Notice and Agenda
Regular Meeting of the Beaumont Basin Watermaster

Wednesday, December 7, 2022 at 11:00 a.m.

Meeting Location:
Beaumont-Cherry Valley Water District
560 Magnolia Avenue • Beaumont, California 92223

This meeting is hereby noticed pursuant to California Government Code Section 54950 et. seq.

Members of the Watermaster Committee:

City of Banning
City of Beaumont
Beaumont-Cherry Valley Water District
South Mesa Water Company
Yucaipa Valley Water District

COVID-19 NOTICE

This meeting of the Watermaster Committee is open to the public who would like to attend in person. COVID-19 safety guidelines are in effect pursuant to the Cal/OSHA COVID-19 Prevention Emergency Temporary Standards and the California Department of Public Health Recommendations

- **Face coverings are recommended for all persons and should be properly worn over the nose and mouth at all times**
- **Maintain 6 feet of physical distancing from others in the building who are not in your party**

Online Meeting Participation Link:
https://us02web.zoom.us/j/81638720446?pwd=UnNZcC9TbGZzTGFuMHdhVkRMblczQT09

Telephone: (669) 900-9128 / Meeting ID: 816-3872-0446 / Passcode: 636756
One-Tap Mobile: +16699009128,,81638720446#,,,,*636756#

*For Public Comment, use the **"Raise Hand"** feature if on the video call when prompted, if dialing in, please **dial *9 to "Raise Hand"** when prompted*

Meeting materials are available on the Watermaster website:
https://beaumontbasinwatermaster.org/

BEAUMONT BASIN WATERMASTER COMMITTEE – DECEMBER 7, 2022

I. Call to Order

II. Roll Call

Committee Member Agency	Primary Representative		Alternate	
City of Banning	Arturo Vela, Chair		VACANT	
City of Beaumont	Jeff Hart		Robert Vestal	
Beaumont-Cherry Valley Water District	Daniel Jaggers		Mark Swanson	
South Mesa Water Company	VACANT		Dave Armstrong	
Yucaipa Valley Water District	Joseph Zoba		Jennifer Ares	

III. Pledge of Allegiance

IV. Public Comments At this time, members of the public may address the Beaumont Basin Watermaster on matters within its jurisdiction; however, no action or discussion may take place on any item not on the agenda. To provide comments on specific agenda items, please complete a Request to Speak form and provide that form to the Secretary prior to the commencement of the meeting, or, RAISE HAND electronically or Press *9 when prompted for public comment.

ACTION ITEMS

Action may be taken on any item on the agenda.

V. Consent Calendar

A. Resolution 2022-08: Authorizing Public Meetings to be Held via Teleconferencing Pursuant to Government Code Section 54953(e) and Making Findings and Determinations Regarding Same [Memorandum No. 22-29, Page 6]

B. Meeting Minutes

   a. October 5, 2022 Regular Meeting [Page 9]

C. Status Report on Water Level Monitoring throughout the Beaumont Basin through November 15, 2022 [Page 15]

D. A Comparison of Production versus Extraction Credits through October 2022 [Page 26]

VI. Reports

A. Report from Engineering Consultant - Hannibal Blandon, ALDA Engineering

B. Report from Hydrogeological Consultant - Thomas Harder, Thomas Harder & Co.

C. Report from Administrative Consultant – Steve Stuart, Dudek

D. Report from Legal Counsel - Thierry Montoya/Keith McCullough, Alvarado Smith [Page 28]

VII. Discussion Items

A. Resolution 2022-__: To Amend Section 3 of the Rules and Regulations of the Watermaster adding Groundwater Level Measuring and Reporting Procedures [Memorandum No. 22-30, Page 117]

Recommendation: Adopt Resolution 2022-__

B. Letter of Support for Beaumont-Cherry Valley Water District's Urban Community Drought Relief Grant Application [Memorandum No. 22-31, Page 152]

Recommendation: Approve the Letter of Support

C. Meeting Teleconferencing Procedures [Memorandum No. 22-32, Page 157]

Recommendation: Direct staff as desired

D. Task Order No. 2 for Groundwater Level Monitoring Services in 2023 [Memorandum No. 22-33, Page 163]

Recommendation: Approve Task Order No. 2 for a sum not to exceed $28,370

VIII. Topics for Future Meetings

A. Procurement Policy

B. Evaluation of Storage Issues in the Basin (tabled from 12/2/2021 meeting)

C. Development of a methodology and policy to account for groundwater storage losses in the basin / groundwater management

D. Incidental discharge

E. Development of a Recycled Water Policy

F. Development of a return flow accounting policy

IX. Comments from the Watermaster Committee Members

X. Announcements

A. The next regular meeting of the Beaumont Basin Watermaster is scheduled for Wednesday, February 1, 2023, at 11:00 a.m.

B. Future Meeting Dates:

- April 5, 2023 at 11:00 a.m.
- June 7, 2023 at 11:00 a.m.
- August 2, 2023 at 11:00 a.m.
- October 4, 2023 at 11:00 a.m.
- December 6, 2023 at 11:00 a.m.

XI. Adjournment in Memory of George Jorritsma

NOTICES

AVAILABILITY OF AGENDA MATERIALS - Agenda exhibits and other writings that are disclosable public records distributed to all or a majority of the members of the Beaumont Basin Watermaster Committee in connection with a matter subject to discussion or consideration at an open meeting of the Committee are available for public inspection in the Office of the Watermaster Secretary, at 560 Magnolia Avenue, Beaumont, California ("Office"). If such writings are distributed to members of the Committee less than 72 hours prior to the meeting, they will be available on the Committee website at the same time as they are distributed to Members: website: https://beaumontbasinwatermaster.org/.

REVISIONS TO THE AGENDA - In accordance with §54954.2(a) of the Government Code (Brown Act), revisions to this Agenda may be made up to 72 hours before the Board Meeting, if necessary, after mailings are completed. Interested persons wishing to receive a copy of the set Agenda may pick one up at the Office, located at 560 Magnolia Avenue, Beaumont, California, or download from the website up to 72 hours prior to the Meeting.

REQUIREMENTS RE: DISABLED ACCESS - In accordance with §54954.2(a), requests for a disability related modification or accommodation, including auxiliary aids or services, in order to attend or participate in a meeting, should be made to the Office, at least 48 hours in advance of the meeting to ensure availability of the requested service or accommodation. The Office may be contacted by telephone at (951) 845-9581, email at info@bcvwd.org or in writing to the Beaumont Basin Watermaster Committee, c/o Beaumont-Cherry Valley Water District, 560 Magnolia Avenue, Beaumont, California 92223.

CERTIFICATION OF POSTING

A copy of the foregoing notice was posted near the regular meeting place of the Beaumont Basin Watermaster Committee and to its website at least 72 hours in advance of the meeting (Government Code §54954.2(a)).

Consent Calendar

BEAUMONT BASIN WATERMASTER
MEMORANDUM NO. 22-29

Date:	December 7, 2022
From:	Dan Jaggers, Secretary
Subject:	Consideration of Resolution No. 2022-08: Authorizing Public Meetings to be Held via Teleconferencing Pursuant to Government Code Section 54953(e) and Making Findings and Determinations Regarding Same
Recommendation:	Adopt Resolution No. 2022-08

This item has been placed on the agenda so that the Watermaster Committee can continue to meet via teleconference pursuant to the special Brown Act requirements outlined in AB 361. These requirements give local public agencies greater flexibility to conduct teleconference meetings when there is a declared state of emergency and either social distancing is mandated or recommended, or an in-person meeting would present imminent risks to the health and safety of attendees.

To continue to hold meetings under the special teleconferencing requirements, a legislative body of a local public agency must make two findings pursuant to Government Code Section 54953(e)(3). First, there must be a declared state of emergency and the legislative body must find that it has "reconsidered" the circumstances of such emergency. Second, the legislative body must find that such emergency continues to directly impact the ability of the legislative body's members to meet in person. Alternatively, for the second finding, the legislative body must find that state or local officials continue to impose or recommend social distancing measures. These findings must be made within 30 days after the legislative body teleconferences for the first time under AB 361 and on a monthly basis thereafter.

The Committee may consider the following findings:

1. The state of emergency due to the spread of COVID-19 in California as proclaimed by Governor Gavin Newsom on March 4, 2020, is still in effect

2. The California Department of Public Health recommends indoor masking

3. Cal/OSHA has issued Emergency Temporary Standards for Requirements to Protect Workers from Coronavirus which include recommendations for social distancing

RESOLUTION NO. 2022-08

A RESOLUTION OF THE BEAUMONT BASIN WATERMASTER AUTHORIZING PUBLIC MEETINGS TO BE HELD VIA TELECONFERENCING PURSUANT TO GOVERNMENT CODE SECTION 54953(E) AND MAKING FINDINGS AND DETERMINATIONS REGARDING SAME

WHEREAS, the Beaumont Basin Watermaster (BBWM) is committed to preserving public access and participation at its meetings which are open and public, as required by the Ralph M. Brown Act (Cal. Gov. Code 54950 – 54963), so that any member of the public may attend, participate, and observe; and

WHEREAS, pursuant to Assembly Bill 361 effective September 16, 2021, the Brown Act, Government Code section 54953(e), makes provisions for remote teleconferencing participation in meetings by members of a legislative body, without compliance with the requirements of Government Code section 54953(b)(3), subject to the existence the following conditions:

1. The legislative body holds a meeting during a proclaimed state of emergency, and state or local officials have imposed or recommended measures to promote social distancing.
2. The legislative body holds a meeting during a proclaimed state of emergency for the purpose of determining, by majority vote, whether as a result of the emergency, meeting in person would present imminent risks to the health or safety of attendees.
3. The legislative body holds a meeting during a proclaimed state of emergency and has determined, by majority vote, that, as a result of the emergency, meeting in person would present imminent risks to the health or safety of attendees.

WHEREAS, such conditions now exist in the area of jurisdiction of the Beaumont Basin Watermaster, specifically, a State of Emergency was proclaimed by California Governor Gavin Newsom on March 4, 2020 due to an outbreak of the COVID-19 respiratory illness due to a novel coronavirus; and

WHEREAS, the Riverside County / Riverside University Health System - Public Health has documented great spread of the coronavirus in the County of Riverside; and

WHEREAS, the California Department of Public Health has asserted that indoor settings are especially high risk for transmission, and that the COVID-19 respiratory illness continues to present imminent risk to health and safety of attendees at meetings; and

WHEREAS, the Centers for Disease Control and Prevention continue to advise that COVID-19 spreads more easily indoors than outdoors and that people are more likely to be exposed to COVID-19 when they are closer than six feet apart from others for longer periods of time; and

WHEREAS, the Watermaster Committee does hereby find that given the continued proclaimed state of emergency by the Governor of the State of California, and that the sustained transmission rate of coronavirus has caused, and will continue to cause, conditions of peril to the safety of persons within the area of the Beaumont Basin; and

WHEREAS, the Watermaster does hereby find that the legislative bodies of the BBWM shall conduct meetings without compliance with paragraph (3) of subdivision (b) of Government Code section 54953, as authorized by subdivision (e) of section 54953, and that such legislative bodies shall comply with the requirements to provide the public with access to the meetings as prescribed in paragraph (2) of subdivision (e) of section 54953; and

WHEREAS, BBWM will assure the right of the public to attend public meetings and address the Committee by continuing to provide teleconferencing access to meetings to the public via an identified call-in / internet-based option, allowing a public comment opportunity at meetings as required by the Brown Act; and

WHEREAS, in the event of a disruption in teleconferencing capability, the Watermaster Committee will take no action on agenda items until the technology issue is resolved,

NOW, THEREFORE, BE IT RESOLVED, by the Beaumont Basin Watermaster Committee that:

1. Recitals. The Recitals set forth above are true and correct and are incorporated into this Resolution by this reference.

2. Governor's Proclamation of a State of Emergency. The Committee members hereby acknowledge the proclamation of State of Emergency made on March 4, 2020.

3. Remote Teleconference Meetings. The members of the Watermaster Committee are hereby authorized and directed to take all actions necessary to carry out the intent and purpose of this Resolution including, conducting open and public meetings in accordance with Government Code section 54953(e) and other applicable provisions of the Brown Act.

4. Effective Date of Resolution. This Resolution shall take effect immediately upon its adoption and shall be effective for 30 days.

PASSED AND ADOPTED this _____ day of _____, 2022 by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

BEAUMONT BASIN WATERMASTER

BY: _____

ART VELA, CHAIR
BEAUMONT BASIN WATERMASTER

Record of the Minutes of the
Beaumont Basin Committee Meeting of the
Beaumont Basin Watermaster
Regular Meeting
Wednesday, October 5, 2022

Meeting Location:

Beaumont-Cherry Valley Water District
560 Magnolia Ave.
Beaumont, CA 92223

I. Call to Order

Chair Arturo Vela called the meeting to order at 11:04 a.m.

II. Roll Call

City of Banning	*Arturo Vela*	*Present*
City of Beaumont	*Jeff Hart*	*Present*
Beaumont-Cherry Valley Water District	*Dan Jaggers*	*Present*
South Mesa Water Company	*David Armstrong*	*Present*
Yucaipa Valley Water District	*Joseph Zoba*	*Present*

Hannibal Blandon and Thomas Harder were present as engineers for the BBWM.
Thierry Montoya was present as BBWM legal counsel.

Members of the public who registered and / or attended:
Joyce McIntire, Yucaipa Valley Water District
Lonni Granlund, Yucaipa Valley Water District
Lance Eckhart, San Gorgonio Pass Water Agency
Ron Duncan, San Gorgonio Pass Water Agency
Steve Stuart, Dudek
Mark Swanson, Beaumont-Cherry Valley Water District
James Bean, Beaumont-Cherry Valley Water District
Robert Rasha, Beaumont-Cherry Valley Water District
Cenica Smith, Beaumont-Cherry Valley Water District

III. Pledge of Allegiance

Chair Vela led the pledge.

IV. Public Comments:

None.

V. Consent Calendar

A. Resolution 2022-07: Authorizing Public Meetings to be Held via Teleconferencing Pursuant to Government Code Section 54953(e) and Making Findings and Determinations Regarding Same

B. Meeting Minutes
   a. August 3, 2022 Regular Meeting

C. Status Report on Water Level Monitoring throughout the Beaumont Basin through September 19, 2022

D. A Comparison of Production versus Extraction Credits through August 2022

It was moved by Member Zoba and seconded by Member Jaggers to approve Consent Calendar items A – D.

AYES:	Hart, Armstrong, Swanson, Vela, Zoba
NOES:	None
ABSTAIN:	None
ABSENT:	None
STATUS:	Motion Approved

VI. Reports

A. Report from Engineering Consultant – Hannibal Blandon, ALDA Engineering

Mr. Blandon reported on new equipment installation and an error on spreadsheet no. 2, which has been corrected.

B. Report from Hydrogeological Consultant – Thomas Harder, Thomas Harder & Co.

No report.

C. Report from Administrative Consultant

No report.

D. Report from Legal Counsel – Thierry Montoya, Alvarado Smith

Mr. Montoya discussed the process to update Watermaster Committee members.

VII. Discussion Items

A. Consideration of Proposals and Award of Contract to Provide Professional Engineering Services to the Beaumont Basin Watermaster

Recommendation: Award Contract to Thomas Harder & Company for Professional Engineering Services for a sum of $315,805 and send invoices to each Watermaster Committee member for 20% of the approved amount

Member Hart reported that the RFP was released on August 4, 2022 with bids due on September 16. One response was received from Thomas Harder and Company and Mr. Stuart prepared a scoring matrix.

Mr. Jaggers thanked Harder and Associates and Mr. Blandon for submitting a proposal and said he believed their work to date has aligned with the Watermaster activities. The proposal touched on the bulk of the RFP items, he noted.

Mr. Hart indicated that the cost seems fair and is tantamount to historical costs given an increase related to determination of the safe yield.

Chair Vela concurred and invited public comment. There was none.

It was moved by Member Zoba and seconded by Member Jaggers to approve the award of a contract to Thomas Harder & Company for Professional Engineering Services for a sum of $315,805 and send invoices to each Watermaster Committee member for 20% of the approved amount.

AYES:	Hart, Armstrong, Swanson, Vela, Zoba
NOES:	None
ABSTAIN:	None
ABSENT:	None
STATUS:	Motion Approved

B. Draft Groundwater Water Well Level Measuring Procedures

Recommendation: Review, Comment, and Provide Direction Regarding Subject Item

Member Jaggers advised that Mr. Stuart had looked at the procedures, provided comments and added value. This activity began with some comments made regarding well monitoring activities, he reminded. The effort is to formalize procedures on behalf of the Watermaster to have repeatability and to provide some assured guidance that things are done consistently. For the Watermaster monitoring, this gets the job done, and for the member agencies some best management practices were shared, Jaggers added.

A final step will be to prepare a resolution to adopt the proposed changes to the Rules and Regulations, Jaggers suggested.

Chair Vela expressed appreciation and said the City of Banning field staff is comfortable with the procedures and requirements.

Member Zoba pointed out that Yucaipa Valley Water District (YVWD) would be installing injection wells rather than extraction wells and pointed to Section B. He suggested taking time before the next meeting to address injection wells and whether that water level data is useful.

Member Jaggers acknowledged Zoba's point and advised that the project is now being spearheaded by Mr. Stuart, but he would be happy to participate. He suggested that since other recharge basins are being considered in the Beaumont Basin, it should be determined if there is enough monitoring to accurately reflect what the groundwater level is doing in areas of influence and how it might be managed to assure ongoing understanding and to have ways to level the recharge or extract under the mound with nearby wells.

Zoba indicated he was comfortable with monitoring the ASR wells but cautioned that the data relative to the mound must not impact the data negatively. He acknowledged that more monitoring is needed around the Basin, especially on the west side.

Comments should be sent to Mr. Stuart.

Mr. Eckhart advised that a recently approved contract between the San Gorgonio Pass Water Agency (SGPWA) and the US Geological Survey (USGS) addressed data gaps on the west side, which should be useful to everyone. He suggested collaboration with Mr. Stuart.

Mr. Blandon pointed out that monitoring well measurement requires ceasing pumping for 24 hours and asked how that would be coordinated.

Member Jaggers noted that the related guideline C reads, "wherever possible" and advised that stopping production would not likely be possible in the summertime, but if coordinated in advance there may be an opportunity to rest the well in advance in the spring and fall. The idea is to collect the best data possible, but in reality, with heavy reliance on extraction wells that may not be achieved. As more redundancy is created, it may become more of a reality, he stated.

Mr. Blandon pointed out that USGS has been using a number of wells on the west side but when some of the owners were approached, they showed reluctance to having a formal contract to install monitoring equipment. Jaggers suggested collaboration with SGPWA.

VIII. Topics for Future Meetings

A. Monitoring of future west side well sites and methodologies, and potential collaboration with USGS

B. Draft Groundwater Water Well Level Measuring Procedures

C. Procurement Policy

D. Evaluation of Storage Issues in the Basin (tabled from 12/2/2021 meeting)

E. Development of a methodology and policy to account for groundwater storage losses in the basin / groundwater management

F. Incidental discharge

G. Development of a Recycled Water Policy

H. Development of a return flow accounting policy

IX. Comments from the Watermaster Committee Members

Member Armstrong advised that South Mesa Water Company will be making a change to its representation on the Watermaster Committee. Member Jaggers acknowledged the long-term commitment and contributions of Member Jorritsma.

X. Announcements

a. The next regular meeting of the Beaumont Basin Watermaster is scheduled for Wednesday, December 7, 2022 at 11:00 a.m.

b. Future Meeting Dates:

i. February 1, 2023 at 11:00 a.m.
ii. April 5, 2023 at 11:00 a.m.
iii. June 7, 2023 at 11:00 a.m.

XI. Adjournment

Chairman Vela adjourned the meeting at 11:24 a.m.

Attest:

_____
Daniel Jaggers, Secretary
Beaumont Basin Watermaster

BEAUMONT BASIN WATERMASTER

Date: December 7th, 2022

From: Hannibal Blandon, ALDA Inc.

Subject: Status Report on Water Level Monitoring throughout the Beaumont Basin through Nov 15, 2022

Recommendation: Presentation - No recommendation.

At the present time, there are 15 monitoring wells equipped with pressure transducers collecting water level information on an hourly basis at various locations throughout the basin. Since the last report, four monitoring wells have been equipped with new probes and communications cables. In addition, there are two monitoring probes collecting barometric pressures at opposite ends of the Beaumont Basin. The location of active monitoring wells is depicted in the attached Figure No. 1. The location of two potential monitoring wells currently being considered are identified in red in this figure.

Water levels at selected locations are depicted in Figures 2 through 7 and are described as follows:

- ✓ Figure No. 2 – Water levels at YVWD Well No. 34 and Oak Valley Well No. 5 are considered representative of basin conditions in the Northwest portion of the basin. Through the summer of 2019 water levels at these two wells have been fairly steady; however, over the last three years a significant declined has been observed. A 16-foot decline has been recorded at YVWD 34 over this period. The decline at Oak Valley 5 has been steeper with a drop 24 feet in the first half of 2020 despite the fact that this well has not been pumped since the fall of 2019. Oak Valley 5 is no longer being monitored, as of the Summer of 2020, as it has been destroyed. A new monitoring probe and communications cable has been installed at YVWD No. 34.

- ✓ Figure No. 3 – Two of the Noble Creek observation wells are presented in this figure representing the shallow and deep aquifers. From the summer of 2016 through the spring of 2018, the water level in the shallow aquifer monitoring well increased over 80 feet to an elevation of 2,422 ft. Water level continued to increase, although at a lower rate, over the ensuing 18 months reaching a peak elevation of 2,431 ft in the fall of 2019. Since, it has declined 80 feet to the current elevation of 2,344 ft. A decline of nine feet has been recorded since our previous visit in late September 2022. In the deeper aquifer, the increase in water level was steady from the summer of 2016 through the spring of 2020 reaching a peak elevation of 2,302 ft.; a decline of 42 feet has been recorded since to the current elevation of 2,257 ft with over half of the decline taking place over the last eight months. The decline in water level at this well has steepen in the last four months. It should be noted that the ground elevation for these two wells obtained from Google Earth has changed. The initial elevation of 2,741 ft has changed to 2,746 ft. While the actual elevation may be close to these values, it is recommended that all monitoring wells be surveyed to use the same and consistent datum.

- ✓ Figure No. 4 – Southern Portion of the Basin. The water level at the Summit Cemetery well is highly influenced by a nearby pumping well that is used to irrigate the cemetery grounds. Since monitoring began, the water level at this well has fluctuated over a 20-foot band. During the March and May 2022 visits, the water level probe and communications cable did not work and the collected information could not be extracted. During our July visit, it was determined that the site had been vandalized as both the communications cable and probe were removed. New water level monitoring equipment was installed at the beginning of October at this well and the site has been secured to minimize future vandalism.

- ✓ Also depicted in Figure No. 4 is the water level at the Sun Lakes well site. Water level at this site has fluctuated minimally between 2015 and the end of 2021, when it began to drop. Between November 2021 and May, 2022, the water level at this well dropped by eight feet to 2,405 ft. Water level information could not be retrieved from this well during our last two visits due to equipment malfunctioning. A new communications cable and recording probe were installed in early October at this location.

- ✓ Figure No. 5 illustrates water levels at three wells owned by the City of Banning in the Southeast portion of the basin. While water level at the Old Well No. 15 (Chevron Well) has been fairly flat over the last six years, a somewhat significant and steady decline, close to 39 feet, has been recorded at Banning M-8 between the summer of 2015 and the present to its current elevation of 2,040 ft. Water level at Banning M-9 has fluctuated in a 19-foot range, between 2,128 ft and 2,147 ft. Current water level elevation is at 2,133 ft. in the lower part of the range. While the water level probe has been collecting data hourly at this well, over the last year, two communications cables have been replaced at this well due to the failure of the water seal at the bottom of the cable. A new replacement cable was installed during our November visit.

- ✓ Figure No. 6 illustrates recorded water level at BCVWD No. 2 and BCVWD No. 25. Water level at these two wells follow the same seasonal pattern rising in the fall through the spring months and falling during the summer as production increases. The water level at BCVWD No. 25 has been fluctuating over a 15 ft range between 2,200 ft and 2,215 ft in elevation; however, this summer it has declined more than normal to the current elevation of 2,195 ft. Water level at BCVWD No. 2 was previously reported in the 2,160 ft to 2,180 ft in elevation; approximately 35 ft lower than those recorded at BCVWD No. 25. In January 2017, the measuring location at BCVWD No. 2 was changed from a side port to the center of the well. Prior to 2017, recorded water levels were inconsistent as variations of 50 ft or more were recorded from one day to the next without a plausible explanation. At that time, a series of constants were introduced in the spreadsheet to adjust these variations and develop a water level pattern; ultimately, recorded levels prior to 2017 were discarded. After the probe was relocated to the center of the well, inadvertently one of the constants was not removed from the spreadsheet resulting in 35 ft lower levels. This error has been corrected and level adjusted, as depicted in this figure. Water level at BCVWD No. 2 is correctly displayed at 2,193 ft slightly below the water level elevation at BCVWD No. 25.

- ✓ Figure No. 7 depicts the recorded water level at the two newest observation wells, BCVWD No. 29 and Tukwet Canyon Well "B". BCVWD No. 29 is a pumping well that is now more actively used to meet peak summer demands. A decline in water level of nine feet has been recorded at this well since monitoring began in the spring of 2019. During the May

2021 visit, the communications cable could not be pulled and information from the water level probe could not be downloaded as reported in the June and August meetings. During our January 2022 visit, the water level meter got lodged between the pump column and the well casing and could not be removed; it has been there since. There is a chance that the water level meter may not be recovered until the column is pulled from the well and the equipment recovered. Tukwet B is a dedicated monitoring well in the southern portion of the basin with minimal fluctuations in elevation since the probe was installed in the spring of 2019. Current water level elevation is at 2,213 ft representing a decline of two feet since monitoring began.

New Monitoring Wells

No additional monitoring wells were added during this reporting period.

Equipment Installation and Replacement

During the August 2022 regular Watermaster Committee meeting, replacement water level monitoring probes and communications cables were requested for YVWD No. 34, Sun Lakes, and Summit Cemetery wells. Both components, communications cable and probes, are needed for these three wells as the old type of communication cable is no longer manufactured by Solinst Canada. Solinst now uses a new optical reader that is not compatible with the original probes installed.

In addition, a communications cable of the new optical type was ordered to replace the existing communications cable at Banning M-9. This cable has been replaced twice before as the water seal at the lower end of the cable continues to fail. Solinst continues to assure us that their new optical readers have been improved; however, we continue to experience failure at this location.

The equipment at Sun Lakes and Summit Cemetery was replaced in early October. Monitoring equipment at YVWD No. 34 and Banning M-9 was replaced during our November visit.

Troubleshooting Issues

The following malfunctioning issues were encountered during our field visit.

1.- Water level information at Banning M-8 could not be retrieved during our November visit as both the communications cable and probe were not working. After pulling them out of the well, the cable was tested and communication established. A new water level probe was installed and lowered into the well; however, we could not communicate with it as the communications cable does not work when inside the well presumably due to stretching and lost of electric contact with the probe. Water level information continues to be collected, but the cable will need to be replaced in the future.

2.- A new communications cable and water level monitoring probe needs to be ordered for the Mountain View monitoring well. This well was selected earlier in the year after Bonita Vista No. 2 collapsed and could no longer be used as a monitoring well. While this is not an optimal location due to the presence of a production well nearby, the data acquired could be cleaned and used to establish static conditions. A 150-ft communications cable is recommended for this site.

Potential Monitoring Sites

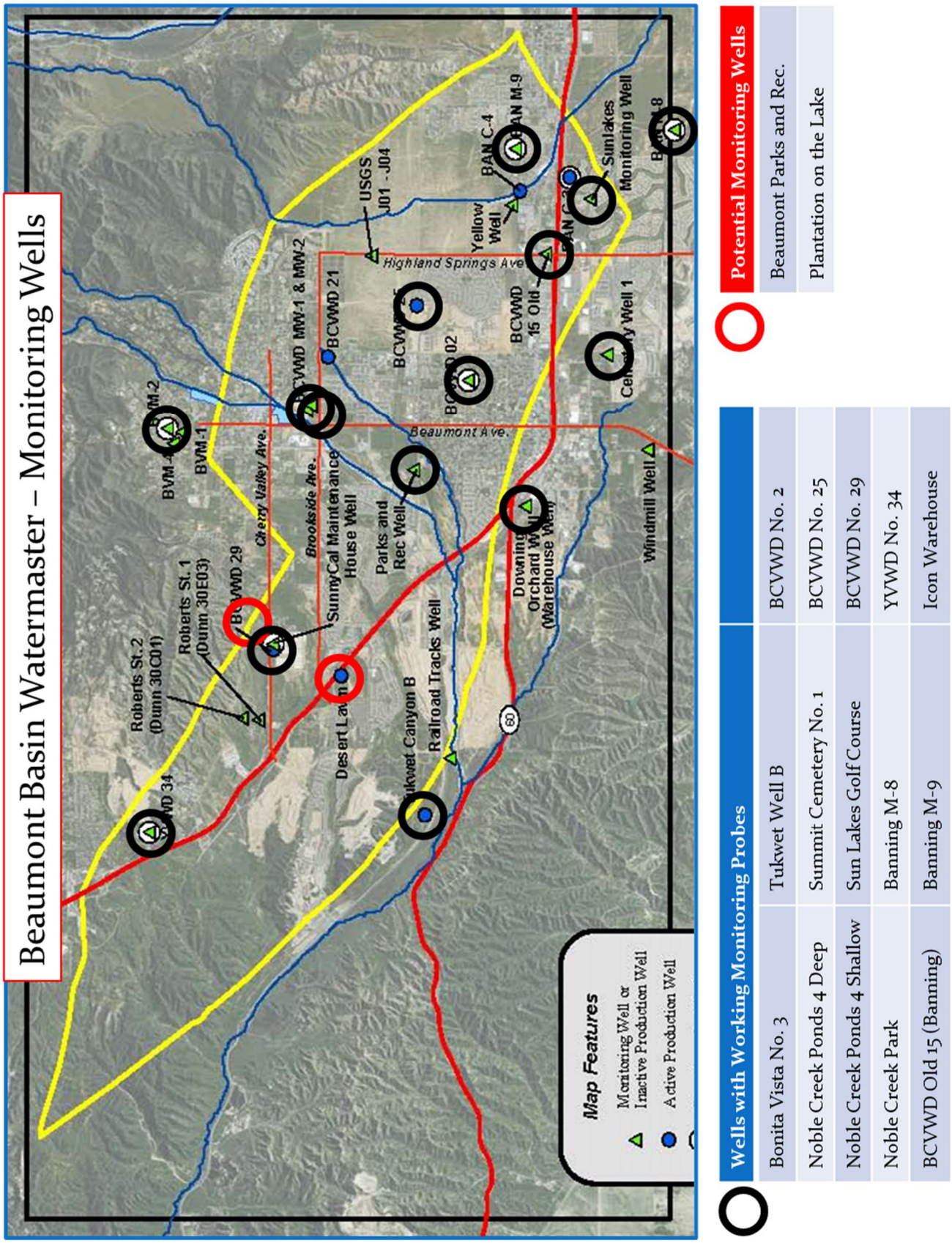
Two production wells have been identified as potential monitoring wells recently. The owners have been contacted and the sites visited. The first well is owned by the Beaumont-Cherry Valley Recreation and Park District. The well is located on the north side of Cherry Valley Blvd and has been recently used to supply water during grading for construction of two warehouses nearby. Upon construction of these facilities, this well will be available to irrigate nearby lands; a monitoring probe could be installed with minor modifications at the well head.

The second well is owned by Plantation on the Lake. The site has been visited and owner is considering drilling a hole on the well head to accommodate the monitoring probe.

Other potential well sites include:

- ✓ Catholic Dioceses of San Bernardino-Riverside counties, near Rancho Calimesa Mobile Home Park has three abandoned wells. Two of these wells cannot be used at this time because the probe could not be lowered; however, the third site could be used; however, it is not secured and could be subject to vandalism. For this reason, this well is not being considered as potential monitoring location.

- ✓ Sharondale Well No. 1 – This well is operated by Clearwater Operations. We initiated contact with this company to install a water level probe at this well, but progress has not been made.


Beaumont Basin Watermaster – Monitoring Wells
Map Features
Monitoring Well or Inactive Production Well
Active Production Well
Roberts St. 2 (Dunn 30C01)
Roberts St. 1 (Dunn 30E03)
BCVWD 29
Cherry Valley Ave.
Brookside Ave.
SunnyCal Maintenance House Well
Desert Lawn
Tukwet Canyon B
Railroad Tracks Well
Parks and Rec Well
BCVWD MW-1 & MW-2
BCVWD 21
Beaumont Ave.
USGS 001 - 004
Highland Springs Ave
Yellow Well
BCVWD 15 Old
Sunlakes Monitoring Well
Windmill Well
Downing Orchard Well (Warehouse Well)
Wells with Working Monitoring Probes
Bonita Vista No. 3
Tukwet Well B
BCVWD No. 2
Noble Creek Ponds 4 Deep
Summit Cemetery No. 1
BCVWD No. 25
Noble Creek Ponds 4 Shallow
Sun Lakes Golf Course
BCVWD No. 29
Noble Creek Park
Banning M-8
YVWD No. 34
BCVWD Old 15 (Banning)
Banning M-9
Icon Warehouse
Potential Monitoring Wells
Beaumont Parks and Rec.
Plantation on the Lake

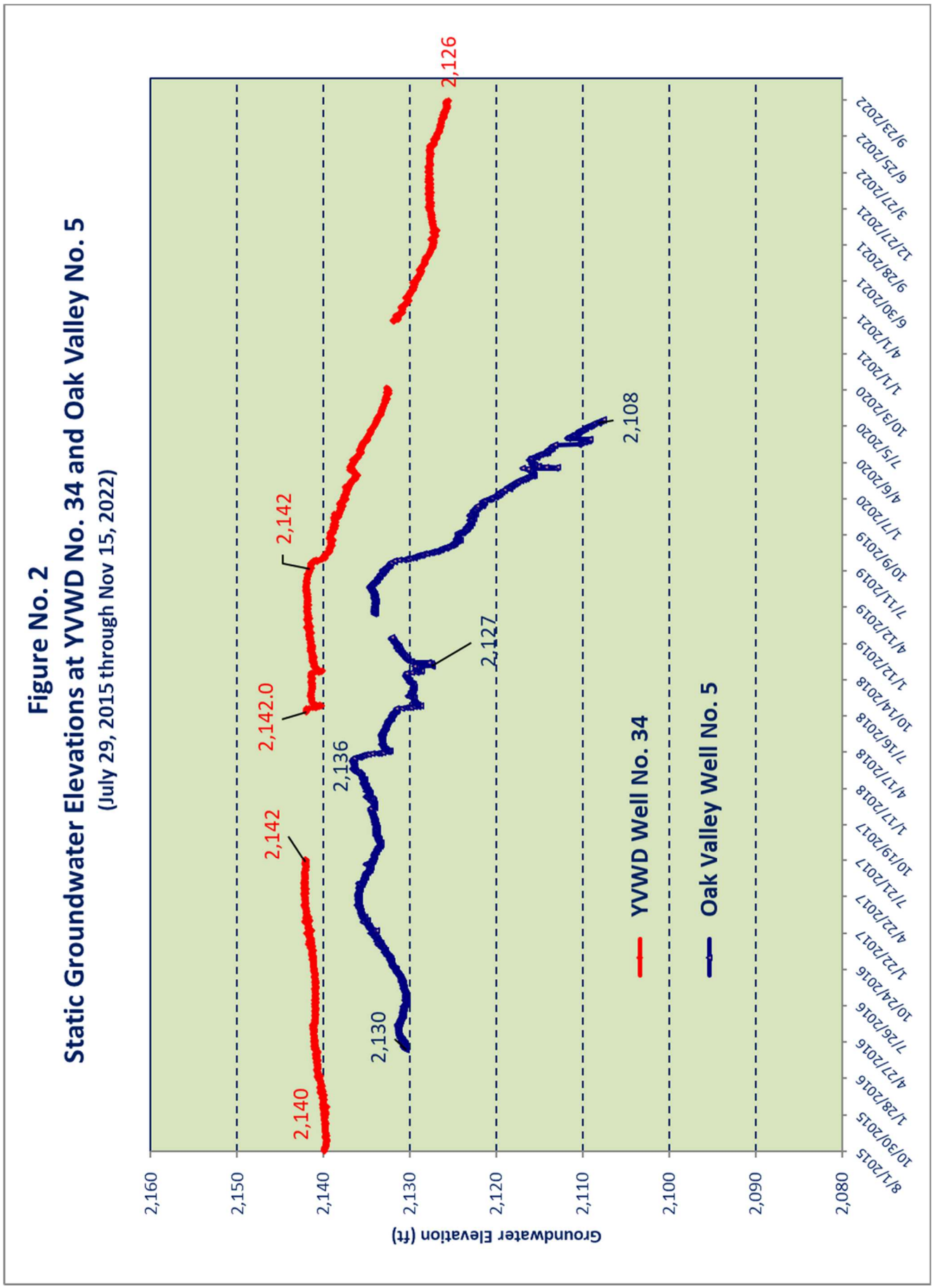


Figure No. 2
Static Groundwater Elevations at YVWD No. 34 and Oak Valley No. 5
(July 29, 2015 through Nov 15, 2022)
Groundwater Elevation (ft)
2,160
2,150
2,140
2,130
2,120
2,110
2,100
2,090
2,080
2,126
2,142
2,142.0
2,136
2,142
2,140
2,130
2,127
2,108
YVWD Well No. 34
Oak Valley Well No. 5
8/1/2015
10/30/2015
1/28/2016
4/27/2016
7/26/2016
10/24/2016
1/22/2017
4/22/2017
7/21/2017
10/19/2017
1/17/2018
4/17/2018
7/16/2018
10/14/2018
1/12/2019
4/12/2019
7/11/2019
10/9/2019
1/7/2020
4/6/2020
7/5/2020
10/3/2020
1/1/2021
4/1/2021
6/30/2021
9/28/2021
12/27/2021
3/27/2022
6/25/2022
9/23/2022

