

March 2026

**COMPONENT 5: AGRICULTURAL AQUIFER
STORAGE AND RECOVERY (AGASR) PILOT PROJECT
MONITORING PLAN**

**SUSTAINABLE GROUNDWATER MANAGEMENT ACT
(SGMA) IMPLEMENTATION GRANT AGREEMENT
NUMBER 4600015877**

PREPARED FOR

TEHAMA COUNTY FLOOD CONTROL AND WATER
CONSERVATION DISTRICT



TEHAMA COUNTY
FLOOD CONTROL AND WATER CONSERVATION DISTRICT

PREPARED BY



**Luhdorff &
Scalmanini**
Consulting Engineers

TABLE OF CONTENTS

1. Goals and objectives of the Surface Water Connections.....	3
2. Site locations and Details	3
3. Improvements implemented	Error! Bookmark not defined.
4. Quantification of project benefits.....	6
5. Monitoring and reporting plan	6
6. References	7

TABLE OF CONTENTS

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Meaning
AF	Acre-feet
AgASR	Agricultural Aquifer Storage and Recovery
ft bgs	Feet below ground surface
GPM	Gallons per minute
GSP	Groundwater Sustainability Plan
PMAs	Projects and Management Actions
SGMA	Sustainable Groundwater Management Act
TCFCWCD	Tehama County Flood Control and Water Conservation District

1. GOALS AND OBJECTIVES OF THE AGRICULTURAL AQUIFER STORAGE AND RECOVERY (AGASR) PILOT PROJECT

According to the Groundwater Sustainability Plan (GSP) and subsequent annual reports prepared for the Red Bluff Subbasin, the Subbasin is currently in a state of groundwater overdraft (TCFCWCD 2024). In order to address this overdraft, the Tehama County Flood Control and Water Conservation District (TCFCWCD), acting as the Groundwater Sustainability Agency (GSA) for the Tehama County portion of the Subbasin has developed Projects and Management Actions (PMAs) to decrease groundwater use and increase groundwater recharge.

One type of project identified by the TCFCWCD to address groundwater recharge is the use of injection wells to directly recharge the deeper portions of the aquifer in the subbasin. The water from this recharge would come from excess surface water and the recharged water could then be pumped for use when surface water is not available. This process is known as Aquifer Storage and Recovery or ASR and is currently in use in various locations in California. Up to this point, most ASR projects have been operated for municipal water use, where surface water is treated to drinking water standards, then injected into the aquifer for storage and later use. As this technology has developed and become more cost effective, various entities have initiated pilot projects for using ASR in an agricultural context.

This particular project aims to inject surface water diverted from Elder Creek during high flow periods into multiple existing irrigation wells on the Marengo Ranch Property. The pilot study will evaluate the feasibility of recharging the deeper portion of the Upper Aquifer and the shallower portion of the Lower Aquifer within the Red Bluff Subbasin, utilizing up to two (2) existing irrigation wells. Pilot injection operations are anticipated to take place intermittently over the course of 3-5 years during high flow periods in Elder Creek. A workplan for the conduct of the pilot project was prepared and presented to the Central Valley Regional Water Quality Control Board in August of 2025 (**Appendix 1**) and was followed up with an addendum document (**Appendix 2**) after comments were received on the initial plan in December 2025. The plan was accepted by the Regional Board in January 2026.

2. SITE LOCATION AND DETAILS

The site of the proposed study lies along Elder Creek between Paskenta Road and Rawson Road, in Tehama County. A site vicinity map is shown in **Figure 1**. Elder Creek is the water source for the ASR project. Diversions of Elder Creek water will be made under a 5-year temporary permit to be issued by the State Water Resources Control Board Division of Water Rights. Water will be diverted through an existing diversion structure on the property, filtered, disinfected, and pumped to existing agricultural water supply wells on the property. These existing wells have casing diameters of 10 and 12.5 inches and are completed to depths of 261 and 578 feet. Construction details for the injection wells are listed in **Table 1**. Further details on the project can be found in **Appendix 1: Marengo Ranch Ag ASR Pilot Project Framework** and **Appendix 2: ADDENDUM to Marengo Ranch Ag ASR Pilot Project Framework**.

Table 1. Injection Well Details						
Well Name	Latitude	Longitude	Casing Diameter (in)	Total Depth (ft bgs)	Screened Intervals (ft bgs)	Specific Capacity (GPM/ft drawdown)
Marengo Recharge Well #3	40.043753	-122.254861	10	578	260-280 300-340 360-440 460-500	220
Marengo Recharge Well #4	40.041228	-122.254767	12.5	261	74-82 140-150 179-192 201-217 250-261	50

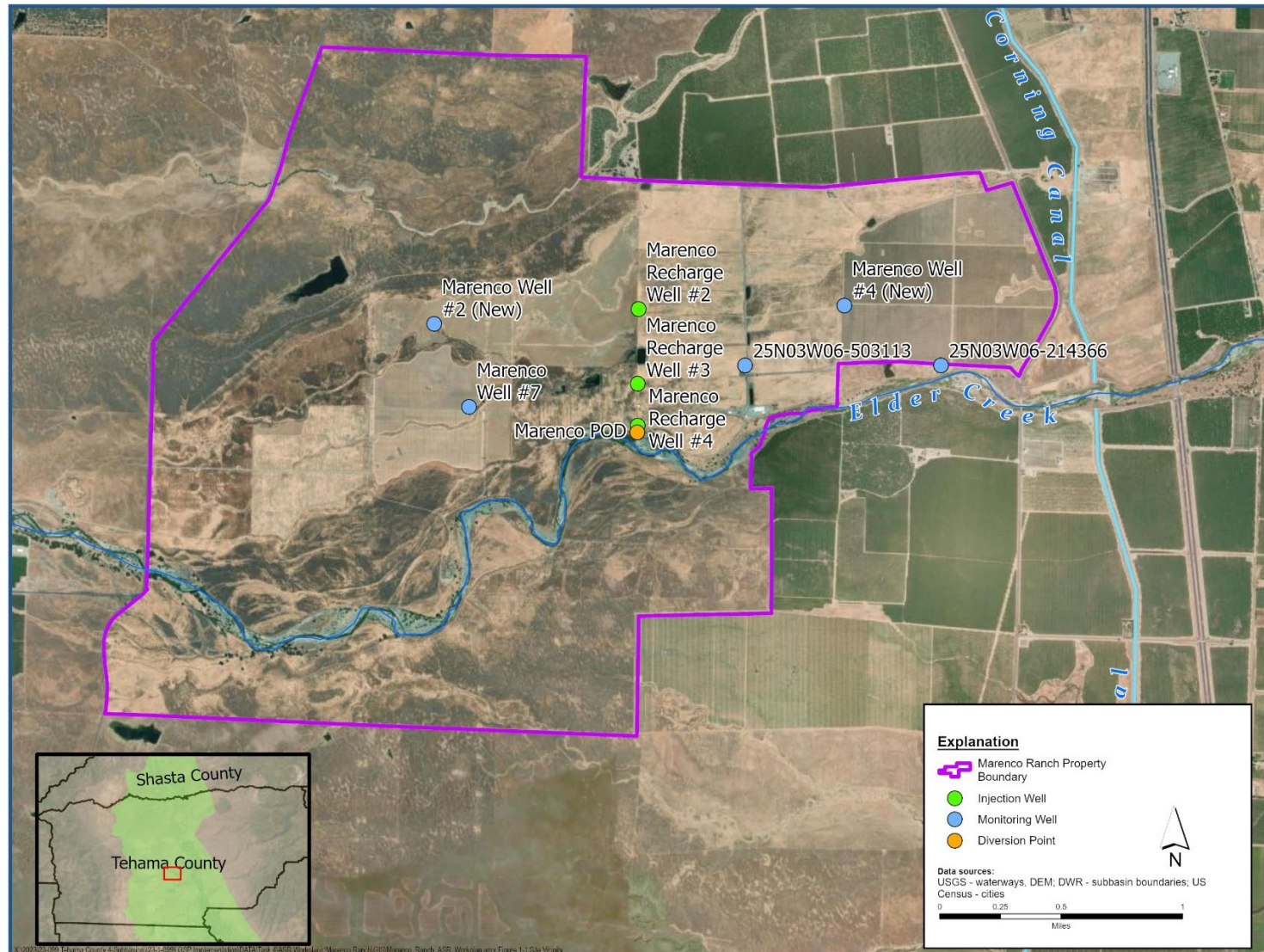


Figure 1. AgASR Pilot Project Site Map

3. CONSTRUCTION ACTIVITIES

As stated previously, this pilot project will utilize existing diversion infrastructure and existing agricultural irrigation wells to divert and inject surface water from Elder Creek. Construction to bring the pilot project into operation included a pump located at the diversion point, a filtration system for the diverted water, and piping to the two wells identified for injections. The pump was installed on the existing infiltration gallery at the diversion point and was sized to accommodate up to 2,500 gallons per minute of pumping to the injection wells. The filtration system consisted of a 4 tank inline sand filter system to remove any sediment which could potentially clog the screens of the injection wells. Finally, a welded steel pipeline to convey the water from the diversion point to the injection wells was installed.

