The study estimates mountain-front recharge for 1981 through 2010 at approximately 8,680 AFY, excludes Rose Valley, and describes its figure as one that "corresponds well with estimates from previous studies ... developing a consensus among estimates during the last 50 years." (Ex. 363-23; Ex. 955-0022; TR 06/16/2026, pp. 979:5-980:7.) The study places 21 percent of its recharge, about 1,800 AFY, in the volcanics subarea north of the Basin—also called the White Hills. (Ex. 363-25.)

Mr. Parker testified that a locally calibrated BCM is "what I consider best available science for estimating recharge in a basin," while acknowledging that he is not an expert in modeling or in the BCM and had never used it. (TR 06/09/2026, p. 467:8-13; TR 06/10/2026, pp. 583:11-24, 585:4-8.) The Technical Modeling Group reviewed the local study during the 2025 update and did not adopt its distribution, because the permeability it assigned to the volcanic rocks north of the Basin was too high and the result was not well calibrated to the Basin's groundwater levels. (TR 06/09/2026, pp. 398:17-399:6; Ex. 998-1.) Dr. Tonkin agreed that the local study "puts a lot of

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recharge in what we call the volcanics," and did no analysis of whether that was reasonable. (TR 06/16/2026, pp. 978:20-26, 1047:14-22.) The Ramboll Model did not use the local study. It used the statewide version, which was never calibrated to the Basin, nor is there any evidence it calibrated to a similar basin. (TR 06/10/2026, pp. 584:13-585:3, 586:15-587:3; TR 06/16/2026, p. 980:5-7.)

g. Summary of Recharge Studies

None of the models in this history are physically before the Special Master or the Court as a model—this the modeling code is not in evidence. The results of each study and each model are presented only through the report that describe how it was built, the recharge it was given, the parameters it ended up with, and its fit to the measured water levels, together with the testimony about it. That is as true of the 2025 DRI Model and the Ramboll Model as of Bloyd and Robson, Berenbrock and Martin, and Brown and Caldwell. All of those reports were admitted into evidence by stipulation, without limitation. (Stipulation re Admissibility of Phase 2 Trial Exhibits (July 8, 2026), ¶ 1; Order re Phase 2 Trial Exhibits (July 9, 2026) [ROA 2102], Attach. A [Exs. 21, 24, 67, 97, 641, 1011].) Dr. Kincaid, who did not have access to the Bloyd and Robson or Brown and Caldwell models, "could see from the reporting and the descriptions of the model what they did and what their calibration results were," and evaluated each study from its report in the same way. (TR 06/23/2026, p. 1707:3-7.) The Authority asks that the Special Master do the same.

III. PROCEDURAL BACKGROUND

A. Mojave Pistachios and Searles' Unsuccessful Actions Challenging the GSP

In September 2020, eight months after GSP adoption, Mojave Pistachios and Searles filed actions against the Authority challenging the GSP, including the GSP's 7,650 AFY safe yield determination, as well as the Authority's Replenishment Fee and other GSP implementation actions. (*Mojave Pistachios, LLC v. Indian Wells Valley Groundwater Authority,* Case No. 30-2021-01187589.)

Neither the District nor Meadowbrook challenged the GSP or the Replenishment Fee. To the contrary, the District filed answers in both Mojave Pistachios and Searles' actions affirmatively defending the GSP and its implementing actions by seeking to have each "Complaint be dismissed

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in its entirety" and asserting numerous defenses as to why Mojave Pistachios and Searles' claims are barred. (*Id*., ROAs 63, 610.)

The Authority successfully demurred to Mojave Pistachios and Searles' challenges to the Replenishment Fee, and Mojave Pistachios sought writ review. On February 8, 2024, the Court of Appeal rejected Mojave Pistachios' claims and upheld the demurrer ruling in a published decision. (See *Mojave*, *supr*a, 99 Cal.App.5th at 614, reh'g denied (Mar. 4, 2024). The California Supreme Court denied Mojave's petition for review on May 15, 2024.

Following the Court of Appeal's decision in the Authority's favor, Searles and Mojave Pistachios each entered into settlement agreements with the Authority, and dismissed their actions. There are presently no challenges to the GSP and any attempt to now challenge the GSP would be time-barred. The Large Pumpers are inappropriately using this adjudication as a back-door attempt to challenge the GSP's safe yield determination, even though the DWR-approved GSP is valid as a matter of law and immune from challenge.

B. <u>The Adjudication Action</u>

1. The Phase 1 Trial on Navy's Federal Reserved Right

The Phase 1 trial commenced on April 28, 2025 and focused exclusively on adjudicating the Navy's federal reserved water right. On September 15, 2025, the Court issued its Statement of Decision, ruling the Navy's federal reserved water right is 2,008 AFY.

2. The Phase 2 Trial on Safe Yield

This Phase 2 bench trial is solely to determine the Basin's safe yield. (Tentative Ruling Adopted by Aug. 5, 2024 Minute Order [ROA 1465].) The trial was held for a period of ten court days, which commenced on June 8, 2026, and concluded on June 29, 2026.

3. The Special Master Referral

During the Phase 2 Trial, the Court gave the parties notice of its intent to appoint a special master due to the complex technical issues involved at trial. On October 30, 2026, the Court entered its Order Appointing Special Master Re: Phase 2 Trial, appointing Bryan Bondy as the special master to recommend to the Court his best estimate of safe yield for the Basin based on the evidence presented at trial.

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C. The CCP 845 Technical Report - Exhibit 955

Code of Civil Procedure section 845 provides that a GSA with a DWR-approved GSP may submit a technical report in an adjudication, and that the report shall be "prima facie evidence of the physical facts found in the report." (Code Civ. Proc., § 845, subdivision (d).) Pursuant Section 845, the Authority submitted its "Technical Report for the Indian Wells Valley Groundwater Basin" ("Technical Report") on May 28, 2026, in advance of the Phase 2 trial.[7] (See Exhs. 955-957.) The Technical Report provides, among other things, the physical characteristics of the Basin and provides a conceptual model of the groundwater system.[8] The Technical Report determined that the average total inflows into the Basin is 7,650 AFY, which is predominantly mountain front recharge from the Sierra Nevada, El Paso, and Argus and Coso mountain ranges. (Ex. 955-0019 - 0024.) The primary natural outflow is evapotranspiration. (*Id.*, at 0024-0026.) Consistent with Code of Civil Procedure section 845, the Court accepted the Technical Report into evidence as "prima facie evidence of physical facts found in the report," such that the physical facts in the report must be accepted as true unless contradicted and overcome by other evidence. (TR 06/08/2026, pp. 139:25-140:4.)

IV. SAFE YIELD: LONG-TERM AVERAGE INFLOWS MINUS OUTFLOWS

A. Safe Yield

The California Supreme Court defines "safe yield" as "the maximum quantity of water which can be withdrawn annually from a ground water supply under a given set of conditions without causing an undesirable result." (*City of Los Angeles v. City of San Fernando* (1975) 14 Cal.3d 199, 278.) The phrase "undesirable result" is generally "understood to refer to a gradual lowering of the ground water levels resulting eventually in depletion of the supply." (*Ibid.*) The gradual lowering of groundwater levels occurs when extractions exceed recharge; therefore, "[s]afe yield is generally calculated as the net of inflows less subsurface and surface outflows." (*City of*

[7] The Technical Report is Exhibit 955 and the Attachments and Figures are Exhibits 956 and 957, respectively.

[8] A conceptual model is a non-numerical model of the physical setting, characteristics, and processes that govern groundwater occurrence within a basin, which provides the basis for developing the water budget and determining the safe/sustainable yield of the Basin.

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Santa Maria v. Adam (2012) 211 Cal.App.4th 266, 279.) Extractions that exceed recharge are wrongful and may be enjoined "because the overdraft, from its very beginning, operate[s] progressively to reduce the total available supply." (*City of Pasadena v. City of Alhambra* (1949) 33 Cal.2d 908, 929.)

B. Sustainable Yield

SGMA created the term "sustainable yield," which largely mirrors the definition of "safe yield," with the addition of a slightly more specific definition of an undesirable results. SGMA defines "sustainable yield" as "the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result." (Wat. Code, § 10721, subd. (w).) SGMA lists six conditions that if they were to occur in a "significant and unreasonable" manner would constitute an "undesirable result." (*Id*., § 10721, subd. (w).) These include, among other things, the:

- "(1) Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon."(*Id*., § 10721, subd. (x).)
- "(2) Significant and unreasonable reduction of groundwater storage." (*Id.*)
- "(4) Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies." (*Id*.)

GSAs are charged with defining the "undesirable results" for a basin. (23 CCR §§ 354.26; 354.28.) SGMA definition of sustainable yield it is not inconsistent with the common law definition of safe yield because the full scope of "undesirable results" is not fully defined in the case law, which primarily focuses on the chronic lowering of groundwater levels. No court has rejected any of the SGMA-specific undesirable results as not being "undesirable results" in the context of safe yield.

Here, the Court has already recognized that the concepts of "safe yield" and "sustainable yield" are "essentially equivalent terms." (August 5, 2024 Phasing Order, p. 60.) Practically speaking, there is no difference in how safe/sustainable yield are calculated. Both safe yield and

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sustainable yield are determined using the basin's water budget, which is developed by expert opinion and modelling of the basin's "net of inflows less subsurface and surface outflows," and the prevention of undesirable results. (*Santa Maria*, *supra*, 211 Cal.App.4th at p. 279; *San Fernando*, *supra*, 14 Cal.3d at p. 278 ["Basically, safe yield was deemed equivalent to an adjusted figure for net ground water recharge"]; see 23 CCR § 354.18(a) ["Each [GSP] shall include a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin"]; *Id*., subd. (b)(7) [the GSP shall "quantify … An estimate of sustainable yield for the basin"].) To the extent there is a difference, the safe yield can only be smaller than the sustainable yield. Under SGMA the GSA defines undesirable results by determining what is significant and unreasonable under the circumstances, and can take into account future management actions and projects. A safe yield determination looks just to current and past conditions and does not take into account projects that do not yet exist.

V. THE COURT SHOULD ADOPT THE GSP'S SUSTAINABLE YIELD BECAUSE IT IS LEGALLY VALIDATED AND APPROVED BY DWR

A. The GSP Is Valid and Immune From Challenge Because No Party Successfully Challenged It Through a Reverse Validation Action

1. The Validation Statutes Apply to GSPs

The validation statutes, Code Civil Procedure § 860 *et seq*., "provide a simple and uniform method" to determine the validity of a public agency's action and to immunize the action from subsequent judicial scrutiny. (*Moorpark Unified School Dist. v. Superior Court* (1990) 223 Cal.App.3d 954, 960.) "A validating proceeding…is an in rem action whose effect is binding on the agency and on all other persons." (*Golden Gate Hill Development Co., Inc. v. County of Alameda* (2015) 242 Cal.App.4th 760, 767 ("*Golden Gate*"), citation and quotation marks omitted.) The validation statutes apply "when 'any other law' authorizes their application." (*Id*., 765–766.)

"Here, the 'other law' applying Code of Civil Procedure section 860 is [SGMA]'s validation provision, Water Code section 10726.6, subdivision (a), which states: 'A groundwater sustainability agency that adopts a groundwater sustainability plan may file an action to determine the validity of the plan pursuant to [c]hapter 9 (commencing with [s]ection 860) of [t]itle 10 of

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[p]art 2 of the Code of Civil Procedure no sooner than 180 days following the adoption of the plan.'" (*AquAlliance v. Vina Groundwater Sustainability Agency* (2026) 122 Cal.App.5th 118, 136–137 ("(*AquAlliance*").) "The plain language of the statute establishes reverse validation actions are permissible." (*Ibid*.)

2. A Reverse Validation Action Is the Exclusive Means of Challenging the GSP's Safe Yield

Importantly, where an agency's action is subject to validation, a reverse validation action is a party's exclusive means of challenging that action. (Code Civ. Proc. 869; *Millbrae School Dist. v. Superior Court* (1989) 209 Cal.App.3d 1494, 1499.) The District recognized as much when it attempted to prevent Searles' dismissal and take over the case. It acknowledged: "Validation is the exclusive means of pleading a challenge to any GSP, including the Authority's…it is also the only way to challenge the GSP." (*Mojave Pistachios, LLC v. Indian Wells Valley Groundwater Authority,* Case No. 30-2021-01187589, ROA 725 (District's Reply in Support of Motion for Order Confirming "Interested Party" Status), p. 3:5-7, emphasis in original.)

The validation statutes supersede other legal mechanisms that a challenger might otherwise use. "[A] third party cannot sidestep [validation] proceedings by purporting to invoke a different procedural vehicle." (*Santa Clarita Organization for Planning & Environment v. Castaic Lake Water Agency* (2016) 1 Cal.App.5th 1084, 1097.) Courts invoke the bar of the validation statutes to direct as well as indirect challenges where the challenged government action is "inextricably bound up" with, or "an integral part of," the action. (*Kaatz v. City of Seaside* (2006) 143 Cal.App.4th 13, 45; *California Commerce Casino, Inc. v. Schwarzenegger* (2007) 146 Cal. App. 4th 1406, 1430-32; *Graydon v. Pasadena Redevelopment Agency* (1980) 104 Cal.App.3d 631, 645.)

Mojave Pistachios brought a reverse validation action against the Authority that specifically challenged the GSP's safe yield determination of 7,650 AFY. (*Mojave Pistachios, LLC v. Indian Wells Valley Groundwater Authority,* Case No. 30-2021-01187589, ROA 612 (Fourth Amended Complaint), ¶¶ 183-191.) Searles also brought an action challenging the safe yield but asserted a cause of action for a "Petition for Writ of Mandate," not reverse validation. (*Id*., ROA 220) The District nevertheless attempted to argue that Searles' petition constituted a reverse validation

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action. (*Id*., ROA 725 (District's Reply in Support of Motion for Order Confirming "Interested Party" Status), p. 2:1 ["To claim that Searles' FAP did not allege a reverse validation action is simply incorrect"].) Mojave and Searles dismissed those actions with prejudice, thereby forfeiting their ability to challenge the safe yield. (*Id*., ROAs 690, 775.)

The Large Pumpers cannot use this adjudication, a different procedural vehicle, to indirectly challenge the Basin's safe yield. The GSP's safe yield calculation is "inextricably bound up" with and "an integral part of" this Phase 2 trial; indeed, it is the very purpose of this Phase 2 trial. Thus, the Court must invoke the bar of the validation statutes. The Large Pumpers are inappropriately using this adjudication as a backdoor attempt to challenge the GSP without the proper deference that should be given to the Authority. (*Poway Royal Mobilehome Owners Assn. v. City of Poway* (2007) 149 Cal.App.4th 1460, 1479 ["judicial review of a legislative type activity is limited to an examination of the record before the authorized decision makers to test for sufficiency with legal requirements"].)

The purpose of this adjudication action is to determine the parties' water rights. (Code Civ. Proc., § 832(c); Wat. Code, §§ 10720.5(c).) Historically, courts had to determine the basin's safe yield as a necessary prerequisite to determine water rights because there was no regulatory regime in place that had determined safe yield. That has changed. SGMA charges GSAs with the duty to determine safe/sustainable yield, subject to DWR review, and requires any challenge to the GSP to be brought as a reverse validation claim.

3. The GSP's Safe Yield Must Be Accepted for Purposes of this Adjudication Because It Is Legally Valid and Immune from Subsequent Judicial Scrutiny

Where, as here, no party prevails on a reverse validation action, the government's action is "***deemed valid and becomes immune from attack***." (*Coachella Valley Water Dist. v. Superior Court* (2021) 61 Cal.App.5th 755, 767-68; *Golden Gate*, *supra*, 242 Cal.App.4th at 771 [if no reverse validation action is brought or it does not succeed, the "agency's action will become immune from attack whether it is legally valid or not" and "the public is 'forever barred from contesting the validity of the agency's action in a court of law.'"].) Mojave and Searles' dismissal

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of their validation actions rendered the GSP's safe yield valid and immune from subsequent judicial scrutiny.[9] Because the GSP's safe yield is legally valid, it cannot be overridden in this adjudication. Accordingly, the Court should accept the GSP's safe yield for purposes of this adjudication.

B. Under the Recent *AquAlliance* Decision, the Court Should Defer to the DWR-Approved Safe Yield Determination Because DWR Has Primary Jurisdiction

Even if the validation statutes do not preclude this phase of trial, the Authority has consistently demonstrated that SGMA and long-standing principles of deference require the Court to defer to DWR-approved safe/sustainable yield. (ROA 1225 (March 11, 2024), p. 18 ["The Legislature delegated jurisdiction and review of the technical merits of GSPs to DWR."]; ROA 1335 (June 3, 2024), p. 8 ["A Phase 2 trial on safe yield and storage would be redundant of DWR's determinations…[t]his Court should defer to DWR's technical expertise, and adopt the sustainable yield as the safe yield for purposes of determining water rights"]; ROA 1421 (July 12, 2024), p. 13 ["Legislature intended that GSPs would address technical issues that would be relevant in an adjudication"]; ROA 1991 (Opening Trial Brief), p. 38 ["the Court should extend substantial deference to the Authority's and DWR's expert administrative determinations regarding the Basin's safe/sustainable yield"].)

The Authority advanced this position to the Court before the Court of Appeal had occasion to address the issue. After the Phase 2 trial concluded, the Court of Appeal issued its decision in *AquAlliance*, reaching the same conclusion as the Authority: courts should be "deferring to [DWR]" and not re-evaluating technical issues in a DWR-approved GSP. (*AquAlliance*, 122 Cal.App.5th at 149.) Instead, under the primary jurisdiction doctrine, courts should dismiss as moot an action that seeks to address issues that overlap with a DWR-approved GSP, such as this Phase 2 trial to re-determine safe yield.

[9] This does not suggest that a GSP, which is validated, or not challenged in a validation action, will avoid further review. SGMA mandates a separate layer of review conducted by DWR. DWR must also continue to assess implementation of a GSP to ensure the sustainability goal is being met. (Wat. Code §§ 10728.2; 10733.4.)

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1. *AquAlliance* and the Primary Jurisdiction Doctrine

In *AquAlliance*, the plaintiffs brought a reverse validation action challenging various aspects of a GSP, including general allegations that the GSP "fails to provide for the management and use of groundwater…without causing undesirable results" and the "GSP fails to identify and/or adequately support its findings that…the basin is operated within its sustainable yield." (RJN Ex. A, pp. 3, 8; *AquAlliance*, 122 Cal.App.5th at 131.) While the action was pending, DWR "approved" the GSP. With respect to the sustainable yield, DWR found it sufficient that the "GSP estimates the sustainable yield based on projected water levels under baseline conditions" but encouraged the GSA "to clarify how the sustainable yield was calculated." (RJN, Ex. B, pp. 27-28.) Based on DWR's approval, the trial court dismissed the action as moot on grounds that DWR's approval "spoke to the entire controversy, which justified dismissal." (*AquAlliance*, 122 Cal.App.5th at 145.) The trial court reasoned that it would be inappropriate for it "to assume the functions of an administrative agency, or to interfere with the functions of an administrative agency" and "these considerations justified dismissal of the action, ruling that [DWR]'s approval of defendants' [GSP] mooted plaintiffs' validation action." (*Id*. at 132, 139.) The mootness dismissal was affirmed on appeal under the primary jurisdiction doctrine. (*Id*. at 139.)

The primary jurisdiction doctrine creates a jurisdictional right-of-way whereby courts yield jurisdiction over technical matters before them to the respective agency tasked with determining such matters. The doctrine "applies where a claim *can* originally be addressed in a court, but would be *better addressed* first by an administrative body." (*Id*. at 144.) A claim is better addressed by an administrative body if the claim is "subject to a specific regulatory scheme" and "requires resolution of issues that are 'within the special competence of an administrative body.'" (*Davel Communications, Inc. v. Qwest Corp.* (9th Cir. 2006) 460 F.3d 1075, 1086.) The "application of the doctrine depends on the service of two related policies: (1) enhancement of court decisionmaking and efficiency through leveraging administrative expertise, and (2) helping assure uniform application of regulatory laws." (*AquAlliance*, 122 Cal.App.5th at 145.) "If the doctrine applies, it *requires* that the suit be stayed until the agency resolves the issue, whereupon the lawsuit resumes if the agency's resolution…has not resolved the entire controversy." (*Id.* at 144, emphasis added.)

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AquAlliance held that the primary jurisdiction doctrine applies when the court must resolve a technical issue that overlaps with DWR's review of GSPs under SGMA, such as whether "the applicable basin is operated within its sustainable yield." (*Id*. at 143, 146.) Under the primary jurisdiction doctrine, the court can (and should) stay any such case while DWR carries out its evaluation, and then dismiss the matter as "moot" if DWR approves the GSP. (*Id*. at 148-149.) The Court of Appeal concluded that "[SGMA]'s detailed allocation of authority to [DWR] to perform the technical sustainability evaluation and the need for uniform application of this evaluation throughout the state to support [SGMA]'s goals justifies application of the primary jurisdiction doctrine." (*Id*., at 147.) Moreover ,the Court of Appeal found that the two policies of the primary jurisdiction doctrine are served by allowing DWR to evaluate GSPs instead of having trial courts conduct separate, independent technical determinations. (*Id*. at 145-149.)

2. DWR's Approval of the Authority's GSP Has Mooted this Safe Yield Trial

AquAlliance controls and moots this Phase 2 trial. Here, as in *AquAlliance*, the Court is being asked to evaluate the safe yield of the Basin, which was already reviewed and approved by DWR. The core purpose of the GSP is to ensure the basin operates within its sustainable yield. (Wat. Code, §§ 10721, subds. (u), (w); 10727; 10727.2.) Every GSP must include a sustainable yield calculation, a water budget, physical and hydrogeologic characteristics of the basin, groundwater conditions and storage, and other technical information. (*Id*., §§ 10727.2; 10727.4; 23 CCR, §§ 354 -354.44.) DWR approved the GSP, finding that it "demonstrates a thorough technical understanding of the basin based on best available science and information." (Ex. 936-007.) Specifically, DWR concluded that "[t]he water budget components in the Plan, *including an assessment of sustainable yield* and change in storage (i.e., conditions of overdraft), were developed using the best available tools and information available." (Ex. 936-0022.) DWR's approval of the Authority's GSP speaks to the entire safe yield controversy of this Phase 2 trial and renders it moot.

The only difference between *AquAlliance* and this adjudication is that it involved a reverse validation challenge to the GSP. The direct and indirect nature of the challenges does not matter. A

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party should not be permitted to accomplish through a groundwater adjudication what it could not accomplish through a direct challenge to the GSP: obtaining a judicial re-determination of technical issues that SGMA commits to DWR's evaluation and oversight. To be sure, both of the primary jurisdiction policies apply with equal force here as in *AquAlliance*.

First, evaluating the Basin's safe yield is "a highly technical analysis [DWR] is uniquely tailored to perform" and the Court's decisionmaking would be enhanced by leveraging DWR's administrative expertise. (*AquAlliance*, 122 Cal.App.5th at 146.) The Court's appointment of a special master confirms that. During the Phase 2 trial, the Court observed: "I'm not sure given my lack of technical information or information regarding some of the issues here I can [determine safe yield] without some significance assistance like a referee." (TR 06/09/2026, p. 247:5-12.) The Court expressed concern about "get[ting] to the right result" given the underlying technical issues and complex groundwater models. (*Ibid*.) SGMA also provides "[DWR] two years to complete its review," while this Court is being forced to arrive at a decision based on ten days of trial testimony and a recommendation from a special master. (*AquAlliance*, 122 Cal.App.5th at 146, citing Wat. Code, § 10733.4, subd. (d).) Because the Court is not "in the same if not better position to render a decision" on safe yield as DWR, the Court should defer to DWR who "is uniquely tailored to perform" the analysis. (*Id*., at 150.)

Second, "[GSPs] are core to [SGMA]'s underlying sustainability goal. Courts deferring evaluations of [GSPs] to [DWR]…helps ensure [GSPs] throughout the state are evaluated uniformly by the same body to protect a core purpose of [SGMA]." (*AquAlliance*, 122 Cal.App.5th at 147.) This is particularly important for the evaluation of the safe/sustainable yield. If the court-determined safe yield is different than the GSA-determined sustainable yield, it would create a conflict between the available supply for purposes of exercising water rights, on the one hand, and the GSA's statutory responsibility to achieve groundwater sustainability on the other. As *AquAlliance* points out, "had the trial court…disagreed with [DWR]'s evaluation, there would have been an intra-basin inconsistency in defendants' basin on whether the [GSP] satisfied [SGMA] and how [the GSAs] should move forward in managing the basin. This problem would burgeon if permitted across the state, potentially creating a multitude of intra- and inter-basin inconsistencies."

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(*Id*. at 147.)

To the extent a court-determined safe yield could override a GSA-determined sustainable yield, that would be especially problematic because it casts a looming uncertainty over every GSP. The safe/sustainable yield is the heart of every GSP, all management actions stem from that calculation. The looming uncertainty of an adjudication disincentives investing in costly management projects. Without certainty that a DWR-approved GSP is valid, GSAs and DWR are unlikely to continue investing millions of dollars and untold resources into existing GSPs that may end up being thwarted in an adjudication.