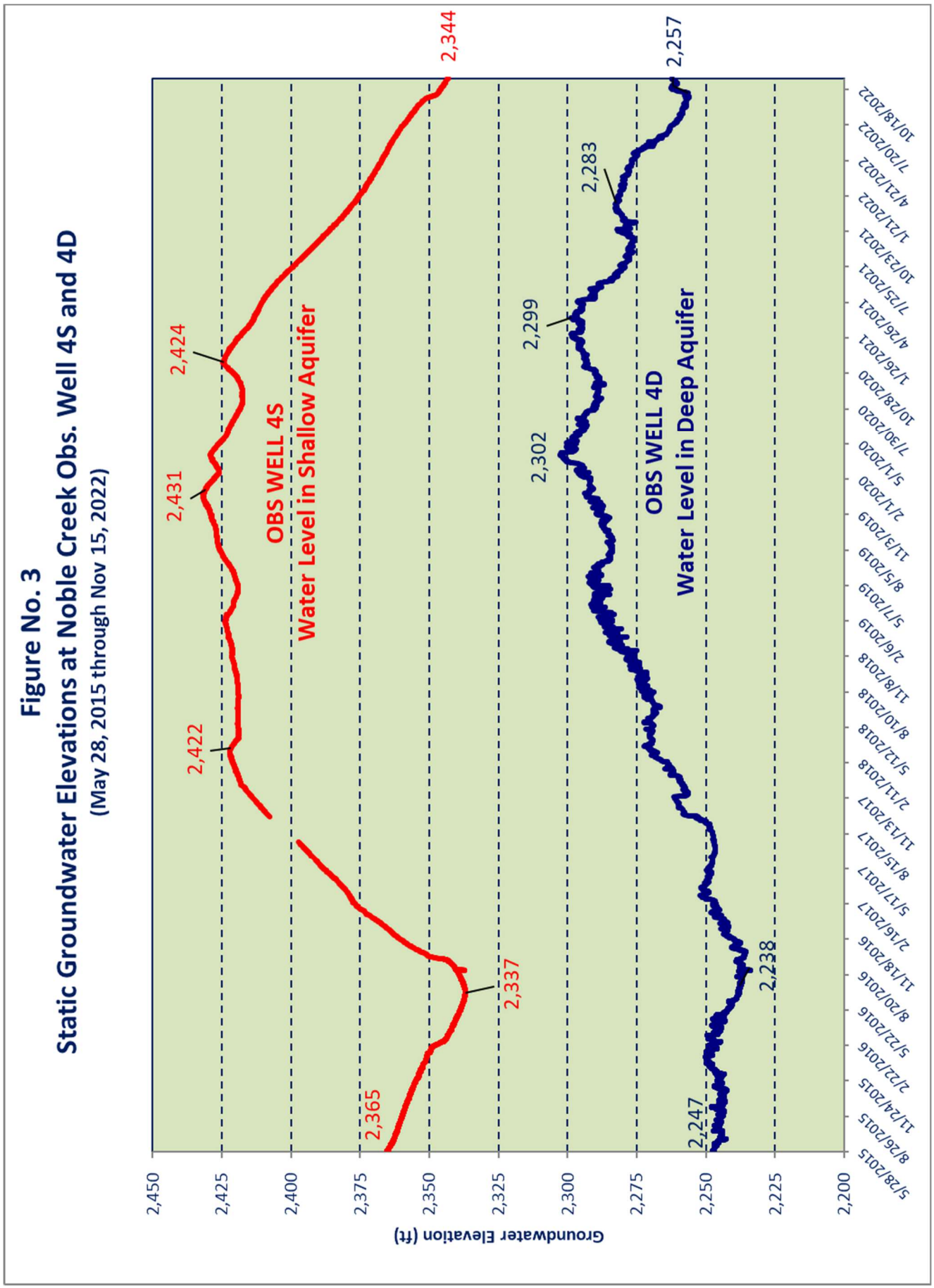


Figure No. 3
Static Groundwater Elevations at Noble Creek Obs. Well 4S and 4D
(May 28, 2015 through Nov 15, 2022)
OBS WELL 4S
Water Level in Shallow Aquifer
OBS WELL 4D
Water Level in Deep Aquifer
2,344
2,424
2,431
2,422
2,365
2,337
2,257
2,283
2,299
2,302
2,247
2,238
Groundwater Elevation (ft)
2,450
2,425
2,400
2,375
2,350
2,325
2,300
2,275
2,250
2,225
2,200
5/28/2015
8/26/2015
11/24/2015
2/22/2016
5/22/2016
8/20/2016
11/18/2016
2/16/2017
5/17/2017
8/15/2017
11/13/2017
2/11/2018
5/12/2018
8/10/2018
11/8/2018
2/6/2019
5/7/2019
8/5/2019
11/3/2019
2/1/2020
5/1/2020
7/30/2020
10/28/2020
1/26/2021
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1/21/2022
4/21/2022
7/20/2022
10/18/2022

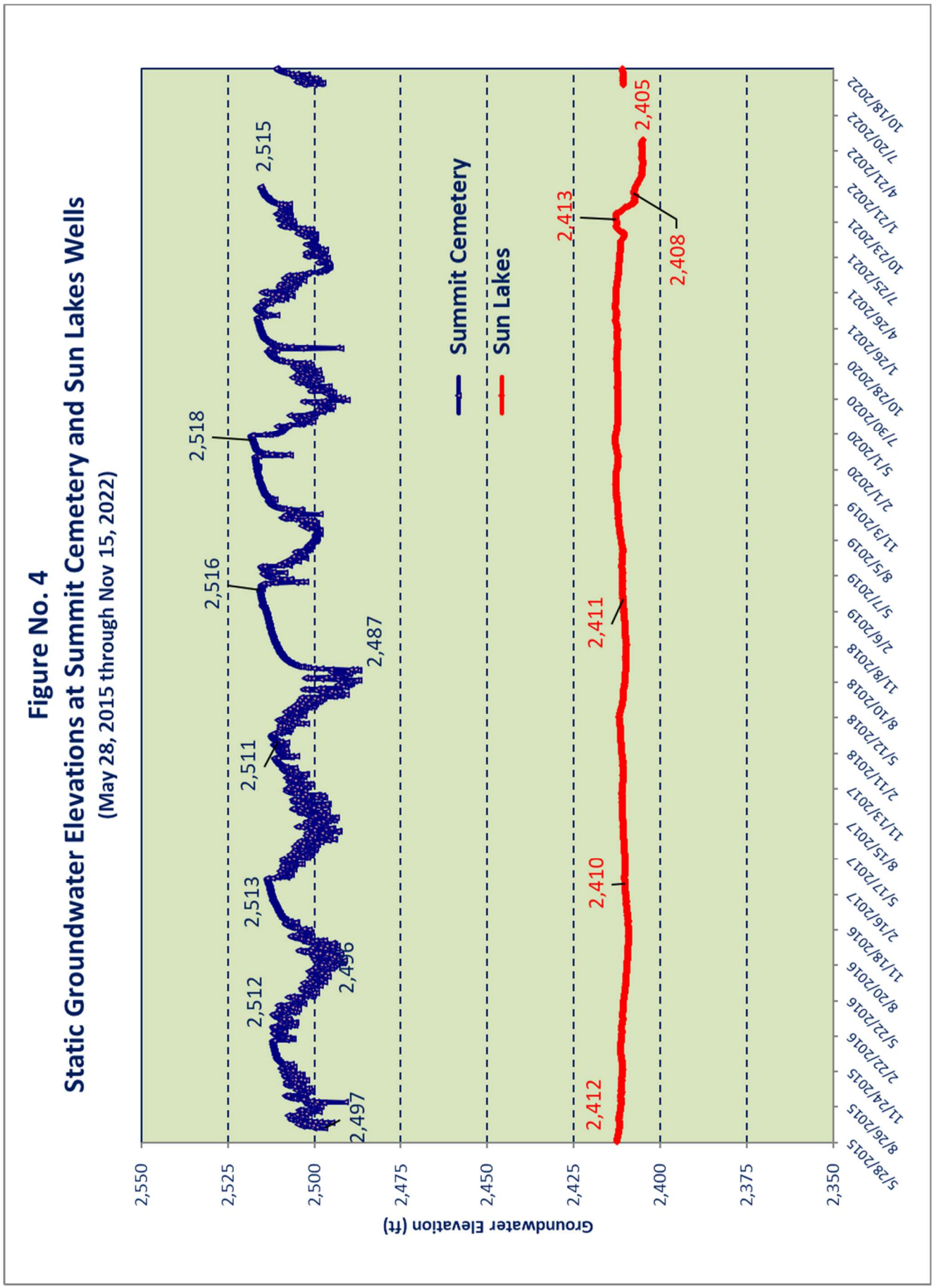
Figure No. 4
Static Groundwater Elevations at Summit Cemetery and Sun Lakes Wells
(May 28, 2015 through Nov 15, 2022)
Summit Cemetery
Sun Lakes
2,518
2,516
2,515
2,511
2,513
2,512
2,497
2,487
2,496
2,413
2,411
2,410
2,412
2,405
2,408
Groundwater Elevation (ft)
2,550
2,525
2,500
2,475
2,450
2,425
2,400
2,375
2,350
5/28/2015
8/26/2015
11/24/2015
2/22/2016
5/22/2016
8/20/2016
11/18/2016
2/16/2017
5/17/2017
8/15/2017
11/13/2017
2/11/2018
5/12/2018
8/10/2018
11/8/2018
2/6/2019
5/7/2019
8/5/2019
11/3/2019
2/1/2020
5/1/2020
7/30/2020
10/28/2020
1/26/2021
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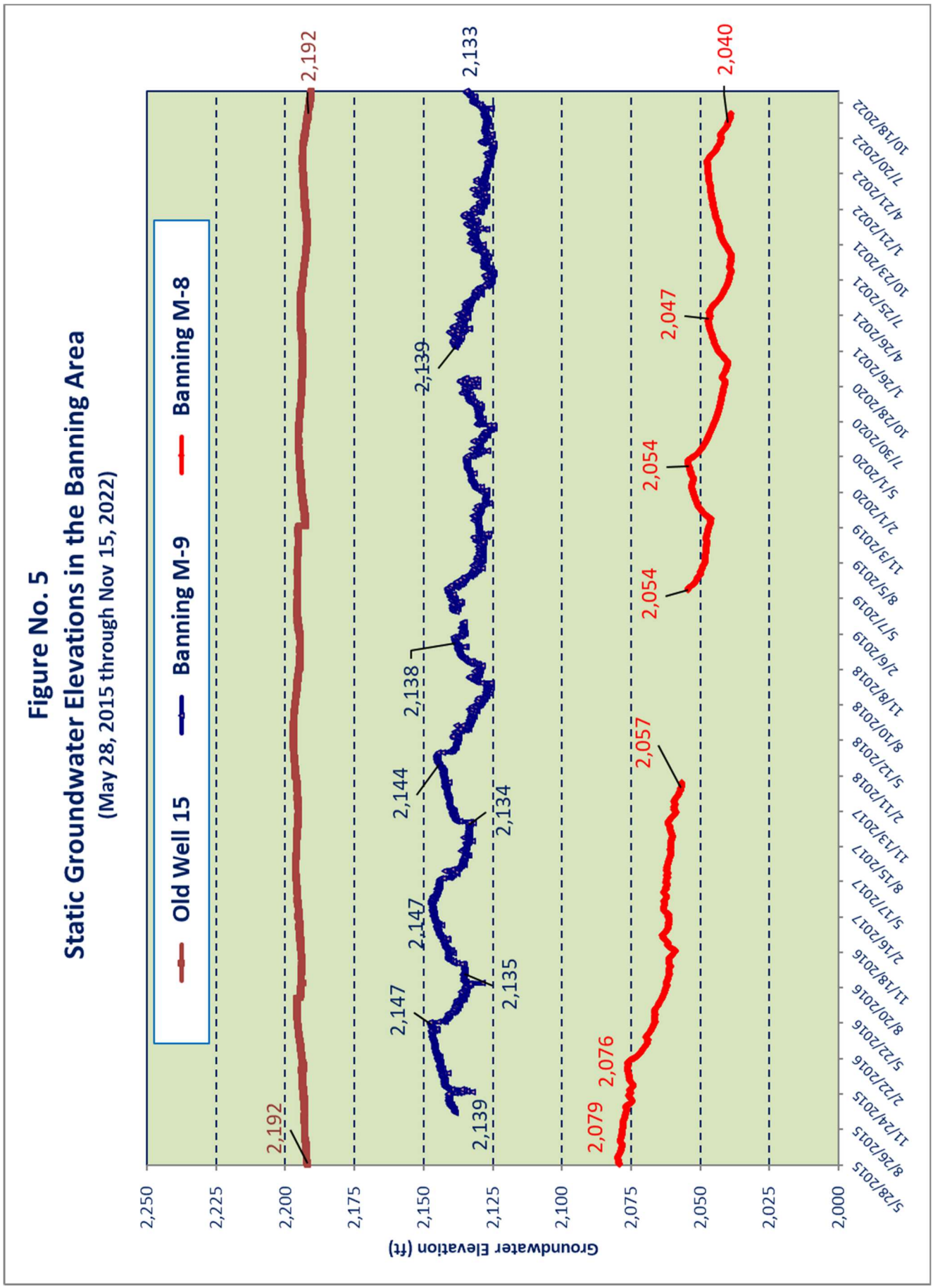


Figure No. 5
Static Groundwater Elevations in the Banning Area
(May 28, 2015 through Nov 15, 2022)
Old Well 15
Banning M-9
Banning M-8
Groundwater Elevation (ft)
2,250
2,225
2,200
2,175
2,150
2,125
2,100
2,075
2,050
2,025
2,000
2,192
2,192
2,133
2,139
2,138
2,144
2,147
2,147
2,134
2,135
2,139
2,079
2,076
2,057
2,040
2,047
2,054
2,054
5/28/2015
8/26/2015
11/24/2015
2/22/2016
5/22/2016
8/20/2016
11/18/2016
2/16/2017
5/17/2017
8/15/2017
11/13/2017
2/11/2018
5/12/2018
8/10/2018
11/8/2018
2/6/2019
5/7/2019
8/5/2019
11/3/2019
2/1/2020
5/1/2020
7/30/2020
10/28/2020
1/26/2021
4/26/2021
7/25/2021
10/23/2021
1/21/2022
4/21/2022
7/20/2022
10/18/2022

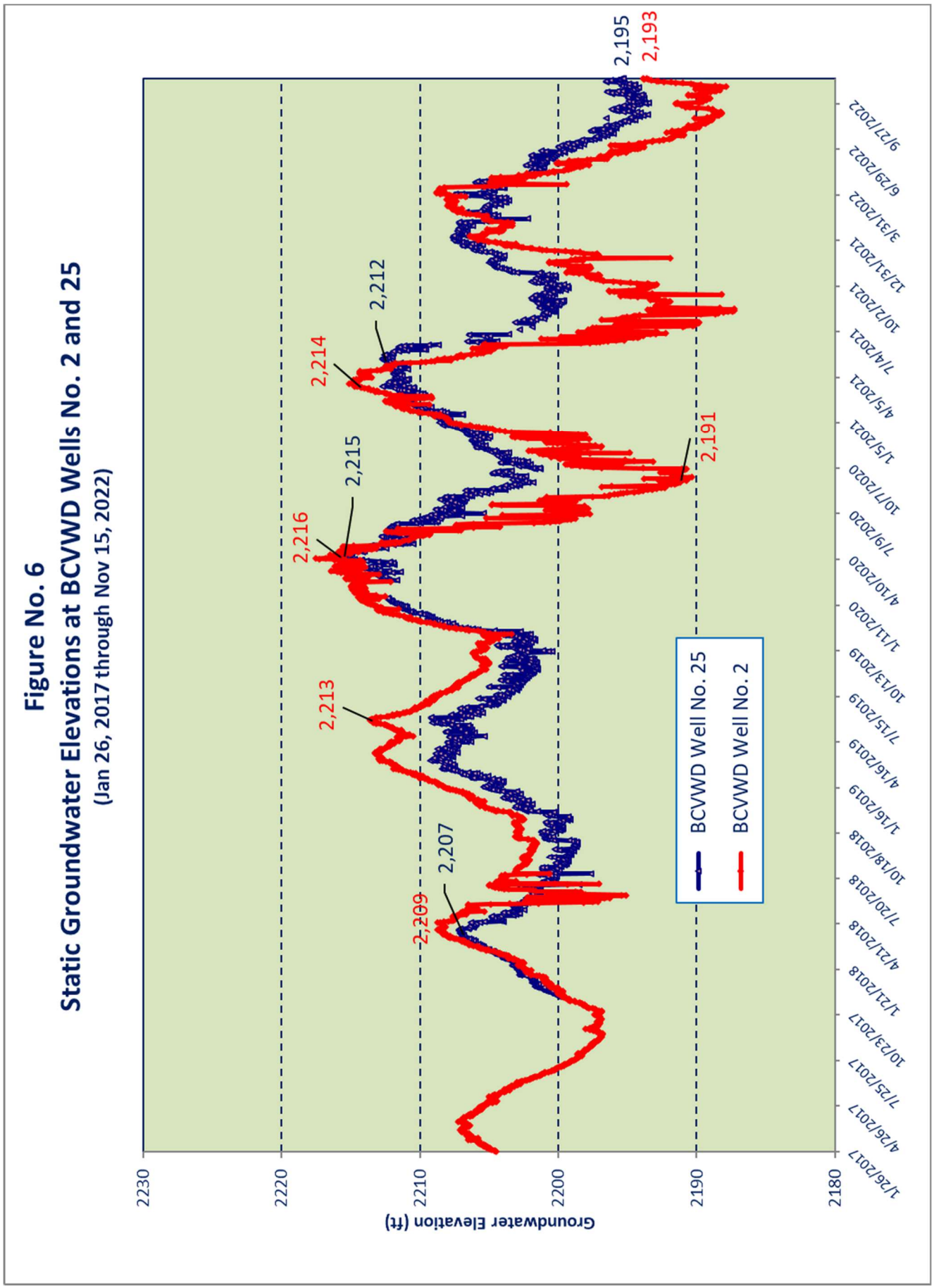
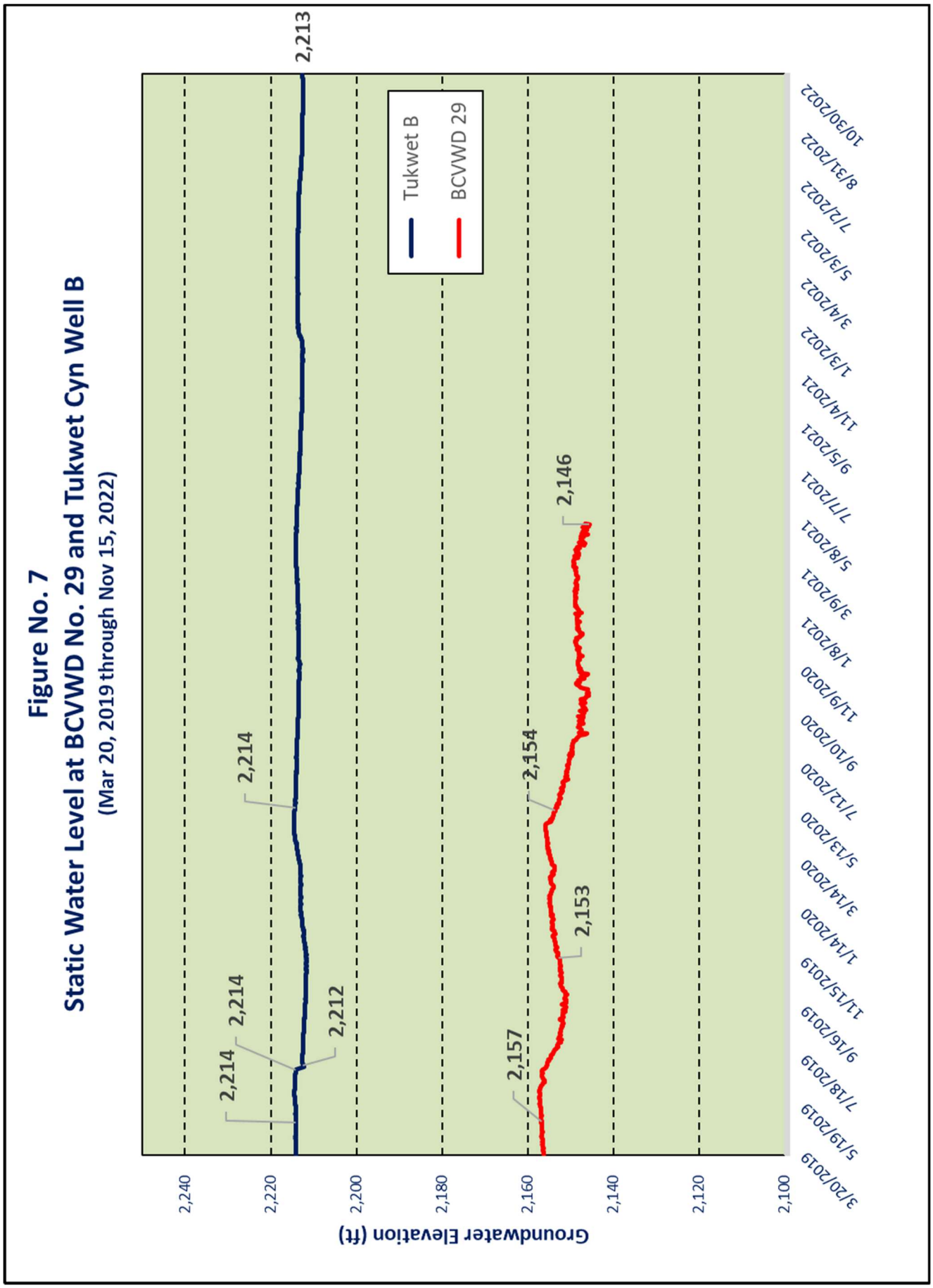


Figure No. 6
Static Groundwater Elevations at BCVWD Wells No. 2 and 25
(Jan 26, 2017 through Nov 15, 2022)
Groundwater Elevation (ft)
2230
2220
2210
2200
2190
2180
2,195
2,193
2,212
2,214
2,215
2,216
2,213
2,207
2,209
2,191
BCVWD Well No. 25
BCVWD Well No. 2
1/26/2017
4/26/2017
7/25/2017
10/23/2017
1/21/2018
4/23/2018
7/20/2018
10/18/2018
1/16/2019
4/16/2019
7/15/2019
10/13/2019
1/11/2020
4/10/2020
7/9/2020
10/7/2020
1/5/2021
4/5/2021
7/4/2021
10/2/2021
12/31/2021
3/31/2022
6/29/2022
9/27/2022

Figure No. 7
Static Water Level at BCVWD No. 29 and Tukwet Cyn Well B
(Mar 20, 2019 through Nov 15, 2022)



BEAUMONT BASIN WATERMASTER

Date: December 7th, 2022

From: Hannibal Blandon, ALDA Inc.

Subject: A Comparison of Production vs Extraction Credits through October 2022

Recommendation: No recommendation - For informational purposes only

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This Technical Memorandum presents a comparison of extraction credits from the Basin against actual production by Appropriator. At the beginning of each year, Appropriators have certain Extraction Credits resulting from: a) unused production by overlying users from 2017 and/or b) permanent transfers of overlying water rights. Extraction credits for individual Appropriators can be increased through the course of the year by spreading imported (supplemental) water.

Total production by Appropriators for the first ten months of 2022 was 15,061 ac-ft while extraction credits for the same period were only 5,168 ac-ft resulting in a negative credit balance of 9,893 ac-ft, as presented in the table below. This credit imbalance is primarily related to BCVWD's production exceeding its extraction credits and the City of Banning to a lesser degree. Spreading of imported water has been minimal at 690 ac-ft for the year. YVWD and SMWC have a positive credit balance. Appropriators that produce less than their individual extraction credits can add the positive difference to their storage accounts at the end of the Calendar Year, as listed in the table.

	City of Banning	Beaumont Cherry Valley W. D.	South Mesa Mutual W. C.	Yucaipa Valley W. D.	Total
Transfer of Overlying Rights from 2017	1,350	1,826	536	583	4,295
Transfer of Overlying Rights - OVP to YVWD	0	0	0	183	183
Imported Water	0	690	0	0	690
Total Extraction Credits	1,350	2,516	536	766	5,168
Production	2,240	11,874	513	434	15,061
Credit Balance	-890	-9,358	23	332	-9,893
Water in Storage as of Dec 2021	48,778	32,081	10,263	15,957	107,078

There have been no transfers from SGPWA's storage account to Appropriators during Calendar Year 2022.

Reports

Item VI - D

MEMORANDUM

TO: Beaumont Basin Watermaster

FROM: Thierry R Montoya

DATE: November 7, 2022

RE: Attorney Services to Report for December7, 2022 meeting

Counsel prepared the attached "Professional Services Contract" between Beaumont Basin Watermaster and Thomas Harder and Associates.

AGREEMENT FOR PROFESSIONAL SERVICES BY INDEPENDENT CONTRACTOR

THIS AGREEMENT FOR PROFESSIONAL SERVICES BY INDEPENDENT CONTRACTOR is made and effective as of the __ day of November**,** 2022, by and between the BEAUMONT BASIN WATERMASTER ("WATERMASTER") whose address is 560 Magnolia Avenue, Beaumont, California 92223 and THOMAS HARDER & CO. whose address is _____, ("CONTRACTOR").

RECITALS

This Agreement is entered into on the basis of the following facts, understandings and intentions of the parties to this Agreement:

A. WATERMASTER desires to engage CONTRACTOR to provide Professional Engineer Services; and

B. CONTRACTOR has made a proposal ("Proposal") to the WATERMASTER to provide such professional services, which Proposal is attached hereto as Exhibit "A"; and

C. CONTRACTOR agrees to provide such services pursuant to, and in accordance with, the terms and conditions · of this Agreement, and represents and warrants to WATERMASTER that CONTRACTOR possesses the necessary skills, licenses, certifications, qualifications, personnel and equipment to provide such services.

AGREEMENT

NOW, THEREFORE, in consideration of the foregoing Recitals and mutual covenants contained herein, WATERMASTER and CONTRACTOR agree as follows:

1. Term of Agreement. This Agreement is effective as of the date first above written and shall continue until terminated as provided for herein. Notwithstanding anything in this Agreement to the contrary, this Agreement shall automatically terminate after three (3) years unless extended by the parties with the approval of the WATERMASTER.

2. Services to be Performed. CONTRACTOR agrees to provide the services ("Services") as Follows: Professional Engineering Services as set forth in Exhibit "A" and any other services which the WATERMASTER may request in writing. All Services shall be performed in the manner and according to the timeframe set forth in the Proposal. CONTRACTOR designates Thomas Harder as CONTRACTOR'S professional responsible for overseeing the Services provided by CONTRACTOR.

3. Associates and Subcontractors. CONTRACTOR may, at CONTRACTOR's sole cost and expense, employ such competent and qualified independent associates, subcontractors and consultants as CONTRACTOR deems necessary to perform the Services; provided, however, that CONTRACTOR shall not subcontract any of the Services without the written consent of WATERMASTER.

4. Compensation.

4.01 CONTRACTOR shall be paid at the rates set forth in the Proposal and shall not increase any rate without the prior written consent of the WATERMASTER. Notwithstanding anything in this Agreement to the contrary, total fees and charges paid by WATERMASTER to CONTRACTOR under this Agreement shall not exceed $315,805.

4.02 CONTRACTOR shall not be compensated for any Services rendered nor reimbursed for any expenses incurred in excess of those authorized unless approved in advance by the WATERMASTER, in writing.

4.03 CONTRACTOR shall submit to WATERMASTER, on or before the fifteenth (15^{th}) of each month, itemized invoices for the Services rendered in the previous month. The WATERMASTER shall not be obligated to pay any invoice that is submitted more than sixty (60) days after the due date of such invoice. WATERMASTER shall have the right to review and audit all invoices prior to or after payment to CONTRACTOR. This review and audit may include, but not be limited to WATERMASTER's:

a. Determination that any hourly fee charged is consistent with this Agreement's approved hourly rate schedule;

b. Determination that the multiplication of the hours billed times the approved rate schedule dollars is correct;

c. Determination that each item charged is the usual, customary, and reasonable charge for the particular item. If WATERMASTER determines an item charged is greater than usual, customary, or reasonable, or is duplicative, ambiguous, excessive, or inappropriate, WATERMASTER shall either return the bill to CONTRACTOR with a request for explanation or adjust the payment accordingly, and give notice to CONTRACTOR of the adjustment.

4.04 If the work is satisfactorily completed, WATERMASTER shall pay such invoice within thirty (30) days of its receipt. Should WATERMASTER dispute any portion of any invoice, WATERMASTER shall pay the undisputed portion within the time stated above, and at the same time advise CONTRACTOR in writing of the disputed portion.

5. Obligations of CONTRACTOR.

5.01 CONTRACTOR agrees to perform all Services in accordance with the terms and conditions of this Agreement and the Proposal. In the event that the terms of the Proposal shall conflict with the terms of this Agreement, or contain additional terms other than the Services to be rendered and the price for the Services, the terms of this Agreement shall govern and said additional or conflicting terms shall be of no force or effect.

5.02 Except as otherwise agreed by the parties, CONTRACTOR will supply all personnel, materials and equipment required to perform the Services. CONTRACTOR

shall provide its own offices, telephones, vehicles and computers and set its own work hours. CONTRACTOR will determine the method, details, and means of performing the Services under this Agreement.

5.03 CONTRACTOR shall keep WATERMASTER informed as to the progress of the Services by means of regular and frequent consultations. Additionally, when requested by WATERMASTER, CONTRACTOR shall prepare written status reports.

5.04 CONTRACTOR is responsible for paying, when due, all income and other taxes, fees and withholding, including withholding state and federal taxes, social security, unemployment and worker's compensation, incurred as a result of the compensation paid under this Agreement. CONTRACTOR agrees to indemnify, defend and hold harmless WATERMASTER for any claims, costs, losses, fees, penalties, interest, or damages suffered by WATERMASTER resulting from CONTRACTOR's failure to comply with this provision.

5.05 In the event CONTRACTOR is required to prepare plans, drawings, specifications and/or estimates, the same shall be furnished in conformance with local, state and federal laws, rules and regulations.

5.06 CONTRACTOR represents that it possesses all required licenses necessary or applicable to the performance of Services under this Agreement and the Proposal and shall obtain and keep in full force and effect all permits and approvals required to perform the Services herein. In the event WATERMASTER is required to obtain an approval or permit from another governmental entity, CONTRACTOR shall provide all necessary supporting documents to be filed with such entity.

5.07 CONTRACTOR shall be solely responsible for obtaining Employment Eligibility Verification information from CONTRACTOR's employees, in compliance with the Immigration Reform and Control Act of 1986, Pub. L. 99-603 (8 U.S.C. 1324a), and shall ensure that CONTRACTOR's employees are eligible to work in the United States.

5.08 In the event that CONTRACTOR employs, contracts with, or otherwise utilizes any CalPers retirees in completing any of the Services performed hereunder, such instances shall be disclosed in advance to the WATERMASTER and shall be subject to the WATERMASTER's advance written approval.

5.09 Drug-free Workplace Certification. By signing this Agreement, the CONTRACTOR hereby certifies under penalty of perjury under the laws of the State of California that the CONTRACTOR will comply with the requirements of the Drug-Free Workplace Act of 1990 (Government Code, Section 8350 et seq.) and will provide a drug-free workplace.

5.10 CONTRACTOR shall comply with all applicable local, state and federal laws, rules, regulations, entitlements and/or permits applicable to, or governing the Services authorized hereunder.

6. Insurance. CONTRACTOR hereby agrees to be solely responsible for the health and safety of its employees and agents in performing the Services under this Agreement and shall comply with all laws applicable to worker safety including but not limited to Cal-OSHA. Therefore, throughout the duration of this Agreement, CONTRACTOR hereby covenants and agrees to maintain insurance in conformance with the requirements set forth below. If existing coverage does not meet the requirements set forth herein, CONTRACTOR agrees to amend, supplement or endorse the existing coverage to do so. CONTRACTOR shall provide the following types and amounts of insurance:

6.01 Commercial general liability insurance in an amount of not less than $1,000,000 per occurrence and $2,000,000 in the aggregate; CONTRACTOR agrees to have its insurer endorse the general liability coverage required herein to include as additional insured's WATERMASTER, its officials, employees and agents. CONTRACTOR also agrees to require all contractors and subcontractors to provide the same coverage required under this Section 6.

6.02 Business Auto Coverage in an amount no less than $1 million per accident. If CONTRACTOR or CONTRACTOR's employees will use personal autos in performance of the Services hereunder, CONTRACTOR shall provide evidence of personal auto liability coverage for each such person.

6.03 Workers' Compensation coverage for any of CONTRACTOR's employees that will be providing any Services hereunder. CONTRACTOR will have a state-approved policy form providing statutory benefits as required by California law. The provisions of any workers' compensation will not limit the obligations of CONTRACTOR under this Agreement. CONTRACTOR expressly agrees not to use any statutory immunity defenses under such laws with respect to WATERMASTER, its employees, officials and agents.

6.04 Optional Insurance Coverage. Choose and check one: Required _X_ /Not Required ___; Errors and omissions insurance in a minimum amount of $2 million per occurrence to cover any negligent acts or omissions committed by CONTRACTOR, its employees and/or agents in the performance of any Services for WATERMASTER.

7. General Conditions pertaining to Insurance Coverage

7.01 No liability insurance coverage provided shall prohibit CONTRACTOR from waiving the right of subrogation prior to a loss. CONTRACTOR waives all rights of subrogation against WATERMASTER regardless of the applicability of insurance proceeds and shall require all contractors and subcontractors to do likewise.

7.02. Prior to beginning the Services under this Agreement, CONTRACTOR shall furnish WATERMASTER with certificates of insurance, endorsements, and upon request, complete copies of all policies, including complete copies of all endorsements. All copies of policies and endorsements shall show the signature of a person authorized by that insurer to bind coverage on its behalf.

7.03. All required policies shall be issued by a highly rated insurer with a minimum A.M. Best rating of "A:VII"). The insurer(s) shall be admitted and licensed to do business

in California. The certificates of insurance hereunder shall state that coverage shall not be suspended, voided, canceled by either party, or reduced in coverage or in limits, except after thirty (30) days' prior written notice has been given to WATERMASTER.

7.04 Self-insurance does not comply with these insurance specifications. CONTRACTOR acknowledges and agrees that that all insurance coverage required to be provided by CONTRACTOR or any subcontractor, shall apply first and on a primary, non-contributing basis in relation to any other insurance, indemnity or self-insurance available to WATERMASTER.

7.05 All coverage types and limits required are subject to approval, modification and additional requirements by WATERMASTER, as the need arises. CONTRACTOR shall not make any reductions in scope of coverage (e.g. elimination of contractual liability or reduction of discovery period) that may affect WATERMASTER's protection without WATERMASTER's prior written consent.

7.06 CONTRACTOR agrees to provide immediate notice to WATERMASTER of any claim or loss against CONTRACTOR or arising out of the Services performed under this Agreement. WATERMASTER assumes no obligation or liability by such notice, but has the right (but not the duty) to monitor the handling of any such claim or claims if they are likely to involve WATERMASTER.

8. Indemnification.

8.01 CONTRACTOR and WATERMASTER agree that WATERMASTER, its employees, agents and officials should, to the extent permitted by law, be fully protected from any loss, injury, damage, claim, lawsuit, cost, expense, attorneys' fees, litigation costs, defense costs, court costs or any other costs arising out of or in any way related to the performance of this Agreement by CONTRACTOR or any subcontractor or agent of either. Accordingly, the provisions of this indemnity are intended by the parties to be interpreted and construed to provide the fullest protection possible under the law to WATERMASTER. CONTRACTOR acknowledges that WATERMASTER would not enter into this Agreement in the absence of the commitment of CONTRACTOR to indemnify and protect WATERMASTER as set forth herein.

a. To the fullest extent permitted by law, CONTRACTOR shall defend, indemnify and hold harmless WATERMASTER, its employees, agents and officials, from any liability, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses, damages or costs of any kind, whether actual, alleged or threatened, actual attorneys' fees incurred by WATERMASTER, court costs, interest, defense costs, including expert witness fees and any other costs or expenses of any kind whatsoever without restriction or limitation incurred in relation to, as a consequence of or arising out of or in any way attributable actually, allegedly or impliedly, in whole or in part to the performance of this Agreement. CONTRACTOR's obligation to defend, indemnify and hold harmless shall include any and all claims, suits and proceedings in which CONTRACTOR (and/or CONTRACTOR's agents and/or employees) is alleged to be an employee of WATERMASTER. All obligations under this provision are to

be paid by CONTRACTOR as they are incurred by WATERMASTER.

b. Without affecting the rights of WATERMASTER under any provision of this Agreement or this Section, CONTRACTOR shall not be required to indemnify and hold harmless WATERMASTER as set forth above for liability attributable solely to the fault of WATERMASTER, provided such fault is determined by agreement between the parties or the findings of a court of competent jurisdiction.

9. Additional Services, Changes and Deletions.

9.01 In the event CONTRACTOR performs additional or different services than those described herein without the prior written approval of the WATERMASTER, CONTRACTOR shall not be compensated for such services. CONTRACTOR expressly waives any right to be compensated for services and materials not covered by the scope of this Agreement or authorized by the WATERMASTER in writing.

9.02 CONTRACTOR shall promptly advise the WATERMASTER as soon as reasonably practicable upon gaining knowledge of a condition, event or accumulation of events which may affect the scope and/or cost of Services. All proposed changes, modifications, deletions and/or requests for additional services shall be reduced to writing for review and approval by the WATERMASTER.

10. Termination of Agreement.

10.01 Notwithstanding any other provision of this Agreement, WATERMASTER, at its sole option, may terminate this Agreement with or without cause, or for no cause, at any time by giving twenty (20) days' written notice to CONTRACTOR.

10.02 In the event of termination, the payment of monies due CONTRACTOR for undisputed Services performed prior to the effective date of such termination shall be paid within thirty (30) business days after receipt of an invoice as provided in this Agreement. Immediately upon termination, CONTRACTOR agrees to promptly provide and deliver to WATERMASTER all original documents, reports, studies, plans, specifications and the like which are in the possession or control of CONTRACTOR and pertain to WATERMASTER.

11. Status of CONTRACTOR.

11.01 CONTRACTOR shall perform the Services in CONTRACTOR's own way as an independent contractor, and in pursuit of CONTRACTOR's independent calling, and not as an employee of WATERMASTER. However, CONTRACTOR shall regularly confer with WATERMASTER as provided for in this Agreement.

11.02 CONTRACTOR agrees that it is not entitled to the rights and benefits afforded to WATERMASTER's members or employees, including disability or unemployment insurance, workers' compensation, retirement, CalPers, medical insurance, sick leave, or any other employment benefit. CONTRACTOR is responsible for providing,

at its own expense, disability, unemployment, workers' compensation and other insurance, training, permits, and licenses for itself and its employees and subcontractors.

