

Notice and Agenda of a Meeting of the Beaumont Basin Watermaster

Wednesday, October 2, 2019 at 10:00 a.m.

Meeting Location:

Beaumont Cherry Valley Water District
560 Magnolia Avenue
Beaumont, California 92223
(951) 845-9581

Watermaster Members:

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

I. Call to Order

II. Roll Call

City of Banning: Arturo Vela (Alternate: Luis Cardenas)

City of Beaumont: _____ (Alternate: Kyle Warsinski)

Beaumont Cherry Valley Water District: Daniel Jagers (Alternate: Mark Swanson)

South Mesa Water Company: George Jorritsma (Alternate: Dave Armstrong)

Yucaipa Valley Water District: Joseph Zoba (Alternate: 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.

V. Consent Calendar

A. Meeting Minutes

1. Meeting Minutes for August 7, 2019 [Page 4 of 44]

VI. Reports

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

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

C. Report from Legal Counsel - Keith McCullough/Thierry Montoya, Alvarado Smith

VII. Discussion Items

A. Status Report on Water Level Monitoring throughout the Beaumont Basin through September 22, 2019 [Memorandum No. 19-19, Page 10 of 44]

Recommendation: No recommendation.

B. A Comparison of Production and Allowable Extractions through August 2019 [Memorandum No. 19-20, Page 19 of 44]

Recommendation: No recommendation - For informational purposes only.

C. Return Flow Analysis – Issues and Comments [Memorandum No. 19-21, Page 20 of 44]

Recommendation: That the Board provide additional input for consideration and inclusion into the Final Report.

- D. Consideration of Change Order No. 1 for Task Order No. 17 for the Development of a Return Flow Methodology for the Beaumont Basin [Memorandum No. 19-22, Page 40 of 44]

Recommendation: That the Watermaster Committee approve Change Order No. 1 to Task Order No. 17 for the sum not to exceed \$4,780 and to direct the Treasurer to invoice specific Appropriators based on anticipated benefits.

- E. Status Report of the 2018 Annual Report [Memorandum No. 19-23, Page 41 of 44]

Recommendation: None – For information purposes only

VIII. Topics for Future Meetings

- A. Development of a methodology and policy to account for new yield from capturing local stormwater in the basin.
- B. Development of a methodology and policy to account for groundwater storage losses in the basin resulting from the spreading of additional water sources.
- C. Development of a methodology and policy to account for recycled water recharge.
- D. Develop a protocol to increase the accuracy and consistency of data reported to the Watermaster.
- E. Discussion of return flow credit and how it might be managed

IX. Comments from the Watermaster Committee Members

X. Announcements

- A. The next regular meeting of the Beaumont Basin Watermaster is scheduled for Wednesday, December 4, 2019 at 10:00 a.m.

XI. Adjournment

Consent Calendar

DRAFT
**Record of the Minutes of the
Beaumont Basin Committee Meeting of the
Beaumont Basin Watermaster
Regular Meeting
Wednesday, August 7, 2019**

Meeting Location:

Beaumont-Cherry Valley Water District
560 Magnolia Avenue
Beaumont, CA 92223

I. Call to Order

Chairman Arturo Vela called the meeting to order at 10:00 a.m.

II. Roll Call

<i>City of Banning</i>	<i>Arturo Vela</i>	<i>Present</i>
<i>City of Beaumont</i>	<i>Kyle Warsinski</i>	<i>Present</i>
<i>Beaumont-Cherry Valley Water District</i>	<i>Daniel Jagers</i>	<i>Present</i>
<i>South Mesa Water Company</i>	<i>George Jorritsma</i>	<i>Present</i>
<i>Yucaipa Valley Water District</i>	<i>Jennifer Ares</i>	<i>Present</i>

Thierry Montoya was present representing legal counsel for the Beaumont Basin Watermaster.

Staff present were: Mark Swanson, James Bean, Josh McCue and Erica Gonzales from BCVWD and Joseph Zoba from YVWD

Members of the public who registered and / or attended were: John Ohanian of Oak Valley Partners; Fran Flanders; Libi Uremovic; and Jeff Davis; Dave Castaldo; and David Fenn from the San Geronio Pass Water Agency

III. Pledge of Allegiance

Chairman Vela led the pledge of allegiance.

IV. Public Comments:

None.

V. Consent Calendar

It was moved by Member Ares and seconded by Member Warsinski to approve the Meeting Minutes of the following dates as amended:

1. Meeting Minutes for June 25, 2019

AYES: Jagers, Vela, Warsinski, Zoba
NOES: None.
ABSTAIN: Jorritsma.
ABSENT: None.
STATUS: Motion Approved

VI. Reports

- A. Report from Engineering Consultant – Hannibal Blandon, ALDA Engineering
Mr. Blandon reported that since the issue of water rights perfection has been resolved, the 2018 report is ready for acceptance.
- B. Report from Hydrogeological Consultant – Thomas Harder, Thomas Harder & Co.
Mr. Harder reported receipt of a data request from Geoscience.
- C. Report from Legal Counsel – Thierry Montoya, Alvarado Smith
No report.

VII. Discussion Items

- A. Status Report on Water Level Monitoring throughout the Beaumont Basin through July 31, 2019
Recommendation: No recommendation.
Mr. Blandon noted that no new wells have been added. Staff continues to monitor the existing 16 wells. In the northwest portion of the area, he is investigating a blip with Well 5. Yucaipa 4 is stable, fluctuating only three feet over the past 40 years, he noted.
The most unstable area, the shallow aquifer, has been fluctuating 4 feet over the last two years, Blandon advised. However, the deep aquifer continues to rise slowly.
The south side of the basin is stable with no changes over the last five years, he reported.
Banning Well 8, which has had a new probe installed, now shows two months of data. It has risen 30 feet over the last four years, Blandon noted. The two most recently added wells show a four-foot decline, he explained.
Staff investigated a decline in Tukwet Canyon Well B, Blandon said, and learned that the drops in water level coincided with the Ridgecrest earthquakes.

Engineer Blandon also noted that the hourly water levels at BCVWD Well 29 drop about 55 feet but recover.

B. A Comparison of Production and Allowable Extractions through June 2019

Recommendation: No recommendation - For informational purposes only.

Mr. Blandon presented a comparison of production rights from the Basin against actual production. BCVWD has imported more than 6,000 acre-feet bringing allowable production close to 8,000 acre-feet. Actual production was about 4,500 a-f, or 55 percent of the total. Production of the City of Banning is about 54 percent of allowable production as of June.

South Mesa and Yucaipa have not added imported water to the basin, but Yucaipa has not produced water from the Basin. Overall, Blandon stated, production is at 50 percent for the 6-month period.

C. Return Flow Accounting Methodology - Draft Report

Recommendation: That the Board reviews the Draft Report and provides comments

Mr. Harder presented an analysis as requested by the Committee. The purpose is to account for the return flow overlying each Appropriator's service area. This was done in 2013 based on land use, and the request was for a more detailed analysis for potential future accounting in the annual reports, Harder explained.

He explained how the analysis was done based on delivery records and explained that parcels overlapping the adjudication boundary were considered using a percentage of area. Harder explained sources and assumptions.

Based on the calculations, Harder said, BCVWD delivers 7,217 acre-feet within the sewered area. Of that, there was inflow to the Beaumont wastewater treatment plant (WWTP) of 3,663, so 51 percent of the water was used indoors, and 49 percent outdoors.

There were issues staff was unable to resolve, said Harder: 1. If there were water losses in the pipeline enroute to the WWTP there could be unaccounted losses, and 2. Some of the water delivered outdoors will become runoff, and there will be evapotranspiration from swimming pools.

For data required for the future, the methodology should be applied to each year's annual report, Harder suggested. New accounts will need to

be incorporated, he noted, and the City of Beaumont wastewater inflow volume.

Mr. Harder detailed lag time for return flow given the varying water depth in the basin, about 15 feet per year.

Member Warsinski asked about methodology for calculating indoor / outdoor water use. Chair Vela pointed out the numbers used from BCWVD do not correlate with other areas due to newer development with required water saving measures. In the City of Banning, the ratio is 31.5 percent indoor, 68.5 percent outdoor, Vela said.

Mr. Jagers concurred that newer houses under the landscape watering ordinances are more efficient and indicated there is likely an adjustment factor for newer and older.

Member Jorritsma asked about golf courses; Mr. Harder noted that those producing their own water were not included in the analysis. Member Warsinski asked about accounting for commercial and industrial customers. Mr. Harder indicated those were included with the high-density residential category. High water users with little outdoor landscaping may skew the analysis, pointed out Warsinski. Mr. Jagers agreed that those high users should be separately calculated.

Chair Vela suggested all comments be forwarded to Engineer Harder and a revised version be discussed at the next meeting. The purpose is to roll this into some type of policy, he said.

Harder responded to additional questions and comments.

Engineer Blandon pointed out there are many ways this analysis can be further refined. He asked the Committee members to view the study with thought to how the data will be used in order to come up with the final plan.

VIII. Topics for Future Meetings

- A. Development of a methodology and policy to account for new yield from capturing local stormwater in the basin
- B. Development of a methodology and policy to account for groundwater storage losses in the basin resulting from the spreading of additional water sources
- C. Development of a methodology and policy to account for recycled water recharge
- D. Develop a protocol to increase the accuracy and consistency of data reported to the Watermaster
- E. Discussion of return flow credit and how it might be managed

IX. Comments from the Watermaster Committee Members:

None.

X. Announcements

- A. The next regular meeting of the Beaumont Basin Watermaster is scheduled for Wednesday, October 2, 2019 at 10:00 a.m.

Ms. Libi Uremovic announced that last night, the Beaumont City Council approved 50 water monitoring wells. This is the second time in the last few years, she said, that Beaumont has run a water monitoring well contract scam. She asked why the City of Beaumont, which has no water rights, is monitoring water and putting in 50 monitoring wells.

XI. Adjournment

Chairman Vela adjourned the meeting at 10:47 a.m.

Attest:

DRAFT UNTIL APPROVED

Daniel Jagers, Secretary
Beaumont Basin Watermaster

Discussion Items

BEAUMONT BASIN WATERMASTER

MEMORANDUM NO. 19-19

Date: October 2, 2019

From: Hannibal Blandon, ALDA Inc.

Subject: Status Report on Water Level Monitoring throughout the Beaumont Basin through September 22, 2019

Recommendation: No recommendation.

At the present time, there are 16 monitoring wells collecting water level information on an hourly basis at various locations throughout the basin. 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.

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. Over the last four years, water level at YVWD No. 34 have ranged within three feet and currently are at the same elevation as in 2015.
- ✓ At Oak Valley No. 5 the water level declined by 10 feet over the last four months and approximately six feet since recording started in the summer of 2016.
- ✓ Figure No. 3 – Two of the Noble Creek observation wells are presented in this figure representing the shallow and deep aquifers. In the shallow aquifer, the water level has increased close to 90 feet over the last two years from a low of 2,337 ft. to 2,427 ft.; however, over the last year it has been fairly steady. In the deep aquifer, water level has increased by 48 ft since the summer of 2016.
- ✓ Figure No. 4 – Southern Portion of the Basin. Water level at the Summit Cemetery well is highly influenced by a nearby pumping well that is used to irrigate the cemetery grounds. The water level at this well continues to fluctuate over a 20-foot band. Conversely, the water level at the Sun Lakes well has fluctuated minimally over the same period as it decreased two feet over the last four years.
- ✓ Figure No. 5 illustrates 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 two years, a somewhat significant and steady decline, close to 23 feet, was recorded at Banning M-8 between the summer of 2015 and the winter of 2017. The probe at Banning M-8 was removed in late January 2018 and was reinstalled this past May; since it has declined and additional 5 ft. Water level at Banning M-9 has fluctuated in a 13-foot range, between 2,134 ft and 2,147 ft. since monitoring began in the summer of 2015. Currently, water elevation is at 2,138 ft. Water level over the last six months are

not depicted in the figure due to problems with the communications cable. It is likely that the communications cable would need to be replaced. Water levels at these three wells could not be downloaded in late September due to a miscommunication issue with Banning staff.

