GRAVELLY FORD WATER DISTRICT GROUNDWATER SUSTAINABILITY PLAN

ANNUAL REPORT WY2022

APRIL 2023

GRAVELLY FORD WATER DISTRICT
GROUNDWATER SUSTAINABILITY PLAN

ANNUAL REPORT
2022 WATER YEAR

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Table of Contents

List of Figures

List of Tables

Appencies

SECTION 1 - INTRODUCTION

1.1 - Purpose of the Groundwater Sustainability Plan (GSP or Plan) Annual Report (Reg. § 354)(354.2)

It is the intent of this Gravelly Ford Water District (GFWD) Groundwater District Sustainability Plan to provide to the California Department of Water Resources the information essential to permit department staff to review the Annual Report for the Water Year 2022 (WY2022), the GFWD is within the Madera Basin (5-022.06). This Section includes not only Plan preparer contact information but brief, critical data, Plan reference data, review of goals, and monitoring procedures. It also includes water usage for a five (5) period after 2014, building on the GFWD GSP report that reviewed water years from 1989-2014.

GFWD conducted a Prop 218 election to assess the acreage within the District Boundary to accumulate funds for the continued reporting and implementation of GSP monitoring requires for the District and the vote passed.

GFWD completed a Revised GSP, based on the Incomplete Letter from DWR dated September 22, 2022. This revised GSP was worked out by coordination with the three (3) other GSP filers in the Madera Basin. The Coordination agreement was also updated through an Amendment that was signed by all GSA's in the Madera Basin. The GSA's for the Madera Basin are also finalizing a MOU for Domestic Well Program to address the impacts during the implantation period to domestic wells.

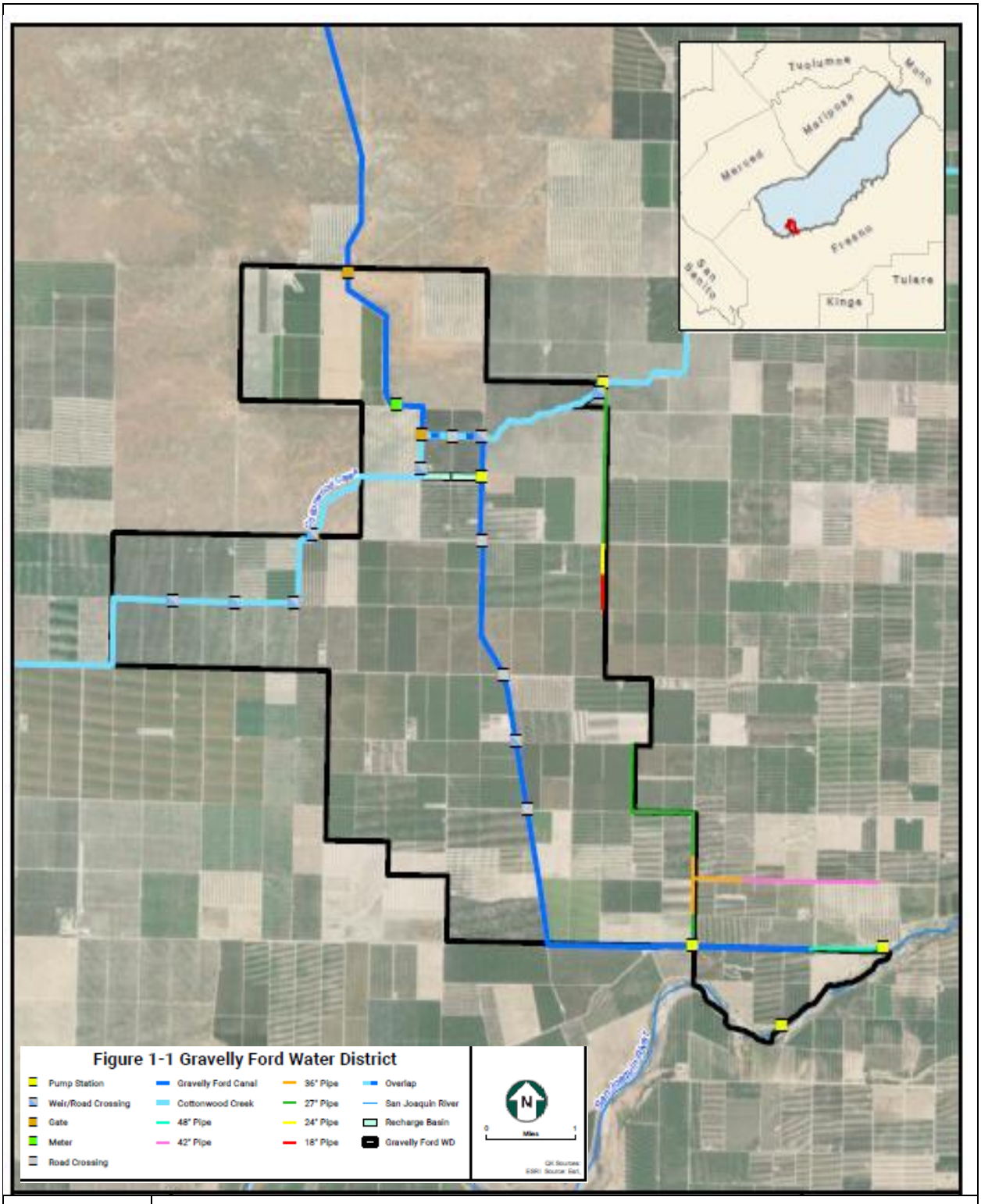

FIGURE 1-1
GRAVELLY FORD WATER DISTRICT MAP

1.2 - Executive Summary (Reg. § 354.2) (a)

The goal of the annual report is to provide an update to the water usage within the Gravelly Ford Water District (GFWD) GSA area and the change in the groundwater storage volume. The report also provides the beginnings of the Data Management System information and tracking methods to compile the data for each year. The revised methodology to coordinate the approach and process of the impacts to the basin with the other GSA's will be addressed in this annual report. A summary table of the revised approach for the elements is in Appendix A. (Table ES-3. Summary of Minimum Thresholds, Measurable Objectives, and Undesirable Results.)

