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## APPENDIX I

### Hydrogeological Assessment for CEQA

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# **HYDROGEOLOGIC ASSESSMENT SUMMARY FOR CEQA**

for the

**ANTONIO AZEVEDO DAIRY #2 EXPANSION  
7618 HIGHWAY 59, EL NIDO, CA**

prepared for

**ANTONIO AZEVEDO DAIRY  
and  
ENVIRONMENTAL PLANNING PARTNERS**

**September 2024**

**Revision 0**

# TABLE OF CONTENTS

<b>1</b>	<b>GENERAL INFORMATION .....</b>	<b>1</b>
<b>2</b>	<b>PHYSICAL SETTING AND EXISTING CONDITIONS.....</b>	<b>5</b>
2.1	EXISTING HERD AND RANCH FEATURES.....	5
2.2	SURROUNDING LAND USE.....	5
2.3	PROJECT SETTING, PHYSIOGRAPHY AND SURFACE WATER.....	6
2.4	GEOLOGY.....	8
2.5	SITE SPECIFIC SOILS .....	19
2.6	FACILITY GROUNDWATER QUALITY SUMMARY .....	25
2.7	IMPAIRED SURFACE WATERS.....	26
2.8	FLOODING.....	26
<b>3</b>	<b>REGULATORY BACKGROUND.....</b>	<b>27</b>
3.1	FEDERAL LAWS AND REGULATIONS.....	27
3.2	CALIFORNIA LAWS AND REGULATIONS.....	27
3.3	CALIFORNIA DEPARTMENT OF WATER RESOURCES FLOOD MANAGEMENT.....	42
3.4	MERCED COUNTY.....	42
3.5	TMDL AND IMPACTED WATERWAYS NEAR THE PROJECT SITE.....	46
<b>4</b>	<b>EXISTING AND PROPOSED DAIRY CONDITIONS.....</b>	<b>48</b>
4.1	EXISTING AND PROPOSED PROJECT OPERATIONS AND NMP & WMP SUMMARY .....	48
4.2	SUMMARY OF POTENTIAL GROUNDWATER RESOURCE DEGRADATION FROM OPERATION OF THE AZEVEDO DAIRY #2 EXPANSION 51	
<b>5</b>	<b>REFERENCES .....</b>	<b>54</b>

## List of Figures

Figure 1 – Facility Location Map (Map Taken from the 2022 NOP).....	2
Figure 2 – Facility, Field Application Map (Map Taken from the 2022 NOP).....	3
Figure 3 – Project Site Merced County Assessor Parcel Numbers (Map Taken from the 2022 NOP) .....	4
Figure 4 - Surface Water Flows (Map Taken from the 2022 GSP), Figure 2-5) .....	6
Figure 5 - Groundwater and Surface Water Interconnection (Map Taken from the 2022 GSP), Figure 2-10) .....	7
Figure 6 - Location of Geologic Cross Sections (Map Taken from the 2022 GSP, Figure 2- 12).....	10



Figure 7- Geologic Cross Section C-C' (Map Taken from the 2022 GSP, Figure 2-15) .....	11
Figure 8 - Geologic Cross Section D-D' (Map Taken from the 2022 GSP, Figure 2-16) ...	11
Figure 9 - Spring 2017 Groundwater Elevation, Principal Aquifer Above CC (Map Taken from the 2022 GSP, Figure 2-44).....	13
Figure 10 - Spring 2017 Groundwater Elevation, Principal Aquifer Below CC (Map Taken from the 2022 GSP, Figure 2-45).....	14
Figure 11 - Average Nitrate (as N) Concentration 2008-2018, Above Corcoran Clay (Map Taken from the 2022 GSP, Figure 2-59).....	15
Figure 12 - Average Nitrate (as N) Concentration 2008-2018, Below Corcoran Clay (Map Taken from the 2022 GSP, Figure 2-60).....	16
Figure 13 - Average TDS Concentration 2008-2018, Below Corcoran Clay .....	17
Figure 14 - Average TDS Concentration 2008-2018, Unknown Aquifer.....	18
Figure 15 - 5-Year Average Distribution of Chloride in Groundwater (2007-2012).....	19
Figure 16 - Fall 2023 Groundwater Elevation, Principal Aquifer: Below Corcoran Clay, taken from 2023 MSGSA Annual Report.....	22
Figure 17 - DWR Hydrographs for Selected Wells with complete history taken from the GSP .....	23
Figure 18 - Locations of RMP Dairies (Taken from CVDRMP Annual Report) .....	35

## List of Tables

Table 1 - Historic Domestic and Irrigation Well Water Quality .....	26
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# 1 GENERAL INFORMATION

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On behalf of the Azevedo Dairy #2 and Environmental Planning Partners, Inc., NV5 has prepared the following Hydrogeologic Assessment Summary for CEQA. This report documents existing hydrogeologic conditions at the Antonio Azevedo Dairy #2 and assesses potential hydrogeologic impacts related to the proposed dairy expansion project. NV5 has prepared this report to comply with County CEQA requirements and support the Draft Environmental Impact Report (DEIR) for the proposed expansion project.

The active dairy facilities of the Azevedo Dairy #2 Expansion (Azevedo Dairy #2) are located on ~33 acres of an existing farm totaling 119 acres in unincorporated Merced County. The dairy project site is located on the east side of State Route (SR) 59 (or Highway 59), 0.6 miles south of East Sandy Mush Road in the El Nido area of the County. The project's location is within the central California region (see Figures 1 and 2). The project cropland application area consists of ~82 acres located on a portion of the dairy parcel, identified as Merced County Assessor's Parcel Number (APN) 075-010-003 (see Table 1 and Figure 3 for Merced County APN). The project site is located in Section 23, Township 9 South, Range 14 East, Mount Diablo Base and Meridian; 37°10'37.20"N, 120°29'16.68"W. This hydrogeologic assessment was completed based on desktop review of existing data, published and non-published resources detailed herein and listed in Section 5. Facility or crop area environmental boring investigations have not been completed nor has a Monitoring Well Installation and Sampling Plan (MWISP) been prepared for the Azevedo Dairy #2.

