
Central Valley Regional Water Quality Control Board

13 April 2016

David Hampton
Cawelo Water District Coalition
17207 Industrial Farm Road
Bakersfield, CA 93308

CONDITIONAL APPROVAL OF CAWELO WATER DISTRICT COALITION GROUNDWATER QUALITY ASSESSMENT REPORT

Thank you for the 4 May 2015 submittal of the Cawelo Water District Coalition (Coalition) Groundwater Quality Assessment Report (GAR), as required by Waste Discharge Requirements General Order R5-2015-0120 (General Order). The purpose of the GAR is to provide the foundational information necessary for design of the Management Practice Evaluation Program, the Groundwater Quality Trend Monitoring Program, and the Groundwater Quality Management Plan(s).

As outlined in the enclosed staff review, the information provided generally addresses the General Order's main GAR objectives. However, additional data and information need to be collected, evaluated, and incorporated into the Coalition's conceptual hydrogeologic model as it moves forward with the Management Practice Evaluation Program, the Groundwater Quality Trend Monitoring Program, and the Groundwater Quality Management Plan(s).

In order to facilitate implementation of the General Order's post-GAR groundwater requirements I am conditionally approving the Coalition's GAR upon submittal of a copy of the GAR that is signed and stamped by a California registered professional geologist or engineer (see Item 17 of the attached memorandum), and which contains the appropriate certification statement (see Section IX.3 of the General Order). This conditional approval provides a pathway for the Coalition to address issues identified in the staff review through future work plans and the 5-year GAR update while also allowing the Coalition to expeditiously proceed with the important work of the Management Practice Evaluation Program, the Groundwater Quality Trend Monitoring Program, and the Groundwater Quality Management Plan(s).

By **13 May 2016**, please submit signed and stamped copy of the Coalition's GAR. All other GAR items need to be addressed in accordance with the schedule in Table 1 - *Summary of Issues to be Addressed in Forthcoming Work Plans* (enclosed).

If you have any questions, please contact David Sholes at (559) 445-6279 or by email at David.Sholes@waterboards.ca.gov.

Sincerely,

Original signed by:

Pamela C. Creedon
Executive Officer

Enclosure(s) Staff Review Memorandum

cc: Sue McConnell, Central Valley Water Board, Rancho Cordova

Table 1 Summary of Issues to be Addressed in Forthcoming Work Plans				
Staff Memorandum Item	Management Practice Evaluation Program	Groundwater Quality Trend Monitoring Program	Groundwater Quality Management Plan(s)	Groundwater Quality Assessment Report 5 Year Update
1.A	X	X		X
1.B	X	X		X
1.C		X		X
1.D		X		X
1.E		X		X
2	X			X
3		X		X
6	X			X
8.A		X		X
8.B		X		X
9		X		X
11		X		X
12		X		X
13		X		X
15				X
16		X		X
17		X		X
18		X		X

Central Valley Regional Water Quality Control Board

TO: David Sholes, CEG
Senior Engineering Geologist
Irrigated Lands Regulatory Program

FROM: Ryan K. West
Engineering Geologist
Irrigated Lands Regulatory Program

DATE: 11 April 2016

SUBJECT: REVIEW OF THE GROUNDWATER QUALITY ASSESSMENT REPORT FOR
THE CAWELO WATER DISTRICT COALITION

On 4 May 2015, the Cawelo Water District Coalition (Coalition) submitted a Groundwater Quality Assessment Report (GAR). The GAR provides the foundational information necessary for design of the Management Practices Evaluation Program, the Groundwater Quality Trend Monitoring Program, and the Groundwater Quality Management Plan. The GAR was reviewed to determine compliance with requirements pursuant to section VIII.D.1 of Waste Discharge Requirements General Order R5-2013-0120 (General Order), section IV.A of Attachment B (Monitoring and Reporting Program or MRP) to the General Order, and the Revising Order R5-2014-0143.

California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board or Water Board) staff's review of the GAR concluded that modifications and additions are necessary to the GAR to meet the terms and conditions of the General Order; however, many of the required modifications can be included in subsequent work plans or GAR updates. Table 1 provides descriptions of the required GAR components from the General Order and Monitoring and Reporting Program and lists the sections in the GAR that address each component. Recommended revisions/additions for incomplete items are provided below. The memorandum item numbers correspond to item numbers in Table 1.

Item 1. Assessment of Readily Available, Applicable and Relevant Data and Information to Determine High and Low Vulnerability Areas.

