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9  
10 **IN THE SUPERIOR COURT OF THE STATE OF ARIZONA**  
11 **IN AND FOR THE COUNTY OF MARICOPA**  
12

13 IN RE THE GENERAL ADJUDICATION  
14 OF ALL RIGHTS TO USE WATER IN  
15 THE GILA RIVER SYSTEM AND  
16 SOURCE

17 W-1 (Salt)  
18 W-2 (Verde)  
19 W-3 (Upper Gila)  
20 W-4 (San Pedro)  
21 (Consolidated)

22 Contested Case No. W1-103

23 **ARIZONA DEPARTMENT OF**  
24 **WATER RESOURCES' CLOSING**  
25 **BRIEF**

26 Special Master Susan Ward Harris

27 **CONTESTED CASE NAME:** *In re Subflow Technical Report, San Pedro River*  
28 *Watershed*

29 **DESCRIPTIVE SUMMARY:** The Arizona Department of Water Resources hereby  
30 submits its closing brief.

31 **NUMBER OF PAGES:** Fourteen

32 **DATE OF FILING:** June 30, 2021

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1 **INTRODUCTION**

2 Following the evidentiary hearing held on February 22-23, 2021, the Court requested  
3 post-hearing briefing in lieu of closing arguments. The Arizona Department of Water  
4 Resources (ADWR) believes that the Court’s February 24, 2021 Minute Entry Order  
5 identified two distinct but related issues for post-hearing briefing:

6 **Issue I:** What is the legal definition of the vertical extent of the subflow zone with  
7 respect to wells located outside the lateral boundaries of the subflow zone?

8 **Issue II:** What are the appropriate horizontal layers of the MODFLOW model that  
9 define the subflow zone?

10 ADWR addresses each of these issues below.

11  
12 **ISSUE I: What is the legal definition of the vertical extent of the subflow zone**  
13 **with respect to wells located outside the lateral boundaries of the**  
**subflow zone?**

14 ADWR has not taken a position on this issue, as Arizona courts have already legally  
15 defined the subflow zone. In 1994, the adjudication court determined that “the geologic  
16 unit which defines subflow is the ‘saturated floodplain Holocene alluvium.’” *See* Goodfarb  
17 June 30, 1994 Order at 56. The 1994 Order was affirmed by the Arizona Supreme Court  
18 “in all respects” in *Gila IV. In re Gen. Adjudication of All Rts. to Use Water in Gila River*  
19 *Sys. & Source*, 198 Ariz. 330, 344, 9 P.3d 1069, 1083 (2000) (“The subflow zone is defined  
20 as the saturated floodplain Holocene alluvium.”).

21  
22 **ISSUE II: What are the appropriate horizontal layers of the MODFLOW model**  
23 **that define the subflow zone?**

24 ADWR understands **Issue II** to question how the bottom of the subflow zone should  
25 be presented in the MODFLOW model, irrespective of how the vertical extent of the  
26

1 subflow zone has been legally defined as part of **Issue I**, above. ADWR presented evidence  
2 at the hearing on **Issue II** based on ADWR’s technical expertise.

3 On January 19, 2021, several parties to these proceedings entered into a stipulation  
4 that “ADWR should model the subflow zone as extending to the bottom of the floodplain  
5 alluvium deposits where those deposits contact basin fill and should not attempt to  
6 differentiate between the [floodplain Holocene alluvium] and [floodplain Pleistocene  
7 alluvium] deposits.” See January 19, 2021 Stipulation, paragraph 13. This stipulation was  
8 not entered into by all parties to the proceeding.

9 If the court adopts the stipulation,<sup>1</sup> ADWR provides the following points for the  
10 Court’s consideration.

11  
12 **A. The Court should allow ADWR to continue using existing data to define**  
13 **the layers of ADWR’s MODFLOW model, including a delineation of the**  
14 **vertical extent of the subflow zone.**

15 **1. ADWR is using existing data and information to build a MODFLOW**  
16 **model and plans to use existing data and information to delineate the**  
17 **bottom of the subflow zone.**

18 ADWR is currently building a regional MODFLOW model representing the  
19 hydrologic system of the Upper San Pedro River basin, which will be available for several  
20 purposes, including conducting subflow zone depletion calculations. ADWR’s model  
21 currently has three layers: 1) Layer 1, which includes Holocene and Pleistocene alluvium,  
22 and in some locations, upper basin fill; 2) Layer 2, which includes clay if the presence of  
23 clay is indicated in the area; and 3) Layer 3, which includes all geologic materials below  
24 the clay layer. Tr. at 25:7- 26:15 (Feb. 22, 2021). ADWR is using existing data and

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25 <sup>1</sup> ADWR reserves the right to present testimony on the feasibility of distinguishing between  
26 subsurface Pleistocene alluvium and Holocene alluvium in the event that the court does not  
accept the stipulation.