- ✓ Figure No. 6 illustrate recorded water level at BCVWD No. 2 and BCVWD No. 25. Over the last two years, water levels are overall in an uptrend; however, they experience seasonal declines following production patterns. As we approach the end of the high pumping season, water level at these two wells have been decreasing over the last four months. It is anticipated that levels at these wells will begin to improve as production declines to meet fall and winter demands.
- ✓ Figure No. 7 depicts the recorded water level at the two newest observation wells, BCVWD No. 29 and Tukwet Canyon Well "B". BCVWD is a pumping well that is now more actively used to meet peak summer demands. Water level at this well has experienced a slight decline of 4 ft over the last two months. Tukwet B is a dedicated monitoring well in the southern portion of the basin; water level at this well has been fairly stable over the last six months.

New Monitoring Wells

During the last reporting period, no additional monitoring wells have been added.

New Equipment Installation

None during the reporting period.

Troubleshooting Issues

The following malfunctioning issues were encountered during our August 1, 2019 field visit:

- ✓ Banning M-9 – Communications cable did not allow us to upload water level information from the probe for the second time; however, the probe continues to record levels on an hourly basis. A new communications cable will be ordered for this well since we have not been able to extract the data for the last four months.

New Monitoring Sites

- The property owned by the 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 has great potential. This well is approximately 400 ft deep and the water level is at approximately 160 feet below ground.
- We have approached Clearwater Operations to consider the installation of a water level probe at Sharondale Well No. 1. This company provides maintenance and operations support to Sharondale HOA. We are in the process of coordinating a field visit to assess the feasibility of installing the probe.
- At Plantation by the Lake, another potential monitoring well site, communications with owner have not be reestablished.

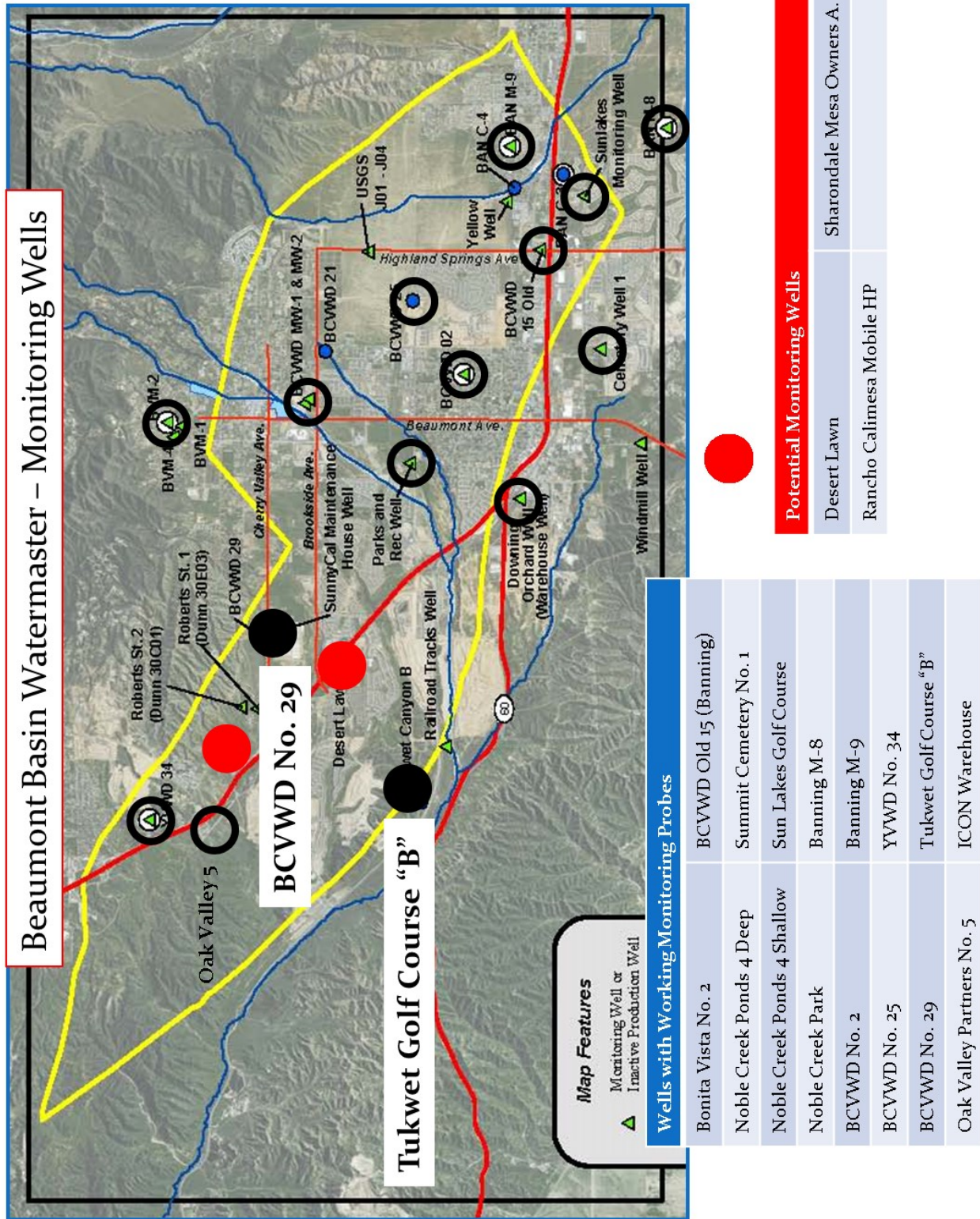


Figure No. 2
Static Groundwater Elevations at YVWD No. 34 and Oak Valley No. 5
 (July 29, 2015 through Sept 22, 2019)

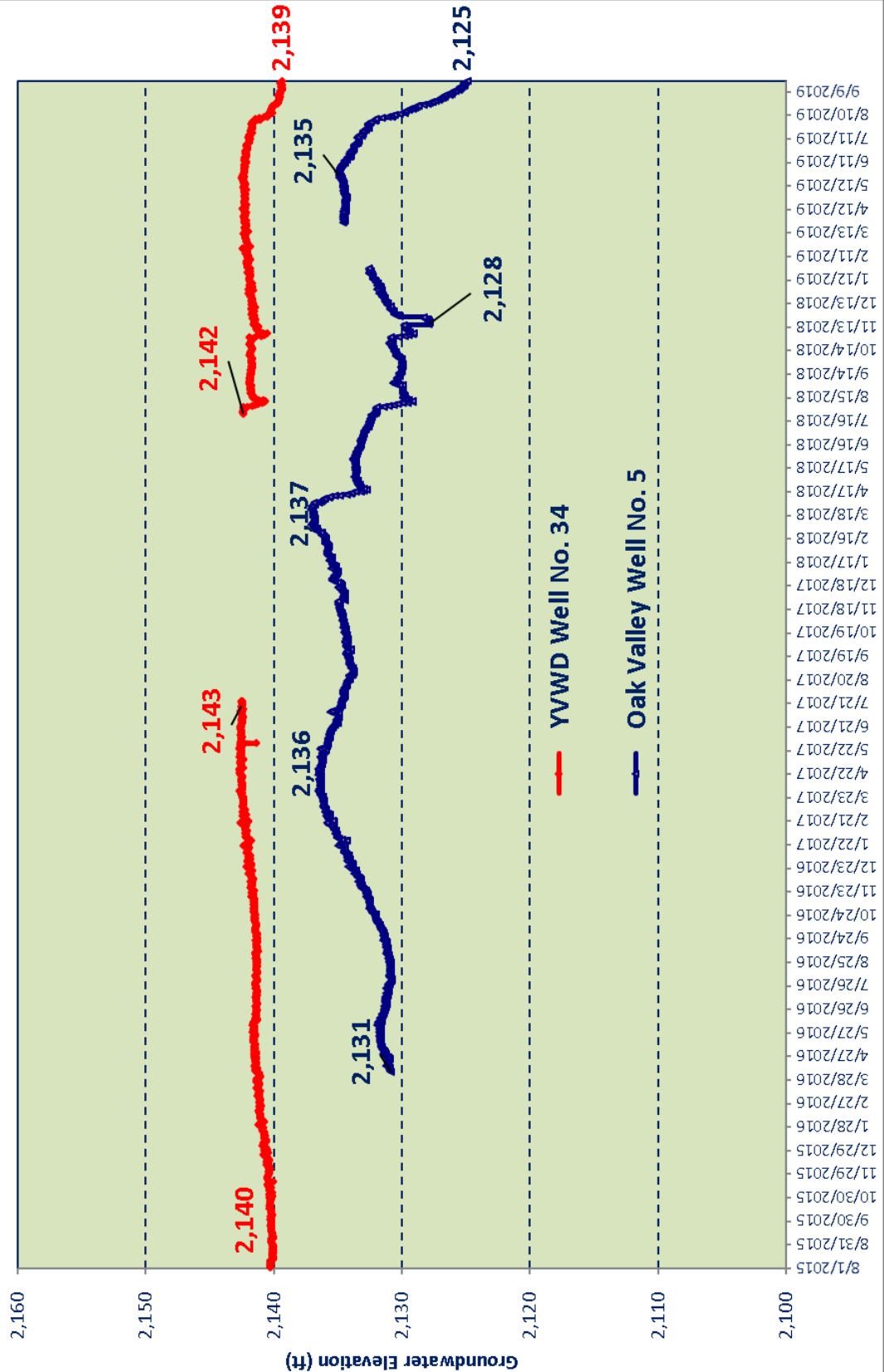


Figure No. 3
Static Groundwater Elevations at Noble Creek Obs. Well 4S and 4D
 (May 28, 2015 through Sept 22, 2019)