The General Order (Section VIII.D.1) requires that the GAR provide an assessment of all readily available, applicable and relevant data and information to determine the high and low vulnerability areas where discharges from irrigated lands may result in groundwater quality degradation. While a portion of the available data was discussed in the GAR and referenced by the document, some information was not identified or evaluated. This has given rise to

uncertainties in the evaluation and determination of high and low vulnerability areas.
Recommended revisions include the following:

- A. The GAR did not provide a discussion regarding the depths of well completion that exists across the Coalition's area and how the various depths of completion may affect groundwater quality (e.g. wells completed at various depths produce different ages of groundwater; groundwater samples collected at greater depths from older groundwater may contain diluted concentrations of constituents of concern). The GAR should be revised to include this information.
- B. Well construction information for groundwater wells that were utilized for collection of groundwater quality data was not provided in the GAR. Evaluating groundwater quality data without knowing the depth within the aquifer from which the sample was obtained provides an incomplete picture for purposes of assigning vulnerability. Well construction information should be utilized in the evaluation of water quality data (e.g., well construction details should be compared to the depth to groundwater maps contained in the GAR and the historical maps presented on the California Department of Water Resources website to determine potential differences between shallow and deeper groundwater quality).

Well construction in relation to the depth of first encountered groundwater is particularly important as it has been established by a variety of USGS investigators and academics that nitrate concentrations decline with depth below first encountered groundwater (Burow et al. 2012; Fuhrer et al. 1999). Therefore, areas for which only deep groundwater quality data are available cannot be assumed to be low vulnerability based solely on this data. Additional efforts need be made to obtain groundwater quality data from first encountered groundwater (domestic well data, etc.) to comply with the requirements of the General Order (MRP Section IV. A. 2); there are numerous locations within the Coalition's primary area that could potentially contain domestic supply wells (see Attachment B to this memorandum). A discussion should be developed regarding differences in shallow groundwater concentrations of constituents of concern (COC's) and deeper groundwater chemistry obtained from the same region.

- C. An evaluation of pesticide concentrations in groundwater was not provided in the GAR and was not factored into the evaluation and determination of high vulnerability areas. If pesticide data exists for groundwater within the Coalition's area, then this data needs to be evaluated and incorporated into the high vulnerability analysis.
- D. An evaluation of arsenic concentrations in groundwater was not provided in the GAR and was not factored into the evaluation and determination of high vulnerability areas. The Cawelo Water District purchases 36,000 acre-feet (or 11 billion gallons) of produced water per year that is used for both irrigation and groundwater banking projects. The produced water contains arsenic concentrations that range up to 120 micrograms per liter ($\mu\text{g/L}$); the maximum contaminant level (MCL) for arsenic in groundwater is 10 $\mu\text{g/L}$. The GAR should be revised to include laboratory analytical data for arsenic concentrations in

groundwater. This data needs to be evaluated and incorporated into the high vulnerability analysis.

- E. Based on a review of the reference section of the GAR, it appears that a number of relevant documents (some of which contain groundwater data that does not appear to have been included in the GAR data set) were not evaluated as part of the GAR (see Attachment A, Additional References to this memorandum).

Item 2. Establish Priorities for Implementation

The General Order (Section VIII.D.1) requires that the GAR establish priorities for implementation of monitoring and studies within high vulnerability areas. To meet the prioritization requirements of the General Order, the GAR prioritized high vulnerability areas into three categories (high, medium, and low) based on consideration of the following factors: (1) proximity to urban and rural communities; (2) significant nitrate exceedances; (3) commodity types and irrigation systems; and (4) soil permeability.

High vulnerability area parcels were classified as high priority if: (a) they are in the vicinity of urban and rural communities; (b) if the analytical results of groundwater sampling have documented at least one nitrate value twice the MCL or greater in the last 15 years; (c) if inefficient irrigation systems (ex. flood irrigation) are used on any of the major crops (almonds, citrus, pistachios, or vineyards); and/or (d) if the high vulnerability parcels have soils with permeability described as moderately rapid or rapid. High vulnerability area parcels were classified as medium priority if exceedances of the MCL for nitrate in groundwater have been documented. High vulnerability area parcels were classified as low priority if concentrations of nitrate in groundwater are above half the MCL and are up-trending.

Section X.C of the GAR stated that prioritization of the high vulnerability areas would help focus the efforts of future groundwater quality monitoring and agricultural management plans. For clarity, groundwater quality monitoring will be required throughout the Coalition's area regardless of whether an area has been designated as a priority with respect to high vulnerability areas (see staff comments to Item 3 below). The GAR should be revised to specify that the tiered priority map (Figure 55 in the GAR) will be used when implementing monitoring and studies within the high vulnerability areas.

Item 3. Basis for Establishing Monitoring Work Plans Developed to Assess Groundwater Quality Trends

The General Order (Section VIII.D.1) requires that the GAR provide the basis for establishing work plans to assess groundwater quality trends. Section XII.C of the GAR states that "The designated high vulnerability area in the CWDC (Coalition's area) will provide the basis to developing a groundwater monitoring plan. Wells to be monitored will focus on the High Priority areas and NO₃ as the primary constituent of concern." The GAR went on to say that wells selected would be representative of the impacted areas within the high vulnerability areas and that additional wells outside of the high vulnerability areas would be evaluated to address areas of potential concern. Based on these statements, it appears that the primary focus of groundwater quality trend monitoring work plans would be in high vulnerability areas. However,

as stated in section IV.C.2 of the General Order's MRP "...the third party shall develop a groundwater monitoring network that will (1) be implemented over both high and low vulnerability areas in the third party area; ..."