4. QUANTIFICATION OF PROJECT BENEFITS

Based on the surface water available to divert under the 5-year temporary permit and the anticipated recharge rate of the wells, the pilot project is expected to recharge between 33 and 232 acre-feet per year. The variation in recharge amounts is due to differences in allowed diversion days from Elder Creek based on water year type (Critically Dry to Wet). Expected injection volumes based on water year type are listed in **Table 2**. Further details on total recharge amounts can be found in **Appendix 2**:

ADDENDUM to Marengo Ranch Ag ASR Pilot Project Framework.

Table 2. Injection Volumes				
Water Year Type	Expected Diversion Days	Injection Rate (GPM)	Injection Rate (AF/day)	Total Volume Injected (AF/Year)
Wet	21	2,500	11	232
Above Normal	13	2,500	11	144
Below Normal	4	2,500	11	44
Dry	4	2,500	11	44
Critically Dry	3	2,500	11	33
All Years	11	2,500	11	122

5. MONITORING AND REPORTING PLAN

Monitoring and reporting for the pilot project will consist of ongoing measurements of diverted water to quantify project benefits and ensure that diversions are in line with the provisions of the 5-year temporary permit. Also, baseline and ongoing sampling of both surface water and groundwater to ensure that injection operations are not negatively impacting groundwater quality. To measure the total volume of water diverted over the course of the project, an inline flow meter was installed downstream of the pump at the point of diversion. The flow meter will be read periodically while diversions are occurring to quantify the total volume of water recharged. Impacts to groundwater quality will be evaluated via a robust monitoring plan consisting of baseline and periodic monitoring of water quality of

both the surface water from Elder Creek as well as groundwater from nearby wells. Water will be monitored for general minerals, metals, pesticides and other constituents to ensure that groundwater near the project site is not being adversely impacted by injection operations. For a more detailed information on water quality sampling, see **Appendix 1: Marengo Ranch Ag ASR Pilot Project Framework**.

6. REFERENCES

Tehama County Flood Control and Water Conservation District (TCFCWCD). 2024. Red Bluff Subbasin Groundwater Sustainability Plan.

Appendix 1: Marengo Ranch Ag ASR Pilot Project Framework

TECHNICAL MEMORANDUM

DATE: August 29, 2025 Project No. 23-1-099

TO: Scott Armstrong, PG, CHG Central Valley Regional Water Quality Control Board (CVRWQCB)

FROM: Eddy Teasdale, PG, CHG (LSCE) and Justin Jenson (Tehama County Flood Control and Water Conservation District Groundwater Sustainability Agency)

SUBJECT: **Marengo Ranch Ag ASR Pilot Project Framework**

1.0 GENERAL INFORMATION

1.1 Project Introduction

To support long-term sustainability in the Red Bluff Subbasin, Tehama County is evaluating opportunities to improve groundwater conditions by recharging surface water into underlying aquifers during periods when surplus or supplemental supplies are available. One promising approach is subsurface injection via Aquifer Storage and Recovery (ASR), which allows water to be stored in deeper aquifers for later use.

Given the presence of hundreds of irrigation wells throughout the County, converting a portion of these wells into ASR facilities could provide a meaningful source of supplemental supply during drought years and help ensure ongoing compliance with the Groundwater Sustainability Management Act (SGMA) sustainability requirements.

Following up on a February 2025 meeting with your staff to discuss the concept of Agricultural ASR in the Northern Sacramento Valley, LSCE has prepared this framework document to outline the project concept. We are requesting your office's initial review, followed by an in-person meeting to discuss the next steps. Our goal is to work collaboratively toward a plan that includes implementing a pilot agricultural ASR project.

1.2 Summary of Project

This pilot project proposes to inject surface water diverted from Elder Creek during high flow periods into multiple existing irrigation wells on the Marengo Ranch Property (Site). The site of the proposed study lies along Elder Creek between Paskenta Road and Rawson Road, in Tehama County. A site vicinity map is shown in **Figure 1-1**. The pilot study will evaluate the feasibility of recharging the deeper portion of the Upper Aquifer and the shallower portion of the Lower Aquifer within the Red Bluff Subbasin, utilizing up to three (3) existing irrigation wells. Pilot injection operations are anticipated to take place intermittently over the course of 3-5 years during high flow periods in Elder Creek.

1.2 Description of Geologic and Hydrogeologic Conditions

The site is located in the Sacramento Valley geologic province, which is the northern region of the Great Valley Province. At the surface, it is underlain by unconsolidated Quaternary alluvium, consisting of a mixture of silts, sands, and gravels with occasional clay lenses. At depths greater than about 100 feet, the unconsolidated alluvium transitions to the Tehama Formation, which consists of sandstone and siltstone with lenses of pebble and cobble conglomerate (TCFCWCD GSA, 2024).

The site lies within the Red Bluff Subbasin, which is a portion of the larger Sacramento Valley Basin. There are two principal aquifers defined in the Subbasin: the Upper Aquifer and the Lower Aquifer. However, the lack of a continuous, distinct confining layer makes defining the transition from the Upper Aquifer to the Lower Aquifer difficult. The Upper Aquifer consists of the unconsolidated alluvium and the upper portion of the Tehama Formation, down to a depth of about 300 feet below ground surface at the site. The Lower Aquifer consists of the Tehama Formation, which is about 300 feet below the ground surface and deeper.

Groundwater flow in the area is generally from west northwest (WNW) to east southeast (ESE) in the fall (with a gradient of around 20 feet of elevation per mile perpendicular to groundwater surface contours), and more directly W to E in spring (with a gradient of around 12.5 feet per mile). Groundwater levels in the area are around 100 feet below ground surface in the fall, and around 80 feet below ground surface in spring, based on groundwater level contours prepared for the Red Bluff Subbasin GSP Annual Report (TCFCWCD GSA, 2024).

2.0 SOURCE WATER

2.1 Elder Creek

Elder Creek (**Figure 1-1**) is the water source for the ASR project. The creek flows east from the Coast Ranges, through the site, before it eventually meets the Sacramento River. Like many westside streams originating in the Coast Ranges, streamflow is highly variable depending upon the season and water year type. Streamflow is measured upstream of the site at a US Geological Survey (USGS) gage near Paskenta. Total monthly flows on the creek have varied between 0 AF/month and 90,839 AF/month. Diversions of Elder Creek water will be made under a 5-year temporary permit to be issued by the State Water Resources Control Board Division of Water Rights.

2.2 Point of Diversion

Water will be diverted through an existing diversion structure and pump depicted in **Figure 2-1**. This diversion draws water from the creek via a pump through an infiltration gallery buried beneath the creek bed. The diversion structure was previously used to irrigate nearby pastures, presumably under a riparian right. The infiltration gallery provides some measure of filtration of the creek water before it enters the pump. From the point of diversion, water will be pumped via pipeline to each of the three (3) proposed injection wells.



Figure 2-1 Diversion Point

3.0 INJECTION WELLS

The three existing wells on the site will be utilized for injection. During the course of the pilot project, injection via both gravity flow and/or pump into the well casing may be utilized. The existing wells are oriented on a north-south axis on the north side of Elder Creek (**Figure 1-1**). The wells are irrigation production wells with casing diameters ranging from 10 to 12.5 inches. Total Depths of the wells range from 261 to 580 feet below ground surface (bgs). Each well has multiple screened intervals, ranging from 74 to 578 feet bgs (**Table 3-1**). Detailed information on each well can be found in its respective Well Completion Report, located in **Appendix A**. Pump tests were carried out on each of the wells in January 2023; field sheets for each of the pump tests are included in **Appendix B**. The specific capacities of each well were calculated using the pump test results and are listed in **Table 3-1**.

Table 1 – Injection Well Details						
Well Name	Latitude	Longitude	Casing Diameter (in)	Total Depth (ft bgs)	Screened Interval(s) (ft bgs)	Specific Capacity (GPM/ft drawdown)
Marengo Recharge Well #2	40.048192	-122.254906	12	580	310-340 360-490 560-578	133
Marengo Recharge Well #3	40.043753	-122.254861	10	578	260-280 300-340 360-440 460-500	220
Marengo Recharge Well #4	40.041228	-122.254767	12.5	261	74-82 140-150 179-192 201-217 250-261	50

4.0 MONITORING WELLS

There are multiple existing wells on the site, which will be utilized for monitoring during the pilot study. These existing wells are a combination of irrigation and domestic wells and are located both up and down gradient from the proposed injection wells. Monitoring at these wells will consist of groundwater level measurements as well as groundwater quality, as detailed in Section 7.0. The total depths and screened intervals on the monitoring wells vary and allow for monitoring of various vertical portions of the aquifer. Locations and construction details for the proposed monitoring wells are depicted in **Table 4-1**, and a map of the well locations is depicted in **Figure 1-1**. Detailed information on each well can be found in its respective Well Completion Report, located in **Appendix C**. Wells will be monitored for water level as well as water quality constituents, as detailed in **Section 5.0**.