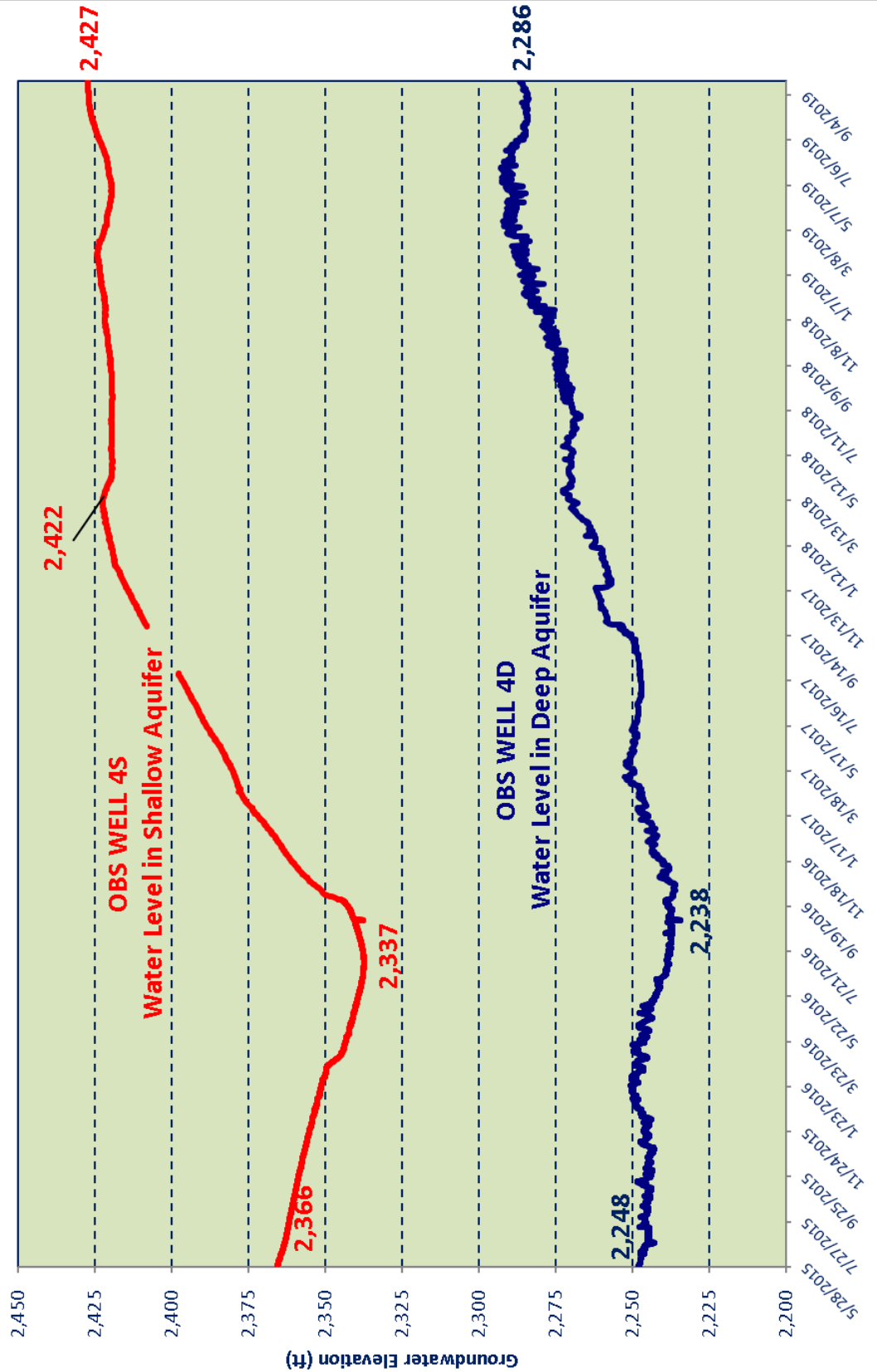


Figure No. 4
Static Groundwater Elevations at Summit Cemetery and Sun Lakes Wells
 (May 28, 2015 through Sept 22, 2019)

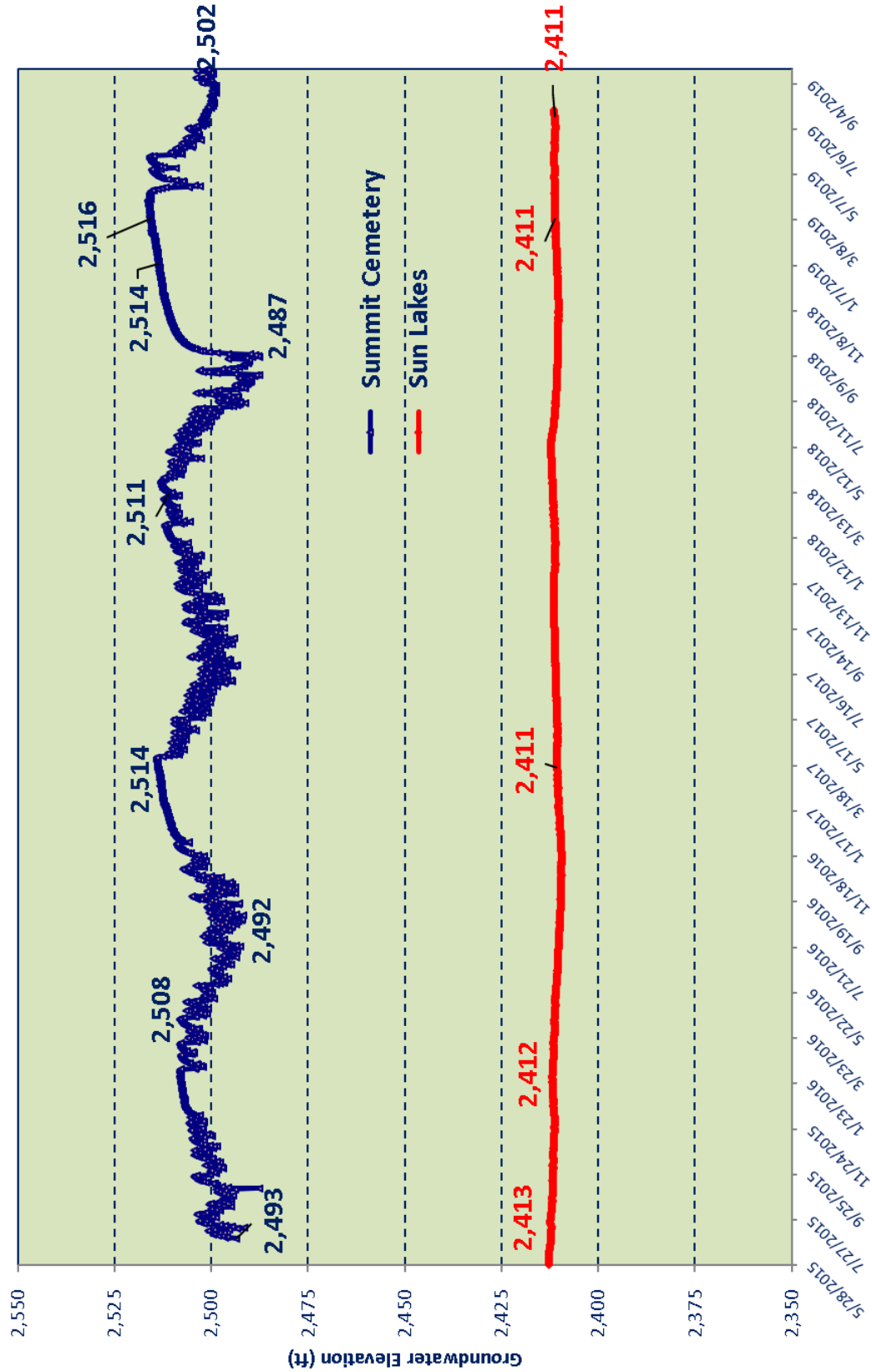


Figure No. 5
Static Groundwater Elevations in the Banning Area
 (May 28, 2015 through Sept 22, 2019)

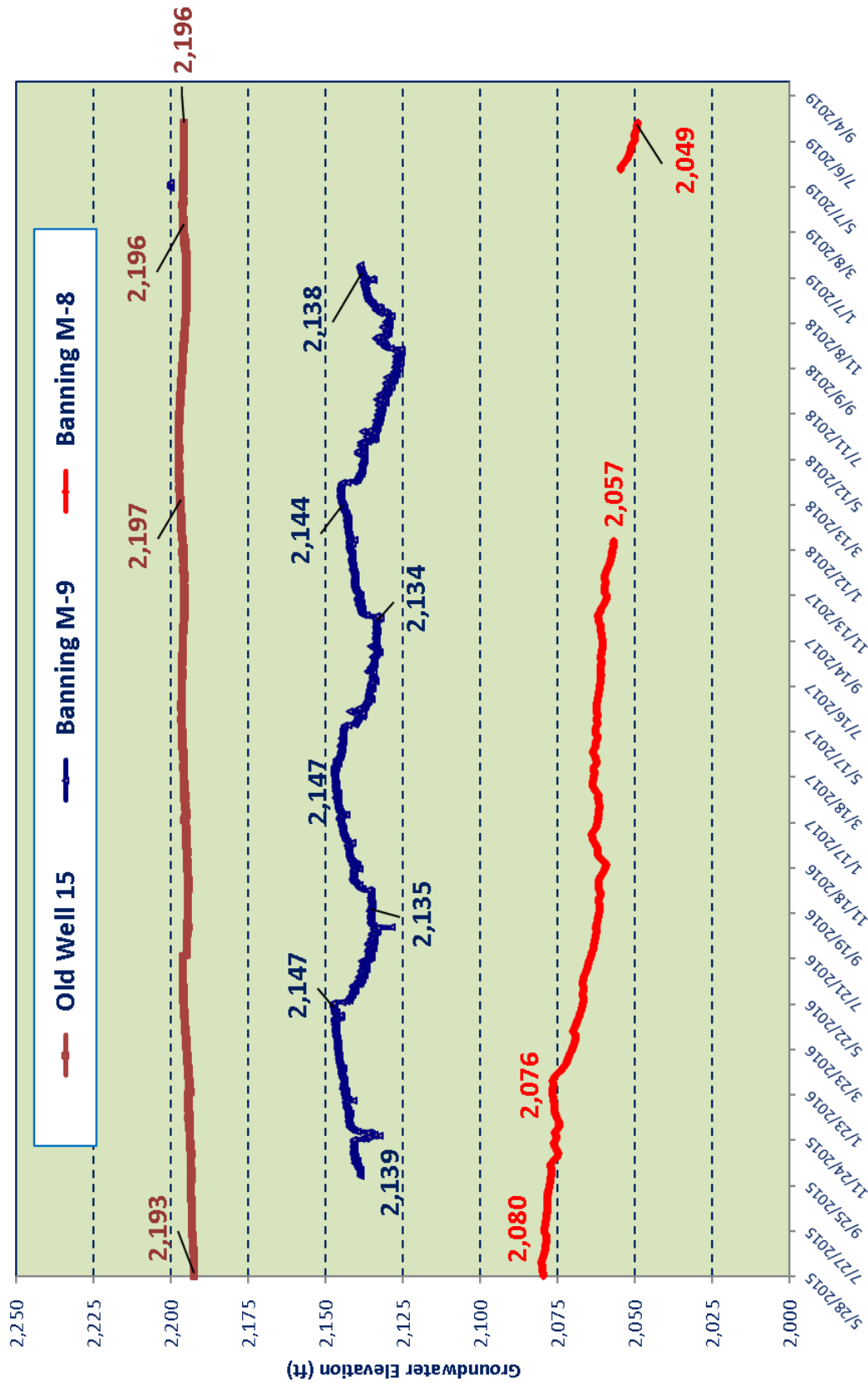


Figure No. 6
Static Groundwater Elevations at BCVWD Wells No. 2 and 25
 (May 28, 2015 through Sep 22, 2019)