3. *AquaAlliance* Is Consistent with General Principles of Deference to Administrative Agencies

AquAlliance is consistent with general principles that courts should extend substantial deference to expert administrative determinations. Such deference stems from settled principles of separation of powers, judicial efficiency and respect for agency expertise in technical matters committed to administrative review. (*California High-Speed Rail Authority v. Superior Court* (2014) 228 Cal.App.4th 676, 699; *California Building Industry Assn. v. San Joaquin Valley Air Pollution Control Dist.* (2009) 178 Cal.App.4th 120, 129 ["Courts exercise such limited review out of deference to the separation of powers between the Legislature and the judiciary, to the legislative delegation of administrative authority to the agency, and to the presumed expertise of the agency within its scope of authority"].)

"The spectrum of judicial review of administrative action ranges from independent judgment on the basis of a trial de novo, to complete nonreviewability." (*California Hotel & Motel Assn. v. Industrial Welfare Com.* (1979) 25 Cal.3d 200, 213.) Administrative agencies' factual findings and decisions are at that point of the continuum at which judicial review is more deferential, and are generally reviewed to determine whether they are "arbitrary, capricious, [or] entirely lacking in evidentiary support. (C*arrancho v. California Air Resources Board* (2003) 111 Cal.App.4th 1255, 1265.) Courts defer and do "not interfere with the discretionary judgments made by the agency" because the administrative agency has "technical expertise to aid it in arriving at its decision." (*Dore v. County of Ventura* (1994) 23 Cal.App.4th 320, 326.) Courts recognize that they

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"have neither the resources nor scientific expertise to engage in such analysis, even if the statutorily prescribed standard of review permitted [them] to do so." (*Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 393, as modified on denial of reh'g (Jan. 26, 1989).) As a result, "courts will permit administrative agencies to work out their problems with as little judicial interference as possible." (*Western States Petroleum Assn. v. South Coast Air Quality Management Dist.* (2006) 136 Cal.App.4th 1012, 1018.)

While the above cases arise out of direct challenges to agency decisions, courts defer to agencies' factual findings regardless of the mode of challenge and specific standard of review. As the California Supreme Court has explained:

> The precise formulation of the standard may be less important than what courts actually do in exercising deferential but not perfunctory review: What matters is that judges generally understand that they may not properly substitute their judgment for administrative judgment *except on questions of law on which they are the experts*, but that something like reasonableness, rational basis, substantial evidence, or clearly erroneous guides what they do on other questions, and that in most cases other factors have a much stronger influence than the words of the formula that is supposed to apply.

(*California Hotel & Motel Assn. v. Industrial Welfare Com.* (1979) 25 Cal.3d 200, 213, emphasis added.)

Here, the Authority and DWR have unique subject matter expertise regarding the Basin's safe yield. The Authority developed its GSP following a multi-year iterative public process in which the Large Pumpers were actively engaged. DWR has reviewed over 80 GSPs and is heavily involved in every other facet of SGMA administration and implementation. DWR's key role in overseeing GSPs all over the State gives DWR a comparative advantage over the Court in understanding water budgets and safe/sustainable yields of basins. Accordingly, the Court should defer in substantial measure to DWR's approval of the GSP and the safe/sustainable yield of 7,650 AFY.

Moreover, even if a court arguably could supersede an approved GSP and re-calculate the safe/sustainable yield, which the Authority does not believe is authorized, *DWR approval is still required*. (Wat. Code, §§ 10737.4(a)(2) ["[DWR] determines that the judgment satisfies the objectives of [SGMA]"; 10737.6 ["[DWR] shall submit to the court the assessments and any

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recommended corrective actions"].) It is unlikely that DWR would conclude that the Large Pumpers' safe yield calculation—which is double the GSP's sustainable yield calculation—"satisfies the objectives of SGMA" after having already concluded that the GSP's "assessment of sustainable yield and change in storage (i.e., conditions of overdraft), were developed using the best available tools and information." Practically speaking, if the Court approves a safe yield determination different than 7,650 AFY, it is possible that after the conclusion of this lengthy and costly adjudication, DWR rejects that safe yield determination, placing the parties back at square one, with less time to reach sustainability before the 2040 deadline.

Put simply, for policy and practical reasons, this Court should not "interfere with the functions of an administrative agency." (*Water Audit California v. Merced Irrigation District* (2025) 111 Cal.App.5th 1147, 1193.) Rather, it should extend due deference to the expertise of the Authority and DWR.

C. SGMA's Statutory Provisions Harmonized Together Show That An Adjudication Should Be Managed Consistently with the GSP

The Legislature intended for GSPs to address technical issues in an adjudication. Numerous provisions in SGMA and the Adjudication Statutes establish that intent. (*D.C. v. Superior Court* (2021) 71 Cal.App.5th 441, 452 [Court's "must harmonize the statute's various parts by considering it in the context of the statutory framework as a whole"].)

First, "the Legislature contemplated…that [GSPs] would first be put into place…[before] an adjudication action to determine water rights." (*Mojave Pistachios, LLC v. Superior Court* (2024) 99 Cal.App.5th 605, 632–633.) The Adjudication Statutes expressly permit a court to stay an adjudication to allow for the "[a]doption of a [GSP] that *provides for a physical solution* or otherwise *addresses issues in the comprehensive adjudication*." (Code Civ. Proc., § 848(a)(1), emphasis added.) A court may also stay an adjudication to allow the "development of technical studies that may be useful to the parties in the comprehensive adjudication." (Code Civ. Proc., § 848(a)(2).) There is no reason to empower courts to stay an adjudication to allow for the adoption of a GSP and costly technical studies, if those efforts will simply be redone in an adjudication.

Second, as discussed above, SGMA provides that the sole method for challenging a GSP is

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through a reverse validation action—the purpose of which is to provide an expedited and uniform process "to settle promptly all questions about the validity" of the GSP, so that it is not subject to subsequent challenge. (Wat. Code, § 10726.6(a); *Golden Gate Hill Development Co., Inc. v. County of Alameda* (2015) 242 Cal.App.4th 760, 767.) The need to promptly resolve the validity of the GSP makes sense because of the timelines and requirements imposed by SGMA, and the need to obtain funds to manage a basin and mitigate damage caused by overdraft during implementation of a GSP. (Wat. Code, §§ 10720.7(a) [GSP to be submitted by January 31, 2020]; 10727.2(b)(1) [GSPs "shall include … Measurable objectives, as well as interim milestones in increments of five years, to achieve the sustainability goal in the basin within 20 years of the implementation of the plan"].)

Third, the Adjudication Statutes contain three legislative directives to courts overseeing adjudications for basins with GSPs: (1) the court is required to manage the adjudication "in a manner that minimizes interference with the timely completion and implementation of a groundwater sustainability plan;" (2) the court is required to "avoid[] redundancy and unnecessary costs in the development of technical information and a physical solution;" and (3) the court is required to manage the proceedings in a manner that is "consistent with the attainment of sustainable groundwater management." (Wat. Code, § 10737.2.)

Finally, Water Code 10737.8 provides that the court "shall not approve entry of judgment in an adjudication action…*unless* the court finds that the judgment will not substantially impair the ability of [the GSA], the [SWRCB], or the [DWR] to comply with [SGMA] and to achieve sustainable groundwater management." (Wat. Code, § 10737.8. emphasis added; see also Code Civ. Proc., § 850(b) [same requirement].)

Taken together, there can be no dispute that the Legislature intended for adjudications to be managed to take advantage of, and not interfere with, the technical determinations in the GSP, which results in streamlining the adjudication process. In basins with GSPs, the Legislature intended for adjudications to proceed in the following manner: (1) the GSP is adopted (Wat. Code, §§ 10727; 10720.7); (2) the GSP, including the sustainable yield calculation, is presumed valid unless there is a successful reverse validation action (*Id*., § 10726.6(a); Code of Civ. Proc., § 869);

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(3) DWR reviews the GSP for compliance with SGMA (Wat. Code, § 10733.4);[10] (4) using the determinations and technical studies in the GSP, the court determines groundwater rights, this will "minimize interference," and "avoid redundancy" and "unnecessary costs" (*Id.*, § 10737.2); (5) the court considers the GSP as the physical solution for the basin, and supplements, only if necessary, to be consistent with the water rights it has determined (Code Civ. Proc., § 849(b)); and (6) the court enters judgment upon finding that it will not "substantially impair" the ability of the GSA, SWRCB, or DWR to comply with SGMA and to achieve sustainable groundwater management (Wat. Code, § 10737.8).

The Large Pumpers have repeatedly failed to harmonize the various provisions of SGMA and the Adjudication Statutes to explain how adjudications should operate in basins with DWR-approved GSPs.

VI. THE AUTHORITY'S SAFE YIELD DETERMINATION AND OTHER PHYSICAL FACTS IN THE TECHNICAL REPORT ARE *PRIMA FACIE* EVIDENCE

A. The Court Must Accept the Physical Facts in the Technical Report as True Unless Contradicted and Overcome by Other Evidence

Code of Civil Procedure section 845 ("Section 845") expressly authorizes a GSA with a DWR-approved GSP to submit a technical report in a comprehensive groundwater adjudication. It provides that "the court shall request that the [GSA] provide a technical report, if the [GSA] is able to do so at a reasonable effort and expense," or "[t]he [GSA] may provide the report at its own election." (Code Civ. Proc., § 845, subd. (d)(1).) Importantly, the report "shall be *prima facie evidence* of the physical facts found in the report, but the court shall hear evidence that may be offered by any party to rebut the report or the prima facie evidence." (*Id.*, subd. (d)(4), emphasis added.)

"Prima facie evidence is that degree of evidence which suffices for proof of a particular fact until contradicted and overcome, as it may be, by other evidence…[b]ut the effect of prima facie evidence is not destroyed merely by the introduction of contradictory evidence. It stands as proof of

[10] GSPs not approved are designated as a "probationary basin" subject to State control.

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the fact until it is both contradicted and overcome by other evidence." (*People v. Van Gorden* (1964) 226 Cal.App.2d 634, 636–637; *Finley v. Superior Court* (2023) 95 Cal.App.5th 12, 21 ["Prima facie evidence is that which will support a ruling in favor of its proponent if no controverting evidence is presented"].)

In advance of the Phase 2 trial, the Authority submitted its Section 845 Technical Report (Exhs. 955-957). The Technical Report provides the physical characteristics of the Basin, including but not limited to the location and climate, structures and sediments, inflows and outflows, and a conceptual model of the groundwater system.[11] The Technical Report is sufficient to establish the physical facts contained therein, unless another party has presented other evidence that specifically rebuts and overcomes the evidence. If no evidence is presented to rebut a particular physical fact in the Technical Report, then that fact must be accepted. Section 845 is yet another instance of the Legislature making expressly clear that the court should defer to the GSP.

B. Physical Facts Are Broadly Construed to Include Any Factual Finding, as Distinguished From the Physical Fact's Legal Effect or Consequence

Section 845 functions similarly to the referral procedure in Water Code section 2000 *et seq.*, which provides that in any action involving the determination of water rights, the court may refer the action to the SWRCB for "investigation of and report upon any or all of *the physical facts* involved." (Wat. Code, § 2001, emphasis added.) Section 845 simply involves the court requesting the GSA to provide a technical report whereas Water Code section 2000 *et seq*. involves the court requesting the SWRCB to provide the report.[12] Section 845(d)(4) is identical to Water Code section 2019, which provides that the report filed by the SWRCB "is prima facie evidence of the physical

[11] A conceptual model is a non-numerical model of the physical setting, characteristics, and processes that govern groundwater occurrence within a basin, which provides the basis for developing the water budget and determining the safe/sustainable yield of the Basin.

[12] Section 845 is not redundant of Water Code section 2000 *et seq*. Section 845 is specific to adjudications while Water Code section 2000 *et seq*. applies broadly to determinations of water rights. Section 845's requirement that the court obtain the technical report from the GSA in an adjudication with a DWR-approved GSP makes sense because the GSP has already been evaluated and approved by DWR and must be "supported by the best available information and best available science." (Cal. Code Regs., tit. 23, § 355.4.) Therefore, there is State oversight over the physical facts in the technical report.

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facts therein found; but the court shall hear such evidence as may be offered by any party to rebut the report or the prima facie evidence." (*Compare* Wat. Code, § 2019, *with* Code Civ. Proc., § 845(d)(4) [same].)

The Court should construe the term "physical facts" to mean the same in both contexts. (*State Compensation Ins. Fund v. Workers' Comp. Appeals Bd.* (1993) 19 Cal.App.4th 1645, 1650 [holding that where "a subsequent statute on the same or an analogous subject is framed in the identical language, it will ordinarily be presumed that the Legislature intended that the language as used in the later enactment would be given a like interpretation"].) In the context of the SWRCB report, "physical facts" is construed to mean any facts contained in the report, which can include "such opinion upon the law and the facts as it deems proper in view of the issues submitted." (Wat. Code, § 2011; see *City of Pasadena v. City of Alhambra* (1949) 33 Cal.2d 908, 917 ["The issues to be tried were dependent to a great extent upon the facts to be ascertained by the referee"]; *City of Pasadena v. City of Alhambra* (Cal. Ct. App. 1947) 180 P.2d 699, 719 ["the report filed by the commission by it shall be prima facie evidence of the physical facts therein found"]; *Fleming v. Bennett* (1941) 18 Cal.2d 518, 525 [comprehensive report consisting of nearly 200 pages of findings and conclusions in addition to schedules, tables and plates that "treat of the physical facts investigated by the referee"].)

The understanding of "physical facts" in the case law is consistent with the dictionary definition. A fact is "[s]omething that actually exists; an aspect of reality" which include "not just tangible things, actual occurrences, and relationships, but also states of mind such as intentions and the holding of opinions…as distinguished from its legal effect, consequence, or interpretation." (FACT, Black''s Law Dictionary (12th ed. 2024).) A physical fact is simply a "fact having a physical existence, such as a fingerprint left at a crime scene" or, in the groundwater context, faults, soils, hydraulic conductivity, climate and precipitation, mountain front recharge, evapotranspiration, groundwater elevations and groundwater in storage. (*Ibid*.)

In their unsuccessful attempt to exclude the Technical Report, the Large Pumpers tried to inappropriately limit the definition of "physical facts" to exclude the Technical Report's water budgets, recharge and evapotranspiration estimates, groundwater in storage, and model-generated

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outputs. (ROA 1993, p. 4:12-23.) Yet, these facts are the very items that are typically included in referral reports filed by the SWRCB pursuant to Water Code section 2000 *et seq.*, which are considered physical facts and given prima facie effect. The Large Pumpers failed to cite any authority for their arbitrary definition of what does and does not constitute "physical facts."

VII. SUMMARY OF TESTIMONY AND OPINIONS

The parties' witnesses provided testimony on the following days:

Trial Day	Date	Witnesses
1	June 8	Anthony Brown; Jean Moran
2	June 9	Jean Moran; Stephen Johnson; Timothy Parker
3	June 10	Timothy Parker; Lauren Wicks
4	June 15	Lauren Wicks; Matthew Tonkin
5	June 16	Matthew Tonkin; Vivek Bedekar
6	June 17	Vivek Bedekar; Eddy Teasdale
7	June 22	Eddy Teasdale; Todd Kincaid
8	June 23	Todd Kincaid
9	June 24	Todd Kincaid; Sean Mckenna
10	June 29	Sean Mckenna

A. The Authority's Witnesses: Safe Yield Is Between 6,100 AFY and 8,400 AFY, with a Best Estimate of 7,650 AFY

1. Jean Moran, PG, CHG

Jean Moran is Stetson's principal hydrogeologist and groundwater modeler and has 30 years of professional experience in the field of hydrogeology and modeling. (TR 06/08/2026, p. 165:18-20; Ex. 14 [curriculum vitae].) She testified during the first and second days of the Phase 2 trial, June 8 and 9, 2026, as the Authority's party-affiliated, non-retained expert. (TR 06/08/2026, pp. 164:8 - 231:26; 06/09/2026, pp. 261:4-399:25.) Ms. Moran was the technical lead on the Authority's 2020 and 2025 GSA/DRI Basin Model. (TR 06/08/2026, pp. 167:3:-26.) She worked closely with the TAC during development of the GSP and the groundwater model. (*Id*., p. 167:3-26.) Her testimony focused on her work in determining the safe yield for the GSP (Ex. 108) and subsequent analysis for the periodic evaluation (Ex. 929). She also emphasized the important role

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the Large Pumpers' experts played in reviewing the GSP's recharge estimates, model inputs, and calibration results on the TAC and Model Ad Hoc Group. Specifically, Ms. Moran testified that the TAC determined the natural recharge to the Basin was between 4,100 to 7,700 AFY, and there was consensus to use 7,650 AFY for the recharge value for model calibration. (*Id.*, p. 306:4-19, 308:24-309:16; Ex. 962.) Model calibration confirmed 7,650 AFY of recharge, which was the number used for the GSP. (*Id.*, p. 309:26-310:17; 358:17-20.)

2. Todd Kincaid, Ph.D., P.G.

Dr. Todd Kincaid is the president of GeoHydros and has more than 30 years of professional experience in the field of hydrogeology and modeling. (TR 06/22/2026, pp. 1584:22-1585:7; Ex. 1000, p. 1; Ex. 1205 [curriculum vitae].) Dr. Kincaid was retained by the Authority to independently review and assess the GSP's safe yield determination. (TR 06/22/2026, pp. 1585:19-1586:8.) He testified that the safe yield falls between 6,100 and 8,400 AFY. (*Id.*, pp. 1588:7-25; Ex. 80, p. 7.) He prepared an expert report (Ex. 80) and responsive expert report (Ex. 84). He testified during the seventh, eighth and ninth days of the Phase 2 trial on June 22, 23 and 24, 2026.

Because the Basin is a closed basin and "all of the natural discharge from the basin occurs in the form of evapotranspiration from the playas," Dr. Kincaid testified that safe yield is best estimated using the Recharge Method—i.e., "use of the hydrologic equation and estimates of the steady-state pre-pumping, meaning circa 1912, total groundwater discharge and recharge to the basin." (TR 06/22/2026, pp. 1588:26-1592:12; Ex.80, pp. 9-17.) The Basin's pre-pumping recharge is able to be determined because previous studies "successfully quantified the total magnitude of evapotranspiration that was leaving from the basin during that prepumping condition." (*Id.*, p. 1591:3-12.) Dr. Kincaid relied on data from prior studies, including the work of Kunkel and Chase, to quantify and analyze recharge based on evapotranspiration occurring during prepumping conditions. (TR 06/23/2026, pp. 1657:9-1659:2; Ex. 80, pp. 9-17.) He also reviewed and relied upon over 25 historical studies on the Basin to estimate the Basin's recharge to be between 7,200–9,900 AFY. (*Id.*, p. 1597:8-19; Ex. 80, pp. 22-24; Ex. 1000, pp. 37-42.)

To estimate safe yield, Dr. Kincaid reduced total recharge by approximately 15 percent, to 6,100 and 8,400 AFY, to account for (1) the amount of natural discharge to the playa that should

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not be extracted because it is necessary to maintain upward gradients in aquifers to preserve water quality; and (2) the recharge from the Argus and Coso mountain ranges that discharges as evapotranspiration because is not being captured by existing wells. (TR 06/22/2026, pp. 1592:20-1593:18.) Dr. Kincaid rejected assumed aqueduct leakage and irrigation return flows because their contribution to recharge has not been verified and there is no seasonal water-level or salinity evidence that would be expected from such return flows. (TR 06/23/2026, pp. 1752:8-1753:25, 1755:13-1756:24; Ex. 80, pp. 25-28.)

Dr. Kincaid explained that his safe yield estimate is supported by the many historical studies of the Basin (TR 06/22/2026, p. 1621:4-23) and the 2025 GSA/DRI Model, which he opined is a reliable and well-calibrated model (TR 06/23/2026, pp. 1750:2-1752:4). Dr. Kincaid criticized the Ramboll Model because it contains foundational defects, including hundreds of flooded cells—meaning the model is simulating too much water in some areas. (TR 06/23/2026, pp. 1733:14-1752:4; Ex. 80, p. 28-40.) Dr. Kincaid testified that the flooded cells constitute 13% of the model domain, which simulates a large lake where none exists. (TR 06/23/2026, pp. 1733:14-1734:25.)

3. Stephen Johnson

Stephen Johnson is the President, Chief Executive Officer, and Chief Financial Officer of Stetson, which serves as the Authority's Water Resources Manager. (TR 06/09/2026, pp. 401:6-18.) Mr. Johnson oversaw the GSP process; he was not directed by the Authority to perform any work for this trial. (*Id*., pp. 402:3-6.) He was subpoenaed and called to testify by the Large Pumpers. (*Id*., p. 401:3-5.) Mr. Johnson's testimony was consistent with Ms. Moran's and confirmed Stetson's involvement in preparing the GSP and DRI's role in conducting modeling for the 2020 GSP. Mr. Johnson testified that while the model code itself remained in the possession of DRI during GSP development, the TAC and the Model Ad Hoc Group directed DRI to perform model runs and had access to the model's structure, scenario inputs, and outputs. (*Id*., pp. 404:13-405:13.) Mr. Johnson further testified that the modeling scenarios DRI performed were "developed through the group," which included the Large Pumpers' experts Mr. Parker and Mr. Teasdale. (*Id*., p. 404:19-22.)

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B. The Navy's Witness: Safe Yield Does Not Exceed 7,650 AFY

1. Sean McKenna, Ph.D

Dr. Sean McKenna is the retained expert for the United States and is the Executive Director of DRI's Division of Hydrologic Sciences. (TR 06/24/2026, pp. 1942:3-1943:6.) He prepared an expert report (Ex. 60) and responsive expert report (Ex. 61) and testified on the ninth and tenth days of trial on June 24 and 29, 2026. He has nearly 40 years of experience in groundwater research and modeling. (TR 06/24/2026, pp. 1944:2-1945:15; Ex. 71[curriculum vitae].) Dr. Mckenna testified that 7,650 AFY is a reasonable estimate of the annual recharge in the Basin, and that the safe yield cannot exceed the recharge the Basin receives, and would need to be lower if transpiration from natural vegetation is considered. (TR 06/24/2026, pp. 1985:9-1988:9; Ex. 60, p. 6.) Dr. McKenna's safe yield estimate is supported by the 2025 GSA/DRI Basin Model, empirical calculations, and a comparative study of Owens Valley.

Dr. McKenna testified that the 2025 GSA/DRI Basin Model reliably represents the Basin's hydrogeologic framework, incorporates the best available data, including airborne electromagnetic surveys and faults, and is well calibrated in both its steady-state and transient components. (TR 06/24/2026, pp. 1990:8-1992:7.) Dr. McKenna further opined that the 7,650 AFY safe yield estimate is supported by his calculations of recharge using the Anderson et al. (1992) equation with corrected and updated numbers, which calculated recharge to be 7,462 AFY. (TR 06/24/2026, pp. 1959:8-1963:23.) And Dr. McKenna also calculated recharge at 8,745 AFY using the bootstrap brute-force recharge model (BBRM) developed by Epstein et al., (2010). (*Id.*, pp. 1963:24-1966:1.) Finally, as a check of the estimated recharge, Dr. McKenna testified that 7,650 AFY is consistent with mountain front recharge in Owens Valley, and what would be expected in an arid basin. (*Id.*, pp. 1967:6-1974:19.)

In contrast, Dr. McKenna identified various problems with the Ramboll Model's recharge estimates including its reliance on unusually wet years, inability to match observed groundwater conditions, and incorrect simulation of a large perennial lake near China Lake where none exists. (*see generally* Ex. 61.) He also opined that the a groundwater model is a better tool than the polygon method, which is "back of the envelope" analysis that does not account for faults and

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differences in groundwater flow, and gives the largest areas, and thus the greatest weight, to wells in places with the fewest data points. (TR 06/29/2026, pp. 2083:8-2089:20.)

C. The Large Pumpers' Witnesses: Safe Yield is Between 12,329 to 18,200 AFY

The Large Pumpers' experts contend the safe yield is between 12,329 and 18,200 AFY, which is roughly double the recharge estimates of nearly every recent study and the DWR-approved safe yield. The Large Pumpers' experts rely on an inappropriate polygon method, an unreliable model that does not reflect actual hydrologic conditions, overinflated native recharge estimates, unsupported assumptions about non-native recharge, and an inappropriate base period.

1. Timothy Parker, PG, CEG, CHG

Timothy Parker is the District's lead expert who was in charge of building the Ramboll Model, despite admitting "I'm not a computer modeler. I think I said that a number of times." (TR 06/10/2026, pp. 565:3-4.) He was also the primary author of the Large Pumpers' Safe Yield Paper, which estimated safe yield between 14,300 AFY and 17,000 AFY. (Ex. 3.) Before authoring the Safe Yield Paper, he participated in both the TAC and Model Ad Hoc Group and agreed that a recharge estimate of 7,650 AFY reflected the best available science and information. (Ex. 962-0008 [Tim Parker Notes].) Following the filing of this adjudication, he pivoted and now estimates safe yield is more than double.