The GFWD GSA area continues to have a trend of a balance area for the long-term water use in the service area. Throughout the water use area of the GFWD the groundwater elevations for the WY2022 period maintained a level above the minimum thresholds and operating above their measurable objectives. The service area of GFWD is currently on track to meet the interim goals by 2025 for the chronic lowering of groundwater levels sustainability indicator. The continue availability to introduce additional surface flows into the service area and the recharge basin will also allow the management actions to allow the GFWD GSA to meet the interim goal for change in storage sustainability indicator. Groundwater levels have had little to no change across the basin over the WY2022 and from the previous WY2021. The Spring well levels will be reviewed for 2021 and 2022 to better analyze the change in storage for the GFWD basin area, the current data reflects no significant change in these levels and that the basin has stayed on track to meet the measurable objectives of the GSP. The building of data measurements within the basin will allow for the necessary level of analysis to occur to measure the change in storage and be able to provide the necessary modifications to the management of the basin area based on the observed terns from this data. The accumulation of data is the key to the GFWD making responsible modifications to the operation of the basins water supply and maintaining the basin area within the measurable objectives of the GSP.

Groundwater Sustainability Plan Annual Report Elements Guide		
Basin Name	Madera	
GSP Local ID	Gravelly Ford Water District	
California Code of Regulations - GSP Regulation Sections	*Groundwater Sustainability Plan Elements*	Document *page number(s) that address the applicable GSP element.*
Article 5	Plan Contents	
Subarticle 4	*Monitoring Networks*	
§ 354.40	Reporting Monitoring Data to the Department	
	Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.	1
	Note: Authority cited: Section 10733.2, Water Code. Reference: Sections 10728, 10728.2, 10733.2 and 10733.8, Water Code.	
Article 7	Annual Reports and Periodic Evaluations by the Agency	
§ 356.2	Annual Reports	
	Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:	
	(a) General information, including an executive summary and a location map depicting the basin covered by the report.	2:3, Fig. 1-1
	(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:	
	(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:	
	(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	6:7, Fig. 2-1, Fig. 2-2
	(B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.	10:11, Fig. 2-4, Fig. 2-5
	(2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.	12, Table 2-2
	(3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.	12, Table 2-1, Table 2-2
	(4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.	12, Table 2-2
	(5) Change in groundwater in storage shall include the following:	
	(A) Change in groundwater in storage maps for each principal aquifer in the basin.	13:14, Table 2-3, Fig. 2-6
	(B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.	14, Fig. 2-6
	(c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.	15

SECTION 2 - MONITORING NETWORKS (REG. § 354.40)

2.1 - Reporting Monitoring Data (Reg. § 354.40)

Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department. GFWD will compile the measurement information and annual water flow data in excel spread sheets to be transferred to the consolidated data management system for the Madera and Chowchilla Subbasins. GFWD has started the process with the selected consultant of Houston Engineering Inc., along with the other GSA's in the Subbasin, through coordination with the Basin point of contact.

2.2 - Groundwater Elevation (Reg. § 356.2 A)

The groundwater measurement program was started in the fall of 2019 and the readings taken in Fall and Spring of each year have been plotted by Ken D. Schmidt & Associates (KSA) as contours with the reference to "Above Mean Sea Level" are reflected in Figure 2-1 (WY2021) and Figure 2-2 (WY2022) for spring readings. The groundwater elevation is reflected at an elevation above Mean Sea Level in the figure and shows the elevation decreasing as you move northwesterly away from the San Joaquin River. The review of well data shows that the levels in the basin have had little or no change from the 2021 to 2022 water year. GFWD will be looking to the 2025 GSP update with the revised approach on thresholds to update the minimum thresholds, measurable objectives and undesirable results, this will revise the change in storage over the previous reporting periods. The spring readings for 2021 and 2022 are shown in Figures 2-1 and 2-2, this shows a minor change in storage after 3 consecutive years with zero allocation of surface water to the District. The influence of the flows in the San Joaquin River on the basin levels is something the GFWD will be studying more to better understand the impact of those flows on the basin levels. Historical groundwater elevation data was recorded by Madera Pump Company and this data is used in this report to make estimates and projections on the levels of the groundwater within the service area.

The CASGEM wells used for the review of the long-term groundwater elevation tern are included and did not have any recent information, Figures 2-4 & 2-5 have been update to reflect the revised approach from the Revised GSP report submitted in March 2023, this reflects the setting of fall 2015 levels as the Minimum Threshold.