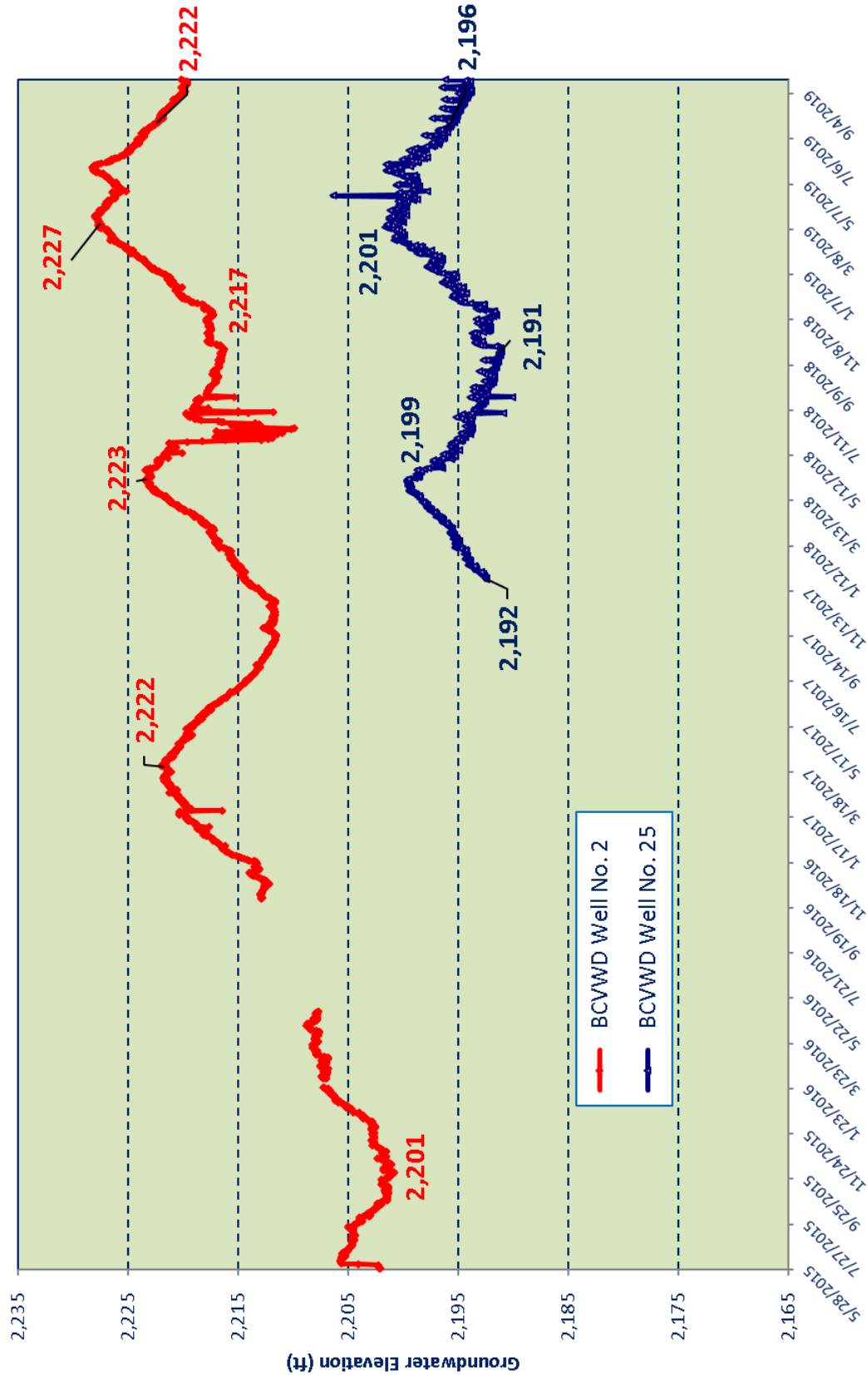
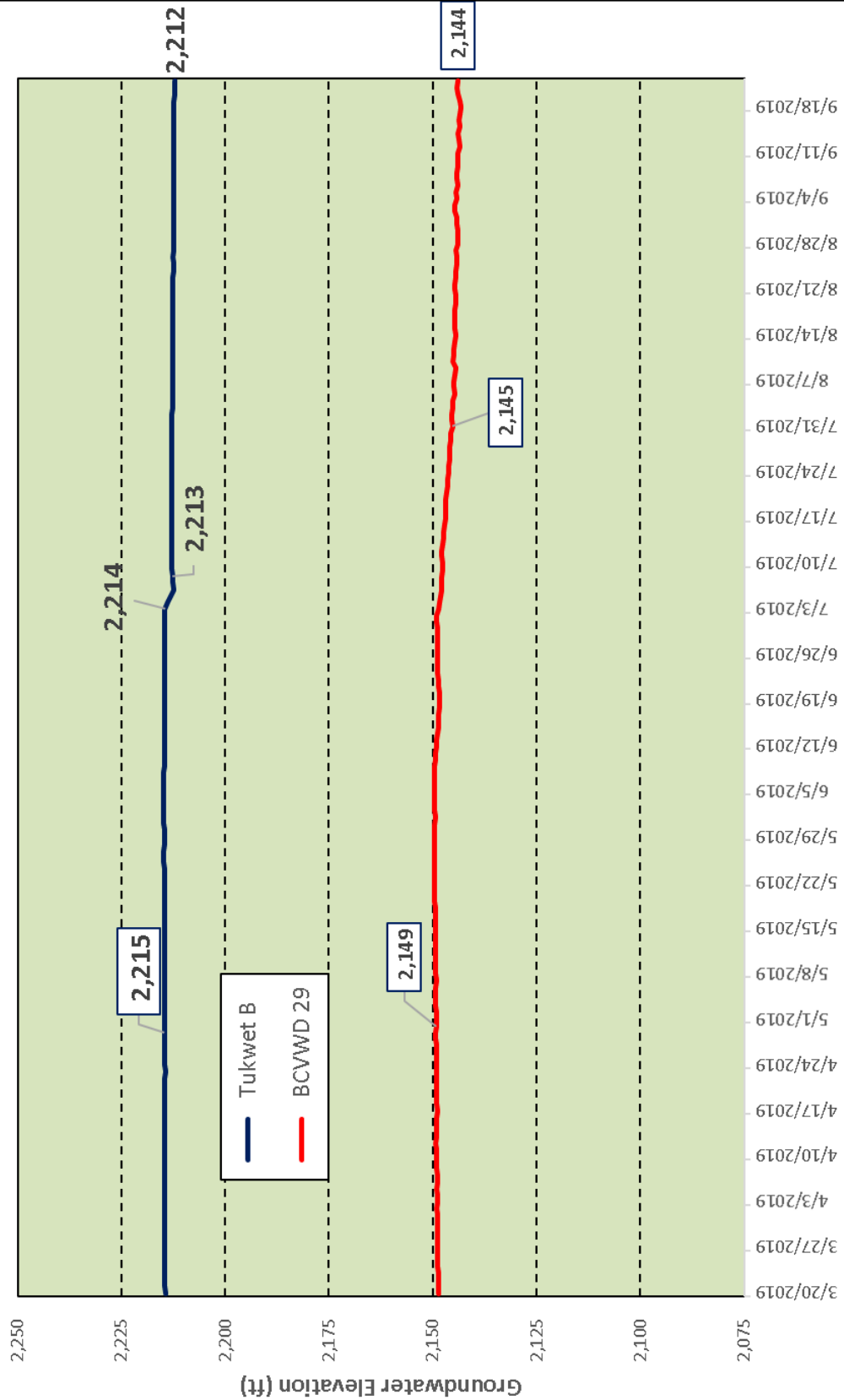


Figure No. 7
Static Water Level at BCVWD No. 29 and Tukwet Cyn Well B
 Mar 20, 2019 through Sept 22, 2019



BEAUMONT BASIN WATERMASTER

MEMORANDUM NO. 19-20

Date: October 2, 2019

From: Hannibal Blandon, ALDA Inc.

Subject: A Comparison of Production and Allowable Extractions through August 2019

Recommendation: No recommendation - For informational purposes only.

The purpose of this Technical Memorandum is to present a comparison of production rights from the basin against actual production by Appropriators. Production rights consist of the sum of Unused Production by Overlying Users from 2014 transferred to Appropriators for 2019 and Imported Water Spreading. This sum is compared against actual production through August 2019. It should be noted that 2019 is the first year in which the Transfer of Overlying Rights were derived from the current basin safe yield of 6,700 ac-ft/yr.

During the first eight months of the year a total of 10,429 ac-ft of water were produced from the basin by the Appropriators while 9,064 ac-ft of imported water were spread at the Noble Creek spreading grounds. Unused production by Overlying users for 2014 was estimated at 4,481 ac-ft. The table below presents the above comparison for all Appropriators; all numbers shown in ac-ft, except as noted.

	City of Banning	Beaumont Cherry Valley Water District	South Mesa Mutual Water Company	Yucaipa Valley Water District	Total
Transfer of Overlying Rights from 2014	1,408	1,905	559	609	4,481
Imported Water	125	8,939	0	0	9,064
Total	1,533	10,844	559	609	13,545
Production	1,400	8,648	233	148	10,429
% of Total	91.3%	79.7%	41.7%	24.3%	77.0%

BEAUMONT BASIN WATERMASTER

MEMORANDUM NO. 19-21

Date: October 2, 2019

From: Hannibal Blandon

Subject: Return Flow Analysis – Issues and Comments

Recommendation: That the Board provide additional input for consideration and inclusion into the Final Report.

A draft of the Return Flow Analysis was distributed, and a formal presentation made at the August 7, 2019 Regular Watermaster Committee meeting by Mr. Harder. During the presentation, a significant number of questions were asked by members of the Committee and the possibility of evaluating other aspects of return flows was discussed. Written comments were requested for incorporation into the final report.

Following submittal of the draft Technical, another issue has been identified that the Appropriators need to consider. During any given application of water on the ground for irrigation, per our recommended methodology, 25 percent of the water that is applied is assumed to return to the aquifer where it would be available to pump again (return flow). The current return flow accounting methodology assumes that the subsequent pumping of this return flow would be consumptively used in its entirety. In other words, the return flow can only be pumped once. This assumption was not made clear in the draft Technical Memorandum. It is our recommendation that the return flow methodology follow this assumption. This issue will be presented for discussion at the October meeting.

BCVWD submitted comments on Wednesday, September 25, 2019. A summary of these comments will be presented and discussed at the October meeting. Additional comments, if any, by other agencies could be brought up for discussion at that time.

Technical Memorandum

DRAFT

To: Mr. Hannibal Blandon
Alda, Inc.

From: Thomas Harder, P.G., CH.G.
Thomas Harder & Co.

Date: 29-Jul-19

Re: Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

1. Introduction

This Technical Memorandum (TM) describes a recommended return flow accounting methodology to develop annual estimates of return flow by Appropriator within the Beaumont Basin Adjudication area. The Appropriators within the Beaumont Basin Adjudicated area include Beaumont-Cherry Valley Water District (BCVWD), the City of Banning, and Yucaipa Valley Water District (YVWD). The return flow accounting methodology will enable Appropriators to account for the portion of annual return flow that occurs over their service areas. Return flow is herein referred to as the portion of water applied to landscaping or crops that is in excess of the plant's needs and percolates below the root zones to become groundwater recharge.

1.1 Background and Purpose

Estimates of return flow in the Beaumont Basin adjudicated area, by Appropriator, were published in the 2013 Reevaluation of the Beaumont Basin Safe Yield (TH&Co, 2015¹). In general, the previous estimates were based on assumptions regarding indoor/outdoor water use and applied to general land use conditions. The Beaumont Basin Watermaster Board directed the Alda/Thomas Harder & 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

¹ TH&Co, 2015. 2013 Reevaluation of the Beaumont Basin Safe Yield. Prepared for Beaumont Basin Watermaster. Dated April 3, 2015.

Thomas Harder & Co.
1260 N. Hancock St., Suite 109
Anaheim, California 92807
(714) 779-3875

Beaumont Basin Watermaster/Alda, Inc.
Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

DRAFT

29-Jul-19

differences in return flow lag time between the time of application and the arrival of the return flow at the groundwater.

The new return flow accounting methodology takes into account the following:

1. Accounting for water delivered to customers within Beaumont Basin adjudication boundary
2. Assumptions as to how much water delivered to customers is applied for outdoor use.
3. Assumptions as to how much of the water applied to outdoor use becomes return flow.
4. Methodology for addressing parcels within Appropriator service areas that overlap and extend across the Beaumont Basin adjudication boundary.

2. Return Flow Accounting Methodology

The proposed return flow accounting methodology follows seven steps:

1. Identify Beaumont Basin Watermaster Appropriator water delivery records by accounts that are within the Beaumont Basin adjudicated area based on parcel, address or other location information.
2. Track the volume of delivered water for accounts that are within the Beaumont Basin adjudicated area, by Appropriator. Water delivered to accounts that overlap the boundary is assumed to be proportional to the area of the parcel in the boundary.
3. Classify each water account as either sewer, unsewer, landscape or construction.
4. Estimate the indoor and outdoor water use by account, according to the account type classification.
5. For sewer and landscape classifications, apply the return flow factors to outdoor water use by account.
6. For the unsewer classification, apply the return flow factors to both indoor and outdoor water use, by account.
7. Return flow associated with the construction classification is assumed to be zero.
8. Sum the return flow within the Beaumont Basin adjudicated area by Appropriator.

2.1 Identification of Delivered Water by Location

The first step in the return flow accounting methodology was to determine a location of each delivery record with respect to the Beaumont Basin adjudicated area. Water delivery records from 2017 were obtained from each of the Appropriators in the basin (BCVWD, City of Banning, and YVWD). Each of the Appropriators keep records of the water account locations by address and/or location description. In some cases, the accounts could be correlated with an APN within the Beaumont Basin based on other identifying information. The spatial distribution of APNs was



Beaumont Basin Watermaster/Alda, Inc.

Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

DRAFT

29-Jul-19

obtained from Riverside County² as a Geographic Information System (GIS) shapefile, which was overlaid on a base map in GIS along with the Beaumont Basin Adjudication area.

In some cases, when APNs were not provided, it was necessary to manually look up the address or location description of the account to determine its location with respect to the adjudication boundary, and then determine whether the account/meter was in the Beaumont Basin adjudicated area based on the address. For 2017, a total of approximately 15,700 active water delivery accounts were identified within the Beaumont Basin adjudicated area.

2.2 Accounting for Delivered Water to Accounts Overlapping the Adjudication Boundary

While most of the APNs or accounts were either classified as completely inside or outside of the adjudicated boundary, some parcels overlapped the boundary (see Figure 1). For parcels overlapping the boundary, TH&Co determined the percentage area of the parcel inside of the boundary compared to the entire parcel area using GIS. The percentage area of overlapping parcels that occurred within the Beaumont Basin adjudicated area was applied to the volume of water delivered to that parcel.

2.3 Classification of Water Accounts by Type

TH&Co grouped water delivery accounts into four categories: sewerer, unsewered, landscape, and construction. Sewered areas include high density residential and urban commercial land uses within the City of Banning's and YVWD's water service areas and the portion of the BCVWD within the City of Beaumont sewerer area (see Figure 2).

The primary unsewered area within the adjudicated Beaumont Basin is the Cherry Valley community, a low-density residential area north of the City of Beaumont (see Figure 3). Residences in Cherry Valley discharge wastewater through individual household septic systems. Parcels in this area are generally larger and water deliveries to those parcels are generally higher, so it is assumed that their outdoor water use is greater. As shown on Figure 3, there are small pockets of unsewered parcels in the Beaumont area that are outside of Cherry Valley.

Landscape includes accounts that were classified as irrigated agriculture as well as golf courses, parks and other urban landscape. However, this analysis does not include water production data from Overliers (private wells).

² <https://gis.rivcoit.org/GIS-Data-2>



Beaumont Basin Watermaster/Alda, Inc.

Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

DRAFT

29-Jul-19

Some water delivery accounts were categorized as “floating meters” which indicates that the water was used for construction, fire suppression, or other uses, which were measured through portable meters. All of these uses were grouped under “construction” and were accounted for in the total water delivered in the basin.

2.4 Estimation of Indoor and Outdoor Water Use for each Account based on Account Type

2.4.1 Water Use in Sewered Areas

For sewered areas, estimates of the portion of delivered water used indoors at each account were developed through an analysis of wastewater treatment plant inflows at the City of Beaumont Wastewater Treatment Plant No. 1 (see Figure 2). In 2017, the City of Beaumont reported 3,663 acre-ft of inflow to the treatment plant (see Table 1). The only sources of water to the treatment plant are from water accounts within the sewered area of BCVWD. During that same year (2017), the BCVWD delivered 7,217 acre-ft of water to non-landscape accounts within the sewered area. It is assumed for this analysis that the inflow to the treatment plant (3,663 acre-ft) represents the cumulative indoor water use for the BCVWD accounts within the sewered area of the district. Thus, the balance of delivered water (3,554 acre-ft) is assumed to be used outdoors. This results in 51 percent indoor use and 49 percent outdoor use (see Table 1).

It is noted that this methodology does not account for water losses in the sewer system. Any losses associated with pipeline leaks could reduce the proportion of assumed outdoor water use. Since pipeline leaks would be assumed to become groundwater recharge, not accounting for pipeline losses may result in underestimates of return flow. Pipeline losses can be incorporated into the methodology if knowledge of pipeline losses is known.

2.4.2 Water Use in Unsewered Areas

Based on 2017 water delivery records, the average delivered water per account per year in the unsewered area is 0.94 acre-ft/account/yr (see Table 2). In contrast, the average delivered water per account in the sewered area is 0.48 acre-ft/account/yr. In order to estimate the outdoor water use in the unsewered areas, it was assumed that indoor water use is the same for both sewered and unsewered areas (0.24 acre-ft/account/yr). The balance between the average delivered water per account (0.94 acre-ft/account/yr) and the indoor water use (0.24 acre-ft/account/yr) is assumed to be outdoor water use in the unsewered area (0.70 acre-ft/account/yr). When expressed as percentages, the estimated amount of indoor water use is 26 percent of delivered water and the estimated outdoor use is 74 percent of delivered water (see Table 2).



Beaumont Basin Watermaster/Alda, Inc.
Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

DRAFT

29-Jul-19

2.4.3 Landscape Water Use

All water delivered under this category is assumed to be used completely outdoors. The total volume of water used for landscape irrigation in the Beaumont Basin adjudicated area in 2017 was 1,621 acre-ft.

2.4.4 Construction Water Use

All water delivered under this category is assumed to be completely consumed with no return flow to the groundwater system. The total water delivered inside the adjudicated area for construction in 2017 was less than 0.5 acre-ft.

2.5 Applying the Return Flow Factor by Account Type

2.5.1 Return Flow in Sewered Areas

For water deliveries that occur in the sewered portions of each Appropriator's service area overlying the adjudicated Beaumont Basin, 49 percent of delivered water was assumed to be used outdoors as per Section 2.4.1 of this Technical Memorandum. Of the water used outdoors, 25 percent is assumed to become groundwater return flow. This method was applied to each of the accounts classified as sewered (see Table 3).

It is noted that deep percolation of applied landscape irrigation in residential areas overlying surface outcrops of the San Timoteo Formation, as mapped by the United States Geological Survey, is assumed to be negligible and is not included in the return flow volumes summarized in Tables 3 and 4. Applied irrigation in these areas that is not consumed by landscape is assumed to become runoff to storm drains, ultimately flowing out of the adjudicated area as surface flow.

2.5.2 Return Flow in Unsewered Areas

As the discharge of water through individual septic systems also contributes return flow to the groundwater, total return flow in the unsewered area is the sum of septic system infiltration and deep infiltration of applied irrigation water. All water discharged through individual septic systems is assumed to become groundwater recharge. Thus, return flow from unsewered areas is the sum of indoor water use and 25 percent of outdoor water use.

2.5.3 Return Flow from Urban Landscape and Irrigated Agriculture

Return flow associated with urban landscape and irrigated agriculture is assumed to be 25 percent of delivered water. However, it is noted that return flow occurs in some portions of the Beaumont Basin adjudication area that are not within an Appropriator service area such as the Morongo Golf



Beaumont Basin Watermaster/Alda, Inc.
Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

DRAFT

29-Jul-19

Course at Tukwet Canyon. This golf course uses private on-site wells for their own irrigation. This analysis does not include return flow from these or other Overlier private wells.

2.5.4 Construction

As mentioned in Section 2.4.4, water delivered under this category is assumed to be completely consumed with no return flow to the groundwater system. The total water delivered inside the adjudicated area for construction in 2017 was less than 0.5 acre-ft and is negligible in the overall return flow estimate in the Beaumont Basin adjudicated area.

3. Estimates of Return Flow by Appropriator for 2017

Application of the return flow methodology outlined in this Technical Memorandum to the water delivery records of BCVWD, City of Banning, and YVWD for 2017 results in the return flow values shown in Tables 3 and 4. The total return flow in 2017 for all accounts within the Appropriator service areas of the adjudicated Beaumont Basin is estimated to be 1,789 acre-ft. Of this, 1,445 acre-ft occurred in BCVWD, 310 acre-ft in the City of Banning, and 34 acre-ft in YVWD.

4. Applying the Return Flow Methodology for Future Years

The return flow accounting methodology reported herein can be implemented on an annual basis and reported in Beaumont Basin Watermaster annual reports. The data required to estimate return flow by Appropriator for annual reports will include:

- Water delivery records, by account, for each Appropriator, including any new accounts.
- City of Beaumont wastewater inflow volumes.

It will be beneficial to conduct the analysis of indoor vs. outdoor water use on an annual basis in order to assess the effects of irrigation conservation efforts on return flow amounts.

5. Seepage Time Lag Analysis

Throughout most of the Beaumont Basin, groundwater is of sufficient depth below the land surface that there is a delay (or lag time) between the time the irrigation water is applied at the land surface and the time it reaches the groundwater table. TH&Co previously estimated the return flow lag time to be approximately 25 years in the vicinity of BCVWD Wells 1 and 2 (TH&Co, 2015). This lag was estimated based on an analysis of hydrographs from BCVWD Wells 1 and 2. Specifically, stabilizing groundwater levels in the early 1960s, despite higher groundwater production and average precipitation conditions suggested that return flow from applied irrigation was reaching



Beaumont Basin Watermaster/Alda, Inc.

Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

DRAFT

29-Jul-19

the groundwater table. As BCVWD began groundwater pumping in 1936, the return flow lag was estimated at this location to be approximately 25 years. Given that the depth to groundwater in 1961 was approximately 370 feet below ground surface (ft bgs) at BCVWD Well 1, the associated percolation rate is estimated to be approximately 15 feet per year (see Table 5).

As the depth to groundwater varies across the Beaumont Basin, the lag time will also vary accordingly. In the TH&Co (2015) report, the 25-yr lag time was applied equally across the basin. For this analysis, TH&Co varied the lag time across the Beaumont Basin adjudicated area by applying the return flow rate of 15 ft/yr to the depth to groundwater contour map shown on Figure 4. The depth to groundwater contour map was based on groundwater levels measured in December 2017. This percolation rate was applied to zones of similar groundwater level depth across the Beaumont Basin adjudicated area to determine return flow lag times. TH&Co assigned zones of equal lag time with each zone representing the area between each depth to groundwater contour, which are contoured at 100-ft intervals (see Figure 5). The return flow rate (15 ft per year) was multiplied by the average groundwater level depth in each zone to estimate the return flow lag time in years (see Table 5).

Applying the varying return flow lag times to the applied irrigation water overlying Appropriator service areas in the Beaumont Basin in 2017 results in the return flow recharge schedule shown in Table 6. It is noted that this recharge schedule assumes that the depth to groundwater conditions in 2017 are approximately the same as the depth to groundwater conditions will be in the future at the time of return flow arrival at the groundwater table. Assuming a constant average percolation rate, significant changes in groundwater level depth during return flow percolation (either up or down) could change the travel time from the land surface to the groundwater table. For example, in 1961, the depth to groundwater at BCVWD Well 1 was approximately 370 ft bgs. At that depth, the return flow lag time was 25 years (370 ft/15 ft/yr). In 2017, the return flow lag time has increased to 29 years (simplified to 30 years for this analysis based on Figure 5) because the depth to groundwater is now approximately 440 ft bgs (440 ft/15 ft/yr). Similar changes to the depth to groundwater in the future will impact the percolation lag time.

6. Conclusions

Applying the return flow analysis methodology described herein to the 2017 water delivery records of each of the Appropriators within the Beaumont Basin adjudicated area results in the following estimated return flow volumes by Appropriator for 2017:

- BCVWD – 1,445 acre-ft
- Banning – 310 acre-ft
- YVWD – 34 acre-ft



Beaumont Basin Watermaster/Alda, Inc.

Return Flow Accounting Methodology for the Beaumont Basin Adjudicated Area

DRAFT

29-Jul-19

The return flow methodology can be used to estimate and report return flow within the Beaumont Basin adjudicated area on an annual basis.

The estimated delay (i.e. lag time) between the application of water at the land surface in 2017 and the arrival of the return flow at the groundwater table varies based on varying depth to groundwater conditions in the Beaumont Basin. The schedule of this delay for water applied in 2017 is shown in Table 6. A return flow lag time schedule would need to be applied to each annual estimate of Appropriator return flow.