Table 4-1 – Monitoring Wells					
Well Identifier	Latitude	Longitude	Casing Diameter (in)	Total Depth (ft bgs)	Screened Interval(s) (ft bgs)
Marenco Domestic	40.044979	-122.246528	Unknown	Unknown	Unknown
Marenco Well #4 (New)	40.048688	-122.238934	18	1270	610-650 690-890 1150-1250
Marenco Well #7	40.042107	-122.26791	18	1090	400-460 480-560 600-640 680-840 1000-1060
Marenco Well #2 (New)	40.047017	-122.270765	18	1150	380-420 460-540 700-780 1060-1140
25N03W06-214366	40.045264	-122.231318	4	82	62-82

5.0 GROUNDWATER SAMPLING AND ANALYSIS PLAN

Water quality for both the injected surface water and the groundwater on the site will be collected and analyzed throughout the pilot project.

5.1 Baseline Conditions

Water Quality samples will be collected from all previously described wells on the site, as well as the proposed point of diversion, prior to the start of injection. These samples will be used to establish baseline conditions for water quality on the site. These baseline conditions will be used as a point of comparison to evaluate impacts from the injection of surface water. Parameters to be sampled during baseline sampling include the constituents listed in **Table 5-1**.

Table 5-1 – Baseline Groundwater Monitoring Parameters
pH
Electrical Conductivity (EC)
Total Dissolved Solids (TDS)
Total Kjeldahl Nitrogen (TKN)
Nitrate as Nitrogen
Total Coliform Organisms
Organochlorine Pesticides (per US Environmental Protection Agency (USEPA) Method 8081A)

Table 5-1 – Baseline Groundwater Monitoring Parameters
Organophosphorus Pesticides (per USEPA Method 8141A)
General Minerals: Alkalinity (as CaCO ₃), Hardness, Bicarbonate (as CaCO ₃), Boron, Carbonate (as CaCO ₃), Calcium, Chloride, Iron, Magnesium, Manganese, Phosphate, Sodium, and Sulfate
Metals: Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, and Thallium

5.2 Injection Water Monitoring

During injection operations, the diverted surface water will be sampled for the same parameters as those taken during baseline condition sampling. Sampling will be conducted as diversions are made based on the stipulations of the 5-year temporary diversion permit. The parameters to be collected and their frequencies are depicted in **Table 5-2**.

Table 5-2 – Injected Water Monitoring		
Parameter	Type of Sample	Monitoring Frequency
pH	Grab	Once during each injection event
EC	Grab	Once during each injection event
Arsenic	Grab	Once during each injection event
Iron	Grab	Once during each injection event
Manganese	Grab	Once during each injection event
Nitrate (as Nitrogen)	Grab	Once during each injection event
TDS	Grab	Once during each injection event
Organochlorine Pesticides (per USEPA Method 8081A)	Grab	Weekly during injection
Organophosphorus Pesticides (per USEPA Method 8141A)	Grab	Monthly during injection
General Minerals	Grab	Monthly during injection
Metals	Grab	Monthly during injection

5.3 Groundwater Monitoring

Sampling will also be conducted on the monitoring wells described in **Section 4.0**. Wells will be measured for depth to groundwater on a monthly basis to evaluate the impacts on groundwater levels from surface water injection. Additionally, groundwater quality parameters will be collected on a quarterly basis to determine the impacts on groundwater quality across the site from injection operations. Parameters to be sampled and their frequency are listed in **Table 5-3**.

Table 5-3 – Groundwater Monitoring		
Parameter	Type of Sample	Monitoring Frequency
Depth to Groundwater	Measurement	Monthly
pH	Grab	Quarterly
EC	Grab	Quarterly
Arsenic	Grab	Quarterly
Iron	Grab	Quarterly
Manganese	Grab	Quarterly
Nitrate (as Nitrogen)	Grab	Quarterly
TDS	Grab	Quarterly
General Minerals	Grab	Quarterly
Metals	Grab	Quarterly
Organochlorine Pesticides (per USEPA Method 8081A)	Grab	Quarterly
Organophosphorus Pesticides (per USEPA Method 8141A)	Grab	Quarterly

7.0 PROJECT SCHEDULE

This pilot project is anticipated to begin in late 2025 and operate over a period of 3-5 years to allow for ample opportunities to conduct diversions from Elder Creek and introduce the water into the injection wells. Following the 3-5 year pilot operations, a report detailing the findings of the pilot project will be developed. A projected project schedule is shown in **Table 7-1**.

Table 7-1 – Project Schedule	
Activity/Milestone	Estimated Timeframe
Baseline water quality sampling	Sept-Oct 2025
Install temporary diversion infrastructure (pipelines, pumps, etc.)	Sept-Nov 2025
Begin injection operations as the diversion permit allows	Nov 2025 – March 2026
Evaluate data collected	April – June 2026
Injection operations as a diversion permit allows	Winter 2026/27 – Winter 2029/30
Evaluate data collected	Spring 2027 – Spring 2030
Prepare Findings Report	Summer 2028 – Summer 2030

8.0 RECOMMENDATIONS

Tehama County, in coordination with LSCE, formally requests the Regional Water Quality Control Board (RWQCB) to review this framework document and provide guidance on the specific steps and requirements necessary to advance the proposed Agricultural Aquifer Storage and Recovery (Ag-ASR) pilot project.

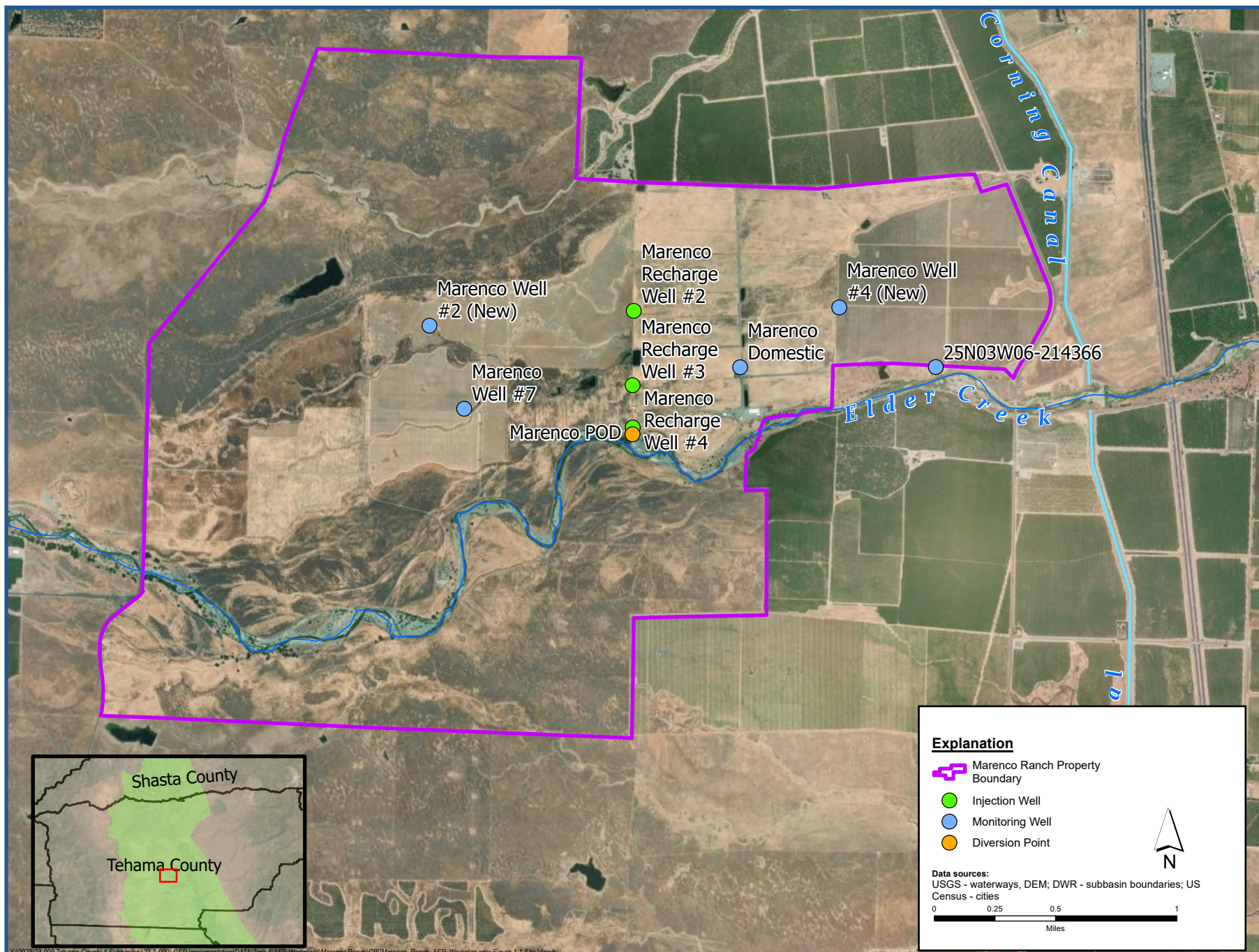
Key elements of this request include:

- Regulatory Pathway Confirmation
 - RWQCB is to provide input on the applicable permitting and compliance requirements under the California Water Code, Porter–Cologne Water Quality Control Act, and the Underground Injection Control (UIC) program.
 - Seek confirmation on whether a Waste Discharge Requirement (WDR), permit amendment, or other regulatory authorization will be required for pilot testing.
- Supporting Documentation Needs
 - RWQCB is to identify what additional technical information is needed beyond the framework materials provided, including hydrogeologic data, injection well construction reports, pump test data, and water quality analyses.
 - Clarify expectations for baseline monitoring of groundwater and source water prior to injection.
- Water Quality Standards and Monitoring Protocols
 - RWQCB guidance on defining water quality objectives for injected water and monitoring thresholds during injection, storage, and recovery phases.
 - Confirm the scope of sampling frequency, analytical parameters, and reporting obligations.
- Pilot Project Evaluation Criteria
 - RWQCB is to outline their expectations for success criteria (e.g., recovery efficiency, absence of degradation of beneficial uses, groundwater quality protection).
 - Confirm how monitoring results should be reported and how compliance will be evaluated.
- Next Steps Toward Implementation
 - RWQCB is to provide a clear list of sequential actions (permits, studies, stakeholder outreach, timelines) required to move from this framework to an approved pilot project.
 - Propose scheduling a joint meeting (County, LSCE, RWQCB) to review these items in detail and establish a roadmap for implementation.

By directly requesting RWQCB's review of this framework and their specific guidance on permitting, monitoring, and evaluation requirements, Tehama County can ensure the pilot project is developed in compliance with regulatory expectations and positioned for timely approval and implementation.

9.0 REFERENCES

Tehama County Flood Control and Water Conservation District Groundwater Sustainability Agency (TCFCWCD GSA). 2024. Groundwater Sustainability Plan Red Bluff Subbasin.
<https://sgma.water.ca.gov/portal/gsp/preview/140>.



Proposed ASR Site

Marenco Ranch ASR Workplan
Tehama County FCWCD

Figure 1-1

Appendix A: Injection Well Completion Reports

Marenco Recharge Well #2

ORIGINAL
File with DWR

Page 2 of 2

Owner's Well No. _____

Date Work Began 7-26-96

Ended 9-11-96

Local Permit Agency Tehama County Health Dept.

Permit No. W151-96

Permit Date 7-19-96

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. **503114**

DWR USE ONLY - DO NOT FILL IN

STATE WELL NO./STATION NO.	
LATITUDE	LONGITUDE
APN/USE/OTHER	

ORIENTATION (✓) ☒ VERTICAL ☐ HORIZONTAL ☐ ANGLE _____ (SPECIFY)

DEPTH TO FIRST WATER _____ F. BELOW SURFACE

DESCRIPTION

Describe material, grain size, color, etc.

DEPTH FROM SURFACE
Ft. to Ft.

565 572 Sandstone
572 580 Cemented sand & gravel

continued page 2

CITY _____ STATE _____ ZIP _____
WELL LOCATION
Address 8475 Marengo Ranch Rd.
City Red Bluff
County Tehama
APN Book 063 Page 120 Parcel 22
Township _____ Range _____ Section _____
Latitude _____ Longitude _____

LOCATION SKETCH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

☒ NEW WELL
MODIFICATION/REPAIR
____ Deepen
____ Other (Specify) _____

DESTROY (Describe Procedures and Materials Under "DEVELOPING LOG")

PLANNED USE(S) (✓)
____ MONITORING

WATER SUPPLY

____ Domestic
____ Public
____ Irrigation
____ Industrial
____ "TEST WELL"
____ CATHODIC PROTECTION
____ OTHER (Specify) _____

TOTAL DEPTH OF BORING _____ (Feet)

TOTAL DEPTH OF COMPLETED WELL _____ (Feet)

DRILLING METHOD _____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL _____ (Ft.) & DATE MEASURED _____

ESTIMATED YIELD _____ (GPM) & TEST TYPE _____

TEST LENGTH _____ (hrs.) TOTAL DRAWDOWN _____ (Ft.)

* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE		BORE-HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE		ANNULAR MATERIAL					
			TYPE (✓)			MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS			SLOT SIZE IF ANY (Inches)	TYPE				
Ft.	to Ft.	BLANK	SCREEN	PIPE	LINEAR				FILL TYPE					Ft.	to Ft.	CE- MENT (✓)
0	580	12-5/8					steel	12				0	34	X		
310	340	perforations														
360	490	perforations							1/4" x	3"						
560	578	perforations							1/4" x	3"						1996
ATTACHMENTS (✓)																

ATTACHMENTS (✓)

- ____ Geologic Log
- ____ Well Construction Diagram
- ____ Geophysical Log(s)
- ____ Soil Water Chemical Analysis
- ____ Other _____

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME W. S. Heitman

(PERSON, FIRM OR CORPORATION) (TYPED OR PRINTED)

ADDRESS P.O. Box 1010 Red Bluff, CA 96080

CITY _____

STATE _____

ZIP _____

Signed W.S. Heitman

WELL OWNER/REGISTERED REPRESENTATIVE

DATE REPORTED 9-11-96

386577

DATE RECORDED

C&T LICENSE NUMBER

Marenco Recharge Well #3

Original
Marengo
#3

ORIGINAL
File with DWR
Page 1 of 1

RECEIVED

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Owner's Well No. MAY 26 1998

No. 510909

Date Work Began 8-29-97

Ended 9-11-97

Local Permit Agency Tehama County Health Dept.

Permit No. W195-97

Permit Date 8-14-97

DWR USE ONLY - DO NOT FILL IN
25N/04W-01M
STATE WELL NO./STATION NO.
LATITUDE
LONGITUDE
APN/TRS/OTHER

ORIENTATION (✓)			GEOLOGIC LOG	
VERTICAL ☒ HORIZONTAL ☐			ANGLE (SPECIFY)	
DEPTH FROM SURFACE			DEPTH TO FIRST WATER 13 FT. BELOW SURFACE	
Ft. to Ft.			DESCRIPTION	
			Describe material, grain size, color, etc.	
0	6		Clay	
6	12		Clay & gravel	
12	17		Gravel	
17	123		Clay	
123	128		Pea gravel	
128	193		Clay	
193	203		Sand & pea gravel	
203	212		Clay	
212	221		Sand & pea gravel	
221	260		Clay	
260	270		Pea gravel	
270	281		Hard clay & sandstone	
281	330		Sandstone	
330	342		Cemented sand & gravel	
342	360		Sandstone & seams of clay	
360	446		Sandstone	
446	456		Clay with seams of sandstone	
456	462		Sandstone	
462	497		Gravel	
497	513		Clay	
513	520		Sand & pea gravel	
520	525		Clay	
525	535		Sand	
535	545		Sandstone & clay seams	
545	580		Sandstone	

WELL OWNER
CITY
STATE
ZIP
WELL LOCATION
Address 8475 Marengo Ranch Rd.
City Red Bluff
County Tehama
APN Book 61 Page 08 Parcel 03
Township 25N Range 04W Section 01
Latitude
Longitude

LOCATION SKETCH
NORTH
SOUTH
EAST
WEST
ACTIVITY (✓)
☒ NEW WELL
MODIFICATION/REPAIR
— Deepen
— Other (Specify)
DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
PLANNED USE(S) (✓)
— MONITORING
WATER SUPPLY
— Domestic
— Public
☒ Irrigation
— Industrial
— "TEST WELL"
— CATHODIC PROTECTION
— OTHER (Specify)

DRILLING METHOD Air rotary
FLUID quick foam
WATER LEVEL & YIELD OF COMPLETED WELL
DEPTH OF STATIC WATER LEVEL 128 (Ft.) & DATE MEASURED 9-11-97
ESTIMATED YIELD 2000 (GPM) & TEST TYPE air lift
TEST LENGTH (Hrs.) TOTAL DRAWDOWN (Ft.)
* May not be representative of a well's long-term yield.

TOTAL DEPTH OF BORING (Feet)
TOTAL DEPTH OF COMPLETED WELL 580 (Feet)

DEPTH FROM SURFACE			BORE-HOLE DIA. (Inches)	CASING(S)						DEPTH FROM SURFACE			ANNULAR MATERIAL				
				TYPE (✓)			MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS				SLOT SIZE IF ANY (Inches)	TYPE			
Ft.	to	Ft.		BLANK	SCREEN	CON- DUCTOR				FILL PIPE	CE- MENT (✓)	BEN- TONITE (✓)		FILL (✓)	FILTER PACK (TYPE / SIZE)		
0	578		12-5/8					steel	10			0	21		X		
260	280							perforations		1/3 x 4							
300	320							"		"							
320	340							"		"							
360	440							"		"							
460	500							"		"							
ATTACHMENTS (✓)																	
CERTIFICATION STATEMENT																	

ATTACHMENTS (✓)
— Geologic Log
— Well Construction Diagram
— Geophysical Log(s)
— Soil/Water Chemical Analyses
— Other
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.
NAME W. S. Heitman
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
ADDRESS P.O. Box 1010 Red Bluff, CA 96080
Signed W.S. Heitman
WELL DRILLER/AUTHORIZED REPRESENTATIVE
DATE SIGNED 9-15-97
LICENSE NUMBER 386577

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

Marenco Recharge Well #4

ORIGINAL
File with DWR

Page 1 of 2

Owner's Well No.