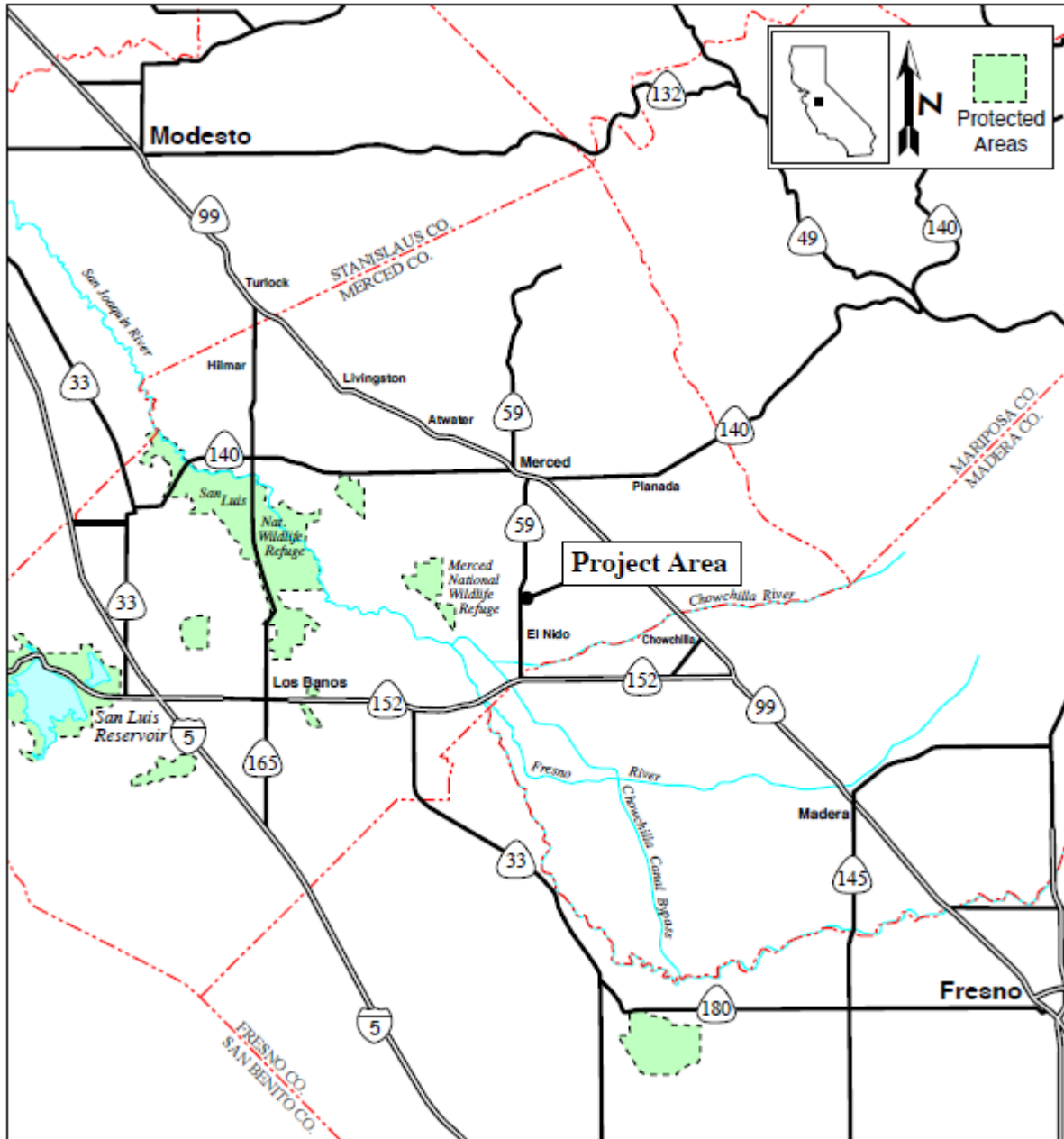
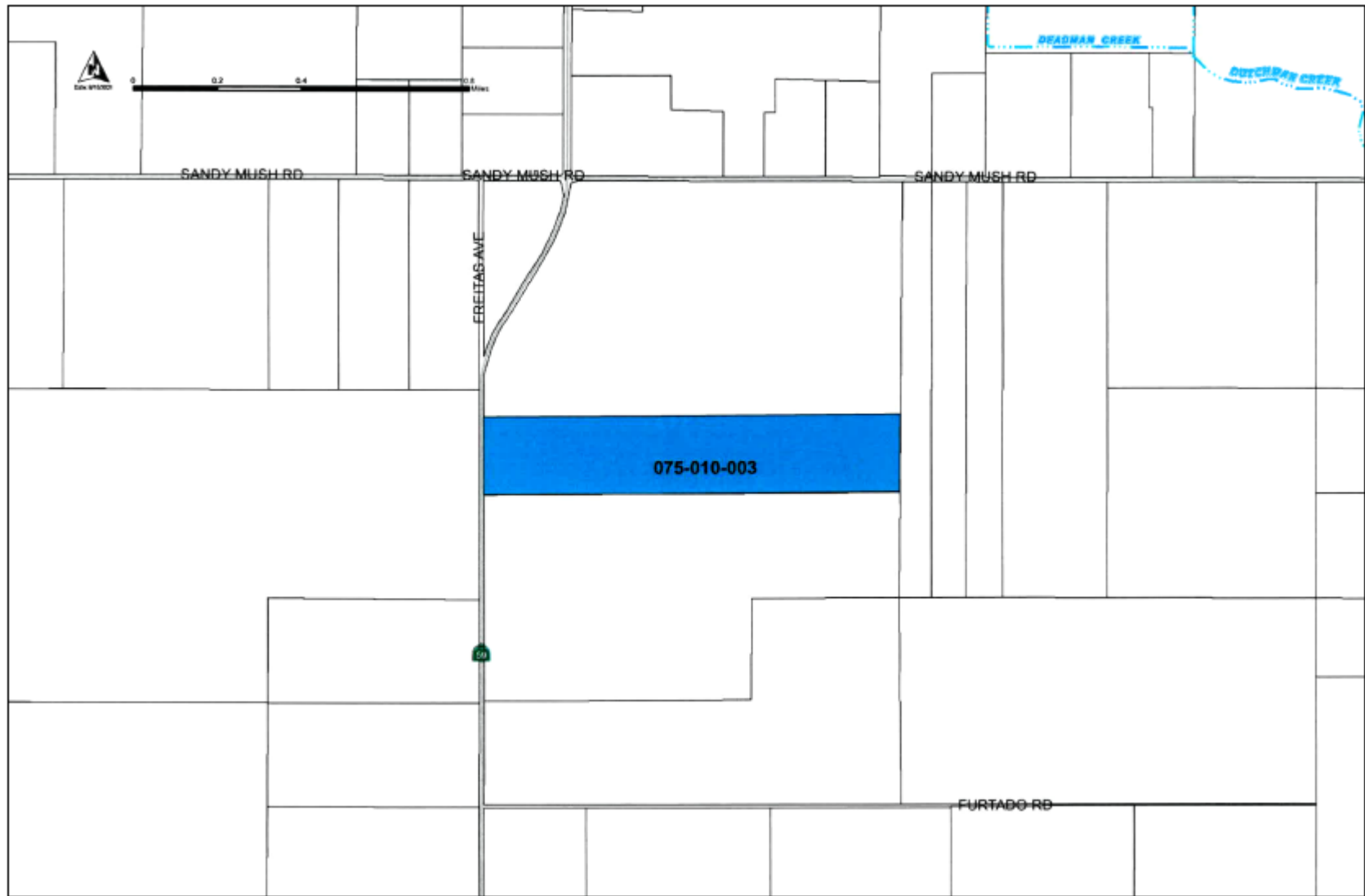


Figure 1 – Facility Location Map (Map Taken from the 2022 NOP)



Figure 2 – Facility, Field Application Map (Map Taken from the 2022 NOP)



**Figure 3 – Project Site Merced County Assessor Parcel Numbers (Map Taken from the 2022 NOP)**

## 2 PHYSICAL SETTING AND EXISTING CONDITIONS

### 2.1 EXISTING HERD AND RANCH FEATURES

The IS/NOP and Environmental Evaluation which contains the Project Description, dated July 2022, contains project details. The existing herd is approximately 2,735 animals at the dairy with 1,135 milk cows and 1,600 support stock. The proposed expansion will increase herd size by a total of 1,256 animals, with approximately 3,000 milk cows, 500 dry cows, 500 bred heifers 15-24 months, zero large heifers 7-14 months, zero calves 4-6 months, and zero calves 0-3 months. Refer to Section 4 for additional details regarding the existing herd and ranch features as well as details related to the surface and groundwater water use/drainage and proposed dairy expansion and hydrologic impacts.

### 2.2 SURROUNDING LAND USE

From the IS/NOP, there are offsite single-family residences associated with neighboring agricultural operations surrounding the project site. There is one off-site residence located within the windshed of the dairy (defined as an area of 1,320 feet upwind to 2,640 downwind of the periphery of the animal facility).

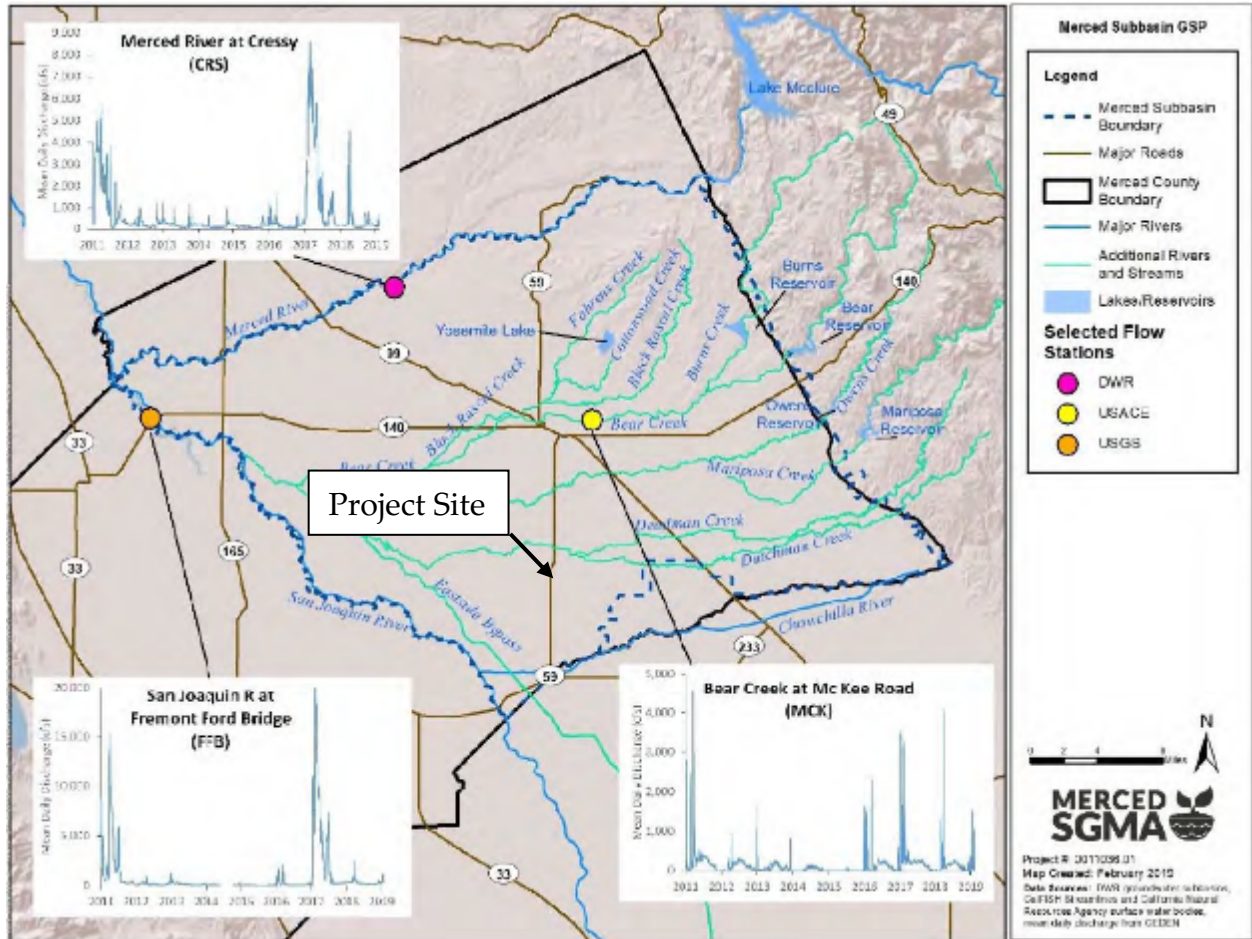
The community of El Nido is located approximately 2.75 miles south of proposed dairy Site. The Merced County John Latorraca Correctional Facility is located approximately 2.5 miles to the northwest of the project site, along the north side of West Sandy Mush Road. The Site is located within the Grasslands Focus Area and the Grasslands Ecological Area boundaries. The Merced National Wildlife Refuge and the Fresno River and Chowchilla Bypass are 4.5 miles southwest of the Site. Deadman Creek runs in a west-east direction approximately 1.25 miles north of the Site.

