DREAM Pilot Project: Schedule update and monitoring well overview

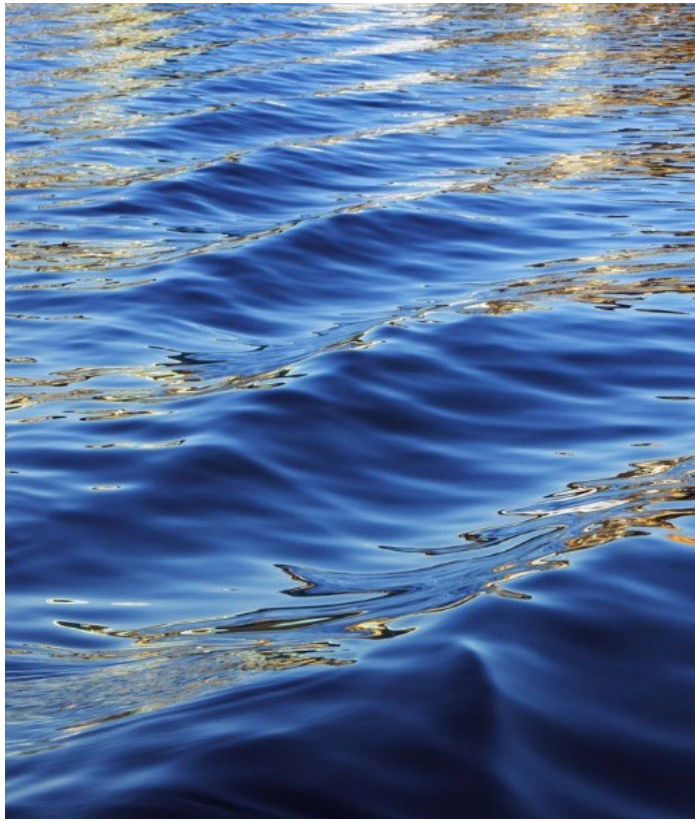
NSJWCD

EWA

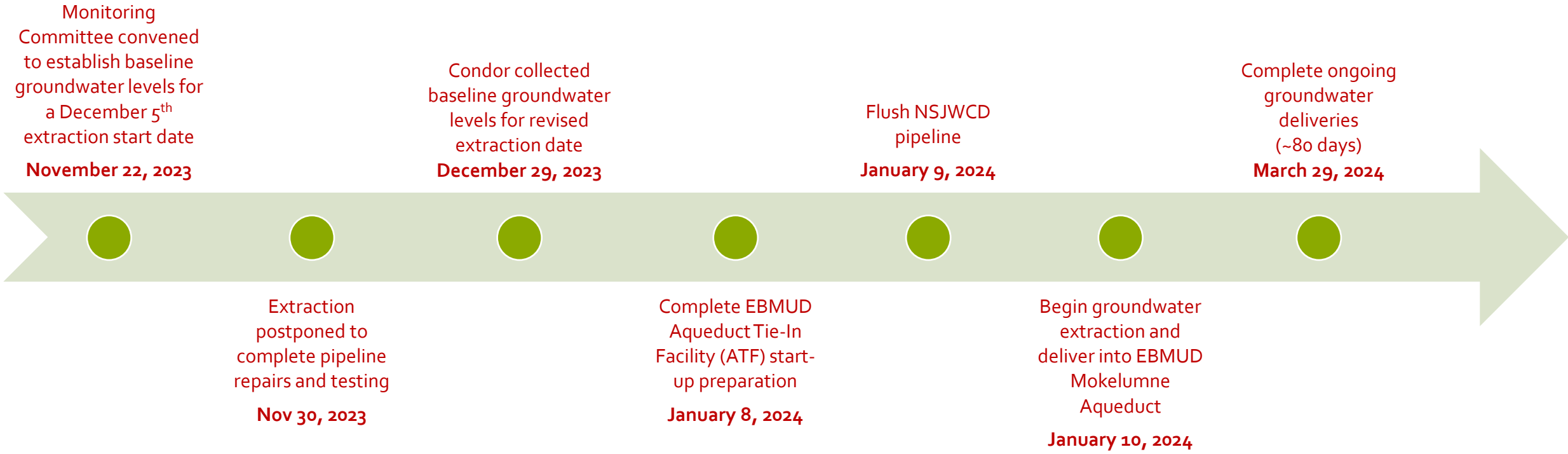
SAN JOAQUIN COUNTY CALIFORNIA

EBMUD

Eastern Water Alliance / DREAM Monitoring Committee
January 3, 2024



Proposed Extraction Schedule: Updated Jan. 3, 2024



- Water quality monitoring at Well K13 & ATF
  - Before and immediately after startup
  - Monthly after startup

Groundwater Monitoring Plan Introduction

Monitoring Plan objectives in accordance with the SJC GW Export Ordinance:

- Identify the project extraction well (K13).
- Extraction to occur in non-irrigation season (Oct 1 through March 31).
- Establish baseline GW conditions through monthly monitoring of representative wells.
- Establish GW Extraction operation monitoring thresholds/minimum operation levels which limit or terminate pumping/extraction activities.

Current GW conditions (hydrogeology)