Date Work Began 5-5-98

Local Permit Agency Tehama County Health Dept.

Permit No. W24-98 Permit Date 3-18-98

RECEIVED

JUN 29 1998

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 510975

DWR USE ONLY - DO NOT FILL IN
25N/3W+6M
STATE WELL NO./STATION NO.
LATITUDE
LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION: ☒ VERTICAL ☐ HORIZONTAL	ANGLE (SPECIFY)
DEPTH TO FIRST WATER _____ Ft. BELOW SURFACE	
DEPTH FROM SURFACE	DESCRIPTION
Ft. to Ft.	Describe material, grain size, color, etc.
0 4	Top soil
4 12	Clay & gravel
12 17	Gravel
17 54	Clay
54 57	Gravel
57 74	Clay
74 82	Gravel
82 106	Clay
106 113	Gravel
113 119	Clay
119 128	Pea gravel
128 140	Clay
140 151	Gravel
151 179	Clay
179 192	Gravel
192 201	Clay
201 216	Gravel
216 232	Clay w/seams of hard clay
232 234	Gravel
234 250	Clay
250 261	Gravel
261 282	Clay
282 292	Gravel
292 296	Clay
296 305	Gravel
305 325	Clay & sandstone
325 335	Cemented sand & pea gravel
335 370	Clay & hard seams of sandstone
370 380	Hard brown clay

TOTAL DEPTH OF BORING _____ (Feet)

TOTAL DEPTH OF COMPLETED WELL 380 (Feet)

WELL OWNER

WELL LOCATION
Address 8475 Marengo Drive
City Red Bluff
County Tehama
APN Book 63 Page 120 Parcel 22
Township 25N Range 3W Section 10
Latitude _____ Longitude _____
DEG MIN SEC NORTH WEST

LOCATION SKETCH
NORTH
WEST
EAST
SOUTH
Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc.
PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)
☒ NEW WELL
MODIFICATION/REPAIR
____ Deepen
____ Other (Specify)
____ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")
PLANNED USE(S)
(✓)
____ MONITORING
WATER SUPPLY
____ Domestic
____ Public
☒ Irrigation
____ Industrial
____ TEST WELL
____ CATHODIC PROTECTION
____ OTHER (Specify)

DRILLING METHOD Air rotary FLUID quick foam

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 58 (Ft.) & DATE MEASURED 5-19-98

ESTIMATED YIELD 1000+ (GPM) & TEST TYPE air lift

TEST LENGTH _____ (Hrs.) TOTAL DRAWDOWN _____ (Ft.)

* May not be representative of a well's long-term yield.

DEPTH FROM SURFACE			BORE-HOLE DIA. (Inches)	CASING(S)					DEPTH FROM SURFACE		ANNULAR MATERIAL							
				TYPE (✓)				MATERIAL / (			INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	TYPE				
Ft.	to	Ft.	BLANK	SCREEN	CON- DUCTOR	FILL PIPE									Ft.	to	Ft.	CE- MENT (✓)
0	377		12-5/8					steel	12.5	.250		0	22		X			
74	82		perforations															
140	150		perforations															
179	192		perforations															
201	217		perforations															
250	261		perforations															

ATTACHMENTS (✓)

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analyses
- Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME W. S. Heitman Drilling
(PERSON, FIRM OR CORPORATION) (TYPED OR PRINTED)

ADDRESS P.O. Box 1010 Red Bluff, CA 96080

CITY STATE ZIP

Signed W.S. Heitman / K.H. DATE SIGNED 5-20-98 386577

WELL DRILLER/AUTHORIZED REPRESENTATIVE C-57 LICENSE NUMBER

Appendix B: Injection Well Pump Tests

Marenco Recharge Well #2

ALSCO, INC.

P.O. BOX 1330
RED BLUFF, CA 96080
530-527-4001

WELL TEST REPORT

CUSTOMER: GRAIN FARMING LOCATION: MARENCO - M2
I.D. WELL: _____ WELL DEPTH: _____ STATIC WATER LEVEL: 119'
ORIFICE SIZE: Flow Meter GEAR RATIO: _____ AIRLINE LENGTH: _____
COLUMN SIZE: 8" COLUMN LENGTH: _____

TIME	WATER LEVEL FT. FROM TOP	R.P.M.	G.P.M.	REMARKS
<u>1/23/23</u>				
<u>9:40</u>	<u>125'</u>		<u>450</u>	<u>SANDY/DIRTY - OPEN FLOW</u>
<u>9:50</u>	<u>127'</u>		<u>400</u>	<u>STARTING TO CLEAR</u>
<u>10:00</u>	<u>128'</u>		<u>400</u>	
<u>10:10</u>	<u>128'</u>		<u>400</u>	<u>CLEAR</u>
				<u>WOULD NOT MAKE PSI</u>
				<u>RECOVERY 5 MIN - 122'</u>

INSTALLED BY: DENNIS S.

APPROVED BY: MARK O. DATE: 1/27/23

REMARKS: 50 HP - GROUND HEAD
- LOT OF STANDING OIL IN WELL
- GOOD VIBRATION DOWN THE PUMP
- AMPS 1-65 2-67 3-67
- FULL LOAD 64

Marenco Recharge Well #3

ALSCO, INC.

P.O. BOX 1330
RED BLUFF, CA 96080
530-527-4001

WELL TEST REPORT

CUSTOMER: CRAIN FARMING LOCATION: MARENCO - M3
I.D. WELL: 12" WELL DEPTH: ? STATIC WATER LEVEL: 105'
ORIFICE SIZE: FLOW METER GEAR RATIO: _____ AIRLINE LENGTH: _____
COLUMN SIZE: 8" COLUMN LENGTH: 220'?

TIME 1/12/23	WATER LEVEL FT. FROM TOP	R.P.M.	G.P.M.	REMARKS:
12:45 PM	126'		1100	
1:00	130'		1100	
1:30	130'		1100	
2:00	131'		1100	
			700	20 PSI
			0	40 PSI
				RECOVERY 5 MIN. - 112'

INSTALLED BY: DENNIS J.

APPROVED BY: MARK O.

DATE: 1/19/23

REMARKS: PERFORMED FLOW TEST

- 50 HP, 8" LAZEN PUMP

- FULL LOAD AMPS 480V-57 1-60 2-62 3-63

Marenco Recharge Well #4

ALSCO, INC.

P.O. BOX 1330
RED BLUFF, CA 96080
530-527-4001

WELL TEST REPORT

CUSTOMER: CRAIN FARMING LOCATION: MARENCO - M4
I.D. WELL: 12" WELL DEPTH: 252' STATIC WATER LEVEL: 98'
ORIFICE SIZE: FLOW METER GEAR RATIO: _____ AIRLINE LENGTH: _____
COLUMN SIZE: 6" COLUMN LENGTH: 170'?

TIME	WATER LEVEL FT. FROM TOP	R.P.M.	G.P.M.	REMARKS
1/12/23				
10:00 AM	127'		350	PUMPING WATER LEVEL
10:10	130'		350	IS SLOWLY DROPPING
10:30	132'		350	AS FLOW STAYS THE SAME
10:50	133'		350	
11:10	134'		350	
			200	20 PSI
			0	40 PSI
				RECOVERY 5 MIN - 110'

INSTALLED BY: DENNIS J.APPROVED BY: MARK O.DATE: 1/19/23

REMARKS: PERFORMED FLOW TEST w/ALSCO'S FLOW
METER DISCHARGE w/CUSTOMER'S EXISTING PUMP.