Location	Land Use	General Plan	Zoning
ON-SITE	Dairy / Agriculture / Residences	Agricultural	General Agricultural A-1
NORTH:	Pasture / Seasonal Grazing / Animal Confinement Facilities	Agricultural	General Agricultural A-1
EAST:	Pasture / Seasonal Grazing	Agricultural	General Agricultural A-1
SOUTH:	Agriculture / Orchards / Residences	Agricultural	General Agricultural A-1
WEST:	Agriculture / Residences / Animal Confinement Facilities	Agricultural	General Agricultural A-1



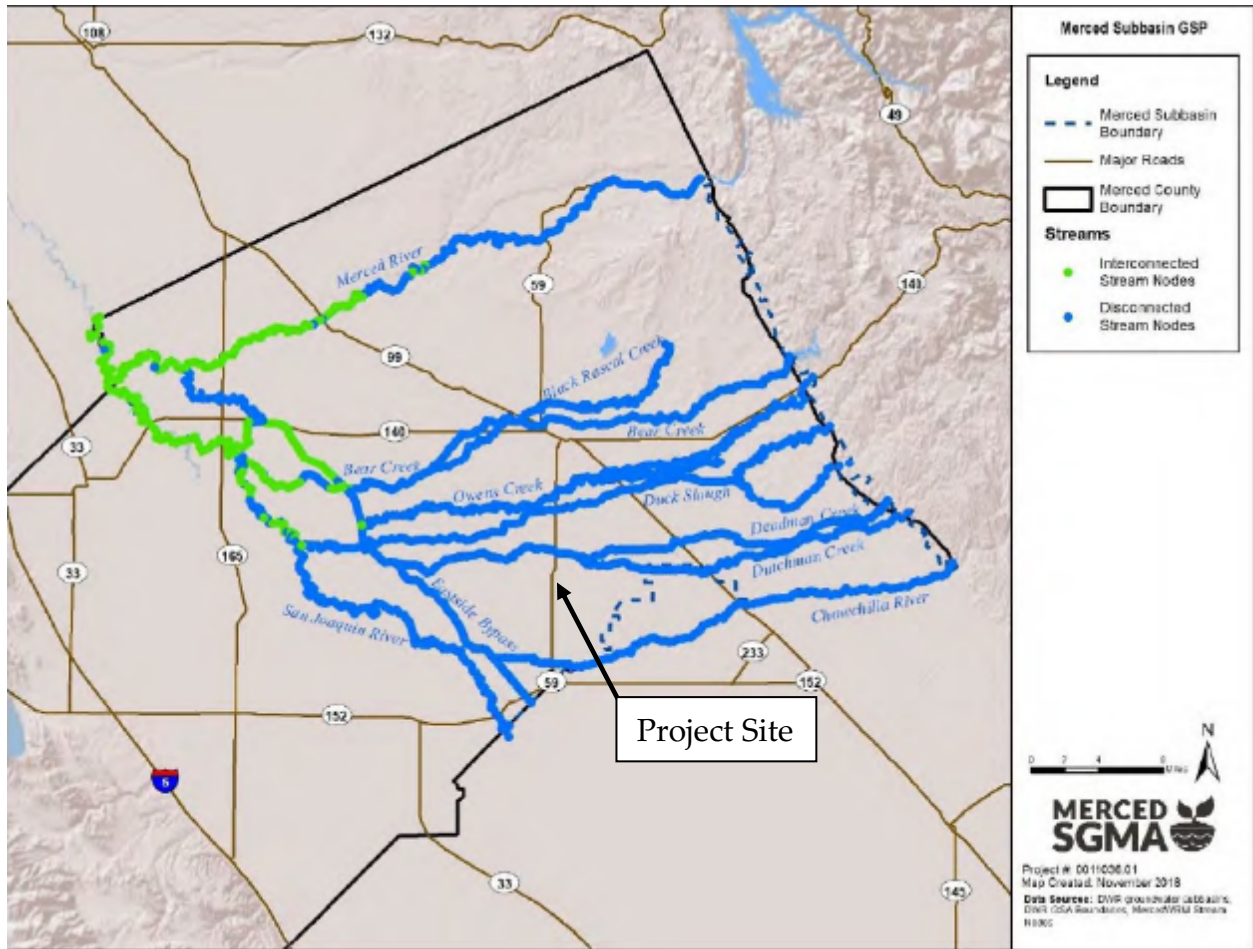
### 2.3 PROJECT SETTING, PHYSIOGRAPHY AND SURFACE WATER

The project site is located in an active agricultural district within the San Joaquin Valley and the larger Central Valley of California. The topography of the site is generally flat with surface elevations from 135 to 140 feet above mean sea level (MSL).



**Figure 4 - Surface Water Flows (Map Taken from the 2022 GSP), Figure 2-5)**

The Azevedo Dairy #2 land application fields are approximately 1.25 miles south of Deadman Creek, which ultimately runs into Dutchman Creek as depicted on Figure 4.



**Figure 5 - Groundwater and Surface Water Interconnection (Map Taken from the 2022 GSP), Figure 2-10)**

Figure 5 depicts that natural surface water features in the subbasin. No natural surface water features are on Azevedo Dairy #2. Groundwater and surface water interconnection is depicted on Figure 5, generally northwest of the project site. This interconnection is also referenced as gaining portions of the river. The dairy facility uses groundwater resources for farm operations. Domestic water to the dairy barn and the four employee residences is provided by three on-site water wells. Irrigation water is supplied by groundwater from one irrigation well. Wastewater is mixed with irrigation water and applied to cropland. Receiving fields are graded to guide excess applied irrigation water to an existing tailwater return and/or retention system. Collected tailwater is either returned to the retention pond (Field 2), or retained by berms (Field 1). Field application of wastewater is via pipeline.



## 2.4 GEOLOGY

The Azevedo Dairy #2 lies within the Great Central Valley, California. The Central Valley is composed primarily of alluvial deposits from erosion of the Sierra Nevada Mountains located to the east and the Coastal Ranges located to the west. In addition to the alluvial deposits that comprise the majority of the geology within the Central Valley, lacustrine<sup>1</sup> and marsh deposits also exist. Lacustrine deposits are composed of fine grained material (clay and silt interbedded with sands and conglomerates) and were formed during a time when lakes and marshes existed within the Valley. Geologic units located east of the San Joaquin River consist of high amounts of silica, volcanic, and granitic grains, which reflect its origin from the igneous pluton of the Sierra Nevada Mountains.

The Cross-Section Alignment Map and Cross-Section C-C' and D-D' on Figures 6 through 8 were taken from the Merced Subbasin GSP to convey the hydrogeology description presented herein. The selected Cross-Section C-C' is a transect of the earth through El Nido area to the east and San Joaquin River to the west. The Cross-Sections depict the geologic sequence found within Merced Subbasin from surface to over 1,000 feet below ground surface (bgs). The geologic formation from deepest to most shallow with referenced formation symbols as follows:

- Basement Complex (pTm),
- Ione Formation (Tce),
- Valley Springs Formation (Tcmo),
- Mehrten Formation (Tm),
- Continental deposits and Older alluvium (QTc, Tulare Formation – Corcoran Clay Member - CC and Qoa)
- Flood basin deposits and Younger Alluvium (Qb and Qya).

The basement complex is the bedrock on which valley sediments were deposited. The Ione Formation, deltaic in nature, is composed of claystone and sandstones with a small percentage of conglomerates. The Valley Springs Formation, alluvial in nature, is composed of rhyolitic sandstones, siltstones, and claystones. The Mehrten Formation, which is alluvial in nature, is composed of andesitic conglomerates, sandstones, siltstones, and claystones. The Continental Deposits and Tulare Formation, which is lacustrine in nature, is composed of claystone, sandstone and gravels that were alternately deposited in oxidizing and reducing environments. Within these deposits is the Corcoran Clay (CC) Member, a prominent aquitard that is found primarily to the

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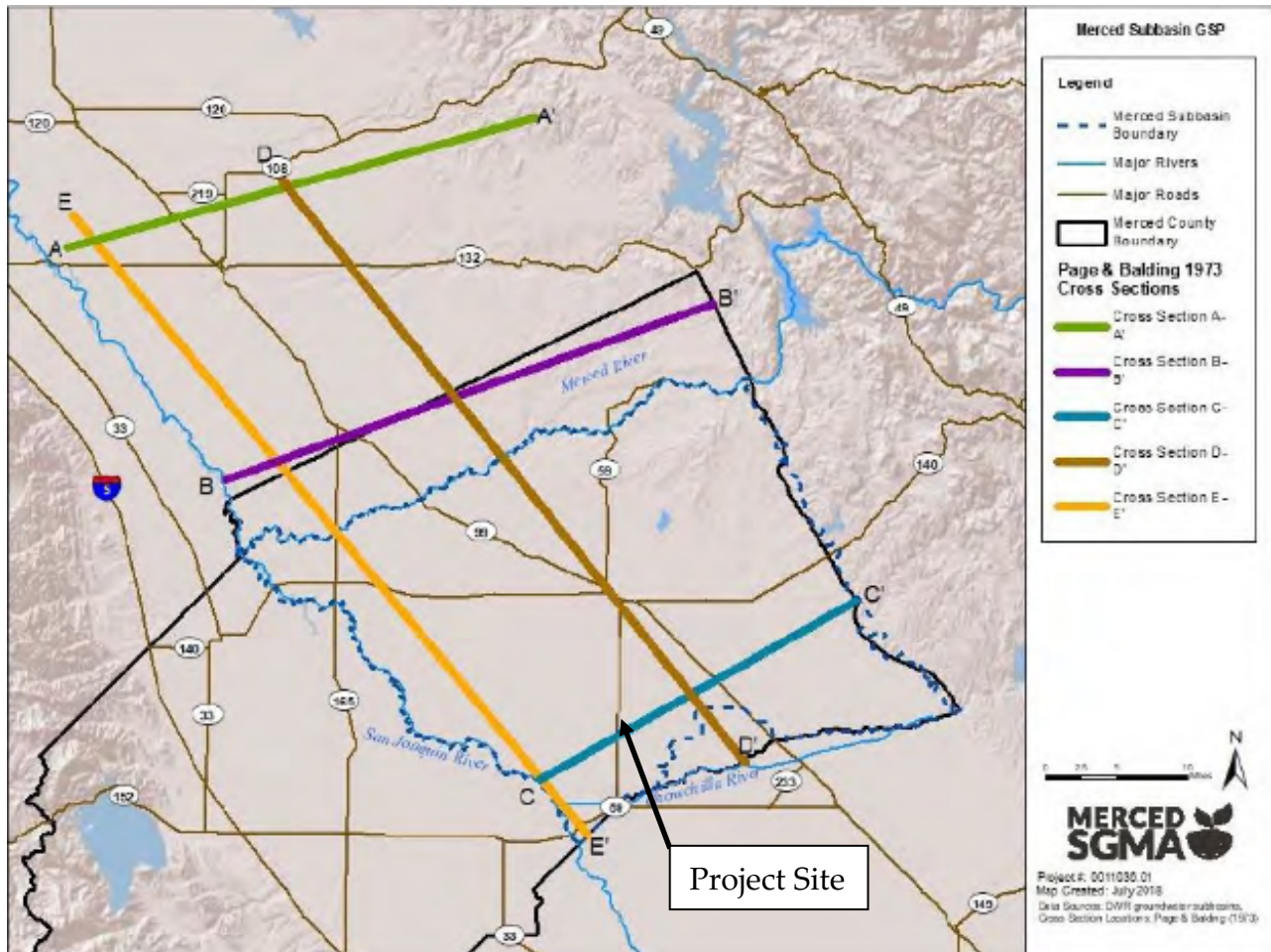
<sup>1</sup> Lacustrine means “of a lake” or “relating to a lake.”