**Beaumont Basin Watermaster
Return Flow Accounting Methodology
for the Beaumont Basin**

**Table 1
DRAFT**

Basis for Estimates of Indoor and Outdoor Water Use

A	B	C ²	D ³
Inflow to Wastewater Treatment Plant ¹ (2017) (acre-ft)	BCVWD Water Delivered within the City of Beaumont Sewered Area (2017) (acre-ft)	Percent of Water Used Indoors	Percent of Water Used Outdoors
3,663	7,217	51%	49%

Notes:

¹ City of Beaumont Wastewater Treatment Plant No.1

² C = A / B

³ D = 1 - (A / B)



**Beaumont Basin Watermaster
Return Flow Accounting Methodology
for the Beaumont Basin**

**Table 2
DRAFT**

Volume of Indoor and Outdoor Water Use per Account in the Beaumont Basin

Sewered Area						
Total Water Delivered (acre-ft)	Number of Accounts	Average Acre-ft/Account	Percent of Indoor Use	Percent of Outdoor Use	Volume of Indoor Use (acre-ft/acct)*	Volume of Outdoor Use (acre-ft/acct)
7,217	15,069	0.48	51%	49%	0.24	0.23

Unsewered Area						
Total Water Delivered (acre-ft)	Number of Accounts	Average Acre-ft/Account	Percent of Indoor Use (acre-ft)	Percent of Outdoor Use	Volume of Indoor Use (acre-ft/acct)*	Volume of Outdoor Use (acre-ft/acct)
1,935	2,062	0.94	26%	74%	0.24	0.70

Note:

* The volume of indoor water use is assumed to be the same for both sewered and unsewered, but outdoor water use determined to be greater for larger homes in the unsewered area.

**Beaumont Basin Watermaster
Return Flow Accounting Methodology
for the Beaumont Basin**

**Table 3
DRAFT**

Return Flow by Type Inside Beaumont Basin Adjudicated Area for 2017

Return Flow Methodology						
Account Type	Total Water Delivered (ac-ft)	Indoor Use		Outdoor Use		Return Flow (ac-ft)
		Percent of Total Delivered	Infiltration Percent of Indoor Use	Total Delivered	Infiltration Percent of Outdoor Use	
Sewered	-	51%	0%	49%	25%	-
Unsewered	-	26%	100%	74%	25%	-
Landscape ¹	-	0%	N/A	100%	25%	-
Construction	-	0%	N/A	100%	0%	-

Beaumont Cherry Valley Water District						
Account Type	A Total Water Delivered (ac-ft)	B	C	D	E ²	F ³
		Indoor Use		Outdoor Use		Return Flow (ac-ft)
		Total Delivered	Infiltration	Total Delivered	Infiltration	
Sewered	5,457	2,783	0	2,674	668	668
Unsewered	1,060	276	276	784	196	472
Landscape	1,218	0	N/A ⁴	1,218	305	305
Construction	1	0	N/A	1	0	0
Total	7,735	3,059	276	4,677	1,169	1,445

City of Banning						
Account Type	Total Water Delivered (ac-ft)	Indoor Use		Outdoor Use		Return Flow (ac-ft)
		Total Delivered	Infiltration	Total Delivered	Infiltration	
Sewered	1,822	929	0	893	223	223
Unsewered	0	0	0	0	0	0
Landscape	349	0	N/A	349	87	87
Construction	1	0	N/A	1	0	0
Total	2,171	929	0	1,242	310	310

Yucaipa Valley Water District						
Account Type	Total Water Delivered (ac-ft)	Indoor Use		Outdoor Use		Return Flow (ac-ft)
		Total Delivered	Infiltration	Total Delivered	Infiltration	
Sewered	166	84	0	81	20	20
Unsewered	0	0	0	0	0	0
Landscape	54	0	N/A	54	13	13
Construction	0	0	N/A	0	0	0
Total	219	84	0	135	34	34

Notes:

¹ Landscape includes Irrigated Agriculture.

² E = D * 0.25

³ F = C + E

⁴ N/A = Not Applicable.

Grand Total 1,789

**Beaumont Basin Watermaster
Return Flow Accounting Methodology
for the Beaumont Basin**

**Table 4
DRAFT**

2017 Water Delivery Summary Table

Appropriator	Total Water Delivered (Acre-ft)	Deliveries Inside the Beaumont Basin Adjudicated Area (Acre-ft)	Return Flow Inside the Beaumont Basin Adjudicated Area (Acre-ft)
BCVWD	11,180	7,735	1,445
Banning	6,510	2,171	310
YVWD	301	219	34
Total	17,991	10,125	1,789

Notes:

¹ This number only accounts for the water delivery accounts given near the adjudication boundary.

**Beaumont Basin Watermaster
Return Flow Accounting Methodology
for the Beaumont Basin**

**Table 5
DRAFT**

Return Flow Lag Time Analysis in the Beaumont Basin

A	B	C	D ¹
Depth to Water Zone (ft)	Average Depth to Water (ft)	Feet per Year	Return Flow Lag Time (Years)
0 - 100	50	14.8	3
100 - 200	150	14.8	10
200 - 300	250	14.8	17
300 - 400	350	14.8	24
400 - 500	450	14.8	30
500 - 600	550	14.8	37
600 - 700	650	14.8	44

Notes:

¹D = B / C

Beaumont Basin Watermaster
Return Flow Accounting Methodology
for the Beaumont Basin

Table 6
DRAFT

Return Flow Lag Time by Appropriator Inside Beaumont Basin Adjudicated Area for 2017

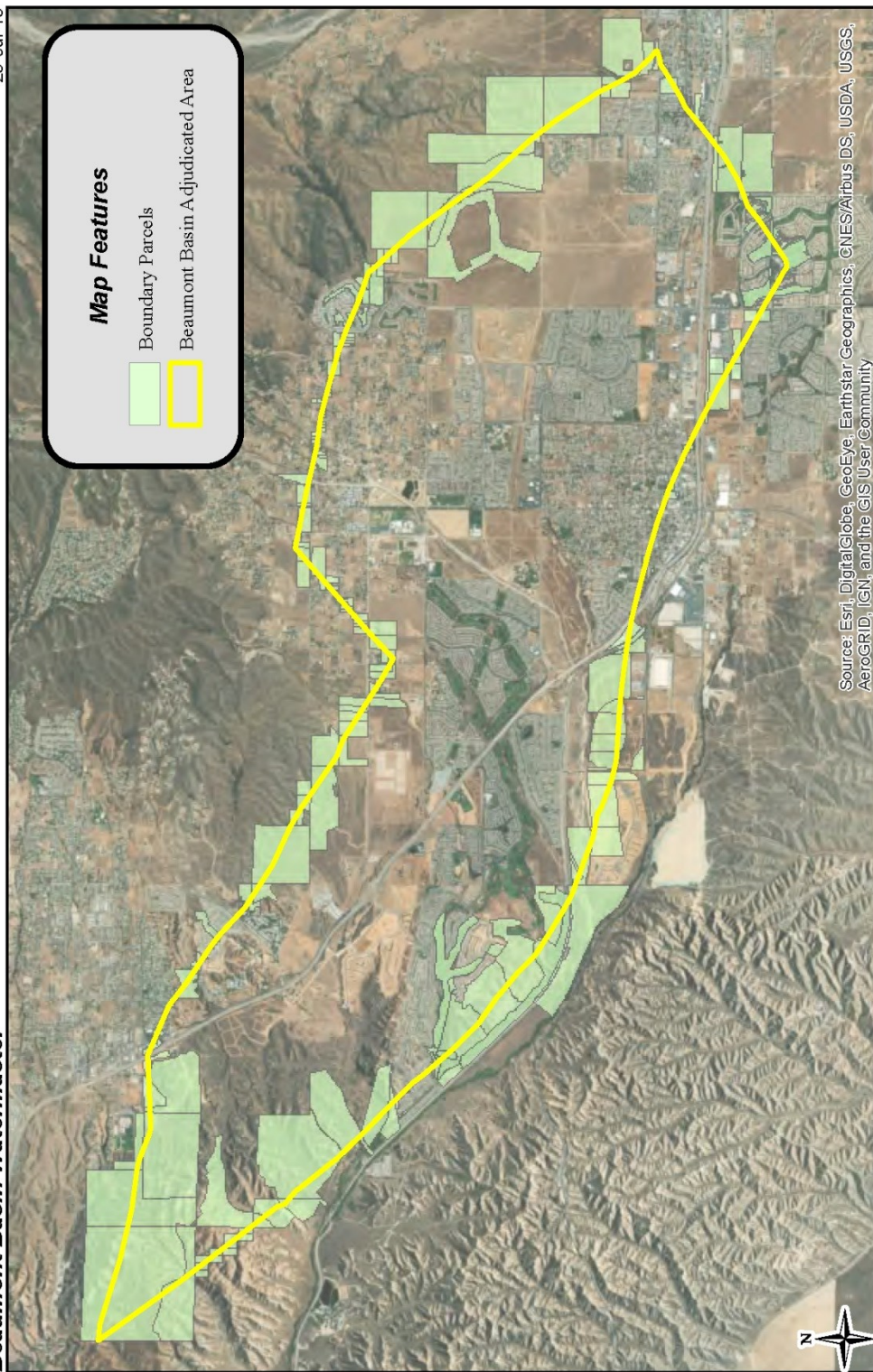
Return Flow Lag Time	Return Flow Inside the Beaumont Basin Adjudicated Area (ac-ft)		
	Beaumont Cherry Valley Water District	City of Banning	Yucaipa Valley Water District
3 Years	5	0	0
10 Years	43	0	0
17 Years	139	0	34
24 Years	255	207	0
30 Years	659	60	0
37 Years	196	43	0
44 Years	148	0	0
No Flow	0	0	0
Total	1,445	310	34
Grand Total			1,789

29-Jul-19

**Return Flow Accounting
Methodology for the Beaumont Basin**

29-Jul-19

Beaumont Basin Watermaster



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

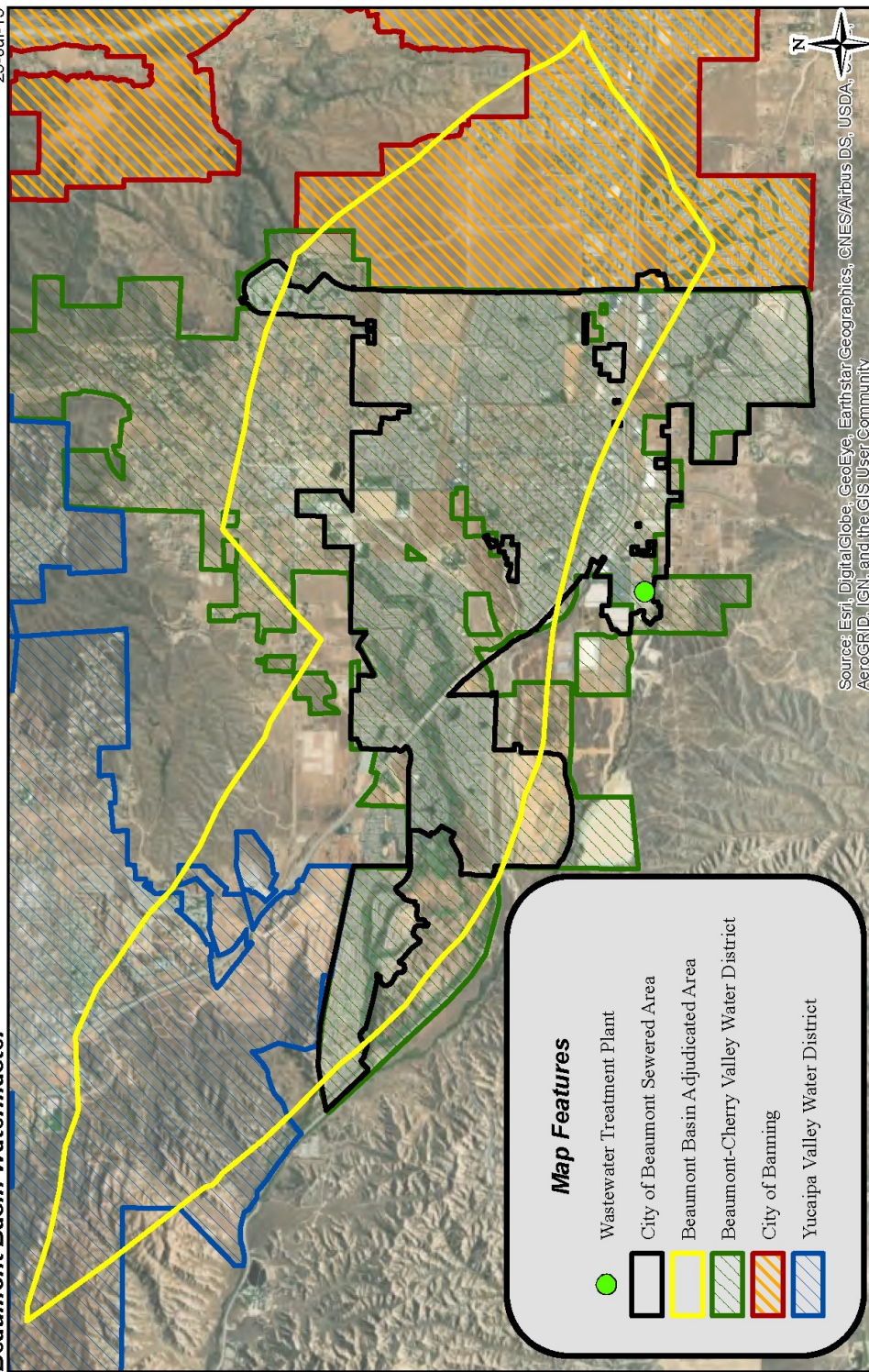
**Parcels Overlapping
the Adjudication Boundary**
Figure 1