- 25 HP, 6" BT PUMP w/ 1 1/2" x 1" TUBE + SHAFT.
- WELL HAS CASCADING WATER
- FULL LOAD AMPS 240V-65 1-59 2-51 3-52

Appendix C: Monitoring Well Completion Reports

Marenco Well #4 (New)

State of California
Well Completion Report
 Form DWR 188 Complete 2/11/2022
 WCR2021-015455

Owner's Well Number MARENCO WELL #4 Date Work Began 09/17/2021 Date Work Ended 10/07/2021
 Local Permit Agency Tehama County Environmental Health Department
 Secondary Permit Agency _____ Permit Number W-148/21 Permit Date 07/01/2021

Well Owner (must remain confidential pursuant to Water Code 13752)		Planned Use and Activity
Name <u>XXXXXXXXXXXXXXXXXXXX</u>	Activity <u>New Well</u>	
Mailing Address <u>XXXXXXXXXXXXXXXXXXXX</u> <u>XXXXXXXXXXXXXXXXXXXX</u>	Planned Use <u>Water Supply Irrigation - Agriculture</u>	
City <u>XXXXXXXXXXXXXXXXXXXX</u> State <u>XX</u> Zip <u>XXXXX</u>		

Well Location	
Address <u>0 RAWSON RD</u>	APN <u>063-120-055</u>
City <u>RED BLUFF</u> Zip <u>96080</u> County <u>Tehama</u>	Township <u>25 N</u>
Latitude <u>40</u> <u>2</u> <u>55.2775</u> <u>N</u> Longitude <u>-122</u> <u>14</u> <u>20.1634</u> <u>W</u>	Range <u>03 W</u>
Deg. Min. Sec. Deg. Min. Sec.	Section <u>06</u>
Dec. Lat. <u>40.0486882</u> Dec. Long. <u>-122.2389343</u>	Baseline Meridian <u>Mount Diablo</u>
Vertical Datum _____ Horizontal Datum <u>WGS84</u>	Ground Surface Elevation <u>331</u>
Location Accuracy _____ Location Determination Method _____	Elevation Accuracy <u>Unknown</u>
	Elevation Determination Method <u>GPS</u>

Borehole Information	Water Level and Yield of Completed Well
Orientation <u>Vertical</u> Specify _____	Depth to first water _____ (Feet below surface)
Drilling Method <u>Reverse Circulation</u> Drilling Fluid <u>Bentonite</u>	Depth to Static _____
Total Depth of Boring <u>1425</u> Feet	Water Level <u>87</u> (Feet) Date Measured <u>10/18/2021</u>
Total Depth of Completed Well <u>1290</u> Feet	Estimated Yield* <u>2500</u> (GPM) Test Type <u>Pump</u>
	Test Length <u>8</u> (Hours) Total Drawdown <u>143</u> (feet)
	*May not be representative of a well's long term yield.

Geologic Log - Free Form		
Depth from Surface Feet to Feet		Description
0	40	SURFACE CASING
40	100	CLAY
100	110	GRAVEL
110	170	CLAY
170	200	CLAY / GRAVEL
200	210	CLAY
210	220	GRAVEL
220	240	CLAY
240	260	GRAVEL
260	270	CLAY / GRAVEL
270	290	CLAY
290	300	CLAY & GRAVEL
300	360	CLAY
360	370	SANDY CLAY

370	420	CLAY
420	440	SAND
440	450	SANDY CLAY
450	490	CLAY
490	500	SAND
500	510	GRAVEL
510	590	CLAY
590	610	SANDY CLAY
610	620	FINE GRAVEL
620	640	CLAY
640	650	SANDY CLAY
650	670	CLAY
670	680	SANDY CLAY
680	690	SAND
690	740	GRAVEL
740	750	SANDY CLAY
750	770	CLAY
770	790	SAND
790	810	GRAVEL
810	840	CLAY
840	870	GRAVEL
870	880	GRAVEL / CLAY
880	960	CLAY
960	970	SAND
970	1130	CLAY
1130	1150	SANDY CLAY
1150	1180	GRAVEL
1180	1190	CLAY
1190	1220	CLAY / GRAVEL
1220	1230	GRAVEL
1230	1340	CLAY
1340	1380	GRAVEL
1380	1425	CLAY

Casings										
Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	40	Conductor or Fill Pipe	Low Carbon Steel	Grade: ASTM A53	375	30			SURFACE CASING
2	0	610	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	610	650	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	650	690	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	690	890	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	890	1150	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	1150	1250	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	1250	1270	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			W/ BULLNOSE
2	1270	1425	No Casing Installed	Other	N/A					NO CASING

Annular Material					
Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	50	Cement	10.3 Sack Mix		ANNULAR SEAL
50	520	Filter Pack	Other Gravel Pack	4 X 12	GRAVEL PACK
520	540	Bentonite	High Solids		INTERMEDIATE CHIP SEAL
540	610	Filter Pack	Other Gravel Pack	4 X 12	GRAVEL PACK
610	650	Filter Pack	8 x 12	#8	GRAVEL PACK
650	690	Filter Pack	Other Gravel Pack	4 X 12	GRAVEL PACK
690	890	Filter Pack	8 x 12	#8	GRAVEL PACK
890	1150	Filter Pack	Other Gravel Pack	4 X 12	GRAVEL PACK
1150	1250	Filter Pack	8 x 12	#8	GRAVEL PACK
1250	1290	Filter Pack	Other Gravel Pack	4 X 12	GRAVEL PACK
1290	1425	Other Fill	See description.		NATIVE MATERIALS

Other Observations:

Borehole Specifications		
Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	40	36
40	1290	28
1290	1425	7.875

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name		WELL INDUSTRIES INC	
Person, Firm or Corporation			
3282 HIGHWAY 32		CHICO	CA 95973
Address		City	State Zip
Signed	electronic signature received	12/06/2021	812678
C-57 Licensed Water Well Contractor		Date Signed	C-57 License Number

DWR Use Only											
CSG #		State Well Number				Site Code			Local Well Number		
		N							W		
Latitude Deg/Min/Sec						Longitude Deg/Min/Sec					
TRS:											
APN:											

Marengo Well #7

State of California
Well Completion Report
 Form DWR 188 Complete 10/27/2022
 WCR2022-010467

Owner's Well Number WELL #7 Date Work Began 04/26/2022 Date Work Ended 05/11/2022
 Local Permit Agency Tehama County Environmental Health Department
 Secondary Permit Agency _____ Permit Number W-173/21 Permit Date 02/01/2022

Well Owner (must remain confidential pursuant to Water Code 13752)		Planned Use and Activity
Name <u>XXXXXXXXXXXXXXXXXXXX</u>	Activity <u>New Well</u>	
Mailing Address <u>XXXXXXXXXXXXXXXXXXXX</u> <u>XXXXXXXXXXXXXXXXXXXX</u>	Planned Use <u>Water Supply Irrigation - Agriculture</u>	
City <u>XXXXXXXXXXXXXXXXXXXX</u> State <u>XX</u> Zip <u>XXXXX</u>		

Well Location	
Address <u>0 MARENCO RANCH RD</u>	APN <u>061-080-009</u>
City <u>RED BLUFF</u> Zip <u>96080</u> County <u>Tehama</u>	Township <u>25 N</u>
Latitude <u>40</u> <u>2</u> <u>31.5852</u> <u>N</u> Longitude <u>-122</u> <u>16</u> <u>4.4741</u> <u>W</u>	Range <u>04 W</u>
Deg. Min. Sec. Deg. Min. Sec.	Section <u>12</u>
Dec. Lat. <u>40.042107</u> Dec. Long. <u>-122.2679095</u>	Baseline Meridian <u>Mount Diablo</u>
Vertical Datum _____ Horizontal Datum <u>WGS84</u>	Ground Surface Elevation <u>363</u>
Location Accuracy _____ Location Determination Method _____	Elevation Accuracy <u>Unknown</u>
	Elevation Determination Method <u>GPS</u>

Borehole Information	Water Level and Yield of Completed Well
Orientation <u>Vertical</u> Specify _____	Depth to first water _____ (Feet below surface)
Drilling Method <u>Reverse Circulation</u> Drilling Fluid <u>Bentonite</u>	Depth to Static _____
Total Depth of Boring <u>1215</u> Feet	Water Level <u>119</u> (Feet) Date Measured <u>08/10/2022</u>
Total Depth of Completed Well <u>1090</u> Feet	Estimated Yield* <u>4000</u> (GPM) Test Type <u>Pump</u>
	Test Length <u>8</u> (Hours) Total Drawdown <u>104</u> (feet)
	*May not be representative of a well's long term yield.