1 information to assess the geology of the area and to build the layers of the model. Tr. at  
2 28:13-16 (Feb. 22, 2021).

3 If requested by the Court, ADWR plans to use existing data and information to assess  
4 the subsurface materials in the Upper San Pedro River basin within the lateral subflow zone  
5 boundaries as approved by the Superior Court.<sup>2</sup> There are various types of information  
6 currently available to ADWR that will assist ADWR in delineating the vertical extent of the  
7 subflow zone consistent with the Court's direction, including well logs (drillers' logs),  
8 geotechnical logs, and geophysical logs. Tr. at 31:2-9 (Feb. 22, 2021). *See also*, Exhibit  
9 APS BHP 001, Cross October 16, 2020 Expert Report pp. 21-23.

10 **2. The evidence at trial shows that using existing data and information**  
11 **is an acceptable method for delineating the vertical extent of the**  
12 **subflow zone.**

13 During the hearing, The Salt River Project's (SRP) expert, Jon Ford, testified that he  
14 has previously used the drillers' logs and other information in ADWR's records to interpret  
15 the thickness of the subflow zone. Tr. 33:17- 38:3 (Feb. 23, 2021). Mr. Ford's  
16 interpretation of the thickness of the subflow zone based on existing data in ADWR's  
17 records was admitted in these proceedings in September of 2015. Tr. 38:9- 39:13 (Feb. 23,  
18 2021). Similarly, Arizona Public Service and BHP Copper's expert, Mark Cross, agreed  
19 that it would be acceptable to approximate the location of the bottom of the subflow zone  
20 as long as "the approximation is consistent with existing data, including drillers' logs." Tr.  
21 84:22- 85:1 (Feb. 23, 2021). *See also*, Tr. 14:3-25 (Feb. 23, 2021, PM). This testimony  
22 confirms that ADWR's use of existing data and information to delineate the bottom of the  
23 subflow zone is appropriate.

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<sup>2</sup> See Order filed July 13, 2017, Contested Case No. W1-103.

1           **B. ADWR should not be required to gather additional data by any of the**  
2           **methods proposed by the parties for the purpose of delineating the**  
3           **bottom of the subflow zone.**

4           In both Mark Cross’s October 16, 2020 Expert Report and during his testimony on  
5           behalf of BHP Copper and Arizona Public Service, Mr. Cross suggested that “identifying  
6           the base of the [floodplain Holocene alluvium] will likely require drilling and data  
7           collection from new boreholes at selected locations to refine hydrogeologic framework  
8           models and reduce uncertainties regarding the vertical extent of the [floodplain Holocene  
9           alluvium].” Exhibit APS BHP 001, Cross October 16, 2020 Expert Report p. 22. Mr. Cross  
10          also offered opinions on methods ADWR could use to identify the contact points between  
11          alluvial materials and basin-fill deposits, such as electrical resistivity and electromagnetic  
12          methods and seismic refraction. *Id.* at 23-24.

13  
14                   **1. There is no evidence that any of the methods for gathering additional**  
15                   **data recommended by the parties would achieve more certainty in**  
16                   **model results.**

17          ADWR’s experts testified that drilling a new borehole does not guarantee that a  
18          geologist would be able to delineate the contact point between alluvial materials and upper  
19          basin fill materials within that borehole. ADWR’s Chief Hydrologist Jeff Inwood testified:

20                   “...there’s no guarantee that, even if you do more drilling and go looking for  
21                   that contact, that you can necessarily find it. It’s possible, and in some places  
22                   I would expect you would. But it may not be universal every time you drill  
23                   that you’re able to make that delineation contact point.”

24          Tr. 84:13-18 (Feb. 22, 2021). ADWR’s expert Kelly Hermanson testified that “there  
25          could still be levels of uncertainty in the materials that you find while drilling.” Tr. 119: 5-  
26



1 22 (Feb. 22, 2021). This testimony was not refuted by any of the parties' experts. In fact,  
2 Mr. Cross agreed that "there's no guarantee" that the contact point between alluvial  
3 materials and basin fill could be located in every borehole. Tr. 87:10-14 (Feb. 23, 2021).