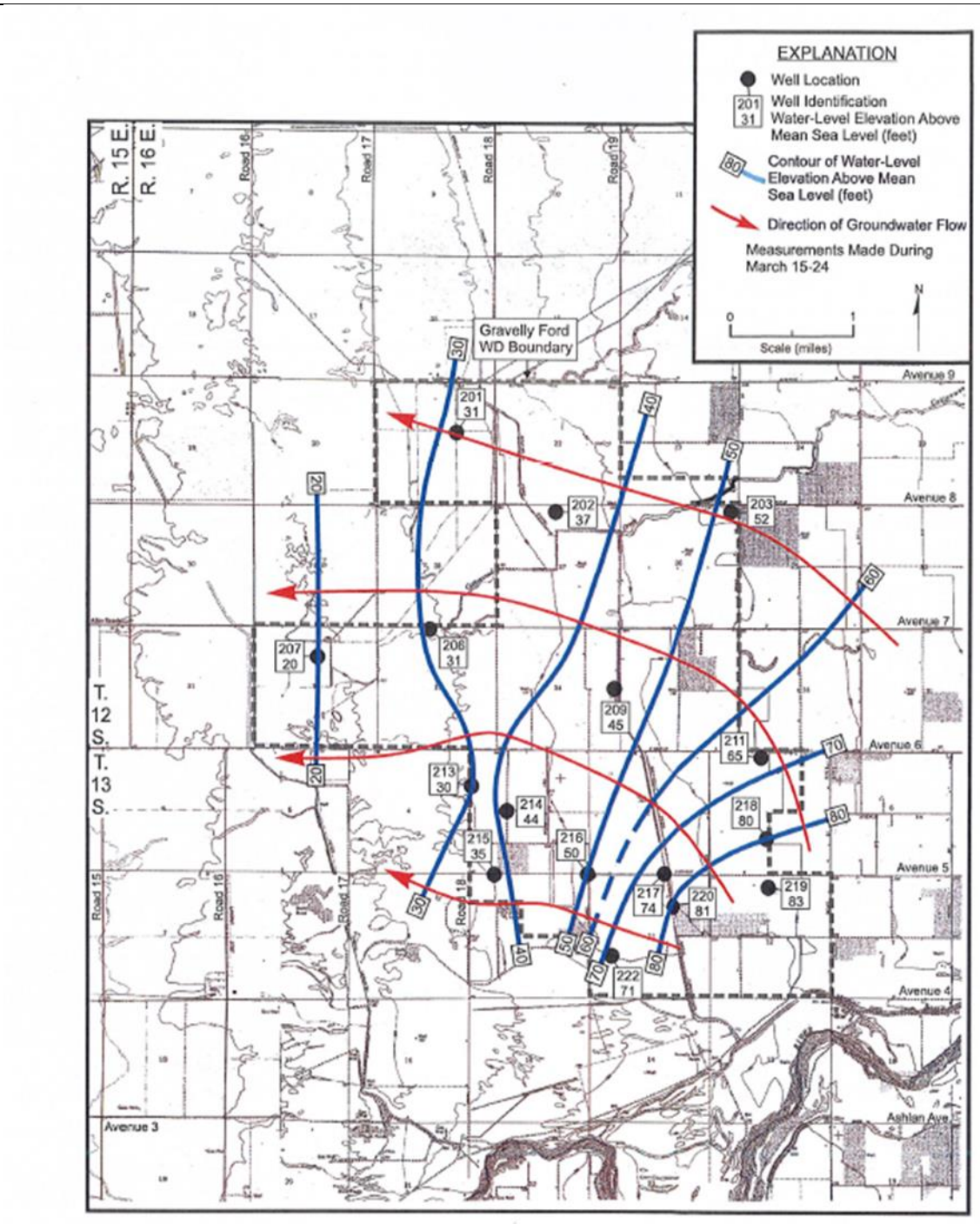

Figure 2-1
Water-Level Elevations & Directions of Groundwater Flow (SPRING 2022)

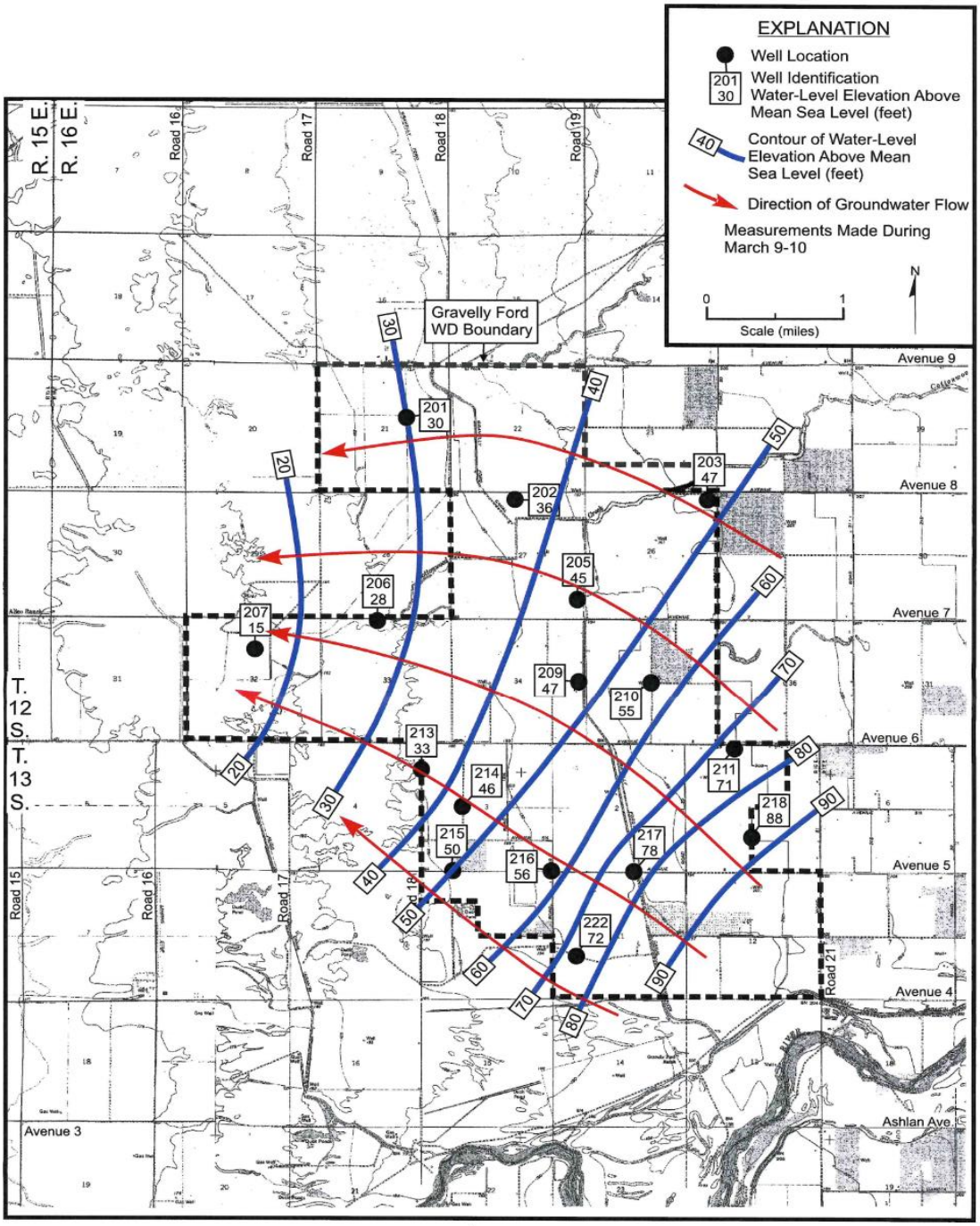

Figure 2-2
Water-Level Elevations & Directions of Groundwater Flow (Spring 2023)