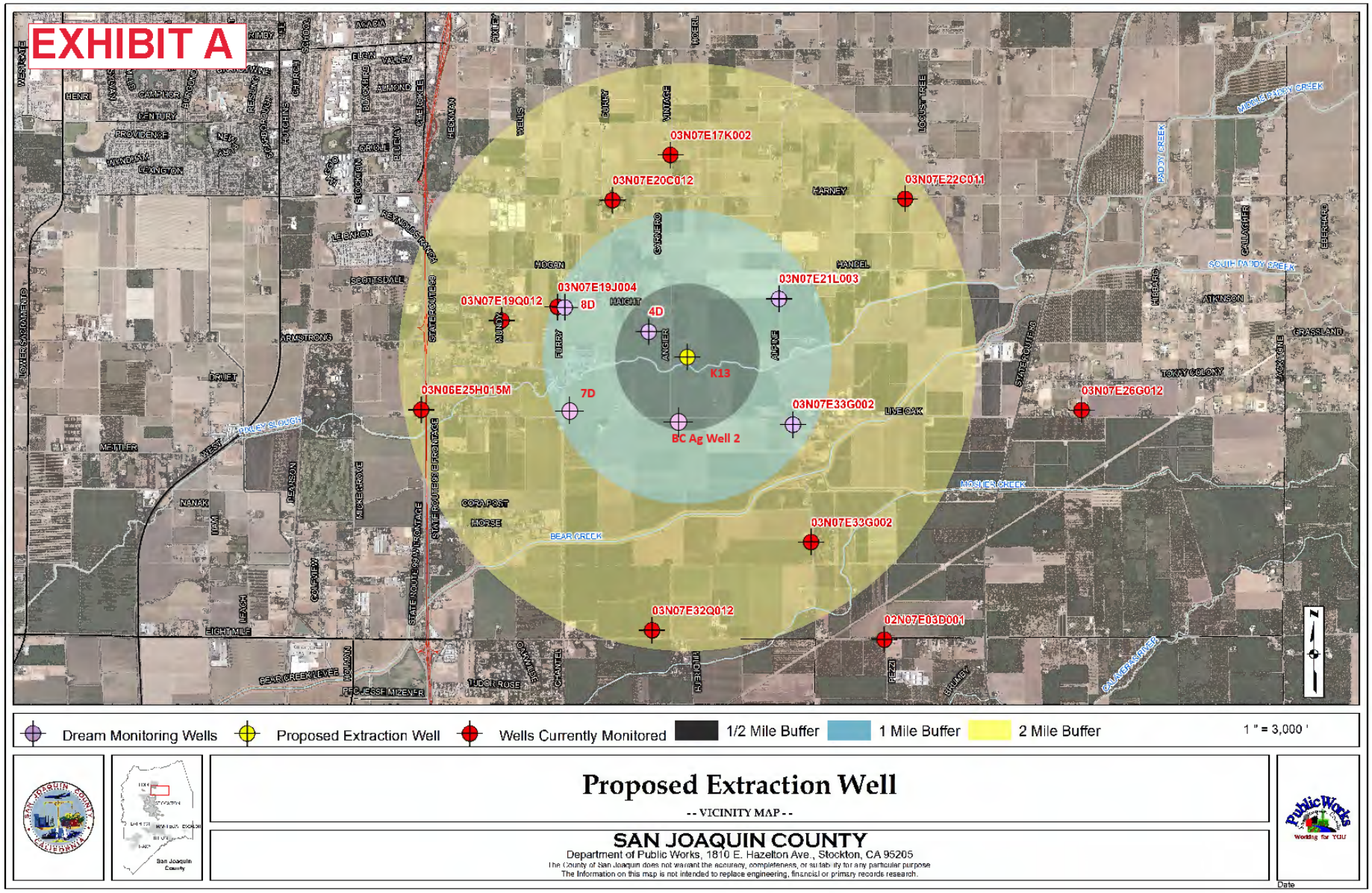
- Historic GW gradient direction (generally to the SE).
  - Recharge is typically from surface and Delta (shallow recharge)
- SJC East San Joaquin Sub-basin is generally considered an unconfined aquifer system; but confined and unconfined conditions locally prevail.
- Unconfined: Groundwater recharge occurs locally; pumping and recharge impact water levels in nearby wells.
- Confined: Aquifer is under “confining” pressure between low permeability zones and GW pumping affects (depressurize) the entire aquifer (reference SSJQV – Corcoran Clay).
- Monitoring summary (following slides).

DREAM Project Vicinity Map

Vicinity map showing approximate locations of wells within the DREAM project area. Extraction well “K13” is shown in yellow, Ag wells initially evaluated for inclusion in the monitoring program are shown in red, and current DREAM monitoring wells are shown in pink.

Amendment #1 to the DREAM Monitoring Plan designates wells 4D, 8D, 03N07E21L003 (L003), and 03N07E33G002 (G002) to monitor effects of the DREAM project; wells 7D and BC Ag Well 2 are backup/alternate program wells.

Monitoring well L003 is identified as a Representative Monitoring Well in the Eastern San Joaquin County Groundwater Sustainability Plan (ESJGSP) and has defined minimum thresholds.



Amendment #1 to the Monitoring Plan of the DREAM Project

The Monitoring Wells, and Minimum Operating Thresholds in the Monitoring Plan shall be modified as follows through Amendment #1.

Monitoring Wells

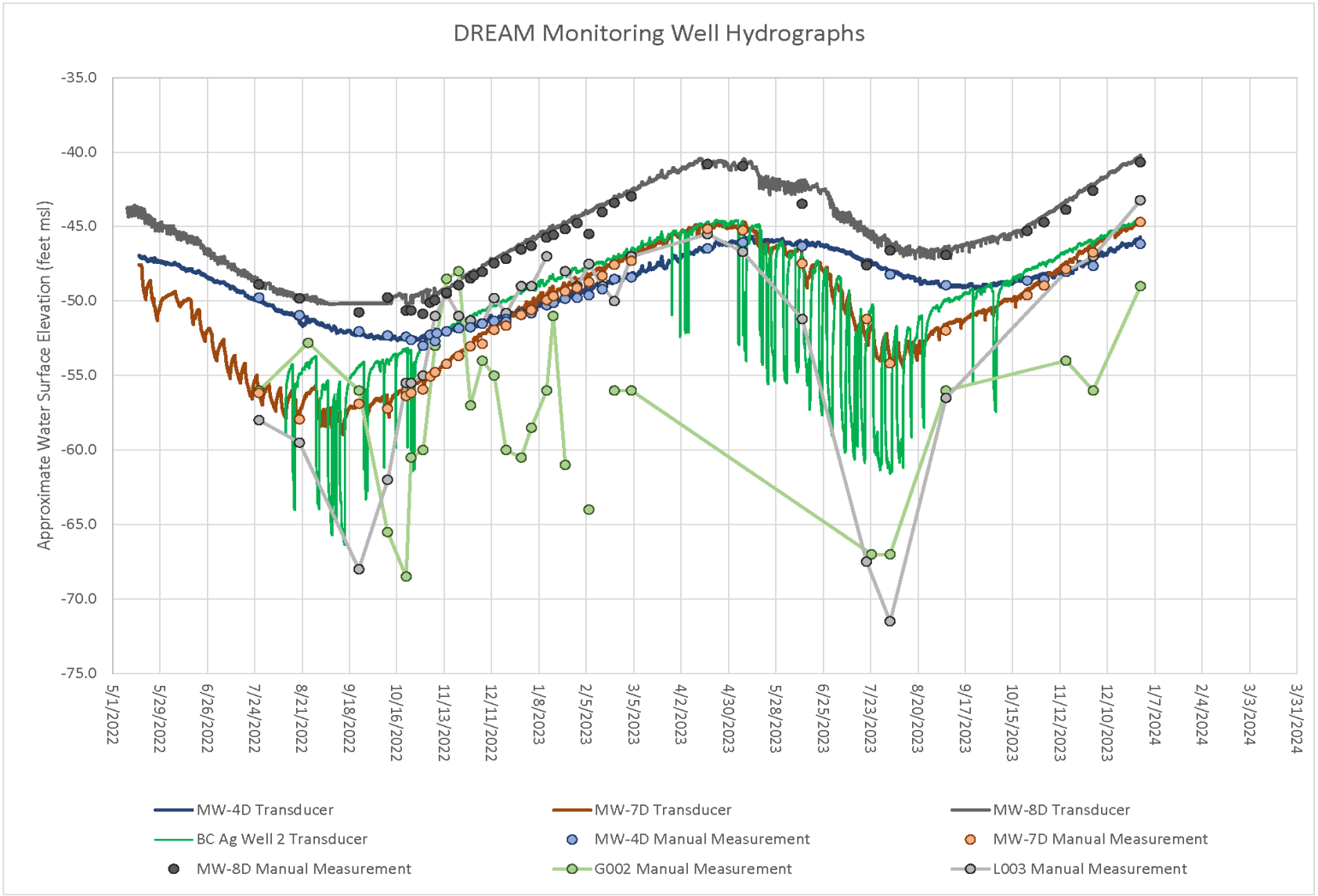
a. The following monitoring wells (hereinafter referred to as the DREAM Monitoring Wells) will be used to monitor the effects of the DREAM Project; the location of these wells have been shown in Exhibit A. These wells can be substituted at the County Engineer's discretion.
   - Bear Creek Monitoring Well 4D
   - Bear Creek Monitoring Well 8D (or 7D as alternative)
   - 03N07E21L003
   - 03N07E33G002

Although not included in Amendment #1, the Bear Creek (BC) Ag Well 2 was also successfully fitted with a remote monitoring system and, like MW-7D, may be used as an alternative monitoring well.