The trend monitoring program should be designed to determine current water quality conditions of groundwater in the Coalition's area, and to develop long-term groundwater quality information that can be used to evaluate the regional effects (i.e. not site specific effects) of irrigated agriculture and its practices. The GAR should be revised to indicate that work plans for groundwater quality trend monitoring will address both high and low vulnerability areas.

Item 6. Land Use

Section IV.A.2 of the Monitoring and Reporting Program requires that the GAR include detailed land use information for the Coalition's area and identify the largest acreage commodity types (including the most prevalent commodities comprising up to at least 80% of the Coalition's irrigated agricultural acreage). The information provided in Section V of the GAR related to agricultural land use (portrayed on Figure 14 - 2014 Crop Survey) did not contain a reference source for the data. The GAR should be revised to include this information.

Item 8. Groundwater Recharge

Section IV.A.2 of the Monitoring and Reporting Program requires that the GAR include information regarding groundwater recharge within the Coalition's area, including the identification of areas contributing recharge to urban and rural communities where groundwater serves as a significant source of supply. Although Section VII of the GAR did identify several different sources of groundwater recharge, including natural flows in Poso Creek, irrigation return flows (water that is applied beyond the needs and evapotranspiration rates of the crop), and two groundwater recharge basins (Famoso Basin and Poso Creek Basin) that are utilized when surplus water is available, additional information is needed. Specifically, the GAR should be revised to provide the following information:

- A. The GAR should be revised to include all groundwater recharge basins within the Coalition's area. Specifically, section VII.D of the GAR is missing Reservoir B, Robertson Reservoir, Reservoir C, and Reservoir E which are operated by the Cawelo Water District. Information regarding some of these recharge basins can be found in the Cawelo Water District Agricultural Water Management Plan dated February 2014. Additionally, the GAR should be revised to include a figure/map that clearly identifies the location of each of the recharge basins.
- B. The GAR did not provide a discussion regarding the use of oil field produced wastewater (produced water) for groundwater recharge. The Cawelo Water District purchases 36,000 acre-feet (or 11 billion gallons) of produced water per year that is used for both irrigation and groundwater banking projects. Section VII of the GAR should be revised to include a discussion of the use of produced water and the potential for entrained constituents to impact groundwater (see Item 1.D. above). The Monitoring and Reporting Programs for

the Orders (R5-2012-0058 & R5-2012-0059) or future orders that regulate the produced water reclamation project should be referenced to determine constituents of concern.

Item 9. Soil Survey Information

Sections III.B and X.A.4. of the GAR provide information on soil properties and qualities that may affect the leaching of agricultural chemicals to groundwater. However, certain information required by the General Order was not provided. Specifically, the GAR does not discuss the presence or absence of a hardpan, and does not discuss areas of high salinity, alkalinity and acidity within the Coalition's area. The GAR should be revised to provide this information.

Item 11. Information on Existing Groundwater Data Collection and Analysis Efforts

The groundwater data compilation and review must include all readily accessible information relevant to the General Order on existing monitoring well networks, individual well details, and monitored parameters. The GAR should be revised to include individual monitoring well construction details (for wells that were utilized for collection of groundwater quality data contained in the GAR), identify the COCs monitored, the QA/QC methods used to validate the data, and specify which data set corresponds to specific or general geographical areas within the Coalition's boundaries (e.g., data distributed across the entire area or only a portion of the area).

Item 12. Existing Water Quality Impacts and Vulnerable Conditions

Section IV.A.3 of the Monitoring and Reporting Program requires that the GAR identify known groundwater quality impacts for which irrigated agricultural operations are a potential contributor or where conditions make groundwater more vulnerable to impacts from irrigated agricultural activities. The introduction to Section IX. of the GAR states "*The focus of this groundwater quality assessment is primarily on the Nitrate (NO₃) constituent with a review and evaluation of the Electrical Conductivity (EC) in the same area.*" The General Order requires that the GAR address all constituents of concern associated with agriculture. At a minimum, the HVAs should also be evaluated for areas with pesticide detections (see Item 1.C. above).

Item 13. Feasibility of Incorporating Existing Groundwater Data and Their Corresponding Monitoring Well Systems.