east of Los Banos. Lastly, Quaternary river and flood plain deposits, consisting of clays, silts, sands, and gravels, overlie the formations and are considered the parent material for the majority of soil deposits in the area.

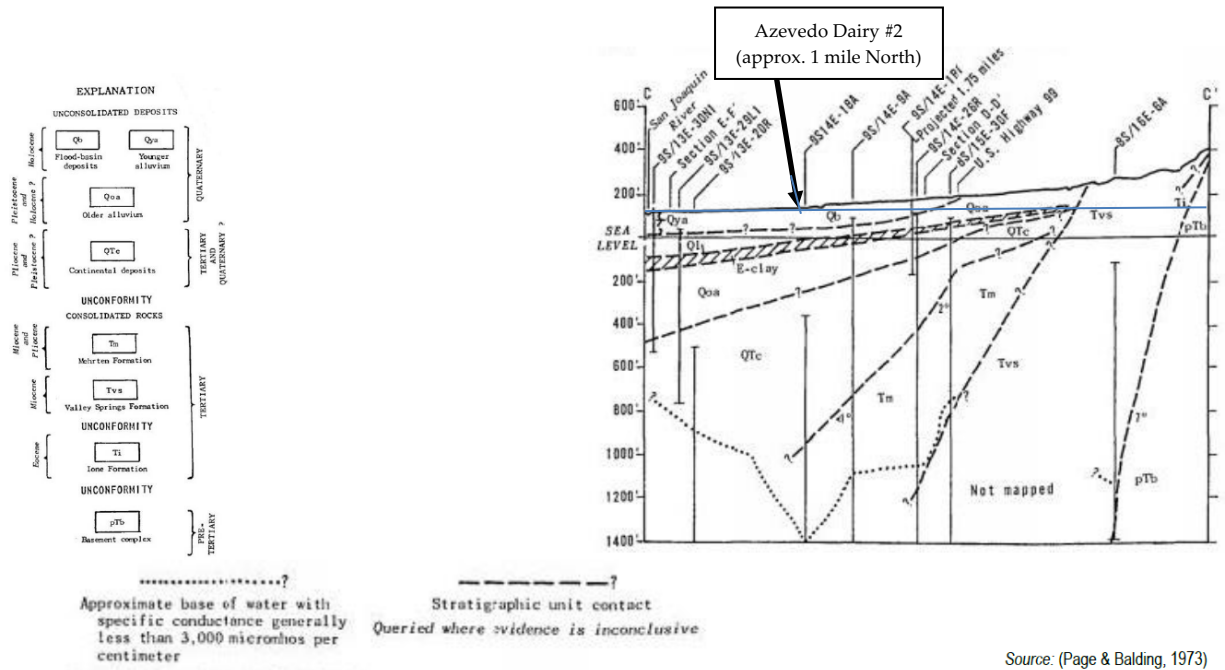
## **REGIONAL HYDROGEOLOGY**

Regional groundwater in Merced County is composed of four subbasins of the San Joaquin Hydrologic Region: the Turlock, the Merced, the Chowchilla, and the Delta-Mendota. The Turlock, Merced, and Chowchilla subbasins are bounded to the east by crystalline rocks of the Sierra Nevada Mountains, and to the west by the San Joaquin River. The project site lies within the Merced Subbasin, bounded on the north and south by the Turlock and the Chowchilla subbasins. The Chowchilla basin is at the southern and eastern edge of the facility.

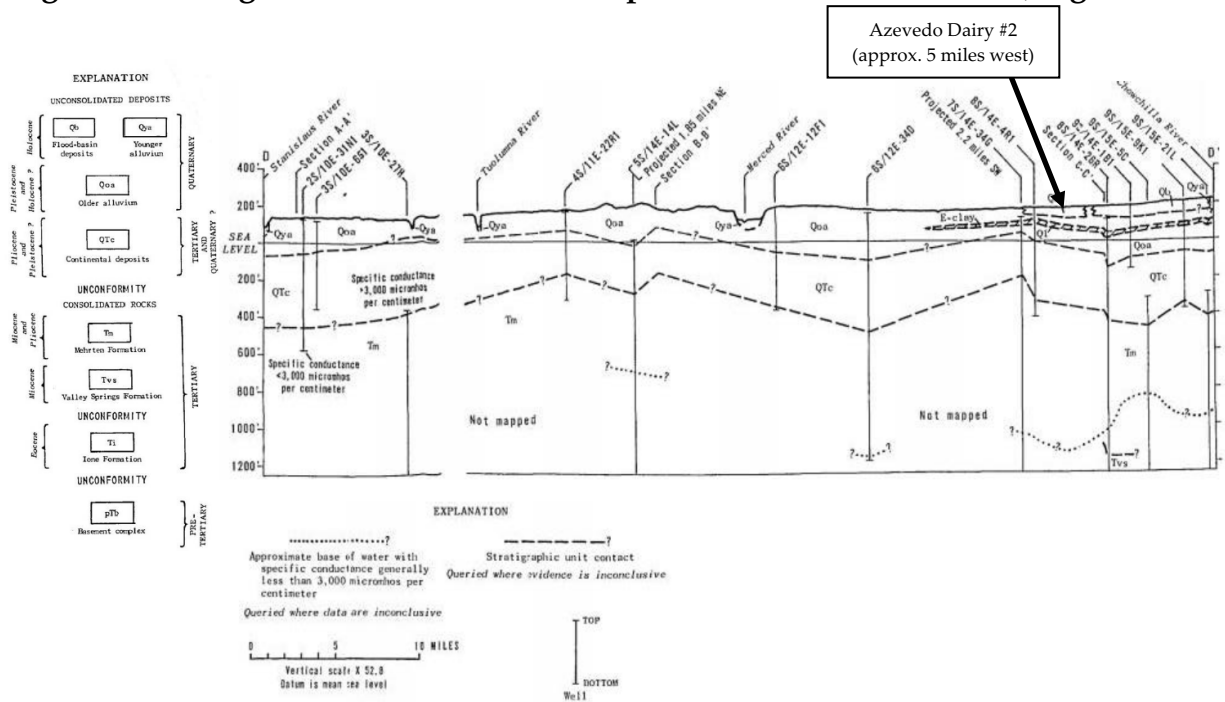
The subbasins in Merced County contain bodies of fresh water within each basin. The subbasins are each split into three different water bodies depending upon depth and geology: an unconfined aquifer, a semi-confined aquifer, and a confined aquifer. Differentiation between the unconfined, semi-confined, and confined aquifers is due to existence of the CC within the Tulare Formation. As depicted on Figures 7 and 8, the CC is considered a significant aquitard throughout the area. Water bodies above the CC are unconfined. Water bodies within the clay are semi-confined, and water bodies below the CC are typically confined. The base of the fresh groundwater near the Site is lower than -1,200 feet msl.



**Figure 6 - Location of Geologic Cross Sections (Map Taken from the 2022 GSP, Figure 2-12)**



**Figure 7- Geologic Cross Section C-C' (Map Taken from the 2022 GSP, Figure 2-15)**



**Figure 8 - Geologic Cross Section D-D' (Map Taken from the 2022 GSP, Figure 2-16)**

As stated in the GSP, the Merced Subbasin extends from the Sierra Nevada foothills to the San Joaquin Valley floor, with ground surface elevations sloping to the southwest and ranging from approximately 450 feet above mean sea level (msl) in the eastern foothills to less than 50 feet msl along the San Joaquin River. The western part of the Subbasin is relatively flat with a uniform slope, and transitions to hummocky, irregular hills and intervening depressions in the eastern Subbasin. The Merced Subbasin is in the San Joaquin Valley where valley-fill sediments overlie consolidated, westward-dipping sedimentary units and basement rock of the Sierra Nevada. Older units crop out in the eastern Subbasin and dip west into the San Joaquin Valley below younger units. Three principal aquifers were defined in the Merced Subbasin for this GSP and future groundwater management of groundwater under SGMA. As referenced, the Corcoran Clay (CC or E clay), underlying the western Subbasin, is the primary aquitard in this part of the Subbasin and is used to separate and define the two principal aquifers in the west part of the subbasin: the Principal Aquifer Above CC is the unconfined aquifer above the Corcoran Clay. The second aquifer is the confined groundwater and referenced as the Principal Aquifer Below the CC. Cross sections developed for the GSP, illustrate the westerly dipping aquifer system, the principal aquifers, and the Corcoran Clay aquitard.