2.3 - Groundwater Extraction (Reg. § 356.2 (2))

The extraction amount is an estimate of the volume of water pumped to meet the ET crop demand minus the surface water applied in the district. This water year of 2022 had an average crop ET for the GFWD area of 3.09 ac. ft. per acre, based on the three main crops of Almonds, Grapes and Pistachios. Figure 2-3 is the map of the well locations in the GFWD area that are used for Agricultural water extraction. The GFWD is currently working with all private agricultural well owners in the GFWD GSA to install meters on each well and to begin an annual usage reporting process form those well owners, this year of 2022 provided a limited number of usage reports.

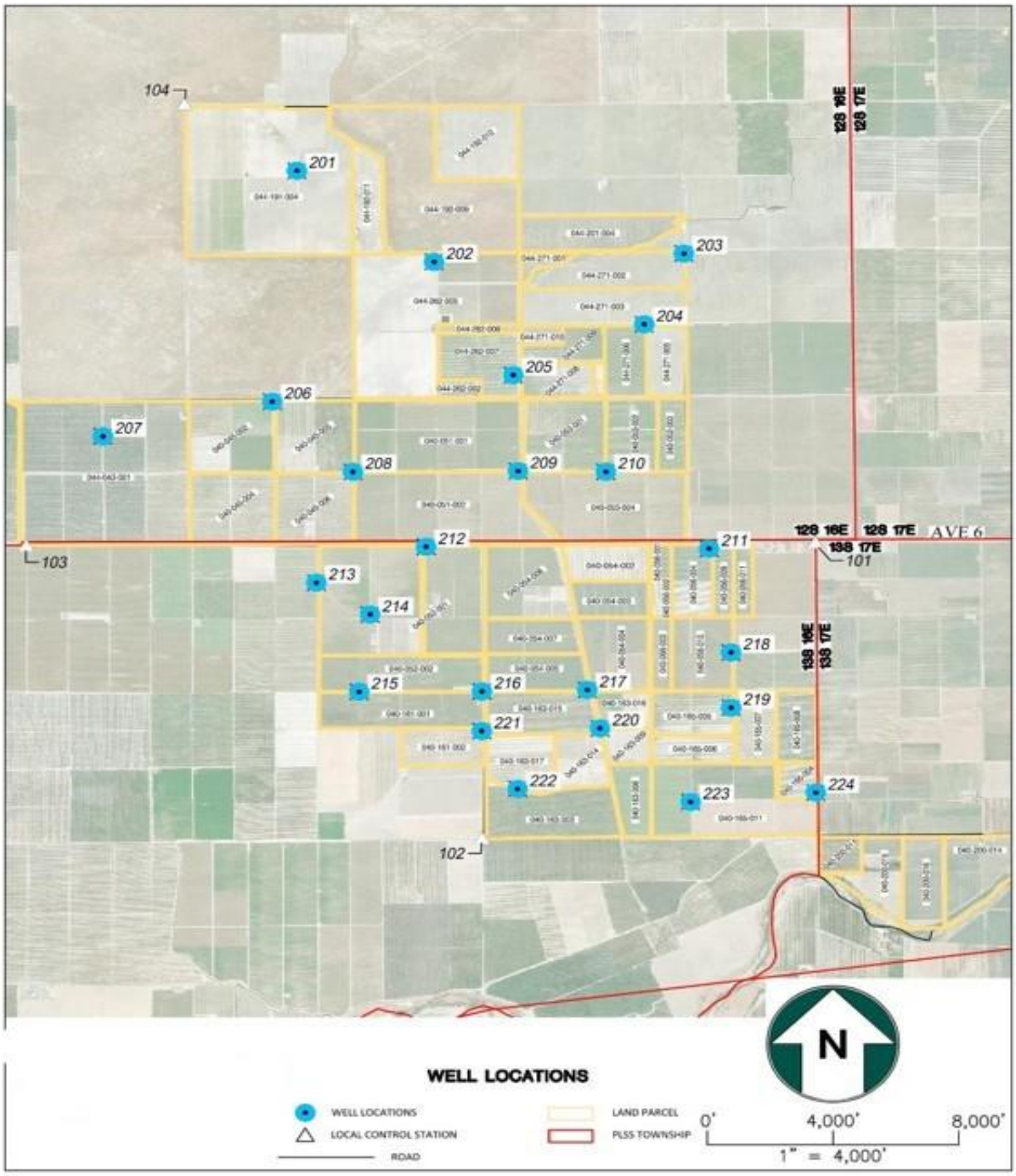

Figure 2-3
Location of Agricultural Water Extraction Wells

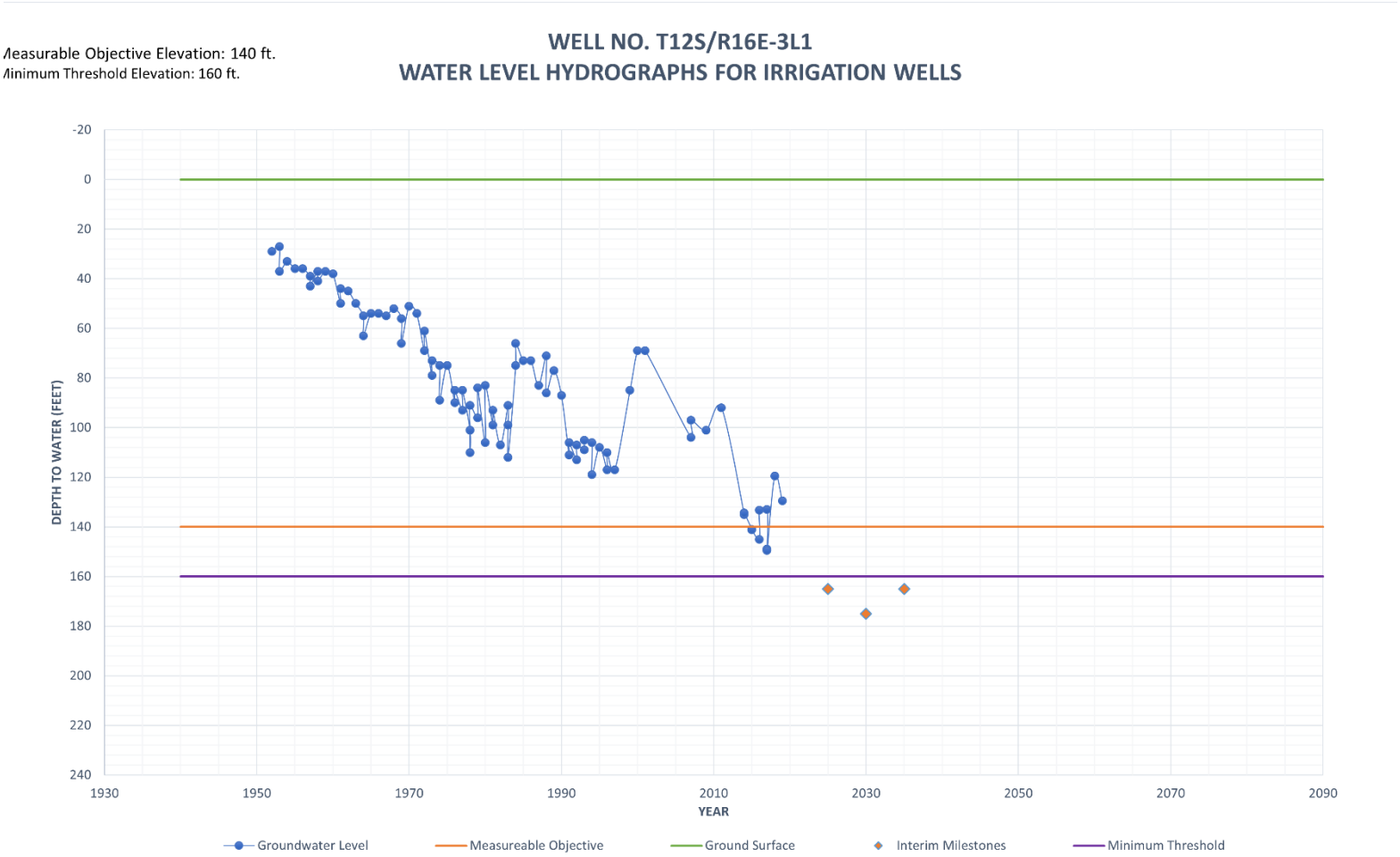

Figure 2-4
Well No. T12S/R16E-3L1
Water Level Hydrographs for Irrigation Wells

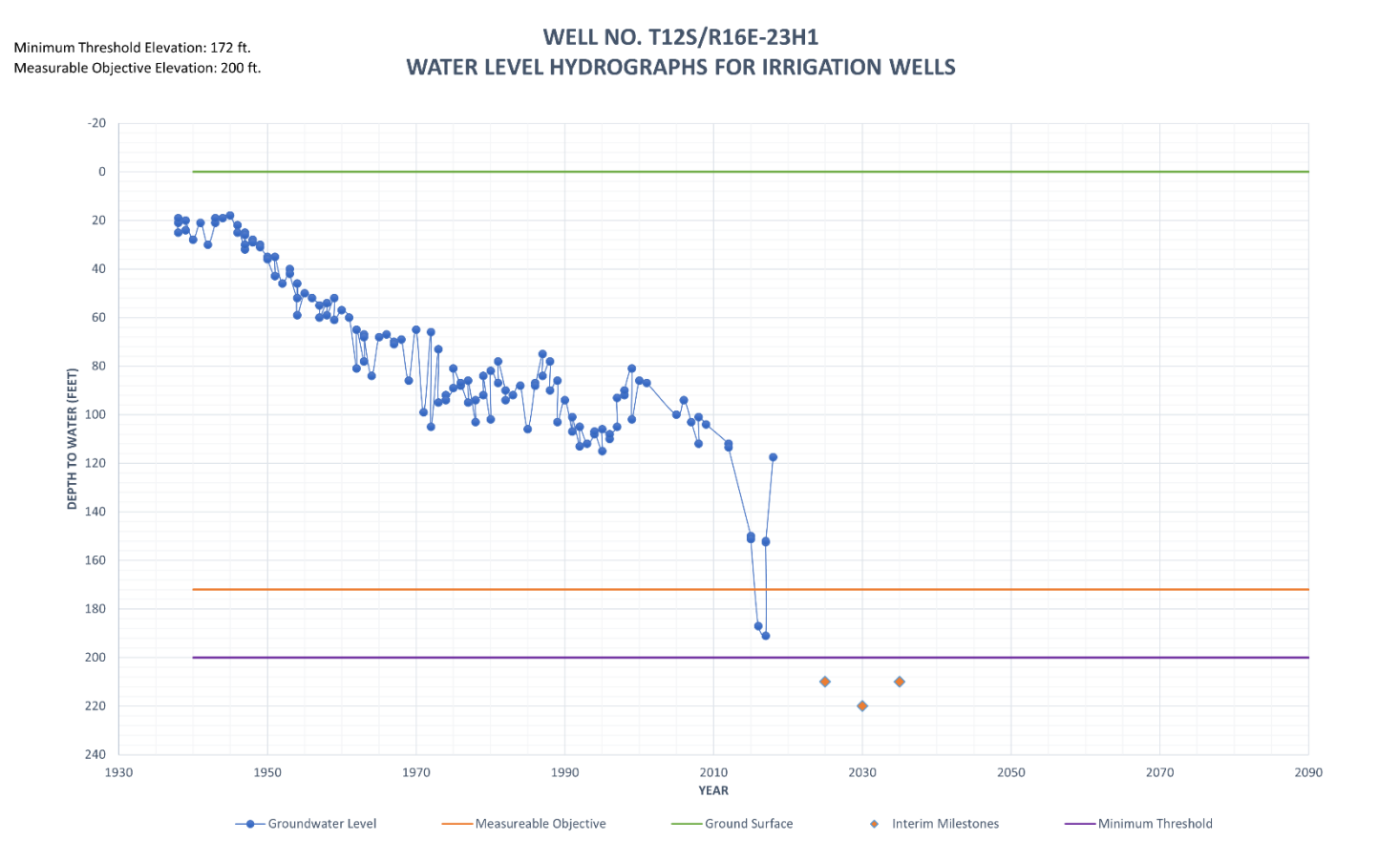

Figure 2-5
Well No. T12S/R16E-23H1
Water Level Hydrographs for Irrigation Wells

2.4 - Surface Water Supply (Reg. § 356.2 (3))

The water year of WY2022 had a total of Zero (0) acre feet of surface water imported into the use area of the GFWD GSA. As shown in Table 2-1 the amounts used for irrigation and recharge have been summarized for the water year. The sources of water are listed in the table and they are the same sources as from the previous years.

Table 2-1
WY2022 Surface Water Supply

Surface Water Supply (Acre-Feet)	
Surface Water Source	**WY2022 Total**
Contract Water Class 2	0
MID Diversions	0
Native Flows	0