The GAR indicated that the Coalition intends on utilizing existing wells from Cawelo Water District's ongoing groundwater monitoring network. However, the GAR did not provide any information to indicate that the use of existing Cawelo Water District wells would be suitable (proper depth and screened interval) to obtain groundwater quality information that is consistent with the groundwater monitoring provisions of the General Order (i.e. required for Trend Monitoring). Available information for Cawelo Water District monitoring wells near the Famoso Basin indicates that the well screen lengths below the water table average 554 feet (based on the average of 15 wells). It has been established by a variety of USGS investigators and academics that nitrate concentrations decline with depth below first encountered groundwater (Burow et al. 2012; Fuhrer et al. 1999). Based on the long well screen lengths, these particular Cawelo Water District monitoring wells would likely produce diluted concentrations of

constituents of concern, and do not appear appropriate to collect groundwater quality information that is consistent with the groundwater monitoring provisions of the General Order.

Section IV.C.2 of General Order's MRP states that groundwater quality trend monitoring needs to employ shallow wells (i.e. with respect to the water table), but not necessarily wells completed in the uppermost zone of first encountered groundwater. The GAR should be revised to indicate that the well selection for the Coalition's Groundwater Quality Trend Monitoring Program will meet the minimum requirements of Section VIII.D of the General Order.

While the GAR also indicated that other groundwater monitoring networks such as GAMA and CASGEM would be considered, there was no mention of utilizing domestic wells for groundwater quality trend monitoring. The Coalition should explore the option of using existing domestic supply wells for the Groundwater Quality Trend Monitoring Program, as these may be suitable (proper well screen length and placement with respect to the water table) for obtaining groundwater samples that would be consistent with the groundwater monitoring provisions of the General Order. There are numerous locations within the Coalition's primary area that could potentially contain domestic supply wells (see Attachment B to this memorandum).

The GAR should be revised to evaluate all available information (domestic supply wells, etc) as it relates to the feasibility of incorporating existing wells into the groundwater monitoring programs required by the General Order and specify that the trend monitoring program will utilize shallow wells (relative to the water table) when available as required by the MRP.

Item 15. Describe pertinent geologic and hydrogeologic information for the third-party area(s) and utilize GIS mapping applications

The GAR provided some geologic and hydrogeologic information for the Coalition's area. However, the GAR did not provide any graphical representations that illustrate the relations of the groundwater quality data to the geologic and hydrogeologic information. The GAR should be revised to include graphical representations that clearly convey pertinent data, support data analysis, and show results (e.g., geologic and hydrogeologic information could be displayed in cross section in combination with depth to groundwater data, well completion data, and groundwater quality data in order to clearly convey the relationships of each of the datasets to each other and to the subsurface geology).

Item 16. Groundwater Vulnerability Designations

The General Order requires that the GAR designate high/low vulnerability areas for groundwater where known groundwater quality impacts exist for which irrigated agricultural operations are a potential contributor or where conditions make groundwater more vulnerable to impacts from irrigated agricultural activities. The third-party must provide the rationale for proposed vulnerability determinations. Review of the vulnerability analysis in Section X.B. of the GAR has identified concerns which need to be addressed.

The vulnerability designations proposed in the GAR were determined primarily based on nitrate concentrations in groundwater. Additional criteria such as proximity to urban and

disadvantaged communities (DACs), electrical conductivity values for groundwater, groundwater levels, soil characteristics (permeability, etc.), commodity types, and irrigation and nutrient application methods were used to support the final high vulnerability designations. The additional criteria were also used to include or exclude some areas with nitrate exceedances in groundwater which lacked sufficient data to establish a trend. The boundaries of high vulnerability areas were defined by parcel boundaries.

The GAR's two-dimensional vulnerability model only considered hydrogeologic conditions as a secondary component to either include or exclude some areas with nitrate exceedances in groundwater. Additionally, the only hydrogeologic factors considered were depth to groundwater and the permeability of surficial soils (upper six feet of soils [NRCS data]). These are only a few of many factors that control vertical leaching through the unsaturated zone. Factors such as hydraulic conductivity, porosity, presence or absence of preferential pathways, amounts and timing of irrigation events, rainfall, crop type, and thickness of the vadose zone affect vertical movement in the unsaturated zone. Hydraulic gradients, groundwater pumping, aquifer material, and multiple screened intervals or the absence of proper seals affect vertical flow within the aquifer. The vulnerability assessment should be revised to account for these hydrogeologic factors. High vulnerability should also include all areas where EC and Nitrate concentrations in groundwater are at 50% of the regulatory threshold (MCL) or higher and have a trend indicating a statistically significant increasing concentration.

Item 17. Compliance with Sections 6735(a) and 7835 of the California Business and Professions Code.