11.03 CONTRACTOR hereby specifically represents and warrants to WATERMASTER that it possesses the qualifications and skills necessary to perform the Services under this Agreement in a competent, professional manner, without the advice or direction of WATERMASTER and that the Services to be rendered pursuant to this Agreement shall be performed in accordance with the standards customarily applicable to an experienced and competent professional rendering the same or similar services in the same geographic area where the WATERMASTER is located. Further, CONTRACTOR represents and warrants that the individual signing this Agreement on behalf of CONTRACTOR has the full authority to bind CONTRACTOR to this Agreement.

12. Ownership of Documents; Audit.

12.01 All draft and final reports, plans, drawings, studies, maps, photographs, specifications, data, notes, manuals, warranties and all other documents of any kind or nature prepared, developed or obtained by CONTRACTOR in connection with the performance of Services performed for the WATERMASTER shall become the sole property of WATERMASTER, and CONTRACTOR shall promptly deliver all such materials to WATERMASTER upon request. At the WATERMASTER's sole discretion, CONTRACTOR may be permitted to retain original documents, and furnish reproductions to WATERMASTER upon request, at no cost to WATERMASTER.

12.02 Subject to applicable federal and state laws, rules and regulations, WATERMASTER shall hold all intellectual property rights to any materials developed pursuant to this Agreement. CONTRACTOR shall not such use data or documents for purposes other than the performance of this Agreement, nor shall CONTRACTOR release, reproduce, distribute, publish, adapt for future use or any other purposes, or otherwise use, any data or other materials first produced in the performance of this Agreement, nor authorize others to do so, without the prior written consent of WATERMASTER.

12.03 CONTRACTOR shall retain and maintain, for a period not less than four years following termination of this Agreement, all time records, accounting records and vouchers and all other records with respect to all matters concerning Services performed, compensation paid and expenses reimbursed. At any time during normal business hours and as often as WATERMASTER may deem necessary, CONTRACTOR shall make available to WATERMASTER's agents for examination all of such records and shall permit WATERMASTER's agents to audit, examine and reproduce such records.

13. Miscellaneous Provisions.

13.01 This Agreement, which includes all attached exhibits, supersedes any and all previous agreements, either oral or written, between the parties hereto with respect to the rendering of Services by CONTRACTOR for WATERMASTER and contains all of the covenants and agreements between the parties with respect to the rendering of such Services in any manner whatsoever. Any modification of this Agreement will be effective only if it is in writing signed by both parties.

13.02 CONTRACTOR shall not assign or otherwise transfer any rights or interest in this Agreement without the prior written consent of WATERMASTER. Unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under this Agreement.

13.03 CONTRACTOR shall timely file FPPC Form 700 Conflict of Interest Statements with WATERMASTER if required by California law and/or the WATERMASTER's conflict of interest policy.

13.04 If any legal action or proceeding, including an action for declaratory relief, is brought to enforce or interpret the provisions of this Agreement, the prevailing party will be entitled to reasonable attorneys' fees and costs, in addition to any other relief to which that party may be entitled.

13.05 This Agreement is made, entered into and shall be performed in the County of Riverside in the State of California and shall in all respects be interpreted, enforced and governed under the laws of the State of California.

13.06 CONTRACTOR covenants that neither it nor any officer or principal of its firm has any interest, nor shall they acquire any interest, either directly or indirectly, which will conflict in any manner or degree with the performance of their Services hereunder. CONTRACTOR further covenants that in the performance of this Agreement, no person having such interest shall be employed by it as an officer, employee, agent, or subcontractor.

13.07 CONTRACTOR has read and is aware of the provisions of Section 1090 et seq. and Section 87100 et seq. of the Government Code relating to conflicts of interest of public officers and employees. CONTRACTOR agrees that they are unaware of any financial or economic interest of any public officer or employee of the WATERMASTER relating to this Agreement. It is further understood and agreed that if such a financial interest does exist at the inception of this Agreement, the WATERMASTER may immediately terminate this Agreement by giving notice thereof. CONTRACTOR shall comply with the requirements of Government Code section 87100 et seq. and section 1090 in the performance of and during the term of this Agreement.

13.08 Improper Consideration. CONTRACTOR shall not offer (either directly or through an intermediary) any improper consideration such as, but not limited to, cash, discounts, services, the provision of travel or entertainment, or any items of value to any officer, employee or agent of the WATERMASTER in an attempt to secure favorable treatment regarding this Agreement or any contract awarded by WATERMASTER. The WATERMASTER, by notice, may immediately terminate this Agreement if it determines that any improper consideration as described in the preceding sentence was offered to any officer, employee or agent of the WATERMASTER with respect to the proposal and award process of this Agreement or any WATERMASTER contract. This prohibition shall apply to any amendment, extension or evaluation process once this Agreement or any WATERMASTER contract has been awarded. CONTRACTOR shall immediately report any attempt by any WATERMASTER officer, employee or agent to solicit (either directly

or through an intermediary) improper consideration from CONTRACTOR.

IN WITNESS WHEREOF, the parties hereby have made and executed this Agreement to be effective as of the day and year first above-written.

WATERMASTER:

WATERMASTER OF BEAUMONT

By: _____

Art Vela, Chair

CONTRACTOR:

THOMAS HARDER & CO.

By: _____

Print Name: _____

Title: _____

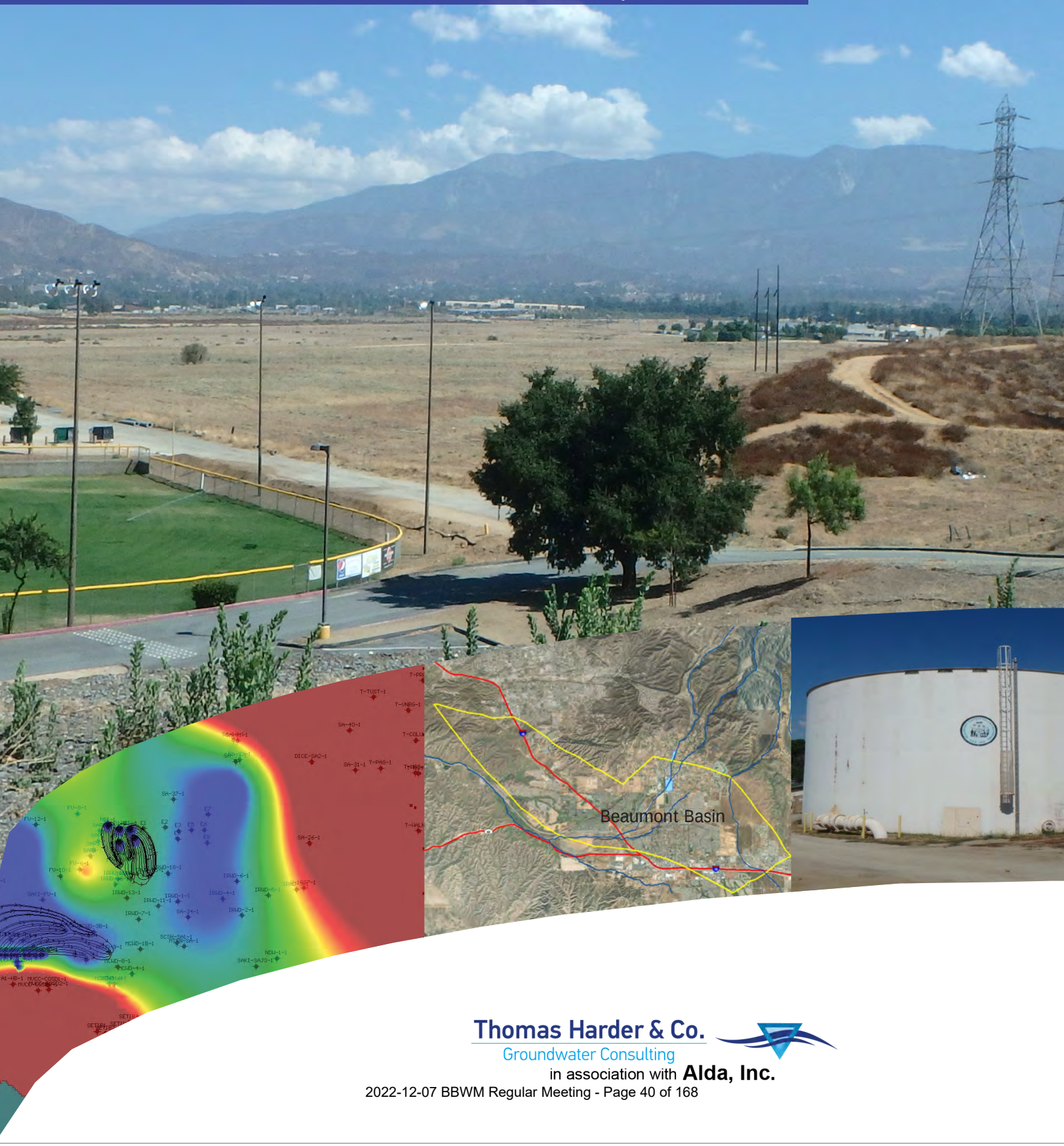
EXHIBIT "A"

SCOPE OF SERVICES AND FEE FOR PROFESSIONAL ENGINEERING SERVICES

EXHIBIT A

Proposal for On-Call Professional Engineering Services for the Beaumont Basin Watermaster

September 16, 2022



Thomas Harder & Co.
Groundwater Consulting
in association with **Alda, Inc.**

Thomas Harder & Co.
Groundwater Consulting

September 16, 2022

Beaumont-Cherry Valley Water District
Attention: Watermaster Secretary
560 Magnolia Avenue
Beaumont, CA 92223

Re: Proposal for On-Call Professional Engineering Services for the Beaumont Basin Watermaster

On behalf of Thomas Harder & Co. (TH&Co), I am pleased to present for your consideration the enclosed proposal to provide engineering and hydrogeological consulting services in response to the Beaumont Basin Watermaster's Request for Proposals for On-Call Professional Engineering Services (RFP).

Over the past 34 years, I have been providing hydrogeological consulting services and technical direction for numerous municipalities and private interests throughout California, Arizona, Nevada and Mexico to develop sustainable groundwater resources for the economy and well-being of the residents of those areas. This experience extends to the Beaumont Basin where, for the last ten years, TH&Co, in association with ALDA, Inc. (ALDA) has been providing engineering and hydrogeological services to the Beaumont Basin Watermaster (the Watermaster). We bring to this project an expert knowledge of the hydrogeology of the Beaumont Basin and a detailed understanding of the Watermaster process, the Beaumont Basin Judgment, and the tasks required of the Watermaster as specified in your RFP.

The TH&Co/ALDA team is uniquely qualified to provide the Watermaster maximum value to meet the requirements of the Judgment with respect to the tasks specified in the RFP, including annual reporting, reviewing rules and regulations, and 10-yr redetermination of the Safe Yield. We have been preparing the annual reports for the last ten years and have developed an efficient process for preparing and moving these reports through the Watermaster Committee. Further, we have developed the groundwater flow model that is updated every year and that we use to inform critical Watermaster issues, such as Safe Yield, basin storage losses, new yield, and potential adverse impacts to groundwater levels and water quality from planned management actions. Through a detailed knowledge of the basin and the groundwater flow model, our team of professional geologists and certified hydrogeologists is best prepared to efficiently update the groundwater flow model and reevaluate the Safe Yield of the basin.

In the early part of 2022, the Watermaster endeavored to develop a framework for optimum basin management with the intent of holding workshops for strategizing the best path forward. Our review of the framework suggests that many of the elements are similar to elements required in Sustainable Groundwater Management Act (SGMA) Groundwater Sustainability Plans (GSPs). The TH&Co/ALDA team has the tools, experience, and expertise to provide the technical support the Watermaster needs to optimally manage the basin. The updated and calibrated groundwater flow model to be developed to estimate the Safe Yield of the basin will be a critical tool to evaluate future basin management alternatives for informing the Beaumont Basin plan.

In a departure from our previous contract, we are proposing that TH&Co be the lead consultant for this contract. Anibal Blandon, P.E. of ALDA will continue to prepare the annual reports and provide engineering support for other tasks as a subcontractor to TH&Co. Thomas Harder, President of TH&Co, will be the Principal-in-Charge and is authorized to negotiate and contractually bind the contract specified in the RFP, which we understand is a term of three years. The TH&Co/ALDA team does not have any professional financial, business, or other relationships with the Watermaster that may have an impact on the outcome of this contract.

We want to convey our genuine enthusiasm at the prospect of continuing our professional engineering and hydrogeological consulting relationship with the Watermaster. If you have any questions or require additional information, don't hesitate to contact me at (714) 779-3875 or (714) 394-4449.

Sincerely,

Thomas Harder

Thomas Harder, P.G., C.HG.
President/Principal Hydrogeologist
1260 N. Hancock St., Suite 109
Anaheim, California 92807
(714) 779-3875

Proposal for:

BEAUMONT BASIN WATERMASTER

PROPOSAL FOR ON-CALL PROFESSIONAL ENGINEERING SERVICES FOR THE BEAUMONT BASIN WATERMASTER

Table of Contents

Attachments

Introduction/Information

This proposal presents Thomas Harder & Co.'s (TH&Co's) proposed approach, scope of work and cost estimate to provide on-call professional engineering and hydrogeological consulting services for the Beaumont Basin Watermaster (the Watermaster). The TH&Co team is uniquely qualified to provide the Watermaster the types of services outlined in the Watermaster's Request for Proposals for On-Call Professional Engineering Services (RFP). Since 2012, the TH&Co/ALDA team has provided the Watermaster with all the services listed in the RFP, including:

Task 1 – Data Collection,

Task 2 – Preparation of Annual Reports,

Task 3 – Annual Determination of Operating Safe Yield,

Task 4 – Review of Rules & Regulations,

Task 5 – Meeting Attendance,

Task 6 – Miscellaneous Special Projects, and

Task 7 – 10 Year Safe Yield Redetermination.

We bring to this project a detailed knowledge of the Watermaster process, the Beaumont Basin Judgment, and each of these tasks. The groundwater flow model that we have developed, and update every year, has been used to estimate the Safe Yield of the basin, groundwater storage losses, and potential water quality impacts from future basin management. We would utilize an updated version of this model to conduct the 10-Year redetermination of Safe Yield (Task 7) as well as other basin management optimization concepts the Watermaster is considering in the future.

Although TH&Co will be the prime contract under this proposal, individual responsibilities for different tasks under the contract will remain the same as they were under our previous ALDA contract. ALDA will continue to compile data (Task 1) and prepare the annual reports (Task 2). TH&Co will continue to prepare the annual determination of Operating Safe Yield (Task 3) as well as the 10-Year Redetermination of Safe Yield (Task 7). All other tasks will be assigned on an as needed basis in accordance with the nature of specific tasks.

TH&Co is submitting this proposal, and any requests for further information should be directed to Thomas Harder, who can be reached at the following address/phone number:

Thomas Harder, P.G., C.HG.
1260 N. Hancock St., Suite 109
Anaheim, California 92807
tharder@thomashardercompany.com
(714) 394-4449

Approach

Successful execution of the engineering services tasks specified in the RFP depends on several factors:

- **Frequent and Clear Communication** – Effective communication with the Watermaster Board is essential to meeting the obligations of the Judgment, complying with the Sustainable Groundwater Management Act (SGMA) reporting requirements, and providing the information necessary to enable the Watermaster to make decisions and effectively manage the groundwater basin. In the last ten years, ALDA and TH&Co have strived to meet this standard. Into the future, the team proposes to use Thomas Harder as the primary point of communication with Anibal Blandon continuing to provide engineering services and communicate annual reporting.
- **Coordination with the Watermaster –** In order to meet the reporting deadlines for SGMA and the annual report, it is essential for efficient coordination between the TH&Co/ALDA team and the Watermaster to ensure the required data is obtained, compiled, and checked prior to reporting deadlines. Further, it will be essential to effectively coordinate with the Watermaster's new Administrative Services consultant Dudek. TH&Co will take the lead to coordinate all needed data collection efforts as well as coordinating with Dudek.
- **Timely Preparation of Reports and Analyses –** Once the data has been obtained and checked, the required reports for SGMA must be completed before April 1 of each year. The annual report does not have as firm a deadline as SGMA but timely preparation of this report is needed to provide the Watermaster Board with information on overall basin recharge and pumping and to provide needed information for making decisions. Over the last ten years, ALDA and TH&Co has successfully provided Watermaster the needed reports and data within the deadlines given. Our reports are now standard and with the TH&Co/Alda team there is no learning curve. We are uniquely qualified to provide Watermaster these reports in the timeliest and most cost-effective manner.
- **Effective QA/QC of Data and Reports –** Reporting accurate data and information is essential to providing the Watermaster Board with the most representative picture of the condition of the groundwater basin. The TH&Co/ALDA team is dedicated to ensuring that all data presented in reports and analyses are accurate and representative. To this end, our team has developed an internal database of basin recharge, groundwater production, groundwater levels, and other hydrogeological data that is updated each year and checked. However, it is highly recommended that the Watermaster establish a formal relational database or coordinate this with another regional database to ensure availability of vital information needed to inform basin management decisions. This may require a financial commitment on behalf of the Watermaster but would be well worth the effort.

- **Transparency with the Watermaster Board Regarding the Results of Analyses –** TH&Co and ALDA have always strived to be up front and transparent with the Watermaster regarding the data we analyze and results we obtain, regardless of the potential ramifications these findings have for individual appropriators. Our analyses have always strived to incorporate the best available data and technically defensible findings based on those data. Our reporting is also done in a public setting at Board meetings, a practice which was established ten years ago to allow the public to see firsthand the process and reports resulting in basin management decisions. As this is a basic premise of our operation, we endeavor to continue this transparency into the future.

In addition to the basic principles of successful administration of the Judgment, as outlined above, the TH&Co team brings to the Watermaster a wealth of experience, knowledge and expertise regarding the geology, hydrogeology, and management of the Beaumont Basin. Into the future, there are several issues the Beaumont Basin Watermaster faces that require engineering and hydrogeologic expertise to guide the appropriators toward optimum basin management. These include:

- Developing a Methodology and Policy to Account for Storage Losses
- Developing a Recycled Water Policy
- Developing a Return Flow Accounting Policy
- Balance of Recharge and Discharge Between the East side of the Basin and the West side
- Overall Optimum Basin Management

In the early part of 2022, the Watermaster endeavored to develop a framework for addressing these and other issues with the intent of holding workshops for strategizing the best path forward. Our review of the framework suggests that many of the elements are similar to elements required in SGMA Groundwater Sustainability Plans (GSPs). The TH&Co/ALDA team have the tools, experience and expertise to provide the technical support the Watermaster needs to address these issues and optimally manage the basin. The calibrated groundwater flow model that we developed to estimate the Safe Yield of the basin and analyze various projects and potential management actions (e.g., basin losses and return flow) will be a critical tool to evaluate future basin management alternatives.

Thomas Harder will be the focal point for internal and external communication and facilitation, serving as a link between you and team members. He will appropriate, assign, and direct the required resources to complete the tasks required of the Watermaster under this RFP and any other tasks identified as needed.

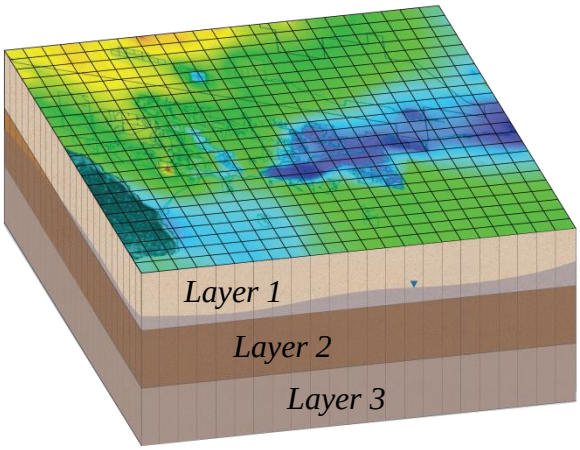
Firm Profile and Location

For more than three decades, ***Thomas Harder*** has been providing technical direction for municipalities and private interests to develop sustainable groundwater resources for the economy and well-being of the residents of California. From groundwater recharge projects in the eastern Mojave Desert to basin management and adjudication in southern California to the modeling and management of banking operations in the Central Valley area, Mr. Harder has played a key role in providing the technical support needed to guide decisions for basin managers. Since 2012, Mr. Harder's work has included hydrogeological services for the Beaumont Basin Watermaster for the implementation of the Judgment and management of the basin.

Mr. Harder formed ***Thomas Harder & Co.*** (TH&Co) in 2008 to provide a full range of hydrogeological services to municipal, industrial, agricultural, and legal interests. TH&Co's mission is to provide our clients with sound hydrogeological expertise for developing effective and sustainable groundwater resource solutions. Our areas of expertise include:

- **Groundwater Models**
- **Large-Scale Groundwater Basin Studies**
- **Groundwater Resource Management**
- **Well Production/Injection Strategy**
- **Artificial Recharge**
- **Design of High-Capacity Groundwater Wells**
- **Well Performance, Rehabilitation and Troubleshooting**
- **Well Modification**
- **Pumping Interference Evaluations**
- **Aquifer and Well Field Monitoring**
- **Groundwater Quality Analysis and Reporting**

3D - Model



Thomas Harder & Co. is a California S-Corporation with a staff of twelve professional geoscientists, geologists and hydrogeologists. Our office is located at 1260 N. Hancock Street, Suite 109, in Anaheim, California 92807.

Our mission is to provide clients with sound hydrogeologic analysis and technical expertise for developing effective and sustainable water resource solutions.

Anibal Blandon, P.E. For over 30 years, Mr. Blandon, has been involved in both regional and local water resources related project in Southern California in general and the Inland Empire in particular. Prior to forming ALDA in 2006, Blandon was involved in various regional water resources and reclamation projects in Los Angeles, Orange, Riverside, San Bernardino and San Diego counties. Locally, he was the project engineer for the Regional Water Master plan for the San Bernardino basin for the San Bernardino Valley Municipal Water District in the mid 1990's. This project served as the basis for subsequent groundwater modeling and water supply studies in the area. Mr. Blandon completed water master/supply plans for the Yucaipa Valley Water District, the cities of San Bernardino, Colton, and Riverside.

ALDA Inc. In 2006, Mr. Blandon formed ALDA Inc. (aka ALDA Engineering Inc.) to focus his water resources expertise on a limited number of clients in the Inland Empire and surrounding areas. Through 2011, Mr. Blandon provided engineering support to the Six Basin Watermaster in the Upland-Claremont-Pomona area. Services provided included the preparation of an annual report, estimate of the basin safe yield, and general engineering support to the Watermaster. Over the last 10 years, Mr. Blandon's work included engineering support services to the Beaumont Basin Watermaster for the implementation of the Judgment and management of the groundwater basin.

Organization, Key Personnel, and Resumes

TH&Co/ALDA team consists of highly specialized experts in engineering, hydrogeology, groundwater flow models, and groundwater basin management. Further, through ten years of experience providing the services specified in the RFP, the entire team has extensive knowledge of the of the Beaumont Basin, the Watermaster process and the requirements to fulfill the scope of work in the most cost effective and efficient manner possible.

Mr. Thomas Harder, PG, CHG will be the point of contact and principal in charge. Mr. Harder has more than 34 years of professional groundwater consulting experience working on hydrogeological projects throughout California, Arizona, Nevada, and Mexico. Since 1999, he has been extensively involved in hydrogeological data collection, design, and characterization of the Beaumont Basin, including test drilling and pilot testing of the Noble Creek Recharge Basins, design, construction management and testing of five large diameter municipal water wells, and peer review and development of groundwater flow models of the basin. He has served as the Beaumont Basin Watermaster hydrogeologist since 2012 and has also provided hydrogeological support for Chino Basin.

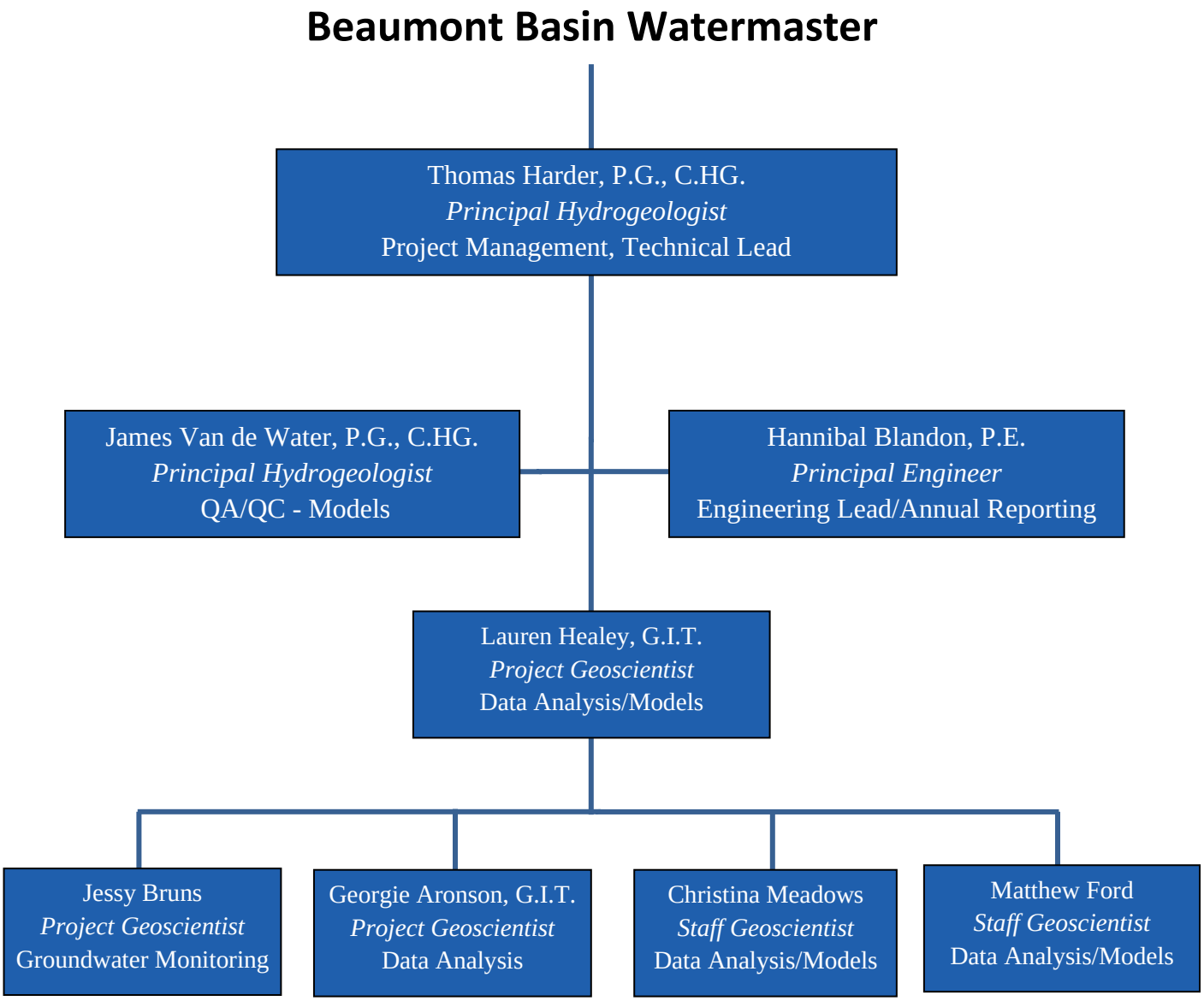
Mr. Anibal Blandon, PE (ALDA Inc) will be in charge of production and recharge data collection and compilation, preparation of the annual report, support for Watermaster rules and regulations and technical support for special projects. Mr. Blandon has been providing engineering services to the Beaumont Basin Watermaster since 2012 and is intimately familiar with the Judgment and reporting requirements. In addition, over the last 33 years Mr. Blandon has provided engineering services for the Six Basins Watermaster, multiple urban water master plans, recycled water master plans, and recharge basin design.

Mr. Jim Van de Water, PG, CHG is a principal hydrogeologist at TH&Co with more than 34 years of professional groundwater consulting experience for a variety of private sector clients and consulting firms as well as federal, state, and county regulatory agencies. Mr. Van de Water specializes in the development and calibration of analytical and numerical (finite difference, finite element, and integrated finite difference) groundwater flow and solute transport models. Mr. Van de Water has provided technical direction and QA/QC for all of TH&Co's basin-scale modeling projects, including the Beaumont Basin model, and will be in charge of the groundwater flow model analysis of safe yield update and QA/QC of all tasks for this project.

Ms. Lauren Healey, GIT will provide support to Mr. Harder and Mr. Blandon to obtain and compile hydrogeological data, conduct the analysis to estimate the annual Operating Safe Yield estimates, and will assist with the analysis to update the Safe Yield of the basin. Ms. Healey has more than 4 years of day-to-day experience developing and using basin-scale numerical models as well as preparation of detailed basin-scale cross sections, groundwater contour maps, and water budgets. Ms. Healey continues to be extensively involved in the development, reporting, and

presenting of the analytical and numerical models and has helped develop and calibrate six basin-scale numerical models.

Resumes of the staff to be utilized on the project are included in Attachment A.



Project Experience

Thomas Harder has more than 21 years of experience working on hydrogeological projects in the Beaumont Area (Mr. Harder's full resume is provided as Attachment A). Mr. Harder's work experience prior to 2008 was as an employee of Geoscience and is summarized as follows:

Thomas Harder Beaumont Area Experience			
Client	**Services Provided**	**Project**	**Project Duration/ Date of Work**
Beaumont-Cherry Valley Water District	Artificial Recharge/Conjunctive Use	Noble Creek Artificial Recharge Program • Test Drilling • Monitoring Well Construction • Basin Pilot Testing • Recharge Basin Design • Recharge Monitoring	2001 - 2008
	Wells and Well Field Design	Construction and Testing of Municipal Production Wells (5 Production Wells - 23, 24, 25, 26, and Sunny Cal No. 4/Well 29)	2001 - 2008
	Groundwater Models	Peer Review of USGS Model of the Beaumont and Banning Groundwater Storage Units – San Gorgonio Pass, CA	2005

Mr. Harder formed TH&Co in 2008 and since that time has continued to provide hydrogeological consulting services in the Beaumont Area. Our company experience in the Beaumont area is summarized as follows:

TH&Co Beaumont Basin Experience			
Client	**Services Provided**	**Project**	**Project Duration/ Date of Work**
Beaumont Basin Watermaster	Groundwater Models	Groundwater Flow Model of the Beaumont Basin – Riverside County, CA	2012 - 2014
	Watershed/Groundwater Basin Evaluations	Beaumont Basin Reevaluation of Safe Yield – Riverside County, CA	2012 - 2014
	Groundwater Management	Preparation of Annual Operating Safe Yield	2012 - Present
	Artificial Recharge/Conjunctive Use	Preliminary Recharge and Recovery Scenarios for Analysis to Estimate Storage Losses in the Beaumont Basin	2017
	Watershed/Groundwater Basin Evaluations	Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area	2019 - 2022

TH&Co Beaumont Basin Experience			
Client	**Services Provided**	**Project**	**Project Duration/ Date of Work**
	Groundwater Models	Analysis of Return Flow Impacts on Groundwater Quality in the Beaumont Basin	2021 - 2022
Beaumont-Cherry Valley Water District	Wells	Well 1A and 2A Preliminary Design	2018

In addition to our Beaumont Basin experience, below are selected recent clients and representative basin management projects. Also included in this section are more detailed descriptions of selected recent relevant projects along with client references.

Project/Location	Adjudicated Basin Management	SGMA GSPs	Groundwater Models	Sustainable Yield
Beaumont Basin Watermaster Services, Riverside County, CA *Beaumont Basin Watermaster*	✓		✓	✓
Tule Subbasin SGMA Support, Tulare County, CA *Tule Subbasin Technical Advisory Committee*		✓	✓	✓
Rosedale-Rio Bravo Managed Area GSP Support, Bakersfield, CA *Rosedale-Rio Bravo Water Storage District*		✓	✓	✓
Bear Valley Basin SGMA GSP, San Bernardino County, CA *Bear Valley Basin Groundwater Sustainability Agency*		✓		✓
Chino Basin Watermaster Services San Bernardino County, CA *Chino Basin Watermaster Appropriative Pool*	✓		✓	✓
Cucamonga Basin Watermaster Services, San Bernardino, CA *Cucamonga Basin Watermaster*	✓		✓	✓
Santa Clara River Valley East SGMA GSP Santa Clarita, CA Latham & Watkins		✓		✓
Orange County Southeast Management Area SGMA GSP Irvine, CA *Irvine Ranch Water District*		✓		✓
Borrego Springs Subbasin SGMA GSP, San Diego County, CA *Jackson Tidus*		✓	✓	✓
Kaweah Subbasin SGMA GSP, Tulare County, CA City of Visalia		✓	✓	✓

Updated Return Flow Accounting Methodology for the Beaumont Basin

Beaumont Basin Watermaster (2021 – 2022)

Project Objective

Estimates of return flow in the Beaumont Basin adjudicated area, by Appropriator, were published in the 2013 Reevaluation of the Beaumont Basin Safe Yield. In 2018, the Beaumont Basin Watermaster Committee directed the ALDA/TH&Co team to develop a revised return flow methodology to consider parcel by parcel water delivery records, a more detailed accounting of indoor/outdoor water use, and account for differences in return flow lag time between the time of application and the arrival of the return flow at the groundwater.

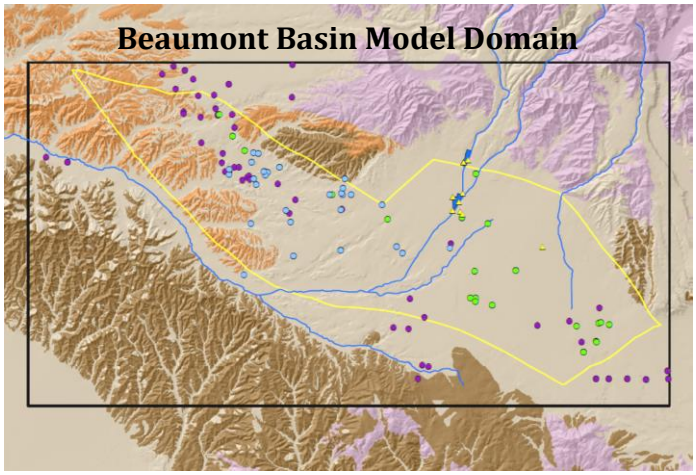
Project Approach

The ALDA/TH&Co team developed a detailed return flow accounting methodology that considered water delivery records, indoor/outdoor water use, land use classifications, irrigation efficiency, trends in water use efficiency, and return flow seepage lag time. Using the proposed accounting methodology, ALDA/TH&Co estimated the return flow, by Appropriator, for 2019.

Another aspect of the return flow methodology evaluation was an analysis to assess the impact that return flow would have on groundwater quality, namely total dissolved solids (TDS) concentrations, into the future. TH&Co conducted the analysis using our calibrated groundwater flow model of the Beaumont Basin (MODFLOW), developed for the 2013 Safe Yield Reevaluation, coupled with a solute transport model (MT3D-USGS).

Project Results

The Watermaster Committee is considering the return flow accounting methodology for incorporation into the Rule and Regulations for implementation to future water accounting. The groundwater quality analysis showed that basin-wide TDS concentrations are projected to remain below the Maximum Benefit Objective of 330 milligrams per liter into the foreseeable future.



Client Contact:

Mr. Dan Jaggers, General Manager
Beaumont-Cherry Valley Water District
560 Magnolia Ave
Beaumont, CA 92223
(951) 845-9581 ext. 217
dan.jaggers@bcvwd.org

SGMA Compliance for the Tule Subbasin

Tule Subbasin Technical Advisory Committee (2016 - Present)

Project Objective

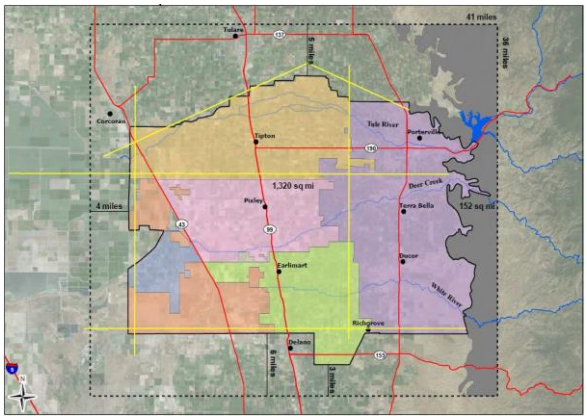
Evaluate the hydrogeological condition, water budget and sustainable yield of the Tule Subbasin in support of Sustainable Groundwater Management Act (SGMA) compliance. The Tule Subbasin consists of six separate Groundwater Sustainability Agencies (GSAs) operating under a common Coordination Agreement.

Project Approach

TH&Co conducted a phased approach to refine the hydrogeological understanding of the basin and estimate the future sustainable yield.

- Phase 1 – Development of a conceptual model and detailed historical surface water and groundwater budgets.
- Phase 2 – Identification of a model purpose, domain, calibration period, future projection period, and model code.
- Phase 3 – Development of the numerical model and future projections.

1,320 Square Mile Model Domain



TH&Co worked with the GSAs to develop and refine multiple future projections and sustainable yield estimates in an iterative way where the results of the model were presented and the GSAs provided direction for changes. This process has ultimately led to one future water budget for the Subbasin that was incorporated into each GSA's Groundwater Sustainability Plans (GSPs).

Project Results

The GSPs for each GSA in the Tule Subbasin were successfully submitted to the California Department of Water Resources (CDWR) in January 2020. TH&Co addressed CDWR comments to the GSPs and Coordination Agreement in July 2022. The model is continuously updated with refined data and management assumptions. TH&Co is also preparing Annual Reports for the collective GSAs for submittal each year.

Client Contact:
Mr. Eric Limas
Tule Subbasin Technical Advisory Committee
357 E. Olive Avenue
Tipton, CA 93272
(559) 686-4716
elimas@ltrid.org

Bear Valley Basin Groundwater Sustainability Plan

Bear Valley Basin Groundwater Sustainability Agency (2019 – Present)

Project Objective

The Bear Valley Basin in the San Bernardino Mountains of southern California relies solely on groundwater to meet municipal water supply demands. In 2019, the Bear Valley Basin GSA commissioned TH&Co to prepare a GSP to meet the requirements of the Sustainable Groundwater Management Act (SGMA) for a medium priority basin.