CVP Supply by Cottonwood Cr.	0
Total:	0

2.4.1 - *TOTAL WATER USE*

The total water use is represented by the measured surface water flow into the GFWD GSA area and the estimated groundwater extraction. The total water used or available is summarized in Table 2-2.

Table 2-2
WY2022 Total Water Use

Component	Historic Condition Water Budget ***	Current Condition Water Budget
Hydrologic Period	WY 1989 - 2014	WY2022
Inflows		
Surface Water	12,200	0
Native Flows	1,900	0
Contract Water Class 2	6,600	0
MID Diversions	1,600	-
CVP supply by Cottonwood Cr.	2,100	-
Precipitation *	7,200	6,375
Groundwater Extraction - Ag	15,800	28,825
Subsurface Inflow	500	-
Groundwater Extraction - Residential	100	100
Outside Water Purchases		-
San Joaquin River Seepage		500?
Total Inflows	35,800	35,800

* Value from CIMIS Station #124 Panoche

*** Average Values from Previous years 1989-2014

2.4.2 - *GROUND WATER STORAGE*

The change in groundwater storage from the previous reporting period and those waters used in the 2022 water year is estimated at 20,825-acre feet, the minimal or unchanged groundwater levels show a non-impact for the usage from the basin by extraction, the change to storage will be reviewed next year with the Spring groundwater level measures and additional analysis of the flows in the San Joaquin River impacts on the basin area for GFWD. These numbers are presented in Table 2-3 and due to the lack of sufficient data on the Spring groundwater levels and flows in the San Joaquin River the inflow and outflow of Groundwater will be reviewed when available to adjust the estimate of the change in storage for the WY2022, this will be reported in the WY2023 report.