Mr. Parker prepared an expert report (Ex. 97) and responsive report (Ex. 98) and testified on the second and third days of trial on June 9 and 10, 2026. His high safe yield range rests on a flawed Thiessen-polygon change-in-storage analysis that relies on sparse data, inappropriate assumptions, and does not account for faults when drawing the polygons. Mr. Parker attempted to characterize the polygon method as data-driven and independent from the Ramboll Model, but admitted the polygon method relies on and is "sensitive" to the Ramboll Model's specific-yield values. (TR 06/10/2026, pp. 588:16-595:15.) Moreover, Mr. Parker admitted that in his nearly 40 years in the water resources field, he has never used the Thiessen-polygon method to determine safe yield before this trial. (*Id.*, pp. 445:15-17, 596:5-7.)

2. Matthew Tonkin, Ph.D

Dr. Matthew Tonkin was retained as an expert by the District in late February 2025 to

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"advis[e] on the Ramboll model." (TR 06/16/2026, p. 967:9-13.) He prepared an expert report (Ex. 123) and responsive report (Ex. 125) and testified on the fifth day of trial, June 16, 2026. Dr. Tonkin relied on the Ramboll Model to estimate safe yield, despite the serious issues with the model and its inability to simulate observed conditions.

Dr. Tonkin estimated safe yield at approximately 14,375 AFY not accounting for evapotranspiration, and 12,329 AFY when accounting for it. (Ex. 123, pp. 37-38.) To support the higher figure, Dr. Tonkin contends in his report that evapotranspiration may be occurring from a perched zone above the principal aquifer, rather than from the principal aquifer itself, and therefore should not reduce safe yield. (*Id*., p. 9.) However, on cross-examination, Dr. Tonkin backtracked, testifying that he "do[es] not have an opinion as to whether there is a perched aquifer." (TR 06/16/2026, pp. 1082:11-1083:10.) And he acknowledged the Ramboll's conceptual framework and numerical model does not show a perched aquifer, but instead connects the playa to the regional aquifer. (*Id*., p. 1083:11-15.) Moreover, Dr. Tonkin's safe yield estimate relies on an inappropriate base period to estimate safe yield using a change-in-storage calculation. On cross-examination, Dr. Tonkin was confronted with Ramboll Model's storage and pumping values for the balanced 1990–2015 period, which produced a safe yield of approximately 9,891 AFY, which was then reduced to approximately 8,290 or 7,790 AFY when deducting the 1,600 or 2,100 AFY irrigation return flows. (TR 06/16/2026, pp. 1077:7-1081:15.) Tonkin acknowledged the calculations were accurate. (*Ibid*.) This exchange showed that a more appropriate base period without unreasonable anthropogenic sources of recharge results in a safe yield estimate significantly closer to that in the GSP.

3. Vivek Bedekar, Ph.D, PE

Dr. Vivek Bedekar works for the same firm as Dr. Matthew Tonkin and was retained at the same time in late February 2025. He had no role in building the Ramboll Model. The District retained him for one purpose: to testify in its support. He prepared an expert report (Ex. 48) and responsive report (Ex. 50) and testified on the fifth and sixth days of trial, June 16 and 17, 2026. His report does not opine on the safe yield of the Basin. Instead, it simply concludes that the Ramboll Model incorporates the necessary components for performing safe yield calculations and

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that the overall model calibration "seems" or "appears" reasonable, but opportunities exist to refine and strengthen the model framework. (See, e.g., Ex. 48, pp. 14 ["inflow rates…seem reasonable], 17 ["aquifer properties…appear reasonable], 19 ["opportunities exist to refine and strengthen the model"].)

On cross-examination, Dr. Bedekar admitted that he added surface drains across the playa in the Ramboll Model because the ET package could not simulate sufficient discharge to account for the large amount of recharge that was being fed into the model. (TR 06/17/2026, pp. 1282:16-1283:7; Ex. 50, p. 31.) This resulted in the flooded cells that do not simulate observed conditions. He further admitted that his report's explanation that the model results matched "historical pooling" was wrong. (*Id*., p. 1241:3-24.) He admitted that "the pooling part is inaccurate" and instead tried to describe the discharge as evapotranspiration. (*Id*., p. 1288:9-26.) Dr. Bedekar's testimony on cross-examination highlighted the fatal flaws in the Ramboll Model.

4. Eddy Teasdale, PG, CHG

Eddy Teasdale is Meadowbrook's expert. He prepared an expert report (Ex. 85) and a responsive report (Ex. 91) and testified on the sixth and seventh days of trial, June 17 and 22, 2026. Mr. Teasdale was a member of the TAC and the Model Ad Hoc Group, and initially agreed that the recharge of 7,650 AFY is based on the best available science and information. After the District initiated this adjudication, he developed the opinion that the safe yield is 15,400 AFY. Like Mr. Parker, Mr. Teasdale relies on a Thiessen-polygon change-in-storage analysis using specific-yield values drawn from the Ramboll Model. Mr. Teadale's analysis only slightly differs from Mr. Parker's by using different specific yield values for localized polygons near Meadowbrook's land. Mr. Teadale's analysis suffers from the same flaws as Mr. Parker's and contains additional computation errors.

Notably, Mr. Teasdale admitted that the depth-to-water data for the Meadowbrook dairy wells show declining water levels but his polygon approach wrongly showed stable or rising trends. (TR 06/22/2026, pp. 1517:25-1543:10.) On cross-examination, Mr. Teasdale acknowledged his mistake: "If you reversed the numbers on accident and those Meadowbrook increases should actually be decreases, that would greatly affect your results here; correct?" (*Id*., p. 1538:21-26.) Mr.

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Teasdale admitted that was "correct" and that it would "reduce the groundwater storage." (*Ibid.*) He also acknowledged many other limits in his analysis. He recognized his change-in-storage analysis is not data-driven but instead relies on interpolation to fill gaps (*Id.*, p. 1494:3-19, 1495:18-26); he excluded outliers without identifying them or describing the exclusion method in his report (*Id.*, p. 1494:14-19); he failed to account for the water level changes associated with the earthquake in his change-in-storage analysis (*Id.*, p. 1495:10-17); he included Los Angeles Aqueduct releases in the water budget despite acknowledging there has only been two aqueduct-release episodes and no plans for future releases (*Id.*, pp. 1572:20-1573:18); and he did not calculate how long irrigation return flows would take to reach the water table (*Id.*, p. 1489:15-22).

The Thiessen Polygon method is also heavily influenced by the base period that is selected because it estimates safe yield by taking average pumping over a selected base period and subtracting the average annual storage decline derived from the polygon analysis. Mr. Teasdale was confronted with an email that showed he was "comparing" safe-yield results across different periods, and ultimately selected the base period that resulted in the highest safe yield. (*Id.*, p. 1578:17-23.) Mr. Teasdale's testimony revealed that his safe yield estimate is based on self-selected data and elementary errors.

5. Lauren Wicks, PG

Lauren Wicks is Searles designated expert but was called to testify by the District on the third and fourth days of trial, June 10 and 15, 2026. She prepared an expert report (Ex. 6) but did not exchange a rebuttal report. Ms. Wicks later produced a "draft" rebuttal report (Ex. 7). Ms. Wicks did not perform independent work of her own; rather, she primarily testified that Mr. Teasdale's estimate is reasonable. Ms. Wicks acknowledged that she had not run the Ramboll Model or independently reproduced Teasdale's principal calculations. (TR 06/15/2026, p. 760:4-8 ["I don't have a separate number."].) She initially took the position that the Thiessen-polygon change-in-storage analysis is based on "things that we can see, we can measure." (TR 06/10/2026, pp. 657:23-658:5.) However, on cross-examination she retreated and acknowledged that the change-in-storage analysis relies on self-reported pumping and specific yield values derived from literature and from the Ramboll Model, that if adjusted will produce different safe yield results.

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(TR 06/15/2026, p. 746:17-23.)

6. Anthony Brown

Mr. Brown is Mojave Pistachios' retained expert. The Court permitted him to testify as a non-retained expert for the District.[13] Mr. Brown did not perform any of the calculations in the Large Pumper's Safe Yield Report, nor did he work on or review the Ramboll Model or the GSP/DRI Model. He also did not submit an expert report. Mr. Brown testified on the first day of trial regarding stored water, recharge sources, and shallow-well impacts.

Mr. Brown tried to argue that the Basin's purportedly large storage volume could allow for "insignificant and reasonable" depletion, such that the Court should adopt a definition of safe yield that allows for continued overdraft. (TR 06/08/2026, p. 58:12-25.) The Court questioned Mr. Brown's attempt to re-define safe yield, noting "I've read *San Fernando* a few times, and on page 278 and 279, it defines what a safe yield is and the fact that you and Mr. Brown keep referring to insignificant and reasonable depletions of storage, I can't find that there." (*Id*., p. 86:15-21.) And on cross-examination, Mr. Brown was confronted with a paper that he had previously written where he defined safe yield as avoiding long-term storage loss and balancing recharge against outflows. (*Id*., p. 112:7-114:18.) He acknowledged using a no-storage-loss definition of safe yield in other matters and in his initial work in this Basin. (*Ibid*.) Mr. Brown also testified that continued pumping at the assumed rates could leave 119 shallow wells needing mitigation by 2047, approximately five wells per year. (*Id*., p. 87:5-16.) Therefore, the depletion of storage does not show an absence of pumping impacts.

VIII. THE RECHARGE METHOD, TESTED THROUGH FIVE DECADES OF GROUNDWATER FLOW MODELS, IS THE MOST RELIABLE MEASURE OF THIS BASIN'S SAFE YIELD

A. <u>Both Methods Apply the Same Equation, but They Do Not Estimate the Same Things</u>

[13] The Authority's MIL No. 1 sought to exclude Mr. Brown from Phase 2 because his opinions are duplicative and he is the retained expert of Mojave Pistachios. Mr. Brown formed his opinions expressly for this adjudication. He is not and cannot be a percipient, *nonretained* expert.

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Every expert's attempt to estimate safe yield begins with the same equation—Inflow to a basin equal outflow from the basin plus or minus the change in storage. (Ex. 80-9 [Kincaid]; Ex. 60-8; Ex. 61-4, 20 [McKenna]; Ex. 85-18-19; Ex. 91-7 [Teasdale]; Ex. 6-7 [Wicks]; TR 06/10/2026, p. 642:11-18 [Wicks]; Ex. 3-10 [TWG]; Ex. 97-36 [Parker]; Ex. 123-27 [Tonkin]; TR 06/17/2026, pp. 1273:9-11, 1312:5-9 [Bedekar].) The equation can be solved two ways, which we have called the recharge method and the storage method. In this basin with the amount of study that has occurred, the recharge method has less variables and is more reliable. (Ex. 80-9 to 12.)

The recharge method, as applied by the Authority, finds a period when storage was not changing, which in this Basin is the period before pumping, and estimates the natural inflow or outflow, because in a steady state the inflow and outflow are equal. Here, in the predevelopment period, outflow left the Basin as evapotranspiration at the playa, through phreatophytes, the plants that draw on the shallow water table, and by evaporation from bare soil.[14] Vegetation in the playa was mapped in 1912 and again in 1953, and depth to water was measured in wells throughout that period. It was remapped within the same boundaries between 2011 and 2014, and since 2014 DRI has measured the rate of evapotranspiration that the earlier investigators had to estimate. (Ex. 1002-68-71, Figs. 12-13, Tables 7-9; Ex. 614-83; Ex. 21-29-32.) From that record researches have calculated estimates of discharge during the predevelopment steady state period. Safe yield must then be set at or below that inflow. (Ex. 80-9-12; TR 06/22/2026, pp. 1589:1-1591:12.) It is important to note that the Authority and its expert do not rely solely on calculations of discharge. Those estimates have been tested through numerous groundwater models throughout the last 55 years, and in every case the estimate was further reduced before a stead state calibration could be reached.

The storage method used by the Large Pumpers' experts has more variables. One must pick a base period, which can greatly affect the outcome, calculate all the pumping during that period, measure or estimate the change in groundwater levels across the Basin during that period, identify the portion of the Basin from which groundwater pumping can reasonably draw water, and

[14] It is possible that a small amount, approximately 50 AFY, leaves the Basin as underflow to Salt Wells Valley. (Ex. 955-18.) Such a small amount of flow will not change the result in this phase.

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calculate the change in storage during that period, which requires estimates of specific yield (Sy) everywhere across the basin you are studying, which also greatly affects the outcome. Sy cannot be directly measured; it must be computed either with a calibrated groundwater model, or, locally through aquifer performance tests using pumping and observations wells and then replicating the tests across the Basin. Then, after limiting the estimation effort to the portion of the Basin likely to contribute to the active pumping, the change in storage must be computed from those estimates of water level change and Sy, and, finally, the safe yield is estimated from the calculated change in storage and the estimates of pumping. (Ex. 84-1 to 8;, Ex. 3-11, 29; Ex. 85-18; TR 06/10/2026, pp. 642:24-643:9, 653:23-654:9.)

They appear mathematically and conceptually equivalent on paper. But, they are not equivalent in what must be estimated to apply them, especially in a heavily faulted desert basin such as this.

B. <u>The Recharge Method Rests on the Predevelopment Discharge, Which Was Mapped in the Field and Has Been Tested for a Decades</u>

Nothing in hydrogeology is measured directly. As Dr. Kincaid put it, "[n]othing in my field, in my profession, is definitively measurable. Everything has to be estimated." (TR 06/23/2026, pp. 1667:24 - 1668:7; see also TR 06/10/2026 (Parker), p. 589:4-5 ["Most hydrogeologic parameters have some uncertainty coupled with them"].) Reliability comes from reducing the number of estimated quantities and the uncertainty in each. The least uncertain measurements available are a water level and the discharge leaving a groundwater system. Dr. Kincaid has spent much of his career measuring springs, and evapotranspiration from a playa "is akin to that because the water is coming out of the ground at the locations where the plants exist." Measuring it is harder than measuring a spring, "but it is still considerably less uncertain than estimating recharge through any types of other calculations." (*Id*., pp. 1668:3-1669:21.)

Pre-development, the Basin was in equilibrium, and natural discharge was equivalent to the sum of all inflows. Every study of the Basin before this litigation proceeded on the premise that the condition of the water table in 1920 was effectively in its predevelopment condition and so did every model. While the studies acknowledge that pumping was occurring in 1920 and earlier it is

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believed to have been very little and would not affect the analysis. (Ex. 1002-78 [Kunkel and Chase, 1969]; Ex. 1011-18 [Bloyd and Robson, 1971]; Ex. 1012-21, 30 [Dutcher and Moyle, 1973]; Ex. 1023-25, 30 [Saint-Amand, 1986]; Ex. 1026-7, 43 [Berenbrock and Martin, 1991]; Ex. 97-54 [Brown and Caldwell, 2009]; Ex. 21-26, 29 [McGraw et al., 2016]; Ex. 108-173 [GSP, 2020]; Ex. 955-28, 48 [Technical Report]; Ex. 1201-2 [2025 DRI Model]; Ex. 80-9-10.)

Dr. Kincaid summarized the literature. "[T]here is consensus that estimations of either quantity for the pre-pumping period, generally identified as prior to 1920, is reflective of a steady-state condition in which total outflows from the IWVGB were equal to total inflows." (Ex. 80-10.)

The discharge area was mapped and the water table measured. (Ex. 1023-38 (Saint-Amand) ["Very little water had been pumped the, so [1920-1921 water table contour map] is representative of the water table's pristine state"].) In 1912 Lee classified the lands around China Lake into units and assigned each a rate of evaporation. In 1953 the USGS mapped the units again, used the depth-to-water records of thirty wells beneath them, and applied consumptive-use rates for the existing phreatophytes and bare soil at each depth. Kunkel and Chase estimated the discharge at 11,000 AF in 1912 and 8,000 AF in 1953. (Ex. 1002-7, 68-71, 77-78; Ex. 614-83; TR 06/22/2026, pp. 1590:21-1591:12.) The area and the depth to water were observed in the field. Only the rate per acre had to be estimated. As knowledge about those rates evolved across the decades since Kunkel and Chase's work, the magnitudes have decreased meaning that current understanding of ET dictates that total pre-development discharge from the Basin, and thus total steady-state inflows to the basin, was then and is now less than what Kunkel and Chase had estimated.

The storage method does not escape estimation. It measures water levels at selected wells, estimates the changes occurring across the majority of the Basin between those wells, and then estimates everything else needed to convert them into a volume. Dr. Kincaid was asked whether his reasoning favored the storage method "because it's measurable." It does not, he explained, because the storage method "is subject to estimation across the basin" and to the faults "in the exact same way as the analytical modeling." (TR 06/23/2026, pp. 1669:22-1670:5.) In that case, where you have a model, you should use the model.

The method is not Dr. Kincaid's invention. Kunkel and Chase stated it in 1969: "under

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natural conditions prior to pumping, the recharge equals the natural discharge. Hence, perennial yield is equal to the recharge or the natural discharge, minus any unrecoverable natural ground-water discharge." (Ex. 1002-78; see Ex. 1002-7, 79, 86.) Dutcher and Moyle restated it in 1973 and estimated "[t]he long-term average ground-water recharge to the basin and the perennial yield ... from long-term discharge by evapotranspiration." (Ex. 1012-21, 30.) Saint-Amand wrote in 1986 that only two techniques give reasonable results, estimating the discharge from the evaporation or estimating the inflow from the shape of the water table, and that the most reliable estimates rest on the 1920–1921 water table "because the water table had not been disturbed." He also explained why the discharge is the better measure in this Basin. Flow calculations "are questionable in a terrain as heterogenous as the Valley sediments, and calculations fail seriously when vertical and horizontal barriers to water flow, such as faults and confining clays, exist. **Evaporation measurements are usually used in desert basins and, although imperfect, are the best indicators of discharge**." (Ex. 1023-25, 36, emphasis added.)

Every model built for the Basin before the Ramboll Model began from the same predevelopment steady state condition, calibrated to the 1920–21 water levels. That includes *three built for the District*. Bloyd and Robson built the first in 1971, in cooperation with the District and the Navy, to test Kunkel and Chase's estimate, and they assumed that "[t]he 1920-21 water levels ... approximate steady-state conditions because little ground-water development had taken place in the basin before that time." (Ex. 1011-2, 18; TR 06/23/2026, pp. 1687:1-1688:5.) Berenbrock and Martin built the second in 1991, also in cooperation with the District and the Navy, and calibrated it "to simulate steady-state conditions as approximated by 1920-21 water levels." (Ex. 1026-1, 7, 43.) Brown and Caldwell built the third for the District in 2009 and used 1920, "the same as in Berenbrock and Martin and Bloyd and Robson." (Ex. 67-22, 23, 33-34; Ex. 97-54; TR 06/23/2026, p. 1691:3-24.) DRI did the same in 2016, 2020, and 2025. (Ex. 21-26; Ex. 955-28; Ex. 1201-2.)

Each model tested an assumed recharge against the measured water levels, and the two that began at Kunkel and Chase's 11,000 AFY could not calibrate there. (Ex. 1011-7, 28, 37; Ex. 67-34; Ex. 80-21; TR 06/23/2026, pp. 1689:12-18, 1691:25-1692:6.) The predevelopment steady state is also how DRI derived the 7,650 AFY that the GSP adopted, with approval from the then existing

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TAC that included Parker and Teasdale. Dr. McKenna reached the same figure by three independent recharge calculations and a check against measured discharge. (Ex. 21-26, 29; Ex. 955-48, 49; Ex. 60-6, 21-22, 30; TR 06/24/2026, pp. 1948:17-22, 1953:13-22.) Ramboll's own report agrees that a simulation "should begin with a relatively steady or quasi-steady-state condition" reflecting "average conditions before the introduction of significant stresses, such as increased pumping." (Ex. 97-38.) The Ramboll Model is the only model of this Basin that did not do that.

C. The Storage Method Rests on Four Choices, and Its Result Is Heavily Influenced By Each

Parker, Teasdale, and Wicks all use a Thiessen Polygon approach to try and calculate storage change. Their storage change method depends on four choices that the recharge method does not require. They are the specific yield, the base period, the water-level record, and the pumping record. None is a measurement of the Basin's recharge, and the record shows how far each one moved the Large Pumpers' figures.

Specific yield is most consequential and the most uncertain of the elements of the storage change calculation. Ms. Wicks testified that the TWG used specific yield values "based on lithologic data" and that it was something "we can see, we can measure." (RT 06/10/2026, p. 567:23-568:3.) But, that is a misleading oversimplification. In fact, specific yield has not been measured directly over the entirety of the Basin, it is "the most uncertain parameter in that equation." (TR 06/29/2026, p. 2089:12-20 (McKenna).) As Mr. Parker admitted:

> **Court**: "How is the specific yield determined for each Polygon?
>
> **Parker**: "That's one of the -- one of the challenges, because we don't always have information on each polygon.
>
> In this particular case … we used specific yield distributions from models…
>
> **Court:** "… Is there actual evidence that -- of the material involved in each polygon, or is it a generalized estimate based on some model?
>
> **Parker:**"It varied. I mean, ***this is one of the more challenging things in that we don't have a lot of hard data on this particular -- this particular element.*** And so that's -- and I won't get into -- not being a modeling expert, groundwater flow modeling expert, I won't get into the specifics of that, but there is a process that the groundwater model used to distribute specific yield in the model domain."

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(TR 06/10/2026, p. 544:23-546:22, emphasis added; see also pp. 589:6 - 591:2 [acknowledging that lithological data involves use of judgment in describing borehole, then a comparison tests for different but similarly described materials].)

Mr. Parker further explained that some polygons have multiple specific yields that were averaged. (TR 06/10/2026, p. 594:14-19.)

Moreover, the TWG took specific yield values from multiple models, including the Ramboll Model, which had already assumed the recharge and calibrated to the same groundwater levels and pumping data used in the polygon analysis. (Ex. 80-14; TR 06/29/2026, p. 2089:12-20; Ex. 91-12; Ex. 7-17; TR 06/22/2026, pp. 1545:22-1546:16.) As Mr. Teasdale admitted prior to the litigation, "[t]he flow model would be the most robust tool to determine sustainable yield." (Ex. 998-9.) Parker and Teasdale's decision to use the "most robust tool" to get specific yield values, but not to calculate storage change makes no sense. It cannot be explained, other than to say he does not trust the Ramboll Model, in which case he cannot trust the specific yield values either.

A change to the specific yield value used in a polygon has an immense effect on the outcome of the TWG's polygon analysis. (TR 06/08/2026, (Brown) p. 100:23-101:3 ["if you use a high specific yield calculation, you get a lower recharge calculation"]; (TR 06/10/2026, (Parker) p. 588:18-21 [safe yield calculation sensitive to specific yield].) With the same water levels and pumping, Mr. Teasdale's figure moved from about 10,500 AFY to 14,800 AFY when he replaced the Authority's specific-yield values with the Ramboll Model's, and other TWG's runs ranged from 13,000 to 18,000 AFY depending on the specific yield chosen. (TR 06/17/2026, pp. 1384:16-1389:4; TR 06/10/2026, pp. 559:12-17, 598:9-16.) If the specific yield comes from a model, the model is the better tool, as Dr. Kincaid testified, and as Mr. Teasdale wrote in 2018. (TR 06/23/2026, p. 1674:5-25; Ex. 998-9; Ex. 955-50.)

The base period comes second. Ms. Wicks agreed that "you will get different safe yield for different base periods." (TR 06/15/2026, p. 755:4-7.) Dr. Tonkin's Table 4-2 applies one method to the Ramboll Model's output over three periods and gets 3,512 AFY, 12,329 AFY, and 14,854 AFY. (Ex. 123-38, 39, 67.) Using the Ramboll Model outputs provided by Dr. Tonkin, and doing a

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change in storage calculation over the balanced period, 1990 through 2015, gives 9,891 AFY, or 7,790 to 8,290 AFY without the assumed irrigation return flows. (TR 06/16/2026, pp. 1079:5-1081:15; Ex. 123-38, 39, 67.) If you remove all of the anthropogenic sources of recharge, the safe yield for 1990-2015 using the Ramboll Model is 6,470 AFY – 6, 970 AFY. (Ex. 123-66, Table 4-1 [Ramboll model outputs]; Ex. 106-33 [anthropogenic recharge in Ramboll Model].) Considering the Ramboll Model is simulating a lake that does not exist in the China Lake playa, it is safe to say that the TWG have input more recharge in to the Ramboll Model than is actually occurring.

The water-level record comes third. It is the only measured input, and it is measured at selected wells, when available, and then assumed to represent each well's entire polygon, an assumption the TWG concedes adds uncertainty. (Ex. 4-34.) The largest polygons used by Parker and Teasdale are located where the wells are fewest and carry the most weight, the record for the TWG's decade has COVID-era gaps that were filled by judgment without explanation, and the TWG's water-level changes sum to 65.4 feet lower than the Authority's data for the same polygons. (TR 06/29/2026, pp. 2085:19-2086:16; TR 06/09/2026, pp. 328:20-329:17; TR 06/10/2026, pp. 622:7-624:6; Ex. 84-3.)