Geologic Log - Free Form		
Depth from Surface Feet to Feet		Description
0	30	COBBLE
30	80	CLAY / GRAVEL
80	90	GRAVEL
90	110	CLAY
110	120	CLAY / GRAVEL
120	140	CLAY
140	150	GRAVEL / CLAY
150	170	CLAY
170	200	CLAY / GRAVEL
200	260	CLAY
260	270	GRAVEL
270	330	CLAY
330	350	CLAY / GRAVEL
350	390	CLAY

390	410	SAND & GRAVEL
410	440	GRAVEL
440	450	CLAY
450	460	CLAY / SHALE
460	490	CLAY
490	520	SANDY CLAY
520	540	SAND & GRAVEL
540	550	CLAY
550	560	SANDY CLAY
560	600	CLAY
600	630	GRAVEL
630	690	CLAY
690	720	SAND
720	740	CEMENTED SAND
740	760	SANDY CLAY
760	770	CLAY & GRAVEL
770	790	CLAY
790	810	GRAVEL
810	820	SHALE
820	1000	CLAY
1000	1050	GRAVEL
1050	1215	BLUE/GRAY CLAY

Casings										
Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	40	Conductor or Fill Pipe	Low Carbon Steel	Grade: ASTM A53	0.375	30			SURFACE CASING
2	0	400	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	400	460	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	460	480	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	480	560	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	560	600	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	600	640	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	640	680	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	680	840	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	840	1000	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	1000	1060	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	1060	1070	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			W/ BULLNOSE
2	1070	1215	No Casing Installed	Other	N/A					NO CASING

Annular Material					
Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	50	Cement	10.3 Sack Mix		ANNULAR CEMENT SEAL
50	310	Filter Pack	Other Gravel Pack	4 X 12	WELL PACK
310	330	Bentonite	High Solids		INTERMEDIATE CHIP SEAL
330	380	Filter Pack	Other Gravel Pack	4 X 12	WELL PACK
380	1090	Filter Pack	8 x 12	#8	GRAVEL PACK
1090	1215	Other Fill	See description.		NATIVE MATERIALS

Other Observations:

Borehole Specifications		
Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	40	36
40	1090	28
1090	1215	7.875

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name		WELL INDUSTRIES INC	
Person, Firm or Corporation			
3282 HIGHWAY 32		CHICO	CA 95973
Address		City	State Zip
Signed	electronic signature received	09/08/2022	812678
C-57 Licensed Water Well Contractor		Date Signed	C-57 License Number

DWR Use Only											
CSG #		State Well Number				Site Code			Local Well Number		
		N							W		
Latitude Deg/Min/Sec						Longitude Deg/Min/Sec					
TRS:											
APN:											

Marenco Well #2 (New)

State of California
Well Completion Report
 Form DWR 188 Complete 9/16/2022
 WCR2022-008533

Owner's Well Number MARENCO WELL #2 Date Work Began 04/21/2022 Date Work Ended 04/28/2022
 Local Permit Agency Tehama County Environmental Health Department
 Secondary Permit Agency _____ Permit Number W-191/21 Permit Date 02/01/2022

Well Owner (must remain confidential pursuant to Water Code 13752)				Planned Use and Activity	
Name <u>XXXXXXXXXXXXXXXXXXXX</u>				Activity <u>New Well</u>	
Mailing Address <u>XXXXXXXXXXXXXXXXXXXX</u> <u>XXXXXXXXXXXXXXXXXXXX</u>				Planned Use <u>Water Supply Irrigation - Agriculture</u>	
City <u>XXXXXXXXXXXXXXXXXXXX</u>		State <u>XX</u>		Zip <u>XXXXX</u>	

Well Location									
Address <u>0 RAWSON RD</u>						APN <u>061-080-003</u>			
City <u>RED BLUFF</u>		Zip <u>96080</u>		County <u>Tehama</u>		Township <u>25 N</u>			
Latitude <u>40</u> <u>2</u> <u>49.2611</u> <u>N</u>		Longitude <u>-122</u> <u>16</u> <u>14.7539</u> <u>W</u>		Range <u>04 W</u>		Section <u>01</u>			
Deg. Min. Sec.		Deg. Min. Sec.		Baseline Meridian <u>Mount Diablo</u>		Ground Surface Elevation <u>359</u>			
Dec. Lat. <u>40.047017</u>				Dec. Long. <u>-122.270765</u>		Elevation Accuracy <u>Unknown</u>			
Vertical Datum _____				Horizontal Datum <u>WGS84</u>		Elevation Determination Method <u>Digital Aerial Photo</u>			
Location Accuracy _____				Location Determination Method _____					

Borehole Information				Water Level and Yield of Completed Well			
Orientation <u>Vertical</u>		Specify _____		Depth to first water _____ (Feet below surface)			
Drilling Method <u>Reverse Circulation</u>		Drilling Fluid <u>Bentonite</u>		Depth to Static _____			
Total Depth of Boring <u>1170</u> Feet				Water Level _____ (Feet) Date Measured _____			
Total Depth of Completed Well <u>1150</u> Feet				Estimated Yield* _____ (GPM) Test Type _____			
				Test Length _____ (Hours) Total Drawdown _____ (feet)			
				*May not be representative of a well's long term yield.			

Geologic Log - Free Form		
Depth from Surface Feet to Feet		Description
0	40	SURFACE CASING
40	50	CLAY
50	80	GRAVEL
80	90	GRAVEL / CLAY
90	130	CLAY
130	150	GRAVEL
150	160	GRAVEL / CLAY
160	270	CLAY
270	280	GRAVEL
280	290	CLAY
290	310	GRAVEL
310	320	SHALE
320	330	GRAVEL
330	390	CLAY

390	420	GRAVEL
420	450	CLAY
450	540	GRAVEL
540	700	CLAY
700	710	SAND / GRAVEL
710	760	GRAVEL
760	1040	CLAY
1040	1120	GRAVEL
1120	1170	CLAY

Casings										
Casing #	Depth from Surface Feet to Feet		Casing Type	Material	Casings Specificatons	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	40	Conductor or Fill Pipe	Low Carbon Steel	Grade: ASTM A53	375	30			SURFACE CASING
2	0	380	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	380	420	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	420	460	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	460	540	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	540	700	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	700	780	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	780	1060	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			
2	1060	1140	Screen	Low Carbon Steel	Grade: ASTM A53	0.312	18	Louver	0.06	FUL-FLO
2	1140	1150	Blank	Low Carbon Steel	Grade: ASTM A53	0.312	18			W/ BULLNOSE

Annular Material					
Depth from Surface Feet to Feet		Fill	Fill Type Details	Filter Pack Size	Description
0	50	Cement	10.3 Sack Mix		ANNULAR CEMENT SEAL
50	310	Filter Pack	Other Gravel Pack	4 X 12	WELL PACK
310	330	Bentonite	High Solids		INTERMEDIATE CHIP SEAL
330	360	Filter Pack	Other Gravel Pack	4 X 12	WELL PACK
360	560	Filter Pack	8 x 12	#8	GRAVEL PACK
560	680	Filter Pack	Other Gravel Pack	4 X 12	WELL PACK
680	800	Filter Pack	8 x 12	#8	GRAVEL PACK
800	1040	Filter Pack	Other Gravel Pack	4 X 12	WELL PACK
1040	1170	Filter Pack	8 x 12	#8	GRAVEL PACK

Other Observations:

Borehole Specifications		
Depth from Surface Feet to Feet		Borehole Diameter (inches)
0	40	36
40	1170	28

Certification Statement			
I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief			
Name	WELL INDUSTRIES INC		
Person, Firm or Corporation			
3282 HIGHWAY 32	CHICO	CA	95973
Address	City	State	Zip
Signed	electronic signature received	07/27/2022	812678
C-57 Licensed Water Well Contractor		Date Signed	C-57 License Number

DWR Use Only											
CSG #		State Well Number				Site Code			Local Well Number		
		N							W		
Latitude Deg/Min/Sec						Longitude Deg/Min/Sec					
TRS:											
APN:											

25N03W06-214366

ORIGINAL

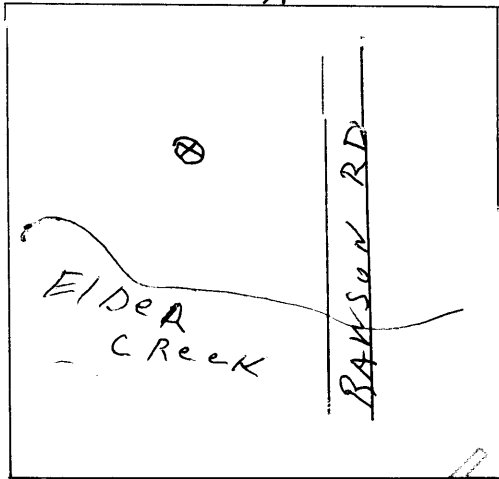
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill in
No. 214366

No. Permit No. 63-120-39
Local Permit No. or Date 120

State Well No. _____
Other Well No. _____

(2) LOCATION OF WELL (See instructions):
County Monterey Owner's Well Number _____
Well address if different from above Elder Creek & Dawson Rd.
Township 25N Range 3W Section 36
Distance from cities, roads, railroads, fences, etc. _____



(3) TYPE OF WORK:
New Well ☒ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12) _____
(4) PROPOSED USE:
Domestic ☒
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☐
Municipal ☐
Other ☐

(12) WELL LOG: Total depth 62 ft. Depth of completed well 62 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	11	Black clay
11	17	Gravel
17	36	Brown clay
36	39	Gravel
39	52	Yellow clay
52	54	Gravel
54	63	Yellow clay
63	60	Gravel
60	62	Brown clay

(5) EQUIPMENT:
Rotary ☐ Reverse ☐
Cable ☐ Air ☐
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☐ No ☐ Size _____
Diameter of bore _____
Packed from _____ to _____ ft.

(7) CASING INSTALLED:

Steel ☐	Plastic ☒	Concrete ☐	
From ft.	To ft.	Dia. in.	Gage or Wall
0	82	4	160

(8) PERFORATIONS:

From ft.	To ft.	Slot size
62	62	3 x 1/8

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☐ No ☐ If yes, to depth 30 ft.
Were strata sealed against pollution? Yes ☐ No ☐ Interval _____ ft.
Method of sealing Bentonite

(10) WATER LEVELS:
Depth of first water, if known _____ ft.
Standing level after well completion _____ ft.