Section 7835 of the California Business and Professions Code states that *“All geologic plans, specifications, reports, or documents shall be prepared by a professional geologist or registered certified specialty geologist, or by a subordinate employee under his or her direction. In addition, they shall be signed by the professional geologist or registered certified specialty geologist or stamped with his or her seal, either of which shall indicate his or her responsibility for them.”*

Section 6735(a) of the California Business and Professions Code states that *“All civil (including structural and geotechnical) engineering plans, calculations, specifications, and reports (hereinafter referred to as “documents”) shall be prepared by, or under the responsible charge of, a licensed civil engineer and shall include his or her name and license number. Interim documents shall include a notation as to the intended purpose of the document, such as “preliminary,” “not for construction,” “for plan check only,” “for review only.” All civil engineering plans and specifications that are permitted or that are to be released for construction shall bear the signature and seal or stamp of the licensee and the date of signing and sealing or stamping. All final civil engineering calculations and reports shall bear the signature and seal or stamp of the licensee and the date of signing and sealing or stamping. If civil engineering plans are required to be signed and sealed or stamped and have multiple sheets, the signature, seal or stamp, and date of signing and sealing or stamping shall appear on each sheet of the plans. If civil engineering specifications, calculations, and reports are required to be signed and sealed or stamped and have multiple pages, the signature, seal or stamp, and date of signing and*

sealing or stamping shall appear at a minimum on the title sheet, cover sheet, or signature sheet.”

The GAR contains information that is consistent with the requirement of the aforementioned sections of the California Business and Professions Code, and, therefore, the appropriate signature or stamp needs to be included. The revised GAR must contain the appropriate signature and license number.

Item 18. Additional Concerns Regarding GAR Material Not Specifically Required by the General Order

Section XII.C of the GAR includes information regarding the anticipated elements the Coalition will employ in the development of the Trend Groundwater Monitoring Program. Review of this section has identified concerns with the proposed elements/processes to be used for trend monitoring development that will need to be addressed in the Coalition’s Trend Groundwater Monitoring work plan.

- A. The Coalition’s proposed methodology for establishing the Trend Groundwater Monitoring network is described as follows.

Within the High Vulnerability Area, identify three (3) wells per Township with a priority of locating wells within high priority areas. Based upon the High Vulnerability Area identified within the GAR, the total estimated number of existing wells planned to be included in the groundwater monitoring network is approximately 15 wells.

No information or discussion is provided in the GAR regarding the basis for the number of trend monitoring wells proposed. Justification for this approach will need to be provided as part of the Trend Groundwater Monitoring work plan.

- B. The Coalition’s Trend Groundwater Monitoring network should include groundwater monitoring wells near Reservoir B (used for storage and distribution of oil field produced water).

Table 1. Components of the Groundwater Assessment Report

Item No.	Required Component	Location in GAR
GAR Objectives – MRP section IV.A.1		
1	Provide an assessment of all readily available, applicable and relevant data and information to determine the high and low vulnerability areas where discharges from irrigated lands may result in groundwater quality degradation.	Sections X. A. & X. B. Throughout Figure 54
2	Establish priorities for implementation of monitoring and studies within high vulnerability or data gap areas.	Section X. C. Figure 55
3	Provide a basis for establishing Monitoring work plans developed to assess groundwater quality trends.	Section XII.
4	Provide a basis for establishing Management Practices Evaluation Program (MPEP) work plans and priorities developed to evaluate the effectiveness of agricultural management practices to protect groundwater quality.	Not included; Elected for Group MPEP Option
5	Provide a basis for establishing groundwater quality management plans in high vulnerability areas and priorities for implementation of those plans.	Comprehensive GQMP submitted as a separate document
Required GAR Components – MRP section IV.A.2		
6	Detailed land use information with emphasis on land uses associated with irrigated agricultural operations. The information shall identify the largest acreage commodity types in the third-party area, including the most prevalent commodities comprising up to at least 80% of the irrigated agricultural acreage in the third-party area. If the third-party manages the area through sub-watershed groups, the GAR information should be developed for each sub-watershed.	Section V. Figure 13 - 20
7	Information regarding depth to groundwater, provided as a contour map(s), if readily available. Tabulated and/or graphical data from discrete sampling events may be submitted if limited data precludes producing a contour map.	Section IV. B. Figures 7 - 12
8	Groundwater recharge information, if readily available, including identification of areas contributing recharge to urban and rural communities where groundwater serves as a significant source of supply.	Section VII.
9	Soil survey information, including significant areas of high salinity, alkalinity and acidity.	Section III. B. Table 3 Figures 4, 5, & 28
10	Shallow groundwater constituent concentrations from existing monitoring networks (potential constituents of concern include any material applied as part of the agricultural operation, including constituents in irrigation supply water [e.g., pesticides, fertilizers, soil amendments, etc.] that could impact beneficial uses or cause degradation).	Section IX. Figures 22 - 27
11	Information on existing groundwater data collection and analysis efforts relevant to this Order (e.g., Department of Pesticide Regulation [DPR], United States Geological Survey [USGS], State Water Board Groundwater Ambient Monitoring and Assessment [GAMA], California Department of Public Health, local groundwater management plans, etc.). This groundwater data compilation and review shall include all readily accessible information relevant to the Order on existing monitoring well	Section IX. A Section IX. B Section IX. C Figures 22 - 27