Project Approach

TH&Co was the technical lead to develop the Bear Valley GSP, preparing the Basin Setting, establishing the historical and future water budget, estimating the sustainable yield, and developing a data management system. In collaboration with the Bear Valley Basin GSA members and TH&Co's teaming partner Water Systems Consulting, TH&Co established management areas, identified a monitoring network, established sustainable management criteria, developed projects and management actions to achieve groundwater basin sustainability, and identified the process and procedures for annual and five-year reporting.

Project Results

The Bear Valley Basin GSP was accepted by the GSA Board and submitted to the CDWR in January 2022. TH&Co continues to provide reporting and data collection services in compliance with the GSP and SGMA, as well as permitting and implementation of Replenish Big Bear, the primary project identified from the GSP.

Client Contact:

Mr. Reggie Lamson, General Manager
City of Big Bear Lake Department of Water
41972 Garstin Drive
Big Bear Lake, CA 92315
(909) 866-5050
rlamson@bbldwp.com

Reevaluation of the Safe Yield of the Chino Basin

Chino Basin Watermaster Appropriative Pool (2009 - Present)

Since 2001, Thomas Harder has provided on-going technical direction for numerous projects in the Chino Basin including:

- Development of a calibrated numerical groundwater flow model of the Chino Basin for use in evaluating potential impacts of the Chino Desalter Well Field on agricultural wells,
- Development of a groundwater monitoring and management plan for the Chino Desalter Well Field,
- Siting, design and construction management of more than 20 municipal supply wells in the basin,
- Detailed analysis of subsidence in the western Chino Basin and participation in the Watermaster's Subsidence Technical Committee,
- Participation on the Watermaster's Recharge Steering Committee

More recently (since 2009), Mr. Harder has provided peer review oversight of the Watermaster's reevaluation of Safe Yield using a groundwater flow model. Mr. Harder was retained by the Watermaster Appropriative Pool to conduct the peer review.

The previous Safe Yield methodology had been based on a historical 10-yr baseline hydrology and land use condition. Precipitation during the selected 10-yr period was below the long-term 50-yr average. Further, rapid land use changes from agriculture to residential was changing the hydrology and recharge in these areas. Thus, the Safe Yield for the next 10-yrs was not representative. Mr. Harder provided recommendations to use the Watermaster's existing groundwater flow model, modified to account for changing land use conditions, to develop the Safe Yield based on a forward projection that incorporated a 50-yr average hydrology.

Mr. Harder continues to provide peer review support for model updates and Safe Yield update for 2025.

Client Contact:

Mr. Eduardo Espinoza
Cucamonga Valley Water District
10440 Ashford St.
Rancho Cucamonga, CA 91730
(855) 654-2893
Eduardoe@cvwdwater.com

References

1. Mr. Reggie Lamson
   City of Big Bear Lake Department of Water
   41972 Garstin Dr.
   Big Bear Lake, CA 92315
   (909) 866-5050
   rlamson@bbldwp.com

2. Mr. Eric Limas
   Tule Subbasin Technical Advisory Committee
   357 E. Olive Avenue
   Tipton, CA 93272
   (559) 686-4716
   elimas@ltrid.org

3. Mr. Dan Bartel
   Rosedale-Rio Bravo Water Storage District
   849 Allen Road
   Bakersfield, CA 93314
   (661) 589-6045
   dbartel@rrbwsd.com

4. Mr. Eduardo Espinoza
   Cucamonga Valley Water District
   10440 Ashford St.
   Rancho Cucamonga, CA 91730
   (855) 654-2893
   Eduardoe@cvwdwater.com

5. Mr. Ben Lewis, General Manager Claremont and San Dimas CSA
   Golden State Water Company
   689 W. Foothill Blvd, Unit E
   Claremont, CA 91711
   Six Basins Representative
   (909) 227-0617

Scope of Services

Task 1 – Data Collection

TH&Co will collect and compile the following data with the support of ALDA and in coordination with Dudek. Through our past work for the Beaumont Basin Watermaster, TH&Co has already developed a comprehensive hydrologic and hydrogeologic database specific to the area of interest in the RFP. Any data collected will be added to this database and coordinated with the regional database. The data necessary for the Annual Report includes:

- Monthly groundwater production for all domestic groundwater production wells,
- Monthly rainfall at established precipitation stations in the area,
- Monthly static groundwater levels at dedicated monitoring wells and selected production wells,
- Monthly deliveries of imported water and/or surface water diversions from applicable water providers, and
- Annual water quality from domestic production wells from the State of California's Groundwater Ambient Monitoring and Assessment Program (GAMA) database and from other non-domestic wells, as documented in the Beaumont Management Zone Maximum Benefit Monitoring Program.

All data will be checked by TH&Co prior to use in analysis and/or incorporation into the annual reports.

Task 2 – Preparation of Annual Reports

ALDA will prepare Annual Reports for each year of the three-year contract that summarize the operations of the Beaumont Basin Watermaster including groundwater levels, water transfers, groundwater production, water quality, assessment of basin conditions, carryovers, replenishment, replenishment obligations, and recommendations for future pumping and spreading activities. The Annual Reports will also provide a summary of all Watermaster Committee activities, as discussed during regular and special meetings, and will provide an annualized safe yield based on the analysis from Task 3. The first Annual Report will be prepared in 2023 for the basin operational data from 2022. Once the final report is approved and adopted, all data, draft documents, spreadsheets, presentations, and other related information used to prepare the Annual Report will be submitted to the Secretary of the Watermaster within thirty days. The cost estimate for this task assumes one draft version of the Annual Report (one hard copy and one electronic version) and one final version (one hard copy with an attached CD that has the electronic version).

Task 3 – Annual Determination of Operating Safe Yield

TH&Co will review groundwater levels, groundwater production, groundwater recharge and change in storage for the Beaumont Basin area as a basis for determining the annual operating safe yield (OSY) of the basin. As part of this task, TH&Co will prepare a groundwater level contour map for the fall of each year and compare it to the groundwater contour map of the previous year to assess changes in groundwater flow patterns across the basin and change in groundwater storage. TH&Co will generate an Operating Safe Yield Technical Memorandum (TM) that summarizes the analysis and provides an annualized safe yield for the 2022 calendar year. The TM will be incorporated into the Annual Report, to be prepared by ALDA. The cost estimate for this subtask assumes one draft version of the TM (two hard copies and one electronic version) and one final version (five hard copies, each with an attached CD that has the electronic version).

Task 4 – Review of Rules & Regulations

The TH&Co/ALDA team will review the existing Rules & Regulations at least once annually to determine if it reflects current policies and practices and will make recommendations, as appropriate, in the Annual Report. The cost estimate for this task assumes revisions are minor.

Task 5 – Meeting Attendance and Agenda Support

The TH&Co/ALDA team will attend up to six regular meetings at the Watermaster in Beaumont, California in each year of the contract. As needed, TH&Co and ALDA can attend special meetings or workshops at the Watermaster's request. The budget for this task assumes that six meetings will be attended. Costs to attend additional meetings at the request of the Watermaster will be billed on a time-and-materials basis at the billing rates indicated in Table 1 of this proposal.

Task 6 – Miscellaneous Special Projects

TH&Co and ALDA will provide as-needed hydrogeological and engineering services for special projects when they are identified. Separate scopes of work and budgets will be submitted to the Watermaster for approval prior to work on each project.

Task 7 – 10-Year Safe Yield Redetermination

As per the Beaumont Basin Judgment, it will be necessary to re-determine the safe yield of the Beaumont Basin in 2023. Although there are multiple methods available for estimating the safe yield of a groundwater basin, the most comprehensive evaluation is through a calibrated, distributed parameter, numerical groundwater flow model, as was done by TH&Co in 2013. Analysis of safe yield using the calibrated groundwater model provides the most complete representation of the water balance of the basin. Further, the model will provide a valuable tool to address other aspects of the Judgment including:

- New yield estimates.
- Losses from the basin.
- Potential changes in safe yield over time from land use changes.
- Optimum management of groundwater resources.
- Identification of data gaps.

TH&Co developed the groundwater flow model of the Beaumont Basin based on a modified and updated version of the United States Geological Survey (USGS) surface and groundwater flow model, as published in 2006.[1] This model was developed using the USGS code MODFLOW, a three-dimensional numerical finite difference modeling code. The model is public domain, encompasses the entire Beaumont Basin and simulates hydrological and hydrogeological conditions from 1927 through 2021. TH&Co has updated the pumping and recharge in the model every year since 2013. However, it would be beneficial to reevaluate some of the other hydrogeological assumptions upon which the older model is based (e.g., boundary conditions) and recalibrate the model in order to account for data collected in the basin since 2013. Our proposed detailed tasks to update the model and redetermine the safe yield of the basin are as follows:

Subtask 7.1 – Model Update

Through validation of the model calibration in recent years, TH&Co has observed deviations between measured and model-generated groundwater levels in certain areas. These include the western part of the basin and in the Noble Creek Recharge Basins area. It would be beneficial to update the model parameters and boundary conditions in these areas to incorporate recent hydrogeological investigations and work as well as new data prior to redetermining the safe yield. Specifically, we are proposing to reevaluate aquifer parameters, layer boundaries, boundary inflows, and fault characteristics. The model pumping and recharge stresses would also be updated through December 2022.

Subtask 7.2 – Model Recalibration

As certain structural and boundary modifications may be implemented as well as the input file updates noted in Task 7.1, the updated model will need to be recalibrated prior to using it to make forecasts and estimate safe yield. TH&Co proposes to use the automated calibration utility PEST++-IES, which will enable us to vary thousands of model parameters in a very short time resulting in an optimum match of measured and model-generated groundwater levels. An additional benefit of using PEST++-IES is that model uncertainty can be readily quantified. While we generally recommend that uncertainty analysis be conducted for forecasting models, it is not

[1] Rewis, D.L., Christensen, A.H., Matti, J.C., Hevesi, J.A., Nishikawa, T., Martin, P., 2006. *Geology, Ground-Water Hydrology, Geochemistry, and Ground-Water Simulation of the Beaumont and Banning Storage Units, San Gorgonio Pass Area, Riverside County, California*. USGS Scientific Investigations Report 2006-5026.

included in our cost estimate. A cost estimate to conduct a predictive uncertainty analysis can be developed at the request of the stakeholders.

Subtask 7.3 – Analysis of Safe Yield

The most representative estimates of safe yield utilize a calibrated groundwater flow model to analyze a future projection of expected basin management. The projection would incorporate the following:

- Expected groundwater pumping and recharge by the parties to the Judgment,
- A projected hydrology based on a long-term historical record, and
- Projections of changes in land use.

Our scope of work is based on this approach and includes:

Preparing Schedules of Expected Future Groundwater Pumping and Recharge - Fundamental to the safe yield estimate is the future projection of expected groundwater pumping and recharge in the basin. TH&Co will prepare an initial draft schedule of pumping and recharge based on projected water use and supplies specified in the most recent versions of each party's Urban Water Management Plans (UWMPs). The budget for this subtask is based on a 50-yr projection.

Preparing Projection Assumptions for Hydrology - As it is not possible to predict future hydrological conditions (e.g., precipitation and streamflow), assumptions must be made based on the historical record. We propose to develop an average future hydrologic condition for the model projection based on the long-term historical average hydrology observed in the basin. The period for the historical average will depend on the available data but is anticipated to be a minimum 50-yr record. As per SGMA, future projections of hydrology for other basins in California are required to incorporate adjustments to account for climate change. These adjustments are published on the California Department of Water Resources (CDWR) website and are readily available. TH&Co will incorporate the climate change adjustments in the hydrology projections for the Beaumont Basin.

Preparing Projection Assumptions for Land Use - TH&Co will review projected land use changes in each party's respective UWMPs to ensure that any changes are incorporated into the future projection scenario for analysis with the model.

Preparing a Technical Memorandum Describing the Future Basin Operation Projection Scenario - TH&Co will prepare a TM that describes the future basin operation projection scenario for submittal to the parties for review and comment. The TM will include schedules for future pumping and recharge, a description of assumptions for projected hydrology, and a description of assumptions for future land use. As needed, TH&Co can meet with the parties to present the projected scenario, answer questions, and discuss potential revisions. One

meeting is budgeted. Upon incorporation of party comments, TH&Co will finalize the TM and proceed to prepare the model input files for analysis.

Prepare Input Files for Future Basin Projection - Upon approval of the future projection scenario, TH&Co will prepare model input files for projected pumping, recharge and hydrology in preparation to run the model. The budget for this task assumes a 50-Year projection.

Analyze Future Basin Projection with the Model and Estimate Safe Yield - TH&Co will analyze the future basin projection using the groundwater flow model. This will result in a future water budget consisting of inflow and outflow components as well as a change in groundwater storage both annually and cumulatively. The safe yield will be estimated based on a foundational concept of hydrogeology referred to as the "continuity equation" which can be simplified as:

$$Inflow - Outflow = \pm \Delta Storage$$

Inflow terms will include areal recharge from precipitation, irrigation return flow recharge, septic system return flow recharge, recharge in stream channels, and underflow into the basin. Outflow terms will include groundwater pumping, evapotranspiration, and underflow out of the basin. The safe yield will be estimated as the sum of the inflow terms that result in no net change in groundwater storage for given land use conditions and under average hydrology for the 50-yr projection period.

Subtask 7.4 – Model Report

TH&Co will prepare a report documenting the updated and recalibrated groundwater flow model, the future projection basin operational scenario, and the safe yield. The report will include:

- A background and purpose for the model,
- A description of the modeling methodology,
- Sources of data used in the model,
- A description of the hydrogeologic setting and conceptual model,
- A description of the model design and computer codes,
- Results of the model calibration,
- Results of the model uncertainty analysis,
- A description of the model scenarios evaluated with the model,
- Results of the analysis of the model scenario including the safe yield estimate, and
- Conclusions and Recommendations

The report would include maps showing the model area, hydrogeologic setting, wells, boundary conditions, input parameter distribution and model analysis results. Supporting data and information will be provided in appendices as appropriate. The budget for this task includes preparation and submittal of one draft version of the model summary report for review and comment (electronic files). Upon incorporation of comments, TH&Co will generate one final electronic version of the report.

Cost Proposal

Our total cost to perform the scope of work described herein (Tasks 1 through 7) is $315,805 as detailed in Table 1. The cost for Tasks 1 through 6 is for one year (2023) of the 3-year term of the contract. Task 1 through 6 for subsequent years (2024 and 2025) will be submitted under separate scope of work and cost prior to establishing the annual budget for those years. The level of effort provided in the scope of work is based on our knowledge of the available data and our experience conducting these tasks previously for the Watermaster Committee.

Our services will be billed on a time-and-materials basis at the unit rates provided at the end of this section. These rates are guaranteed for the Beaumont Basin Watermaster for the three-year term of the contract.

Insurance

TH&Co can provide all required insurance certificates as stated in the draft copy of "Professional Services Agreement" attached as Exhibit "B" in the RFP

Beaumont Basin Watermaster
On-Call Professional Engineering Services

Table 1

Cost Estimate for Beaumont Basin Watermaster On-Call Engineering Services

			Thomas Harder & Co.								ALDA			
Task	Sub-task	Description	Principal Hydro-Geologist $220/hr	Associate Hydro-Geologist $190/hr	Senior Hydro-Geologist $160/hr	Project Geo-Scientist $135/hr	Staff Geo-Scientist $115/hr	Graphics $100/hr	Clerical $80/hr	Total Hours TH&Co	Project Manager $225/hr	Professional Engineer $200/hr	Total Hours ALDA	Total Cost
1		**Data Collection (1 Yr)**	12	0	0	36	0	0	0	48	4	56	60	**$19,600**
2		**Preparation of Annual Reports**	12	0	0	0	0	0	0	12	82	92	174	**$39,490**
3		**Annual Determination of Operating Safe Yield**	9	0	0	27	36	18	4	94	16	0	16	**$15,485**
4		**Review of Rules and Regulations**	0	0	0	0	0	0	0	0	8	0	8	**$1,800**
5		**Meeting Attendance**	42	0	0	0	0	0	12	54	48	0	48	**$21,000**
6		**Miscellaneous Special Projects**	*To Be Determined*							0			0	**$0**
		Total Labor Hours Tasks 1 through 6	**75**	**0**	**0**	**63**	**36**	**18**	**16**	**208**	**158**	**148**	**306**	**$97,375**
7		**10-Year Safe Yield Redetermination**												
	7.1	Model Update	20	28	0	84	50	0	0	182	8	0	8	**$28,610**
	7.2	Model Recalibration	64	0	0	192	100	0	0	356	0	0	0	**$51,500**
	7.3	Analysis of Safe Yield	64	148	0	184	160	12	8	576	16	0	16	**$90,880**
	7.4	Prepare Draft Report	24	40	0	100	40	40	8	252	8	0	8	**$37,420**
	7.5	Prepare Final Report	8	12	0	24	16	0	0	60	4	0	4	**$10,020**
		Total Labor Hours Task 7	**180**	**228**	**0**	**584**	**366**	**52**	**16**	**1426**	**36**	**0**	**36**	**$218,430**
												Total Cost		**$315,805**

Note: Costs for Tasks 1 through 6 are for Annual Reporting and Meeting Attendance for the 2023 Reporting Year. Costs for 2024 and 2025 of the Contract Will Be Prepared Under Separate Scope of Work and Cost Estimate.

Attachment A

Resumes

THOMAS E. HARDER

Principal Hydrogeologist

EDUCATION

B.S., Geology. California State Polytechnic University - Pomona, 1990

M.S., Geology with Honors. Emphasis in Hydrogeology, California State University – Los Angeles, 1995

PROFESSIONAL REGISTRATIONS

California Professional Geologist (No. 6512)

Certified California Hydrogeologist (No. 588)

PROFESSIONAL AFFILIATIONS

National Ground Water Association

Groundwater Resource Association of California

Watereuse Association

For more than three decades, Mr. Harder has been providing technical direction for municipalities and private interests to develop sustainable groundwater resources for the economy and well-being of the residents of California. From groundwater recharge projects in the Mojave Desert to basin management and adjudication in southern California to the modeling and management of banking operations in the Kern Water Bank, Mr. Harder has played a key role in providing the technical support needed to guide decisions for basin managers. His expertise spans a wide range of hydrogeological disciplines, including regional groundwater basin analysis, sustainable yield, artificial recharge, groundwater management, groundwater models, contaminant hydrogeology, and water wells.

PROFESSIONAL EXPERIENCE

2008 to Present: *Principal Hydrogeologist*, Thomas Harder & Co.; Anaheim, California

1998 to 2008: *Senior Geohydrologist*, Geoscience Support Services, Inc.; Claremont, California

1997 to 1998: *Principal Hydrogeologist, Geosciences Department Manager*, Parsons Engineering Science; Pasadena, California

1989 to 1997: *Senior Geologist*, Harding Lawson Associates; Irvine, California

TECHNICAL COMMITTEE PARTICIPATION

2016 - Present: Metropolitan Water District of Southern California Regional Recycled Water Recharge Scientific Advisory Panel

2011 to 2016: Kern Fan Monitoring Committee – Groundwater Model Technical Advisory Subcommittee

2010 to 2013: Chino Basin Recharge Master Plan Steering Committee

2009 to 2012: Chino Basin Watermaster Appropriative Pool and Advisory Committee

2003 to Present: Big Bear Lake Department of Water Groundwater Management Technical Review Team

2002: Chino Basin Subsidence Technical Committee

PROJECT EXPERIENCE – SUSTAINABLE GROUNDWATER MANAGEMENT ACT (SGMA)

Tule Subbasin Sustainable Groundwater Management Act Compliance, Tulare County, CA

Client: Tule Subbasin TAC. 2017 - Present.

Currently providing technical direction to the Tule Subbasin Technical Advisory Committee (TAC) for compliance with the Sustainable Groundwater Management Act (SGMA). This has included development of a subbasin-wide hydrogeological conceptual model and calibrated groundwater flow model. Mr. Harder and his team also developed a groundwater and land subsidence monitoring plan and hydrogeological sections of the Groundwater Sustainability Plans (GSPs) for each of the six Groundwater Sustainability Agencies (GSAs) in the subbasin. Mr. Harder also provided technical support for development of sustainable management criteria and development of a Coordination Agreement between the GSPs. Mr. Harder and his team continue to provide monitoring and annual reporting services for the TAC.

Bear Valley Basin Groundwater Sustainability Plan, San Bernardino County, CA

Client: Bear Valley Basin Groundwater Sustainability Agency. 2019 - Present.

Mr. Harder was the technical director for the preparation of a Groundwater Sustainability Plan (GSP) for the Bear Valley Basin in the mountains of San Bernardino County, California. The GSP was submitted and adopted in January 2022. Mr. Harder continues to provide technical direction and support for basin monitoring and annual reporting.

Orange County Southeast Management Area Basin Setting Document, Orange County, CA

Client: Irvine Ranch Water District. 2016 - 2021.

Mr. Harder prepared the basin setting section for the Orange County Groundwater Basin Southeast Management Area Groundwater Sustainability Plan. Mr. Harder also prepared the 5-year update in 2021.

Santa Clara River Valley East Groundwater Subbasin Groundwater Sustainability Plan, Los Angeles County, CA

Client: Latham & Watkins, LLP. 2020 - Present.

Provided technical direction and consulting for the review of a groundwater flow model and Groundwater Sustainability Plan (GSP) for the Santa Clara River Valley East Subbasin. Provided comments to the GSP and technical input into basin management scenarios for analysis using the groundwater flow model.

Kaweah Subbasin Sustainable Groundwater Management Act Compliance, Tulare County, CA

Client: City of Visalia. 2018 - Present.

Currently serving as a technical representative for the City of Visalia and the Mid-Kaweah GSA for compliance with SGMA as it pertains to the Kaweah Subbasin in Tulare County, California. This has included technical review of hydrogeological reports and a model prepared by another consultant.

Borrego Springs Groundwater Subbasin Groundwater Sustainability Plan, San Diego County, CA

Client: Jackson Tidus, LLP. 2019.

Provided technical direction and consulting for the review of a groundwater flow model and sustainable yield analysis for the Borrego Springs Groundwater Subbasin in San Diego County, California. Provided comments to the GSP and technical input into basin management scenarios for analysis using the groundwater flow model.

PROJECT EXPERIENCE – GROUNDWATER MANAGEMENT (OTHER THAN SGMA)

Eastern Tule GSA Land Subsidence Monitoring and Management Plan, Tulare County, CA

Client: Eastern Tule Groundwater Sustainability Agency. 2020 - Present.

Mr. Harder has been providing technical direction to develop a monitoring and management plan to control land subsidence along the Friant-Kern Canal in the eastern portion of the Tule Subbasin. Mr. Harder conducted extensive analysis using a groundwater flow model to assess potential future land subsidence along the canal and evaluate groundwater management measures that would have the greatest success at controlling land subsidence. From the analysis, Mr. Harder prepared a land subsidence monitoring plan and provided technical direction to develop a land subsidence management plan through a collaborative process with ETGSA board members, staff, and potentially affected landowners/growers. Mr. Harder and his team review land elevation, groundwater level, and satellite data on an ongoing basis as part of a Land Subsidence Monitoring Committee that reviews the data and provides recommendations for management action.

Beaumont Basin Watermaster, Riverside and San Bernardino Counties, CA

Client: Beaumont Basin Watermaster. 2012 to Present.

Provides groundwater management planning services to the Beaumont Basin Watermaster. This includes assistance with annual reports, analysis of operating safe yield, and basin condition assessments. Mr. Harder also provides analysis of various proposed projects and management actions using a calibrated groundwater flow model.

Chino Basin Environmental Water Storage/Exchange Project – Chino Basin, CA

Client: Inland Empire Utilities Agency. 2018 - 2020.

Mr. Harder provided a preliminary analysis of various recharge and recovery alternatives associated with a regional recharge and recovery project. The project entails an advanced water treatment facility that would provide up to 15,000 acre-ft/yr of advanced treated recycled water which would be used to recharge the Chino Groundwater Basin using injection wells or recharge basins. This water would be stored solely for ecosystem benefits in the Sacramento-San Joaquin Delta. In-lieu of imported water deliveries, the stored water could be pumped out at a rate up to 50,000 acre-ft/yr and delivered to an imported water pipeline.

PROJECT EXPERIENCE – GROUNDWATER MANAGEMENT (OTHER THAN SGMA)

Kern Water Bank Joint Operating Committee, Kern County, CA

Client: Rosedale-Rio Bravo Water Storage District. 2012 to Present.

Mr. Harder provides technical direction to the Joint Operating Committee for evaluating the impacts of projected pumping and/or recharge within the Kern Water Bank on area private wells. Analysis is informed through the annual update of Thomas Harder & Co.'s calibrated numerical groundwater flow model of the Kern Water Bank and area.

Chino Basin Optimum Basin Management Plan, Chino Basin, CA

Client: Chino Basin Watermaster Appropriative Pool. 2012 to Present.

Mr. Harder provides technical consulting for the Appropriative Pool including review and comment on the basin groundwater flow model, updates to the safe yield of the basin, and basin management including the Optimum Basin Management Plan (OBMP).

Chino Basin Watermaster Recharge Master Plan Update

Client: Jurupa Community Services District. 2009 to 2013.

Mr. Harder served on the technical steering committee for development of the Chino Basin Recharge Master Plan Update, published in 2013.

Chino Basin Watermaster

Client: Jurupa Community Services District. 2009 to 2012.

Representative for the JCSD on the Appropriative Pool and Advisory Committees. Provided input and direction on policy issues that affected the JCSD.

City of Pomona Integrated Water Supply Plan

Client: RMC Water/City of Pomona. 2010.

Provided an analysis of groundwater supply issues related to an overall water supply strategy for the City. Included an analysis of groundwater production in the Chino, Six Basins area, and Spadra Basin.

Santa Ana Watershed Cooperative Agreement

Client: San Gorgonio Pass Water Agency. 2009.

Provided technical support to the Agency in meeting the requirements of the Regional Water Quality Control Board's Cooperative Agreement for total dissolved solids and nitrate management associated with the artificial recharge of imported water within the Santa Ana River Watershed.

Adelanto Water Development Strategy – Adelanto, CA

Client: Confidential. 2007 to 2008.

Developed a strategy to meet anticipated water supply demands for a proposed 5,000-unit residential development near Adelanto, CA. Included a planning-level assessment of imported water, groundwater, recycled water and conservation options as part of an integrated water supply plan.

PROJECT EXPERIENCE – GROUNDWATER MANAGEMENT (OTHER THAN SGMA)

Gillibrand/Tapo Canyon AB3030 Groundwater Management Plan – Simi Valley, CA

Client: Ventura County Waterworks District No. 8 City of Simi Valley. 2006 to 2007.
Developed a groundwater monitoring and management plan in accordance with AB3030 as a cooperative program for the City of Simi Valley and the P.W. Gillibrand Mining Corporation.

Chino Desalter System Projects Groundwater Monitoring and Mitigation Plan – Chino, CA

Client: Chino Basin Desalter Authority. 2002 to 2004.

Developed a comprehensive groundwater monitoring and mitigation plan for the Chino Desalter well field. The purpose of the plan was to address potential impacts from lowering the groundwater level on private agricultural wells in the vicinity of the well field.

Big Bear Valley Groundwater Monitoring and Management Plan – Big Bear Lake, CA

Client: City of Big Bear Lake Department of Water & Power. 2002 to 2005.

Developed a comprehensive groundwater monitoring and management plan for the Big Bear Lake area of the San Bernardino Mountains. Currently serving as a member of a technical review team to periodically review monitoring data and provide input for basin management decisions.

Lake Arrowhead Integrated Surface and Groundwater Management Plan – Lake Arrowhead, CA

Client: Lake Arrowhead Community Services District. 2004 to 2007.

Developed a groundwater monitoring and management strategy for the Lake Arrowhead area. Included identifying monitoring features and potential locations for the features to improve the existing database for the area's water resources.

Cadiz Groundwater Storage and Dry-Year Supply Program – Cadiz, CA

Client: Metropolitan Water District of Southern California. 1998 to 2002.

Provided technical assistance for the development of an EIR/EIS for the project that included a detailed and comprehensive groundwater monitoring and management plan. The plan covered an area of approximately 1,500 square miles of the eastern Mojave Desert and included implementation of cluster monitoring wells, soil moisture instrumentation, stream gages, evapotranspiration stations, and other weather stations. Participated in meetings with the U.S. Geological Survey, U.S. Bureau of Land Management, U.S. Parks Department, and the County of San Bernardino to adjust and finalize the monitoring and management plan.

Robinson Ranch Golf Course – Santa Clarita, CA

Client: Robinson Development Corporation. 2000.

Developed a comprehensive groundwater monitoring and management plan for groundwater pumping related to irrigation for a golf course. The plan outlined a monitoring well network and detailed monitoring and sampling protocol. The plan was prepared in cooperation with the State of California Water Resources Control Board.

PROJECT EXPERIENCE – WATERSHED / GROUNDWATER BASIN EVALUATIONS

Tule Subbasin Water Balance Analysis/SGMA Compliance – Tulare County, CA

Client: Tule Subbasin MOU Group. 2015 to present.
Prepared detailed surface water and groundwater budgets for the Tule Subbasin and surrounding watershed. The analysis resulted in change in groundwater storage estimates using multiple methods for the period between 1987 and 2014. The work was originally used in support of a legal case for which Mr. Harder served as an expert witness. The water budgets were later refined for use in support of Sustainable Groundwater Management Act (SGMA) compliance for the Tule Subbasin MOU Group.

Aliso Creek Groundwater Supply Evaluation – Laguna Niguel, CA

Client: Moulton Niguel Water District. 2017 - Present.
Conducted a feasibility study for the development of groundwater resources in the Aliso Creek Canyon. The study included the drilling and testing of three monitoring wells and two test wells.

Cummings Valley Safe Yield Evaluation – Tehachapi Mountains, CA

Client: SunSelect Produce. 2015.
Conducted a peer review of a safe yield evaluation of the Cummings Valley Groundwater Basin near Tehachapi, California.

South Fork Kern River Valley Surface and Groundwater Analysis – Kern County, CA

Client: Spaletta Law/Rosedale-Rio Bravo Water Storage District. 2015 to present.
Prepared a detailed hydrogeological conceptual model, surface water budget, groundwater budget for an analysis of groundwater resources in the South Fork Kern River valley. The analysis included development of a three-dimensional numerical surface and groundwater flow model.

Lee Lake Groundwater Basin Water Balance Analysis – Riverside County, CA

Client: VA Consulting/Summit Partners, LLC. 2014 - 2015.
Conducted a surface and groundwater water balance for the Lee Lake Groundwater Basin near Corona, California.

Beaumont Basin Reevaluation of Safe Yield – Riverside County, CA

Client: Beaumont Basin Watermaster. 2012 - 2014.
Conducted a reevaluation of the safe yield of the Beaumont Basin adjudicated area as required by the Judgment for the Beaumont Basin Watermaster. Included the development of a numerical groundwater flow model of the basin for use in the reevaluation.

San Bernardino Liquefaction Mitigation Project – San Bernardino, CA

Client: PACE/Inland Valley Development Agency. 2009 to 2010.

Conducted an evaluation of potential pumping necessary to lower groundwater levels in the downtown San Bernardino area to levels that are preventative of liquefaction in the event of an earthquake.

PROJECT EXPERIENCE – WATERSHED / GROUNDWATER BASIN EVALUATIONS

Arrastre Creek Water Resource Evaluation – San Bernardino Mountains, CA

Client: City of Big Bear Lake Department of Water and Power. 2010.

Conducted a perennial yield evaluation of the Arrastre Creek Watershed, located east of the community of Lake William in the San Bernardino Mountains, California. Perennial yield was evaluated using a simplified water balance approach as a basis for developing the groundwater resource as a water supply for the nearby community. Provided an analysis and recommendations for potential well sites to develop the resource.

Peer Review of USGS Scientific Investigations Report – Big Bear and Baldwin Lakes Watershed, CA

Client: City of Big Bear Lake Department of Water and Power. 2007.

Prepared peer review comments for the United States Geological Survey's draft report entitled "Geohydrology of the Big Bear Groundwater Basin, California." Coordinated revisions to the report with USGS scientists.

Murrieta Valley Perennial Yield Evaluation – Murrieta, CA

Client: Western Municipal Water District. 2006.

Technical advisor for a perennial yield evaluation of the Murrieta Valley in Riverside County, California. Provided an analysis and recommendations for potential artificial recharge sites to supplement natural recharge in the area.

Tapo Canyon Perennial Yield Evaluation – Simi Valley, CA

Client: Ventura County Waterworks District No. 8 City of Simi Valley. 2005 to 2006.

Project manager and technical advisor for the development of a detailed hydrogeologic analysis of the watershed surrounding Tapo Canyon for the purpose of developing estimates of maximum perennial yield (i.e. safe yield). Included the development of a detailed watershed hydrologic model (using EPA HSPF), which was calibrated to stream flow. Provided recommendations for future production wells based on study results.

Lake Arrowhead Perennial Yield Evaluation – Lake Arrowhead, CA

Client: Lake Arrowhead Community Services District. 2004 to 2005.

Project manager and technical advisor for the development of a detailed hydrogeologic analysis of the watersheds surrounding Lake Arrowhead for the purpose of developing estimates of maximum perennial yield (i.e. safe yield). Included the development of a detailed watershed hydrologic model (using EPA HSPF), which was calibrated to historical lake levels.

Big Bear Lake Area Groundwater Exploration Program – Big Bear Lake Watershed, CA

Client: City of Big Bear Lake Department of Water and Power. 2002 to 2005.

Project manager and technical advisor for an ongoing test drilling program in the Big Bear Lake Watershed to evaluate the groundwater production potential of areas identified as potential well sites. Eleven test drilling sites have been explored. The testing program includes detailed stratigraphic analysis, depth-specific production and water quality testing, supervision and interpretation of geophysical logs, and design and construction of monitoring wells at key locations.

PROJECT EXPERIENCE – WATERSHED / GROUNDWATER BASIN EVALUATIONS

Perennial Yield – Lake Williams Tributary Subarea, Baldwin Lake Watershed, CA

Client: City of Big Bear Lake Department of Water and Power. 2004.

Developed a detailed hydrogeologic analysis of the tributary subarea surrounding Lake Williams in the Baldwin Lake Watershed of the San Bernardino Mountains for the purpose of developing estimates of maximum perennial yield (i.e. safe yield). Included the development of a detailed watershed hydrologic model (using EPA HSPF).

Hydrogeologic Evaluation of Gypsum Canyon – Northern Santa Ana Mountains, CA

Client: Confidential. 2004.

Performed a study to assess the groundwater resources of the Gypsum Canyon Area of the Northern Santa Ana Mountains. Included an evaluation of potential natural groundwater recharge and an impact analysis for use in support of an EIR for a future housing development.

Hydrogeologic Evaluation of Rattlesnake Canyon – Northern Santa Ana Mountains, CA

Client: Confidential. 2003 to 2004.

Performed a study to assess the groundwater resources of the Rattlesnake Canyon Area of the Northern Santa Ana Mountains. Included an evaluation of potential natural groundwater recharge and an impact analysis for use in support of an EIR for a future housing development.

Baldwin Lake Area Groundwater Exploration Program – Big Bear City, CA

Client: Big Bear City Community Services District. 2003.

Designed and supervised a test drilling program to evaluate the groundwater production potential of three sites within the Baldwin Lake watershed. The testing program included detailed stratigraphic analysis, depth-specific production and water quality testing, supervision and interpretation of geophysical logs.

Hydrogeologic Evaluation of Irvine Lake Area – East Orange, CA

Client: Confidential. 2003.

Performed a study to assess the groundwater resources of the Irvine Lake Area of the Northern Santa Ana Mountains. Included an evaluation of potential natural groundwater recharge, groundwater quality and an impact analysis for use in support of an EIR for a future housing development.

Perennial Yield Evaluation – North Shore and Grout Creek Subunits, Big Bear Lake, CA

Client: City of Big Bear Lake Department of Water and Power. 2003.

Developed a detailed hydrogeologic analysis of the North Shore and Grout Creek Hydrologic Subunits on the north side of Big Bear Lake in the San Bernardino Mountains of southern California for the purpose of refining previous estimates of maximum perennial yield (i.e. safe yield). Included delineation of tributary subareas and a detailed analysis of the geology, aquifer systems, groundwater levels, groundwater production, groundwater quality, precipitation, evapotranspiration, and surface water runoff for each subarea. Included the development of a detailed watershed hydrologic model (using EPA HSPF).

PROJECT EXPERIENCE – WATERSHED / GROUNDWATER BASIN EVALUATIONS

Raymond Basin Baseline Hydrogeologic Study – Pasadena, CA

Client: Raymond Basin Management Board. 2003.

Performed a study to assess Raymond Basin Management Board's long-term groundwater storage program through a detailed hydrogeologic evaluation of the Raymond Basin. The study included development of a relational database of existing data, display and manipulation of data using a geographic information system (GIS), development of a groundwater monitoring and management plan, and development of a 3-dimensional groundwater flow model for use in future basin management and planning.

Hydrogeologic Analysis of Subsidence in the Western Chino Basin – Chino, CA

Client: City of Chino Hills. 2002 to 2003.

Prepared a hydrogeologic analysis of land surface subsidence associated with groundwater withdrawal in the western portion of the Chino Basin. The study included a detailed stratigraphic and structural analysis of the western Chino Basin along with an evaluation of groundwater levels and groundwater pumping between 1900 and 2001.

Hydrogeologic Evaluation of the Northwestern Portion of the Chino Basin – Upland, CA

Client: Chino Basin Water Conservation District. 2001 to 2003.

Conducted an evaluation of the effects of the San Jose fault on groundwater flow between the Claremont and Chino Groundwater Basins. Included a detailed analysis to locate the trace of the fault using satellite data (Interferometric Synthetic Aperture Radar – InSAR) and seismic reflection geophysics, analysis of groundwater levels in wells on either side of the fault, and stratigraphic analysis.

Chino Groundwater Basin Study – Western San Bernardino and Riverside Counties, CA

Client: Santa Ana Watershed Project Authority. 2001.

Conducted a detailed hydrogeologic analysis of the Chino Groundwater Basin for the purpose of evaluating the potential impacts of developing a 13-well wellfield in the southern portion of the basin. The hydrogeologic analysis served as a conceptual model for the development of a groundwater flow model that encompassed approximately two-thirds of the basin.

Hydrogeologic Analysis of the Northern Portion of the Irvine Subbasin – Irvine, CA

Client: Confidential. 2002.