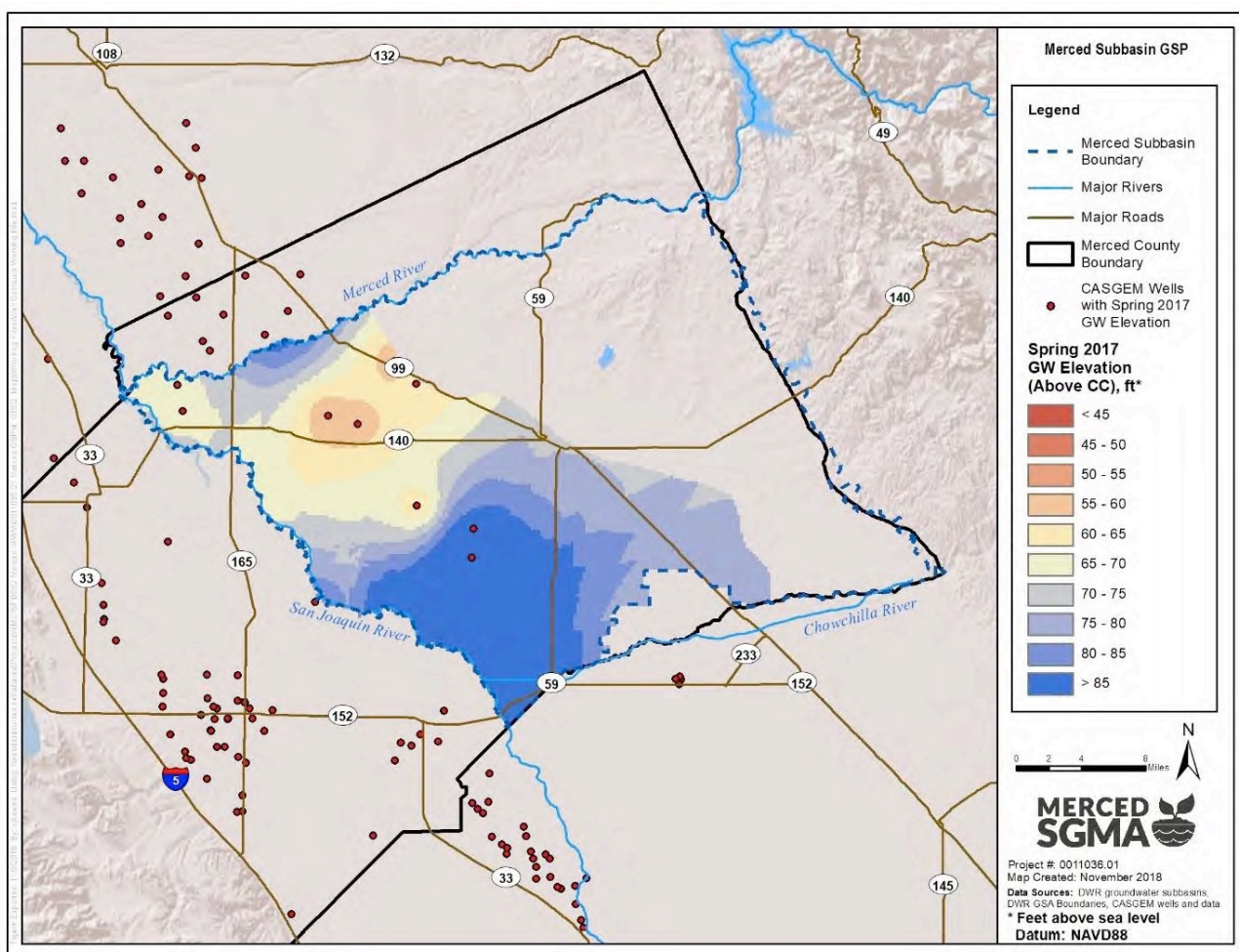
The subbasin GSP Figures extend from the San Joaquin River on the west Subbasin boundary across the center of the Subbasin to the Sierra Nevada foothills on the eastern boundary (see cross section location). The extent of the CC in the western Subbasin is shown on the cross section, ranging from depths of 90 to 240 feet below the ground surface. The unit ranges in thickness from approximately 10 feet to 90 feet. The westerly dipping aquifers are interpreted to be offset by geologic faults in the central and eastern Subbasin, but faults are not interpreted to be a barrier to groundwater flow (GSP, 2022).

As stated in the GSP and depicted on Figure 9 and 10, the regional groundwater flows toward the west and southwest across the Subbasin, but flows are altered locally by pumping from wells. Vertical groundwater flow within the extent of the CC is downward to the lower aquifer. Groundwater elevations in the aquifer above and below the CC, the area of the Azevedo Dairy #2, have been relatively stable during the GSP study period, with declines during the recent drought of less than 15 feet in change, followed by water level recovery. Water level declines during the 2015 drought were greater in the Above CC Aquifer, especially in agricultural areas in the central and eastern Subbasin where groundwater is the primary water supply. Pumping in the Principal Aquifer Below CC has created a cone of depression in the central Subbasin that has expanded during the GSP study period. Available data in the easternmost

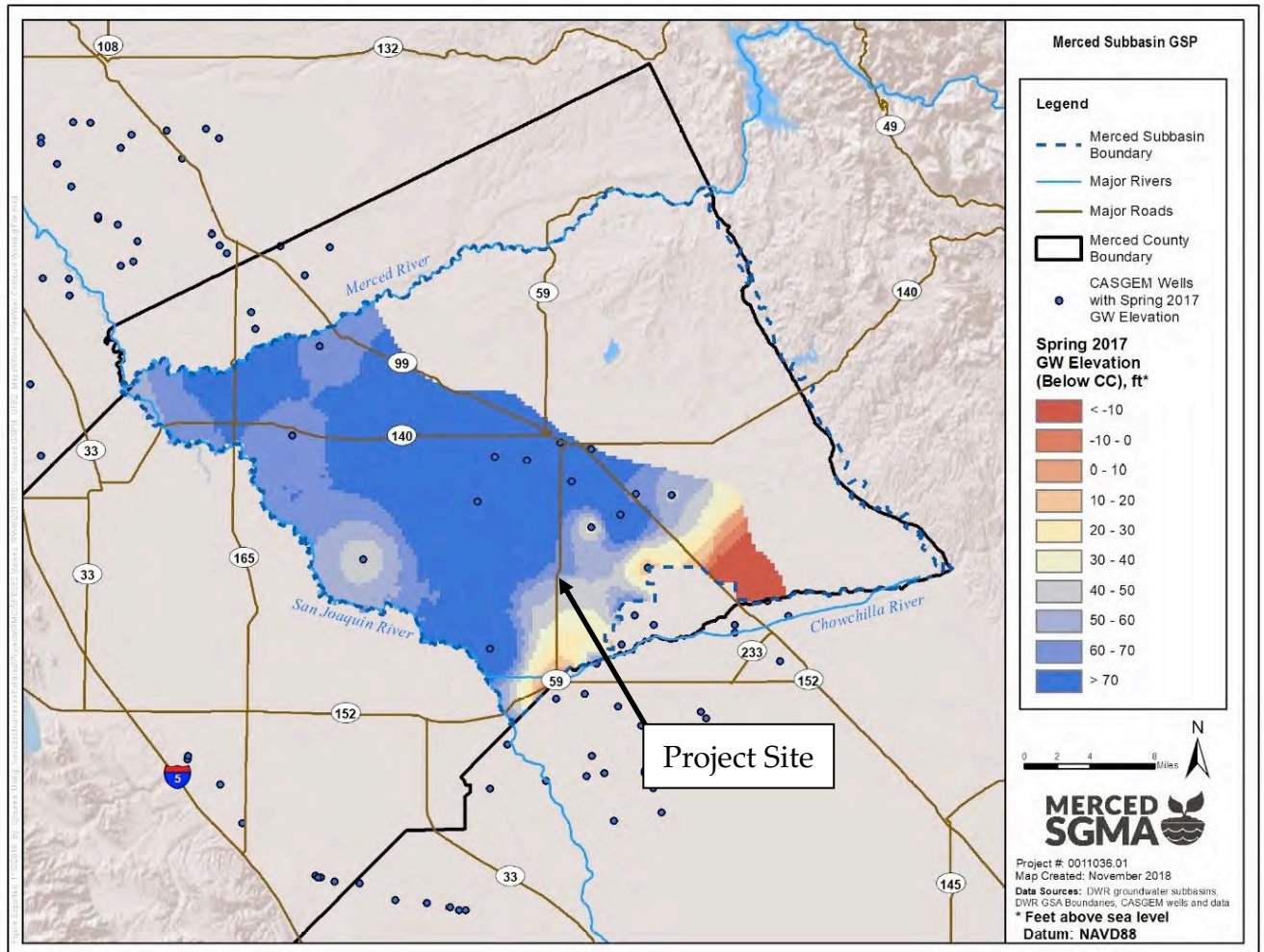


Subbasin are sparse, but water level declines between 2006 and 2017 are observed from about 4 feet per year to about 8 feet per year, with little to no recovery until recently (GSP, 2022 and the 2023 Annual Report). The GSP contour map for 2017 below the CC are provided in Figure 10.

Recent aquifer stable groundwater levels near San Joaquin River above the CC and below the CC is supported by the high recharge within the permeable unconfined aquifer conditions.