View includes hourly water level data from wells fitted with remote monitoring systems (MW-4D, -7D, -8D, and BC Ag Well 2), manual water level measurements collected from wells without remote monitoring systems (G002, L003), and manual water levels collected to verify remote system accuracy (MW-4D, -7D, -8D).

Manual water level measurements shown in this graph highlight the difficulty in using active Ag wells to monitor seasonal and long-term water level trends, including:

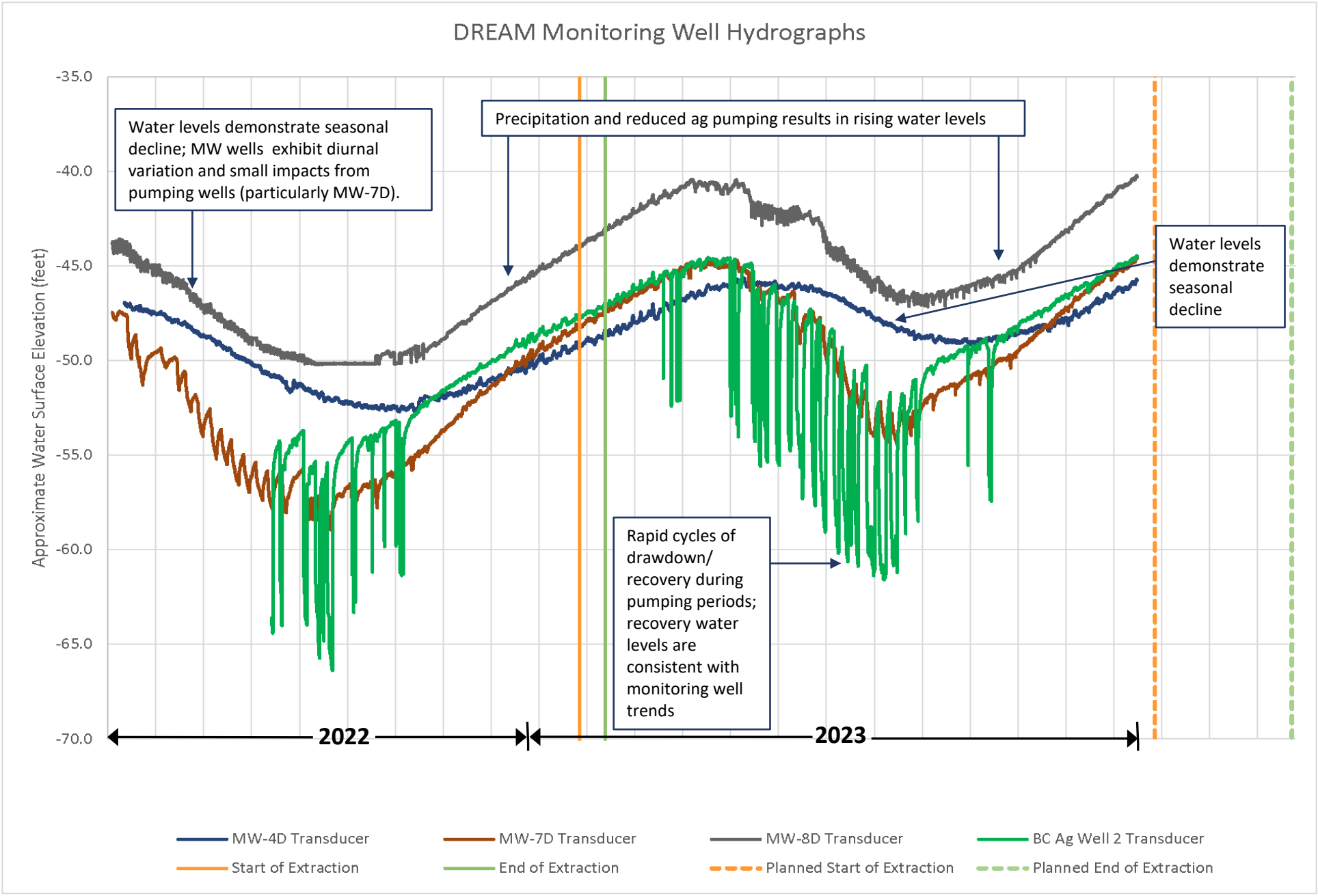
- Small, angled sounding access ports which limit equipment used to access water level measurements (steel tape),
- Well casing, sounding tubes, and groundwater are impacted by pump oil, and
- Residual pumping effects on groundwater levels during the irrigation season.



Hydrographs of wells fitted with remote monitoring equipment.

During 2022, groundwater levels began to recover between early September and early November. In 2023, groundwater levels began to recover in early August through late October.

Groundwater levels in 2023 recovered to higher levels than in 2022 and seasonal lows were above 2022 levels, potentially related to DREAM project recharge and decreased agricultural pumping.



Monitoring Plan groundwater level thresholds are determined based on the following factors:

- **Initial water level:** Measurements are taken on the same date from all wells (for consistency) within approximately two weeks from the beginning of extraction.
- **Regional trend:** Reflects the overall, long-term trend (decline) in groundwater levels based on available local/regional water level data, estimated at 0.155 feet over a 91-day period (expected extraction end date of 3/29/24).
- **Allowable drawdown:** Identified as 10 to 15 feet based on historical data.