	networks, individual well details, and monitored parameters. For existing monitoring networks (or portions thereof) and/or relevant data sets, the third-party should assess the possibility of data sharing between the data-collecting entity, the third-party, and the Central Valley Water Board.	
GAR Data Review and Analysis – MRP section IV.A.3		
12	Determine where known groundwater quality impacts exist for which irrigated agricultural operations are a potential contributor or where conditions make groundwater more vulnerable to impacts from irrigated agricultural activities.	Throughout Section X.B. Figure 54
13	Determine the merit and feasibility of incorporating existing groundwater data collection efforts, and their corresponding monitoring well systems for obtaining appropriate groundwater quality information to achieve the objectives of and support groundwater monitoring activities under this Order. This shall include specific findings and conclusions and provide the rationale for conclusions.	Section X.A. 8
14	Prepare a ranking of high vulnerability areas to provide a basis for prioritization of work plan activities.	Section X. C. Figure 55
15	Describe pertinent geologic and hydrogeologic information for the third-party area(s) and utilize GIS mapping applications, graphics, and tables, as appropriate, in order to clearly convey pertinent data, support data analysis, and show results.	Throughout
Groundwater Vulnerability Designations – MRP section IV.A.4		
16	The GAR shall designate high/low vulnerability areas for groundwater in consideration of high and low vulnerability definitions provided in Attachment E of the Order. The vulnerability designations will be made using a combination of physical properties (soil type, depth to groundwater, known agricultural impacts to beneficial uses, etc.) and management practices (e.g., irrigation method, crop type, nitrogen application and removal rates, extent of implementation, etc.). The third-party shall provide the rationale for proposed vulnerability determinations.	Sections X. A. & X. B. Throughout Figure 54
Other		
17	Section 7835 of the California Geologist and Geophysicist Act states that “All geologic plans, specifications, reports, or documents shall be prepared by a professional geologist or registered certified specialty geologist, or by a subordinate employee under his or her direction. In addition, they shall be signed by the professional geologist or registered certified specialty geologist or stamped with his or her seal, either of which shall indicate his or her responsibility for them.”	Included Cover Sheet
Additional Concerns		
18	Groundwater Quality Trend Monitoring Program concerns	

Attachment A
Additional References

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Attachment B
Sites that could potentially contain Domestic Supply Wells within the Coalition's Primary Area

Sites	Latitude	Longitude	Location	Description
1	35.674934	-119.080474	S of Nevis Ave, W of Highway 65	Single building
2	35.673417	-119.078544	S of Nevis Ave, W of Highway 65	building
3	35.658838	-119.081204	S of Sherwood Ave, W of Highway 65	tower facility
4	35.647929	-119.096433	N of Whisler Rd, W of Highway 65	facility with trailers
5	35.646019	-119.097769	N of Whisler Rd, W of Highway 65	building
6	35.636331	-119.090297	N Phillips Rd, W of Highway 65	building next to ag pond
7	35.653009	-119.107669	S of Nill Ave, E of Industrial Farm Rd	building next to ag pond
8	35.671539	-119.108047	S of Nevis Ave, W of Fay Ridge Rd	building on ag parcel
9	35.624517	-119.106698	S of Phillips Rd, W of Fay Ridge Rd	facility next to ag pond
10	35.602889	-119.107007	N of Famoso Rd, W of Fay Ridge Rd	facility next to ag pond
11	35.606027	-119.120294	N of Famoso Rd, W of Quality Rd	residential home
12	35.613049	-119.119594	S of Mc Combs Rd, W of Quality Rd	residential home
13	35.634873	-119.132872	N of Phillips Rd, E of Kyte Rd	facility next to ag pond
14	35.637336	-119.125650	N of Phillips Rd, E of Kyte Rd	residential or facility
15	35.652945	-119.132520	S of Hanawalt Ave, E of Kyte Rd	facility
16	35.680896	-119.125854	N of Nevis Ave, E of Kyte Rd	residential home
17	35.681599	-119.125473	N of Nevis Ave, E of Kyte Rd	facility
18	35.669854	-119.134370	S of Sherwood Ave, W of Kyte Rd	building next to ag pond
19	35.665072	-119.134378	N of Hanawalt Ave, W of Kyte Rd	residential home
20	35.649713	-119.137362	N of Whisler Rd, W of Kyte Rd	facility
21	35.627054	-119.134443	S of Phillips Rd, W of Kyte Rd	facility
22	35.619055	-119.133928	N of McCombs Rd, W of Kyte Rd	facility
23	35.611705	-119.137892	S of McCombs Rd, W of Kyte Rd	facility
24	35.605999	-119.137183	N of Famoso Rd, W of Kyte Rd	building next to ag pond
25	35.656705	-119.151753	S of Hanawalt Ave, E of Zerker Rd	Single building
26	35.653243	-119.164675	S of Hanawalt Ave, E of Wallace Rd	building next to ag pond
27	35.638083	-119.160407	N of Phillips Rd, E of Wallace Rd	residential home
28	35.625171	-119.155242	S of Phillips Rd, W of Zerker Rd	residential homes
29	35.603078	-119.152475	N of Famoso Rd, W of Zerker Rd	residential and facility
30	35.597089	-119.169549	S of Famoso Rd, W of Wallace Rd	facility
31	35.589198	-119.169409	S of Poso Ave, W of Wallace Rd	facility
32	35.600164	-119.192087	S of Famoso Rd, W of Zachary Ave	facility
33	35.593915	-119.186738	S of Famoso Rd, W of Zachary Ave	building next to pond
34	35.593584	-119.204380	S of Famoso Rd, E of C St	building next to pond
35	35.596442	-119.205579	S of Famoso Rd, E of C St	facility
36	35.598770	-119.209364	S of Famoso Rd, E of Hwy 99	facility
37	35.600967	-119.210358	S of Famoso Rd, E of Hwy 99	facility
38	35.598193	-119.211920	S of Hwy 46, W of Golden State Hwy	facility
39	35.603382	-119.210653	N of Paso Robles Hwy, E of Highway 99	facility
40	35.612260	-119.204522	S of McCombs Rd, W of Driver Rd	residential/build next to ag pond
41	35.573524	-119.181216	N of Jackson Ave, W of Kimberlina Rd	residential homes
42	35.565702	-119.179394	S of Jackson Ave, W of Kimberlina Rd	facility