**Figure 9 - Spring 2017 Groundwater Elevation, Principal Aquifer Above CC (Map Taken from the 2022 GSP, Figure 2-44)**



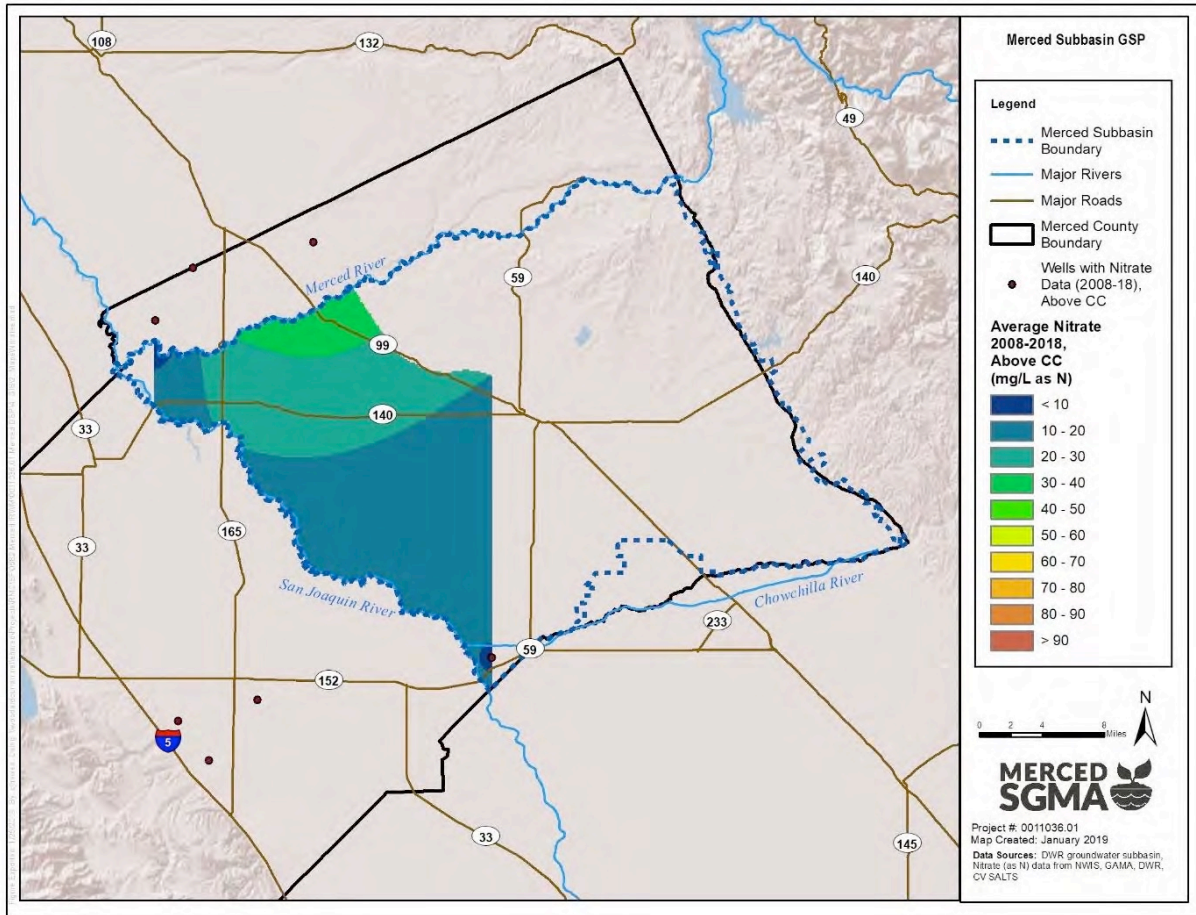
**Figure 10 - Spring 2017 Groundwater Elevation, Principal Aquifer Below CC (Map Taken from the 2022 GSP, Figure 2-45)**

## REGIONAL GROUNDWATER QUALITY

For this section, the parameters Nitrate, Total Dissolved Solid (TDS) and Chloride have been used to assess the groundwater impacts.

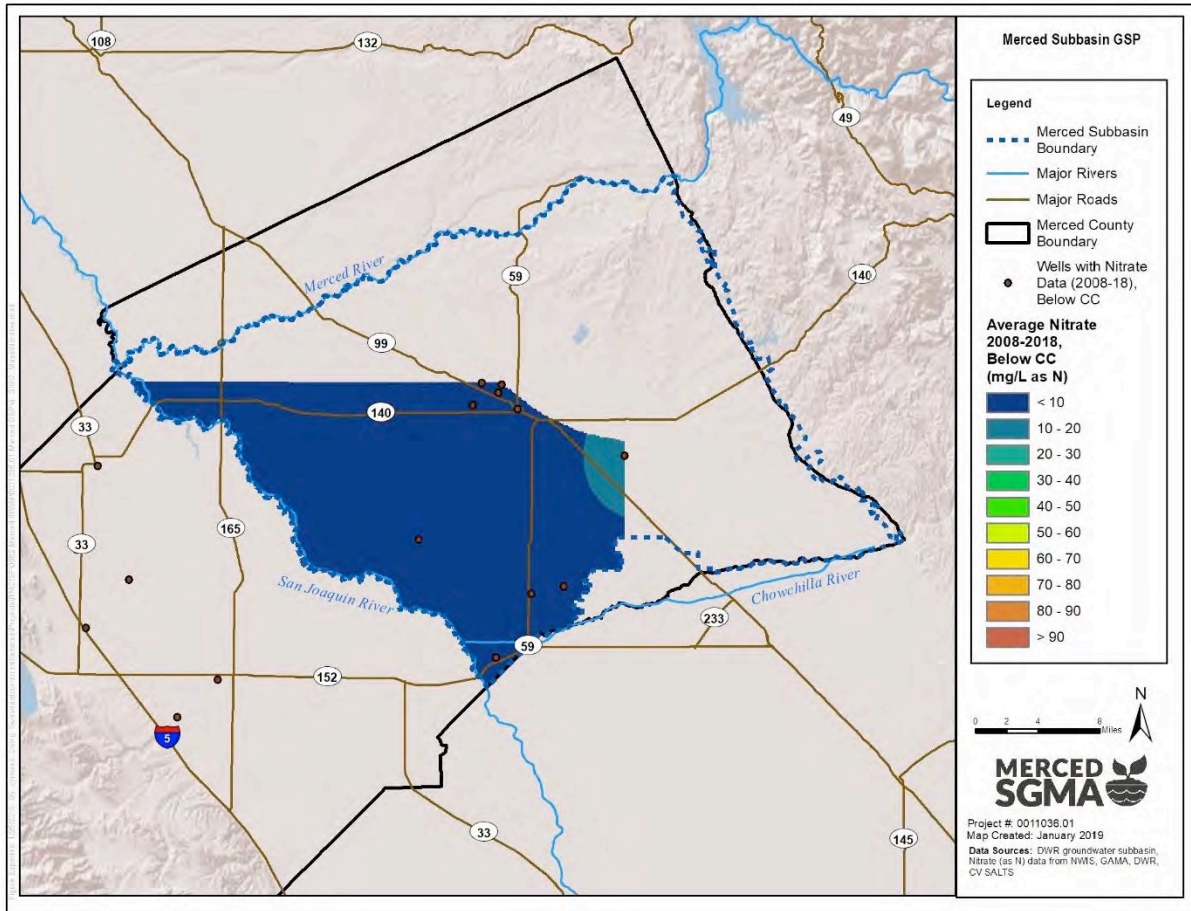
As sited in the 2022 GSP and depicted below on Figures 11 and 12, Nitrate as N in the western portion of the subbasin is slightly elevated above the CC and below the CC is lower than the Maximum Contaminant Level (MCL) of 10 mg/l. (GSP, 2022). Nitrate is typically associated with agricultural practices. For the limited number of monitoring wells near Azevedo Dairy #2, the observed proximal average Nitrate concentration above the CC and below the CC is lower than the MCL.





**Figure 11 - Average Nitrate (as N) Concentration 2008-2018, Above Corcoran Clay  
(Map Taken from the 2022 GSP, Figure 2-59)**