Prepared a detailed hydrogeologic analysis of the Irvine Subbasin, with specific reference to the area north and west of the former El Toro Marine Corps Air Station. The analysis included an evaluation of potential impacts of a proposed development plan on natural groundwater recharge and groundwater quality. The report was used in support of an Environmental Impact Report for the proposed development.

PROJECT EXPERIENCE – WATERSHED / GROUNDWATER BASIN EVALUATIONS

Re-evaluation of Maximum Perennial Yield – Big Bear Lake Watershed, CA

Client: City of Big Bear Lake Department of Water and Power. 2001.

Developed a detailed hydrogeologic analysis of the Big Bear Lake watershed for the purpose of refining previous estimates of maximum perennial yield (i.e. safe yield). Included a detailed analysis of the geology, aquifer systems, groundwater levels, groundwater production, groundwater quality, precipitation, evapotranspiration, and surface water runoff for the watershed. Included the development of a detailed watershed hydrologic model (using EPA HSPF), flownet analysis, and evaluation of maximum perennial yield using the 0-net draft method.

Evaluation of Average Annual Recharge to the Klinefelter/Sacramento Springs Area, Eastern San Bernardino County, CA

Client: City of Needles. 2001.

Developed a detailed hydrogeologic analysis of the lower Piute Valley in the Eastern Mohave Desert to assess the average annual recharge to the Klinefelter/Sacramento Springs. The study was conducted to assess potential for utilization of the springs as a drinking water source.

Hydrogeologic Investigation of Spring Water Occurrence – Northern Owens Valley, CA

Client: Confidential. 1999 to 2001.

Performed field reconnaissance and investigation of springs within the northern Owens Valley, for the purpose of developing the springs as a drinking water source. Provided field supervision of exploratory borings, pumping tests, and water quality sampling and analysis.

Evaluation of Potential Water Resources – Victorville, CA

Client: City of Victorville. 2000.

Conducted a comprehensive evaluation of the average annual recharge to the aquifers in the transition zone of the Alto Sub-basin of the Mojave River watershed. Included a detailed analysis of stream/aquifer relationships in the area downgradient of the Lower Narrows area of the Mojave River.

Maximum Perennial Yield Study – Baldwin Lake Watershed – Big Bear Area, CA

Client: Big Bear City Community Services District. 1999.

Developed a detailed hydrogeologic analysis of the Baldwin Lake watershed for the purpose of refining previous estimates of maximum perennial yield in the area and locating potential areas for additional groundwater development.

Stream Gauge Assessment – Victorville, CA

Client: Baldy Mesa Water District/Victor Valley Water District. 1998.

Project manager for a stream gauge assessment to evaluate the physical condition of three gauges located along the Mojave River near Victorville. Provided an evaluation of the quality of data and estimates of storm flow/base flow separation.

PROJECT EXPERIENCE – WATERSHED / GROUNDWATER BASIN EVALUATIONS

Hydrogeologic Analysis of the Western Irvine Groundwater Subbasin – Tustin, CA

Client: Orange County Water District. 1995.

Performed a hydrogeologic assessment of the groundwater basin beneath the Tustin area of the Irvine Subbasin. Assessed the source, fate, and transport of nitrate detected in drinking water wells of the area using the hydrogeological assessment combined with isotopic tracking methods.

PROJECT EXPERIENCE – GROUNDWATER MODELS

Groundwater Flow Model of the Tule Subbasin – Tulare County, CA

Client: Tule Subbasin MOU Group. 2017 - Present.
Currently developing a numerical groundwater flow model of the Tule Subbasin for use in support of Sustainable Groundwater Management Act (SGMA) compliance. The model is being prepared using the USGS code OWHM (MODFLOW) and covers an area of approximately 1,100 square miles. The model analysis will be used to refine the Sustainable Yield estimate of the subbasin and enable planning analyses using basin management scenarios. The model analysis is also being used to inform the development of six Groundwater Sustainability Plans (GSPs) for the six individual Groundwater Sustainability Agencies (GSAs) in the subbasin.

Groundwater Flow Model of the South Fork Kern River Area – Lake Isabella, CA

Client: Rosedale-Rio Bravo Water Storage District. 2011 to Present.

Developed a numerical surface water and groundwater flow model of the South Fork Kern River Valley east of Lake Isabella, California. The model was developed to assess potential project benefits associated with water diversions from the river and impacts on a riparian habitat. The model was developed using MODFLOW and encompasses approximately 173 square miles.

Groundwater Flow Model of the Erwin Subunit – Erwin Lake Area, CA

Client: California Department of Fish and Wildlife. 2016 to 2017.

Technical lead for development of a numerical groundwater flow model of the Erwin Subunit near Erwin, California in the San Bernardino Mountains. The model was developed to assess the impact of groundwater pumping on a natural spring pond that supports the Stickleback Fish and to develop options for sustaining the pond. The model was developed using MODFLOW.

Groundwater Flow Model of the Kern Fan Area – Bakersfield, CA

Client: Rosedale-Rio Bravo Water Storage District. 2011 to Present.

Developed a numerical groundwater flow model of the Kern Fan Area west of Bakersfield, California. Included development of both conceptual and numerical models (MODFLOW). The model encompasses approximately 160 square miles and is constructed with three layers, 268 rows and 417 columns (200-ft grid cells). The model includes 243 non-agricultural production wells, 181 agricultural production wells, and 89 individual recharge zones, most of which are associated with the Kern Water Bank and Pioneer Projects. The model has been successfully calibrated for the transient period from 1988 through 2016. The model is currently being used to evaluate potential groundwater level changes associated with various recharge and recovery scenarios within the model area.

PROJECT EXPERIENCE – GROUNDWATER MODELS

Groundwater Flow Model of the Beaumont Basin – Riverside County, CA

Client: Beaumont Basin Watermaster. 2012 to 2014.

Developed a numerical groundwater flow model of the Beaumont Basin for the purpose of groundwater management and reevaluating the safe yield of the basin. The model was developed using MODFLOW and encompasses approximately 42 square miles. The model is currently being updated and recalibrated on an annual basis for the purpose of evaluating groundwater resources and planning scenarios.

Groundwater Dewatering Evaluation for Cow Camp Road Waterlines – Rancho Mission Viejo, CA

Client: GMU Geotechnical/Rancho Mission Viejo. 2012 to 2015.

Developed a numerical groundwater flow model (MODFLOW) of the Chiquita Canyon area for the purpose of evaluating optimum well locations and expected discharge rates for extraction wells to dewater a planned pipeline jack-and-bore excavation beneath Chiquita Creek. The model was calibrated to steady state conditions based on groundwater levels measured in area wells. Aquifer parameters were developed based on pumping tests that TH&Co conducted in new wells constructed near the dewatering site.

Park Place Parking Structure Subdrain Design – Irvine, CA

Client: The Irvine Company. 2011 to 2012.

Conducted a hydrogeological analysis of historical groundwater levels in the vicinity of a proposed parking structure. Developed a groundwater flow model for assessing the effectiveness of a proposed subdrain design at maintaining groundwater levels below the bottom of the parking structure.

Portola Hills Drainage Levee Certification – Irvine, CA

Client: NMG Geotechnical/The Irvine Company. 2010.

Developed a coupled unsaturated/saturated flow groundwater model to assess potential seepage through the levee from a 100 year flood. Included the collection and analysis of borehole lithologic data and surface water flow measurements in the drainage channel. The model was used to simulate seepage through the levee under both steady state and transient flow conditions within the channel. Results of the model were used to obtain certification of the levee with the Federal Emergency Management Agency (FEMA).

Chino Desalter Groundwater Flow Model Update – Chino Basin, CA

Client: Chino Basin Desalter Authority. 2007 to 2008.

Updated a previously established MODFLOW groundwater flow model of the Chino Basin to assess potential future regional drawdown from desalter groundwater pumping operations. The model was updated using data obtained from pumping tests of the Chino I expansion and Chino II wells as well as information from local subsidence investigations. Predictive scenarios included the addition of a proposed Chino Creek Well Field and five Chino II expansion wells.

PROJECT EXPERIENCE – GROUNDWATER MODELS

Groundwater Flow Model of the Murrieta Valley – Murrieta, CA

Client: Western Municipal Water District. 2007 to 2008.

Developed a groundwater flow model of the watershed encompassing the Murrieta Valley to assess potential future conjunctive use options for the District. Included development of both conceptual and numerical models (MODFLOW). Developed four conjunctive use scenarios for evaluation with the model, all involving aquifer storage and recovery wells.

Fashion Island Parking Structure Subdrain Design – Newport Beach, CA

Client: The Irvine Company. 2006 to 2007.

Developed and implemented a work plan to drill boreholes and construct monitoring wells in a parking lot to assess hydrogeologic properties for designing a subdrain system for high groundwater. Included developing a groundwater flow model for assessing potential groundwater flow to the subdrain beneath the proposed parking structure.

Pole Creek Debris Basin Subdrain Design – Fillmore, CA

Client: Griffin Industries. 2006.

Modified an existing MODFLOW model to assess the amount of groundwater flow that could be expected in order to maintain groundwater levels a satisfactory depth below a proposed debris basin. Results of the model effort were used in support of a subdrain design.

Chino Basin Water Quality Evaluation – Chino Basin, CA

Client: Jurupa Community Services District. 2002 to 2003.

Updated a previously established groundwater flow model of the Chino Basin to include a solute fate and transport package (using MT3D) to assess the impact of artificial recharge operations planned by the Chino Basin Watermaster on Nitrate and TDS concentrations in the southern Chino Basin.

USGS Model of the Beaumont and Banning Groundwater Storage Units – San Gorgonio Pass, CA

Client: Beaumont Cherry Valley Water District. 2005.

Provided a peer review of the USGS report. This included a MODFLOW model of the Beaumont and Banning Storage Units and a rainfall runoff model of the surrounding watershed (Infil v.3).

San Luis Rey River Groundwater Storage and Recovery Study – Oceanside, CA

Client: San Diego County Water Authority. 2004.

Provided peer review oversight of a MODFLOW groundwater flow model of the Mission and Bonsall Basins prepared as part of a large scale conjunctive use study.

PROJECT EXPERIENCE – GROUNDWATER MODELS

Arrowhead East Tunnel – San Bernardino County, CA

Client: Metropolitan Water District of Southern California. 1999 to 2003.

Technical advisory role in the oversight of the development of a discreet fracture groundwater flow model (FracMan) by the United States Geological Survey. Included participation at periodic update meetings and preparation of response letters to provide input for the development of the model.

Hayfield Groundwater Storage Program – Riverside County, CA

Client: Metropolitan Water District of Southern California. 2003.

Provided peer review oversight of a MODFLOW groundwater flow model of the Hayfield Valley prepared as part of the Hayfield Groundwater Storage Program.

I-105 Groundwater Beneficial Use Study – Downey, CA

Client: Black & Veatch / City of Downey. 2002.

Modified and expanded an existing groundwater flow model (the US Geological Survey's code MODFLOW) to include updated groundwater levels and production data to assess optimum pumping rates to maintain water levels below the freeway surface. Capture zones from 5 proposed wells were assessed using EPA's Wellhead Protection Area (WHPA) model for use in a Department of Health Services DWSAP Permit.

Fate and Transport Model of MCAS El Toro TCE Plume – Irvine, CA

Client: Confidential. 2002.

Prepared a detailed hydrogeologic analysis of the potential impacts of historical volatile organic compound (VOC) releases from the El Toro Marine Corps Air Station on a proposed future development. The analysis included a detailed assessment of the current extent of the VOC plume and development of a 2-dimensional groundwater fate and transport model to assess the potential future extent of the plume. The report was used in support of an Environmental Impact Report for the proposed development.

Cadiz Groundwater Storage and Dry-Year Supply Program – Cadiz, CA

Client: Metropolitan Water District of Southern California. 1998 to 2002.

Provided technical assistance for the development of a comprehensive watershed hydrologic model and groundwater flow model (MODFLOW) that encompassed the Bristol, Fenner and Cadiz watersheds of the eastern Mojave Desert, San Bernardino County. Results of the modeling effort were used to assess average annual recharge to the area and provide a planning tool to evaluate potential operational scenarios for a conjunctive use program using surface spreading basins.

Surface Water/Groundwater Model - Santa Margarita River Watershed – Temecula, CA

Client: Rancho California Water District. 1998 to 2002.

Technical assistant for the development of a conceptual hydrogeologic model of the Upper Santa Margarita River watershed for the purpose of quantifying the relationship between surface water and groundwater within the watershed.

PROJECT EXPERIENCE – GROUNDWATER MODELS

Chino Desalter System Projects – Chino, CA

Client: Santa Ana Watershed Project Authority / Chino Basin Desalter Authority. 2001.

Developed a groundwater flow model of a large portion of the Chino Basin using MODFLOW to evaluate potential groundwater level changes associated with a proposed desalter well field.

PROJECT EXPERIENCE – WELLS AND WELL FIELD DESIGN

Construction and Testing of Municipal Production Wells – California, Arizona and Mexico

Client: Multiple Water Districts and Cities. 1998 to Present.

Provided technical direction and field oversight for the drilling, design and construction of more than 100 high capacity municipal water supply wells throughout Southern California. Included development of technical specifications, field inspection of the drilling process including borehole logging, inspection of geophysical logging, aquifer zone testing, well construction, well development, pumping tests, water quality sampling, and flowmeter surveys. Provided technical direction for the design of wells including the evaluation of field borehole logs, cuttings samples, sieve analyses, geophysical logs and zone-specific water quality analyses. Prepared and coordinated the preparation of numerous well completion reports. Wells have included:

- *Arizona Water Company* (Wells 7 and 9)
- *Baldy Mesa Water District* (1 Production Well - No. 9)
- *Beaumont Cherry Valley Water District* (5 Production Wells - 23, 24, 25, 26, SunnyCal No. 4)
- *Big Bear City Community Services District* (4 Production Wells - 3B, 8, 9, 10 and 8A)
- *California Department of Forestry and Fire Protection* (1 Production Well – Owens Valley)
- *California Water Service Company* (1 Production Well - Bakersfield Station 214-01)
- *Chino Basin Desalter Authority* (9 Chino II Desalter Wells - II-1, II-2, II-3, II-4, II-6, II-7, II-8, II-9, II-9a), (3 Chino I Expansion Wells - I-13, I-14, I-15)
- *City of Big Bear Lake Dept. of Water and Power* (9 Production Wells - Canvasback, McAlister, Moonridge, Sheephorn, Magnolia, Sawmill, Seminole, Cherokee, and Arrastre Creek)
- *City of Blythe* (1 Production Well)
- *City of Fullerton* (Well No. 7A)
- *City of Ontario* (10 Production Wells – 40, 41, 43, 44, 45, 46, 47, 49, 50, 52)
- *City of Riverside* (Gage 29-3R)
- *Coachella Valley Water District* (Design Only - 10 Production Wells)
- *Eastern Municipal Water District* (Perris II Desalter Wells 93, 94, 95 and 96; Well 38)
- *Golden State Water Company* (Kiowa Well No. 1; La Jolla Well No. 3, Elaine Well No. 3, Armstrong Well, Miramonte Well No. 3)
- *Hacienda Resort Mexico (*One Seawater Desalination Well)
- *High Valleys Water District* (1 Production Well – McMullen Flat)
- *Highland Fairview Development* (2 Production Wells)
- *Irvine Ranch Water District (3 Production Wells)*
- *Jurupa Community Services District* (3 Production Wells - 22, 23, and 25)
- *Lake Arrowhead Community Services District* (2 Production Wells - 6 and 8)
- *M.D.J. Development Company* (1 Production Well - Alta Vista Country Club Well)
- *Metropolitan Water District of Southern California – (Cadiz)* (1 Production Well -PW-1)
- *Rancho Mission Viejo* (1 Production Well – Well 5)

PROJECT EXPERIENCE – WELLS AND WELL FIELD DESIGN

Construction and Testing of Municipal Production Wells – California, Arizona and Mexico (Cont.)

- *Rosedale-Rio Bravo Water Storage District* (8 Drought Relief Project Production Wells – WB-1 through WB-3; SUP-1, SUP-2, SUP-4 through SUP-6; 3 Onyx Ranch Wells; 2 Stockdale East Wells)
- *San Diego County Water Authority / City of Oceanside* (3 Production Wells - PW-9, PW-10 and PW-11)
- *Santa Margarita Water District* (2 Production Wells)
- *Three Valleys Municipal Water District* (Grand Avenue Well)
- *Vista Serena Mexico* (PW-1b Seawater Desalination Well)

Well Rehabilitation Projects – Southern California

Client: Multiple Water Districts and Cities. 1998 to Present.

Provided technical direction and field oversight for the rehabilitation of high capacity municipal water supply wells throughout Southern California. Included development of technical specifications, bid support, initial testing including sidewall and CITM, field inspection of the rehabilitation process, and follow-up pumping tests and water quality testing. Rehabilitation processes have included brushing, bailing, swabbing, combination airlift/swab, and chemical rehabilitation. Wells have included:

- *Chino Basin Desalter Authority* (13 Wells)
- *City of Big Bear Lake Department of Water* (Mooncamp Well)
- *City of Fullerton* (Well 5)
- *City of Murrieta* (Adams/Juniper Well)
- *City of Santa Barbara* (5 Wells)
- *Golden State Water Company* (Yeager Well No. 3)
- *Irvine Ranch Water District* (Wells 5, 21, 22, 110, and Stockdale West Agricultural Well)
- *Summit Partners, LLC* (Elliott Well)
- *Western Municipal Water District* (5 Arlington Desalter Wells)

Depth-Specific Well Testing, Helendale Community Services District Well No. 9 – Helendale, CA

Client: Helendale Community Services District. 2010.

Designed a depth-specific water quality sampling program for Well No. 9 in order to assess the potential for packing off portions of the well with high total dissolved solids concentrations.

Perris II Desalter Wells Test Drilling and Well Design – Perris, CA

Client: Eastern Municipal Water District. 2009 to 2010.

Conducted a comprehensive well siting and test drilling program that including identification of seven potential well sites and test drilling at six sites. Data collected from the test drilling program was used to develop preliminary designs and technical specifications for high capacity desalter production wells at four of the sites.

PROJECT EXPERIENCE – WELLS AND WELL FIELD DESIGN

Seawater Injection Barrier Well Evaluation – West and Central Basins, CA

Client: West Basin Municipal Water District. 2007 to 2008.

Evaluated injection well barrier performance for the Alamitos, Dominguez Gap and West Coast Basin Seawater Injection Barriers. Specific injection decline in wells was correlated with water quality criteria for injection water in the context of increasing the percentage of recycled water for injection. Provided recommendations for future rehabilitation methods and frequency.

Seawater Supply Well and Brine Injection Well Design – Cabo San Lucas, Mexico

Client: Confidential. 2006 to 2008.

Provided management oversight of a test drilling program to obtain design parameters for a seawater supply well for a desalination system in southern Baja California, Mexico. The supply well was designed with 8-inch diameter AL6XN steel. Two injection wells were also designed for the purpose of discharging brine waste from the desalination process.

Depth-Specific Well Testing, WMWD New Clay Well – Murrieta, CA

Client: Western Municipal Water District. 2008.

Designed a depth-specific water quality sampling program for the New Clay Well in order to assess changes in arsenic concentrations at various screened intervals within the well. The results of the testing will be used to provide recommendations for installing a packer to lower the arsenic concentrations in the discharge water.

Depth-Specific Well Testing, City of Ontario Well 50 – Ontario, CA

Client: City of Ontario. 2008.

Designed a depth-specific water quality sampling program for Well 50 in order to characterize the vertical distribution of perchlorate, color, and total dissolved solids within the well. The results of the testing were used to recommend a setting depth for an inflatable packer to limit production from the impacted aquifers.

Well Destruction, IRWD Well 14 – Tustin, CA

Client: RBF Consulting/Irvine Ranch Water District. 2008.

Developed detailed technical specifications for the destruction of one well. The specifications were developed in accordance with Department of Water Resources and local requirements.

Seawater Production Well Feasibility Study – Oceanside, California

Client: Tetra Tech/City of Oceanside. 2007 to 2008.

Developed a near-shore drilling and testing investigation program to assess the feasibility of producing seawater from wells in near-shore aquifers for the purpose of desalination. The testing program followed recommendations made to the City of Oceanside for seawater production as an alternative water supply. The program included drilling and testing one nested monitoring well and design of one test well.

PROJECT EXPERIENCE – WELLS AND WELL FIELD DESIGN

Preliminary Design Report for Three ASR Wells – Pasadena, CA

Client: RMC Water/City of Pasadena. 2006 to 2007.

Provided technical direction and quality control for development of a preliminary design for three aquifer storage and recovery wells in the City of Pasadena (MacDonald Park, Victory Park and Craig Well). The design followed a well siting analysis and included a description of the hydrogeologic setting, recommended well design, a recommended operation and maintenance program, and planning costs for the drilling and construction of the wells.

Lake Arrowhead Well Site Evaluation – Lake Arrowhead, CA

Client: RMC Water/Lake Arrowhead Community Services District. 2006 to 2007.

Evaluated and ranked 18 potential well sites in the Lake Arrowhead area for possible future production wells. The sites were evaluated with respect to hydrogeology, property ownership, drilling access, proximity to existing infrastructure, and environmental issues. Three sites were selected for new wells.

Victorville City-Wide Well Site Evaluation – Victorville, CA

Client: City of Victorville. 2006 to 2007.

Conducted a comprehensive well site evaluation for wells to supply water for the Southern California Logistics Airport in Victorville. Considerations included production yield potential, groundwater quality (both regional and point source contamination), potential for excessive drawdown in areas with other wells, environmental concerns, and proximity to the City's existing pipeline distribution system. Developed well site potential zones for use by the City in locating future well sites.

Murrieta Valley Well Site Evaluation – Murrieta, CA

Client: Western Municipal Water District. 2007.

Identified and evaluated six potential well sites within the Murrieta Valley. As a result of the study, one well site is being pursued for construction of a production well.

Beach Well Feasibility Study – Cabo San Lucas, Mexico

Client: Confidential. 2006 to 2008.

Provided field oversight and management of a test drilling program on two beaches in southern Baja California, Mexico. The program included the drilling and testing of boreholes, a monitoring well and an 8-inch diameter test well for the purpose of evaluating the feasibility of beach wells as water supply for seawater desalination systems.

PROJECT EXPERIENCE – WELLS AND WELL FIELD DESIGN

Gobernadora Multi-Use Basins Well Field Design Study – Rancho Mission Viejo, CA

Client: Santa Margarita Water District. 2005 to 2006.

Project manager and lead technical advisor for a wellfield design alternatives analysis for a surface water diversion/artificial recharge facility in southern Orange County. The evaluation included development of a MODFLOW model of the proposed spreading basins and selection of potential well sites. Developed a drilling and testing protocol for construction of the wells.

Well Rehabilitation Evaluation – Chino, CA

Client: Chino Basin Desalter Authority. 2005 to 2006.

Conducted an evaluation of declining production capacity in eleven Chino I Desalter wells. Included evaluation of video logs, water chemistry data, Southern California Edison pumping test data, groundwater levels and production. Based on the evaluation, provided specific rehabilitation recommendations for each of the eleven wells.

Well Sites Evaluation – High Valleys, CA

Client: High Valleys Water District. 2003 to 2005.

Conducted a reconnaissance level well site evaluation within the High Valleys Water District area, located between Idyllwild and Banning in southern California.

Private Well Evaluation – Fawnskin, CA

Client: City of Big Bear Lake Department of Water and Power. 2004.

Developed and implemented a well evaluation protocol for determining the suitability of four existing private wells in the Fawnskin area north of Big Bear Lake for incorporation into the City's distribution system. Included onsite inspection of downhole video logs of each well, redevelopment, pumping tests, water quality analyses and reporting.

Jurupa Community Services District District-Wide Well Site Evaluation – Mira Loma, CA

Client: Jurupa Community Services District. 2003.

Conducted a comprehensive well site evaluation within the JCSD boundaries. Considerations included production yield potential, groundwater quality (both regional and point source contamination), potential for excessive drawdown in areas with other wells, and potential to exacerbate existing environmental problems (i.e. subsidence). Developed well site potential zones for use by the District in locating future well sites.

City of Ontario City-Wide Well Site Evaluation – Ontario, CA

Client: City of Ontario. 2002.

Conducted a comprehensive well site evaluation within the City boundaries. Considerations included production yield potential, groundwater quality (both regional and point source contamination), potential for excessive drawdown in areas with other wells, potential to exacerbate existing environmental problems (i.e. subsidence), and proximity to the City's existing pipeline distribution system. Developed well site potential zones for use by the City in locating future well sites.

PROJECT EXPERIENCE – WELLS AND WELL FIELD DESIGN

Chino Desalter System Projects Well Field Design – Chino, CA

Client: Santa Ana Watershed Project Authority. 2001 to 2002.

Project manager and senior technical lead for the design of a 13-well well field in the southern Chino Basin. Included development of a comprehensive well field design protocol that considered property access, environmental concerns, Chino Basin Watermaster goals, potential interference with existing pumpers, and pipeline costs.

City of Arcadia Infrastructure Restoration and Design – Arcadia, CA

Client: Cities of Arcadia and Sierra Madre. 1998 to 1999.

Developed a detailed hydrogeologic analysis of the Raymond Basin to evaluate potential sites for new production wells. The analysis included development of a watershed hydrologic model and a groundwater flow model. The model was used to assess potential pumping interference from proposed well sites with existing production wells. As a result of the project, three sites were recommended based on a priority system that considered location with respect to existing wells, location with respect to faults, available groundwater resources, water quality, and proximity to existing City facilities.

PROJECT EXPERIENCE – ARTIFICIAL RECHARGE / CONJUNCTIVE USE

Regional Recycled Water Program Feasibility Study – Southern California

Client: Metropolitan Water District of Southern California. 2016 - Present.

Mr. Harder served on an advisory panel for Metropolitan Water District to provide input and guidance for the development of a regional recycled water program that would treat water from the Los Angeles County Sanitation District's Joint Water Pollution Control Plant in Carson, California and deliver it to recharge facilities in the West Basin, Central Basin, Orange County Basin, and Main San Gabriel Basin. The proposed program would ultimately produce up to 150 million gallons per day of advanced treated water for recharge in the basins. Mr. Harder provided input primarily on the hydrogeological aspects of the project.

Groundwater Recharge Analysis – Orange County, CA

Client: Irvine Ranch Water District. 2016 (ongoing).

Mr. Harder served as the technical lead to evaluate potential groundwater quality impacts from the proposed use of desalinated seawater in the Talbert Injection Barrier. The analysis was conducted using the existing Orange County Water District numerical model of the Orange County Groundwater Basin, coupled with a solute transport model code. Modeled constituents of concern included, total dissolved solids, chloride, and boron.

East Declez Recharge Basin Evaluation – Mira Loma, CA

Client: Inland Empire Utilities Agency. 2015.

Conducted a field investigation of artificial recharge potential using CPT and boreholes. Data collected during the investigation were used to assess subsurface permeability, liquefaction potential, subsurface storage potential and recharge capacity.

Recycled Water Recharge Feasibility Study – Montclair, CA

Client: Carollo Engineers/Inland Empire Utilities Agency. 2015.

Conducted analyses to assess potential impacts of spreading recycled water in the Montclair Basins on groundwater levels, groundwater flow, and existing contaminant plumes. Included development of a 2 dimensional groundwater flow model for use in assessing potential travel times for regulatory compliance.

Stockdale Integrated Banking Project – Bakersfield, CA

Client: Rosedale-Rio Bravo Water Storage District/Irvine Ranch Water District. 2012 to 2015.

Conducted an analysis of potential groundwater level impacts associated with a proposed recharge and recovery project in support of an Environmental Impact Report. The analysis was conducted using a calibrated numerical groundwater flow model developed by TH&Co.

PROJECT EXPERIENCE – ARTIFICIAL RECHARGE / CONJUNCTIVE USE

James Canal Integrated Banking Project – Bakersfield, CA

Client: Rosedale-Rio Bravo Water Storage District/Buena Vista Water Storage District. 2012 to present.

Conducted an analysis of potential groundwater level impacts associated with a proposed recharge and recovery project in support of an Environmental Impact Report. The analysis was conducted using a calibrated numerical groundwater flow model developed by TH&Co.

Recycled Water Recharge Evaluation – Indio, CA

Client: Carollo Engineers/Indio Water Authority. 2009 to 2011.

Conducted analyses to assess potential groundwater level and quality impacts from proposed recycled water recharge facilities, including both spreading grounds and injection wells, in the Indio area.

Recycled Water Recharge Basin Monitoring – Rancho Cucamonga, CA

Client: Inland Empire Utilities Agency. 2008 to 2011.

Prepared technical specifications for the construction of two lysimeter clusters and three deep monitoring wells as part of a groundwater monitoring system for future recycled water recharge in the Victoria and San Sevaine recharge basins in Rancho Cucamonga, California. Provided field inspection oversight of the construction of the monitoring features.

Artificial Recharge Basin Evaluation – Ontario, CA

Client: Confidential. 2009.

Prepared a reconnaissance-level evaluation of a potential artificial recharge basin located in the central Chino Basin. The evaluation included development of a basin evaluation protocol for considering the site for artificial recharge.

Regional Recharge and Recovery Project – Hesperia, CA

Client: Mojave Water Agency. 2007 to 2008.

Lead technical director for a 40,000 acre-ft/yr artificial recharge and extraction project along the Mojave River near Hesperia, California. Included preliminary design work for artificial recharge facilities and a 22-well well field. Also provided peer review of a regional groundwater flow model for use in evaluating conjunctive use scenarios.

Chuckwalla Groundwater Recharge Project – Chuckwalla, CA

Client: Metropolitan Water District of Southern California. 2002.

Technical advisor for an artificial recharge pilot test located near the Colorado River Aqueduct in Upper Chuckwalla Valley, Riverside County. Included peer review oversight of pilot basin siting, monitoring well locations and construction, groundwater sampling and analysis, and soil infiltration instrumentation.

PROJECT EXPERIENCE – ARTIFICIAL RECHARGE / CONJUNCTIVE USE

Smith Creek Artificial Recharge Evaluation – Banning, CA

Client: Pardee Homes/City of Banning. 2006 to 2008.

Evaluated the feasibility of artificial recharge along Smith Creek in the City of Banning. Preliminary analysis included locating potential recharge basins, determining potential recharge area within a large proposed residential development, and developing a drilling and pilot testing program. Potential sources of recharge include imported water, recycled water and captured storm flow.

Noble Creek Artificial Recharge Program – Beaumont, CA

Client: Beaumont-Cherry Valley Water District. 2001 to 2008.

Project manager and lead technical advisor for an artificial recharge evaluation located near Beaumont. The evaluation included a drilling and testing program, including a pilot recharge test. Provided input for engineering design of full-scale artificial recharge basins. Provided design and construction oversight of cluster monitoring wells for full-scale facility. Provided groundwater monitoring and reporting for the facility, which began operation in September 2006. ***This project received the National Ground Water Association's 2008 Outstanding Groundwater Project Award.***

Big Bear Valley Groundwater Replenishment Study – Big Bear Lake, CA

Client: Big Bear Area Regional Wastewater Agency. 2001 to 2006.

Conducted a comprehensive artificial recharge study for the Big Bear Valley area of the San Bernardino Mountains. The study involved the identification of potential artificial recharge sites and a comprehensive drilling and pilot testing program utilizing surface recharge basins. The ultimate project would include the use of recycled wastewater as a water source so detailed tracer studies, water quality analysis, and groundwater migration rate analyses were conducted as part of the study. ***This project won the California Water Environment Association – Desert and Mountain Section 2005 Research and Development Award.***

Discharge Basin Expansion Project – Victorville, CA

Client: Victor Valley Wastewater Reclamation Authority. 2004 to 2005.

Conducted an evaluation of the percolation potential of ten surface spreading basins used for the discharge of secondary effluent from a wastewater treatment plant. Currently evaluating additional areas in the vicinity of the plant for potential future percolation basins. Included coordination with the Regional Water Quality Control Board – Lahontan Region for the permitting of the basins.

Hayfield Groundwater Storage Program – Chuckwalla, CA

Client: Metropolitan Water District of Southern California. 2003.

Technical advisor and peer review oversight of field investigations to design project spreading basins and extraction wells for a conjunctive use program in Hayfield Valley, Riverside County. Includes design of a relational database and geographic information system for the project.

PROJECT EXPERIENCE – ARTIFICIAL RECHARGE / CONJUNCTIVE USE

Mission and Bonsall Basins Artificial Recharge Program – Oceanside, CA

Client: San Diego County Water Authority. 2002 to 2004.

Project Manager and lead technical advisor for a groundwater/surface water conjunctive use feasibility study in the Mission and Bonsall Basins of the San Luis Rey River Watershed, San Diego County. Included development and oversight of a comprehensive field drilling and data collection program (borehole drilling, sample collection and analysis; monitoring well construction, development and sampling; test well drilling, construction and testing).

Cadiz Groundwater Storage and Dry-Year Supply Program – Cadiz, CA

Client: Metropolitan Water District of Southern California. 1998 to 2002.

Project and task manager for the development and implementation of a field program designed to assess the water resources and hydrogeologic characteristics of the Fenner Gap portion of the Fenner Watershed of the Eastern Mojave Desert near Cadiz, California. Developed and implemented an 8-month pilot recharge test to assess the permeability of unsaturated zone sediments in the project area and the mounding characteristics of the groundwater.

Rapid Infiltration Design (RIX) Project – San Bernardino, CA

Client: City of San Bernardino. 1998.

Project Geohydrologist for a preliminary design of spreading basins for tertiary treated wastewater along the Santa Ana River near San Bernardino. Designed a field program to evaluate permeability characteristics of native sediments for use in designing an extraction system to control groundwater mounding from spreading activities and prevent offsite migration of untreated wastewater.

PROJECT EXPERIENCE – ENVIRONMENTAL HYDROGEOLOGY

Helendale Wastewater Treatment Plant Antidegradation Study – Helendale, CA

Client: RBF Consulting/Helendale Community Services District. 2009 to 2010.

Prepared an antidegradation study for tertiary treated wastewater discharge in the vicinity of Helendale CSD's Wastewater Treatment Plant. Included coordination with the RWQCB-Lahonton Region for obtaining a National Pollution Discharge Elimination System (NPDES) permit.

Grass Valley Antidegradation Study – Lake Arrowhead, CA

Client: Lake Arrowhead Community Services District. 2008.

Prepared an antidegradation study for emergency discharges to Grass Valley Creek from LACSD's Grass Valley Wastewater Treatment Plant. Included coordination with the RWQCB-Lahonton Region for obtaining a National Pollution Discharge Elimination System (NPDES) permit.

Evaluation of Nitrate in Groundwater from Septic Systems – Lake William, CA

Client: City of Big Bear Lake Department of Water & Power. 2006.

Conducted an evaluation of the source, extent and potential migration of nitrate in groundwater resulting from septic system drains in the Lake William area of the Big Bear Valley, San Bernardino County, California.

Evaluation of MTBE Release – City of Big Bear Lake, CA

Client: City of Big Bear Lake Department of Water & Power. 2002 to 2004.

Technical advisor for the evaluation of data related to a methyl tert butyl ether (MTBE) release from a gasoline station in the City of Big Bear Lake. The release directly threatens the water quality of a municipal supply well field, located downgradient from the gas station.

Hexavalent Chromium Evaluation – Montebello Forebay – Bell, CA

Client: Confidential. 2000 to 2001.

Performed a fate and transport evaluation of hexavalent chromium in soil and groundwater beneath a former chromium plating facility. Included development of both vadose zone (VS2DT), groundwater flow (MODFLOW) and solute transport (MT3D) models. Work was performed in support of expert witness work for attorneys representing the former facility.

Defense Fuel Supply Point MTBE Release Technical Review – Norwalk, CA

Client: City of Norwalk. 2000 to 2001.

Technical advisor for the evaluation of data related to a methyl tert butyl ether (MTBE) release from a tank farm and fuel distribution facility.

PROJECT EXPERIENCE – ENVIRONMENTAL HYDROGEOLOGY

Navy/Marine Corps Bases – Southern California and Arizona

Client: Navy Southwest Division. 1997 to 1998.

Project manager responsible for hydrogeologic and geochemical evaluations of remediation by natural attenuation of both petroleum hydrocarbons and chlorinated solvents in groundwater at five bases. Analyzed geochemical indicators of physical and biological processes that degrade contaminants.

Former Aerospace Facility – Torrance, CA.

Client: Confidential. 1997 to 1998.

Conducted a site assessment/feasibility study of soil and groundwater impacted by petroleum hydrocarbons and chlorinated solvents. Geochemical data were collected and evaluated to assess the potential for remediation by natural attenuation of both chlorinated solvents and petroleum hydrocarbons. Provided support for negotiations with the LA Regional Water Quality Control Board regarding the most cost-effective remedial option. Successfully negotiated closure of soil issues at the site based on natural attenuation of chlorinated solvents.

Property Transaction – Los Angeles, CA.

Client: Confidential. 1996.

Project manager for a hydrogeological investigation in the Los Angeles Narrows. Prepared design plans for both monitoring wells and groundwater extraction wells. Developed a soil and groundwater sampling and analysis plan and supervised the collection of field data. Prepared both conceptual and numerical models (using MODFLOW) based on the data collected in the field investigation to help predict the groundwater pumping rates and number of wells necessary to capture the dissolved PCE plume.

Jet Fuel Storage Facility – Los Angeles, CA.

Client: Confidential. 1989 to 1995.

Performed a full range of field investigation tasks including soil logging and sampling during drilling, monitoring well installation, well development, and groundwater sampling from wells. Performed free hydrocarbon product bailout tests on four monitoring wells to assess formation production thickness and to determine recovery pump design. Performed step-drawdown and constant rate pumping tests on two wells to assess formation hydraulic conductivity. Designed and installed large-diameter (8 and 12-inch) groundwater recovery wells. Managed the design and installation of a free hydrocarbon product recovery system.

Tequesquite Landfill – Riverside, CA.

Client: City of Riverside. 1992 to 1994.

Installed a clustered monitoring well network using mud-rotary drilling techniques. Installed Well-Sentinel data collection devices in the well network to assess seasonal rainfall effects on contaminant transport from the landfill into the Santa Ana River.

PROJECT EXPERIENCE – ENVIRONMENTAL HYDROGEOLOGY

Semiconductor Manufacturing Facility – Puyallup, WA.

Client: Confidential. 1994.

Performed step drawdown and constant rate groundwater pumping tests from wells screened in glacial till, using a Grundfos pumping system and Hermit data loggers. Calculated hydraulic characteristics of the aquifer (hydraulic conductivity, transmissivity, etc.) from the results of the test to assess remedial alternatives for a diesel fuel release at the site.