Pumping comes last. All of it is reported or estimated; the Authority does not install, inspect, or read the meters. (TR 06/09/2026, pp. 439:14-440:9; Ex. 80-13.) And the result cannot be reproduced. The record holds four different basin-wide storage figures for the single year 2022 from Mr. Teasdale's work and the data he used, and the Court could not reproduce one row of the TWG's own table from its printed inputs. (TR 06/22/2026, pp. 1538:7-1544:16; TR 06/15/2026, pp. 726:19-728:10.)

At trial, Mr. Parker initially said he did not recall whether anyone on the TWG team expressed concerns that the polygon method is not suitable for determining safe yield. (*Id*., p. 624:8-11.) In fact, concerns were raised that "there can be considerable uncertainty associated with this method as the method relies on water levels being obtained from a well that is representative of the entire polygon area, and the specific yield value is also representative of the entire polygon area," which Mr. Parker admitted on cross-examination. (*Id*., pp. 624:8 - 626:1.)

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D. The TWG's Reasons for Preferring the Storage Method Do Not Survive Its Witnesses

The TWG gives two reasons for calling the storage method "technically superior." It supposedly "relies on measured data," and it "represents a complete accounting of all groundwater inflows and outflows without the uncertainty associated with estimating each element of the water budget." (Ex. 3-6, 11, 29; Ex. 6-5; Ex. 85-9-10; Ex. 98-32-33; TR 06/17/2026, pp. 1373:8-1374:21.) It does not.

The first reason fails because only the water levels are measured, and only at the wells and those measurements are not always available. Ms. Wicks told the Court that the method relies on "recorded groundwater pumping and measured groundwater elevations" and on specific yield "based on lithologic data," so that "these are all things that we can see, we can measure ... but it is measurable." (TR 06/10/2026, pp. 657:23-658:5.) On cross-examination she agreed that the water levels are measured "at selected wells," that she measured specific yield in no polygon, that the values came from literature and from a model calibrated to simulate water levels, and that the basin-wide change in storage "is calculated, not something that's measured like a meter." (TR 06/15/2026, pp. 745:1-746:23, 750:17-751:10.) The pumping is self-reported. (TR 06/09/2026, pp. 439:14-440:9.) The TWG's own rebuttal report lists the inputs as "reported groundwater extractions, observed groundwater level changes, and storage parameters derived from calibrated models." (Ex. 7-17.) One of the three is observed. The method measures water levels, but only where available, and estimates everything else needed to estimate the volume.

The second reason describes the method's defect, not its strength. A calculation that accounts for every inflow and outflow without identifying any of them or observing the effects on the Basin cannot tell natural recharge from anything else that moved the water table. It cannot separate recharge from the surplus of two of the wettest years in the record, from two one-time Aqueduct releases, from earthquakes, or from incidental recharge that may not persist. (Ex. 7-16; TR 06/22/2026, pp. 1572:20-1574:12.)

It also rests on two assumptions. The first is that the water level in one well represents the whole polygon around it, which the TWG previously conceded adds uncertainty. (Ex. 4-34; TR

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06/10/2026, pp. 624:19-625:7.) The second is that every acre-foot of storage in the Basin is available to the pumpers' wells as they are now configured. It is not.

Kunkel and Chase wrote that using all of the Basin's storage "would, however, be impossible with the existing distribution of pumping plants," and they, Dutcher and Moyle, and Saint-Amand each held back discharge that the wells cannot reach or that must be left at the playa to keep saline water out of the supply. (Ex. 1002-79, 86; Ex. 1012-7, 30; Ex. 1023-37.) Consistent with Brown and Caldwell before them, Todd Engineers found the storage in the El Paso area "relatively inaccessible to wells in the main part of the basin." (Ex. 614-85; Ex. 67-33 ["quantity of flow from the El Paso Sub-Basin is very limited with respect to the magnitude of pumping occurring in the southern and western portions of the model" … "both observed and simulated groundwater elevation within the El Paso Sub-basin do not exhibit any significant declines over time in response to pumping within the IWV Basin"].) Ms. Moran confirmed this at trial. (TR 06/08/2026, pp. 195:14-196:6, discussing Ex. 24-25.)

Dr. Kincaid testified that the storage method "makes an assumption that the entire basin is available to the pumping that occurs at the wells," which the faults make untrue, so that it "overestimates the amount of water that will flow to the wells as a result of pumping." (TR 06/23/2026, pp. 1671:23-1673:3; TR 06/22/2026, pp. 1592:23-1593:25.) Dr. Tonkin agreed that the wells are not situated to capture the discharge at the playa, and that reversing the gradient to capture it would risk drawing poor-quality water into the regional aquifer. (TR 06/16/2026, pp. 1087:4-1088:6.)

Mr. Teasdale put it plainly. "I don't have to defend any of the recharge components." (TR 06/17/2026, p. 1381:4-10.) That is the problem. A figure that does not estimate recharge cannot be checked against recharge. Dr. Tonkin, the District's own modeler, did not use the storage method at all. He calculated "the likely safe yield of the IWV Basin as the average rate of groundwater recharge." (Ex. 123-37.) The recharge he averaged, however, is the Ramboll Model's input, taken from the statewide BCM, the TWG's Rose Valley estimate, and the man-made items for which there is no evidence they reach the aquifer, so his figure restates the model's assumptions rather than testing them. (TR 06/15/2026, pp. 874:8-9, 927:15-18; TR 06/16/2026, pp. 980:11-15, 1016:5-

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22.) Dr. McKenna, who teaches Thiessen polygons in graduate courses, explained why they do not fit the task here. In a polygon "everything is flat," water does not flow, and the boundaries do not follow the faults, so "I don't think they're very well suited for groundwater studies." They cannot test a recharge estimate, because recharge "is not part of the polygon analysis." (TR 06/29/2026, pp. 2083:8-2084:24, 2089:2-11.)

IX. THE EVIDENCE ESTABLISHES THAT THE BASIN'S LONG-TERM AVERAGE NATURAL RECHARGE IS APPROXIMATELY 7,650 AFY

Four independent lines of proof place the Basin's natural inflow at approximately 7,650 AFY—consisting of mountain-front recharge and Rose Valley underflow—with evapotranspiration at the China Lake playa as its natural outflow. They are the physical facts found in the Technical Report, which is prima facie evidence, the sixty-year record of study and model calibration, the independent checks performed by the USGS, Dr. McKenna, and Dr. Kincaid, and the three models DRI built on the figure and successfully calibrated. The Large Pumpers' reasons for disregarding that record do not survive the evidence.

A. Safe Yield Cannot Exceed the Long-Term Average Natural Recharge

In a closed basin with no access to imported water, groundwater discharge—through extractions or ET—in excess of the long-term average rate of natural replenishment comes out of storage, and storage that is drawn down year after year is the "gradual lowering of the ground water levels" that San Fernando identifies as an undesirable result. (*San Fernando*, *supra*, 14 Cal.3d at p. 278.) Dr. Tonkin, Dr. Kincaid, and Dr. McKenna each testified that safe yield cannot exceed recharge. (TR 06/15/2026, pp. 799:2-6, 923:13-924:13; TR 06/22/2026, p. 1588:10-14; TR 06/24/2026, p. 2052:10-11.) Mr. Brown wrote the same in 2023—"Thus, over a period of years, safe yield must equal the amount of water entering the basin (i..e., recharge), minus outflows." (TR 06/08/2026, pp. 112:25-113:18.) As the Court on the first day of trial, *San Fernando* "defines what a safe yield is" at pages 278 and 279 and that the "insignificant and reasonable depletions of storage" to which Mr. Brown and the District's counsel kept referring could not be found there. (TR 06/08/2026, p. 86:15-23.) The natural recharge is therefore the ceiling on the safe yield, and the question is what the Basin's natural inflow is over a representative period and what fraction of

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it the wells can capture without unacceptable consequences.

B. <u>The Technical Report's Findings on Natural Recharge and Evapotranspiration Were Proven at Trial and Were Not Rebutted by Credible Evidence</u>

The Technical Report finds that natural recharge to the Basin totals 7,650 AFY. (Ex. 955-21.) In the 2025 DRI Model the total is apportioned as 5,731 AFY of mountain-front recharge and 1,919 AFY of Rose Valley underflow. (Ex. 955-48-49, Table 20; Ex. 24-66, Table 5-1.) The report further finds that before development the Basin's inflow of 7,650 AFY left as 7,601 AFY of evapotranspiration at the China Lake playa and 49 AFY of underflow, and that "[t]he evapotranspiration (ET) that occurs at the China Lake Playa and nearby phreatophytic area is the primary natural discharge for the IWVGB." (Ex. 955-25, 48-49, Table 20.) These are the two findings the Large Pumpers set out to rebut.

Both findings are physical facts in the ordinary sense of the words. How much water enters the ground at the mountain fronts in an average year, and how much leaves at the playa, are quantities of water moving through the ground. They are measured indirectly, by precipitation records, stream gauges, evaporation instruments, water-level histories, and calibrated models, because no one can put a meter on a mountain front that measures the amount of water infiltrating into the ground. The Basin's structure and sediments are also inferences from data, because no witness has seen them except through well logs, the airborne electromagnetic survey, and the seismic lines, and no one disputes that they are physical facts. (Ex. 955-13 to 16.) The statute speaks of "physical facts found in the report," and the report is, by design, a hydrogeologic characterization whose purpose is to describe the Basin's water budget, which is a set of physical quantities. (Ex. 955-48 to 50.)

Regarding evapotranspiration, every witness who described the Basin's natural discharge described evapotranspiration at the playa, no witness testified that a perched zone exists, and neither model simulates one. (TR 06/16/2026, pp. 1082:11-1083:19; TR 06/24/2026, pp. 1880:9-18, 1931:10-21.) Present-day evapotranspiration is estimated at "about 4,000 acre-feet per year," and declining as pumping lowers the water table. (TR 06/24/2026, pp. 2048:3-2049:4.) Kunkel and Chase, Berenbrock and Martin, and DRI each estimated pre-development evapotranspiration

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between 7,450 and 11,000 AFY. (Ex. 955-25, Table 11.)

On the amount of natural recharge, the Large Pumpers' evidence does not rebut the report's finding, because it is not credible evidence of a different recharge. A base period chosen for its result, a storage-change calculation whose specific-yield values came from a model that had assumed the answer, and a model that cannot simulate a dry playa are not evidence "which would support a finding" that recharge is materially different from 7,650 AFY. (Evid. Code, § 604.)

C. The Sixty-Year Record Is Evidence of the Basin's Natural Recharge, and It Places the Figure Between About 6,000 and 9,850 AFY

The historical reports were admitted into evidence without limitation, and each describes what its authors measured or tested and what they found. Every calibrated model of the Basin from 1971 to 2025 reproduced the Basin's groundwater levels with natural inflow ranging between about 7,650 and 9,850 AFY. Bloyd and Robson started from Kunkel and Chase's estimate of the Basin's evaporation and verified a steady-state recharge of 9,850 AFY by changing the recharge values "until the head configuration determined by the model was in agreement with the water-level contour map." (Ex. 1011-7, 28, 37.) Berenbrock and Martin used the same 9,850 AFY and independently produced a groundwater model that calibrated to the groundwater levels measured in 1920/1921. (Ex. 641-41, 43, 45, Table 5.) Brown and Caldwell began with a conceptual budget of 11,000 AFY and calibrated at 8,821 AFY finding "it was necessary to reduce recharge by approximately 2,000 AFY from the conceptual estimate to successfully calibrate the model," and "[w]ithout such adjustments, the model was unable to simulate the observed water levels effectively." (Ex. 67-34, Table 5-1.) DRI's 2016 model, the 2020 GSP Model, and the 2025 DRI Model each calibrated with 7,650 AFY. (Ex. 21-27-28; Ex. 108-173-174; Ex. 955-28-30; Ex. 24-66, Table 5-1.) Dr. Kincaid explained what the sequence shows. Each model "incorporate[s] different aquifer parameters" and is therefore a separate test of the recharge, "[t]he fact that the model was able to calibrate indicates that the values for the boundary conditions will continue to be reasonable," and the District's model "has failed to calibrate. So, essentially, it fails the test." (TR 06/24/2026, pp. 1932:4-15, 1933:4-5.) Before the Ramboll Model, no model of this Basin had been calibrated with natural recharge above about 9,850 AFY, and every estimate of the Basin's natural

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recharge published since 1989, apart from the Ramboll Model's inputs, falls between approximately 6,000 and 10,000 AFY. (TR 06/24/2026, p. 1931:3-9; Ex. 955-22-23, Table 10; Ex. 4-10-11; Ex. 363-12, Table 1; Ex. 1281.)

Although some reports assume that recharge is occurring from anthropogenic—man-made––sources, there has been no observable evidence that the water reaches the principal aquifer. Saint-Amand's return flow "was an assumption," Bean's aqueduct leakage was "still a guess," and Berenbrock and Martin's wastewater percolation rested on a premise Todd Engineers later tested against the Basin's stratigraphy and rejected. (TR 06/24/2026, p. 1935:1-11; TR 06/23/2026, p. 1823:8-23; Ex. 21-28; Ex. 641-41, 49; Ex. 614-80-81.) Where the historical reports measured and tested, they corroborate the Technical Report. Where they assumed, they add nothing to it. The Large Pumpers' figures lie outside that history by a wide margin. Dr. Kincaid computed what the District's safe-yield values imply, which is "total recharge to the [Basin] that [is] 157% to 217% of the maximum reasonable estimate of total recharge to the [Basin]," and Dr. McKenna's compilation of every estimate of the last twenty-five years found them "all fairly consistent with one another ... with the exception of the Ramboll estimates that are larger." (Ex. 84-2, Table 1; TR 06/24/2026, p. 1987:19-23; Ex. 1281-1.) The TWG's own appendix tabulates the same history and reaches the same numbers. (Ex. 4-10-11.)

D. Dr. McKenna's Recalculations, the USGS's Locally Calibrated Study, and Dr. Kincaid's Analysis Corroborate 7,650 AFY

1. Dr. McKenna

Dr. McKenna reproduced the empirical estimates without the two-dimensional model. He reapplied the Anderson regression to the Basin's precipitation, found and corrected an error in DRI's 2016 table (which had reported 4,085), and obtained 7,462 AFY. (TR 06/24/2026, pp. 1959:12-1963:23; Ex. 1200-20, Table 1.) Dr. Tonkin reviewed his corrections and agreed "they're correct." (TR 06/15/2026, pp. 858:8-859:11.) He reapplied the Epstein bootstrap method and obtained 8,745 AFY. (TR 06/24/2026, p. 1966:1-6; Ex. 1200-21, Table 2.) He then checked both against the Owens Valley, the next basin north aling the Sierra and "the subject of considerable study by both the USGS and LADWP," and found a recharge coefficient of about 3.7 percent of

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precipitation, which, applied to this Basin's Sierra Nevada watersheds, gives 3,394 AFY against 3,372 AFY in the 2025 DRI Model. (TR 06/24/2026, pp. 1967:23-1968:3, 1973:19-1974:19, 1980:24-1981:2, 1985:17-20; Ex. 24-66, Table 5-1.) He did not rely on the 2016 two-dimensional model, and everything he did can be reproduced from disclosed materials. (TR 06/29/2026, p. 2159:13-26.)

The Large Pumpers' responses were directed at the methods, not the result. Dr. Tonkin observed that the Anderson and Epstein methods estimate recharge from precipitation only, so that the figures exclude Rose Valley. (TR 06/16/2026, pp. 985:21-26, 999:24-1003:11.) His principal criticism was that the Epstein coefficients were derived with the lowest precipitation interval included, so he opined that DRI should not have excluded the recharge the method assigns to areas receiving less than eight inches of rain a year, and that with that interval restored the method gives more than 15,000 AFY. (TR 06/15/2026, pp. 864:25-866:4, 875:11-876:6.) The opinion first appeared in a spreadsheet uploaded the night before his deposition. (TR 06/15/2026, pp. 877:1-6, 879:9-13.)

The criticism does not survive. The areas receiving less than eight inches are the valley floor, where the water "will be lost to evaporation." No researcher, model, or recharge estimate before the Court counts rain on the valley floor as recharge; neither the Authority's model nor the Ramboll Model simulates it, and Dr. Tonkin himself excluded the statewide BCM's valley-floor recharge from his own work "because of the high potential ET in the basin." (TR 06/24/2026, p. 1937:9-19; TR 06/16/2026, p. 967:4-8.) Dr. McKenna explained that excluding areas with less than eight inches of precipitation has been the practice of the field since Maxey and Eakin, that the Epstein method yields a distribution for each coefficient and the coefficient for that interval is "not significantly different than zero," and that Anderson built his regression both ways and found it improved by the exclusion. (TR 06/24/2026, pp. 1961:7-15, 1966:7-22; TR 06/29/2026, p. 2161:13-24.)

Ms. Wicks criticized the Owens Valley comparison for using Danskin's figure for recharge between that valley's perennial streams, about 26,000 AFY, rather than a figure that includes the recharge from the streams themselves, which would raise the Basin's recharge. (TR 06/10/2026,

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pp. 697:7-698:13; TR 06/29/2026, pp. 2134:15-2136:23.) But, the Owens Valley's streams are perennial and are fed by the highest peaks in the Sierra Nevada. This Basin has no such streams. That is why, as Dr. McKenna explained, he confined the comparison to the recharge that occurs between the streams and to the west side of that valley, outside the rain shadow. (TR 06/24/2026, pp. 1968:9-20, 1969:6-1970:2, 1972:13-26.) Mr. Teasdale conceded the same point about his own comparison, agreeing that some of the basins he selected have perennial streams, are not arid in the way this Basin is, and are less tectonically active. (TR 06/22/2026, pp. 1477:17-1478:19.) The Owens Valley check is in any event one of three independent methods that arrive at about 3.5 percent of precipitation, and the result does not depend on it. (TR 06/24/2026, pp. 1985:13-1986:5.)

On cross-examination Dr. McKenna agreed that the Anderson equation is a regional tool with a wide prediction range, that it was not developed for this Basin, and that a wetter period could give a higher figure. (TR 06/29/2026, pp. 2111:3-2117:25.) None of this changes the result. These checks are not the source of the Authority's figure. They reproduce the empirical step DRI took in 2016, from disclosed materials and with the arithmetic corrected, and they land inside the sixty-year range on either side of 7,650 AFY. The only recalculation Dr. Tonkin offered that approaches the Large Pumpers' figures is the one that counts rainfall on the valley floor as recharge, and he "didn't spend a great deal of time reviewing" the Owens Valley comparison. (TR 06/16/2026, p. 1000:3-6.) The Authority joins the United States' fuller discussion of these methods.

2. Local BCM

The USGS's locally calibrated BCM study, the one Mr. Parker suggested in 2018 would be the "best available information and science," was published in March 2026 and estimates total recharge for 1981 through 2010 at about 8,680 AFY, a figure the USGS describes as one that "corresponds well with estimates from previous studies ... developing a consensus among estimates during the last 50 years." (Ex. 356-2; Ex. 363-23; Ex. 955-22; TR 06/09/2026, p. 467:8-13.) The figure excludes Rose Valley because the study states that "[s]ubsurface flow [from Rose Valley] is obstructed by geologically recent basalts, which force most of the groundwater to the surface as it crosses between basins." (Ex. 363-23.)

However, as Mr. Parker noted, "a careful assessment of the assumptions that went into the

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BCM should be conducted and used to qualify the results as necessary and appropriate." (Ex. 998-13.) The Authority did such a review. The Model Ad Hoc group discussed the USGS's draft estimates in 2018, and the consensus was not to use them. (TR 06/09/2026, pp. 294:17-295:15; Ex. 952-18; Ex. 998-1.) The Technical Modeling Group took the study up again for the 2025 DRI Model. Ms. Moran testified that the group discussed the local BCM's numbers, that the permeability it assigned to the volcanics "was way too high," and that its distribution "was not well calibrated to the groundwater levels that we saw in the basin." (TR 06/09/2026, pp. 398:17-399:6.) The local BCM assigns about 21 percent of its recharge to the volcanics subarea—an average of about 1,865 AFY. (Ex. 363-23, 25, Table 6; Ex. 955-24.) For reference, the 2025 DRI Model assigns approximately 300 AFY to the same area, and 1,919 AFY to underflow from Rose Valley. (Ex. 24-66, 135.) Correcting for the permeability of the volcanics, and adding Rose Valley underflow, would still result in a recharge estimate higher than 7,650 AFY, but not by much, and certainly nowhere near the TWG's safe yield estimates. The Technical Report describes the comparison as follows:

> [T]he USGS has estimated between 5,980 AFY and 8,680 AFY of recharge from mountain front recharge. The USGS Study (2026) attributes no recharge from Rose Valley and approximately 1,865 AFY to the White Hills/Volcanics area, southeast of Rose Valley, which is significantly larger than estimated in other studies. However, when comparing more recent DRI estimates of recharge from both Rose Valley and the White Hills/Volcanics area, as described in Section 4.2, the combined recharge of approximately 2,220 AFY is generally consistent with the combined recharge from the USGS Study. This suggests that the estimates of total recharge from the north and northwest portion of the Basin have relatively converged, though the distribution of the recharge in that area has some uncertainty. A new monitoring well was drilled in 2021, south of Little Lake to help fill this data gap.

(Ex. 955-24.)

3. Dr. Kincaid

Dr. Kincaid's analysis is consistent with Dr. McKenna's checks. Dr. Kincaid reviewed all of the historical studies, and took the estimates of natural inflows published from 1989 forward, the first year in which, as he put it, the 11,000 AFY figure was no longer reported. In his opinion, the 11,000 AFY estimate from Kunkel and Chase "had been tested multiple times and found to be too high." (TR 06/23/2026, p. 1707:22-26.) Acknowledging the uncertainty associated with the

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analysis the experts have been asked to perform, Dr. Kincaid averaged the post-1989 historical estimates up to before the GSP was adopted and took one standard deviation on either side. The result is a range of 7,200 to 9,900 AFY for total inflow, including Rose Valley. (Ex. 80-3, 53; TR 06/23/2026, pp. 1707:15-1708:12; TR 06/24/2026, pp. 1920:14-16, 1929:22-1930:3.) If you include the 2020 GSP model, and the 2025 DRI Model, the average drops further.

Dr. Kincaid then opined that the safe yield of the Basin must be less than total recharge to account for faulting in the Basin and the fact that the current pumping configuration cannot capture all inflows, and that some discharge to the playa is necessary to prevent poor quality water from the playa migrating down and affecting quality of the water in the principal aquifer—an undesirable result. (Ex. 80; TR 06/22/2023, pp. 1588:7-1593:25; TR 06/23/2026, pp. 1793:15-1798:18.) The TWG will criticize Dr. Kincaid's analysis for not considering anthropogenic sources, but he was very clear in his reports and testimony that he was evaluating natural recharge and does not consider the anthropogenic sources reliable because there is no evidence they are adding supply to the principal aquifer. (Ex. 80-9 to 11 , 19-28; TR 06/23/2026 pp. 1752:8-13, p. 1753:13-25, 1755:13-24.)

The Technical Report's 7,650 AFY lies inside the range identified in Dr. Kincaid's analysis, and Dr. McKenna's two recalculations. (Ex. 955-21, 48; Ex. 80-3; Ex. 1200-20, 21.) It has also been tested in three separate groundwater models. (Ex. 21-35, 37; Ex. 24-65 to 66; Ex. 108-38, 173-174; Ex. 990-13, 14; Ex. 955-28 to 30.) Dr. Kincaid's range and Dr. McKenna's checks were developed independently, by experts retained by different parties, and they agree with each other, and with decades of prior studies.

E. <u>Contrary to the TWG's Assertion, the 2025 DRI Model's Recharge Is Neither Fixed Nor Hard-Wired, and Its Long-Term Average Was Tested, Not Assumed</u>

The Large Pumpers' attack on the recharge used in the 2025 DRI Model rests on the premise that recharge in the model is "a fixed assumption," a "predetermined modeling input that is hard-wired into the 2025 DRI Model," and that the model "does not respond to wet-year inflows." (TWG Opening Brief, pp. 36, 72, 74.) They are wrong. None of these statements describes the 2025 DRI Model, which is documented in Exhibit 24 and which the Large Pumpers had and

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analyzed before trial. (Ex. 50-9.) It is as if the Large Pumpers reached their conclusion without understanding the model.

The 2025 DRI Model was built in the same two steps as the Ramboll Model, a steady-state calibration followed by a transient one. (Ex. 97-38, 39.) The 2025 DRI Model's steady-state is predevelopment, when inflows were presumed to equal natural discharge, with 7,650 AFY of recharge spread over six recharge zones, Rose Valley among them. (Ex. 24-66, Table 5-1; Ex. 1201-2.) The second step was a transient calibration from water year 1921 through 2022, and in that modeling scenarios recharge is not constant. "The updated 2025 Basin Model, uses estimated annual and monthly recharge rates for the transient-historical model based on the average observed precipitation at stations" in the three main recharge areas. (Ex. 24-66.) DRI fit recharge to precipitation, scaling it so that the long-term average equals 7,650 AFY. (Ex. 24-66 to 67, Figs. 5-1, 5-2; Ex. 24-136.)