4 Secondly, geologists can disagree on ADWR's proposed delineation of the contact  
5 points between different geologic materials, and there is no way to demonstrate which  
6 geologist's opinion is more correct than another. Mr. Cross admitted that any two  
7 geologists can differ in their opinions about the location of the contact point between  
8 alluvial materials and upper basin fill materials. Tr. 88:3-6 (Feb. 23, 2021). Similarly, Mr.  
9 Ford agreed that geologists can have differing interpretations of the geologic materials  
10 described in the drillers' logs. Tr. 39:2-5 (Feb. 23, 2021). This testimony confirms that  
11 conducting a drilling operation and performing further lithologic analysis on subsurface  
12 materials will not necessarily achieve more certainty in the model results.

13 As set forth above, the evidence at trial shows that there will likely be differing  
14 opinions amongst experts regarding ADWR's proposed delineation of the bottom of the  
15 subflow zone, whether the delineation is based solely upon existing data or also incorporates  
16 lithologic data gathered pursuant to a basin-wide drilling operation. Despite the parties'  
17 experts' recognition that such an undertaking does not guarantee increased certainty in the  
18 model results, counsel for BHP Copper and counsel for Freeport Minerals continued to  
19 suggest and continued to elicit testimony regarding the efforts and costs ADWR should be  
20 required to assume for this type of project while generally ignoring the facts that this type  
21 of operation is outside of ADWR's purview and would require millions in taxpayer dollars  
22 to complete, as described more fully below. Conducting a basin-wide drilling operation  
23 that is unlikely to increase certainty in model results cannot be justified when weighed  
24 against other important considerations, such as cost and further delay of the adjudication.

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**2. ADWR does not perform the types of work proposed for gathering additional data.**

During the hearing, ADWR’s experts testified that ADWR does not conduct drilling operations. Tr. 36:11-14 and 117:20 (Feb. 22, 2021). Mr. Cross confirmed that ADWR does not conduct drilling operations. Tr. 91:3-8 (Feb. 23, 2021). ADWR’s experts also testified that ADWR does not have the ability to gather information and data using the methods that Mr. Cross has proposed and that ADWR does not perform the type of lithologic analysis that would be required. Tr. 41:9-15 and 117:8- 118:8 (Feb. 22, 2021).

**3. ADWR does not have the resources to hire another entity to perform drilling operations or other lithologic analysis.**

If the Court were to request that ADWR gather additional information and data using the methods proposed by Mr. Cross, such as drilling new boreholes and conducting lithologic analysis, it would be necessary for ADWR to subcontract with a firm or consultants to complete the work. Tr. 36:15-37:3 (Feb. 22, 2021). During the hearing, ADWR’s Chief Hydrologist Jeff Inwood testified that managing such a project is “beyond our resources capability.” Tr. 41:9-15 (Feb. 22, 2021).

Testimony at trial indicated that the costs to conduct a drilling operation and related lithologic analysis would be exorbitant. During his deposition, Mr. Cross estimated that the contractor costs for drilling one borehole of approximately 100 feet in depth would be “in the range of \$10-15,000.” Tr. 114:10- 115:21 (Feb. 22, 2021). ADWR’s expert, Kelly Hermanson, testified that based on her experience working on drilling operations, she estimated the total project costs for drilling and collecting the data from one hole to be “between \$50-70,000.” Tr. 117:8- 118:17 (Feb. 22, 2021). Mr. Cross agreed that Ms.

1 Hermanson’s estimate included related project costs that Mr. Cross’s estimate did not  
2 account for. Tr. 88:7- 91:2 (Feb. 23, 2021).

3 Testimony at trial also indicated that the San Pedro River is more than 150 miles  
4 long and that drilling more than ten new boreholes would likely be necessary, which would  
5 result in millions of taxpayer dollars being spent for this type of project. Tr. 118:18- 119:4  
6 (Feb. 22, 2021). In addition to the exorbitant costs, securing legal access to drill boreholes  
7 on private lands within the subflow zone creates another barrier for conducting a drilling  
8 operation. Tr. 36:15-22 (Feb. 22, 2021). ADWR staff designated to manage this type of  
9 project would be largely unavailable to assist with other tasks for the Adjudication Court or  
10 in furtherance of ADWR’s other statutory duties. Such an undertaking would likely take  
11 several years of work and would require millions in taxpayer dollars over multiple budget  
12 cycles to complete, resulting in further delay of the adjudication.