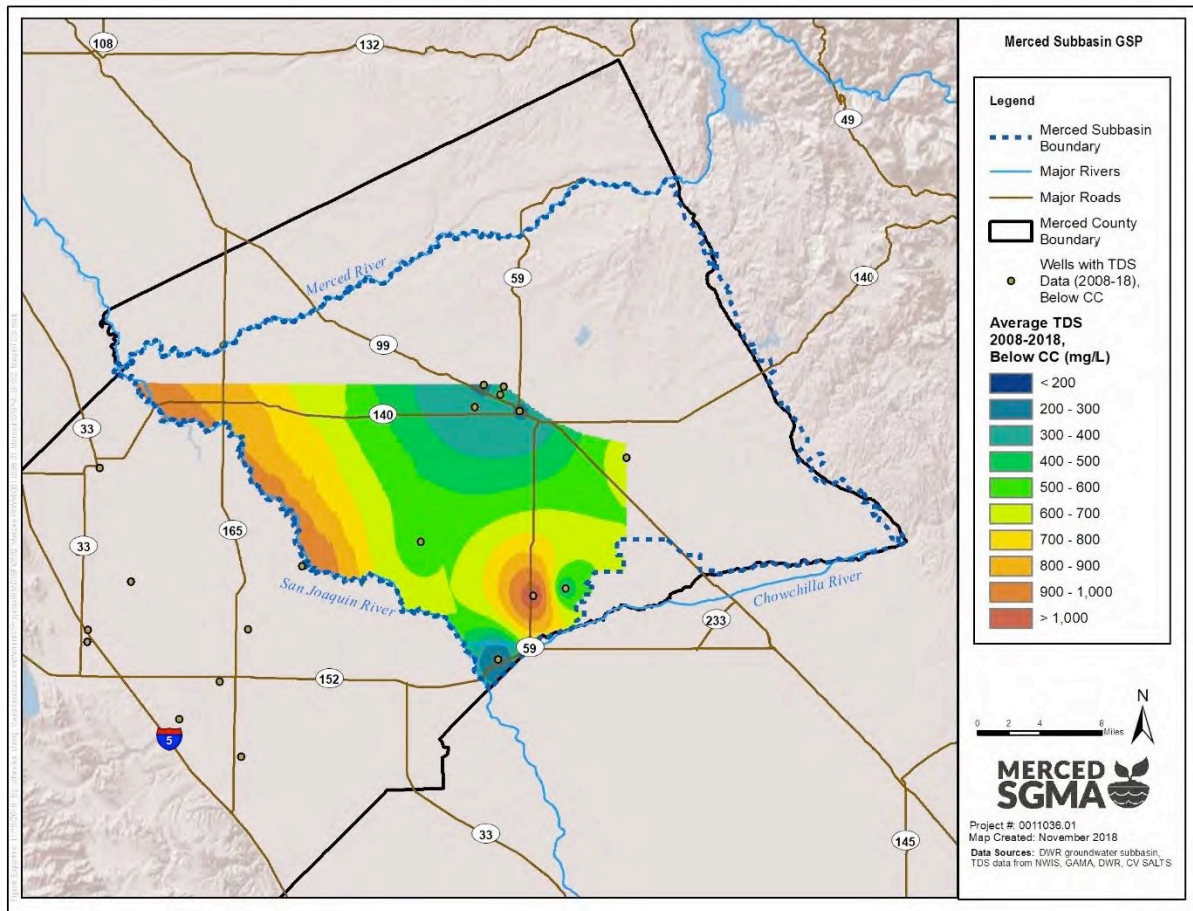




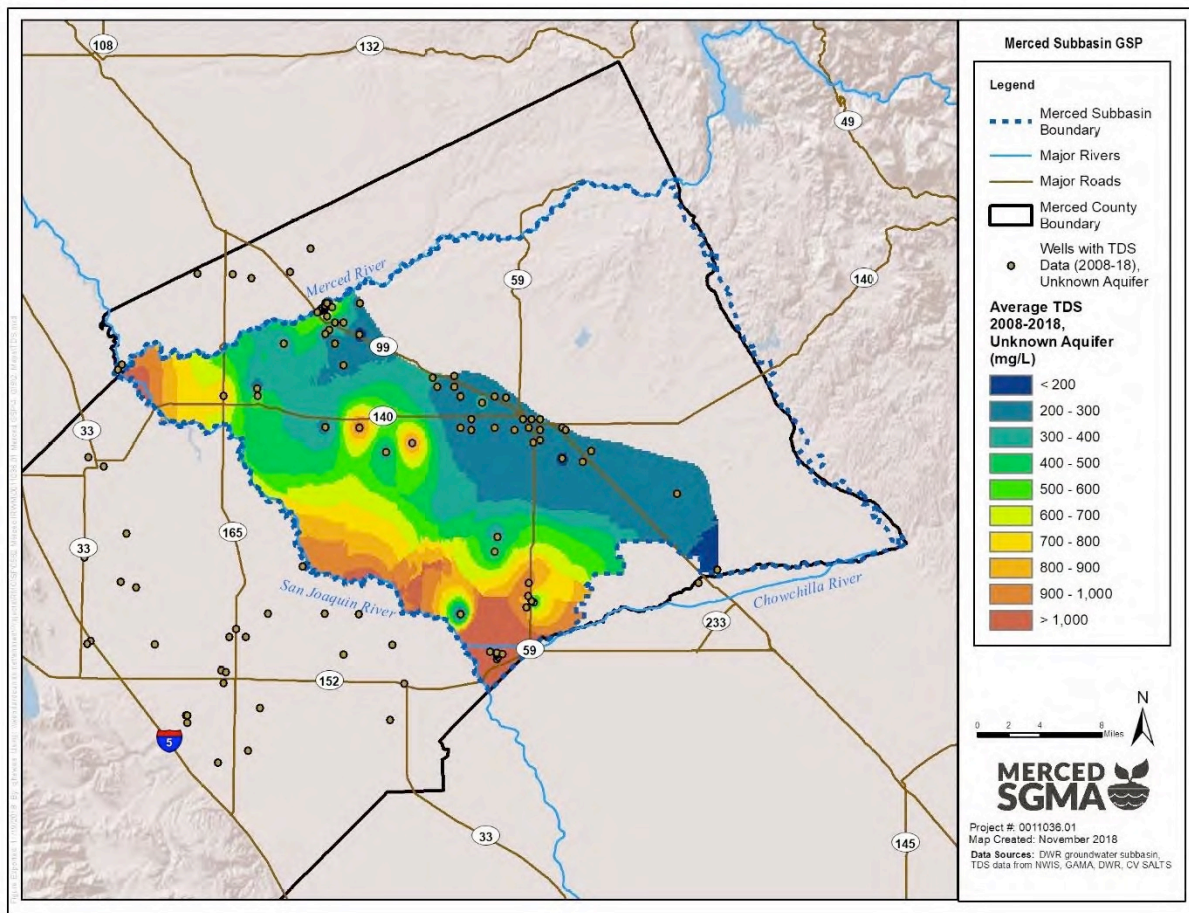
**Figure 12 - Average Nitrate (as N) Concentration 2008-2018, Below Corcoran Clay  
(Map Taken from the 2022 GSP, Figure 2-60)**

As sited in the 2022 GSP and depicted below on Figures 13 and 14, TDS is associated with saline or water impacted from agricultural uses. In the western portion of the subbasin TDS is elevated (GSP, 2022). For the limited monitoring data near the

Azevedo Dairy #2, TDS average concentration above the CC and below the CC was elevated above 700 mg/l, which is above the secondary MCL of 500 mg/l.



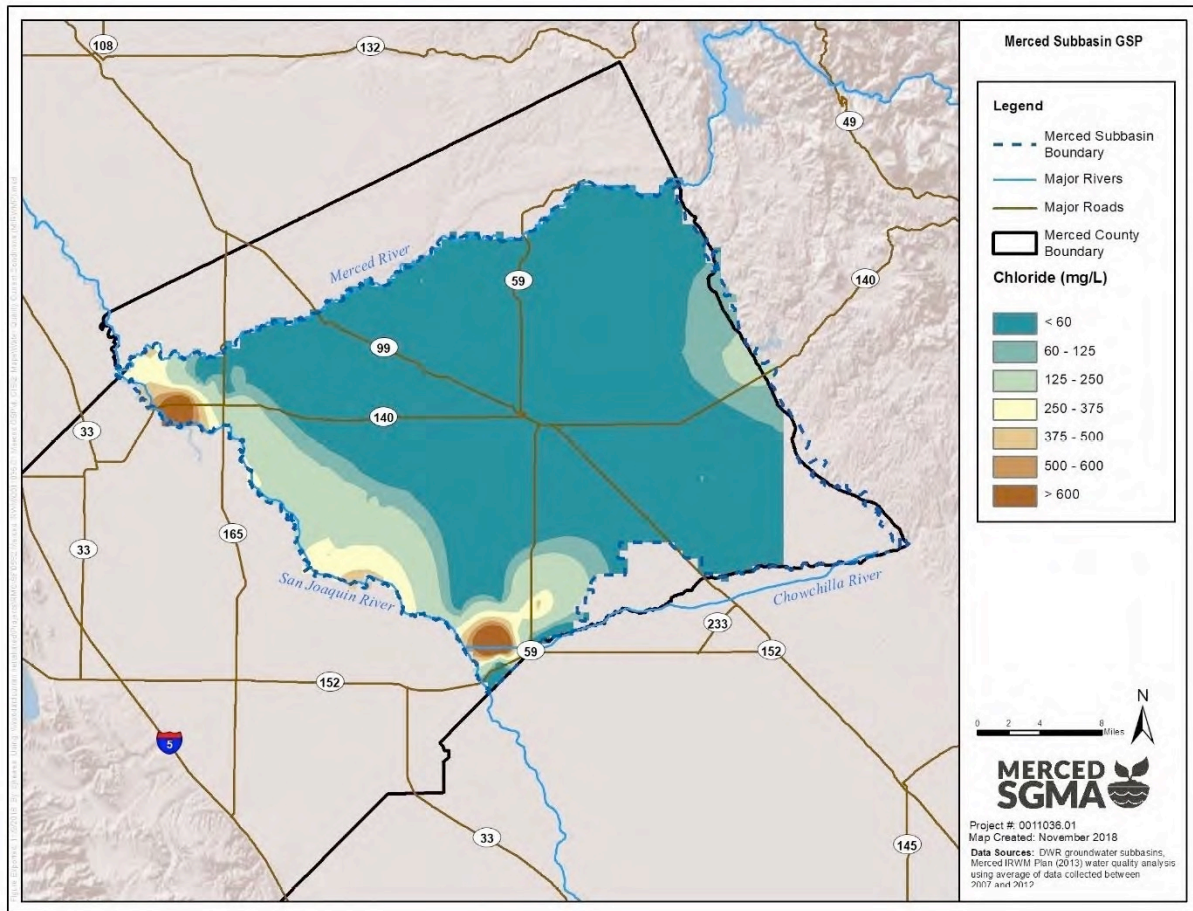
**Figure 13 - Average TDS Concentration 2008-2018, Below Corcoran Clay  
(Map Taken from the 2022 GSP, Figure 2-63)**



**Figure 14 - Average TDS Concentration 2008-2018, Unknown Aquifer  
(Map Taken from the 2022 GSP, Figure 2-64)**

Chloride is associated with saline groundwater. As depicted on Figure 15, the average chloride in the western portion of the subbasin is elevated (GSP, 2022). For the limited monitoring wells, data shows concentrations above 60 mg/l near Azevedo Dairy #2 as a 5 year average value. The MCL is 250 mg/l.