Recharge to the two deeper model layers is held at 3,362 AFY to represent "older, slower recharge" near the long-term average. (Ex. 24-66, 136.) That treatment is consistent with the slow travel times understood to occur in the Basin. Mr. Teasdale testified that as to the movement of water through this Basin "[g]enerally it is slow" and "in some areas it is very slow." (TR 06/22/2026, pp. 1561:23-1562:15; Ex. 952-30 [Model Ad Hoc slides re travel times]; TR 06/09/2026, p. 284:2-25 [slides discussed with the Model Ad Hoc group].) Recharge to the top layer rises and falls with each water year's precipitation through 1995 and with each month's from 1996 on. (Ex. 24-66, 136.) The result is annual recharge between 3,863 and 15,682 AFY over 1980 through 2021, with an average of 8,180 AFY and a median of 7,978 AFY. (Ex. 80-30, Fig. 5.)

The Ramboll Model's natural inflow over the same years is not far from that figure. Its mountain-front recharge and Rose Valley underflow together averaged 10,762 AFY for 1980 through 2021, with its six steady-state years included, and 9,752 AFY for the transient years 1986 through 2021. (Ex. 123-66, Table 4-1 [recharge "via WEL"]; Ex. 97-67, Table 5-4.)

The testimony described the model the same way. Ms. Moran, who co-authored the memorandum that developed the recharge inputs for the 2025 DRI Model, testified that recharge in the 2025 model "is based on the precip in the mountains for that year." (Ex. 24-134; TR

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06/09/2026, pp. 396:16-397:8.) Dr. McKenna testified that "both the annual and the monthly or seasonal recharge vary in the DRI model, the 2025 model," and that placing the variation in the top layer, with smoother recharge at depth, is "a reasonable representation of the recharge process." (TR 06/24/2026, pp. 1991:4-8, 2005:10-26.)

The TWG's witnesses did not dispute the variation when they were asked about it. Dr. Tonkin, shown the 2025 report's description by the TWG's own counsel, explained that DRI "scaled the recharge up and down for different years based on precipitation, but so that at the end of the simulation period, the average would still be 7,650." (TR 06/15/2026, pp. 911:18-912:26.) On cross-examination Mr. Teasdale admitted that recharge in the 2025 model does vary seasonally and annually and that he had not "looked at that that closely." (TR 06/22/2026, p. 1561:16-22.) As Dr. McKenna explained, 7,650 AFY is "the long-term average in the 2025 model," and, as compared with the 2020 model, the two models "handled [it] in two different ways." (TR 06/29/2026, pp. 2105:21-2106:16.)

The claim that the model "does not respond to wet-year inflows" is also incorrect. Dr. Bedekar offered only one set of nested wells to support the assertion. (Ex. 50-7-9; TR 06/17/2026, pp. 1253:10-1257:11.) His own report says the wet-year rises are "observed only in a few wells," that they lag precipitation "by up to three years," and that the Ramboll Model's response is "larger and earlier than the observed data suggests." These observations support the 2025 DRI Model, not the Ramboll Model. Dr. Bedekar's first recommendation for the Ramboll Model was to add the lag it lacks. (Ex. 50-7-8; TR 06/17/2026, pp. 1208:20-1209:10.) As Dr. McKenna testified, the DRI Model "fits the observed data very well" and the Ramboll Model jumps "roughly two and a half years early," the result of "putting recharge in immediately in deeper layers." (TR 06/24/2026, pp. 2006:12-2008:25.)

Dr. Tonkin's responsive report states that the DRI Model's recharge "changes very little" with precipitation. (Ex. 125-17.) It changes by a factor of four between its driest and wettest years. What it does not do is spike to 62,410 AF, as the Ramboll Model's recharge does in 2017. (Ex. 123-66, Table 4-1.) Dr. Kincaid attributed the Ramboll Model's spikes to "an assumption that 100% of runoff from periodic floods results in recharge to the principal aquifer," and he found no

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evidence of it. If such spikes occurred, the monitoring wells near the mountain fronts would show mounding, and "the data I've reviewed doesn't reflect any such mounding." (Ex. 80-30.)

For the 2025 DRI Model the geometry, faults, clay layer, storage parameters, evapotranspiration zones, and recharge distribution all changed from the 2020 model, and it calibrated against three times the water-level observations with a transient fit "twice as good." (Ex. 1201-2-5; TR 06/24/2026, pp. 1990:14-21, 2004:7-21; TR 06/29/2026, p. 2110:6-17.) Dr. McKenna opined that the improved calibration "provides confidence that that recharge number is reasonable." (TR 06/24/2026, pp. 2004:22-2005:2.)

The difference between the models is not that one has a recharge input and the other does not. Recharge is an input in every groundwater model; it "is assigned to the boundary conditions of the model when it is constructed and run." (TR 06/23/2026, p. 1673:11-21.) The difference is that the 2025 DRI Model's input has been tested repeatedly, reproduces a century of measured water levels, matches the independent estimates, and varies with the rain, while the Ramboll Model's input was taken from the statewide BCM without the assessment the District's own consultant had called for, was augmented with man-made recharge to the aquifer for which there is no evidence, computes groundwater levels above the land surface where the ground is dry, and even produces a lake that does not exist. (Ex. 955-22-23, Table 10; Ex. 80-19-24, 34-35; Ex. 356-2; TR 06/10/2026, pp. 586:23-587:13; Ex. 97-45-48, Table 4-3; TR 06/24/2026, pp. 2049:21-2052:13.)

F. No Opinion Offered at Trial Rests on the 2016 Two-Dimensional Model

The Large Pumpers invoke Evidence Code sections 801 through 803 and Sargon Enterprises, Inc. v. University of Southern California (2012) 55 Cal.4th 747, to argue that the Authority's and the United States' opinions must be excluded because a two-dimensional model DRI used in 2016 is unavailable. (TWG Opening Brief, pp. 3, 8-9.) Sargon requires the court to examine the material and reasoning on which an opinion actually rests, and to exclude opinions that are speculative or that leave an "analytical gap" between data and conclusion, while leaving the weighing of competing scientific conclusions to the trier of fact. (Sargon, at pp. 770-772.) An expert may rely on matter "made known to him at or before the hearing" if it is "of a type that reasonably may be relied upon by an expert in forming an opinion upon the subject." (Evid. Code,

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§ 801, subd. (b).)

The two-dimensional model was a one-layer, steady-state screening tool that DRI used in 2016 to adjust its empirical recharge estimates against the water levels measured in the 1920s, and its product was a starting total of 7,650 AFY and a starting distribution among five zones. (TR 06/15/2026, pp. 849:19-850:11 [Tonkin]; Ex. 955-21, Table 9.) The figure was then tested in 2018 without the 2-D model, by DRI's three-dimensional model calibrated at bookends of 4,100 and 7,700 AFY with the District's and Meadowbrook's consultants participating,

The 2025 DRI Model then kept the total "as previously developed by DRI in coordination with the IWV TAC" and redistributed the recharge among six boundaries "based on model calibration." (TR 06/09/2026, pp. 303:16-306:19, 309:6-16; Ex. 962-8; Ex. 955-28-29; Ex. 24-51, 66, Table 5-1.) In other words, they changed the amounts in the distribution zones, which was what the 2016 2-D model was used for. Nothing in the 2025 DRI Model comes from the 2-D model, the distribution the 2-D model produced was replaced by the 2025 calibration.

The Sargon inquiry is directed to the opinions offered, not to a document no witness relied on and no model now depends on. Neither Dr. McKenna nor Dr. Kincaid relied on the two-dimensional model, their bases were disclosed, and the Large Pumpers cross-examined each of them on those bases at length. (TR 06/29/2026, p. 2159:13-26; TR 06/23/2026, p. 1707:2-7.) The Court has already recognized as much. When the United States explained on the second day of trial that neither its expert nor Dr. Kincaid relies on the model, the Court observed that "despite all the hoopla over the 2-D model, it doesn't really have much to do, as far as I understand it, with where we are now." (TR 06/09/2026, p. 290:14-17.)

The Special Master is now being asked to review and opine on all of the evidence in the record. The Special Master will not have the 2-D model, or any modeling code for any of the flow models. Yet, he will still be asked to review and provide an opinion based on his expertise, just as the experts at trial.

G. The Large Pumpers' Reasons for Disregarding the Prior Studies Are Not Persuasive

The Large Pumpers offer three reasons for disregarding sixty years of work. The first is

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lineage. Their brief asserts that the 7,650 AFY figure "is not the product of independent scientific analysis, but rather a fixed assumption that has been carried forward unchanged," and that every estimate descends from Kunkel and Chase and the two-dimensional model. (TWG Opening Brief, pp. 3, 5-10; TR 06/10/2026, pp. 699:26-701:6 [Wicks]; TR 06/17/2026, p. 1211:8-16 [Bedekar].) The second is that the prior studies rest on "a hypothetical steady-state Basin condition that no longer exists" and "substitute speculative historical recharge estimates for measured groundwater response under current conditions." (TWG Opening Brief, pp. 3-4.) Mr. Teasdale's version was that using data "from 100 years ago just seemed a bit ridiculous to me." (TR 06/17/2026, p. 1359:16-18.) The third is that the data are better now. (TWG Opening Brief, p. 67.)

The lineage argument mistakes a series of tests for an inheritance. A range that emerges each time a higher figure is tested against the Basin's measured water levels is corroborated, not merely repeated.

The "pre-development" argument fails because the predevelopment steady-state is the last time the Basin was in equilibrium, and every study of the Basin and every model built before the District filed this lawsuit agreed. Ramboll's own report says a simulation should begin from a steady state "before the introduction of significant stresses, such as increased pumping." (Ex. 97-38.)

Next, the Large Pumpers object that some wells were pumping in 1920—about 1,000 AFY. (TR 06/29/2026, pp. 2096:16-2098:10.) The point was not discovered at trial. DRI's 2016 report states that the steady-state model was calibrated to water levels measured in 1920, that "a small amount of domestic groundwater pumping may have occurred prior to 1920 (<1,000 afy)," and that the model "assumes no significant groundwater pumping." (Ex. 21-28, § 3.5.2.) Kunkel and Chase, on whom the Large Pumpers rely for the early history, reported that in 1912 the valley had eight wells equipped with power pumps, that in 1919 the irrigated acreage "did not exceed 800 acres," that in 1921 only one ranch appeared to be commercially productive, and that pumping before 1919 was "probably considerably less" than 2,000 to 4,000 AFY. (Ex. 1002-17, 76.)

Dr. Kincaid acknowledged the "recognized limitation" and explained that he, Bloyd and Robson, Berenbrock and Martin, and Brown and Caldwell all concluded that the early pumping

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"wasn't sufficient to negate the 1920 condition from being reasonably representative of steady-state conditions." (TR 06/24/2026, pp. 1857:8-1858:14.)

The reason the early pumping does not matter is physical. Pumping lowers the water table around the wells that pump, and the effect spreads outward slowly, more slowly still across faults that leave drawdown "quite muted or not transmitted as quickly or as strongly" from one compartment to the next. (TR 06/29/2026, pp. 2078:7-2079:21.) As Dr. McKenna put it when the question was pressed, "basins change very slowly." (TR 06/29/2026, p. 2097:20-25; TR 06/24/2026, p. 2058:19-23.) A thousand acre-feet a year drawn from a few pumped wells had not reshaped the water table that 132 wells recorded in 1920. (Ex. 1023-38 (Saint-Amand) ["Very little water had been pumped the, so [1920-1921 water table contour map] is representative of the water table's pristine state"].)

Nor does the correction run in the Large Pumpers' direction. If the 1920 water levels already reflected some pumping, then the discharge measured at the playa understates the natural inflow by at most the amount pumped (1,000 AFY), which would place natural recharge nearer 8,650 AFY than 7,650 and nowhere near 14,300.

The "better data" argument relies on the Authority's own data. Ms. Wicks testified that the TWG used the Authority's GSP annual reports because they cover "a period after the GA has enacted their well registration, metering, and reporting program." (TR 06/10/2026, pp. 673:24-674:3, 685:15-686:6.) No witness testified that the water-level record before 2014 is unreliable, and the Ramboll Model obviously depends on it, because its transient period is 1986 through 2023. (Ex. 97-8, 9, 80; Ex. 123-38.) The Large Pumpers thus rely on forty years of the record whenever their model needs it, and confine themselves to one decade only for the calculation that produced the highest number.

Contrary to Mr. Teasdale's assertion, it is not "ridiculous" to rely on decades of scientific research just because they are old. As he himself previously noted, the sustainable yield should be calculated "over a base period representative of long-term conditions in a basin," and he has already acknowledged that is 7,650. (Ex. 998-9; TR 06/17/2026, p. 1341:14-23.) The new data since 2020, namely the airborne electromagnetic survey, the post-earthquake fault mapping, three

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times the volume of water-level measurements, and the USGS's locally calibrated recharge study, were reviewed and incorporated by the Authority, and they support a figure of 7,650 AFY. (Ex. 363-23; Ex. 955-27-31; TR 06/24/2026, pp. 1991:20-1992:7; TR 06/29/2026, pp. 2110:6-17, 2160:18.)

X. THE 2025 DRI MODEL APPROPRIATELY SIMULATES THE BASIN, AND THE RAMBOLL MODEL DOES NOT

A reliable groundwater model must be able to simulate known conditions. This Basin is closed and its only natural outlet is evapotranspiration at the China Lake playa. There has not been a lake in the valley for more than ten thousand years, and water levels have fallen since the late 1940s, with the cones of depression under the pumping centers continuing to grow. (Ex. 955-7, 25, 38, 42; Ex. 1002-6; Ex. 929-112; TR 06/08/2026, p. 123:3-6; TR 06/17/2026, pp. 1298:23-1299:6; TR 06/24/2026, pp. 2047:14-26, 2060:2-9.) It is generally accepted that the Basin has been in overdraft for seventy years, losing an estimated 19,510 AFY from storage between 1953 and 2022. (Ex. 955-42.) A reliable model for the Basin must be able to reasonably simulate these conditions.

The 2025 DRI Model reproduces them. It has "just a few" flooded cells, as no model is perfect, where the Ramboll Model's flooded cells are "pervasive," the DRI Model does not simulate a lake, in either pumping or non-pumping scenarios, and during the no-pumping scenario run the foregone pumping goes to storage, as is expected in a basin that has been in overdraft for more than half a century. (Ex. 80-34, § 4.7.2; Ex. 50-31, Table 2-1.)

The TWG's brief describes the Ramboll Model as "state-of-the-art," calls its flooded cells a "numerical artifact" and asserts that sensitivity analyses were performed. (TWG Opening Brief, pp. 46, 51, 54.) The record shows otherwise. Tested against the conditions above, without pumping and with it, the Ramboll Model fails.

A. <u>Even Without Pumping, the Ramboll Model Simulates More Discharge than Recharge and a Continuing Loss of Storage, While the 2025 DRI Model Simulates the Recovery an Overdrafted Basin Should Show</u>

Dr. Bedekar was retained at the end of February 2025 to review the Ramboll Model and testify about it. (TR 06/17/2026, p. 1224:3-7.) He described his work as a "peer review of the

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model," and he described what such a review requires. "As a first step, I had to review the background and modeling objectives. ... I had to understand what the Indian Wells Valley Groundwater Basin is, what the conceptual idea is, where the water comes in and goes out." (TR 06/16/2026, pp. 1123:18-1124:10.) His analysis of the models demonstrates that he did not take that step.

Dr. Bedekar ran a no-pumping simulation with each of the models to see "how well the model would represent the 'pre-development' conditions in the basin." (Ex. 48-17.) Nearly every report for more than 100 years has described the predevelopment condition of the Basin. Before development, the inflow left as evapotranspiration at the China Lake playa, and there was no lake. (Ex. 1002-71, 74, 77; Ex. 955-25, Table 11; Ex. 955-48-49, Table 20.) Dr. Kincaid's report states the modeling consequence: "[i]n the IWVGB, I wouldn't expect to see any flooded cells as there are no perennial wetlands or lakes." (Ex. 80-34.) Dr. Bedekar agreed that after seventy years of overdraft, if the pumping stops, "first it will start recovering storage that's lost and then eventually it will show up as discharge," and a model calibrated to a no-pumping steady state and run without pumping over 1987–2022 should show evapotranspiration "on average, 6- to 8,000 acre-feet, consistent with the average inflows." (TR 06/17/2026, pp. 1280:10-17, 1281:10-18, 1308:11-14, 1314:11-22.) A model of this Basin with its pumping removed should therefore simulate the foregone pumping going into storage first, evapotranspiration at the playa rising only as water levels recover, discharge no greater than recharge, and no water above the ground. Dr. Bedekar ran that test on both models.

The Ramboll Model fails this test. The 2025 DRI Model passes.

1. The Ramboll Model Fails

In his August 2025 report Dr. Bedekar describes a simulation where he switched off pumping in the Ramboll Model. (Ex. 48-17.) He wrote that "[i]n the absence of groundwater pumping **the IWV basin is expected to pool in low lying areas, consistent with historical understanding of the pre-development conditions**," and "[t]o account for the potential pooling" he added a drain boundary "at the land surface elevation," in every model cell, to remove water that rose above the ground. (Ex. 48-17; TR 06/17/2026, pp. 1292:16-20, 1297:9-13, emphasis added.)

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The problem with Dr. Bedekar's understanding of the Basin is that **"historical pooling" has not occurred in the areas simulated in the Ramboll Model for *over 10,000 years*, if it ever occurred**. (TR 06/17/2026, p. 1289:16-18; Ex. 61-4.) Dr. Bedekar's based his opinion on a figure titled "Ancestral Owens River and inter-Basin Connections." (Ex. 48-43.) The figure shows China Lake as a lake, being fed by overflow from Owens Lake, not historical pooling, and, most importantly, that lake ceased to exist more than 10,000 years ago. (Ex. 48-43; TR 06/17/2026, pp. 1298:8-1300:15.)

In the simulation the Ramboll Model simulated a perennial lake, where one does not exist. The model performed so poorly, that Dr. Bedekar had to add surface drains to every model cell because the model could not simulate the needed discharge with the ET package alone. (TR 06/17/2026, pp. 1282:16-1283:7, 1297:9-13; Ex. 50-31.) Those drains alone then removed *on average* 16,205 AFY. (*Id.*) Dr. Bedekar wrongly concluded this was "consistent with areas in and around China Lake where water pooling occurred historically," and that the simulation "illustrates that the Ramboll Model adequately represented the no-pumping conditions in the IWV basin." (Ex. 48-17, 42-43.) His December report repeated that the result "demonstrates that the Ramboll Model is robust in representing conditions that are consistent with historical pooling that occurred during pre-development conditions." (Ex. 50-10.)

After being confronted with the report his own figure came from, he withdrew his premise. "I stand corrected. You showed me the paper, and I take back the pooling part." (TR 06/17/2026, p. 1284:20-23.) Asked whether "we know that water pooling did not actually occur historically," he answered, "Correct." (*Id.*, p. 1289:16-18.) Yet, at trial he doubled down, standing by his conclusion that the Ramboll Model's no pumping simulation "adequately represents the no-pumping conditions in the Indian Wells Valley Basin." (*Id.*, pp. 1284:5-13, 1289:19-1290:8.) At trial, Dr. Bedekar claimed the drains were just capturing groundwater discharge that evapotranspires. (*Id.*) But, no study has ever suggested that the Basin has ever experienced 16.457 AFY of discharge on the playa.[15] (*Id.*; Ex. 955-25.)

[15] When added up, the three components in Dr. Bedekar's table (storage increase, groundwater ET

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And, it gets worse. The chart in Dr. Bedekar's report is only showing what happened to the water that was extracted by pumps during the normal run, it does not show the total recharge or evapotranspiration during the no-pumping scenario. To determine that, one must look to Dr. Tonkin's report.

The water budget for the base run is in Dr. Tonkin's table of the Ramboll Model's annual budgets. (Ex. 123-66.) For the no-pumping simulation period, 1987-2022, the Ramboll Model outputs in Dr. Tonkin's report show an average of 24,121 AFY of pumping (roughly consistent with Dr. Bedekar's report, a 28 AFY difference), 12,420 AFY of total recharge including the man-made components, 2,008 AFY of evapotranspiration, and 13,710 AFY drawn from storage. (Ex. 123-66; Ex. 50-31.)

Using these outputs we can calculate that during the no-pumping scenario, the Ramboll Model was *discharging on average 18,500 AFY a year* through evapotranspiration and the drains *against only 12,400 AFY of recharge*. In other words, the model continued to draw 5,500 to 6,000 AFY from storage with no pumping at all. On cross-examination Dr. Bedekar agreed that in a no-pumping scenario water should first go to storage to fill the pumping depressions and evapotranspiration should increase only later. Asked whether 18,000 AFY would flow to the playa if pumping stopped today, he answered, "There's a delay. As you stop pumping, first it will start recovering storage that's lost and then eventually it will show up as discharge. (TR 06/17/2026, p. 1278:20-1281:21; p. 1307:20-14.)

Dr. Bedekar confirmed the model's recharge in 1987 was only 6,360 AFY and agreed that the discharge through evapotranspiration and the drains would average "something on the order of 18,000 acre-feet" a year. (TR 06/17/2026, pp. 1309:19-1310:3.) In the transient no-pumping scenario, the Ramboll Model simulated a lake that has not existed for 10,000 years, and still continued to *lose* water from storage.

Both of Dr. Bedekar's reports (Exs. 48 and 50) were written before he discovered his mistake about the lake, yet at trial his conclusion did not change. He continued to do that which he

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increase, and surface drainage) total 24,654 AFY, which is 505 AFY more than the pumping decrease of 24,149 AFY. (Ex. 50-31.) The table does not explain the difference.

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was hired to do, advocate for the Ramboll Model.

Dr. McKenna was more objective in his observations. He found the model did not follow best practice because it defined steady-state boundary conditions over a short wet period, not a long-term average condition, and also because it did not use "faults identified in the Ramboll (2019) HCF". (Ex. 61-6; 20-21, 30-31, 33.) He ran similar no-pumping tests on the Ramboll Model. The first tested whether it could simulate predevelopment conditions. (Ex. 61-4, 6, 34-35.) It could not.

Dr. McKenna observed as follows:

> 1) Under predevelopment conditions (i.e., before pumping), the Ramboll 2025 Model produces a large perennial lake in the China Lake area. A perennial lake was never observed in this area. **This result shows that either Ramboll's estimated long-term average recharge is too high, the Ramboll simulated ET is too low, or both.**
>
> 2) The inappropriate use of an anomalous wet=period recharge rate in the steady-state model results in simulated water levels several hundred feet higher than what would be simulated if the steady-state model were correctly designed using long-term average recharge rates. **This result shows that the calibrated hydraulic conductivity values in the Ramboll 2025 model are too high.**
>
> 3) Correction of hydraulic conductivity values will require changes in specific yield values in order to simulate observed water levels in the basin. **This means that any estimates of Safe Yield supported by the Ramboll 2025 model results are unreliable**.

(Ex. 61-34-35.) Dr. McKenna further described the results at trial:

> [P]utting in the drains allowed the water to essentially flow out under the desert floor. Think of each drain as a spring in the desert. And I was able to measure how much of that water was coming out. ... It's about 9,000 acre-feet per year coming out of the drains. ... [Y]ou get about a 2-foot deep lake that's about 2 1/2 square miles in area in the bottom of the basin. ... [I]t's a perennial lake. It's not just after storms. It's there all year long. It's telling me that there's either much too much recharge coming into the model or not nearly enough discharge leaving the model or some combination of both of those.

(TR 06/24/2026, pp. 2051:5-2052:7; Ex. 1202-19, 34, 37.)

The Authority encourages the Special Master to review the simulation descriptions in Dr. McKenna's rebuttal report (Ex. 61-34 to 46), and is confident he will come to the same conclusion.

2. The 2025 DRI Model Passes

Dr. Bedekarr ran the same no-pumping experiment on the 2025 DRI Model, and 91 percent

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of the foregone pumping went back into storage, exactly what one would expect after decades of overdraft. (Ex. 50-31, Table 2-1; see TR 06/17/2026, p. 1308:11-14.) In his report, before he knew that the lake was not a predevelopment condition, Dr. Bedekar criticized the DRI Model result: The model "failed to show the expected outcome, that is to represent pre-development conditions characterized by surface water discharges and increased evapotranspiration (ET), suggesting that the overall inflow to the model is low." (Ex. 50-5, 10.)

But in fact, the result was exactly what he agreed at trial should happen in a basin that has experienced decades of persistent overdraft, recharge goes to storage while the basin equilibrates, and evapotranspiration increases later. (TR 06/17/2026, pp. 1281:10-18, 1308:11-14.)