Extraction thresholds definitions:

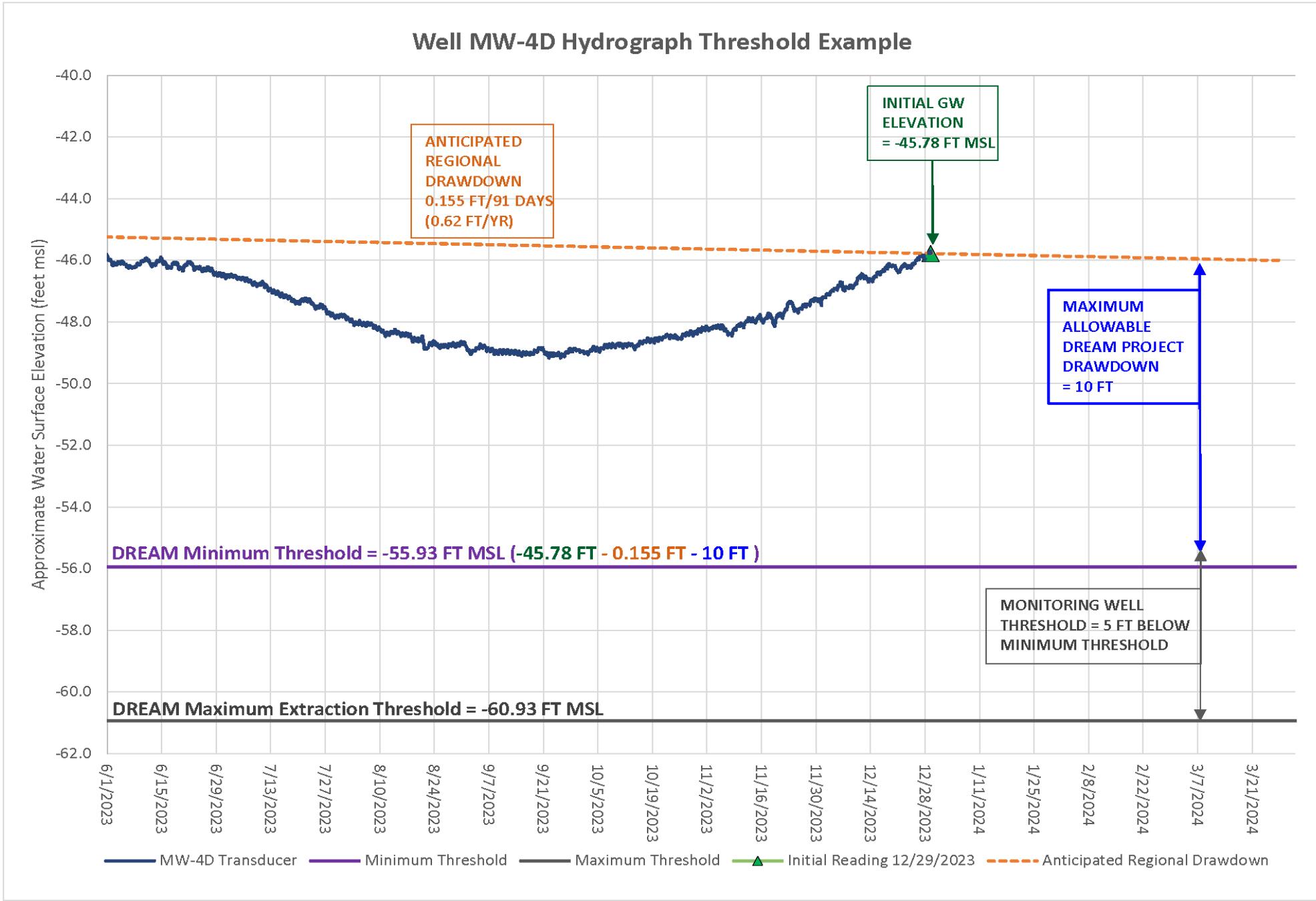
- **DREAM minimum threshold:** If three of four DREAM monitoring wells reach the minimum threshold, extraction will be reduced or stopped while data is evaluated by the Monitoring Committee.
- **DREAM maximum extraction threshold:** If any one monitoring well reaches the maximum extraction threshold, extraction will be stopped while data is evaluated by the Monitoring Committee. Additionally, if well L003 exceeds its minimum ESJGSP threshold, extraction will cease.

Threshold calculation:

DREAM minimum threshold = Initial water level – regional trend – allowable drawdown (10 ft)

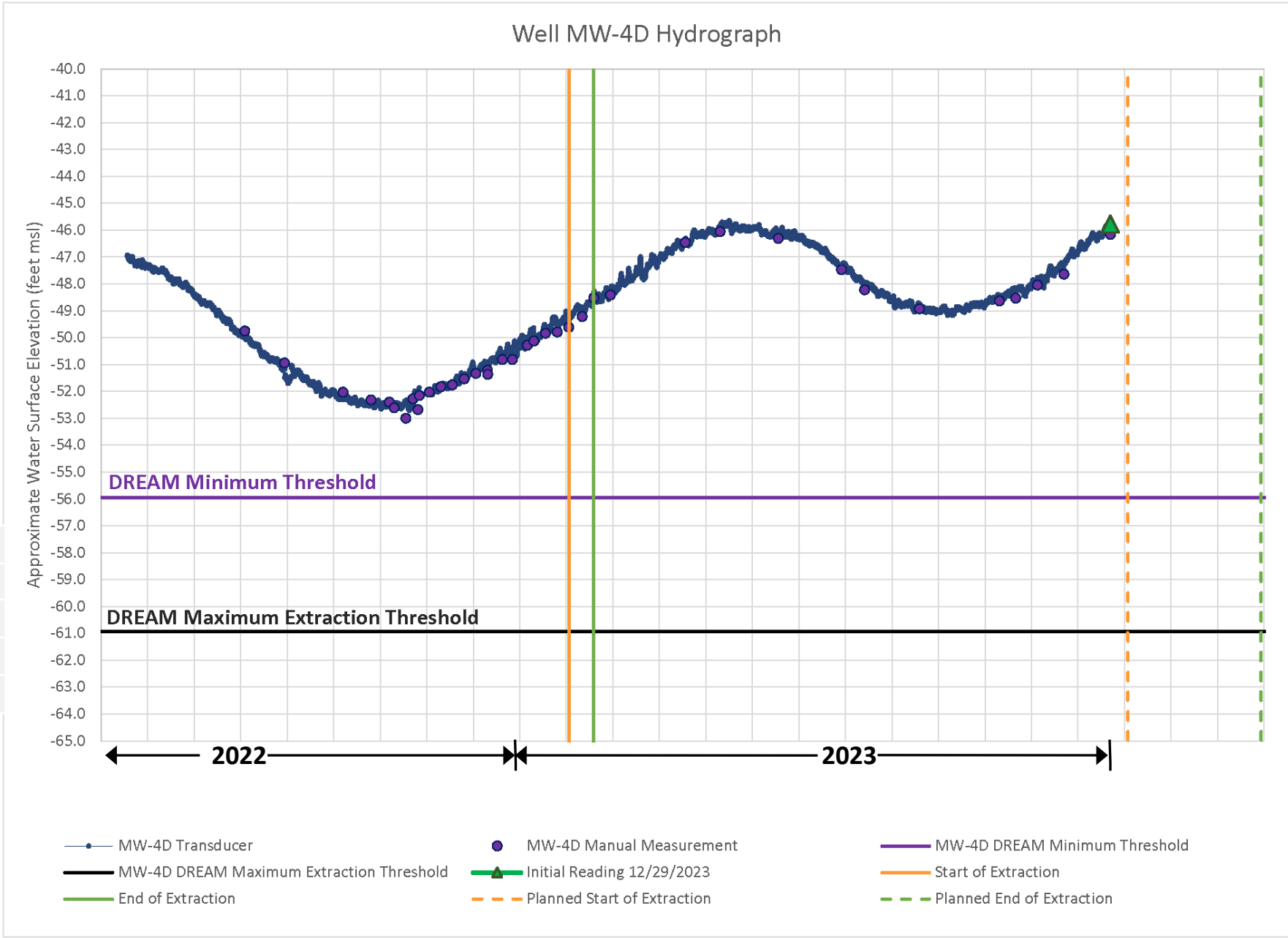
DREAM maximum extraction threshold = Initial water level – regional trend - allowable drawdown (15 feet, or five feet below the minimum threshold)

Following the end of extraction, water levels are again recorded to produce a final groundwater elevation for comparison to initial groundwater levels.