DRAFT

**Return Flow Accounting
Methodology for the Beaumont Basin**

29-Jul-19

Beaumont Basin Watermaster



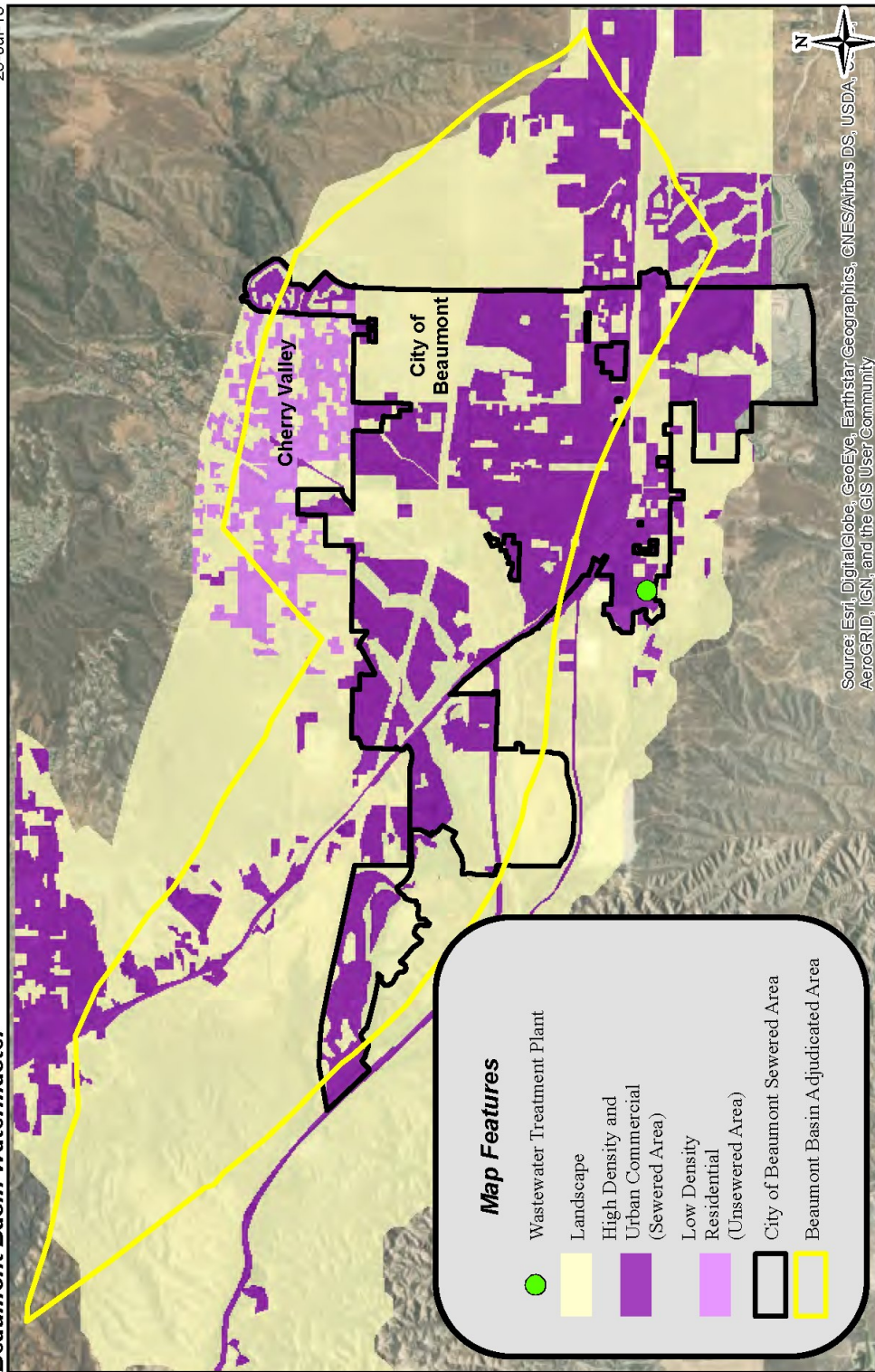
Thomas Harder & Co.
Groundwater Consulting
in association with **Alda, Inc.**

**Appropriator Areas and
City of Beaumont
Sewered Area**
Figure 2
DRAFT

**Return Flow Accounting
Methodology for the Beaumont Basin**

29-Jul-19

Beaumont Basin Watermaster

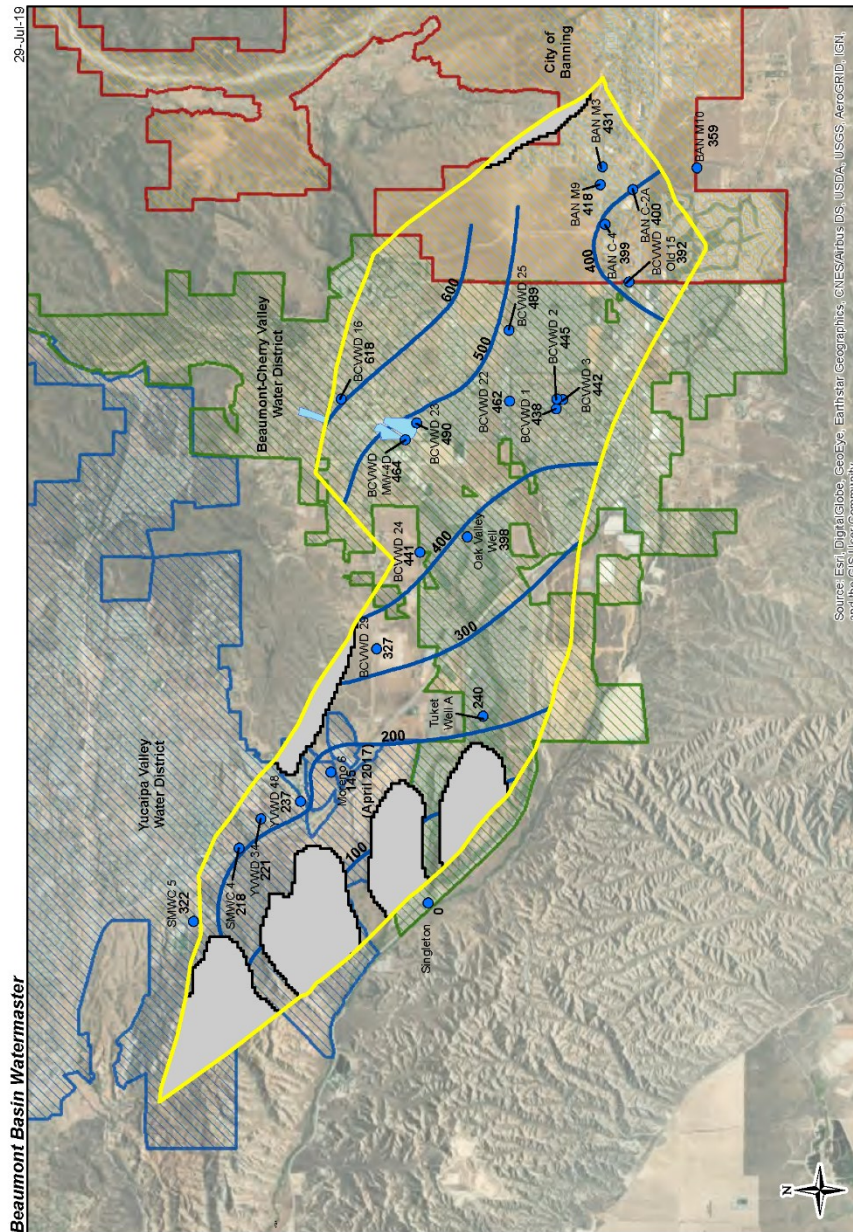
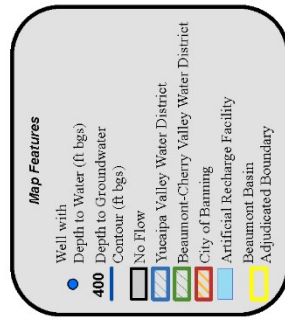


Thomas Harder & Co.
Groundwater Consulting
in association with **Alda, Inc.**

Notes: Sewer area is modified from UCR Nitrate Study, 2012
and Sewer manhole locations provided by the City of Beaumont.
Land use is modified from 2010 Land Use Google Aerial Imagery.