Evaluated against the correct predevelopment condition, the two models performed very differently. For one, the 2025 DRI Model, groundwater that was not extracted by wells primarily went to storage, to offset decades of overdraft, as Dr. Bedekar previously agreed should occur. The other, the Ramboll Model, continued to lose groundwater from storage even after the pumping stopped.

3. Dr. Bedekar Could Not Describe His Simulations

Evaluated against the correct predevelopment condition, model performance was the opposite from how Dr. Bedekar described in his reports. The model that refilled its storage behaved as he agreed a basin in overdraft should behave; the one he called robust did not. When pressed at trial, Dr. Bedekar could not describe the specifics of either simulation. He could not say whether pumping was switched off for the whole period or part of it ("It's been a while. I'll have to check. I don't recall exactly what I have done."), what drain conductance he had used, what the maximum evapotranspiration rates in either model were based on, how his 1987 figures added up ("whether there's a timing issue here"), whether the drains had been necessary in the Authority's model, or when he had shut off its pumping. (TR 06/17/2026, pp. 1283:13-16, 1286:17-21, 1292:16-20, 1295:4-8, 1301:6-11, 1303:2-5, 1307:5-10, 1314:6-10, 1315:14-19.) "I'm a little hazy on some of these specifics ... I'll need to go back and check all of the details to clearly answer your questions on this." (Id., p. 1308:19-22.) "Standard instructions give juries the common sense directive that an opinion is only as good as the facts and reasons on which it is based.' (BAJI No. 2.40.) An expert's

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opinion, even if uncontradicted, may be rejected if the reasons given for it are unsound." (*Kelley v. Trunk* (1998) 66 Cal.App.4th 519, 523.) Dr. Bedekar's criticisms of the 2025 DRI Model, and his endorsement of the Ramboll Model, rest on simulations he could not describe and a predevelopment condition he did not understand. His opinion regarding the models should be disregarded.

B. <u>Even With Pumping On, the Ramboll Model Erroneously Simulates Water Levels Above the Land Surface.</u>

With pumping simulated the Ramboll Model still simulates water levels above the land surface in across the China Lake playa. Flooded cells make up 13 percent of the model's cells. (TR 06/23/2026, p. 1734:6-25.) The condition is "pervasive," present to varying extents "across all stress periods and in every layer," and "in places, more than 20 feet above land surface." (Ex. 80-34.) Dr. Tonkin agreed that the model simulates flooded cells on the playa "pretty much throughout the simulation." (TR 06/16/2026, p. 1088:17-23.) Dr. Bedekar agreed that the simulation says that "if I put a well in one of the blue areas, the water will come up in that well 20 feet above the land surface," and that in Rose Valley, in the northwestern corner of the model, the simulated head is "in excess of 1,000 feet above the observed levels" and 1,000 feet "above land surface in the model." (TR 06/17/2026, pp. 1317:2-10, 1318:18-24.) Dr. Tonkin agreed that a well there "would get a geyser 1,000 feet in the air," or at least "[t]hat's the head potential that you would measure," and that this "is not consistent with current conditions." (TR 06/16/2026, p. 1096:20-26.) Dr. McKenna put it this way:

> [I]t's simulating water levels that are too high. It's creating artesian conditions. If you went out into the basin and stuck a well in, water would shoot up into the air. That doesn't happen. To me, that is a red flag for that model. Even though the calibration numbers are quite good, having simulated water levels above ground surface in the desert is not realistic.

(TR 06/24/2026, p. 2060:1-9.)

The Ramboll Model simulates a potential geyser, not because one exists—it does not—but because when water levels rise above the land surface the modeling code used (MODFLOW-NWT) switches to specific storage and calculates the head as if the cell were under confined conditions, even when it is not. (TR 06/16/226, p. 1093:3-21; TR 06/17/2026, p. 1198:14-23.) This is another

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example of the model failing to simulate known conditions. While no model is perfect the sheer magnitude of dry and flooded cells in the Ramboll model cannot be overlooked.

The TWG will try to downplay this as a "numerical artifact" whose water budget is small relative to inflows. (TWG Opening Brief, p. 46,) But "numerical artifact" just means error. The Authority agrees simulating water levels above the land surface over 13 percent of the model, and by up to 1,000 feet in some areas, is an error. The only reason the model statistics appear to show a good calibration is because the errors occur in areas where there are few monitoring wells. But every flooded cell is a known error that is over predicting water levels because we know the ground is dry. As Dr. Kincaid observed: "the minimum error at every cell is the height above land surface at which it is simulating the groundwater elevation," and if those cells were put on the calibration plot "it would cause the statistics to become wildly skewed." If those cells are taken into consideration, the model "fails the calibration process." (TR 06/23/2026, pp. 1734:12-25, 1737:3-23.) Dr. Kincaid's conclusion is that "there's too much water flowing through the model to produce a reasonable calibration," which "means your estimate of total inflow into the basin is not reasonable," and he accordingly called the flooded cells "a fatal flaw." (TR 06/23/2026, pp. 1734:6-11, 1735:17-1736:3.)

XI. EVERY PART OF THE RAMBOLL MODEL'S RECHARGE IS OVERSTATED

Every modeling witness agreed that recharge is an input to a groundwater model rather than a result of it. Dr. Tonkin—recharge "is a boundary condition that is preset by the modeler," adding, "[i]n most MODFLOW models and in the two models that were used in this case, yes." (TR 06/15/2026, p. 927:15-18.) Mr. Teasdale—recharge "is an output from the BCM model" and that Ramboll "calibrated the model to that recharge." (TR 06/22/2026, p. 1546:6-16.) Dr. Bedekar—"That's how Ramboll model was calibrated." (TR 06/17/2026, p. 1320:21-24.) The input has three parts. Dr. Tonkin's water budget starts with approximately 9,200 AFY of mountain-front recharge and runoff from the statewide BCM, adds approximately 2,600 AFY of underflow from Rose Valley, then adds approximately 2,600 AFY of anthropogenic recharge. (TR 06/15/2026, p. 874:8-9; TR 06/16/2026, pp. 980:11-15, 1016:5-9.) Each part is examined below, beginning with the man-made recharge.

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A. Anthropogenic Recharge Does Not Reach the Aquifer

Decades of research confirm the total natural inflows into the Basin are less than 10,000 AFY. To force a higher safe-yield number, the Large Pumpers include five anthropogenic sources of water in their water budget and model. None is appropriate. They are water-distribution system leakage, Los Angeles Aqueduct leakage, Los Angeles Aqueduct releases, wastewater percolation, and irrigation return flows. (Ex. 97-45.)

1. Water Distribution/Aqueduct Leakage

The Ramboll Model includes 220 AFY as leakage from the District's distribution system and 1,000 AFY of recharge from leakage from the Los Angeles Aqueduct. (Ex. 97-45.) There is no evidence that either of these provides any recharge, much less sustained recharge to the Basin.

There is no evidence that leakage from the District's distribution system recharges the Basin in any appreciable amount. In fact, there is evidence that it does not, Mr. Parker and the TWG were told this, and ignored it, and did not disclose it in his report or direct testimony. The Ramboll Model Report, approved by Mr. Parker, states that the District's water audit showed 6% water system losses in water year (WY) 2021-2022. (Ex. 97-2, 45.) The report continues:

> "This corresponds to approximately 360 AFY (6% loss rate of 6,000 AFY) of leakage and potential recharge from system losses which is consistent with the higher-range estimates from previous studies. *As a conservative estimate* between 80 AFY and 360 AFY, 220 AFY recharge from the distribution system was applied to the model in urban area of the model domain."

(*Id*.; TR 06/10/2026, p. 619:20-22, emphasis added.) A *conservative estimate*. Remember that.

At trial, on cross-examination Mr. Parker was shown an email and draft report he sent to Ms. Wicks in December 2022.[16] (TR 06/10/2026, p. 615:18-20.) The draft report contained comments from Mr. Parker and others, including Chuck Krieger, from Krieger & Stewart, the District's consulting engineer. Mr. Parker identified Mr. Krieger as "the one on the TWG team that would have investigated water distribution leakage making it to the aquifer." (TR 06/10/2026, p. 604:2-7.)

In the draft report, Mr. Krieger said "that 1 percent would be a supportable and reasonable

[16] Water year 2021-2022 ends September 30, 2022. The email was sent on December 20, 2022. (TR 06/10/2026, p. 626:16-17.)

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estimate of leakage." (*Id*., pp. 620:11-20.) Mr. Krieger also said "the impact of subsurface and below-pipelines caliche should be evaluate and considered." (*Id*., p. 620:21-26.) Mr. Parker described "caliche" as "an unsaturated zone layer that restricts recharge from moving down." (TR 06/10/2026, p. 573:3-8; 605:16-21 [caused by water evaporating from soil].) In other words, the presence of caliche could stop leakage from moving down to the water table, or the caliche itself could be evidence that the water evaporates in the soil and never makes it to the aquifer, as Mr. Brown admitted.

> Q. Can that -- Can return flows or leakage from distribution pipes cause caliche?
>
> A. It can cause it, yes, because the water would allow potentially some of the cementation.

(TR 06/08/2026, pp. 128:1-12.)

Mr. Parker admitted *without any explanation* that he used a higher number than Mr. Krieger's "supportable" 1 percent, and that he never perform the evaluation the man tasked with investigating leakage for the TWG recommended.

> Q. You used the higher number than Mr. Krieger said, and you didn't evaluate for whether it could percolate through the groundwater, correct?
>
> A Correct.

(TR 06/10/2026, p. 621:1-4.)

On redirect, counsel for the TWG asked only when the safe yield paper was finalized, which was two years later. (TR 6/10/2026, pp. 16-26.) So, what? The estimate in the report is for the time period ending September 2022, and Mr. Krieger's comments were on December 20, 2022, almost three months later. Mr. Parker did not testify about new information or new studies. He said they did not do the recommended study.

That fact is Mr. Parker wrote in his report that 220 AFY was a *conservative* estimate. And it is not conservative. It rests on a 6 percent loss rate, six times the 1 percent that the person the TWG tasked with investigating leakage said would be "supportable and reasonable."

There is no evidence to support the addition of recharge from the District's distribution system in a safe yield calculation. Any analysis that assumes this recharge, including outputs from

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the Ramboll Model, should be reduced by 220 AFY.

As for the Los Angeles Aqueduct, none of the TWG witnesses did any analysis in an attempt to quantify leakage from the Aqueduct, or show that it recharges the Basin. The most recent study to address this, was Todd Engineers in 2014, which assigned 0 AFY of recharge to leakage from the Aqueduct. (Ex. 614-78; Ex. 4-12; TR 06/16/2026, pp. 1029:15-1030:9; Ex. 955-22, Table 10.) Dr. Kincaid stated that leakage from the Aqueduct as recharge is not verifiable, and opined that it should not be included in recharge. Dr. Kincaid explained: "I have personally observed water losses from the L.A. Aqueduct, and I have personally observed the rate at which they repair those leakages." (TR 06/23/2026, p. 1752:14 - 1753:25; Ex. 80-26 [LADWP "diligently work to maintain their pipelines specifically to reduce the probability of leakage and repair leaks that are found to exist"].)

There is no evidence to support the addition of recharge from the Los Angeles Aqueduct in a safe yield calculation. Any analysis that assumes this recharge, including outputs from the Ramboll Model, should be reduced by an additional 1,000 AFY.

2. Aqueduct Releases

Two releases from the Aqueduct to the Indian Wells Valley—2,090 AF in 2017 and 12,699 AF in 2023—have occurred in the Aqueduct's 113 year history. Two occurrences in 113 years is not a reliable indicator of sustainable recharge to the Basin. Moreover, despite the Authority's effort no one has yet determined how much of either release reached the aquifer. (Ex. 97-47; Ex. 4-13; TR 06/10/2026, pp. 603:19-604:1; TR 06/16/2026, pp. 1030:10-1032:15; TR 06/22/2026, pp. 1572:16-1573:23; TR 06/17/2026, p. 1379:2-13; TR 06/15/2026, p. 739:16-20; TR 06/24/2026, p. 1957:6-15.) The Ramboll Model's assumption that 15 percent of each reached the aquifer in the year of its release is not supportable, and should be excluded from any safe yield calculation.

3. Wastewater Discharge

The Ramboll Model and water budget credits 100 AFY of percolation from wastewater treatment ponds. (Ex. 97-45.) The City of Ridgecrest's wastewater facilities facility has clay-lined treatment ponds and evaporation/percolation ponds, and thick clay layers separate the shallow aquifer beneath them from the principal aquifer. (Ex. 108-118 ["Secondary treatment occurs in a

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series of on-site facultative ponds with clay limings"]; Ex. 614-81 ["essentially none of the percolated water contributes to the yield of the principal aquifer.) Even the TWG Safe Yield Paper 2024 excluded wastewater discharge: "due to uncertainties regarding the connectivity of the shallow and deep aquifer systems and direction of hydraulic gradients in the area of wastewater spreading, recharge has been conservatively estimated to be zero here." (Ex. 4-17; Ex. 61-28 (McKenna) ["There is no basis to include contribution from the wastewater treatment plant ponds in the IWV's water budget"].)

The Special Master should likewise set this to 0. There has been no testimony that any of the TWG witnesses attempted to measure the discharge, its evaporation rates, or whether it percolates. (TR 06/17/2026, pp. 1268:10-17, 1269:19-24.) This input is not included in the 2025 DRI Model, and the Ramboll Model does not accurately simulate flow or recharge. This should be sect to 0.

4. Agricultural Return Flows

The Ramboll Model wrongly includes agricultural return flows of between 1,600 to 2,100 AFY. These should not be included in the model, or considered for safe yield for multiple reasons.

First, there is no evidence that return flows have reached the water table. Dr. Kincaid testified that agricultural return flows were recharging the Basin, you would expect to see signs of it "in multiple forms." The "most direct evidence would be on the groundwater elevations" where you "would see a response in the form of mounding during the return flow period that could be tracked seasonally." There "would be evidence of recharge, or return flow both in the form of the groundwater elevation itself and the periodicity of that response." (TR 06/23/2026, pp. 1755:23-1756:9.) Additionally, "the purpose of over irrigating is to ensure that salts don't build up in the root zones." And there is "an expectation of an increase in salinity." (*Id.*, p. 1756:10-20.) Dr. Kincaid stated that he has "not seen any data to suggest, on either of those, that they exist." (*Id.*, p. 21-24.) Without any evidence that irrigation returns make it to the water table, they should not be included. Although other researchers have assumed return flows in the past, none of them suggested they had seen any data or evidence that irrigation returns are recharging this Basin. Without any observable evidence, including irrigation return flows is speculative and should not be

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done.

Furthermore, the TWG members have acknowledged that due to the depth to water in the agricultural areas any return flows "would likely take many decades to reach the groundwater surface." (Ex. 4-15.) However, they made no attempt to calculate how many decades. Dr. McKenna did, though.

The only person in the history of the Basin to try and calculate the travel time for potential return flows, is Dr. McKenna. (Ex. 60-31.) Dr. McKenna calculated that it would take ***122 years*** for agricultural return flows to reach the water table. (*Id*.) In other words, if return flows are possible here, it is still likely that the first irrigation flows from a century ago *still* have not yet reached the water table.

Notably, Dr. McKenna's calculation assumed "that no clay layers impede infiltration." (Ex. 60-31.) As noted earlier, multiple TWG witnesses have testified that there is caliche in the Basin and that would further slow the travel times of any potential return flows. (TR 06/08/2026 (Brown), p. 128:5-12; TR 6/10/2026, p. 573:3-8; 605:16-21 (Parker).)

Moreover, as Mr. Parker testified, over irrigating itself can cause caliche. (TR 06/10/2026, p. 605:23-606:2.) In other words, the caliche could itself be a sign that excess irrigation water is evaporating in the soil, not reaching the water table, and leaving cemented minerals that slow later water. So, if water is able to migrate down it could be slowed by caliche and take even longer than the 122 years calculated by Dr. McKenna.

Despite previously admitting that any return flows would take many decades to reach the water table, the Ramboll Model adds the chosen irrigation return flow number to the aquifer with no lag time. (TR 06/16/2026 (Tonkin), pp. 1021:3-10 [Ramboll model "does not" model lag time].)

The safe yield is the amount of water that can be taken out of a basin under given conditions without depleting the Basin. Adding return flows that will not arrive at the aquifer for more than a century if ever, is not a reliable source of recharge that should be included in a safe yield calculation. Unless and until there are observable signs that irrigation return flows are recharging the Basin, any estimates of safe yield should not include irrigation return flows. Any safe yield estimates derived from the Ramboll Model should remove 1,600 to 2,100 AFY for unproven

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speculative return flows.

B. Rose Valley Inflow Was Set at the Highest Published Value, Scaled by Precipitation, and Counted Twice

Inflows from Rose Valley have not been measured. They are assumed to occur and must be estimated and then varied during calibration if necessary.

The Rose Valley figure used in the Ramboll Model is approximately 2,600 AFY, was "included in the calibration," and, as Dr. Tonkin conceded, "[t]echnically it is the highest" of the published estimates. (TR 06/16/2026, pp. 983:20-24, 987:1-2.) Dr. Bedekar agreed that the Rose Valley inflow "is an estimate" and that he is not aware of any physical data on it. (TR 06/17/2026, pp. 1265:7-1266:19.)

As discussed above, flooded cells make up 13% of the Ramboll Model's domain. One of the areas of significant flooding, where simulated water levels are 1,000 feet above the land surface, is where inflow from Rose Valley would occur. (TR 06/23/2026, p. 1734:12-13; TR 06/16/2026, pp. 1096:14 - 1097:17; TR 06/17/2026, pp. 1317:2-10, 1318:18-24; Ex. 80-35; 61-34.) On direct, Dr. Bedekar referring to the flooded cell problem claimed he could "address some of these" and that it would change calibration, but not safe yield. (TR 06/17/2026, p. 1208:10-19.) Notably, a change in "calibration" likely results in a change in Sy, which means the safe yield calculations from the TWG polygon analysis would change.

Dr. Bedekar said his changes would not affect the model simulated safe yield because "the inflow is a separate calculation. And Ramboll model is just validating that inflow." (TR 06/17/2026, p. 1208:10-19.) But, it is not. That is the point. The Ramboll Model does not validate the inflows the TWG is force feeding it because it does not simulate known conditions. And Dr. Bedekar cannot guarantee that it will correctly simulate known conditions with that amount of inflow in the future. He is assuming that all of the recharge calculations are correct or he does not care because he thinks he can make anything fit. Neither is justification for this model's current failures.

Dr. Bedekar's statements that he can fix the model without changing any of the inflows is inconsistent with modeling history in the Basin, and strong evidence of the Large Pumpers' goal

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here—to argue for a higher safe yield, no matter what the data shows. Many of the prior modelers had to reduce recharge from their initial estimates in order to calibrate the model. Bloyd and Robson stated with Kunkel and Chase's estimate of 11,000 AFY of evaporation, but reduced that to 9,850 AFY during calibration. (Ex. 1011-7, 28, 37.) Brown and Caldwell similarly began with a conceptual budget of 11,000 AFY and calibrated at 8,821 AFY finding "it was necessary to reduce recharge by approximately 2,000 AFY from the conceptual estimate to successfully calibrate the model," and "[w]ithout such adjustments, the model was unable to simulate the observed water levels effectively." (Ex. 67-34.) The inability to appropriately calibrate the Ramboll Model to their current water budget suggests their initial estimated water budget, like those before them, is too high.

Dr. Tonkin, expressly admitted "it's uncertain that [Rose Valley] flow." (TR 06/16/2026, p. 980:15-19.) On cross-examination Dr. Bedekar was directed to the Rose Valley area, where model simulated heads are 1,000 feet above land surface. He agreed that the storativity value assigned there, 0.3, is high and is not consistent with the sediments in that area. He also agreed that, using his storativity values, the volume of water in those cells "would be very high." (RT 06/17/2026, pp. 1318:5 - 1319:5 ; Ex. 259.)

It is not reasonable to use the highest estimate of inflows from Rose Valley on record, while also adding multiple sources of unverified anthropogenic recharge, when the model cannot handle that inflow. Both Dr. Tonkin and Dr. Bedekar said the problem could be fixed by changing some of the parameters, but they did not fix the problem, they ignored it. If it could be fixed it should have been fixed. It was not.

At every turn, Ramboll and the TWG seek to use unreasonably high recharge estimates. Mr. Parker and the TWG did it with the anthropogenic sources, and now with Rose Valley.

C. The Statewide BCM Was Not Calibrated to the Basin, and the Review of It Compared Totals, Not Assumptions

The Ramboll Model's mountain-front recharge and runoff came from the statewide version of the BCM. (TR 06/15/2026, p. 874:8-9; TR 06/16/2026, p. 980:5-7.) That choice contradicted the District's own expert. Mr. Parker's 2018 memorandum recommended the USGS's local BCM

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study on two conditions, that "uncertainty should be applied to bracket final results," and that "a careful assessment of the assumptions that went into the BCM should be conducted and used to qualify the results as necessary and appropriate." (Ex. 356-2; TR 06/10/2026, pp. 485:14-23, 585:9-12.) He wanted the locally calibrated version because the statewide version "doesn't account for some of the local datasets that are available, like stream gauge data, local precipitation stations," its "cell sizes are larger," and "the idea was to not have a statewide version of this, but actually have it locally calibrated to the Indian Wells Valley Basin." (TR 06/09/2026, pp. 464:2-465:12.)

The TWG did neither of the things Mr. Parker suggested. The USGS produced the locally calibrated version he had asked for, which estimates total recharge at about 8,680 AFY and excludes Rose Valley. (Ex. 363-23; TR 06/16/2026, pp. 979:5-980:7.) The TWG used the statewide version instead, "because the localized version only covered 1980 through 2010" and the TWG "wanted to use the period 2014 through 2023." The TWG made no effort to calibrate the statewide version locally. (TR 06/10/2026, pp. 586:15-587:3.) Notably, the statewide version did not cover the TWG's chosen decade either. Its results for the last quarter of 2023 had not been released when the model was built, so Ramboll used the third quarter of 2023, the quarter of Tropical Storm Hilary, twice. (Ex. 97-69; TR 06/16/2026, pp. 1058:5-26, 1061:12-17.)

Dr. Tonkin and Dr. Bedekar were brought in late in the game to review the model and defend it at trial. Dr. Tonkin had never before used the statewide BCM as a direct recharge input to a groundwater model, and the choice was not his here. He and Dr. Bedekar were retained after the model had been built and its recharge set; neither built it, and neither selected what went into it. (TR 06/15/2026, pp. 769:7-10, 940:1-3, 940:10-21; TR 06/16/2026, pp. 967:9-13, 1036:7-14; TR 06/17/2026, p. 1224:2-12.)

Dr. Tonkin's review of the choice was a comparison of totals. For 1981 through 2010, he observed the statewide and local versions differ by "2 or 3 percent," so "for the same period they compute very similar numbers." (TR 06/16/2026, pp. 977:24-978:15.) But, the similarity stops at the total. As Dr. Tonkin conceded on cross-examination, the distribution "is" different. "[E]ach of those [watersheds] is different between the two different models," and that the local version has less recharge from the Sierra Nevada and "a lot of recharge" in the volcanics. (TR 06/16/2026, pp.

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978:16-26, 1045:9-1046:15.)

He described his analysis of the changes the USGS made between the two versions as: "Some. Not as much as I would like to do," with no "full file compare," and he did not analyze whether the permeability the local version assigns to the volcanics is reasonable. (TR 06/16/2026, pp. 1046:17-1047:22.) He "did recommend trying to switch to the local model," which the TWG did not do. (TR 06/16/2026, p. 1048:21-23.) The assumptions that Mr. Parker previously stated should be carefully assessed were not assessed. Dr. Tonkin adopted the assumption that 15 percent of all mountain runoff becomes recharge before he even knew its basis. In fact, that assumption is "not supported by any data in Indian Wells Valley" and resulted in approximately 500 AFY being added to the Ramboll Model, on top of the mountain front recharge. As applied by Ramboll the statewide model also counted as recharge to this Basin water from the Coso and Argus Ranges that drain to Airport Lake, "another terminal basin." (TR 06/16/2026, p. 963:6-9; TR 06/24/2026, pp. 2062:17-2063:3; TR 06/29/2026, pp. 2074:23-2076:13; Ex. 1202-22, Table 4.) Corrected for the Airport Lake error alone, the model's BCM recharge for 1986 to 2023 reduces to approximately 10,037 AFY. (Ex. 1284-1; TR 06/29/2026, pp. 2074:23-2075:18.)