Attachment B
Sites that could potentially contain Domestic Supply Wells within the Coalition's Primary Area

Sites	Latitude	Longitude	Location	Description
43	35.566425	-119.174583	S of Jackson Ave, E of Kimberlina Rd	residential
44	35.565768	-119.151657	N of Jacobs Ave, W of Zerker Rd	residential
45	35.580157	-119.155409	N of Jackson Ave, W of Zerker Rd	building next to ag pond
46	35.600782	-119.136353	S of Famoso Rd, E of Zerker Rd	residential and trailers
47	35.595152	-119.133640	S of Famoso Rd, E of Zerker Rd	facility
48	35.586402	-119.139566	N of Jackson Ave, E of Zerker Rd	facility
49	35.569902	-119.147010	N of Poso Creek Ln, E of Zerker Rd	residential
50	35.566304	-119.149522	S of Poso Creek Ln, E of Zerker Rd	building
51	35.565201	-119.147252	S of Poso Creek Ln, E of Zerker Rd	residential
52	35.563736	-119.144316	S of Poso Creek Ln, E of Zerker Rd	residential
53	35.564329	-119.138837	S of Prospect Ave, W of Kyte Ave	residential
54	35.565923	-119.138412	S of Prospect Ave, W of Kyte Ave	trailers
55	35.562705	-119.116055	N of Kimberlina Rd, W of Quality Rd	trailers
56	35.591435	-119.120449	S of Famoso Rd, W of Quality Rd	residential/facility
57	35.600226	-119.090305	S of Famoso Rd, W of Highway 65	residential/facility
58	35.592499	-119.097035	N of Poso Ave, W of Highway 65	residential
59	35.577275	-119.097033	N of Jackson Ave, E of Fay Ridge	residential
60	35.575211	-119.096974	N of Jackson Ave, E of Fay Ridge	trailer
61	35.575058	-119.093061	S of Poso Height Rd, E of Highway 65	residential
62	35.570392	-119.115416	S of Jackson Ave, E of Quality Rd	facility
63	35.560332	-119.114127	N of Kimberlina Rd, E of Quality Rd	building
64	35.546617	-119.104507	N of Dresser Ave, E of Quality Rd	residential
65	35.544655	-119.113175	N of Dresser Ave, E of Quality Rd	trailer
66	35.548233	-119.119956	N of Dresser Ave, W of Quality Rd	residential
67	35.548833	-119.124114	N of Dresser Ave, W of Quality Rd	residential
68	35.557025	-119.115947	S of Kimberlina Rd, W of Quality Rd	residential
69	35.548180	-119.128828	N of Merced Ave, E of Kyte Ave	residential
70	35.549358	-119.130531	N of Merced Ave, E of Kyte Ave	residential
71	35.550289	-119.133755	N of Dresser Ave, W of Kyte Ave	residential
72	35.548170	-119.133651	N of Dresser Ave, W of Kyte Ave	residential
73	35.546379	-119.149655	N of Dresser Ave, E of Zerker Rd	facility
74	35.558315	-119.160334	S of Kimberlina Rd, W of Zerker Rd	residential
75	35.552606	-119.172494	S of Kimberlina Rd, W of Wallace Rd	facility
76	35.555158	-119.178441	S of Kimberlina Rd, E of Zachary Ave	residential
77	35.557040	-119.183067	S of Kimberlina Rd, E of Zachary Ave	residential
78	35.550787	-119.178319	S of Dresser Ave, E of Zachary Ave	residential
79	35.543951	-119.169437	S of Dresser Ave, W of Wallace Rd	residential
80	35.540646	-119.169325	S of Dresser Ave, W of Wallace Rd	facility
81	35.543922	-119.132791	S of Dresser Ave, E of Kyte Ave	facility
82	35.533585	-119.120587	N of Merced Ave, W of Quality Rd	residential
83	35.533268	-119.125203	N of Merced Ave, E of Kyte Ave	residential/trailers
84	35.536406	-119.134157	S of Rd 5037, W of Kyte Ave	facility/residential
85	35.530036	-119.169943	N of Merced Ave, W of Wallace Rd	abandoned facility