Table 2-3
Annual & Historical Change in Storage

Component	Historic Condition Budget AF/yr.	Current Reporting Period AF/yr.
Hydrologic Period	WY 1989 - 2014	WY2022
RECHARGE		
Deep Percolation of Precipitation	500	500
Canal Seepage	6,200	0
Deep Percolation of Irrigation Water	6,400	6,400
Groundwater Inflow	5,200	500
Subtotal:	18,300	7,400
DISCHARGE		
Pumpage	15,900	28,825
Groundwater Outflow	4,100	0
Subtotal:	20,000	28,825
Net Deficient (Decrease in Storage)	(1,700)	(21,425)

Figure 2-6 provides the summary of the groundwater storage changes by water year within the GFWD GSA area and is the graph from the 2019 water year annual report, this graph relies on available data and estimates of groundwater extraction based on average crop ET and GFWD staff operations. As the GFWD moves forward with the implementation of the Agricultural Well meter project to record annual extraction volume, these numbers will be based on that data group, along with the well water level measurement program within the GFWD service area. This table has not been updated for the WY2022 as the no change in groundwater levels indicants there are additional factors impacting the basin area for GFWD and those factors of San Joaquin River flows and other influences are being reviewed for data sources to better determine their impacts to the groundwater basin for the area of GFWD, along with revision to the GSP approach to setting thresholds for the March 2023 submittal will be used to revise and update this Figure 2-6.