Crude-Oil/Gasoline Terminal – Port of Los Angeles, CA.

Client: Confidential. 1990 to 1992.

Installed five groundwater observation wells to assess the extent of petroleum hydrocarbon releases from pipes and tanks. Conducted aquifer tests on selected wells to assess formation hydraulic conductivity and formation product thickness, product recovery rates, and well performance. Conducted weekly monitoring of wells to assess tidal influence on free hydrocarbon thickness in wells.

Drinking Water Distribution Facility – San Diego, CA.

Client: Confidential. 1992.

Installed, developed and sampled monitoring wells, many of which were completed as cluster wells screened in shallow and deep alluvial aquifers, to assess the migration of petroleum hydrocarbons in groundwater from leaking underground fuel tanks. Performed step drawdown and constant rate groundwater pumping tests from the wells to assess well yield and aquifer characteristics.

California State Superfund Site – Santa Fe Springs, CA.

Client: Confidential. 1990 to 1992.

Supervised the drilling and construction of 12 monitoring wells to assess chlorinated solvent contamination beneath the site. Conducted slug and pumping tests for selected wells to assess hydraulic properties of the subsurface across the site. Conducted a step-out groundwater investigation using CPT/Hydropunch groundwater sampling techniques.

California State Superfund Site – Los Angeles, CA.

Client: Confidential. 1990.

Supervised a petroleum hydrocarbon plume characterization at a former ceramics manufacturing facility. Involved excavation oversight, drilling and sampling of soil borings, and observation well installation. Developed and sampled wells downgradient of the site contamination source. Prepared a report describing the investigation.

City of Orange TCE Investigation – Orange, CA.

Client: Orange County Water District. 1989 to 1990.

Drilled 10 borings to depths ranging from 120 to 250 feet using rotary, drill-and-drive drilling methods. Logged cuttings and collected groundwater samples to assess trichloroethene concentrations in the subsurface. Included post-installation perforation of the casing and installation of pre-pack casing. Some wells were completed as cluster wells.

PROJECT EXPERIENCE – GEOCHEMISTRY STUDIES

Geochemical Evaluation of Nitrate and Selenium in Groundwater – Irvine, CA

Client: Confidential. 2004 to 2005.

Evaluated the source and fate of selenium and nitrate in groundwater in the northern Irvine Subbasin.

Geochemical Mixing Evaluation – Lower San Luis Rey River Conjunctive Use Study – Oceanside, CA

Client: San Diego County Water Authority. 2004.

Conducted a detailed geochemical evaluation of potential adverse chemical reactions that could occur as a result of mixing imported Colorado River Water with native groundwater via injection wells or surface spreading basins. The evaluation was conducted with the assistance of the USGS geochemical model PHREEQC.

Well Screen Corrosion Evaluation Using Metal Coupons – Ontario, CA

Client: City of Ontario. 2003.

Evaluated the corrosion potential of groundwater in the Ontario, California area through a metal coupon test. The test includes lowering an apparatus with pre-weighed coupons representing five different metal types (mild steel, copper-bearing steel, corten steel, 304 stainless steel and 316L stainless steel) into a non-pumping well. After a period of 6 to 12 months, the coupons are cleaned, reweighed and the amount of metal loss recorded, thus indicating the corrosion potential of the water.

Well Screen Corrosion Evaluation of Desert Groundwater – Cadiz, CA

Client: Metropolitan Water District of Southern California. 1998 to 2002.

Performed a metal coupon test for wells in the Fenner Gap area of the eastern Mojave Desert to assess the corrosion potential of the water. Results of the test indicated highly corrosive conditions and recommendations were made for corrosion-resistant (i.e. stainless steel) well materials for future wells.

Cadiz Groundwater Storage and Dry-Year Supply Program – Cadiz, CA

Client: Metropolitan Water District of Southern California. 1998 to 2002.

As part of the Cadiz conjunctive use feasibility study, developed detailed protocols for the evaluation of mixing Colorado River Water with native groundwater. The protocol was implemented through the development of a laboratory physical model, glass coupon studies, and computer modeling of equilibrium reactions (using the USGS code PHREEQC).

Diamond Valley Lake Injection Wells Geochemistry Evaluation – Hemet, CA

Client: Metropolitan Water District of Southern California. 2000.

Prepared a computer model simulation of mixing injected Colorado River water in injection wells near Diamond Valley Lake. Injection wells had been clogging excessively and the analysis was meant to assess an appropriate well rehabilitation program.

PROJECT EXPERIENCE – EXPERT WITNESS

Lower Tule River Irrigation District v. Sandridge Partners LP – Tulare County Superior Court Case No. 253401

Client: Spaletta Law PC/Lower Tule River Irrigation District. 2013 to 2015.

Provided hydrogeological analysis and expert witness services. This case settled out of court.

Rosedale-Rio Bravo v. Kern County Water Agency – Ventura County Superior Court Case No. 56-2010-00379084-CU-WA-VTA

Client: McMurtrey Hartsock & Worth/Rosedale-Rio Bravo Water Storage District. 2010 to 2015.

Provided a hydrogeological analysis of groundwater level impacts associated with recharge and recovery operations of the Kern Water Bank and Pioneer Project near Bakersfield, California. Mr. Harder was designated as an expert for trial. This case settled out of court.

Antelope Valley Groundwater Cases, JCCP 4408

Client: Smith Trager LLP/Aleshire & Wynder LLP/Phelan Pinon Hills Community Services District. 2010 to present.

Provided a hydrogeological analysis of the characteristics and conditions of the groundwater system in the southeast portion of the Antelope Valley Groundwater Basin. Mr. Harder was designated and qualified as an expert for the Phase III portion of the trial. This case is ongoing.

Agri-Empire Inc., v. Osborne Development, Inc. et al. – Riverside County Superior Court Case No. RIC 488628

Client: Davis & Wojcik. 2009.

Provided a well condition analysis for a municipal well altered during construction for a housing development. Mr. Harder conducted the analysis and was the designated expert for trial. The case was settled out of court.

PUBLICATIONS

Harder, Thomas E., 1995. *A Hydrogeochemical Assessment of the Fate and Transport of Nitrate in Groundwaters Beneath the Tustin Area of Orange County, California*. Masters Thesis.

Williams, D.E. and Harder, T.E., 2003. *Pilot Study to Determine the Feasibility of Artificial Recharge of Recycled Water in Surface Spreading Basins*. Prepared paper for the 11th Biennial Symposium on Groundwater Recharge, Arizona Hydrological Society, Salt River Project, U.S. Water Conservation Laboratory, and Arizona Department of Water Resources, Tempe Arizona. June 5-7, 2003.

Diehr, D., Harder, T., and Jamison, D., 2006. *Lower San Luis Rey River Valley Groundwater Storage and Recovery Feasibility Study*. Prepared for the 15th Annual Groundwater Resource Association Conference. September 21-22, 2006.

Williams, D.E. and Harder, T.E., 2006. *The Use of Wells to Provide Water for Seawater Desalination Systems*. Prepared for the 15th Annual Groundwater Resource Association Conference. September 21-22, 2006.

Harder, T.E., 2007. *Pilot Study to Determine the Feasibility of Artificial Recharge in the San Bernardino Mountains, Southern California.* Prepared for the National Groundwater Association 2007 Groundwater Summit. May 1-3, 2007.

Harder, T.E., 2008. *The Hydrogeology of the Big Bear Valley, San Bernardino County, California*; in Geology and Hydrogeology of the Big Bear Valley and San Bernardino Mountains, Transverse Ranges, California; South Coast Geological Society Annual Field Trip Guidebook, No. 35.

F. Anibal Blandon, P.E.

Principal Engineer – ALDA Inc.

Education

M.S. Civil and Environmental Engineering, Utah State University, (1989)

B.S. Agricultural Engineering California State Polytechnic University, Pomona, (1987)

Registration

Professional Engineer California (1992)

Mr. Blandon has over 30 years of experience in the fields of civil and environmental engineering. His experience has been focused on providing water resources consulting services throughout the Inland Empire in particular and Southern California in general. While he has executed and managed a wide array of local and regional water resources planning studies, his expertize has focused in the execute on and/or management of groundwater basin management projects, water and recycled water master plans, feasibility studies, facilities plans, and hydraulic modeling of water distribution systems.

Mr. Blandon has also been responsible for desalting facilities feasibility studies and facilities plans, reclaimed water marketing surveys, and other related studies. He has also been involved in the design and construction management of water distribution facilities including local and regional pipelines and flow control and metering facilities.

Watermaster Engineer for the Beaumont Basin Watermaster. Over the last 10 years, Mr. Blandon has been responsible for providing engineering support services to the Beaumont Basin Watermaster. These include:

- ✓ Preparation of annual reports
- ✓ Determination of the operating safe yield
- ✓ Evaluation of water quality Conditions
- ✓ Development of a groundwater model of the Beaumont Basin
- ✓ Evaluation of water level conditions
- ✓ Documentation of various technical issues related to management of water resources in the Beaumont Basin

Technical Support to TVMWD's Administrative and Technical Services to Six Basins Watermaster. From 2004 through 2011, Mr. Blandon was responsible for the majority of the technical services provided by Three Valleys Municipal Water District to the Six Basins Watermaster in the Pomona-Claremont-La Verne area including:

- ✓ Development of Annual Report
- ✓ Determination of the Operating Safe Yield
- ✓ Evaluation of Water Quality
- ✓ Preparation of Annual Budget
- ✓ Management of Spreadsheet Model
- ✓ Evaluation of Water Level Conditions

- ✓ Documentation of various technical issues related to management of water resources in Six Basins

Project Manager. Groundwater Model Development and Facilities Plan. For the Pomona Valley Protective Association (PVPA), Mr. Blandon was responsible for coordinating the development of groundwater model of the Six Basins area. The model was developed to help PVPA to manage intermediate and long-term operations of the basins. Mr. Blandon was also responsible for the development of a facilities plan to spread up to 30,000 ac-ft. of local surface water at the San Antonio and Thompson Creek spreading grounds. The facilities plan identified metering, diversion, conveyance, and spreading facilities. In addition, detailed cost estimates of the capital improvements required to construct the facilities were developed.

Project Manager. Mitigation Alternatives to Rising Groundwater Study. Mr. Blandon was responsible for the management of this study conducted for TVMWD. The study involved the evaluation of alternatives to spread up to 15,000 ac-ft per year of imported water in the San Antonio Spreading Grounds and the potential impact on rising water conditions in the Claremont and Pomona basins. He was responsible for the evaluation of groundwater model results and the assessment of pumping facilities needed to minimize rising water conditions in the area.

Project Manager. Assessment of Current Spreading Operations and Development of Spreading Operating Parameters. Mr. Blandon was responsible for the management of this study conducted for PVPA. The study focused on the calibration of the groundwater model, the evaluation of spreading patterns to operate the San Antonio Spreading Grounds, and the development of management scenarios for the Six Basins Groundwater Management Area.

Project Manager. Water Master Plan. Mr. Blandon has been fully or partially responsible, as noted below, for the completion of water master plans for the following communities:

Training

Innovize Infowater
Water System Modeling

Innovize H20 Map
Water System Modeling

Kentucky Pipeline
Water System Modeling

- ✓ City of Big Bear Lake Department of Water and Power (P.Manager)
- ✓ Golden State Water Company – Claremont System (P. Manager)
- ✓ Golden State Water Company – San Dimas System (P. Manager)
- ✓ Golden State Water Company – Orcutt System (P. Manager)
- ✓ East Valley Water District (Technical Advisor)
- ✓ Yucaipa Valley Water District (Project Manager)
- ✓ San Bernardino Valley Municipal Water District (Project Engineer)
- ✓ City of San Bernardino Municipal Water Department (P. Manager)
- ✓ City of Colton (Project Manager)
- ✓ City of Tijuana and Rosarito, BC. (Task Manager)

- ✓ City of San Diego (Task Manager)
- ✓ City of Henderson, NV, Recycled Water Master Plan (P. Manager)
- ✓ City of Fontana Recycled Water Master Plan (P. Manager)
- ✓ San Antonio Water Company (P. Manager)
- ✓ Santa Ana River Water Company (P. Engineer)
- ✓ County of San Bernardino Zone L, Phelan Area (P. Manager)

As an example of the above listed studies, Mr. Blandon was fully responsible for the development, execution, and completion of the water master facilities plan for the City of San Bernardino MWD. As part of this study, he developed a hydraulic model of the city's system which included 18 pressure zones, over 60 wells and pump stations, 15 pressure reducing stations, and over 20 large capacity reservoirs. The model was used as the basis for the development of a 20 year Capital Improvement Plan that identified over 300 improvement projects worth in excess of $450,000,000. This study also involved the assessment of long-term water demands and the development of a water supply plan to meet projected demands.

Project Manager/Engineer. Hydraulic Modeling Development. Mr. Blandon has been responsible for the initial development of hydraulic models for city-wide or system-wide water distribution systems for the following communities:

- ✓ City of San Bernardino
- ✓ City of Colton
- ✓ Yucaipa Valley Water District
- ✓ East Valley Water District
- ✓ San Bernardino Valley Municipal Water District
- ✓ City of Big Bear Lake
- ✓ San Antonio Water Company
- ✓ Phelan / Pinion Hills (SBCSD – Zone L)
- ✓ City of Tijuana and Rosarito
- ✓ Western Municipal Water District
- ✓ Santa Ana River Water Company

Project Manager. Hydraulic Modeling Analyis. Mr. Blandon has been responsible for the hydraulic modeling of water distribution systems to assess the hydraulic capacity or size water facilities including transmission pipelines, pump stations, wells, and reservoirs. Some of the hydraulic modeling applications, in addition to those involved in the preparation of Water Master Plans, include:

- ✓ Existing 48-inch Baseline Feeder for San Bernardino Valley MWD

- ✓ Impact of proposed 60-72 inch Baseline Feeder South on the SBMWD's Lower pressure zone
- ✓ 19th Street Pump Station for the SBMWD
- ✓ 30-inch Northpark transmission pipeline for the SBMWD
- ✓ Zone 3 transmission capacity for the City of Upland
- ✓ System head curves for Wells 14, 15, and 16 for the Jurupa Community Services District
- ✓ System head curves for the Alessandro (4,000 HP) and Bergamont (800 HP) pump stations for Western Municipal Water District
- ✓ Sizing of Cajon Blvd. transmission pipeline for the SBMWD
- ✓ Sizing of Magnolia Booster Station, Meyers Canyon Booster Station, and Palm Avenue Reservoir for the SBMWD
- ✓ Routing alignment for the 36-inch Sterling Avenue pipeline for the East Valley Water District
- ✓ Sizing of Waterman and Newmark pump stations for the SBMWD

Project Manager. Water Feasibility Studies. Mr. Blandon has been responsible for the completion of water feasibility studies to assess the potential impacts of proposed developments on existing water system facilities. In general, these studies included the assessment of water demands, hydraulic modeling to determine whether existing distribution facilities were adequate to provide service or if new facilities were needed to meet maximum day and/or fire flow conditions. When existing facilities were not adequate, one or more alternatives to provide service were developed and recommendations made for implementation. Some of the feasibility studies completed by Mr. Blandon include:

- ✓ City of San Bernardino Municipal Water Department
  - Verdemont Development
  - Martin Ranch Development
  - Shandin Ranch Development
  - Sterling Heights Development
  - Hillwood I-215 Interchange Warehouse Distribution
  - Hillwood Southgate Development
  - Cotts Beverage
  - West Bay Holdings
  - Numerous development tracts
- ✓ Big Bear Lake Department of Water and Power
  - Big Bear Zoo
  - Moon Camp in Fawnskin
  - Erwin Lake System

- Lake Williams System
- Marina Point Development
- Big Bear Hilton
- Pine Knot Development
- Sandalwood Development
- Unique Mountain Development
- Jefferies Road Development
- McAlister Tract
- Bow Canyon Development

Technical Support. Integrated Water Supply Plan for the City of Riverside. As a subconsultant to CDM, Mr. Blandon played a significant role in the development and evaluation of several water supply alternatives to meet ultimate water demands and in the final evaluation of a recommended water supply plan.

Technical Support. City of Pomona Integrated Water Supply Plan. Mr. Blandon assisted the City of Pomona in the execution of a long-term Integrated Water Supply Plan conducted by RMC, an engineering consulting firm. He was responsible for developing the initial scope of services included in the request for proposals and assisted the City during the consultant selection process. He provided technical support to the City on the various aspects of the study.

DESIGN PROJECTS

Project Manager/Engineer. Baseline Feeder Flow Control and Metering Improvements for SBVMWD. Mr. Blandon was responsible for the management and overall design of flow control and metering facilities for six delivery points along the 48-inch Baseline Feeder regional pipeline. The implementation of this project required significant coordination with the City of Rialto and West Valley Water District as the proposed facilities were integrated into WVWD's telemetry system.

Project Manager. Bunker Hill Regional Water Supply Project. Mr. Blandon was responsible for the management of this water resources and design project to develop up to 30,000 ac-ft/yr. of new groundwater production in the Bunker Hill Basin for the San Bernardino Valley Municipal Water District. Mr. Blandon was responsible for the development of the initial scope of services, consultant selection, and for the overall coordination of the technical work conducted by three consulting firms, which included groundwater modeling of the basin and the development of 30 percent preliminary design. As a project manager, he provided technical guidance, managed consultants, and maintained participating water agencies abreast of the development of the project.

Project Manager. 36-inch Sterling Pipeline for East Valley Water District. Mr. Blandon was responsible for the management and design coordination of the 36-inch Sterling Pipeline, approximate length 13,500 ft. The purpose of this pipeline was to convey groundwater production in the lower portion of EVWD's service area into the Intermediate and higher pressure zones, where most of the future development is anticipated. The design included close coordination with Caltrans as the pipeline route crossed state routes at three separate locations.

Project Manager/Engineer. Rogers Lane Pipeline. For the East Valley Water District, Mr. Blandon was responsible for the design of approximately 4,000 ft. of 8-inch diameter pipeline. This pipeline was constructed to replace undersized pipelines with limited fire flow capacity in this portion of the City of Highland, CA.

Project Manager/Engineer. Lower Moonridge Pipeline Replacement. Mr. Blandon was responsible for all technical aspects involved in the design and construction management of Phase I and II of the Lower Moonridge pipeline replacement project for the Big Bear Lake Department of Water and Power (BBLDWP). Through this project, approximately 9,000 ft. of undersized pipelines were replaced to provide adequate fire flow protection to this area of the City of Big Bear Lake.

Project Manager/Engineer. Erwin Lake, Chipmunk, and Metcalf Bay Pipelines. Mr. Blandon was responsible for all technical aspects of the design of approximately 8,500 ft. of 8-inch and 10-inch diameter pipelines for the BBLDWP. These pipelines were constructed in the summer of 2010-11 and replaced old and undersized pipelines in various portions of the service area.

Jim Van de Water

Principal Hydrogeologist

EDUCATION

B.S., Geology. State University of New York at Stony Brook, 1986

M.S., Hydrology and Water Resources, University of Arizona, 1989

PROFESSIONAL REGISTRATIONS

California Professional Geologist (No. 6538)

Certified California Hydrogeologist (No. 508)

Arizona Registered Geologist (No. 61345)

PROFESSIONAL AFFILIATIONS

National Ground Water Association

During his 33 years of professional experience, Mr. Van de Water has conducted numerous modeling studies throughout the United States in support of water supply, remediation system design, and risk assessment. His work has involved water and irrigation districts in California and Arizona as well as USEPA and state agencies in California, Nevada, Arizona, Utah, Indiana, New Jersey, and Hawaii. His primary expertise is in the development and application of deterministic and stochastic analytical groundwater flow and solute transport models and numerical groundwater flow and solute transport models in support of regional- and site-scale hydrogeologic investigations and risk assessment. In addition to modeling, his expertise includes groundwater sampling, design and construction of monitoring, extraction, and injection wells, aquifer testing and analysis using analytical and numerical methods, statistical analysis, and expert witness/litigation/mediation services.

PROFESSIONAL EXPERIENCE

2014 to Present: *Principal Hydrogeologist*, Thomas Harder & Co.; Anaheim, California

1999 to 2014: *Independent Consulting Hydrogeologist*; Irvine, California

1995 to 1999: *Associate Hydrogeologist*, Harding Lawson Associates; Irvine, California

1994 to 1995: *Senior Hydrogeologist*, Bechtel Corporation; Norwalk, California

1992 to 1994: *Senior Hydrogeologist*, Multimedia Environmental Technology; Newport Beach, California

1991 to 1992: *Project Hydrogeologist*, Fluor Daniel; Irvine, California

1989 to 1991: *Staff Hydrogeologist*, McLaren-Hart; Irvine, California

RELEVANT PROJECT EXPERIENCE

Particle Tracking/Solute Transport Modeling

Groundwater Recharge Analysis – Porterville, CA

Client: Carollo Engineers, Inc. (ongoing).

Used a calibrated numerical groundwater flow model (MODFLOW-OWHM) linked to a solute transport model (MT3D-USGS) to assess the impact of discharging treated effluent from a wastewater treatment plant on nitrate concentrations in groundwater. Alternative discharge scenarios were evaluated over various time periods. To facilitate the analysis, developed an analytical model to generate nitrate input concentrations used in the solute transport model.

Groundwater Recharge Analysis – Beaumont, CA

Client: Beaumont Basin Watermaster. (ongoing).

Ported an existing calibrated numerical groundwater flow model to MODFLOW-NWT and then linked the resulting model to a solute transport model (MT3D-USGS) to assess the impact of return flow areas on total dissolved solids (TDS) concentrations in groundwater. Over thirty return flow areas throughout the basin were evaluated and historical data were used to calibrate the solute transport model.

Groundwater Recharge Analysis – Orange County, CA

Client: Irvine Ranch Water District. 2016-2019.

Coupled an analytical solute transport model to a flow-weighted mixing model to assess the impact of injection water containing various levels of total dissolved solids, chloride, and boron to a water supply well field in terms of mass loadings and assimilative capacity based on basin water quality objectives. The resulting analytical model was programmed to run both deterministically and stochastically to identify the most sensitive model inputs and the range of probable outcomes. Based on the results of the analytical modeling and other issues, OCWD revised their proposed injection scenarios to include additional and more widespread injection locations. Given the complexity of these additional scenarios, numerical methods involving the use of MODFLOW-2005, MODPATH, and MT3DMS were implemented.

Model Review – Phoenix/Scottsdale, AZ

Client: The Fehling Group (ongoing).

Serving as reviewer for a groundwater flow and particle tracking model being used to assess remediation of trichloroethene (TCE) at the North Indian Bend Wash Superfund site, which involves an extensive groundwater plume. The 10-layer model was recently converted from an older variant of MODFLOW to MODFLOW 6 and has now been appended to a model developed by the Salt River Project. The client is a subcontractor to the prime contractor for the USEPA.

Particle Tracking/Solute Transport Modeling (continued)

Former Western Chemical Site - La Mirada, CA

Client: JPR Technical Services, Inc. / SoCo West, Inc. 2006 to 2014.

Conducted aquifer testing and groundwater flow, capture zone, and solute transport modeling using MODFLOW, MODPATH, and MT3DMS, respectively, for a site contaminated with chlorinated solvents being overseen by the RWQCB (Los Angeles Region). The modeling was conducted to assist in the design of a groundwater extraction system. Specifically, the model results were used to identify optimum locations and pumping rates for extraction wells and provide water level data to geotechnical engineers to assist in settlement calculations. The model was updated and expanded to include injection wells and additional extraction wells.

Orange County Water District Forebay / AC Products Site – Placentia, CA

Client: MC2 Environmental Engineering, Inc. / AC Products. 2002 to 2003.

Conducted aquifer testing and developed a groundwater flow, capture zone, and solute transport model using MODFLOW, MODPATH, and MT3DMS, respectively, for a site contaminated with chlorinated solvents. All work was conducted in response to an Order issued by the RWQCB (Santa Ana Region) and involved estimating hydraulic conductivity values from step-drawdown, constant rate, and recovery tests. The modeling was conducted to assess the performance of two extraction wells (P-2 and P-3) located approximately 1 and 2 miles downgradient of the source area and to revise capture zone model predictions reported by the Orange County Water District (OCWD).

Argonne National Laboratory – Ceresco, NE

Client: USDA Parcel. 1997 to 1999.

Developed numerical groundwater flow/solute transport model using MODFLOW and MT3D/MT3DMS to assess the potential impact of carbon tetrachloride-impacted ground water on a municipal supply well.

Tri Valley Growers, Inc. – Madera, CA

Client: Tri Valley Growers, Inc. 1997 to 1999.

Developed a numerical groundwater flow/solute transport model using MODFLOW and MT3D/MT3DMS to optimize operation of a groundwater remediation system for a 1.5-mile long chloride plume and assess the impact of retention pond operations.

Particle Tracking/Solute Transport Modeling (continued)

9th Avenue Superfund Site – Gary, IN

Client: Fluor Daniel, Inc. 1992 to 1994.

Developed numerical solute transport models using both BIOPLUME II and MT3D and a multiphase flow model (ARMOS) to optimize the performance of a remediation system comprised of dual-phase extraction wells and infiltration galleries.

Hi Shear Site - Torrance, CA

Client: Alta Environmental, Inc. / Lisi Aerospace, Inc. 2012 to 2013.

Conducted aquifer testing and groundwater flow and capture zone modeling using MODFLOW and MODPATH, respectively, for a site contaminated with chlorinated solvents to identify optimum extraction well rates and locations. All work was conducted in response to an Order issued by the RWQCB (Los Angeles Region) and involved estimating hydraulic conductivity values from step-drawdown, constant rate, and recovery tests.

Tidal Modeling – Oakland Army Base, Oakland, CA

Client: ERRG, Inc. 2015-2016.

Programmed an analytical tidal-influence groundwater solute transport model and coupled it to tidal-influence surface water model to assess transport of volatile organic compounds and pesticides into, and subsequent mixing within, the intertidal zone of the San Francisco Bay. Installed, continuously logged, and developed several groundwater monitoring wells and conducted tidal measurements (using pressure transducers) which were used to calibrate the models.

Baker Hughes Centrilift Facility – Huntington Beach, CA

Client: AIS, Inc. 2014 to Present.

Lead hydrogeologist for extensively sampled and remediated site being overseen by the Regional Water Quality Control Board. Responsibilities include development of site- and regional cross-sections, aquifer test analysis, and stochastic solute transport modeling.

AMVAC – Los Angeles, CA

Client: Pacific Edge Engineering, Inc. 2005 to 2015.

Provided hydrogeologic and risk management support for large extensively sampled chemical manufacturing site largely impacted by organochlorine and organophosphorus pesticides including the highly volatile and toxic fumigant DBCP. Used vadose vapor- and aqueous-phase fate-and-transport models to assess migration of contaminants and to identify optimum locations for groundwater monitoring wells.

Particle Tracking/Solute Transport Modeling (continued)

Former LASMO Facility - Port Liberté, NJ

Client: IESI, Inc. 2000.

Reviewed MODFLOW simulations performed in support of remedial design involving groundwater extraction wells and trenches, and a slurry wall for site impacted by fuel hydrocarbons. Based on the review, an analytical, stochastic solute transport model was developed and implemented to assess the long-term performance of a slurry wall.

Southern California Edison Service Area – Rosemead, CA

Client: SCE. 2002 to 2005.

Developed numerical vadose zone solute transport model coupled to an analytical groundwater model to assist SCE in prioritizing cleanup for their regional network of above- and below-ground transformers.

Stringfellow Superfund Site – Glen Avon, CA

Client: Stringfellow PRP Group. 1994 to 1995.

Developed a two-dimensional vadose zone numerical modeling (using VS2DT) to assess the feasibility of dewatering to assess the feasibility of various remedial approaches.

Shiloh Road Site – Santa Rosa, CA

Client: Fluor Daniel, Inc. 1991 to 1992.

Developed surface water model to simulate aqueous- and sorbed-phase transport in local and regional surface water systems (using SWRRBWQ), as well as a numerical vadose zone and analytical saturated zone solute transport model (using SESOIL and AT123D, respectively).

Basin-Scale Groundwater Flow Modeling

Groundwater Flow Model of the Tule Basin – Tulare County, CA

Client: Tule Basin MOU Group, 2017 (ongoing).

Developed a numerical groundwater flow model of the Tule Subbasin using the USGS code OWHM (MODFLOW). The model covers an area of approximately 1,100 square miles and has been prepared in support of Sustainable Groundwater Management Act (SGMA) compliance. The model analysis will be used to refine the Sustainable Yield estimate of the subbasin and enable planning analyses using basin management scenarios. The model analysis is also being used to inform the development of six Groundwater Sustainability Plans (GSPs) for the six individual Groundwater Sustainability Agencies (GSAs) in the subbasin..

Groundwater Flow Model of the Beaumont Basin – Riverside County, CA

Client: Beaumont Basin Watermaster. 2014 to Present.

Assisted in the development of a numerical groundwater flow model of the Beaumont Basin for the purpose of groundwater management and reevaluating the safe yield of the basin.

Groundwater Flow Model of the Kern Fan Area – Bakersfield, CA

Client: Rosedale-Rio Bravo Water Storage District. 2011 to Present.

Assisted in the development of a numerical groundwater flow model using MODFLOW-2005 of the Kern Fan Area west of Bakersfield, California. The model has been successfully calibrated for the transient period from 1988 through 2011 and is currently being used to evaluate potential groundwater level changes associated with various recharge and recovery scenarios. Developed a front-end pre-processor to calculate pumping and return flow based on precipitation, surface deliveries, crop properties, and satellite evapotranspiration data.

Groundwater Flow Model of the Borrego Springs Area – Bakersfield, CA

Client: Confidential. 2019.

Conducted numerical groundwater flow model (MODFLOW-OWHM) simulations to estimate the sustainable yield of the Borrego Springs Groundwater Subbasin as it relates to the Borrego Valley Groundwater Sustainability Plan (GSP). The analysis was expanded to account for the impacts of future projects, management actions, and climate change on the overall water balance to meet the requirements of the Sustainable Groundwater Management Act (SGMA).

Site-Scale Groundwater Flow and Dewatering Modeling

San Joaquin Apartments Parking Structure Subdrain Design – Irvine, CA

Client: The Irvine Company. 2014.

Conducted a hydrogeological analysis of groundwater levels in the vicinity of a proposed parking structure. Conducted aquifer tests to quantify input parameters for numerical model. Developed a groundwater flow model using MODFLOW-2005 for assessing the effectiveness of a proposed subdrain design at maintaining groundwater levels below the bottom of the parking structure and estimating discharge rates from the proposed subdrain system.

Parkside Estates Dewatering Plan – Huntington Beach, CA

Client: Shea Homes. 2014.

Conducted groundwater flow modeling using MODFLOW-2005 to support development of a construction dewatering plan for a parcel targeted for residential development. Specifically, the model results were used to identify optimum locations and pumping rates for extraction wells and provide water level data to geotechnical engineers to assist in settlement calculations for shallow and deep excavations in close proximity to a regional confined aquifer.

Hydrogeologic Evaluation of Wastewater System – Malibu, CA

Client: Robertson Geotechnical, Inc. 2015

Managed the development of a numerical groundwater flow model using MODFLOW-2005 within a proposed residential area to assess groundwater mounding due to discharge from a proposed onsite wastewater system.

Lauren Healey

Project Geoscientist

Ms. Healey has more than four years of professional experience including development of basin-scale groundwater flow models for analysis of sustainable yield, future projections, project operational scenarios, groundwater quality changes, and groundwater impacts. Her experience includes conceptual model design, model construction, development of input files, model calibration, sensitivity analyses, and generation of output graphics. Ms. Healey is experienced in MODFLOW-based modeling using ModelMuse, Groundwater Vistas, and Visual MODFLOW and is also familiar with MODFLOW-OWHM modeling using command line and other modeling software such as WinFlow. She also has experience with oversight and field inspection on projects involving drilling, construction, development, and testing of high-capacity municipal water supply wells. Her field experience includes inspection of pilot borehole drilling and lithologic logging, geophysical logging, well construction, well development, pumping tests, aquifer zone testing, and collection of groundwater quality samples. Ms. Healey also has experience with various aspects of regional groundwater basin studies including compilation of large hydrogeological databases, analyses for water budget components, and preparation of detailed hydrogeological cross sections.

EDUCATION

B.S., Earth Science. California State University, Long Beach, cum laude, 2018

PROFESSIONAL EXPERIENCE

July 2018 to Present: Project Geoscientist, Thomas Harder & Co. Anaheim, California

September 2017 to July 2018: Hydrogeology Intern, Water Replenishment District of Southern California. Lakewood, California

PROFESSIONAL AFFILIATIONS

National Groundwater Association

PROFESSIONAL CERTIFICATION

Geologist in Training No. 1086

PROJECT EXPERIENCE

Groundwater Flow Model of the Onyx Ranch Area – Onyx, CA

Client: Spaletta Law PC. 2020 to present.

Updates the numerical groundwater flow model of the Onyx Ranch Area using ModelMuse to assess groundwater pumping impacts. The model encompasses approximately 110 square miles consisting of a single layer made up of 200-ft grid cells. Tasks include creation of model input files, review of the model water budget, model calibration, sensitivity analyses, and post-processing.

Groundwater Flow Model of the Kern Fan Area - Bakersfield, CA

Client: Rosedale-Rio Bravo Water Storage District. 2018 to present.

Updates the numerical groundwater flow model of the Kern Fan Area using ModelMuse. The original model encompassed approximately 160 square miles and was constructed with three layers made up of 200-ft grid cells. The model included 243 non-agricultural production wells, 181 agricultural production wells, and 89 individual recharge zones. The model was successfully calibrated for the transient period from 1988 through 2015. In 2016, the model was expanded to encompass approximately 295 square miles and was successfully calibrated through 2016. The model is currently being updated on an annual basis to assess project groundwater production and recharge impacts, and the model is calibrated through 2020. Tasks include creation of input files, review of the model water budget, model calibration, sensitivity analyses, recharge and recovery scenarios, and post-processing.

Groundwater Flow Model of the Tule Subbasin – Porterville, CA

Client: Tule MOU Group. 2018 to 2020.

Assisted in updating a numerical groundwater flow model of the Tule Subbasin and surrounding areas in support of work for the Sustainable Groundwater Management Act. The five-layer, 1,500 square mile model incorporates and expands on the previously prepared water budget of the Tule Subbasin. The model was successfully calibrated from 1986 through 2017 with monthly stress periods. In 2020, the model was updated and successfully recalibrated from 1986 through 2020. Tasks included creation of boundary conditions, creation of model input files and post-processing.

Groundwater Flow Model of the Borrego Springs Basin – Borrego Springs Basin, AZ

Client: Jackson Tidus. 2019.

Updated an existing United States Geological Survey numerical groundwater flow model of the Borrego Springs Basin using ModelMuse to estimate the sustainable yield of the basin. The model encompasses approximately 115 square miles consisting of three layers made up of 2,000-ft by 2,000-ft grid cells. The model calibration period is 1945 to 2010 with monthly stress periods. Tasks included creation of model input files and estimation of sustainable yield.

Groundwater Flow Model of the Upper San Pedro Basin– Upper San Pedro Basin, AZ

Client: Arizona Water Company. 2019.

Updated an existing United States Geological Survey numerical groundwater flow model of the Upper San Pedro Basin using ModelMuse to assess groundwater pumping impacts. The model encompasses approximately 3,400 square miles consisting of five layers made up of 250-m by 250-m grid cells. The model calibration period is 1986 to 2003 with biannual stress periods. Tasks included creation of model input files and analysis of groundwater impacts.

Groundwater Flow and Solute Transport Model of Proposed Desalination Project- Irvine, CA

Client: Irvine Ranch Water District. 2019.

Updated the numerical groundwater flow and solute transport model of the Talbert Gap using ModelMuse to assess groundwater quality impacts. The model was originally developed using Visual MODFLOW and was later converted to ModelMuse. Using the model, helped conduct an evaluation of TDS, chloride, and boron concentrations in nearby wells, including multiple scenarios of differing constituent concentrations and injection water mixing. The model encompasses approximately 120 square miles centered on the Talbert Gap injection wells and is a cutout of an existing Orange County Water District model. The model has been successfully calibrated for the transient period between July 2008 through December 2015. Tasks included creation of boundary conditions, creation of model input files, and post-processing.

Beaumont Basin Return Flow Analysis– Beaumont, CA

Client: Alda Engineering. 2019.

Assisted in the development of a return flow accounting methodology to develop annual estimates of return flow by appropriator within the Beaumont Basin Adjudication area. To account for return flow within the adjudicated boundary, water delivery record types by parcel (i.e., sewered, unsewered, landscape, or construction water) were identified based on location, whether inside or outside of the boundary, and a methodology to address parcels that extended across the boundary was developed. Return flow seepage lag time was analyzed to account for the time between application of water and arrival of return flow to the groundwater table. These return flow factors were applied to both indoor and outdoor water use by account.

Kiowa Well No. 1 – Apple Valley, CA

Client: Three Valleys Municipal Water District. 2018 to 2019.

Provided field inspection during the construction of an 18-inch diameter municipal supply well. The well was constructed this year to a total depth of 590 ft below ground surface. The borehole for the well was drilled using a fluid reverse circulation drilling rig. Field tasks included inspection of aquifer zone testing, observation of geophysical logging, groundwater level monitoring during step-drawdown and constant rate pumping tests, and collection of samples for Title 22 water quality analysis. Office tasks included graphing pumping test data, writing the pumping test results letter, and updating the well completion report.

Arlington Desalter Well AD-1 – Riverside, CA

Client: Western Municipal Water District. 2018 to 2019.

Provided field inspection during the rehabilitation of one well (Arlington Desalter Well AD-1). Field tasks included inspection during pump and pipe removal, initial development by airlift/swab, and groundwater level monitoring during the constant rate pumping test.

Adams/Juniper Well – Murrieta, CA

Client: City of Murrieta. 2018.

Provided field inspection during the rehabilitation of one well (Adams/Juniper Well). Field tasks included observation of video log, alignment survey, and casing inspection and thickness measurement (CITM) survey.

Thomas Harder & Co.
Groundwater Consulting
in association with **Alda, Inc.**

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Discussion Items

BEAUMONT BASIN WATERMASTER
MEMORANDUM NO. 22-30

Date:	December 7, 2022
From:	Steve Stuart, Dudek
Subject:	Consideration of Resolution No. 2022-__: To Amend Section 3 of the Rules and Regulations of the Watermaster adding Groundwater Level Measuring and Reporting Procedures
Recommendation:	Adopt Resolution No. 2022-__

Per request of the Committee, Dudek has compiled the BBWM Rules and Regulations into a fresh document. Attached is the redline version delineating the new, recommended Section 3.3 on Groundwater Water Well Level Measuring Procedures.