Two estimates that put different amounts of water in each mountain range where precipitation and permeability differ agree by coincidence, not by confirmation. And the coincidence cuts against the Large Pumpers. The Authority's technical modeling group performed the assessment Mr. Parker's memorandum called for, found that the permeability the local study assigned to the volcanics "was way too high" and that its distribution "was not well calibrated to the groundwater levels that we saw in the basin." (TR 06/09/2026, pp. 398:17-399:6.) Dr. Decker had made the same point about the USGS's draft recharge table since 2018, writing that there was "no reason to suspect that the massive flows of extrusive lava in the Cosos are somehow more porous as claimed." (Ex. 998-1.) Ms. Moran testified that she encountered a similar problem in the Cahuilla and Anza-Terwilliger basins, where a BCM "produced too much water for the basin" and the model could not be calibrated with it. (TR 06/08/2026, p. 170:10-19; TR 06/09/2026, p. 399:7-16.) If the local version is too high in the volcanics, the total it shares with the statewide version is too high as well, and Dr. Tonkin's 2 or 3 percent measures only how closely the statewide version

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tracks an error he failed to examine.

Mr. Parker's other 2018 recommendation, an uncertainty analysis, was also ignored by the TWG. Dr. Tonkin, whose expertise includes uncertainty analysis, proposed one, but was not asked to do it. "[I]t was not completed." (TR 06/16/2026, p. 1038:7-22.) Ms. Wicks did no sensitivity analysis of the specific-yield values. (TR 06/15/2026, p. 744:8-26.) The TWG's brief nevertheless asserts that sensitivity analyses were performed. (TWG Opening Brief, p. 51.)

XII. THE LARGE PUMPERS' 2014–2023 BASE PERIOD IS NOT REPRESENTATIVE OF LONG-TERM CONDITIONS, AND EVERY FIGURE THAT DEPENDS ON IT MUST BE IGNORED

A. The Law Requires a Base Period Representative of Long-Term Conditions

Safe yield is a long-term average. When doing an analysis such as the TWG loss in storage analysis, the base period is crucial and must be representative of average long-term conditions. If it is not, then pumping in the current condition, could eventually deplete the Basin. (*San Fernando*, *supra*, 14 Cal.3d at p. 278 ["Safe yield" is defined as "the maximum quantity of water which can be withdrawn annually from a ground water supply under a given set of conditions without causing an undesirable result"].)

The Large Pumpers' own filing agrees that safe yield is determined "during a representative period." (ROA 1413, p. 6.) The Technical Report explains why the choice matters in a desert basin. Recharge arrives in a few very wet years separated by long droughts, so a base period must be long enough to include both, and it "should not begin or end at the endcaps of available data, as periods anchored at either end of the datasets are more likely to reflect anomalous wet or dry trends rather than balanced long-term conditions." (Ex. 955-48.) The Technical Report and the GSP accordingly use 1990 through 2015, the twenty-six years that Stetson Engineers identified in 2018 from the cumulative departure curves of the precipitation stations in and near the recharge zones, and that begin and end in balance and contain both wet and dry years. (Ex. 108-177; Ex. 990-15, 50, 68; Ex. 955-48.) The GSP used that period to construct the fifty-one-year planning hydrology SGMA requires, the 2025 DRI Model carries it forward, and the Technical Report adopts it as the base period for the balanced-condition water budget. (Ex. 108-177; Ex. 990-15, 50; Ex. 24-134; Ex.

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955-49-50, Table 22.) The period was fixed in the GSP, with the District's and Meadowbrook's consultants on the TAC, before this lawsuit was filed.

B. The 2014–2023 Decade Is a Short Wet Period, with Outlier Events and Incomplete Data

The decade chosen by the Large Pumpers is not representative of long-term conditions.

First, it is a wetter than average period. Dr. Tonkin agreed that 2014–2023 is "wetter, yes," than the long term. (TR 06/16/2026, p. 1060:2-4; TR 06/15/2026, p. 937:18-24.) The Ramboll Model simulates approximately 12,000 AFY of recharge over 1990-2015, but approximately 16,000 AFY over 2014–2023. (Ex. 123-68; Ex. 7-16.) According to the Ramboll Model, recharge in the TWG's chosen base period is 39% wetter than the long term balanced hydrologic period—1990-2015. Dr. Tonkin explained the consequences—the TWG's estimate "may overestimate the reasonably anticipated longer-term average yield of the IWV Basin because the TWG estimate is based upon a period (2014-2023) that is fairly wet compared to the longer available record." (Ex. 123-38; TR 06/15/2026, p. 937:9-24.)

But it is not just a wet period, it is wet and contains outlier events that are not likely to occur again. The decade contains two of the wettest years in the Ramboll Model's forty-four-year record, 2017 and 2023, including a tropical storm. (Ex. 7-16; Ex. 123-66; TR 06/22/2026, pp. 1573:24-1574:12.) Mr. Teasdale testified that he is not aware of a tropical storm ever hitting the Basin before. (TR 06/22/2026, pp. 1573:24-1574:12.) That period contains the only two known deliberate releases of Los Angeles Aqueduct water into the Basin in the aqueduct's 113 year history—2017 and 2023—and no one is aware of plans for that to happen regularly, or ever again. (TR 06/22/2026, pp. 1572:20-1573:23, 1581:17-1582:3.) And it contains the data gaps for water levels during the COVID years, which Mr. Teasdale acknowledged are "big gaps" that add uncertainty. (TR 06/22/2026, pp. 1492:6-18, 1496:15-17.)

And it contains the July 2019 earthquakes, whose effect on water levels Mr. Teasdale failed to consider prior to the trial. The analysis he presented at trial found six or seven polygons where water levels changed and never returned to their pre-earthquake trend, and he could not say whether the net effect raised or lowered his safe yield number. (TR 06/22/2026, pp. 1449:8-18,

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1454:7-12, 1458:9-16, 1495:10-17.)

C. The TWG Rejected a Period Its Expert Identified as Balanced, After Saying it Would First Compare Results

The TWG claims it chose the 2014-2023 base period by looking at the record of a precipitation station on the valley floor. (TR 06/10/2026, pp. 661:9 - 662:14, 665:10-18.) But that is not a correct method to determine the base period, because precipitation on the valley floor is not representative of precipitation in the surrounding mountains, where the Basin gets its main source of recharge. (Ex. 955-13, 24; Ex. 363-11; TR 06/22/2026, p. 1581:8-10.) In December 2022 Mr. Parker emailed comments to the TWG "regarding whether the historical record of precipitation on the Basin floor actually reflects recharge along the mountain fronts coming from the highland precipitation." (TR 06/10/2026, p. 616:4-10.) It does not. At trial, Mr. Parker praised his question. (*Id*., p. 616:10-11 ["Yes, yes. I asked that question That's a good question."].) Mr. Parker does not recall getting an answer to his question. (*Id*., p. 616:12-14.) The answer is no. The Basin is in a rain shadow and precipitation in the mountains is "a lot greater. It's double plus." (TR 2026/06/08, p. 172:9-10; 173:7-20; Ex. 955-19.)

Mr. Teasdale stated that precipitation in the mountains was intentionally left out—"what's happening in the mountains was not part of—was never incorporated into our base period"—even though he agreed the mountains are "the primary recharge component in this basin." Asked whether a balanced period of recharge requires considering the mountains, he answered, "we did not do that for our analysis." (TR 06/22/2026, p. 1581:2-16.) Mr. Parker likewise has not done a correlation between playa precipitation and mountain precipitation and could not recall whether the decade contained the wettest period on record. It contains the two highest recharge years in the Ramboll Model's record. (TR 06/10/2026, pp. 611:1-7, 612:3-5; Ex/ 123-66.)

So, why did they choose 2014-2023? The answer is in their emails. In August 2022, Ms. Wicks e-mailed Mr. Teasdale that her colleague looked at cumulative-departure curves and "thinks the period from 1991 to 2014 looks promising: it starts at the end of a dry cycle (7-year drought from 1984-1990) and ends with a dry period, the average precipitation is similar to the long-term average, and it includes wet and dry conditions." (TR 06/22/2026, pp. 1576:12-1577:14 [reading

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Ex. 92].) Mr. Teasdale forwarded the recommendation to Meadowbrook's counsel with a note. "**We'll see how this base period safe yield value *compares* with 2016 - 2021 and can share preliminary results with you next week**." (Ex. 92-1; TR 06/22/2026, p. 1578:17-23.)

The TWG did not use 1991–2014, a period with approximately 4,000 AFY less recharge according to the Ramboll Model. (TR 06/22/2026, p. 1578:14-16; Ex. 123-66.) It used 2014–2023, a ten-year period, which is the minimum DWR will accept, and the most recent decade in the record. (Ex. 3-6; TR 06/10/2026, p. 610:21-25 ["ten-year minimum and you chose the minimum"].) Ms. Wicks could not recall considering 1991–2014 at all. (TR 06/15/2026, p. 755:21-23.) Mr. Parker did not choose the period himself—"I didn't do it. Other people did the analysis, and I reviewed it." (TR 06/10/2026, pp. 607:18-23, 609:3-5.) Mr. Teasdale, shown his own e-mail, could not recall making the comparison it describes:

> Q. So you were comparing safe yield values compiled over different base periods. That's what this e-mail indicates; correct?
>
> A. What I recall, this was the beginning of a discussion about the base period. I don't recall ever making a comparison of safe yield between the two different base periods. I don't recall doing that.
>
> THE COURT: So what does that word "compare" mean in the e-mail, if not that?
>
> THE WITNESS: What I recall was when we were having conversations about the base period, we wanted to make sure that it was utilizing the best available data. And taking it back to 1990, even though the cumulative departure curve shows a balanced hydrologic period, there was some concern about the water level data and groundwater pumping.

(TR 06/22/2026, pp. 1578:19-1579:15.)

That answer conceded, in passing, that the period beginning in 1990 "shows a balanced hydrologic period." The only reason any witness gave for rejecting it was Mr. Teasdale's "some concern about the water level data and groundwater pumping" in the earlier years, a concern he did not explain and the TWG's papers do not document. (TR 06/22/2026, p. 1579:12-15.) No witness recalled comparing results over the earlier period. (TR 06/22/2026, p. 1579:3-6; TR 06/15/2026, p. 755:21-23; TR 06/16/2026, p. 1074:18-20.) What the record does show is the purpose Mr. Teasdale's e-mail states, to see how the safe yield over the recommended period "compares" with a

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recent one, and the outcome. Using the Ramboll outputs to perform a change in storage calculation, the balanced hydrologic period (1990-2015) yields a 9,891 AFY safe yield, and that with the unjustified anthropogenic sources included. (TR 06/16/2026, pp. 1079:5-1081:15.) Remove them and the yield drops further. Without irrigation return flows it is between 7,790 AFY and 8,290 AFY, and it goes lower still without the unproven leakage from the Los Angeles Aqueduct and the District's system. (*Id.*, pp. 1079:5-1081:15; TR 06/17/2026, pp. 1384:16-1389:4.) The decade the TWG kept, contains the two largest recharge years in the Ramboll Model's forty-four-year record, multiple outlier events, and yields a safe yield value higher than any prior study could support.

D. The Choice of Base Period Controls the Result

The choice of base period is not a technicality, because it controls the result. Ms. Wicks agreed that "you will get different safe yield for different base periods." (TR 06/15/2026, p. 755:4-7.) Dr. Kincaid testified that the calculation "is highly sensitive to the choice of base period." (TR 06/23/2026, p. 1781:12-18.) Dr. Tonkin's own Table 4-2 applies his method to three periods and obtains three answers, 3,512 AFY for 2011–2015; 12,329 AFY for 1980–2023; and 14,854 AFY for 2014–2023, and his method applied to the GSP's 1990–2015 period yields 9,891 AFY, or 7,790 - 8,290 AFY without the assumed irrigation return flows. (Ex. 123-38, 67; TR 06/16/2026, pp. 1079:5-1081:15.) A method that returns 3,500 or 15,000 depending on which years are chosen is not measuring the Basin's long-term supply.

XIII. THE TEASDALE AND WICKS POLYGON CALCULATIONS ARE NOT A RELIABLE MEASURE OF SAFE YIELD

The TWG's brief asserted that Mr. Teasdale used "industry-standard techniques using empirical, measured data" and that his specific-yield values were "firmly rooted in data." (TWG Opening Brief, pp. 32-34.) At most, only the water levels are measured, and only at the wells, and only when there is a well and a measurement. Everything else in the calculation is a choice. The TWG chose the specific yield, the base period, the wells that stand for each polygon, and the pumping record, and each choice moved its result by thousands of acre-feet. The figures that resulted cannot be reconciled with one another or checked against the data.

A. The Result Is Controlled by the Specific Yield

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For the TWG's polygon method, specific yield controls the result more than any other input—as explained in Section VIII.C, and the Large Pumpers' own figures show how much. Mr. Teasdale averaged the storage changes in the Authority's annual reports, added the pumping, and obtained about 10,500 AFY. He then replaced the reports' specific-yield values with the Ramboll Model's, changed nothing else, and obtained 14,800 AFY. (TR 06/17/2026, pp. 1384:16-1389:4.) The TWG's paper reported 14,300 AFY with one set of values and 17,000 AFY with another, Mr. Parker's range ran from 13,000 to 18,000 AFY "based on the specific yield distributions in the numerical models," and Ms. Wicks attributed the rise from 14,300 to 15,400 AFY to "the finalized specific yield values from the Ramboll groundwater flow model." (Ex. 3-7; TR 06/10/2026, pp. 559:12-17, 598:9-16, 702:7-11.) Brown and Caldwell's own model, built for the District, could not calibrate with more than 8,821 AFY of recharge, yet its specific-yield values produce a safe yield of 14,200 AFY for Mr. Teasdale and about 17,000 AFY for Mr. Parker.

Dr. McKenna's assessment was that "it's not clear to me how they could get 14,000 and 17,000 when the model is showing 8,800 acre-feet per year," which "would certainly call into question those Thiessen polygon calculations." (TR 06/29/2026, pp. 2089:22-2092:6; see also Ex. 80-21.) The Court put the point to Mr. Teasdale after he produced two different storage figures for the same basin and the same year:

> THE COURT: ... [D]on't you think that it causes one to think, a third party like myself, that once you start messing or adjusting the specific yield number you can get any number you want by just changing it up or down? I mean, that's what it feels like from what you're telling me now.
>
> THE WITNESS: Correct. That wasn't what I did, but that's —

(TR 06/22/2026, p. 1542:4-11.)

Ms. Moran, who uses a modified version of the Thiessan Polygon method to calculate change in storage for the Authority's annual reports only because a model was not available at that time, described it as "almost like back-of-the-envelope calculation." (TR 06/09/2026, p. 325:3-12.) The District's consulting engineer, Mr. Krieger, criticized the approach stating the annual storage figures "vary significantly (over 3 orders of magnitude)" and do not correlate with pumping or precipitation, which "suggests that data and/or method used for estimation is not appropriately

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applied and not suitable for estimating average sustainable yield." The TWG's 2024 Safe Yield Paper said the approach "suggests limitations in the data and/or method used for this estimation." (Ex. 4-34; TR 06/10/2026, pp. 624:8-626:2.) A method whose answer moves by thousands of acre-feet with one input is not measuring the Basin. It is reporting the uncertainty in that input.

B. <u>The Specific-Yield Values Came From the Ramboll Model, So the Method Is Not Independent of It, and the Model Itself Gives a Lower Answer</u>

The TWG's values were not all measured. Specific yield is estimated from pump tests, from model calibration, or from lithological data, and "[a]ll three methods of estimation carry considerable uncertainty." (Ex. 80-14; TR 06/23/2026, p. 1686:3-5.) The TWG's storage paper acknowledges "limited direct empirical data on Sy." (Ex. 5-29.) Ms. Wicks agreed that "the formula is very straightforward, but the reliability of the result depends on the reliability of the inputs," that "nobody has a complete understanding of the specific yield everywhere," that no one measured it in every polygon, and that the values came from "lithologic interpretation literature values and model-derived values." (TR 06/15/2026, pp. 742:19-22, 745:1-746:23.) Notably, Ms. Wicks did not provide an independent safe yield opinion, she just reviewed and agreed with Mr. Teasdale. Mr. Teasdale took his values "directly from the calibrated Ramboll numerical model," and the Yeh-Wicks rebuttal report describes them as "storage parameters derived from calibrated models." (Ex. 91-12; Ex. 7-17.)

The values were not only estimated. They were calibrated to a recharge that Ramboll had already assumed, and inflated as far as possible. Ramboll "set the recharge in the model and then they calibrated the model to that recharge," and the specific-yield values were "modified so that the model could simulate observed water levels." (TR 06/22/2026, pp. 1545:22-1546:16; TR 06/15/2026, pp. 745:25-746:3.) A storage calculation that borrows those values restates the recharge that produced them. Dr. McKenna wrote that when calibrated specific yield is used, "the estimate of Safe Yield is effectively pre-determined by the assigned recharge rate." (Ex. 61-5; TR 06/29/2026, p. 2109:2-13.)

For example, a recharge assumption of 13,000 to 15,000 AFY (Ex. 7-16) produced specific-yield values that, applied to the same water levels, produce a yield of approximately 15,000 AFY.

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The calculation cannot confirm the assumption, because it restates it. Mr. Parker's alternative runs used the specific-yield values of the Brown and Caldwell and DRI models instead, and those runs "would get a lower safe yield." (TR 06/10/2026, pp. 597:24-598:7.) The Court asked Mr. Parker whether the specific-yield values rested on "actual physical testing of each polygon as opposed to using a model that essentially predicts what the specific yield would be," and he answered, "It's more the latter." (TR 06/10/2026, pp. 544:23-546:22.) Dr. Kincaid was asked whether it concerned him that the TWG used different specific-yield values for different methods:

> [T]he thing that concerns me is that they're represented as independent assessments. And in my opinion, they are not independent assessments because they're relying on the specific yield values that are derived through modeling, which in turn relies on an estimation of recharge that is assigned to the boundary conditions of the model when it is constructed and run. So those are — that's a circular reasoning. They are not independent assessments. They are — they are very related.

(TR 06/23/2026, p. 1673:9-21.)

C. The Water Levels Were Misread, and the Experts Who Vouched for the Work Did Not Notice

Mr. Teasdale's report characterized the hydrographs at his client's wells as "[s]table to [r]ising [t]rends" suggesting "modest recovery or stability," and "a relatively strong upward trend." (Ex. 85-32.) Unfortunately, the hydrographs plot depth to water, so a larger number means the water is farther away from the land surface and therefore a lower water level. The values Mr. Teasdale believes he was reading water level measurements from sea-level. What Mr. Teasdale thought was "rising" was actually falling. (TR 06/22/2026, pp. 1515:13-1518:4.) He agreed at trial, as at his deposition, that the characterizations were inverted. "Those are not supposed to be recovery or stability. Those are decreasing; correct?" "Correct." "[I]t should be 'a relatively strong downward trend'; correct?" "Correct." (TR 06/22/2026, p. 1518:7-18.) The report in evidence was not corrected. And his opinion of safe yield using the water levels in those polygons has somehow remained unchanged.

The mistake affected Mr. Teasdale's results, as was revealed at trial. Focusing on 2022 as an example, it was noted that the record contains four different basin-wide storage change figures from Mr. Teasdale's work and the data he used. The TWG's paper reports a loss of 12,426 AF, his

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report reports a loss of 6,900 AF, the Authority's data as he compiled shows a loss of 18,001 AF, and the 2025 Periodic Evaluation shows a loss of 15,883 AF. (TR 06/22/2026, pp. 1538:1-1544:16; Ex. 9-7; Ex. 85-67; Ex. 929-37.) Asked whether the differences caused him concern, Mr. Teasdale said, "It did not, no." (TR 06/22/2026, p. 1538:17-20.) The Court then asked:

> Well, how can they be so different if they're the same year? I mean, think about it for a moment. You're asking me to accept your numbers but they're wildly different. One's half of the other and you're saying well, the specific yields are different. Why wouldn't the specific yields be the same for each year? ... I mean, as a hydrogeologist, does that ring true to you?

(TR 06/22/2026, p. 1540:11-22.)

Mr. Teasdale answered that the change in one year, from a loss of 12,000 AF to a loss of 6,900 AF, "doesn't concern me because it doesn't really impact the overall average" (TR 06/22/2026, p. 1541:2-8), and that the Meadowbrook-area specific yield had been "refined." Asked what fraction of the Basin Meadowbrook occupies, he said, "3 percent, 4 percent," and asked whether that justified spreading the change over the entire Basin, he said, "that's the data I used, Your Honor." (TR 06/22/2026, p. 1542:12-26.)

The largest difference attributable to Meadowbrook property can be found in polygon 61 in 2022–2023. Mr. Teasdale's report shows a gain of water in storage of 5,742 AF, and the TWG's paper shows a loss of 64 AF, a difference Mr. Teasdale first attributed to "different specific yield values" and then to "the water level data in the Meadowbrook Dairy area." (Ex. 85-66, Table A-3; Ex. 9-7; TR 06/22/2026, pp. 1535:7-1536:16.)

The tables show that the difference is not just specific yield. The shape and area of polygon 61 (5,859 acres) is the same for both. The TWG's paper records a 0.1-foot decline in polygon 61 for that year. (Ex. 9-7.) Mr. Teasdale's report records a 4.9-foot rise, flagged as a value "refine[d]" with "[g]roundwater level measurements from Meadowbrook Dairy wells." (Ex. 85-66 to 67, fn. b.) Those are the wells whose hydrographs Mr. Teasdale misread. (Ex. 85-32; TR 06/22/2026, pp. 1514:12-18, 1518:1-18.) He agreed that if the Meadowbrook increases "should actually be decreases," it "would reduce the groundwater storage," and he had not run the numbers to see what it would do to his safe yield. (TR 06/22/2026, pp. 1538:21-1539:4.)

Ms. Wicks testified that she reviewed Mr. Teasdale's analysis and supported it but did not

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recreate Mr. Teasdale's calculations. (TR 06/15/2026, p. 759:1-11.) When Mr. Teasdale was asked if Ms. Wicks or her colleague Dr. Yeh had come to him about the differences in mistaken water measurement readings or the difference between his polygon figures and the safe-yield paper's, he said, "nothing was identified by them." (TR 06/22/2026, p. 1537:7-15.) A review that recreates nothing, tests nothing, and fails to catch errors is not quality control. It is adoption.

In addition to the Thiessan Polygon method being inherently unreliable for a determination as important as safe yield in an adjudication, Mr. Teasdale's mistakes in collecting the data used and performing the calculation render his opinion on safe yield unreliable, and it should be disregarded.

D. <u>The Method Does Not Properly Consider the Complexity of the Basin</u>

The water-level record is the only measured input in the polygon method, and it is measured only at selected wells. The method assumes a change in one well applies equally across the entire polygon. Dr. McKenna explained that the largest polygons fall where there are the fewest wells, polygons 78, 81, and 1 in Mr. Teasdale's configuration, and that polygon area "acts like a weight," so the polygons with the least data "are getting the most weight put on them." (TR 06/29/2026, pp. 2085:19-2086:16.)

The polygons also ignore the faults. The storage-change calculation treats the Basin as one connected tank, in which a rise in water level anywhere is counted as water available to offset the decline anywhere else. The Basin is not one tank. The Technical Report finds that the Little Lake fault zone and the El Paso fault "have been shown to impede movement of groundwater within the Basin," and that the El Paso Subarea "is hydraulically separated from the main Basin by the Freeman Fault," across which groundwater elevations differ by approximately 520 feet over 3.6 miles, so that the Subarea's wells have held stable levels since 2005 and are "not affected by pumping that occurs in the main basin." (Ex. 955-14, 18.)

The GSP, the Ramboll Model's own flow barriers, and the airborne electromagnetic survey all confirm the faults' effect. (Ex. 108-36, 141; Ex. 97-67, Table 5-3; Ex. 929-33.) Dr. McKenna described the three compartments the faults create, the El Paso area, the central compartment between the unnamed fault and the Little Lake fault "where the pumping happens," and the

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discharge zone east of the Little Lake fault, and explained that the drawdowns from pumping "are quite muted or not transmitted as quickly or as strongly" across the faults. Asked by the Court how he knew, he pointed to the measured differences in water levels on either side of them. (TR 06/29/2026, pp. 2078:7-2079:21.) Dr. Kincaid explained why that defeats the method:

> [T]he change in storage method makes an assumption that the entire basin is available to the pumping that occurs at the wells. So in essence, it means that a water level change, let's take, for instance, in the El Paso subbasin, we observe groundwater levels in the El Paso subbasin. And in some cases, and in fact, many cases, we can see those groundwater levels rising. And the implication through the use of the Thiessen polygon methodology and particularly the change in storage method is that water becomes available to the drawdown of the wells and it would mitigate the drawdown that's occurring due to the pumping, and I don't believe that to be the case at all because of the faulting. ... [T]he change in storage method cannot account for that; and therefore, it overestimates the amount of water that will flow to the wells as a result of pumping.

(TR 06/23/2026, pp. 1671:23-1673:3.)

Mr. Teasdale's polygon calculations, and Mr. Parker's, subtract the basin-wide storage change from pumping, so a polygon behind a fault whose water level rises is entered as a gain, the gain cancels part of the loss measured under the pumping centers, and the yield is overstated by the water the wells never receive. Mr. Parker agreed that faults affect groundwater flow in this Basin and that "Ramboll gave no consideration to faults when they created the polygons." (TR 06/10/2026, p. 582:14-24.)