Well MW-4D Hydrograph Threshold Example
Approximate Water Surface Elevation (feet msl)
-40.0
-42.0
-44.0
-46.0
-48.0
-50.0
-52.0
-54.0
-56.0
-58.0
-60.0
-62.0
ANTICIPATED REGIONAL DRAWDOWN 0.155 FT/91 DAYS (0.62 FT/YR)
INITIAL GW ELEVATION = -45.78 FT MSL
MAXIMUM ALLOWABLE DREAM PROJECT DRAWDOWN = 10 FT
DREAM Minimum Threshold = -55.93 FT MSL (-45.78 FT - 0.155 FT - 10 FT)
MONITORING WELL THRESHOLD = 5 FT BELOW MINIMUM THRESHOLD
DREAM Maximum Extraction Threshold = -60.93 FT MSL
6/1/2023
6/15/2023
6/29/2023
7/13/2023
7/27/2023
8/10/2023
8/24/2023
9/7/2023
9/21/2023
10/5/2023
10/19/2023
11/2/2023
11/16/2023
11/30/2023
12/14/2023
12/28/2023
1/11/2024
1/25/2024
2/8/2024
2/22/2024
3/7/2024
3/21/2024
MW-4D Transducer
Minimum Threshold
Maximum Threshold
Initial Reading 12/29/2023
Anticipated Regional Drawdown

MW-4D is a groundwater monitoring well fitted with a remote monitoring system. Water level data is collected hourly by the remote system and additional manual water level measurements are collected for quality control.

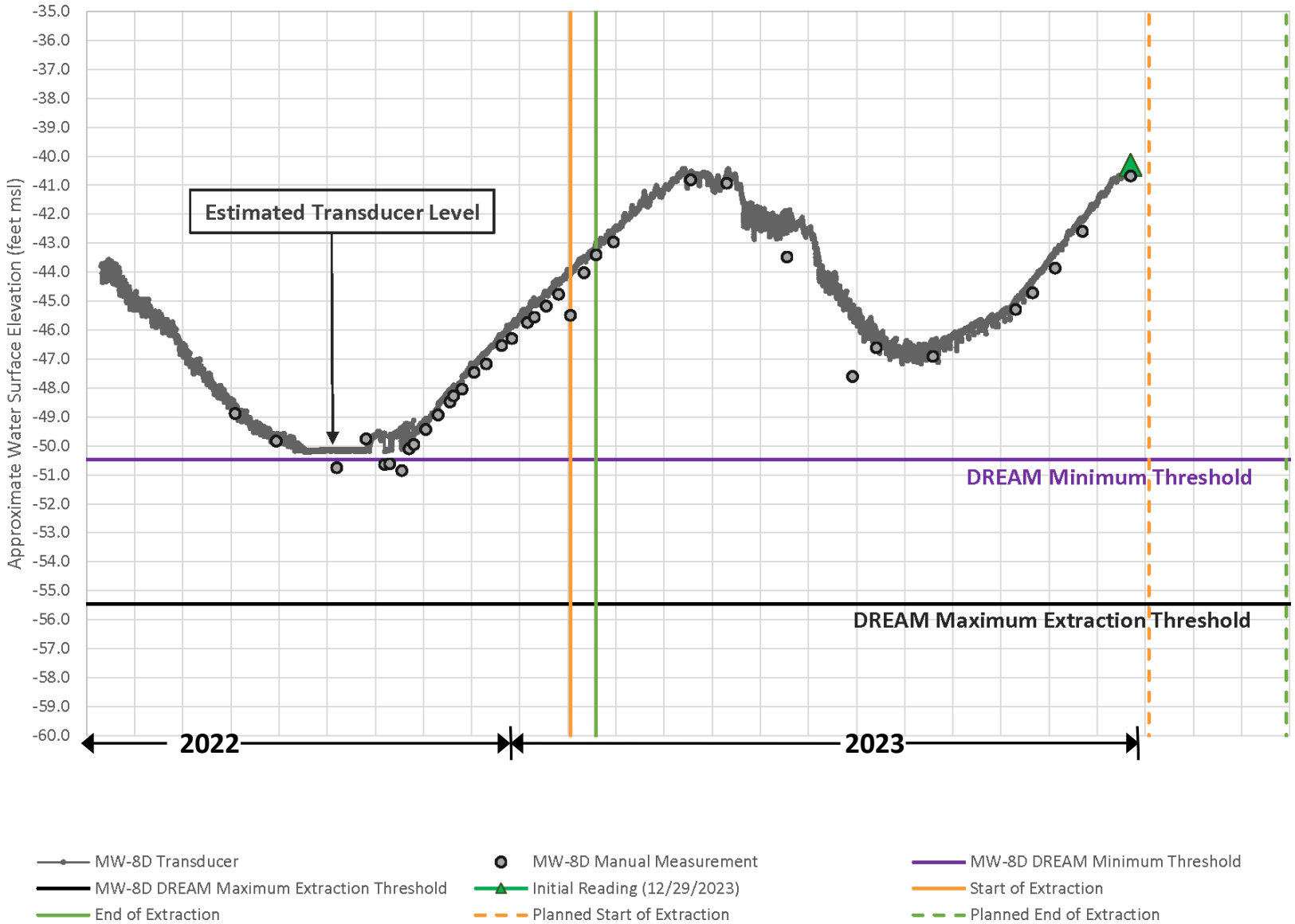
	MW-4D
Initial Reading	-45.78
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-55.93
DREAM Maximum Extraction Threshold	-60.93



MW-8D is a groundwater monitoring well fitted with a remote monitoring system. Water level data is collected hourly by the remote system and additional manual water level measurements are collected for quality control.

The MW-8D well bottom is above the maximum extraction threshold, so this well's usefulness in monitoring compliance with the Groundwater Export Ordinance will be limited if water levels drop 10+ feet at this location. If water levels drop below the well bottom, threshold triggers transfer to MW-7D. BC Ag Well 2 may also be used as a backup monitoring well if needed during the evaluation.