Background

The need for Groundwater Level Measuring and Reporting Procedures arose after communication was received from Jeanne Sabin of the Regional Water Quality Control Board. Discussion took place at the following BBWM Committee meetings:

Feb. 2, 2022: BBWM Legal Counsel Thierry Montoya advised that he received an email from Ms. Sabin. He said it may behoove the Watermaster to draft a water well monitoring procedure to provide to the requester. Ms. Sabin's questions and concerns were discussed (Agenda Item VII – B). Member Jaggers offered to prepare a draft procedure document.

Feb. 8: Counsel Montoya responded to Ms. Sabin via email and advised her that a copy of the groundwater monitoring protocols will be sent.

June 1: Counsel Montoya reported there had been no further contact from Ms. Sabin and reminded that his Feb. 8 email indicated that groundwater monitoring protocols will be sent. Mr. Swanson noted that no comments have been received on the circulated draft protocols.

Aug. 3: The Committee tasked Dudek with completing the procedures.

Oct. 5: The Committee reviewed draft procedures and provided comments.

Summary

Attachment 2 offers a redline of the complete BBWM Rules and Regulations as compiled by Dudek. Action today is to adopt the Resolution adding Section 3.3.

RESOLUTION NO. 2022-09

A RESOLUTION OF THE BEAUMONT BASIN WATERMASTER TO AMEND SECTION 3 OF THE RULES AND REGULATIONS OF THE WATERMASTER

WHEREAS, the Stipulated Judgement establishing the Beaumont Basin Watermaster (Riverside Superior Court Case No. 389197) empowers the Beaumont Basin Watermaster to adopt appropriate rules and regulations for the conduct of Watermaster affairs; and

WHEREAS, the Beaumont Basin Watermaster desires to establish groundwater level measuring and reporting procedures that provide a foundation for the collection and reporting of groundwater level data that is accurate and consistent between all owners of wells included in the Beaumont Basin monitoring well network; and

WHEREAS, the Beaumont Basin Watermaster desires to include in the groundwater level measuring and reporting procedures a methodology for communicating with private well owners and documenting requests to access their wells and provide them the opportunity to accompany the Beaumont Basin Watermaster representative during the collection of data; and

WHEREAS, the groundwater level measuring and reporting procedures include decontamination procedures for equipment used to manually measure depths-to-water at multiple wells to ensure no cross-contamination between wells.

NOW, THEREFORE, BE IT RESOLVED by the Beaumont Basin Watermaster Committee as follows:

1. The Beaumont Basin Watermaster hereby amends Section 3 of the Beaumont Basin Watermaster Rules and Regulations to include Section 3.3 as provided in Attachment A.
2. The Beaumont Basin Watermaster hereby adopts Form 9 entitled, “Water Level Field Form”, as provided in Attachment A.
3. The Secretary of the Watermaster is hereby authorized and directed to disseminate copies of this Resolution Amendment to all pumpers within the Beaumont Basin and other interested parties, and to incorporate such Amendment in the Rules and Regulations of the Watermaster and maintain the same on its website for reference.

PASSED AND ADOPTED this _____ day of _____, 2022 by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

BEAUMONT BASIN WATERMASTER

BY: _____

ART VELA, CHAIR
BEAUMONT BASIN WATERMASTER

RULES AND REGULATIONS

OF THE

BEAUMONT BASIN WATERMASTER

Adopted: June 8, 2004

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SECTION **PAGE NO.**

1 GENERAL PROVISIONS

1.0 In General

In general, Watermaster will strive to accomplish as many of its specific duties as is feasible and practical by entering into agreements with the Parties for the performance of those duties (e.g., meter installation, testing and maintenance, meter reading, water level measurement, etc.). Nothing herein shall conflict with the terms of the Judgment.

1.1 Definitions

The terms used in these Rules and Regulations shall have the same meanings as set forth in Section 1, Paragraph 3 of the Judgment, unless the context shall clearly indicate a different meaning. The following additional terms are defined for the purposes of these Rules and Regulations:

(a) "Annual or Year" means a fiscal year, July 1 through June 30 following, unless the context shall clearly indicate a different meaning.

(b) "Judgment" means the Judgment Pursuant to Stipulation Adjudicating Groundwater Rights in the Beaumont Basin dated February 4, 2004 in the Riverside Superior Court, Case No. 389197.

(c) "Salt Credits" means an assignable credit that may be granted by the Regional Water Quality Control Board and computed by the Watermaster from activities that result from the removal of salt from the Basin, or that result in a decrease in the amount of salt entering the Basin. Salt Credits may be used by Appropriators to facilitate implementation of the Beaumont Basin Water Resources Management Plan and as an offset against potential impacts associated with discrete projects. This does not preclude development of Salt credits by Appropriators implementing projects through agreements with their users.

(d) “Watermaster” and “Watermaster Committee” means the 5-member committee composed of persons nominated by the City of Banning, the City of Beaumont, the Beaumont-Cherry Valley Water District, the South Mesa Mutual Water Company and the Yucaipa Valley Water District, each of whom shall have the right to nominate one representative who shall be an employee of or consultant to the nominating agency.

2 ADMINISTRATION

2.0 Principal Office

The principal office of the Watermaster shall be:

Office of the Watermaster Secretary
c/o Beaumont-Cherry Valley Water District
560 Magnolia Avenue
Beaumont, CA 92223

or at such other location as may be designed from time-to-time by the Watermaster by resolution.

2.1 Records

All records of the Watermaster shall be available for public inspection pursuant to the California Public Records Act, except as otherwise provided by law. Copies of such records may be obtained upon payment of the cost of duplication.

2.2 Meetings of the Watermaster

The Watermaster shall conduct regular meetings on the first Wednesday of every even numbered month. Special meetings and workshops may be called as necessary to conduct the business of the Watermaster. All meetings of the Watermaster shall be open in public and conducted in accordance with the provisions of the California Open Meeting Law (Brown Act).

Commented [SS1]: Section 2.2 amended on April 18, 2012 with Resolution 2012-01 to establish regular meeting dates to improve communication and coordination between the Watermaster, interested parties and the public.

2.3 Quorum

A majority of the 5-member committee acting as the Watermaster shall constitute a quorum for the transaction of business.

2.4 Voting Procedures

Only action by affirmative vote of a majority of the members of the Watermaster Committee shall be effective.

2.5 Employment of Experts and Agents

The Watermaster may employ or retain such administrative, engineering, geologic, accounting, legal or other specialized personnel and consultants as it may deem appropriate.

2.6 Acquisition of Facilities

The Watermaster may purchase, lease and acquire all necessary real and personal property, including facilities and equipment.

2.7 Investment of Funds

The Watermaster may hold and invest all Watermaster funds in investments authorized from time-to-time for public agencies of the State of California, pursuant to a Statement of Investment Policy adopted by the Watermaster Committee.

2.8 Borrowing

The Watermaster may borrow, from time-to-time, amounts not exceeding annual receipts (payments on funds borrowed to implement Watermaster projects and programs must be included in Watermaster assessments such that they are part of Watermaster's annual receipts).

2.9 Contracts

The Watermaster may enter into contracts and agreements for the performance of any of its powers, and may act jointly or cooperate with agencies of the United States, the State of California, or any political subdivisions, municipalities, special districts or any person.

2.10 Budgets

The Watermaster shall prepare a proposed annual administrative budget for the upcoming fiscal year for Watermaster review. The Watermaster shall hold a public hearing on each such budget prior to adoption. Budgets shall be prepared in sufficient detail so as to make a proper allocation of the expenses and receipts. The adopted budget shall be funded in the upcoming year through assessments made pursuant to the Judgment. Expenditures within budgeted items may thereafter be made by the Watermaster as a matter of course (Judgment p.22, lines 3-5).

2.11 Assessments

Pursuant to the Judgment, Watermaster is empowered to levy and collect the following assessments:

(a) Annual Replenishment Assessments. The Watermaster shall levy and collect assessments in each year, in amounts sufficient to purchase replenishment water to replace Overproduction by any Party from the prior fiscal year. Replenishment assessments shall be collected not later than October 1 of each year. Under no circumstances shall Overlying Parties be required to pay assessments for pumping in an amount up to that set forth in column 4 of Exhibit B of the Judgment, subject to Section III of the Judgment.

(b) Annual Administrative Assessments. Annually, not later than the June meeting of the Watermaster, a General Administrative Budget shall be adopted for the ensuing fiscal year for the

purpose of funding General Administration Watermaster Expenses. The General Watermaster Administration Expenses shall include office rent, labor, supplies, office equipment, incidental expenses and general overhead. General Watermaster Administration Expenses will be assessed equally among the Appropriators who have appointed representatives to the Watermaster (Judgment, p. 19, lines 21-27).

(c) Special Project Assessments. Special Project Assessments will be levied to cover special project expenses including: special engineering, economic or other studies, litigation expenses, meter testing or other major operating expenses. Each such project shall be assigned a task order number and shall be separately budgeted and accounted for. Special Project Expenses shall be allocated to the Appropriators, or portion thereof, on the basis of benefit. This may be accomplished through the identification and implementation of Special Project Committees. A Specific Project Committee may involve a specific Party or any group of Parties, provided that no Party shall be involved without its approval (Judgment, p. 20, lines 1-9). Special Project Assessments shall be invoiced upon approval of a budget and a scope of work for a Special Project by Project Committee.

(d) Supplemental Assessments. Supplemental Assessments may be levied based on incurring unbudgeted or unforeseen expenses as approved by Watermaster. Examples include Special Project expenses for litigation in which Watermaster has taken action to participate. All Supplemental Assessments shall reference the Watermaster action authorizing same and be invoiced within one week of the Watermaster action.

(e) Assessment Procedure. Assessments shall be levied and collected as follows:

i. Notice of Assessment. The Watermaster shall give written notice of all applicable assessments to each producer in the form of an invoice.

ii. Payment. Each assessment shall be payable on or before thirty (30) days after the date of invoice, and shall be the primary obligation of the party or successor owning the water production facility at the time written notice of assessment is given, even though prior arrangement for payment by others has been made in writing and filed with the Watermaster.

iii. Delinquency. Any delinquent assessment shall incur a late charge of 10% per annum (or such greater rate as shall equal the average current cost of borrowed funds to the Watermaster) from the due date thereof.

iv. Assessment Adjustments. The Watermaster shall make assessment adjustments as necessary for the reporting period as either a credit or a debit in the next occurring assessment period unless otherwise reasonably decided by the Watermaster.

v. Collection of Delinquent Assessments. The Watermaster may bring suit in a Court having jurisdiction against any Producer for the collection of any delinquent assessments and interest thereon. The Court, in addition to any delinquent assessments, may award interest and reasonable costs including attorneys' fees.

(f) Salt Credits. Watermaster may establish a method of calculating salt credits in the future as part of a conjunctive use program or as part of the maximum benefit objectives demonstration program for discrete projects.

2.12 Annual Report

A draft annual report shall be prepared by ~~the August Watermaster meeting~~ May and ~~a~~ final report shall be prepared by July ~~the September meeting~~ of each year. At a minimum, the annual report will describe Watermaster's operations, assessments and expenditures, and a review of Watermaster activities. The annual report shall also include a summary report ~~by the Watermaster engineer, at a minimum,~~ describing and updating any basin condition information collected or analyzed and a current active party list.

Commented [SS2]: Section 2.12 amended by Resolution 2011-01 on September 21, 2011. The Watermaster adopted Resolution 2011-01 to "better coordinate intergovernmental water resource management planning activities and to improve the usefulness of the Watermaster's Annual Report, the Watermaster desires to amend the dates of issuance of the draft and final versions of the Annual Report."

2.13 Basin Condition Report

The Watermaster shall prepare, at least once every two years, a "state of the groundwater basin" report including an update on the status of monitoring, storage and water quality.

2.14 Interventions

Any Person who is neither a Party to the Judgment nor a successor or assignee of a Party to the Judgment may seek to become a party to the Judgment by filing a petition in intervention. Watermaster will provide a standard form for interventions should the need arise, and will report on any such interventions in its annual report. Interveners shall have no water rights under the Judgment (unless acquired from an Appropriator Party).

2.15 Notice and Waiver of Notice

Pursuant to the Judgment, each Party shall designate, in writing, the name and address to be used for purposes of all subsequent notices and services under the Judgment. Such designation may be changed by filing a written notice with the Watermaster. Any Party desiring to be relieved of receiving notices of Watermaster activity may file a waiver of notice on a form to be provided by the Watermaster. Watermaster staff shall maintain, at all times, a current list of Parties to whom notices are to be sent and their addresses for the purposes of service as well as a current list of the names and addresses of all parties or their successors and assigns. Copies of such lists shall be available to any Person.

2.16 Watermaster Alternates

To ensure consistency in the administration of the affairs of the Watermaster, the members of the Watermaster Committee will endeavor to attend all meetings of the Watermaster. However, from time-to-time the press of business may prevent such regular attendance. Therefore, the members of the Watermaster agencies may appoint an alternate member to the Watermaster Committee who, in the absence of the regular member, shall, if present, participate in a meeting of the Watermaster the same as if the alternate member were a regular member of the Watermaster Committee. Each alternate member must hold a senior management position within the organization of the appointing Watermaster member agency.

3 MONITORING

3.0 Scope

The Watermaster will carry out the monitoring activities described in the Beaumont Basin Management Plan and such policies and procedures as may be deemed necessary by the Watermaster. Any such policies and procedures shall be adopted at regular or special meetings of the Watermaster and reported in the Watermaster's annual report.

3.1 Measuring Devices

Groundwater production shall be monitored by measuring devices and/or meters (hereinafter collectively, "meter" or "meters"), as follows:

(a) Meter Installation. Except as otherwise provided by agreement, such necessary meters as Watermaster may deem appropriate shall be installed as follows:

i. New Wells:

1. Appropriator Wells. A meter shall be installed on each new Appropriator well by the Appropriator and at the Appropriator's expense concurrently with the installation of the pump.

2. Overlyer Wells. A meter shall be installed on each new Overlyer well by the Watermaster and at the Watermaster's expense concurrently with the installation of the pump.

ii. Existing Wells. Meters shall be installed on existing wells as soon as practicable by the Watermaster at the Watermaster's expense.

(b) Meter Maintenance. The Watermaster shall, at its expense, perform routine maintenance on all well meters in the Beaumont Basin.

(c) Inspection, Testing, Repair and Retesting. Meters shall be inspected and tested as deemed necessary by the Watermaster and the cost thereof borne by the Watermaster. The Watermaster may contract for a meter testing service or with an Appropriator for meter inspection and/or testing. Any Producer may request an evaluation of any or all of its water meters at any time; provided, however, the Watermaster shall only pay for tests initiated by the Watermaster. Meter repair and retesting will be a Producer expense (Judgment, pp. 18-19, lines 28 – 7).

3.2 Reporting By Producers

Each Producer producing in excess of 10 acre-feet per year shall file with the Watermaster on forms provided therefore, a monthly report of its total water production during the preceding calendar month, together with such additional information as the Watermaster may reasonably require (including power use

records, if unmetered). The report shall be due on the fifteenth (15th) day of the month next succeeding the end of each respective month. Appropriators shall report groundwater levels and Overlying Owner production along with such additional information as may be necessary to complete the Watermaster monitoring program through Agreements with the Watermaster. Producers producing 10 acre-feet or less per year shall file an annual report of their total water production during the preceding fiscal year by the 15th of July of each year on forms provided therefore.

3.3 Groundwater Level Measuring and Reporting Procedures

The watermaster will carry out all groundwater measuring activities in accordance with the procedures identified hereafter and in accordance with the Groundwater Elevation Monitoring Guidelines issued by the California Department of Water Resources (DWR, 2010) for the California Statewide Groundwater Elevation Monitoring (CASGEM) program and the Monitoring Protocols, Standards, and Sites Best Management Practices issued by DWR to assist in the development of monitoring protocols for Groundwater Sustainability Plans (DWR, 2016).

To the extent possible, groundwater level monitoring events shall be coordinated so that measurements are taken in the late spring and late fall to record the annual highs and lows, respectively, in groundwater levels in the Beaumont Basin.

3.3.1 Communication and Planning

The Beaumont Basin Watermaster and representatives of the Watermaster will conduct the following procedures to coordinate the collection of water level data with all stakeholders owning a well that is part of the Beaumont Basin groundwater monitoring network:

1) Notification of the intent of the Watermaster to access the respective party's well to collect a water level measurement will be provided via email, text message, or phone call two weeks, at a minimum, before the data collection event.

2) Verification of receipt of the notification and authorization by the well owner granting access to the well shall be obtained by the Watermaster and Watermaster representative via email, text message or phone call at least three days prior to accessing the well.

    a) The Watermaster and/or Watermaster representative will follow up with an email, text message or phone call should the well owner not respond within three days of the groundwater monitoring event.

    b) All forms of correspondence shall be documented (e.g., record date and time of text message delivery).

3) All efforts shall be made by the Watermaster representative to accommodate the schedule of the well owner to access the well within the two-week period set for the groundwater monitoring event, and to provide the well owner the opportunity to observe the collection of data at their respective well.

4) Digital and hard copies of the groundwater level measuring and reporting procedures shall be made available at the well owner's request at the time of data collection.

5) Arrangements, to the extent possible, shall be made with the well owner to collect a static water level measurement per Section 3.3 (d)(c). This may include requesting that the well be idle for 24 hours, at a minimum, prior to measuring the water level.

3.3.2 Monitoring Well Network

3.3.2.1 Existing Wells

The monitoring well network used by the Watermaster for purposes of characterizing groundwater conditions in the Beaumont Basin shall include all accessible production and monitoring wells owned by the Appropriators, Overlying Parties, and other stakeholders. The following highlight the minimum requirements for existing wells to be included in the Beaumont Basin monitoring well network:

1) Wells in the monitoring network shall be screened in the unconsolidated Quaternary alluvium and upper portion of the San Timoteo Formation, together comprising the water-bearing aquifer of the Beaumont Basin.

2) Groundwater level measurements shall be taken from a clearly marked and permanent reference point on the top of a sounding tube, well casing, or other permanent feature.

3) Reference points shall be surveyed by a California licensed surveyor. The survey shall include the following details:

   a) Well locations (center point of well casing) shall be referenced to the North American Datum of 1983 (NAD83) and reported in decimal degrees for latitude and longitude.

   b) Elevations shall be referenced to the North American Vertical Datum of 1988 (NAVD88) with an accuracy, at a minimum, of 0.5 foot. The following features, if applicable, shall be surveyed at each well point:

      (1) Top of Well Casing or Sounding Tube (i.e., TOC)

      (2) Top of protective steel riser or monument cover

      (3) Land surface

3.3.2.2 New Wells

New wells installed in the Beaumont Basin shall be equipped with dedicated sounding tubes (if a production well) or have open casing to facilitate the use of a water level metering device to measure groundwater elevations. The new well shall be constructed to accommodate the installation of a 7/8-inch diameter dedicated pressure transducer. The following highlight the minimum requirements for new wells to be included in the Beaumont Basin monitoring well network:

1) Well construction details and survey results by a licensed surveyor shall be shared with the Beaumont Basin Watermaster and included in the well network database for the Beaumont Basin.

2) New wells that are screened fully or partially in the unconsolidated Quaternary alluvium and upper portion of the San Timoteo Formation, together comprising the water-bearing aquifer of the Beaumont Basin, will be included in the monitoring well network for the Beaumont Basin.

3) Groundwater level measurements shall be taken from a clearly marked and permanent reference point on the top of a sounding tube, well casing, or other permanent feature.

4) Reference points shall be surveyed by a California licensed surveyor. The survey shall include the following details:

    a) Well locations (center point of well casing) shall be referenced to the North American Datum of 1983 (NAD83) and reported in decimal degrees for latitude and longitude.

    b) Elevations shall be referenced to the North American Vertical Datum of 1988 (NAVD88) with an accuracy, at a minimum, of 0.5 foot. The following features, if applicable, shall be surveyed at each well point:

        i) Top of Well Casing or Sounding Tube (i.e., TOC)

        ii) Top of protective steel riser or monument cover

        iii) Land surface

3.3.3 Groundwater Water Level Measuring Devices

3.3.3.1 Electric Water Level Sounder

Where possible, groundwater levels shall be manually measured with an electric water level sounder calibrated to the nearest 0.01 ft. All equipment must be in good working condition. No damaged or refurbished electric sounding tape should be used, unless specifically approved by the Watermaster.

3.3.3.2 Dedicated Pressure Transducers

Dedicated pressure transducers shall be installed in monitoring and production wells identified as key wells for administration of the Judgement. The pressure transducers shall be installed below the groundwater level and pressure-rated for the range of anticipated groundwater level fluctuations due to seasonal fluctuations and/or groundwater production.

Dedicated pressure transducers shall be equipped with a datalogger that is programmable to measure and record water levels at a desired frequency. Each dedicated pressure transducer shall measure absolute pressure in units of pounds per square inch (psia) and/or feet of water. The Watermaster shall use separate

pressure transducers dedicated to measure barometric pressure in units of psia and/or feet of water to provide a general characterization of barometric pressure in the Beaumont Basin.

3.3.4 Manual Groundwater Level Measurements

The following procedures shall be used to measure and record manual groundwater level measurements in the field.

3.3.4.1 Water Level Form

1) Upon arrival at each well site, the field technician shall note the following information on a standardized Water Level Field Form (see Appendix A):

    a) Name of well owner

    b) Well Identifier (e.g. well owner name, State Well ID)

    c) Date (mm/dd/yyyy) and time (24 hr) of measurement

    d) Climate conditions (e.g., sunny, light breeze, air temp is 80 °F, etc.)

    e) Type of well (e.g., municipal, monitoring, agricultural, etc.)

    f) Status of water level and/or well: Static, Recovering (i.e., rising), Pumping, Artesian (i.e., flowing), Falling.

    g) Time since pumping stopped (i.e., idle time) if well was previously active.

    h) Method of water level measurement (e.g., electric water level sounder, airline, sonic, dedicated pressure transducer)

    i) Field technician and/or representative measuring the water level

    j) Any additional comment

2) Use one Water Level Field Form for each well. If possible, the same field form should be used at each well during each monitoring event.

3.3.4.2 Water Level Status

Where possible, groundwater level measurements must be representative of static (i.e. non-pumping) groundwater level conditions. To ensure measurements of static groundwater levels in active pumping wells, the field technician collecting the data shall coordinate, verify, and/or confirm that the pump has been off for at least 24 hours prior to collecting the data (wherever possible).

3.3.4.3 Decontamination

All water level measuring equipment shall be cleaned prior to lowering it into the well(s) using the following decontamination procedure:

a) Wash equipment with an Alconox solution which is followed by a deionized water rinse.

b) Triple rinse equipment with deionized water.

3.3.4.4 Electric water level sounder

3.3.4.4.1 Before making a measurement

1) Inspect the sounding tape for wear, kinks, frayed electrical connections, and possible stretch. Make a notation in the Water Level Field Form documenting any wear or other issues that possibly affect measurements with the electric water level sounder.

2) Test that the battery and replacement batteries are fully charged.

3) Test the circuit by dipping the probe into tap water and observe whether the sounder indicator turns on and/or makes a sound to indicate the circuit is closed when in contact with water.

3.3.4.4.2 Making the Measurement

1) Lower the electrode probe slowly into the designated sounding port for production wells and into the main well for monitoring wells. Lower the probe until the circuit is closed and contact with the water surface in the well is made.

2) Measure the depth-to-water (DTW) by placing the sounder tape next to the dedicated and clearly marked reference point on the top of the sounding tube or well casing. Measure the DTW to the nearest 0.01-foot. The DTW shall be recorded as feet below reference point (or ft brp).

3) Lift the probe slowly a few feet and make second measurement by repeating the step above. If the 2nd measurement is more than 0.02 feet different from the first measurement, collect and record a third measurement. If more than two measurements are taken, record the average of all reasonable readings.

4) If the groundwater level is not static, stay at the well long enough (if reasonable time allows) for a static groundwater level. If that wait is more than 1 hour or not possible, make ten (10) or more measurements at 1-minute minimum intervals to document the rate of groundwater level rise or fall per 5 minutes for the non-static measurements. If necessary, use additional sheets of the Water Level Field Form to document all measurements. Document possible reason for the rise or fall of the water level in the comment section.

5) All DTW measurements shall be immediately recorded on the Water Level Field Form (see Appendix A). The DTW shall be compared to previous measurements in the field and re-measured if significantly different.

a) If the DTW measurement appears incorrect or anomalous, provide the possible reason or recommend follow-up actions so that future measurements are representative of actual conditions at the well.

3.3.4.4.3 After Making the Measurement

1) The sounder tape and electrode probe shall be wiped down during retrieval from the sounding tube or well using a clean paper towel or disinfectant wipe.

2) If oil is noticeable on the sounder tape and/or electric probe, its presence and apparent thickness, if possible, shall be noted in the Water Level Field Form. The CASGEM Guidelines note that, “oil on the surface of the water may interfere with obtaining consistent readings and could damage the electrode probe.” An alternative method may be necessary to obtain an accurate water level measurement.

3) Refer to Section 3.3.4.3 for disinfection procedures.

4) The cap to the sounding tube or well shall be replaced.

5) Where applicable, the riser shall be secured with the dedicated lock.

6) Prior to leaving the monitoring well site, the field representative shall note any physical changes in the concrete well pad and riser pipe, such as erosion, cracks, or damage. All changes shall be recorded on the Water Level Field Form.

7) Whenever possible, an electric water level sounder should be used to measure the DTW in a well. The use of an airline or sonic water level meter should only be used when well conditions do not allow for electric water level sounder measurements.

3.3.4.5 Airline Measurements

Airline measurements are an acceptable alternative to measuring DTW in a well in the following cases:

1) There is no access port or sounding tube available to allow access of an electric water level sounder to measure the DTW.

2) No dedicated pressure transducer has been installed and calibrated to measure and record water levels

3) At the time of installation, the DTW measured by the airline was calibrated to a water level measured using an electric water level sounder or steel tape.

4) The airline extends a minimum 10 feet below the lowest anticipated water level in the well.

5) The airline is the only method for measuring a water level that the well can accommodate.

3.3.4.5.1 Making the Measurement

DTW measurements using an airline will be collected per the following (Cunningham et al., 2011):

1) The depth to the open end of the airline and length of the airline is known. The airline is secure and not subject to freely move in the well.

2) The pressure gauge is calibrated and covers the anticipated range in pressure fluctuations associated with water level fluctuations anticipated in the well due to seasonal and/or pumping effects.

3) The accuracy of the airline measurement must be documented in the Water Level Field Form. The typical accuracy using a pressure gauge is approximately 1 foot.

3.3.4.6 Sonic Water Level Meter

1) Sonic water level meter procedures vary by meter manufacturer. Refer to the meter operating instructions for procedures.

3.3.4.6.1 Making the Measurement

1) In general, use of a sonic meter requires an access port that is 5/8-inch or greater in diameter and a measurement of the average air temperature in the well casing.

    a) The typical accuracy of a sonic meter is 0.2 feet for water levels less than 100 feet or 0.2% for water levels deeper than 100 feet.

    b) Sonic water levels should not be used if the casing diameter is greater than 8-inches in diameter, air temperature inside the well is not known, there is an obstruction in the well casing that is close to half the well diameter or more, and there is no cover surrounding the meter in open wells.

3.3.5 Automatic Groundwater Level Measurements

3.3.5.1 Installation of Dedicated Pressure Transducers

1) Before installing a pressure transducer in a well, the water level in the well shall be confirmed at a static condition using an electric water level sounder (see Section 3.3.4.2 and 3.3.4.4) and no pumping from the well has occurred in the previous 24 hours.

2) The dedicated pressure transducer shall be lowered below the water level in the well to a depth within the transducer's pressure rating. The device shall be set at a depth to accommodate the anticipated fluctuations in the water level due to seasonal effects and pumping (if applicable).

3) Once the desired depth setting of the pressure transducer is set, the transducer shall be secured to the wellhead, casing, or other permanent structure.

4) A real-time reading of the pressure head (in feet of water) from the pressure transducer shall be collected and documented once it has been set and given time to equilibrate to the temperature of the water.

5) The measured DTW by the electric sounder shall be added to the height of water measured above the transducer's sensor to calculate the depth of the pressure transducer from the well's reference point.

6) The depth the transducer is set below the reference point, the make, model, and serial number of the pressure transducer, and battery life remaining (or usage) at time of deployment shall be recorded in a Water Level Field Form.

3.3.5.2 Installation of barometric pressure transducers

1) Barometric pressure transducers shall be installed in the protective steel casings of wells, well houses, or other protected structure that is open and/or in contact with the atmosphere.

2) The location of the barometric pressure transducer, the make, model, and serial number of the pressure transducer, and battery life remaining (or usage) at time of deployment shall be recorded in a Water Level Field Form.

3.3.5.3 Frequency of Water Level Measurements

1) Dedicated pressure transducers equipped with internal dataloggers shall be programmed to measure and record water levels in units of psi or feet of water at a frequency of once per hour at the top of the hour.

2) Water level data will be downloaded from each pressure transducer at least once every three months.

3) During each download session, the field technician will also obtain a manual groundwater level measurement to verify transducer readings and ensure that the instruments are working properly.

3.3.5.4 Frequency of Barometric Pressure Measurements

1) Barometric pressure transducers shall be programmed to measure and record barometric pressure in units of psi or feet of water at a frequency of once per hour at the top of the hour.

2) In the event any pressure transducer assembly must be removed from any particular well for download, the removed assembly shall be disinfected in accordance with decontamination procedures outlined under Section (c)d.

3.3.6 References

California Department of Water Resources (DWR), 2010. Groundwater Elevation Monitoring Guidelines. December 2010.

California Department of Water Resources (DWR), 2016. Monitoring Protocols, Standards, and Sites BMP, Best Management Practices for the Sustainable Management of Groundwater. December 2016.

Cunningham, W.L., and Schalk, C.W., comps., 2011, Groundwater Technical Procedures of the U. S. Geological Survey: U. S. Geological Survey Techniques and Methods 1-A1, 151 p.

4 OPERATING YIELD, SAFE YIELD AND NEW YIELD

4.0 Redetermination of Operating Yield

The Operating Yield of the Beaumont Basin shall be redetermined annually by the Watermaster.

4.1 Redetermination of Safe Yield

The Safe Yield of the Beaumont Basin shall be redetermined at least every ten (10) years beginning 10 years after the date of entry of the Judgment (Judgment p. 22, lines 6-9).

4.2 New Yield

In order to encourage maximization of Basin water under the Physical Solution, New Yield shall be accounted for by the Watermaster in interim periods between re- determinations of Safe Yield.

(a) New Yield includes proven increases in yield in quantities great er than the historical level of contribution from certain recharge sources may result from changed conditions including, but not limited to, the increased capture of rising water, increased capture of available stormflow, and other management activities that occur after February 20, 2003, as determined by Watermaster (Judgment, p. 4, lines 1-5). These increases are considered New Yield.

(b) Recharge with new locally generated water shall be credited as New Yield to the Party that creates the new recharge. The Watermaster shall make an independent scientific assessment of the estimated New Yield to be created by each proposed project based upon monitoring data. The cost of the Watermaster scientific assessment of the New Yield shall be borne by the Party applying to create it.

(c) New Yield shall be allocated on an annual basis, based upon monitoring data and review by the Watermaster. (Judgment, p. 21, lines 14-20).

4.3 Losses or Spills from the Basin

Water in Storage may be subject to losses. The Watermaster shall determine if losses are occurring and report its findings in the first Basin Condition Report. If losses are occurring, Watermaster shall determine how much water is being lost. Supplemental Water stored pursuant to Groundwater Storage Agreements shall be lost prior to Basin water (i.e., unused operating safe yield) held in Storage by a Party to the Judgment.

5 RECHARGE

5.0 In General

All Groundwater Recharge activities in the Beaumont Basin shall be subject to the Watermaster Rules and Regulations

(a) The Watermaster shall calculate additions, extractions and losses, and maintain an annual account of all recharged water in the Beaumont Basin, and any losses of water supplies or Safe Yield resulting from such recharged water (p. 21, lines 9-13).

(b) The owners of existing publicly-owned recharge facilities shall cooperate with the Watermaster to expand, improve and/or preserve recharge facilities. The Watermaster shall cooperate with appropriate entities to construct and operate new recharge facilities.

(c) The Watermaster shall account for all sources of recharge and shall provide an annual accounting of the amount of recharge and the location of the specific types of recharge.

(d) The Watermaster may deter mine to prepare a Recharge Master Plan, which Plan shall be periodically updated to account for changed conditions.

(e) The Watermaster may arrange, facilitate and provide for recharge by entering into contracts with appropriate persons, who may provide facilities and operations for the physical recharge of water.

5.1 Application to Recharge Supplemental or New Yield Water

All recharge of Supplemental or New Yield Water shall be subject to Watermaster approval obtained by an application made to the Watermaster to protect the integrity of the Beaumont Basin.

5.2 Notice of Pending Applications

Upon receipt of an application, the Watermaster staff shall prepare a written summary and analysis of each such application. The application, along with the written summary and analysis shall be distributed to the Producers and any other interested parties not less than 21 days prior to the date the Watermaster is scheduled to consider and take action on the pending application. The cost of the summary and analysis of each application shall be borne by the applicant.

5.3 Watermaster Investigations of Applications

The Watermaster may, in its discretion, cause an investigation of the subject of a pending application. Any party to the proceeding may be requested to confer and cooperate with the Watermaster's staff and

consultants, and to provide such additional information and data as may be reasonably required to complete the investigation.

5.4 Sources of Supplemental Water

Supplemental Water may be obtained by the Watermaster from any available source. The Watermaster shall, however, seek to obtain the best quality of Supplemental Water at the most reasonable cost for recharge. Available sources may include, but are not limited to:

(a) Maximum beneficial use of Recycled Water, which shall be given a high priority by the Watermaster;

(b) State Project Water;

(c) Local Imported Water through facilities and methods for importation of surface and groundwater supplies from adjacent basins and watersheds;

(d) Available supplies of Metropolitan Water District;

(e) Stormwater recharge projects.

(f) Other Imported Water.

5.5 Method of Replenishment

The Watermaster may accomplish replenishment by any reasonable method, including spreading and percolation, injection of water in existing or new facilities, in-lieu delivery arrangements and acquisition of unproduced water.

6 STORAGE

6.0 In General

A substantial amount of available groundwater storage capacity exists that is not used for storage or regulation of basin waters. It is essential that the use of storage capacity be undertaken only under Watermaster control and regulation so as to protect the integrity of the Beaumont Basin. The Watermaster shall exercise regulation and control of storage primarily through the execution of Groundwater Storage Agreements.

6.1 Relationship Between Recapture and Storage

Recapture of water held in a storage account will generally be approved by the Watermaster as a component of and coincident with a Groundwater Storage Agreement. However, the Watermaster may approve a Groundwater Storage Agreement where the plan for recovery is not yet known. In such cases, the applicant for a Groundwater Storage Agreement may request Watermaster approval of the Agreement and subsequently submit and process an independent Application for Recapture to the Watermaster.

6.2 Storage of Water

Storing Supplemental Water for withdrawal, or causing withdrawal of water unused and stored in prior years, shall be subject to the terms of a Groundwater Storage Agreement with the Watermaster. Any Water recharged by any person is deemed abandoned and shall not be considered water stored except pursuant to these Rules and Regulations and a Groundwater Storage Agreement.

6.3 Application for Storage of Water

The Watermaster will ensure that any Person, including, but not limited to, the State of California and the Department of Water Resources, shall make an application to the Watermaster to store and recover water as provided herein. The Watermaster shall also ensure that sufficient storage capacity shall be reserved for local projects implemented by the Appropriators.

6.4 Contents of Groundwater Storage Agreements

Each Groundwater Storage Agreement shall include, but not be limited to, the following components:

(a) The quantities and term of the storage right, which shall specifically exclude credit for any return flows;

(b) A statement of the priorities of the storage right as against overlying, Safe Yield uses, and other storage rights;

(c) The projected delivery rates, together with projected schedules and procedures for spreading, injection or in-lieu deliveries of Supplemental Water for direct use;

(d) The calculation of storage water losses and annual accounting for water in storage; and

(e) The establishment and administration of withdrawal schedules, locations and methods.

6.5 Notice of Pending Applications

Upon receipt of an application, the Watermaster staff shall prepare a written summary and analysis of each such application. The application along with the written summary and analysis shall be distributed to the Producers and any other interested parties not less than 21 days prior to the date the Watermaster is scheduled to consider and take action on the pending application. The cost of the written summary and analysis of each such application shall be borne by the applicant.

6.6 Watermaster Investigations of Applications

The Watermaster may, in its discretion, cause an investigation of the subject of a pending application. Any party to the proceeding may be requested to confer and cooperate with the Watermaster's staff and consultants, and to provide such additional information and data as may be reasonably required to complete the investigation.

6.7 Accounting for Water Stored

The Watermaster shall calculate additions, extractions and losses of all water stored and any losses of water supplies or Safe Yield resulting from such water stored, and keep and maintain for public record an annual accounting thereof.

7 ADJUSTMENTS OF RIGHTS

7.0 In General

Commented [SS3]: Section 7 amended on June 25, 2019 by Resolution 2019-02, which rescinded the entire Section 7 and replaced it with the text in red.

In General, Overlying Parties shall have the right to exercise their respective Overlying Water Rights except to the extent provided in Section III, Paragraph 3, entitled Adjustment of Rights, of the Judgment. (Judgment, p. 8, lines 12-14).

(a) To the extent any Overlying Party requests, and uses its adjudicated water rights to obtain water service from an Appropriator Party, an equivalent volume of potable groundwater shall be earmarked by the Appropriator Party which will serve the Overlying Party, up to the volume of the Overlying Water Rights as reflected in Column 4 of Exhibit "B" of the Judgment, for the purpose of serving the Overlying Party. (Judgment, p. 8, lines 15-27).

(b) When an Overlying Party receives water service as provided for in paragraph 7(a), the Overlying Party shall forebear the use of that volume of the Overlying Water Right earmarked by the Appropriator Party. The Appropriator Party providing such service shall have the right to produce the volume of water foregone by the Overlying Party, in addition to other rights otherwise allocated to the Appropriator Party. (Judgment, p. 8, line 28– p. 9, line 7).