13 **C. The owner of a well may rebut the presumption that the well is depleting**  
14 **the subflow zone.**

15 The expenditure of taxpayer resources necessary to implement the methods proposed  
16 by the parties are even more unjustified considering the alternative available to individual  
17 well owners. Once the Court approves a delineation for the bottom of the subflow zone for  
18 model construction, depletion calculations may create a *rebuttable* presumption that a well  
19 is depleting the subflow zone if the well is found to be pulling water from the layer  
20 designated as the subflow zone in the model. The presumption that a particular well is  
21 depleting the subflow zone may be rebutted by a preponderance of the evidence.

22 In 1994, Judge Goodfarb recognized that “the entire process of the adjudication  
23 requires that the independent evaluations of ADWR are entitled to a presumption in their  
24 favor and the property owner or an objector to a claim supported by an HSR has the duty to  
25 come forward with evidence to overcome that presumption.” *See* Goodfarb June 30, 1994  
26

1 Order at 63. The court also recognized that given the nature of ADWR’s work regarding  
2 subflow, there will necessarily be questions concerning “the quality of geologic or  
3 hydrologic opinion, the frequent lack of data, and the many assumptions which cannot be  
4 fully proven.” *Id.* In light of these considerations, the court reduced the burden of proof for  
5 property owners or objectors to a “preponderance of the evidence” standard. *Id.*

6 In *Gila IV*, the Arizona Supreme Court affirmed the June 30, 1994 Order “in all  
7 respects”, and specifically held:

8  
9 “...a well pumping underground water is presumed initially to be pumping  
10 percolating groundwater, not appropriable subflow. When DWR determines  
11 and establishes that a well is in the subflow zone by using the pertinent  
12 criteria or that it is pumping subflow by reason of its cone of depression,  
13 DWR provides clear and convincing evidence of that fact. *See Gila River II*,  
14 175 Ariz. at 392, 857 P.2d at 1246. The burden then shifts to the well owner  
15 to show that a well is either outside the subflow zone or is not pumping  
16 subflow.” *Id.*

17 *In re Gen. Adjudication of All Rts. to Use Water in Gila River Sys. & Source*, 198 Ariz. 330,  
18 343, 9 P.3d 1069, 1082 (2000). “Given the strong initial presumption that a well is pumping  
19 percolating groundwater, we agree with the trial court that a preponderance of the evidence  
20 standard is more appropriate and should apply to well owners’ efforts to rebut DWR’s  
21 determination that a well is pumping subflow.” *Id.*

22 If a well owner questions the determination that their well is depleting the subflow  
23 zone, the well owner is best suited to provide information about his or her well to rebut the  
24 presumption. Addressing such issues on a case-by-case basis is a much more effective use  
25 of taxpayer dollars than conducting a basin-wide drilling operation, as depletion  
26 calculations may not be at issue in every case and the delineation may not be challenged by  
every well owner.

1 **CONCLUSION**

2 Based on the foregoing, ADWR respectfully requests that the Court allow ADWR  
3 to delineate the vertical extent of the subflow zone within the MODFLOW model using  
4 existing data and information. The limited potential for additional certainty in isolated cases  
5 cannot justify the extensive taxpayer resources, potentially requiring millions of taxpayer  
6 dollars for private contractors and multiple years of ADWR's time, to conduct drilling  
7 operations throughout the 150-mile river basin. Rather, if the Court allows ADWR to rely  
8 on existing data and information to delineate the vertical extent of the subflow zone for  
9 purposes of the model, the rebuttable presumption that results may then be challenged on a  
10 case-by-case basis with information specific to a particular well. This outcome is more  
11 efficient and effective and would allow ADWR, the parties, and the Court to move the  
12 process forward.

13 **RESPECTFULLY SUBMITTED** this 30th day of June, 2021.

14 ARIZONA DEPARTMENT OF WATER  
15 RESOURCES

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19 **ORIGINAL** of the foregoing sent by  
20 first-class mail on June 30, 2021, to:

21 Clerk of the Maricopa Superior Court  
22 Attn: Water Case  
23 601 W. Jackson Street  
24 Phoenix, Arizona 85003

25 **COPY** of the foregoing sent by  
26 first-class mail on June 30, 2021, to:

1 Special Master Susan Ward Harris  
2 Maricopa County Superior Court  
3 Central Court Building  
4 201 West Jefferson Street, Suite 3A  
5 Phoenix, AZ 85003-2205

6 **COPIES** of the foregoing sent by first-class  
7 mail on June 30, 2021 to all parties on the  
8 court-approved mailing list for Contested Case  
9 No. W1-103.

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