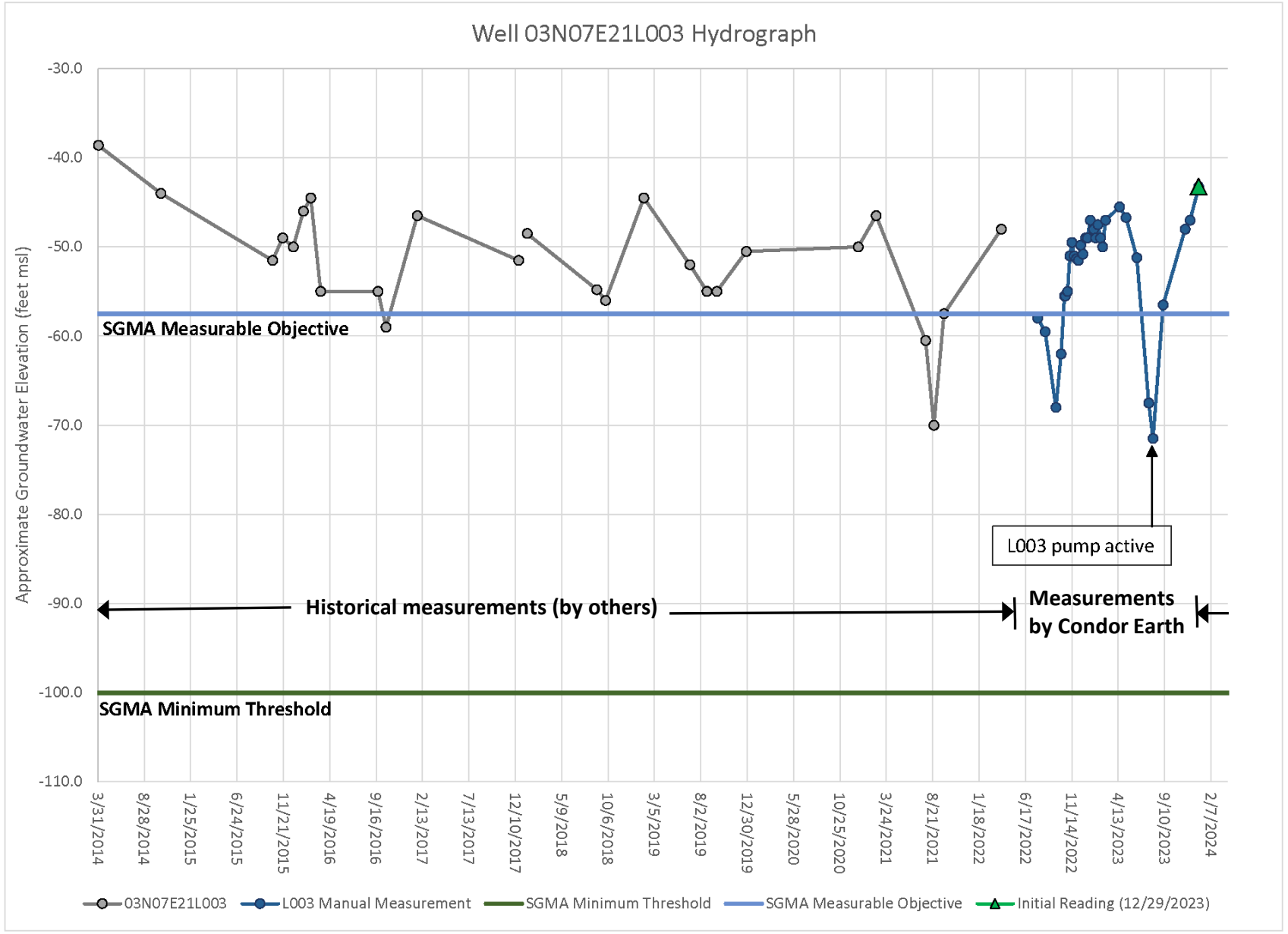
	MW-8D
Initial Reading	-40.30
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-50.45
DREAM Maximum Extraction Threshold	-55.45



Monitoring well 03N07E21L003, referred to as "L003", is a Representative Monitoring Well identified and defined in the Eastern San Joaquin Groundwater Sustainability Plan (ESJGSP). While an Initial Reading (shown as a green triangle on this graph) was collected two weeks prior to extraction startup for reference, the measurable objective and minimum thresholds for this well are specified in the ESJGSP.

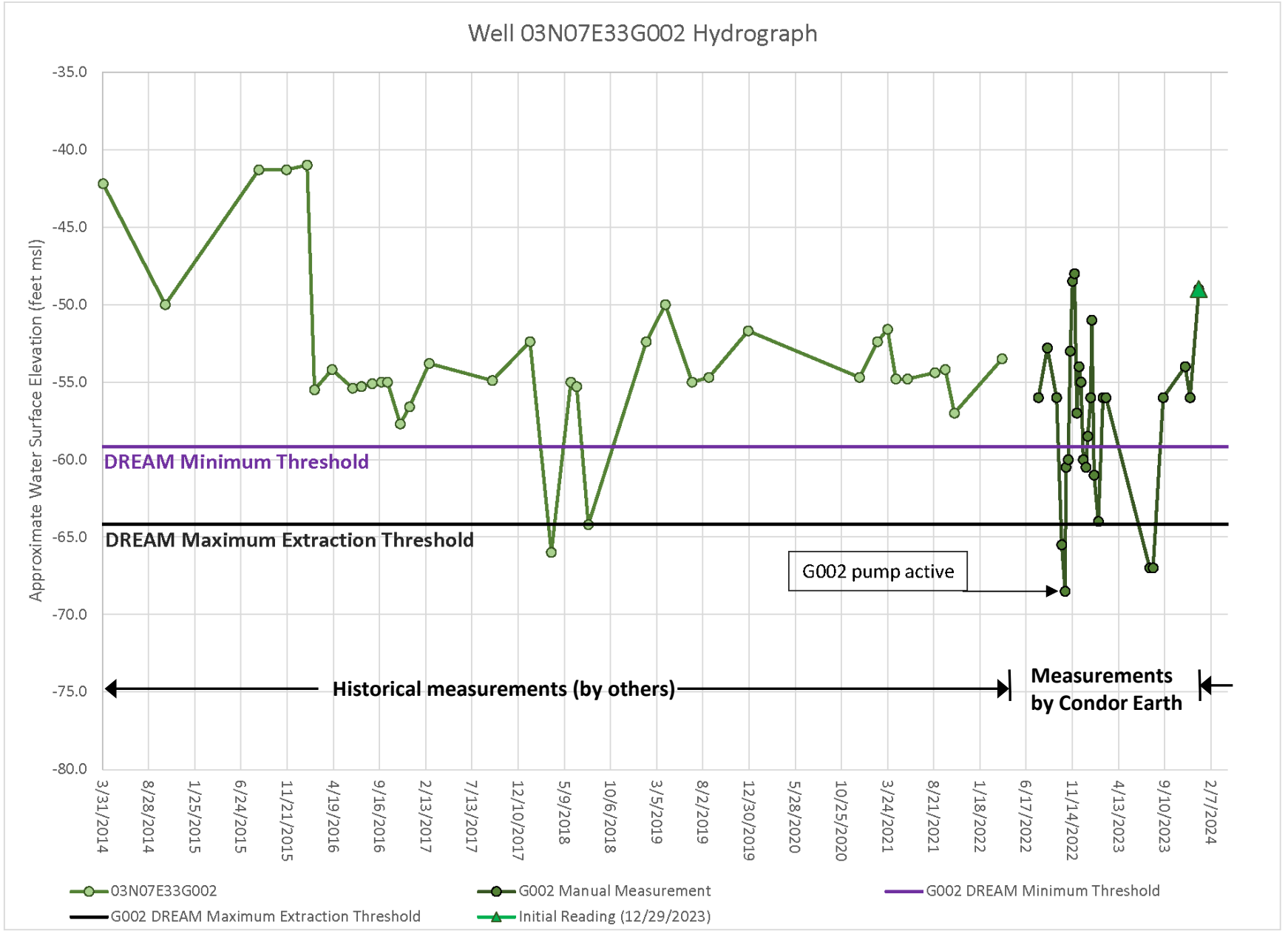
Manual water level measurements at L003 are less reliable due to access issues as presented earlier; interpretation of data trends compared to other wells is limited.