(11) WELL TESTS:
Was well test made? Yes ☒ No ☐ If yes, by whom? Driller
Type of test _____ Pump ☐ Bailer ☐ Air lift ☐
Depth to water at start of test _____ ft. At end of test _____ ft.
Dir _____ 30 gal/min after _____ 2 hours Water temperature _____
Chemical analysis made? Yes ☐ No ☐ If yes, by whom? _____
Was electric log made? Yes ☐ No ☐ If yes, attach copy to this report

Work started 5-20 19 87 Completed 5-26 19 87
WELL DRILLER'S STATEMENT: 0/389
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
SIGNED Jerry Rindahl by J. Rindahl
(Well Driller)
NAME North Valley Drilling, Inc.
(Person, firm, or corporation) (Typed or printed)
Address P.O. Box 100
City Corning, Calif. Zip 96021
License No. 418834 Date of this report 6-3-87

Appendix 2: ADDENDUM to Marengo Ranch Ag ASR Pilot Project Framework

ADDENDUM

DATE: December 12, 2025

Project No. 23-1-099

TO: David Durette, Central Valley Regional Water Quality Control Board (CVRWQCB)

FROM: Eddy Teasdale, (LSCE) and Justin Jenson (Tehama County Flood Control and Water Conservation District Groundwater Sustainability Agency)

SUBJECT: ADDENDUM to Marengo Ranch Ag ASR Pilot Project Framework

1.0 GENERAL INFORMATION

1.1 Project Background

This pilot project proposes to inject surface water diverted from Elder Creek during high flow periods into multiple existing irrigation wells on the Marengo Ranch Property (Site). The site of the proposed pilot study lies along Elder Creek between Paskenta Road and Rawson Road, in Tehama County. The pilot study will evaluate the feasibility of recharging the deeper portion of the Upper Aquifer and the shallower portion of the Lower Aquifer within the Red Bluff Subbasin, utilizing two (2) existing irrigation wells. An original Marengo Ranch Ag ASR Pilot Project Framework dated August 29, 2025 was prepared for review by Central Valley Regional Water Quality Control Board staff.

1.2 Reason for Addendum

Representatives from the Tehama County Flood Control and Water Conservation District Groundwater Sustainability Agency and the Central Valley Regional Water Quality Control Board met on November 20, 2025. Discussion during the meeting identified specific pieces of the proposed project that required more detailed information for thorough analysis. Two items were identified specifically: 1. A more detailed evaluation of nearby domestic wells, 2. Clarification of proposed locations, volumes, rates, and durations of injection events, 3. Clarification of the monitoring plan, specifically timing of baseline monitoring and reporting. This addendum to the original Technical Memorandum seeks to provide information and clarification on these items.

2.0 NEARBY DOMESTIC WELLS

2.1 Domestic Well Search

A thorough search for nearby domestic wells was conducted through two methods: 1. Search for public records through the DWR well completion report mapping application and 2. Reviewing satellite imagery of the downgradient area surrounding the project site. These methods identified two confirmed domestic

wells in the vicinity and another five probable wells. Locations of these wells are shown in **Figure A1** and additional details about the wells (where known) are shown in **Table 1**.

Table 1 – Nearby Domestic Well Details					
Well Name	Latitude	Longitude	Total Depth (ft bgs)	Screened Interval(s) (ft bgs)	Distance to Nearest Injection Well (miles)
25N03W08-798989	40.039694	-122.232619	168	Not Listed	1.17
25N03W05-573894	40.056701	-122.223176	151	Not Listed	1.91
Unknown – 1	40.056063	-122.256659	Unknown	Unknown	0.86
Unknown – 2	40.055423	-122.24009	Unknown	Unknown	1.13
Unknown – 3	40.059393	-122.2357	Unknown	Unknown	1.49
Unknown – 4	40.038845	-122.224708	Unknown	Unknown	1.60
Unknown – 5	40.039611	-122.221964	Unknown	Unknown	1.75

2.2 DWR Well Completion Mapping Application

The DWR well completion report mapping application yielded well completion reports for two nearby domestic wells. Well completion reports, especially for domestic wells completed prior to the 2000s, are often placed in the centroid of the section in the mapping application, so additional information is needed to pinpoint the location of the well. Additionally, many wells in the vicinity were recorded with incorrect Township, Range and Section information, further complicating the search. Finally, records for many domestic wells, especially older ones, are often not contained in the mapping application. Two nearby domestic wells were identified based on the address listed on their well completion reports. In both cases, the driller recorded the total depth of the well, but not the screened intervals.

2.2 Satellite Imagery Search

Due to the limitations of the well completion report mapping application described in the previous section, an additional search for probable well locations was carried out by reviewing satellite imagery of the area. In this search, locations with dwellings were assumed to have domestic wells as this is a rural area without connection to municipal water systems. This search resulted in the identification of five probable domestic wells. The construction details for these wells are unknown.

3.0 PROPOSED INJECTION OPERATIONS

3.1 Injection Locations

After consultation with the landowner and site visits to determine pump and equipment sizing for the pilot project, it was decided to limit injection to two of the original three proposed wells identified in the original Pilot Project Framework. Marengo Recharge Well #2, located farthest from the point of diversion will not be utilized during the pilot project (see **Figure A2** for an updated map of the point of diversion and injection wells to be used).

3.2 Injection Rate

The total volume expected to be injected during the Ag ASR pilot project is a function of the ability of the injection wells to receive water, and the availability of surface water from Elder Creek. Water for the pilot will be diverted from Elder Creek under a temporary 5-Year permit for recharge currently under review by the State Water Resources Control Board. The maximum diversion allowed by the permit if approved will be 10 cubic feet per second (CFS) or 4,488 gallons per minute (GPM). However, the estimated recharge rate into the two identified injection wells is up to 2,500 GPM. Any additional diversions above 2,500 GPM will be diverted to a traditional Flood Managed Aquifer Recharge (Flood-MAR) project also located on the Marenco Ranch Property (see **Figure A2**).

3.3 Injection Volume

The 5-Year permit for recharge is based on the 90th Percentile Method for diversions. Based on the water availability analysis prepared for the permit application, in an average year, diversions will be allowed approximately from 3 to 21 days in a year depending on the water year type. The total expected volume of water injected based on water year type is shown in **Table 2**.

Table 2 – Injection Volumes				
Water Year Type	Expected Diversion Days	Injection Rate (GPM)	Injection Rate (AF/day)	Total Volume Injected (AF/Year)
Wet	21	2,500	11	232
Above Normal	13	2,500	11	144
Below Normal	4	2,500	11	44
Dry	4	2,500	11	44
Critically Dry	3	2,500	11	33
All Years	11	2,500	11	122

3.4 Injection Duration

The majority of 90th Percentile Flows that allow for diversion events will be one to two days in duration. Based on the water availability analysis prepared for the permit application, 68.8% of diversion events will be one day, and 12.9% of diversion events will be two days. Diversion events longer than two days would be less than 20% of total diversions. See **Table 3** for a full listing of durations from 1948 through 2024 when diversions would have been possible under 90th percentile flow rules.

Table 3 – Injection Duration		
Diversion Duration (Days)	Number of Incidences	Percentage
1	214	68.8%
2	40	12.9%
3	14	4.5%
4	12	3.9%

Table 3 – Injection Duration		
Diversion Duration (Days)	Number of Incidences	Percentage
5-10	24	7.7%
Greater than 10	7	2.3%

3.5 Project Duration

The project is expected to operate on a trial basis, to allow for the collection and analysis of data related to impacts of ASR operations. Due to the variability in flows from one year to the next, there is no guarantee that diversions from Elder Creek will be possible in sufficient quantity to provide meaningful data. This project aims to inject at least 100 acre-feet of water (slightly below what is expected in an average year), to ensure that appropriate data collection can take place.

4.0 MONITORING PLAN

The monitoring plan remains generally the same from the original project framework document with some minor updates.

4.1 Baseline Monitoring Timeline

Baseline water quality sampling will take place prior to the start of injections. The wells listed in the original project framework document and surface water at the point of diversion will be sampled for water quality as well as groundwater levels. The sites will be sampled for the water quality parameters listed in the original project framework document. The results and an analysis of this baseline sampling will be shared with Regional Board staff in a Technical Memorandum prior to the start of injections.

5.0 CONCLUSION AND RECOMMENDATIONS

The plan for proposed pilot study remains generally similar to what was contained in original Marengo Ranch Ag ASR Pilot Project Framework dated August 29, 2025. This addendum clarifies and updates specific items discussed during the meeting with Regional Board staff on November 20, 2025. The Tehama County Flood Control and Water Conservation District Groundwater Sustainability Agency and the landowner for the Marengo Ranch property request that Regional Board staff review this addendum and provide any comments or additional requests for information as soon as is practicable. Following review and analysis, they further request that Regional Board staff prepare a letter or memorandum stating approval of the pilot study.