(c) Should the volume of the Overlying Water Right equal or exceed the volume of portable groundwater earmarked as provided in paragraph 7(a), the Appropriator Party which will serve the Overlying Party shall:

i. Impose potable water charges and assessments upon the Overlying Party and its successors in interest at the rates charged to the then-existing regular customers of the Appropriator Party, and

ii. Not collect from such Overlying Party any development charge that may be related to the importation of water into the Beaumont Basin.

(d) If an Appropriator Party provides recycled water to serve an overlying use served with groundwater, then the Overlying Water Right shall not be diminished by the receipt of recycled water.

7.1 Notice of Adjustment of Rights from an Overlying Pumper to an Appropriator

The Overlying Pumper and Appropriator shall complete a Notice of Adjustment of Rights (Form 5 – Notice to Adjust Rights of an Overlying Party due to Proposed Provision of Water Service by an Appropriator) and file it with the Watermaster.

(a) Accounting for Transfers. Watermaster shall maintain an accounting of acquisitions by Appropriators of water otherwise subject to Overlying Water Rights as the result of the provision of water service by an Appropriator. The Watermaster shall maintain an accounting

of all transfer, and such accounting shall be included in the Annual Report and other relevant Watermaster reports as appropriate.

7.2 Transfer of Water Between Appropriators

Any Appropriator may transfer all or any portion of its Appropriator's Production Right or Operating Yield that is surplus to its needs to another Appropriator in accordance with these Rules and Regulations. The Watermaster shall maintain an accounting of all transfers, and such accounting shall be included in the Annual Report and other relevant Watermaster reports as appropriate.

7.3 Availability of Unused Overlying Production and Allocation to the Appropriator Parties

Except as provided for in Section 7.0 herein, to the extent that groundwater pumping by an overlying party to the Judgment does not exceed five times the share of safe yield assigned to the overlying party during any five-year period (see column 4 of Exhibit B to the Judgment), the amount of groundwater not produced by such overlying party pursuant to its rights under the Judgment shall be available for allocation to the appropriator parties in accordance with their respective percentage shares of unused safe yield (see column 3 of Exhibit C to the Judgment). The availability and allocation of any such groundwater not produced by the overlying parties in accordance with their rights under the Judgment shall be first determined in fiscal year 2008/09 and every year thereafter. The table below illustrates the allocation process anticipated in the Judgment.

Available Unused Overlying Production in Fiscal	Will be Allocated to the Appropriator Parties in Fiscal
2003/04	2008/09
2004/05	2009/10
2005/06	2010/11
2006/07	2011/12
2007/08	2012/13
2008/09	2013/14
2009/10	2014/15
2010/11	2015/16
2011/12	2016/17
2012/13	2017/18

Groundwater not produced by the overlying parties in accordance with their rights under the Judgment and determined to be available for allocation to the appropriator parties pursuant hereto may be utilized by the appropriator parties in accordance with the terms of the Judgment and these Rules and Regulations. Neither this rule nor its operation shall be deemed or construed in any way to change, limit or otherwise affect any rights awarded to and held by the overlying parties pursuant to the Judgment. Nor shall this rule or its

operation result in any liability to the overlying parties or be deemed or construed as a transfer, assignment, forfeiture or abandonment of any overlying rights under the Judgment.

(a) Overlying Parties shall have the right to exercise their respective Overlying Water Rights except to the extent provided in Section III, Paragraph 3, entitled Adjustment of Rights, of the Judgment. (Judgment, p. 8, lines 12-14).

(b) To the extent any Overlying Party requests, and uses its adjudicated water rights to obtain water service from an Appropriator Party, an equivalent volume of potable groundwater shall be earmarked by the Appropriator Party which will serve the Overlying Party, up to the volume of the Overlying Water Rights as reflected in Column 4 of Exhibit "B" of the Judgment, for the purpose of serving the Overlying Party. (Judgment, p. 8, lines 15-27).

(c) When an Overlying Party receives water service as provided for in paragraph 7(a), the Overlying Party shall forebear the use of that volume of the Overlying Water Right earmarked by the Appropriator Party. The Appropriator Party providing such service shall have the right to produce the volume of water foregone by the Overlying Party, in addition to other rights otherwise allocated to the Appropriator Party. (Judgment, p. 8, line 28 – p. 9, line 7).

7.4 Notice of Adjustment of Rights

The Overlying Pumper and Appropriator shall complete a Notice of Adjustment of Rights (Form 5) and file it with the Watermaster within 30 days of entering into a Service Agreement.

7.5 Accounting for Adjustment of Rights

Watermaster staff will maintain an accounting of all adjustments of rights based on actual meter readings or other measuring devices. The accounting will be presented in the Annual Report and other relevant Watermaster reports as appropriate.

7.6 Transfer of Water

Any Appropriator may transfer all or any portion of its Appropriator's Production Right or Operating Yield that is surplus to its needs to another Appropriator in accordance with these Rules and Regulations.

Commented [SS4]: Rules and Regulations amended by Resolution 2006-01 on February 7, 2006 with the addition of Sections 7.3 to 7.7. These sections establish the rules and regulations governing the transfer of water between Appropriators in the Beaumont Basin. However, these sections were replaced by language provided in Resolution 2019-02.

7.7 Watermaster Supervision and Approval

Any proposed transfer shall first be approved by the Watermaster and implemented under Watermaster supervision.

~~7.8 Marketing Procedures~~

An Appropriator wishing to transfer all or any portion of its Appropriator's Production Right may do so in any one of the following three ways:

~~(a) The Appropriator may undertake its own marketing efforts and negotiate an agreement with one or more Appropriators; or~~

~~(b) The Appropriator may request assistance from the Watermaster to conduct a sealed bidding process among the Appropriators and award a contract to the highest bidder; or~~

~~(c) The Appropriator may request the Watermaster to allocate the total amount of water to be transferred to the accounts of the other Appropriators in proportion to their respective shares of the Operating Safe Yield and assess each of the Appropriators for the water at a cost not to exceed a Watermaster approved Groundwater Replenishment Rate.~~

~~7.9 Disposition of Revenue~~

Any revenue generated from the transfer of surplus water shall be used first to reduce or pay off delinquent Annual Administrative Assessments and Annual Replenishment Assessments, if any, and the balance shall be paid over to the transferring party. At the transferring party's option, the balance may be credited to future Assessments.

~~7.10 Accounting for Transfers~~

The Watermaster shall maintain an accounting of all transfers, and such accounting shall be included in the Annual Report and other relevant Watermaster reports as appropriate.

8 COORDINATION WITH THE SAN GORGONIO PASS WATER AGENCY AND OTHER AGENCIES

8.0 In General

The San Gorgonio Pass Water Agency ("Agency") was established by the California Water Uncodified Act No. 9099. The Agency has contracted with the California Department of Water Resources to import as much as 17,300 acre feet of water from the California State Water Project. As of 2004, the Agency is importing, at its sole cost and expense, up to 2,000 acre feet of State Water Project water per year for recharge in the Beaumont Basin.

8.1 Potential Conflict

The Agency has expressed concern that the exercise of its powers may conflict with the powers of the Watermaster, a concern that the Watermaster has acknowledged.

8.2 Coordination of Water Resources Management Activities

The Judgment provides that any Person may make reasonable beneficial use of the Groundwater Storage Capacity for the storage of Supplemental Water; provided however that no such use shall be made except pursuant to a written Groundwater Storage Agreement with the Watermaster. (Judgment, p. 15, lines 17-21). Therefore, in order to minimize the potential for conflict, the Watermaster is authorized to coordinate with the Agency, or other agencies such reasonable Groundwater Storage Agreements. Each such Agreement shall address (for example) whether the management activity that is the subject matter of the Agreement will increase or deplete water supplies, enhance or impair water quality, is engineeringly feasible, and whether it will provide the greatest public good with the least private injury.

9 REVIEW PROCEDURES

9.0 In General

Nothing in the Judgment or these rules and regulations shall be deemed to prevent any party from seeking judicial relief against any other party whose pumping activities constitute an unreasonable interference with the complaining party's ability to extract groundwater. Any and all disputes between and among the Producers and/or the Watermaster shall be addressed expeditiously and resolved, if possible, amicably, in accordance with the following procedures.

9.1 Complaints or Contesting an Application

Any Producer or interested person may file a written complaint with the Watermaster concerning matters other than applications to recharge (Section 5), or sore (Section 6), or contest an application to recharge or store water. The written complaint or objection shall describe the basis for the complaint or objection and the underlying facts and circumstances. Such complaint or objection shall be filed with the Watermaster at least fourteen (14) days before the item is to be agendized for the Watermaster Committee. The Watermaster staff shall provide notice of the complaint or objection to all interested parties.

(a) Answering the Complaint or Objection. At the discretion of the affected Party , a written answer to a complaint or objection may be filed at the time it is presented to the Watermaster Committee for consideration. In lieu of immediately answering the complaint or objection, the Party may request a reference to a two-member subcommittee of the Watermaster for review, discussion, and potential resolution prior to the item being agendized for Watermaster consideration.

(b) Continuance for Good Cause. An affected Party may also request a continuance to a subsequent Watermaster meeting (without reference to a subcommittee) and the request may be granted by the Watermaster's staff where good cause exists.

(c) Investigation by Watermaster. The Watermaster may, in its discretion, cause an investigation of the subject matter of the complaint. Any party to the proceeding may be requested to confer and cooperate with the Watermaster, its staff or consultants to carry out such investigations, and to provide such information and data as may be reasonably required.

(d) Uncontested Applications. The Watermaster shall consider and may approve or deny any uncontested application to recharge or store water at a regularly-scheduled meeting of the Watermaster. Where good cause appears, the Watermaster may also, conditionally approve, or continue an uncontested application to a future meeting. If the Watermaster staff recommendation to the Watermaster is to deny an application it shall first be referred to a two-member subcommittee of the Watermaster for review, discussion and potential resolution with the applicant.

(e) Judicial Review. Any action, decision, rule or procedure of the Watermaster shall be subject to review by the Court on its own motion or on timely motion by any Party as follows:

i. Effective Date of Watermaster Action: Any order, decision or action of the Watermaster pursuant to the Judgment or these Rules and Regulations on noticed specific agenda items shall be deemed to have occurred on the date of the order, decision or action.

ii. Notice of Motion for Judicial Review: Any Party May, by a regularly noticed motion, petition the Court for review within 90 days of the action or decision by Watermaster, except motions for review of assessments under the Judgment shall be filed within 30 days of mailing of the notice of the assessment. The motion shall be deemed to be filed and served when a copy, conformed as filed with the Court, has been delivered to the Watermaster staff, together with a service fee sufficient to cover the cost of photocopying and mailing the motion to each Party. The Watermaster staff shall prepare the copies and mail a copy of the motion to each Party or its designee according to the official service list that shall be maintained by the Watermaster staff pursuant to the Judgment. Unless ordered by the Court, any petition shall not operate to stay the effect of any Watermaster action or decision which is challenged.

iii. De Novo Nature of Proceeding: Upon filing of a petition to review a Watermaster action, the Watermaster shall notify the Parties of a date when the Court will take evidence and hear argument. The Court's review shall be de novo and the Watermaster decision or action shall have no evidentiary weight in such proceeding.

iv. Decision: The decision of the Court in such proceedings shall be an appealable Supplemental Order in this case. When it is final, it shall be binding upon the Watermaster and the Parties.

10 WATERMASTER FORMS

10.0 In General

In order to facilitate and expedite he performance of its duties, the Watermaster may, from time-to-time, develop standardized forms for the transaction of business. Such forms shall be adopted by minute action of the Watermaster Board.

10.1 Approved Forms

The following standardized forms shall be used, except when good cause exists for the use of a customized format:

1) Application for Groundwater Storage Agreement.
2) Groundwater Storage Agreement.
3) Application for Recharge.
4) Application (or Amendment to Application) to Recapture Water in Storage.
5) Notice to Adjust Rights of an Overlying Party due to Proposed Provision of Water Service by an Appropriator.
6) Request for Notice or Waiver of Notice and Designation of Address for Notice and Service.
7) Notice of Transfer of Appropriator Production Right or Operating Yield Between Appropriators.
8) Transfer of Right to Recapture Water in Storage Between Appropriators.
9) Water Level Field Form

Commented [SS5]: Per Resolution 2019-02.

Commented [SS6]: Per Resolution 2019-02.

Commented [SS7]: Per Resolution 2006-01.

- END OF RULES AND REGULATIONS -

Water Level Field Form

Well Name/Owner _____ **Well ID** _____

Type of Well: Municipal / Private / Monitoring / Agricultural

Reference Point Sketch:

SECTION 1: Reference Points (RP): Please update if the reference point changes.

RP Number	Month/ Day /Year	feet +/- land surface*	Description
1			
2			
3			

* feet above (+) or below (-) land surface.

SECTION 2: Water Levels Measurements

Date and Time				*ES=Electic Sounder AL=Airline S=Sonic PT=Pressure Transducer*	*Feet below RP*	*From Section 1*	*1=Static 2=Rising 3=Pumping 4=Falling 5=Flowing*	*Time (minutes) or UNK*	*Field Staff Initials*	
Month	Day	Year	Time (24 Hour)	Measurement Method	Depth to Water Measurement	RP Number	Well Status	Pump Idle Time	Measured By:	Comment

BEAUMONT BASIN WATERMASTER
MEMORANDUM NO. 22-31

Date:	December 7, 2022
From:	Dan Jaggers, Secretary
Subject:	Support Letter for Beaumont-Cherry Valley Water District Grant Application
Recommendation:	Direct staff as desired

Background

The Department of Water Resources Urban Community Drought Relief Program offers financial assistance to address drought impacts through implementation of projects with multiple benefits. Wells and well rehabilitation are eligible projects.

Discussion

Beaumont-Cherry Valley Water District will apply for this grant to fund the replacement of Wells 1A and 2A, which have reached the end of their service lives. The service area includes a large portion of the City of Beaumont, inclusive of the downtown areas, identified as the District's 2750 pressure zone. The 2750 Zone is the zone with the greatest current and future demand.

Wells 1A and 2A would discharge to the "City Reservoir" located at 12th St. and Palm Ave. The water from Wells 1A and 2A would then be boosted into the 2750 Zone by the existing Twelfth and Palm Boosters. Well 1 has reached the end of its service life and is currently out of service due to production issues. Well 2 had a casing failure around the year 2006. The pumping equipment has been pulled from this well and therefore Well 2 is currently not in service.

The replacement wells will be used to supplement the District's water supply. Once re-drilled, each well is estimated to be capable of producing 1,500 gpm (gallons per minute) which is much needed in the downtown part of the District's system.

The water availability (coverage) within the pressure zones make this water available to at least 95 percent of the District's service area. These wells would help the District provide considerable redundancy to the District's Service Area as well as provide redundancy of emergency supplies (regional redundancy) for neighboring communities, such as Banning, in the event of emergencies where additional water supplies are requested. This was recently experienced during local emergencies related to the Apple Fire and El Dorado fire of 2020.

Summary

If approved by the Committee, staff will prepare the attached draft support letter for signature of Chairperson Art Vela.

Attachments:

1. Well Location Map and Site Maps

December 8, 2022

Karla Nemeth
Director, Department of Water Resources
1416 9th Street, Room 1115-1
Sacramento, CA 95814

SUBJECT: Support for Beaumont Cherry Valley Water District's Urban Community Drought Relief Grant Application

Dear Director Nemeth:

I write to express my support for Beaumont Cherry Valley Water District's Urban Community Drought Relief Grant application requesting approximately $8.9 million to replace two critical wells that serve the greater Beaumont area.

For more than 100 years, the District has been responsible for providing local water resources for the growing community. At a time when water prices, wildfires, and an uncertain economy threatens the sustainability of water resources, Beaumont-Cherry Valley Water District (BCVWD) continues to operate with transparency and dedication to providing high-quality drinking water to its customers.

The District has two wells that are in dire need of replacement. The proposed two replacement wells, which are shovel-ready, will be designed for use as production wells to replace existing wells that have reached the end of their service life and are currently not in service to the area. The service area includes a large portion of the City of Beaumont, inclusive of the downtown areas, identified as the District's 2750 pressure zone.

The water availability (coverage) within these zones makes this water available to at least 95 percent of the District's service area. These wells would help the District provide considerable redundancy to the District's Service Area as well as provide redundancy of emergency supplies (regional redundancy) for neighboring communities, such as Banning, in the event of emergencies where additional water supplies are requested. This was recently experienced during local emergencies related to the Apple Fire and El Dorado fire of 2020.

The Beaumont Basin Watermaster Committee supports this grant application to support water sustainability, lower water costs, and equitable delivery services to the district's disadvantaged area. Thank you in advance for your consideration.

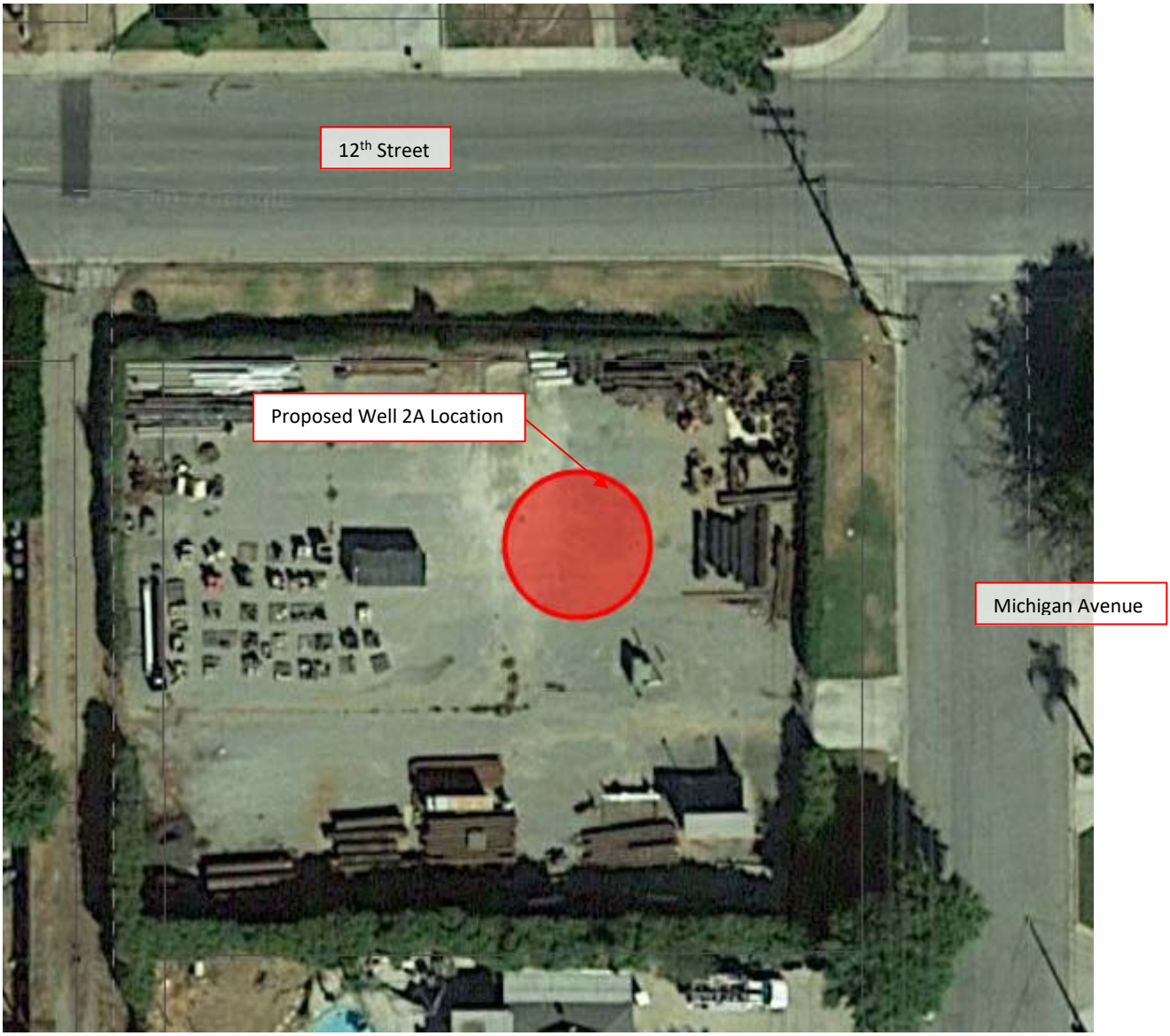
Sincerely,

Art Vela, Chairman
Beaumont Basin Watermaster Committee

Attachment 1:
Well Location Map and Site Maps
Figure 1: Well Location Map

Attachment 1:
Well Location Map and Site Maps
Figure 2: Well 1A Site Map

Attachment 1:
Well Location Map and Site Maps
Figure 3: Well 2A Site Map



BEAUMONT BASIN WATERMASTER
MEMORANDUM NO. 22-32

Date:	December 7, 2022
From:	Dan Jaggers, Secretary
Subject:	Meeting Teleconferencing Procedures
Recommendation:	Direct staff as desired

Background

In order to protect the rights of the public to access meetings and be able to provide comment, the Brown Act (Government Code 54950 et. seq.) sets restrictions on the availability of teleconferencing for meetings of legislative bodies.

At the onset of the COVID-19 pandemic, Governor Gavin Newsom issued Executive Orders which allowed relaxation of the teleconferencing regulations of the Brown Act. Following their expiration in September 2021, the Legislature passed AB 361, which made those teleconferencing adaptations available during a proclaimed state of emergency. Since January 2022, with the Watermaster Committee's first adoption of the AB 361 standards (Resolution 2022-01), the organization has been operating under the adapted Brown Act teleconferencing rules.

Beginning with the Special Meeting of March 10, 2022, the Committee members resumed meeting in person, but kept the AB 361 teleconference option available by continuing to pass a resolution as required, effective for 30 days.

On September 13, 2022, Governor Newsom signed into law AB 2449, which provides different options for teleconferencing of public meetings beginning on January 1, 2023. The Governor has announced that the COVID-19 State of Emergency will be terminated on February 28, 2023, ending the relaxed Brown Act procedures afforded by AB 361.

Discussion

In October, AB 2449 was signed into law, providing alternate, but still somewhat onerous, procedures for allowing teleconferencing sans the Brown Act agenda posting requirements (see Attachment 1).

The BBWM Committee may consider implementing the procedures of AB 2449 to provide for the procedures outlined, or may simply do nothing and revert to regular Brown Act procedures when the State of Emergency terminates on February 28.

Staff requests direction in order to prepare for implementation beginning March 1, 2023.

Option 1 – The Brown Act original regulation

In order to protect the rights of the public to access the meeting and be able to provide comment, the Brown Act requires that meeting teleconference locations must be identified on the agenda, the agenda must be posted at all teleconference locations, and the locations must be open to the public. Teleconference locations must also be ADA accessible.

Option 2 – AB 361 (in effect now; available only through February 28, 2023)

This allows meeting wholly or partially remotely under relaxed teleconferencing standards while the State of Emergency continues to exist, or state / local officials continue to impose or recommend social distancing measures. BBWM meetings have been held under these procedures since January 2022. This option becomes void upon termination of the State of Emergency, but can still be used for the February 1, 2023 meeting if desired.

Option 3 – AB 2449 (effective January 1, 2023)

In order to avoid the requirement for posting the teleconference location, the provisions of AB 2449 offer a different set of rules for Committee member teleconferencing, but would not require the adoption of findings every 30 days.

A Committee member desiring to attend remotely must have an emergency, or "just cause" defined in the legislation as:

"Emergency circumstances" means a physical or family emergency that prevents a member from attending in person

"Just cause" means any of the following:

- A childcare or caregiving need of a child, parent, grandparent, grandchild, sibling, spouse, or domestic partner that requires the Board member to participate remotely
- A contagious illness that prevents the member from attending in person
- A need related to a physical or mental disability
- Travel while on official business of the legislative body or another state or local agency

Just Cause

The Committee member must notify the District of the desire to teleconference and provide a general description of the "just cause" to participate remotely at the earliest possible opportunity. Remote participation under the AB 2449 "just cause" provisions is limited to two meetings per calendar year per Committee member.

Emergency Circumstances

The Committee member may request teleconferencing "as soon as possible" and the Board must request a general description of the emergency circumstances and take action to approve the request.

Additional requirements

A Committee member is limited to use of teleconferencing for no longer than three consecutive months or 20 percent of the regular meetings of the agency.

The Committee member attending remotely must participate by both audio and video connection.

AB 2449 also requires the agency to implement procedures for receiving and quickly responding to requests for reasonable accommodations for individuals with disabilities.

Summary

Since the Committee has returned to in-person meetings, staff recommends simply dropping the AB 361 resolution beginning with the next meeting, and reverting to the traditional Brown Act procedures.

Attachments

1. Article: What Local Governments Should Know About the New Brown Act Rules

WHAT LOCAL GOVERNMENTS SHOULD KNOW ABOUT THE NEW BROWN ACT RULES

THU, 10/6/2022

Gov. Gavin Newsom signed California Assembly Bill 2449 (AB 2449) into law last month. Effective January 1, 2023, AB 2449 makes several changes to the Ralph M. Brown Act (Brown Act) regarding remote participation in public meetings.

The below **guidance on AB 2449** is offered by Thomas D. Jex, a city attorney and Partner with **Burke, Williams & Sorensen, LLP** — a premier law firm representing cities, counties, school districts and special districts in California.

> Under this new law, members of a legislative body may attend public meetings remotely without identifying their teleconference site on the agency's agenda or ensuring it is accessible to the public if the procedures below are followed.

As long as a quorum of the legislative body participates in person from a physical location open to the public, the remaining agency members can participate remotely in two situations:

1. Just Cause

Just cause is defined as any one of the following:

- childcare or caregiving of a child, parent, grandparent, grandchild, sibling, spouse, or domestic partner that requires a member to participate remotely;
- a contagious illness that prevents a member from attending in person;
- a need related to a physical or mental disability; or
- travel while on business of the legislative body or another state or local agency.

In order to participate remotely under the *just cause* provisions, the member must notify the legislative body at the earliest possible opportunity, including at the start of a meeting, of their need to participate remotely and provide a general description of the circumstances related to one of the four items above.

A member may only participate remotely under the *just cause* provisions up to two meetings per calendar year.

2. Emergency Circumstances

Emergency circumstances means a physical or family medical emergency that prevents a member from attending in person.

In order to participate remotely under the *emergency circumstances* provisions, the member must request that the legislative body allow them to participate in the meeting remotely because of emergency circumstances and the legislative body must take action to approve the request.

A member must make a request to participate remotely under the *emergency circumstances* provisions as soon as possible. The legislative body may take action on this request at the earliest opportunity. If the request does not allow sufficient time to place it on the agenda for the meeting for which the request is made, the legislative body may take action on the request at the beginning of the meeting by majority vote.

The legislative body must request a general description of the circumstances relating to the member's need to appear remotely. This description does not have to be more than 20 words and the member does not have to disclose any personal medical information.

Additional Rules if Members Participate Remotely

If agency members participate remotely under this new law for either the *just cause* or *emergency circumstances* situations described above then the following rules apply:

- The legislative body must provide a way for the public to remotely hear, visually observe, and remotely address the legislative body, either by a two-way audiovisual platform or a two-way telephonic service and a live webcasting of the meeting.
- The legislative body must provide notice of how the public can access the meeting and offer comments.
- The agenda must identify and include an opportunity for the public to attend and directly address the legislative body through a call-in option, an internet-based service option, and in-person at the location of the meeting.
- The body cannot require comments to be submitted before the start of the meeting. The public must be allowed to make "real time" public comment.
- If there is a disruption to the meeting broadcast or in the ability to take call-in or internet-based public comment, no further action can be taken on agenda items until the issue is resolved.
- The legislative body must implement a procedure for receiving and resolving requests for reasonable accommodations for individuals with disabilities, and must give notice of these procedures.

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- Members participating remotely must participate through both audio and visual technology.
- Members participating remotely must publicly disclose at the meeting before any action is taken whether any other individuals 18 years of age or older are present in the room at the remote location with the member and the general nature of the member's relationship with the individual.
- A member may not participate in meetings solely by teleconference under this law for more than three consecutive months or 20% of the regular meetings for the public agency within a calendar year. If the legislative body regularly meets less than 10 times a year, a member may not participate remotely for more than two meetings.

Legislative bodies may still meet via teleconference by following the traditional Brown Act rules of identifying the teleconference site on the agency's agenda and ensuring it is accessible for the public to attend. Further, legislative bodies may meet by teleconference under AB 361 until January 1, 2024 during the Governor's proclaimed State of Emergency and as long as other requirements are met.

COMMENTS

TOP STORIES

CAL STATE FULLERTON WILL STOP SUPPLYING TEACHERS TO PYLUSD AFTER CRITICAL RACE THEORY BAN

THURSDAY, OCTOBER 20, 2022 - 08:40

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- Republicans Hope To 'Shake Wokeness' With School Board Victories This November

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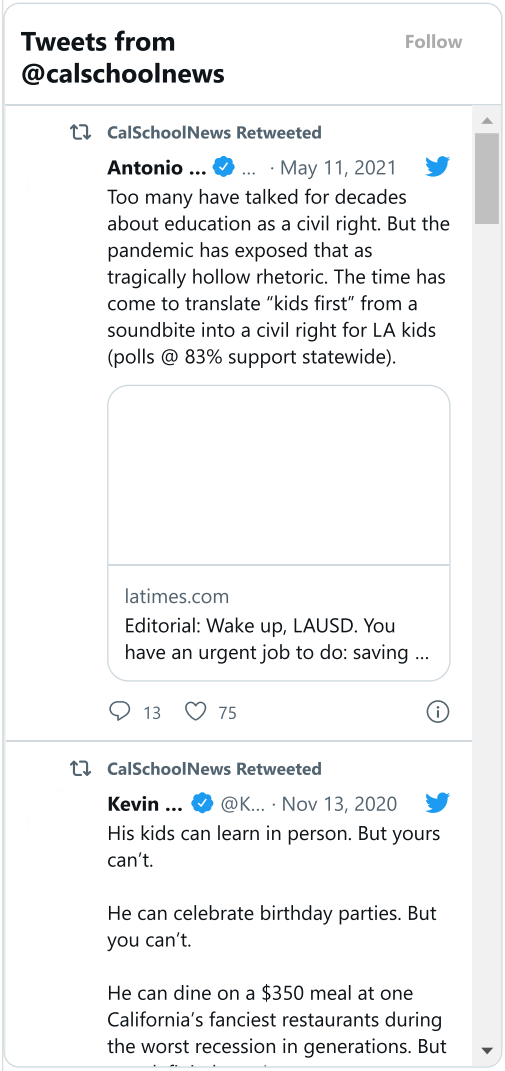
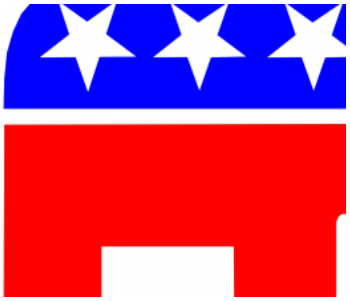


ELECTIONS



REPUBLICANS HOPE TO 'SHAKE WOI WITH SCHOOL BOARD VICTORIES TH NOVEMBER

TUESDAY, OCTOBER 18, 2022 - 05:35

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- Should Noncitizens Vote In Oakland Board Elections? Voters Will Decide.
- Tony Thurmond Appears Headed For

BEAUMONT BASIN WATERMASTER
MEMORANDUM NO. 22-33

Date: December 7, 2022

From: Thomas Harder, Thomas Harder & Co.

Subject: Discussion Regarding Task Order No. 2 for Groundwater Level Monitoring Services in 2023.

Recommendation: That the Watermaster Committee approves Task Order No. 2 for a sum not to exceed $28,370.00.

This task order is necessary to authorize TH&Co to provide groundwater level monitoring services during calendar year 2023.

The proposed scope of services for Task Order No. 2 provides for the continued monitoring and processing of groundwater level data in the 15 wells equipped with continuous monitoring pressure transducer equipment. The scope also includes contingencies for monitoring equipment maintenance, identification of additional monitoring sites, and installation of new monitoring equipment in any new sites identified.

The proposed budget is $28.370.00 and is based on 152 engineering and administrative hours.

The financial impacts associated with the proposed contract would result in a budget line item of $28,370.00, and if approved would result in an invoice sent to each Watermaster Committee member in the amount of $5,674.00.

Thomas Harder & Co.
Groundwater Consulting

November 29, 2022

Mr. Art Vela
Beaumont Basin Watermaster
99 E. Ramsey St.
Banning, California 92220

Re: Beaumont Basin Watermaster – Proposed Groundwater Level Monitoring Services for Calendar Year 2023 – Task Order 2

Dear Mr. Vela,

This letter outlines our proposed scope of services and consulting fee to provide groundwater level monitoring services for the Beaumont Basin Watermaster (the Watermaster) in calendar year 2023. Historically, Alda, Inc. has provided these services including:

- Coordination with well owners for equipment installation,
- Purchase of transducer and barometric pressure equipment,
- Installation of monitoring equipment,
- Downloading and periodic maintenance of monitoring equipment, and
- Reporting to the Watermaster Committee.

There are currently 15 wells in the Watermaster monitoring network equipped with continuous groundwater level monitoring transducers:

- YVWD No. 34
- Tukwet B
- Noble Creek Park
- Noble Creek Ponds 4 Deep
- Noble Creek Ponds 4 Shallow
- ICON Warehouse
- Summit Cemetery
- Bonita Vista No. 3 (BCVWD)
- BCVWD No. 2
- BCVWD No. 25
- BCVWD No. 29
- BCVWD Old 15 (Banning)
- Sun Lakes Golf Course (Banning)
- Banning M-8
- Banning M-9
  -

Two wells, YVWD No. 34 and Banning M-9, are also equipped with barometric pressure probes to determine barometric pressure at the north and south ends of the Beaumont Basin, respectively.

Groundwater levels and barometric pressure have been monitored hourly since 2015 and results have been presented at the regular Watermaster Committee meetings.

We are proposing to continue groundwater level monitoring services for 2023 as a task order (No. 2) under the new Watermaster contract with Thomas Harder and Company (TH&Co) dated November 2022. Our proposed detailed scope of services is as follows:

SCOPE OF SERVICES

Task 1 – Data Processing and Reporting

A TH&Co team representative will visit each of the 15 monitoring sites every other month (up to six times) to download the data from the transducers and barometric pressure instruments, manually monitor the groundwater level, and inspect the wellhead to ensure that the probe is secure and operating properly. Manual groundwater level measurements will be collected in accordance with Section 3 of the Rules and Regulations.

Downloaded data will be exported to a spreadsheet program for processing, QA/QC, and graphing. The information collected at the selected sites will be reviewed to determine consistency with previous readings. Collected information will be tabulated and used to determine groundwater elevation considering ground elevation, length of communications cable, and barometric pressure. Water level elevation graphs for selected wells will be prepared and presented to the Watermaster Committee as part of the regular consent calendar.

Estimated Hours:	106 Hours
Estimated Cost:	$19,990.00

Task 2 – Monitoring Equipment Maintenance

Historically, some transducers installed in Watermaster wells have malfunctioned or required maintenance. This task is included to provide as-needed maintenance of groundwater level monitoring equipment should it be needed. Maintenance activities could include (but not necessarily be limited to) the following:

- Evaluation of communications cables to make sure information collected by the groundwater level probes can be accessed electronically.
- Removal of communications cable and transducers from monitoring wells to troubleshoot issues when the equipment doesn't work.
- Coordination with the equipment manufacturer to arrange repairs or order replacement cables or equipment.
- Measurement of replacement communications cables to make sure actual length of cable is the same as documented by the manufacturer.

A TH&Co team representative will conduct additional visits to monitoring sites, if necessary, to replace faulty equipment previously identified and/or to check on the performance of newly installed equipment.

Estimated Hours: 30 Hours

Estimated Cost: $5,250.00

Task 3 – Consideration of Potential Additional Monitoring Sites

While the existing groundwater level monitoring network provides relatively good spatial coverage across the Beaumont Basin, there remain areas where additional and more reliable monitoring would be beneficial. The TH&Co team will evaluate potential monitoring sites for installation of groundwater level transducers for consideration by the Watermaster Committee. Selection of sites will be based on a number of parameters including location within the basin, distance to pumping wells, accessibility to the site, and on-site improvements that may be required.

Estimated Hours: 10 Hours

Estimated Cost: $ 2,080.00

Task 4 – Installation of New Monitoring Equipment

This task includes budget to install groundwater level transducers at new well sites selected from Task 1 and approved by the Watermaster Committee. All new monitoring equipment will be installed and programmed in accordance with Section 3 of the Rules and Regulations currently being considered by the Watermaster Committee. Required modifications at some of the well head sites, such as installation of plates, locks, measurement ports, etc., will be coordinated by the TH&Co team to make sure all sites operate adequately, and the monitoring equipment is secured. Manual groundwater level measurements will be made during transducer installation to compare with the transducer readings and ensure the probes are operating properly. The budget

for this task assumes the TH&Co team will purchase and install up to two additional transducers. The budget does not include the cost of transducer equipment.

Estimated Hours: 6 Hours

Estimated Cost: $ 1,050.00

COST ESTIMATE

The total estimated cost for this scope of work is $28,370 as summarized in Table 1. Services will be billed on a time and materials basis up to the approved limit according to the billing rates shown in Table 1.

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

Sincerely,

Thomas Harder

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

Beaumont Basin Watermaster
Groundwater Level Monitoring Services for 2023

Table 1

Cost Estimate for Beaumont Basin Watermaster Engineering Services

		Thomas Harder & Co.								ALDA				
Task	Description	Principal Hydro-Geologist $220/hr	Associate Hydro-Geologist $190/hr	Senior Hydro-Geologist $160/hr	Project Geo-Scientist $135/hr	Staff Geo-Scientist $115/hr	Graphics $100/hr	Clerical $80/hr	Total Hours TH&Co	Project Manager $225/hr	Professional Engineer $200/hr	Staff Engineer $175/hr	Total Hours ALDA	Total Cost
1	**Groundwater Level Data Processing and Reporting**	8	0	0	8	0	0	0	16	6	44	40	90	**$19,990**
2	**Monitoring Equipment Maintenance**	0	0	0	0	0	0	0	0	0	0	30	30	**$5,250**
3	**Consideration of Additional Monitoring Sites**	4	0	0	0	0	0	0	4	0	6	0	6	**$2,080**
4	**Installation of New Monitoring Equipment**	0	0	0	0	0	0	0	0	0	0	6	6	**$1,050**
	Total Labor Hours Tasks 1 through 4	**12**	**0**	**0**	**8**	**0**	**0**	**0**	**20**	**6**	**50**	**76**	**132**	**$28,370**

Note:

The budget does not include the costs for new monitoring equipment.