	L003
Initial Reading	-43.2
SGMA Measurable Objective	-57.5
SGMA Minimum Threshold	-100



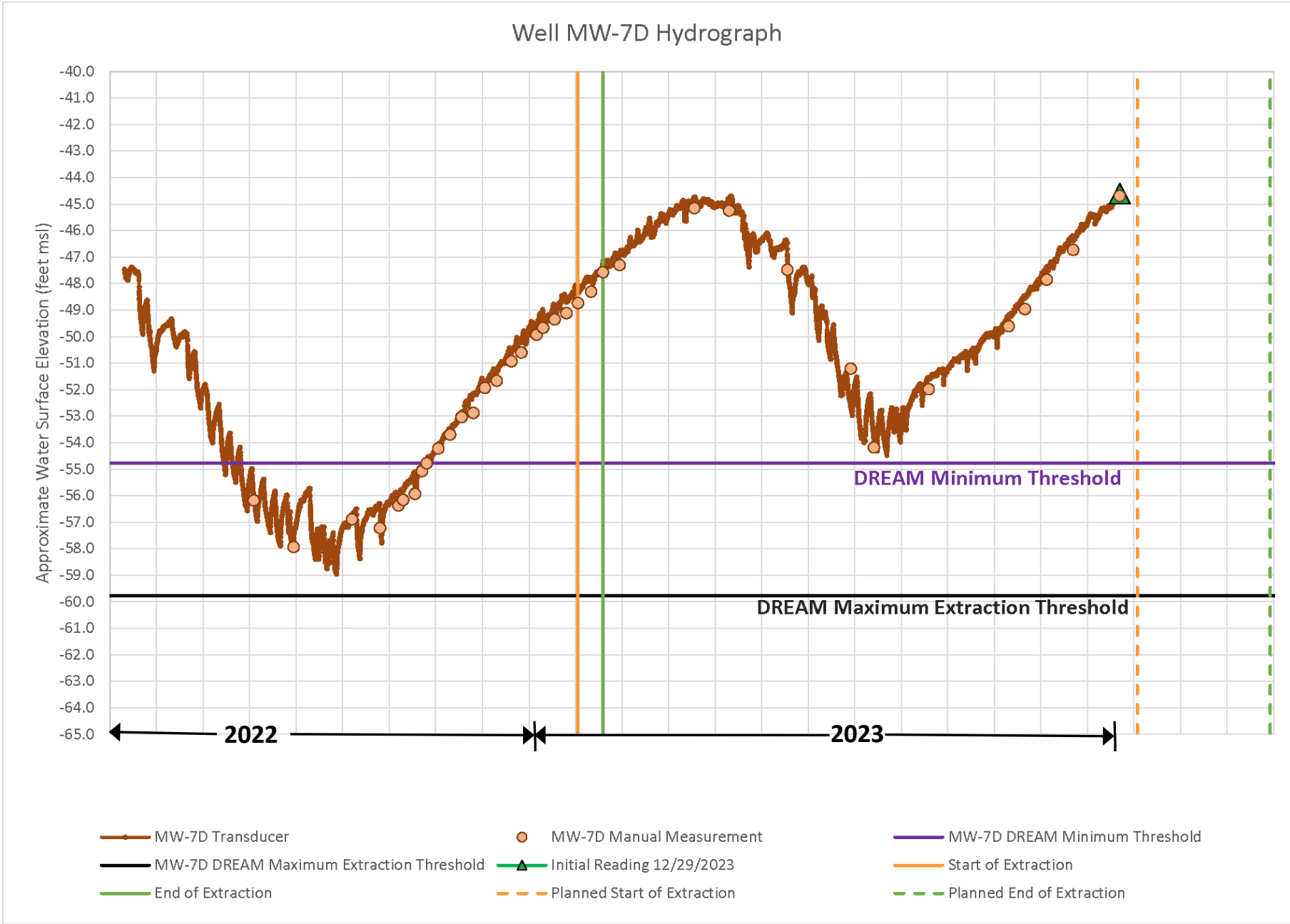
Well 03N07E33G002, referred to as “G002”, is actively pumped for agricultural purposes and accurate manual water level measurements are difficult to collect. Manual water level measurements at G002 are less reliable due to access issues as presented earlier; interpretation of data trends compared to other wells is limited.

	G002
Initial Reading	-49.0
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-59.2
DREAM Maximum Extraction Threshold	-64.2