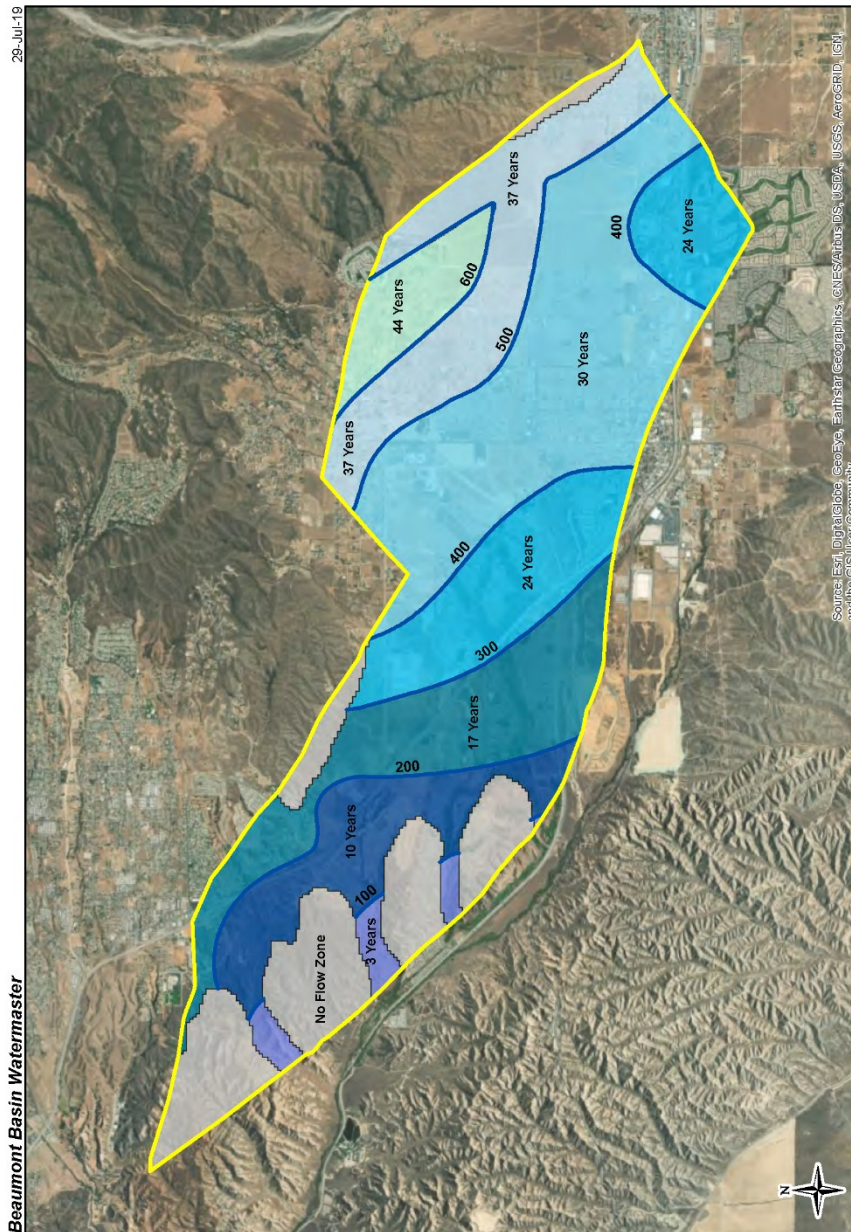
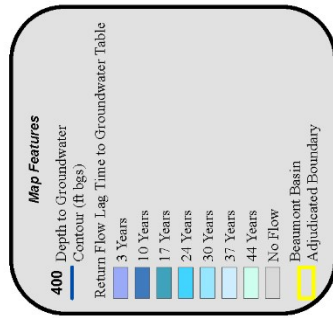
2010 Land Use
Figure 3
DRAFT

**Return Flow Accounting
Methodology for the Beaumont Basin**



**Depth to Groundwater Contours
December 2017**
Figure 4
DRAFT

**Return Flow Accounting
Methodology for the Beaumont Basin**



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

Return Flow Lag Time Zones

**Figure 5
DRAFT**

BEAUMONT BASIN WATERMASTER

MEMORANDUM NO. 19-22

Date: October 2, 2019

From: Joseph Zoba, Treasurer

Subject: Consideration of Change Order No. 1 for Task Order No. 17 for the Development of a Return Flow Methodology for the Beaumont Basin

Recommendation: That the Watermaster Committee approve Change Order No. 1 to Task Order No. 17 for the sum not to exceed \$4,780 and to direct the Treasurer to invoice specific Appropriators based on anticipated benefits.

On October 3, 2018, as documented in Technical Memorandum 18-21, the Watermaster Committee approved Task Order No. 17 for the Development of a Return Flow Methodology for the Beaumont Basin. Task Order No. 17 was approved for the sum not to exceed \$40,140. The expenses associated with the initial task order were to be divided equally between Appropriators anticipated to receive a benefit from the development of this methodology.

The out-of-scope services relate to compiling the individual appropriators water account data necessary to develop the methodology. As stated in the initial scope of services, it was assumed that water delivery records could be linked to Assessors Parcel Numbers (APNs) and that those records will be provided electronically by the Appropriators. While most of the water delivery records were provided, not all of them were linked to APNs. As such, it was necessary to locate approximately 10,000 accounts manually. This additional work was not considered in the initial scope of services.

The total cost of the out-of-scope services for which we are requesting this change order is \$4,780.00 as documented below.

Task Description	Initial Hours	Initial Cost	Revised Hours	Revised Cost
1.- Accounting Methodology	82	\$10,080	126	\$14,860
2.- Apply Analysis to CY 2017	68	\$7,640	68	\$7,640
3.- Reevaluate Seepage Lag	110	\$12,300	110	\$12,300
4.- Technical Memorandum	88	\$10,120	88	\$10,120
		\$40,140		\$44,920

BEAUMONT BASIN WATERMASTER

MEMORANDUM NO. 19-23

Date: October 2, 2019

From: Hannibal Blandon

Subject: 2018 Annual Report Update

Recommendation: None – For information purposes only

A draft of the 2018 Annual Report was presented to the Watermaster Committee meeting held on February 6, 2019. The preparation of the final report was delayed until transfers of water rights from an Overlying Party to an Appropriator Party was properly addressed and documented.

Through the adoption of Resolution No. 2019-02 at the Watermaster Committee Special Meeting, held on June 25, 2019, revisions to Section 7 of the Rules and Regulations were adopted to address the transfer of water rights. The new Section 7 includes Form 5 to document the adjustment of rights of an Overlying Party due to Proposed Provision of Water Service by an Appropriator.

Yucaipa Valley Water District will be filing an executed Form 5 later in early November. At that time, selected portions of the 2018 annual report will be updated and provided to the Watermaster Committee for review and comment. Comments, if any, will be incorporated into a final report and presented for adoption at the December meeting.

Facts About the Beaumont Basin Watermaster

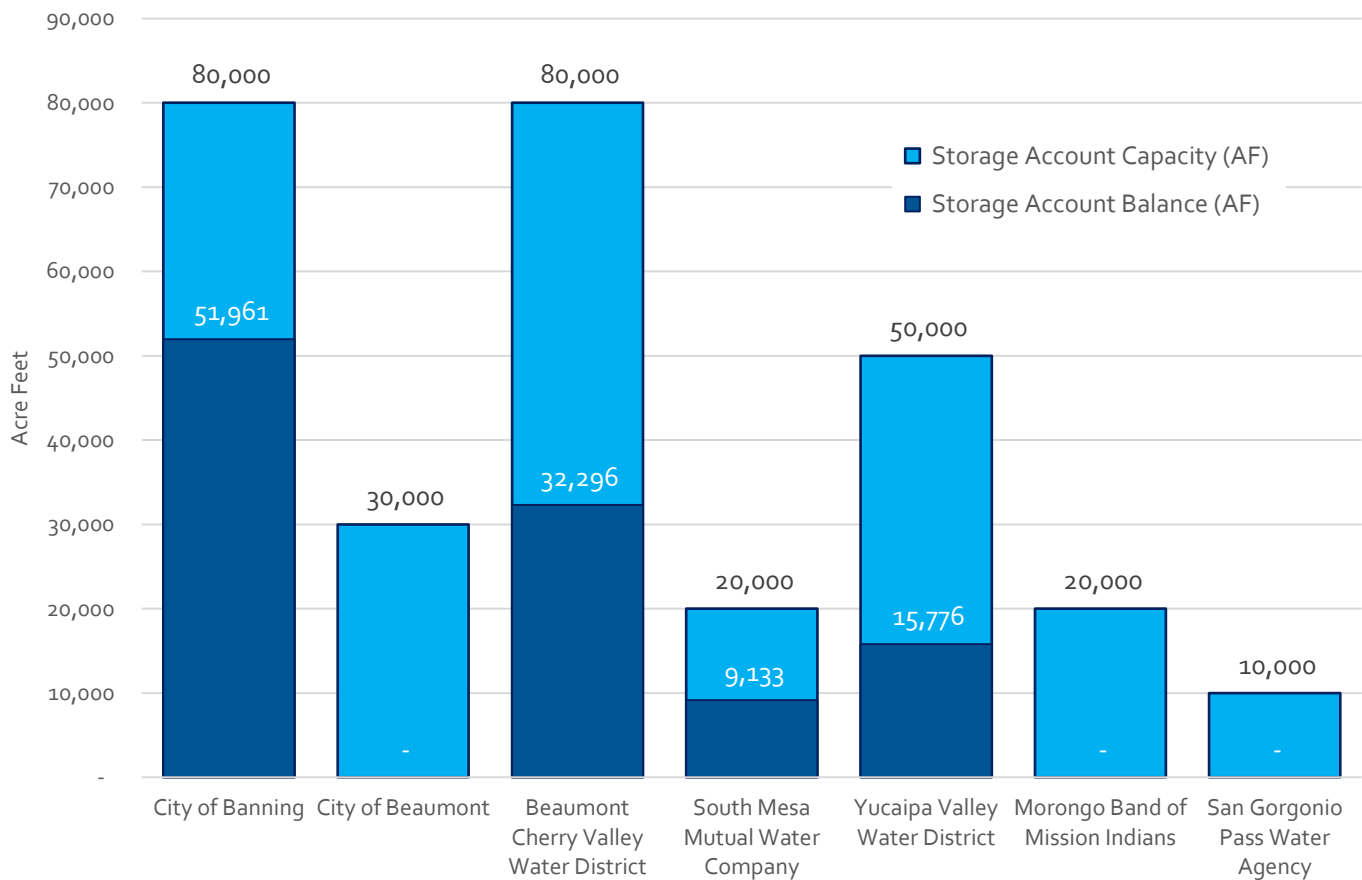
Authority and Formation: Case No. RIC 389197 – A Stipulated Agreement signed by Honorable Judge Gary Tranbarger of the Superior Court of the State of California, County of Riverside on February 4, 2004 (the “Judgment”).

Online Documentation: www.beaumontbasinwatermaster.org

Watermaster Members:

- City of Banning
 - Arturo Vela and Luis Cardenas
- City of Beaumont
 - _____ and Kyle Warsinski
- Beaumont Cherry Valley Water District
 - Dan Jagers and Mark Swanson
- South Mesa Mutual Water Company
 - George Jorritsma and David Armstrong
- Yucaipa Valley Water District
 - Joseph Zoba and Jennifer Ares

Storage Account Balances (as of December 31, 2017)



Original Safe Yield Determination (2004):	8,650 acre feet per year
Safe Yield Re-evaluation (2014):	6,700 acre feet per year
Safe Yield Re-evaluation (2024):	To be determined

Overlying Party to the Judgment	2004 Initial Overlying Water Right (acre feet)	2014 Updated Overlying Water Right (acre feet)
California Oak Valley Golf and Resort	950.0	735.8
Plantation on the Lake	581.0	450.0
Sharondale Mesa Owners Association	200.0	154.9
Tukwet Canyon Golf Club	2,200.0	1704.0
Rancho Calimesa Mobile Home Park	150.0	116.2
Gutierrez, Hector, et.al.	10.0	7.7
Darmont, Boris and Miriam	2.5	1.9
Aldama, Nicolas and Amalia	7.0	5.4
McAmis, Ronald L.	5.0	3.9
Nikodinov, Nick	20.0	15.5
Beckman, Walter M.	75.0	58.1
Albor Properties III	300.0	232.4
Sterns, Leonard M. and Dorothy D.	200.0	154.9
Sunny-Cal Egg and Poultry Company	1,439.5	1,115.0
Merlin Properties	550.0	426.0
Oak Valley Partners	1,806.0	1,398.9
Roman Catholic Bishop of San Bernardino	154.0	119.3
Total	8,650.0	6,700.0

Transfer of Overlying Rights to Overlying-Appropriative Rights:

Beaumont Basin Watermaster Resolution No. 17-02 adopted on August 30, 2017 transferred all of the overlying water rights from Oak Valley Partners to Yucaipa Valley Water District.

Summary of Assigned Overlying-Appropriative Rights	Watermaster Notification Date	Earmarked Amount (acre feet)
Assignment No. 1 to Yucaipa Valley Water District	3/28/2018	90.94
Assignment No. 2 to Yucaipa Valley Water District	8/1/2018	59.89
Assignment No. 3 to Yucaipa Valley Water District	10/3/2018	29.57
Assignment No. 4 to Yucaipa Valley Water District	2/6/2019	2.65
Total		183.05

Financial Information:

Each year the Beaumont Basin Watermaster has an independent accountant's review of the financial standing. The following illustration provides a summary of the annual revenue and expenditure information since the formation of the Beaumont Basin Watermaster.