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Sites	Latitude	Longitude	Location	Description
86	35.529402	-119.169907	S of Merced Ave, W of Wallace Rd	residential
87	35.536533	-119.178875	S of Rd 5037, W of Gulley St	facility/residential
88	35.531121	-119.188107	N of Merced Ave, W of Zachary Ave	facility
89	35.529102	-119.187630	S of Merced Ave, W of Zachary Ave	facility
90	35.524680	-119.169721	S of Merced Ave, W of Wallace Rd	residential
91	35.520457	-119.150923	N of Rd 5039, E of Zerker Rd	facility
92	35.518799	-119.134638	N of Rd 5039, W of Kyte Ave	building next to ag pond
93	35.529558	-119.142483	S of Merced Ave, W of Kyte Ave	residential/build next to ag pond
94	35.528726	-119.108809	S of Merced Ave, W of Industrial Farm Rd	facility
95	35.523076	-119.109086	S of Merced Ave, W of Industrial Farm Rd	residential
96	35.521890	-119.115257	S of Madera Ave, E of Quality Rd	building
97	35.510858	-119.110880	S of Madera St, E of Quality Rd	facilities
98	35.507084	-119.109653	N of Lerdo Hwy, W of Industrial Farm Rd	building
99	35.505364	-119.115180	N of Lerdo Hwy, E of Quality Rd	facility
100	35.500819	-119.145986	N of Lerdo Hwy, E of Zerker Rd	facility
101	35.502740	-119.149680	N of Lerdo Hwy, E of Zerker Rd	facility
102	35.513722	-119.134585	S of Rd 5039, W of Kyte Ave	residential/facility
103	35.504447	-119.153741	N of Lerdo Hwy, W of Zerker Rd	facility
104	35.498131	-119.126167	S of Lerdo Hwy, E of Kyte Ave	facility
105	35.492945	-119.114157	S of Lerdo Hwy, E of Quality Rd	residential
106	35.498879	-119.102390	S of Lerdo Hwy, W of Amost St	facility
107	35.477520	-119.109029	N of Burbank St, E of Industrial Farm Rd	residential
108	35.475969	-119.091812	N of Burbank St, W of Amos Rd	residential
109	35.476400	-119.083404	N of Lucadia Ave, W of Quinn Rd	residential
110	35.474591	-119.084452	N of Lucadia Ave, W of Quinn Rd	residential/facility
111	35.475011	-119.085262	N of Lucadia Ave, E of Amos Rd	residential
112	35.472231	-119.085054	N of Burbank St, E of Amos Rd	residential
113	35.466802	-119.066063	S of James Rd, E of Highway 65	facility
114	35.468593	-119.076628	S of Burbank St, W of Highway 65	facility
115	35.463985	-119.082929	S of Burbank St, W of Quinn Rd	residential
116	35.469283	-119.101469	S of Burbank St, W of Imperial Rd	facility next to ag pond
117	35.463081	-119.070367	N of Imperial St, E of Highway 65	residential
118	35.449955	-119.097530	N of Petrol Rd, E of Saco Rd	facility
119	35.445960	-119.086893	S of Petrol Rd, W of Quinn Rd	facilities
120	35.445667	-119.079104	N of Merle Haggard Dr, W of Highway 65	facilities
121	35.452727	-119.078521	S of Imperial St, E of Quinn Rd	facilities
122	35.441895	-119.073656	N of Merle Haggard Dr, E of Highway 65	facilities
123	35.438560	-119.079120	S of Merle Haggard Dr, E of Highway 65	facilities
124	35.445810	-119.096910	N of 7th Standard Rd, W of Highway 99	facilities
125	35.443543	-119.104952	N of 7th Standard Rd, W of Highway 99	residential
126	35.419152	-119.118877	S of Snow Rd, E of Jewetta Ave	city section/residential