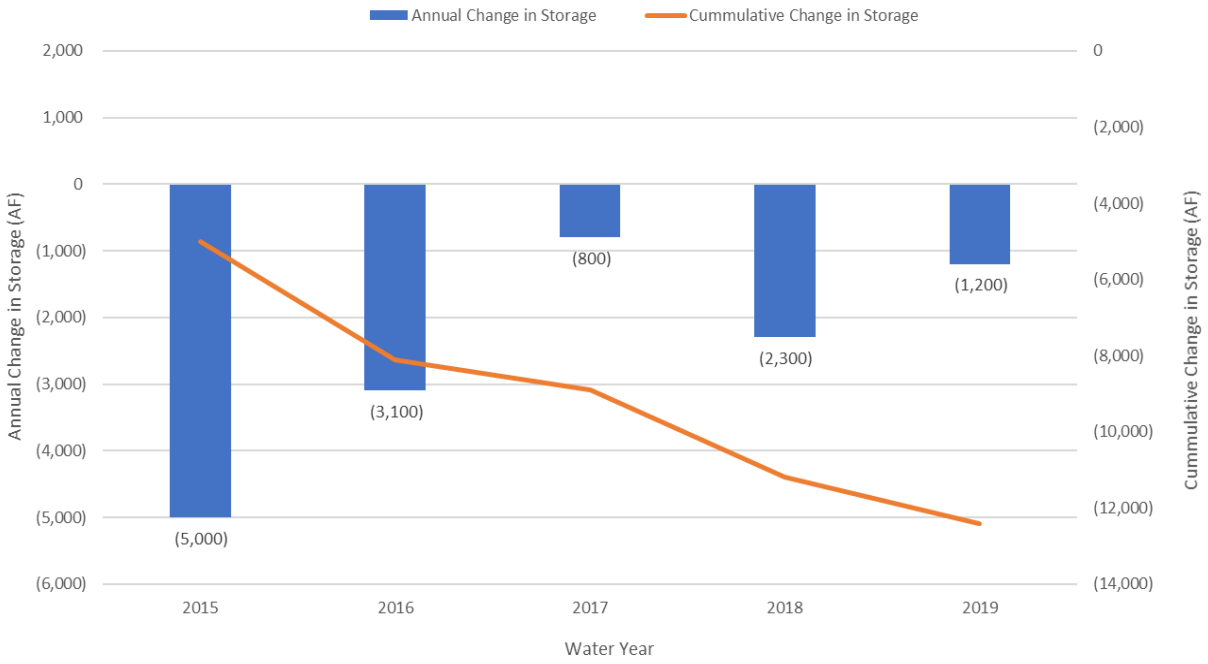

Figure 2-6
Annual & Cumulative Change in Storage

2.4.3 - *PLAN IMPLEMENTATION (REG. § 356.2 C)*

The GFWD GSA has made progress toward the implementation of various measure to improve the collection of water usage and water measurements within the service area. Those items include the measurement of the depth to groundwater from a number of private agricultural wells in the service area and the installation of measurement meters has started on those wells. The goal is to continue to work with growers in the service area to achieve full water metering of all the agricultural wells in the service area over the next two (2) years. Additionally, then the meter readings for each water year will be reported voluntary by those growers to provide an actual volume of extracted groundwater from those wells in the service area.

GFWD is looking to collect data on the San Joaquin River flows and determine the impact of those flows on the groundwater basin for GFWD.

GFWD conducted a Prop 218 process to assess the lands within the District Boundary for funds to implement the monitoring and reporting requirements of the GSP, along with implementation of the proposed projects. GFWD GSA developed four (4) new projects to enhance the ability of the GFWD to draft surface waters into the GSA Plan area, those projects are listed below.

The following is a list and brief description of future projects that the GFWD GSA is exploring for the sustainability management of the GSA Plan area and funding opportunities.

- San Joaquin River Flood Water Recharge – The project is focused on the conveyance of San Joaquin River (SJR) Flood Water Flows and increasing the capacity of the GFWD distribution system to allow for increased volumes of flood water to be captured and distributed for recharge in the GFWD GSA Plan area.

- District System Water Metering Project – This project looks to install metering stations and controls at three (3) locations along Cottonwood Creek to monitor and record the flows in the creek in and out of the GFWD GSA boundary.

- Conveyance Pipeline from San Joaquin River Pumps – The project is to look at the installation of an additional pipeline to convey waters from the existing San Joaquin River Pumps to the open Gravelly Ford Main Canal.

- Automation & SCADA – The project is to provide water management through the installation of control structures/gates with SCADA controls at six (6) existing water control structures (weirs). The automated gates would allow for improved water management of flood flows in the SJR and Cottonwood creek to be routed for either irrigation needs or for recharge.

The GFWD during the 2022 water year was not able to discharge surface water into the existing recharge basin to add volume to the groundwater storage of the area. GFWD will

continue to seek surface water each year to recharge available surface water to the service area in an effort to balance or add to the water storage volume of the area.

As determined in the GSP for GFWD GSA the use of the existing recharge basin and the unlined channels of the District, the ability of groundwater recharge can be achieved with the those facilities during a normal water year and additional water can be recharged during above normal or wet water years. An operational goal will be to import additional surface water when available during the normal and above normal years to recharge the aquifer that the GFWD GSA uses for extraction of groundwater.

The District has established the network and surveyed each private agricultural well in the service area to have a datum for future yearly surveys to determine the subsidence within the boundary of the GFWD GSA, Figure 2-7 shows the location of the wells within the District service area and Table 2-4 provides the difference between the survey events in 2019 and 2021. This will continued to be surveyed every 2 years and the results will be reported and graphed when more data is collected by future visits.

The District has coordinated with private well owners to sample their wells for water quality, this information will be provided in the WY2023 report.