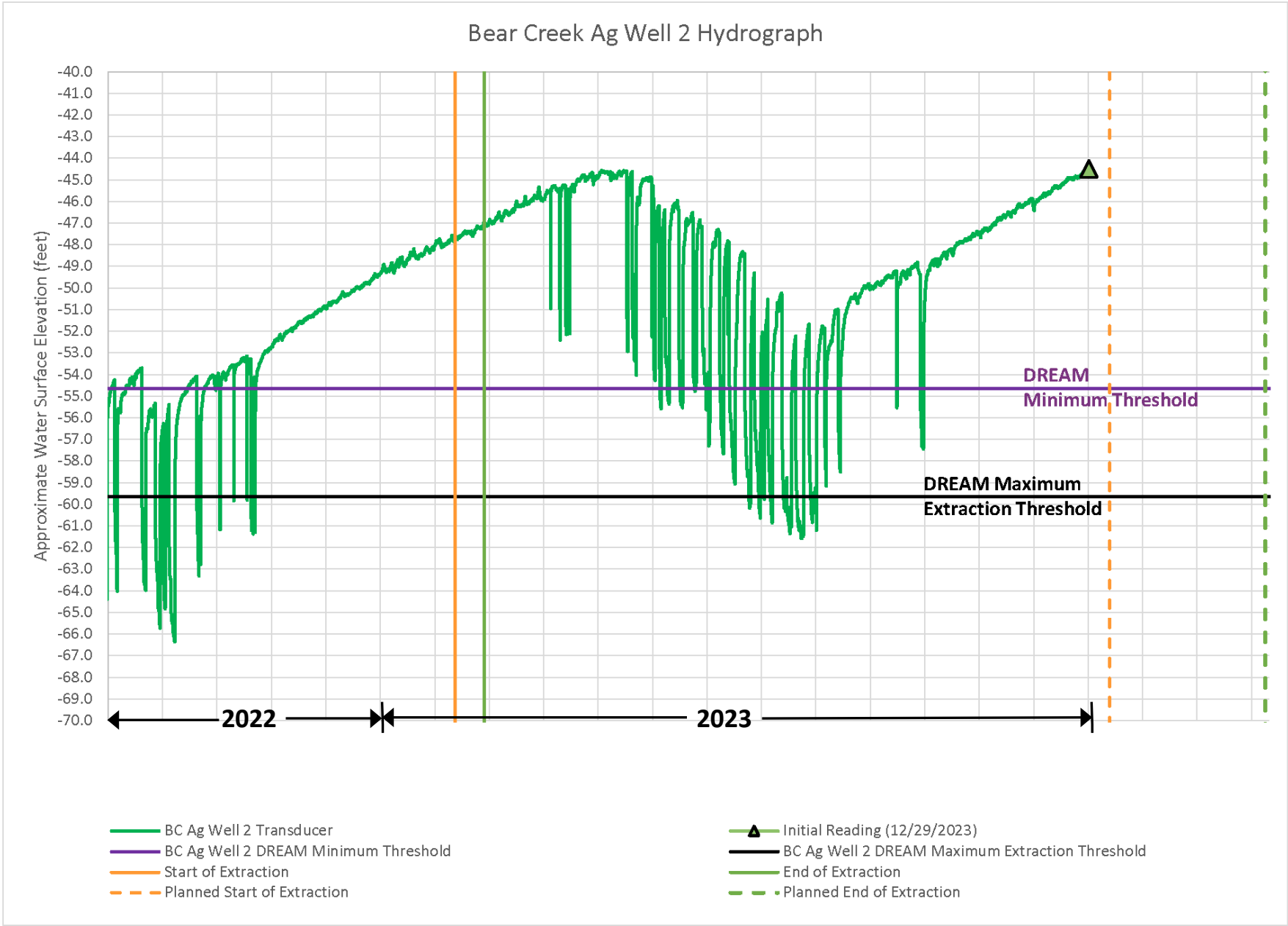
MW-7D is a groundwater monitoring well fitted with a remote monitoring system. Water level data is collected hourly by the remote system and additional manual water level measurements are collected for quality control.

	MW-7D
Initial Reading	-44.61
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-54.76
DREAM Maximum Extraction Threshold	-59.76



The Bear Creek (BC) Ag Well 2 is an agricultural well fitted with a remote monitoring system. This well serves as a backup monitoring well that may be utilized if needed. Water level data is collected hourly by the remote system.

	BC Ag Well 2
Initial Reading	-44.50
Regional Trend Adjustment (91 Days)	-0.155
DREAM Minimum Threshold	-54.65
DREAM Maximum Extraction Threshold	-59.65



DREAM Monitoring Well Thresholds and Alert Notifications

DREAM Monitoring Well Minimum and Maximum Extraction Thresholds						
	MW-4D	MW-7D	MW-8D	L003	G002	BC Ag Well 2
Initial Reading (12/29/2023)	-45.78	-44.61	-40.30	-43.23	-49.0	-44.50
Regional Trend Adjustment (91 days to 3/29/2024)	-0.155	-0.155	-0.155		-0.155	-0.155
DREAM Minimum Threshold	-55.93	-54.76	-50.45		-59.2	-54.65
DREAM Maximum Extraction Threshold	-60.93	-59.76	-55.45		-64.2	-59.65
Well Bottom Elevation (approximate)	-64.76	-73.19	-52.65			
SGMA Measurable Objective (for L003)				-57.5		
SGMA Minimum Threshold (for L003)				-100		

Initial reading for MW-4D, -7D, -8D, and the BC Ag Well 2 as measured by the transducer on 12/29/2023 at 10:00am.
Initial readings for G002 and L003 as measured manually by Condor on 12/29/2023 at approximately 9:30am-10:30am.

Alert Notifications (Automated)				
	MW-4D	MW-7D	MW-8D	BC Ag Well 2
Initial Reading	-45.78	-44.61	-40.30	-44.50
Regional Trend Adjustment (91 Days)	-0.155	-0.155	-0.155	-0.155
DREAM Minimum Threshold	-55.93	-54.76	-50.45	-54.65
Distance between Initial Reading & Minimum Threshold	10.15	10.15	10.15	10.15
75% of DREAM Minimum Threshold	7.62	7.62	7.62	7.62
75% Minimum Threshold Alert Elevation*	**-53.39**	**-52.23**	**-47.92**	**-52.12**
DREAM Maximum Extraction Threshold	-60.93	-59.76	-55.45	-59.65
Distance between Initial Reading & Maximum Threshold	15.15	15.15	15.15	15.15
75% of DREAM Maximum Extraction Threshold	11.37	11.37	11.37	11.37
75% Maximum Extraction Threshold Alert Elevation*	**-57.14**	**-55.98**	**-51.67**	**-55.87**

Threshold below well bottom

*75% Threshold Alerts previously requested by San Joaquin County Engineer; threshold alerts are customizable and may be adjusted as needed for the Monitoring Committee or for individuals.

GROUNDWATER MONITORING PLAN SUMMARY

- Amendment #1 to the Monitoring Plan specifies that effects of the DREAM Project are monitored by wells MW-4D, MW-8D, L003, and G002. These wells can be substituted at the County Engineer's discretion. MW-7D and BC Ag Well 2 serve as backup/alternate monitoring wells.
- L003 is a Representative Monitoring Well in the East San Joaquin Groundwater Sustainability Plan (ESJGSP) and has defined minimum thresholds. Minimum and Maximum Extraction Thresholds were developed for other Dream Project wells as specified in Amendment #1.
- Amendment #1 states that if water levels in three of the four DREAM Project monitoring wells decrease to below their Maximum Extraction Thresholds, the project extraction well shall be shut down for evaluation and the Monitoring Committee shall make a recommendation to the Board of Supervisors for continued operation based on results of the evaluation.
- The DREAM Project shall not be allowed to operate if groundwater in L003 falls below the minimum threshold defined in the ESJGSP.
- Wells MW-4D, MW-7D, and MW-8D are dedicated groundwater monitoring wells, and the BC Ag Well 2 is an active irrigation well, owned by Bear Creek Winery; these wells are fitted with remote monitoring devices and water levels are recorded hourly. Near real-time data may be viewed through an online portal, hydrovu.com; for access, contact Suzanna at sfelton@condorearth.com.
- Automated, customized alert notifications may be set up for HydroVu users if water levels exceed specified levels. Alerts are proposed for water levels dropping to 75% of the specified thresholds as well as water levels exceeding the thresholds. Contact Suzanna at sfelton@condorearth.com if you would like to receive automated, customized alerts.
- The Monitoring Committee will be notified by e-mail if a Threshold (including 75% Minimum Alert Threshold or other Threshold as desired) is reached in any well (notification by Casey Kipf or Suzanna Felton).
- L003 and G002 are older agricultural-use wells with dedicated pumping systems and could not be fitted with remote monitoring devices. Water levels are measured manually and accurate measurements are challenging due to access and oil interference from the pump.