Mr. Teasdale's explanation that his first configuration followed the Authority's annual-report polygons, which align "with those fault boundaries, just to make sure you're not skewing the data because of the faults" (TR 06/17/2026, pp. 1365:22-1366:7), concedes that the faults matter without answering the problem. Drawing a boundary along a fault keeps one polygon from straddling it, but it does not change the arithmetic that follows, in which every polygon's gain or loss is summed as if the water could move freely to the wells. (See Ex. 67-33 [Brown and Caldwell discussing steepening gradient between El Paso subarea and pumping centers].)

E. <u>Results Cannot Be Reproduced</u>

The data record for the base period used for the polygon analysis is incomplete. Additionally, Mr. Teasdale stated that he and his team excluded and disregarded data that they considered to be outliers. But, there was no explanation given in either the reports or at trial

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explaining what was excluded, the basis for an exclusion, where there were data gaps, or how they were filled. The result is that Mr. Teasdale's analysis cannot be reproduced. And therefore is inherently unreliable.

Mr. Teasdale's report states that the water-level surfaces for his first approach were created "with outliers excluded." (Ex. 85-28.) He testified that he made those decisions himself, based on his "professional judgment." (TR 06/22/2026, pp. 1494:20-1495:9.) Where one well in a polygon did not follow the trend of the others, he would "in some cases disregard one of the wells." *(Id.*, p. 1486:15-18.) His report does not describe the method he used, nothing in the report or its appendix identifies the data he excluded. (*Id*., pp. 1494:14-19, 1503:15-19.)

He also filled gaps in the data. He agreed that the water-level record for 2014 through 2023 has gaps and testified that "you work around them." (TR 06/22/2026, p. 1492:6-18.) In his first approach, he created "a raster surface" of water levels across the Basin by computer interpolation from selected wells, "with outliers excluded," by a method the report does not describe, on decisions he made alone, and it used "control points,"—where "you tell the computer that the water level is at a certain level,"—in areas with no readings. (Ex. 85-28; TR 06/22/2026, pp. 1493:10-1496:17.) For his second approach, his report says that "[w]here data were missing or anomalous, linear interpolation or trend estimation was applied." (Ex. 85-29.) He agreed that his tables for that approach do not show which values were measured and which were extrapolated. (TR 06/22/2026, p. 1502:5-15.)

Mr. Teasdale acknowledged "big gaps" that add uncertainty. (TR 06/22/2026, pp. 1492:6-18, 1496:15-17.) Mr. Parker's team filled the COVID-era gaps by "drawing a line from the dots," which he admitted at trial adds uncertainty. (TR 06/10/2026, pp. 622:7-624:6.) The July 2019 earthquake also changed the water levels in six or seven polygons, which never returned to their pre-earthquake trend, and Mr. Teasdale could not say whether the net effect raised or lowered his number. (TR 06/22/2026, pp. 1449:8-18, 1454:7-12, 1458:9-16, 1495:10-17; see Section XI.B.)

The Authority's annual reports also use a polygon method, which is then checked against the model in the periodic evaluation. In each report, the Authority lists, for each polygon, the well, the specific yield, the area, and the spring depth to water in each year. It marks the readings that

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were not available and explains in its notes how those values were estimated, including the substitute wells used. (Ex. 945-74-75; TR 06/22/2026, pp. 1496:26-1499:11, 1508:8-10.) Mr. Teasdale's tables do not identify the wells or give the water-level readings, he does not identify were data was missing, how gaps were filled, or what he excluded. (Ex. 85-59-70; TR 06/22/2026, pp. 1499:17-19, 1500:21-1501:10.) Without the wells, the readings, the excluded data, and the estimated values, his calculation cannot be checked or reproduced.

Dr. Kincaid tried to test the results reported by the TWG experts directly. He downloaded the readings for the TWG's control wells from the Authority's data management system, computed the 2014–2023 changes himself, and compared them polygon by polygon with the changes the TWG reported for the same seventy-seven polygons. They "are not" the same. "[T]hey are quite different." (TR 06/23/2026, pp. 1761:2-1763:18.) Across the seventy-seven polygons, the changes Mr. Parker and Mr. Teasdale used "sum to a value that is 65.4 feet lower than what is indicated by the data included in the GSP groundwater database," and the lower values reduce the calculated storage loss "by between 23% and 30% of what would be calculated using the GSP values." (Ex. 84-3.) Dr. Kincaid concluded that "there has been a different choice of wells, and therefore, different selection of data used to determine the water level elevations in the polygons," which "is, absolutely, a form of uncertainty" that the TWG never propagated into its result. (TR 06/23/2026, pp. 1765:2-15.) The TWG offered no explanation of the difference.

The safe yield of the Basin should not be based off of the storage change analysis of either Mr. Teasdale of Mr. Parker.

XIV. DR. TONKIN'S ANALYSIS, BASED ON RAMBOLL WATER BUDGET, IS FLAWED

Dr. Tonkin offers two safe yield numbers, both based on the water budget of the Ramboll Model—14,375 AFY and 12,329 AFY. These are averages of the water budget inflows used in the Ramboll Model for the period 1980 through 2023, the first without consideration of evapotranspiration, the second subtracts the evapotranspiration calculated in the model. (Ex. 123-9, 37-38, 67; TR 06/15/2026, p. 936:20-22.) Dr. Tonkin's use of the Ramboll Model water budget is flawed because the model itself is flawed, and his decision not to consider evapotranspiration is not

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justified.

A. The Ramboll Water Budget Is Not Reliable Because the Model Is Not Reliable

As detailed above, 13% of the Ramboll Model has flooded cells the entirety of the transient period, and it failed Dr. Bedekar's no-pumping test. One possible reason for this is that the water budget being used is too high. The Ramboll Model includes anthropogenic sources of recharge. There is no evidence that these sources are recharging the principal aquifer, and therefore they should not be counted. (See Section XI.A.) The most glaring problem source is irrigation return flows. As previously addressed, even if irrigation return flows were to recharge the Basin eventually, it would approximately 122 years. (Ex. 60-31.) Meaning, groundwater used for agricultural irrigation in 1904, if any, would only now be reaching the aquifer. The Ramboll Model, however, includes some percentage of agricultural pumping as recharge in the year it is extracted. (Ex. 97-78.) This is incorrect and Dr. Tonkin should not have included these in his analysis. The same is true for the District's distribution system, Los Angeles Aqueduct leakage, and wastewater treatment ponds.

B. The Base Period Is Not Representative of Long-term Conditions

Furthermore, Dr. Tonkin base period (1980-2023) does not represent long-term conditions in the Basin. Dr. Tonkin made no effort to identify a balance hydrologic period to be used a base period, instead he just picked the period used in the Ramboll Model. (TR 06/16/2026, pp. 1073:21 - 1074:14, 1107:12 - 1108:7; TR 06/15/2023, p. 936:20-23.)

If possible, the base period should not include analogous events that could skew the results of the safe yield analysis. Dr. Tonkin's base period includes multiple. In 2023 Tropical Storm Hillary hit the Indian Wells Valley. Mr. Teasdale testified that he was not aware of a tropical storm ever hitting the Basin before. (TR 06/22/2026, pp. 1573:24-1574:12.) Including an anomalous high recharge event in the base period will artificially inflate the safe yield calculated using that period. Here, the problem is compounded because when the Ramboll Model was developed BCM data for the last quarter of 2023 had not yet been released. So Ramboll used the third quarter of 2023, the quarter of Tropical Storm Hilary, twice. (Ex. 97-69; TR 06/16/2026, pp. 1058:5-26, 1061:12-17.) Furthermore, the period includes two releases from the Los Angeles Aqueduct—2,090 AF in 2017

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and 12,699 AF in 2023. (Ex. 97-47.) In the Aqueduct's 113 year history these are the only 2 known releases. The base period should not include either the tropical storm or the releases.

Dr. Tonkin should have used a balanced base period.

C. <u>A Balanced Base Period Without Unjustifiable Anthropogenic Recharge Yields a Safe Yield Value of between 6,470 and 6,970 AFY.</u>

Dr. Tonkin's method calculated over the correct base period (1990-2015) and correcting for unjustified anthropogenic sources of recharge results in a safe yield of 6,470 AFY and 6,970 AFY.

Page 66 of Dr. Tonkin's report (Ex. 123) includes a chart listing the output files from the Ramboll model that he used in his calculation. Dr. Tonkin did a safe yield analysis for the 26 year period of 1990 - 2015 at trial using the change in storage formula: Safe Yield = ((change in storage) +/- pumping) / 26. (TR 06/16/2026, pp. 1075:134 - 1079:25.) According to the Ramboll Model, the Basin lost 375,554 AF of groundwater from 1990 through 2015. Over that same period, pumping extraction totaled 632,714 AF. The sum of the two is 257,160 AF. Divided over the 26 year base period equals 9,890 AF. (TR 06/16/2026, p, 1079:5-26.) However, the analysis is not done. As noted above, extensively, the Ramboll Model water budget includes anthropogenic sources that are not justified, and possibly contributing to the flooded cells. Dr. Tonkin testified that irrigation return flows in the Ramboll Model are between 1,600 and 2,100 AFY. (*Id*., p. 1071:17-22; see also Ex. 97-45.) Using the high and the low as bookends, and removing unjustified agricultural return flows results in a safe yield between 7,790 AFY and 8,290 AFY. (*Id*., pp. 1081:7-15.)

While that was all that was calculated at trial that should end the analysis. The amount of the remaining anthropogenic sources can be ascertained from the Ramboll Model Report: Los Angeles Aqueduct leakage is 1,000 AFY, water distribution leakage is 220 AFY, and percolation from wastewater treatment ponds is 100 AFY, for a total of 1,320 AFY. (Ex. 97-45.) Removing those additional sources brings the safe yield for the base period of 1990 to 2015 down to between 6,470 AFY and 6,970 AFY. The data necessary to make this calculation is in evidence and should be considered by the Special Master.

Dr. Tonkin did not do a loss in storage analysis in his report, instead looking only at the recharge output of the Ramboll Model and subtracting for modeled ET or not. The above analysis

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is the same, only using the loss in storage as a start includes the ET calculation. ET is also provided in Dr. Tonkin's chart and averaged 2,061 AFY for the 1990 - 2015 period. (Ex. 123-66.) That means natural inflows to the Basin in the Ramboll Model for 1990 - 2015 period were between 8,531 and 9,031 AFY, right in the range that Dr. Kincaid estimated. (Ex. 80-3, ["Total groundwater inflow to the IWVGB is between 7,200 to 9,900"].) Dr. Kincaid then opined, consistent with prior researches, that the safe yield would have to be less than total inflows to account for ET that could not be captured and ET that is needed to maintain upward gradients and prevent pollution to the basin. Dr. Kincaid reduced total inflow by 15%, which applied to the Ramboll Model natural recharge calculation would result in a safe yield of between 7,251 AFY and 7,676 AFY.

Based on the evidence a safe yield of 7,650 AFY is reasonable and should be adopted.

XV. THE SAFE YIELD MUST BE SET TO PREVENT UNDESIRABLE RESULTS

The lowering of water levels is the undesirable result identified in *San Fernando*, it is also identified in SGMA. Water levels have been falling in the Basin since the 1940s, storage has been lost every year since 1953, and the cones of depression under the pumping centers are still growing at approximately 20,000 AFY of pumping. The cone under the northwest pumping center more than tripled in area between 2010 and 2023, from 2,839 acres to 10,120 acres, and a new cone is developing in the southwest where the District relocated its wells. (Ex. 955-38, 42; Ex. 929-112, Table 4-7; TR 06/08/2026, pp. 123:3-6, 213:17-214:1.) The Basin has approximately 872 wells 200 feet deep or less. (Ex. 955-35.) Mr. Brown's shallow-well study, prepared for Mojave Pistachios, projects that at current pumping 122 of the Basin's wells will have gone dry and 228 will have required mitigation by 2070. (Ex. 204-10-11.)

A second undesirable result is poor water quality. The water in the shallow aquifer beneath the playa is highly saline, and is kept out of the principal aquifer by an upward hydraulic gradient that exists only because water still discharges at the playa. As Dr. Kincaid testified, if pumping captured the whole natural inflow, the gradient would reverse and "the water in the shallow aquifer ... would reduce the water quality in the groundwater resource if it were allowed to come in and mix." (TR 06/22/2026, pp. 1592:23-1593:25.) Dr. Kincaid' s conclusion "goes back as early as Kunkel and Chase," "was very forcefully argued by Saint-Amand," and has "been repeated by

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nearly every" study since. (TR 06/23/2026, pp. 1797:9-1798:1.) Both Kunkel and Chase, and Dutcher and Moyle stated that 1,000 AFY must be left to discharge at the playa to prevent a reversal of gradients and pollution of the principal aquifer. (Ex. 955-25.) Dr. Kincaid's proposes leaving 15% of total inflow to discharge via evapotranspiration at the playa. (Ex. 80-7, 8, 12, 21, 53.)

Dr. Tonkin, the District's modeler, agreed that the gradient beneath the playa "used to be firmly upward" and "has reduced substantially" under pumping, that it is what keeps the poor-quality water from migrating down, and that reversing it to capture the evapotranspiration would carry "that potential" for poor-quality water to move into the regional aquifer. (TR 06/16/2026, pp. 1085:15-1088:6.)

The Technical Report finds that the process is already under way. TDS "concentrations have increased over time in some of the northwest area wells where high rates of pumping may have migrated naturally occurring saline water," and "[d]egraded water quality has caused groundwater producers in the Basin to relocate pumping to areas with higher water quality." (Ex. 955-39.)

No Large Pumper witness evaluated what a safe yield of 14,300 or 15,400 AFY would do to water levels, water quality, or wells. For this reason alone those opinions must be rejected. Dr. Tonkin equated safe yield with total inflow on the express assumption "that there are no undesirable effects that are being incurred," so that "[i]n theory, you could recover all of the recharge," but he agreed on cross-examination that an undesirable result is "a chronic lowering of water levels." (TR 06/15/2026, pp. 791:2-5, 798:19-23, 925:23-26.) Mr. Parker defined safe yield as the pumping "that will not result in undesirable results" and offered no analysis of any. (TR 06/10/2026, p. 569:21-24.)

XVI. THE LARGE PUMPERS' OPINIONS WERE FORMED FOR THIS LITIGATION AND SHOULD BE WEIGHED ACCORDINGLY

The Authority does not contend that any witness testified falsely. It contends that the sequence of events, the documents, and the witnesses' own words show that the Large Pumpers' numbers were positions taken for this case, and that the Special Master and the Court, who will be

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asked to weigh "the potential bias of some of the experts depending on who they're testifying for" (TR 06/29/2026, p. 2174:20-24), should weigh them accordingly.

A. Before the Lawsuit, the Same Consultants Agreed With the Authority's Figure

In 2018, Mr. Parker (as the District's representative on the TAC) wrote that the Basin was "currently unsustainable" and that recharge should be set by the USGS's local study with uncertainty brackets, and Mr. Teasdale (as Meadowbrook's representative on the TAC) wrote that the Basin "does presently appear to be experiencing overdraft" and that the flow model "would be the most robust tool to determine sustainable yield." (Ex. 356-2; Ex. 998-9, 11.) Both agreed to the bookends and to the "consensus" to use 7,650 AFY, which Mr. Parker recorded in his own notes and Mr. Teasdale confirmed "sounds about right" and then used in his own proposed model runs. (Ex. 36-1; Ex. 962-8; Ex. 119-52-53; TR 06/09/2026, pp. 306:17-19, 309:6-16; TR 06/22/2026, p. 1560:2-7.) Searles' representative chaired the TAC throughout, the District did not dissent when the GSP was adopted, and all of it occurred in public. (Ex. 36-1; Ex. 929-68; TR 06/08/2026, pp. 223:22-224:7.)

Prior to that the District commissioned Brown and Caldwell to develop a model, with Searles and the Navy on the committee that oversaw it. (Ex. 67-2, 7.) That model could not be calibrated until recharge was reduced to about 8,800 AFY. (Ex. 67-34. 44.)

B. After the Lawsuit, the Same Consultants Produced Figures Roughly Double, and the Number Preceded the Model

After their clients sued, the same consultants left the TAC, Mr. Teasdale "because counsel told me to leave" and Mr. Parker "in conjunction ... with this filing of this adjudication," and formed the TWG within weeks to produce "results that we could defend" because "[w]e knew where this was going at that point." (Ex. 921; TR 06/22/2026, pp. 1566:7-25, 1568:25-26; TR 06/10/2026, pp. 518:11-16, 532:17-22, 533:5-11; TR 06/17/2026, p. 1357:1-6.) The group's first work product was billed as litigation support, and its safe-yield work "was not done for SGMA." (TR 06/22/2026, pp. 1512:21-1513:23; TR 06/15/2026, p. 754:16-17.)

The numbers then rose in steps that tracked the litigation rather than the data. In March 2024 Searles told the Court the safe yield "is 13,400." (ROA 1243, fn. 5.) In September 2024, a

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month after the Court set this trial, the TWG announced 14, 300 AFY, resting on "preliminary calibration runs" of a model "in progress." (Ex. 3-7; ROA 1504, p. 5.) Five months later, despite being the one that asked for this phase of trial, the model was still not done, and the District asked for more time so that a newly retained expert could confirm that "everything in there conforms with my own personal opinions before it's disclosed," prompting the Court's concern that "the expert is driving the model as opposed to the other way around." (TR 02/10/2025, pp. 35:13-18, 39:16-18.)

Dr. Tonkin and Dr. Bedekar were retained at the end of February 2025. Neither built the model or chose its inputs. Dr. Tonkin's first task was "advising on the Ramboll model," which already existed with its recharge set, and Dr. Bedekar joined at "the tail end" of calibration, recommended a change to the model's geology that Ramboll "incorporate[d]," and had "less than two months" with the model before it was produced. (TR 06/16/2026, pp. 967:9-13, 1036:11-14; TR 06/17/2026, pp. 1223:11-1224:12.) The model's specific-yield values were then "finalized," and the TWG's number rose from 14,300 to 15,400 AFY on that basis alone. (TR 06/10/2026, p. 702:7-11.) The number came first, the model was adjusted after the experts arrived, and the number moved with the model. This is consistent with Dr. Bedekar's testimony that he would fix the model without changing inflows because the model was just there to "validate that inflow." (TR 06/17/2026, p. 1208:10-19.)

In June 2025, in its Phase 1 closing brief, Meadowbrook described the Navy's claim to 6,783 AFY as an effort "to monopolize a majority of the entire water supply of a groundwater basin." (ROA 1784, p. 58.) Six thousand AFY is a majority of a supply near 7,650 AFY. It is not a majority of 15,400 AFY.

C. No New Field Data Explain the Change

Mr. Teasdale was asked what was new in his 2025 analysis, and he listed five things. They were "calibrated specific yield values from the 2025 Ramboll model"; using 150 wells rather than one per polygon; "site-specific well test data from the North Brown Road area"; pressure transducers in Meadowbrook's wells; and a separate treatment of evapotranspiration. (TR 06/17/2026, pp. 1364:3-1365:17.) None is a new measurement of the Basin's recharge. The first is an output of the litigation model. (Ex. 91-12.) The second is a different way of using the same

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public water-level records. The third is a pump test at a single site that gave a specific yield of about 0.20, a value that, on his own testimony, lowers the calculation wherever water levels are falling, and that he applied only in the polygons where he inverted the data and incorrectly showed them rising. (TR 06/22/2026, pp. 1419:2-13, 1524:15-1525:17.)

The fourth is his client's own transducer record at the wells whose hydrographs his report inverted, and the fifth is an accounting choice. Asked what made the old method unacceptable, he said that using data "from 100 years ago just seemed a bit ridiculous to me," which is a change of opinion about method, a method he previously endorsed on the TAC, not new information about the Basin. (TR 06/17/2026, p. 1359:16-18.) Dr. Tonkin and Dr. Bedekar, retained in 2025, brought no field data of their own. (TR 06/16/2026, p. 1016:19-22; TR 06/17/2026, pp. 1265:7-1266:19, 1268:1-18.)

D. <u>The Witnesses Could Not Say What They Did or When</u>

The Large Pumpers' witnesses answered readily about the Basin's geology and their reports' conclusions, but when pressed on what they had done, and when, the answers changed. Mr. Parker testified that he had asked in 2018 "for a range of up to 12,000 acre-feet per year," and "[t]hat's in my documentation," but no such document is in the record, his 2018 memorandum asks for the USGS's figure with uncertainty brackets, and his own workshop notes record consensus on 7,650 AFY. (TR 06/10/2026, p. 517:15-20; Ex. 356-2; Ex. 962-8.) Asked whether the base period he chose contained the wettest period on record, he said, "I don't recall." (TR 06/10/2026, p. 611:1-7.) Called to rebut the Technical Report, he had "not completely read it." (TR 06/10/2026, p. 496:4-12.)

Mr. Teasdale, shown his firm's June 2022 e-mails, said, "this e-mail was six-plus years ago. I don't remember this," and asked what litigation was pending when the "Litigation Support" work referenced in an email began, he said, "I'm not aware of the timing on the litigation." (TR 06/22/2026, pp. 1512:6-7, 1512:25-1513:10.) He could not recall where the 2018 bookends came from, whether DRI presented its model at the workshop he attended, or whether he had made a recommendation on how to vet the model. (TR 06/17/2026, p. 1342:4; TR 06/22/2026, pp. 1550:2-7, 1554:2-4.) Dr. Bedekar could not recall how he had set up the no-pumping simulations on which

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both of his reports rest.

The word "rigorous," or "rigor," appears twenty times in the Large Pumpers' reports and brief. (Ex. 3-6, 10, 29; Ex. 4-7; Ex. 5-39; Ex. 6-5, 7; Ex. 85-7, 22; Ex. 91-4, 8, 17; Ex. 123-6, 13; Ex. 125-5; TWG Opening Brief, pp. 21, 23, 42, 67.) No Large Pumper witness used the word on the stand, and the only witness who tried to say what made the work reliable was Mr. Teasdale, whose definition was "transparent and reproducible." (TR 06/22/2026, p. 1427:20-25.)

Measured against that definition, the work fails. The tables in Mr. Teasdale's reports do not disclose the wells or the readings, outliers were excluded by an undisclosed method, hydrographs were inverted and not corrected, and Ms. Wicks said she reviewed the calculation but did not recreate it. (TR 06/22/2026, pp. 1494:6-1495:9, 1499:13-1502:15, 1518:7-18; TR 06/15/2026, pp. 726:19-728:10, 759:1-11.) By contrast, Dr. McKenna's calculations can be reproduced by anyone "with materials that have been disclosed," and Dr. Tonkin, having reviewed one of them, pronounced it "correct." (TR 06/29/2026, p. 2159:24-26; TR 06/15/2026, p. 858:20-21.) Dr4. Kincaid' s calculations are likewise reproducible. The Authority's witnesses testified from a public record of minutes, slides, notes, and letters that are in evidence.

E. <u>The Opinions Should Be Weighed Accordingly</u>

Evidence Code section 780 permits the trier of fact to consider, in determining the credibility of a witness's testimony, "[t]he existence or nonexistence of a bias, interest, or other motive," and "[a] statement made by him that is inconsistent with any part of his testimony." (Evid. Code, § 780, subds. (f), (h).) An expert's opinion is only as good as the facts and reasons on which it is based. (*Kelley v. Trunk* (1998) 66 Cal.App.4th 519, 523.)

The Large Pumpers' witnesses gave one set of opinions in public, when their clients were participating in the Basin's management, and a different set in private, after their clients had sued over the fee and, in Mr. Teasdale's case, after counsel had told him to leave. The data did not change, and the fee did not go away. The Court has already identified what the Large Pumpers hope this proceeding will accomplish. (ROA 1465, § II.) The Special Master and the Court should treat the later opinions as what the sequence shows them to be, and should give them no weight above the range the Basin's sixty-year record supports.

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XVII. CONCLUSION

The GSP's sustainable yield of 7,650 AFY is valid as a matter of law, because no party successfully challenged it through a reverse validation action. It is also owed deference under *AquAlliance* because DWR approved it as consistent with the best available science.

The Court need not rest on the GSP's legal validity because the testimony and evidence at trial compels the same conclusion. The Basin is closed and its safe yield can be no more than its natural inflow. Every way of measuring that inflow, including sixty years of study, three independent empirical checks, a model that simulates the Basin as it is and reproduces a century of water levels, and the Basin's own falling water table, places it between approximately 7,200 and 9,900 AFY, and 7,650 AFY is a reasonable safe yield figure that is inside that range and designed to prevent undesirable results.

The Large Pumpers contend the safe yield is between 12,329 and 18,200 AFY—roughly double the DWR-approved sustainable yield—because they want to continue mining the Basin as they have for decades. Their methods and opinions are not supported by the best available data and science and should be rejected.

Dated: November 10, 2026

RICHARDS, WATSON & GERSHON
A Professional Corporation

By: _____
KYLE H. BROCHARD
Attorneys for Cross-Defendant INDIAN WELLS VALLEY GROUNDWATER AUTHORITY

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