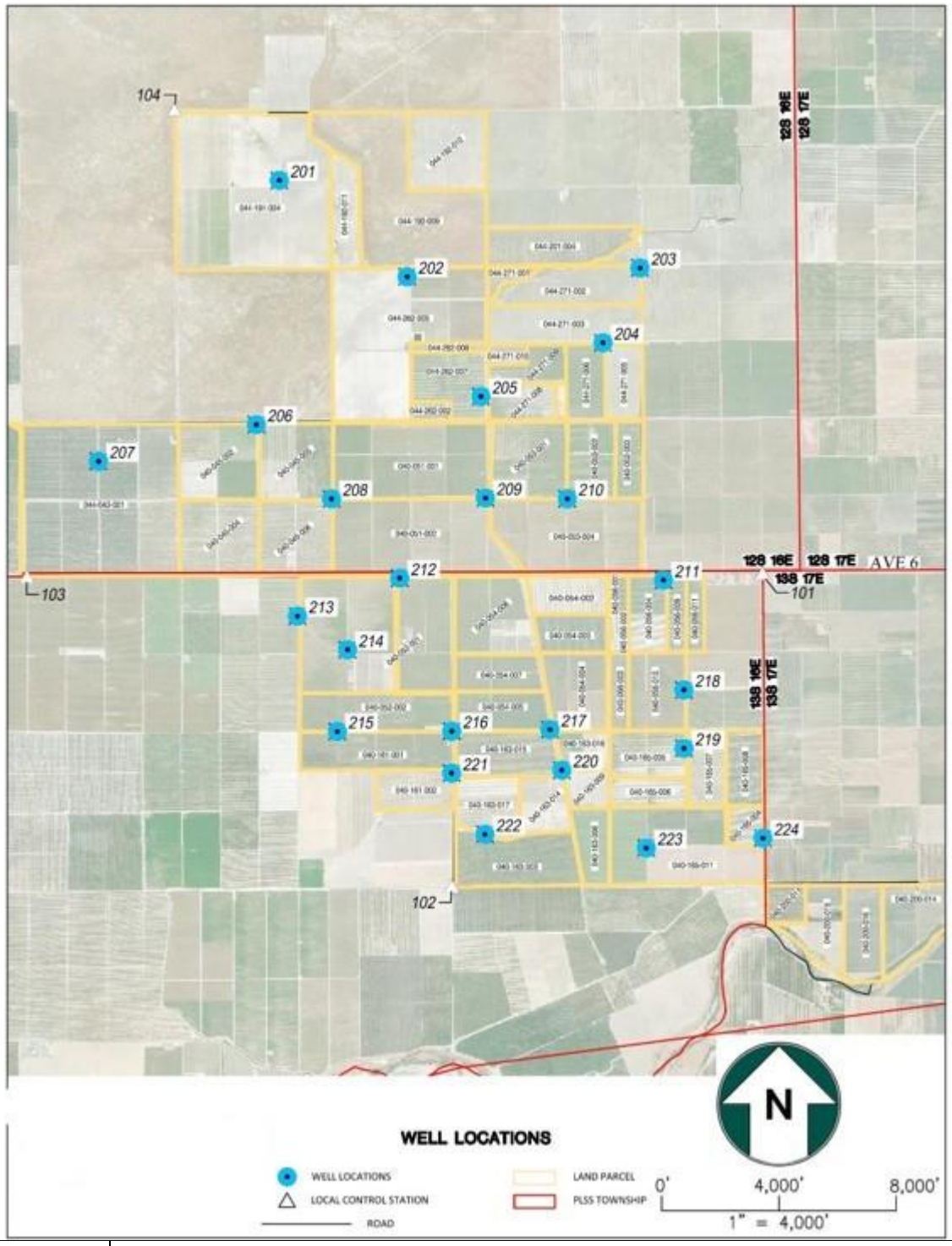

Figure 2-7
Well Locations

Table 2-4
Subsidence Data

PT NO.	ELEVATION (AS OF 7/29/2021)	ELEVATION (AS OF 12/12/2019)	SUBSIDENCE IN FEET
101	202.848	202.997	-0.149
103	171.944	172.196	-0.252
201	186.777	187.147	-0.370
202	191.471	191.784	-0.313
203	200.083	200.319	-0.236
204	199.341	199.563	-0.222
205	191.313	191.668	-0.355
206	183.610	183.957	-0.347
207	176.898	177.178	-0.280
208	185.874	186.139	-0.265
209	192.644	192.798	-0.154
210	197.397	197.585	-0.188
211	199.996	200.180	-0.184
212	188.570	188.740	-0.170
213	183.572	183.815	-0.243
214	185.843	186.067	-0.224
215	185.270	185.434	-0.164
216	189.662	189.837	-0.175
217	193.334	193.618	-0.284
218	199.539	199.699	-0.160
219	200.556	200.637	-0.081
220	196.565	196.706	-0.141
221	189.920	190.111	-0.191
222	191.400	191.546	-0.146
223	198.396	198.516	-0.120
224	203.731	203.792	-0.061

Appendix A

Table ES-3. Summary of Minimum Thresholds, Measurable Objectives, and Undesirable Results.

Sustainability Indicator	Minimum Threshold	Measurable Objective	Undesirable Result (after 2040)[1]
Chronic Lowering of Groundwater Levels	Set equal to the Fall 2015 measurement, if that observed data point is available at the RMS. Otherwise, set equal to the expected Fall 2015 groundwater level determined from MCSim results, with adjustment, if necessary, to account for the offset between historical observed and modeled data.	Set equal to the Fall 2010 measurement, if that observed data point is available at the RMS. Otherwise, set equal to the expected Fall 2010 groundwater level determined from MCSim results, with adjustment, if necessary, to account for the offset between historical observed and modeled data.	Same 30 percent of RMS wells below minimum threshold for two consecutive fall measurements.
Reduction of Groundwater Storage	Same as MTs for chronic lowering of groundwater levels. (Groundwater levels used as a proxy.)	Same as MOs for chronic lowering of groundwater levels. (Groundwater levels used as a proxy.)	Same 30 percent of RMS wells below minimum threshold for two consecutive fall measurements. (Groundwater levels used as a proxy.)
Land Subsidence	0 feet/year, subject to uncertainty of +/-0.16 feet/year	0 feet/year, subject to uncertainty of +/-0.16 feet/year	Average subsidence across 75 percent or more RMS exceeding minimum threshold for two consecutive years.
Seawater Intrusion	Not Applicable	Not Applicable	Not Applicable
Degraded Water Quality	Nitrate = 10 mg/L or existing level plus 20% (whichever is greater) Arsenic = 10 µg/L or existing level plus 20% (whichever is greater) TDS = 500 mg/L or existing level plus 20% (whichever is greater)	Current constituent concentrations	10 percent of RMS wells above the minimum threshold for the same constituent due to projects and/or management actions, based on average of most recent three year period
Depletion of Interconnected Surface Water	A percent of time surface water is connected to shallow groundwater that is equal to historical conditions for a similar climatic/hydrologic period.	A percent of time surface water is connected to shallow groundwater that is equal to historical conditions for a similar climatic/hydrologic period.	Greater than 30 percent of RMS wells below minimum threshold for two consecutive annual five-year rolling average annual evaluations

[1] SGMA defines sustainable groundwater management as the "management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results" [CWC §10721(v)]. The "planning and implementation horizon" is defined as "a 50-year time period over which a groundwater sustainability agency determines that plans and measures will be implemented in a basin to ensure that the basin is operated within its sustainable yield" [CWC §10721(r)]. The 50-year time period in the Madera Subbasin begins after the GSP implementation period.