**Figure 15 - 5-Year Average Distribution of Chloride in Groundwater (2007-2012)**  
(Map Taken from the 2022 GSP, Figure 2-66)

## 2.5 SITE SPECIFIC SOILS

Predominant soils in the area of the proposed Site as classified by the Natural Resources Conservation Service (NRCS Web Soil Survey) consist of loams. Soil groups are Fresno loam slight to strong saline-sodic with 0 to 1 percent slopes. Saline and high sodium soils have a high pH which may interfere with crop growth.

Near surface geology at the Site consists of Alluvium and Modesto Formation Alluvium underlain by Tulare Formation clay deposits. The well logs on the DWR website and the referenced cross section above in Figures 7 and 8 indicate that interbedded clay, sandy clay, and sand deposits dominate the near surface geology in proximity to the proposed facility. Gravel lenses 5 to 10 feet in thickness exist beneath the site. Somewhat continuous sand deposits and continuous clay beds varying in thickness from 50 to 100 exist at depths ranging from 300 feet bgs are considered to be part of the Corcoran Clay (CC). On site well log information was not available for this report.

## AREA AND SITE SPECIFIC HYDROGEOLOGY

The Site lies in the Merced subbasin of the San Joaquin hydrologic region. Historically groundwater flow in the Merced Subbasin is generally to the west, towards the San Joaquin River for shallow groundwater. Groundwater follows the dip of the crystalline and sedimentary units. In general, groundwater depths are shallowest near San Joaquin River and increase to the east as surface elevation increases. As referenced in the GSP, ground water elevations have decreased significantly over the last two decades as shown by the declining groundwater levels which have had undesirable impacts from area dewatering resulting in groundwater flow direction changes, water wells going dry and land subsidence.

The water level information specific to hydrogeology is separated into three principal aquifers 1) unconfined groundwater above the CC, 2) confined groundwater below the CC and 3) semiconfined groundwater outside of the area where the CC does not exist.

Area knowledge and DWR hydrographs indicate that groundwater may exist within sand units found less than 100 feet bgs. First encountered groundwater is anticipated to be found in unconfined aquifers within laterally extensive sands units or as isolated perched units, significantly above the reported levels.

As referenced in the MSGSA 2023 Annual Report (2023 Report) and the 2022 GSP, regional historical groundwater levels are shown on Figures 16 and 17 which indicate the decline in groundwater elevations. As depicted on Figure 17, data from 11 wells located Above CC Principal Aquifer, the average groundwater level decline was 1.3 feet per year (ft/yr) from 1996-2015. Based on data from 15 wells in the Below CC Principal Aquifer, average groundwater level decline was 2.4 ft/yr from 1996-2015.

The 2023 Report stated that groundwater levels generally increased in water year 2023 for all three principal aquifers. Based on data from 12 wells in the Above Corcoran Clay Aquifer, average groundwater level change was +6.3 ft from fall 2022 to fall 2023. Based on data from 16 wells in the Below Corcoran Clay Principal Aquifer, average groundwater level change was +19.1 ft from fall 2022 to fall 2023.

The single well hydrograph (Figure 17a) taken from the appendices of the 2023 Report depicts the longest history of nearby monitoring well located 2 miles to the northeast. This record shows a 95-foot decline in groundwater level from 1975 to 2023, which is consistent with the average annual trends cited above.

The minimum threshold (MT) is defined as the minimum pre-January 1, 2015 elevation and the measurable objective (MO) is defined as the projected average future groundwater level under sustainable yield modeling simulation. For one of the six

sustainable management criteria – groundwater levels, a nested monitoring well in the El Nido Area was completed in 2020 which will assist with this assessment.

For the sustainable management criteria – land subsidence, subsidence remains an ongoing concern in the Subbasin as referenced in the 2023 Report. Measurements have been recorded semiannually in July and December of each year to monitor ongoing subsidence since 2011. Subsidence values in the last year were positive from December 2022 to December 2023, likely due to the impact of increased rainfall in late 2022 to early 2023. Minimum thresholds (MT) are provided for groundwater levels, water quality, and land subsidence. The MTs are established based on 2015 information. Measurable objectives (MO) have been established as follows: 1) 2011 ground water levels, 2) TDS of 500 mg/L and 3) subsidence of 0 ft/year.

To address the concerns referenced in the 2023 Report, the MSGSA has adopted a Two Phased GSP Implementation Approach, focusing on land repurposing as a near-term option to achieve the Water Year 2025 objective, combined with importing surface water in the GSA (flood waters or purchased water).

During the June 1, 2022 Coordination Committee Meeting, a management action with a designated subsidence focus area (shown to the right) was recommended to achieve a positive annual groundwater storage change. The reduced groundwater extractions toward the demand reduction management action goal have been included in the July 2022 GSP update. Three corrective actions are referenced as the 2025 demand reduction, metering, and allocations to each GSA. The Project Site is located within this management area.

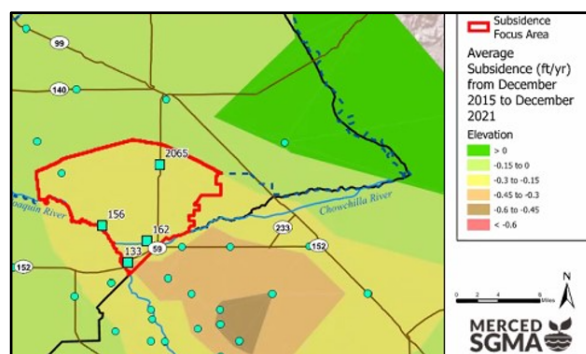
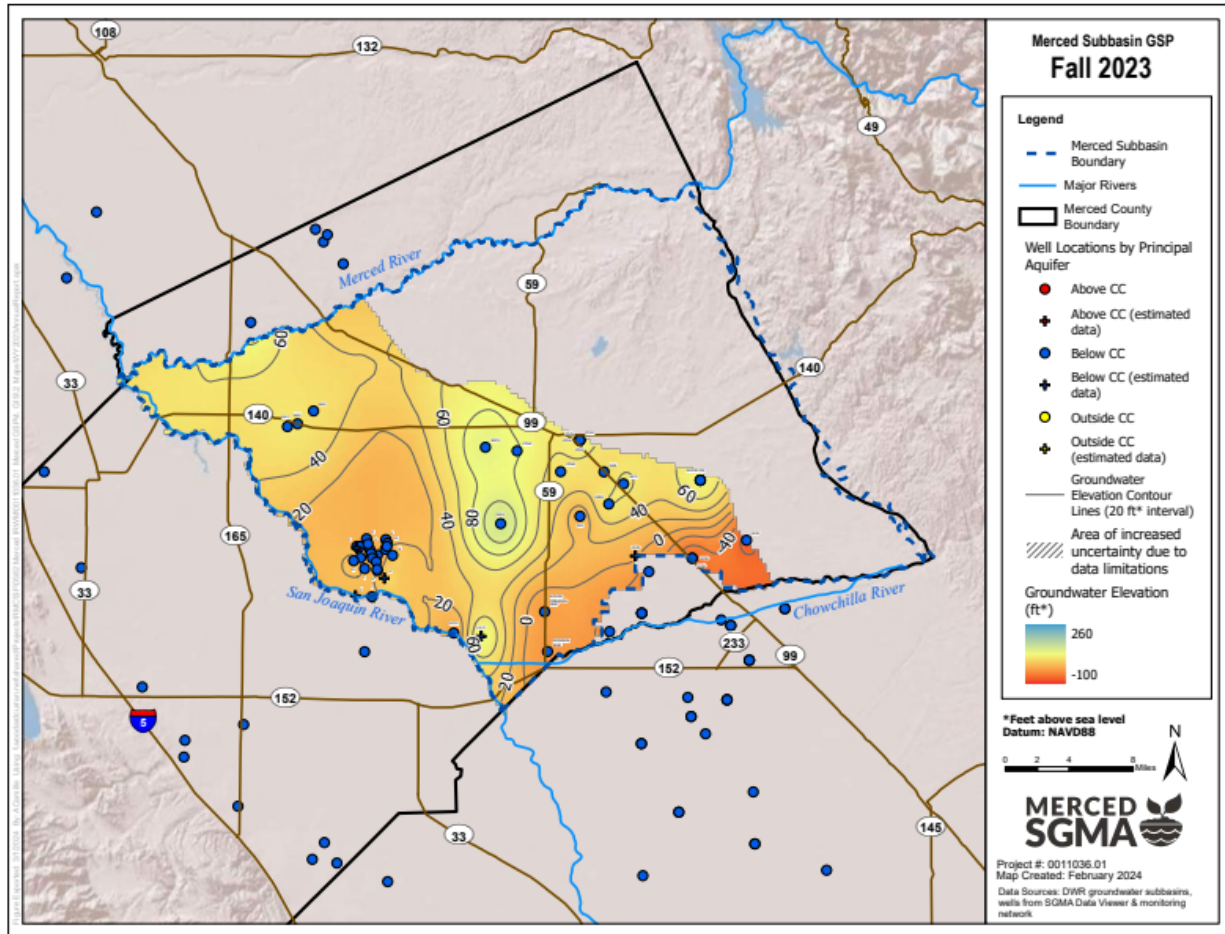


Figure 16 - Fall 2023 Groundwater Elevation, Principal Aquifer: Below Corcoran Clay, taken from 2023 MSGSA Annual Report





**Merced Subbasin GSP**

**Legend**

- Merced Subbasin Boundary
- Major Rivers
- Major Roads
- Merced County Boundary

**CASGEM Wells**

- Above CC
- Below CC
- Outside CC

**Voluntary Wells**

- Above CC
- Below CC
- Outside CC

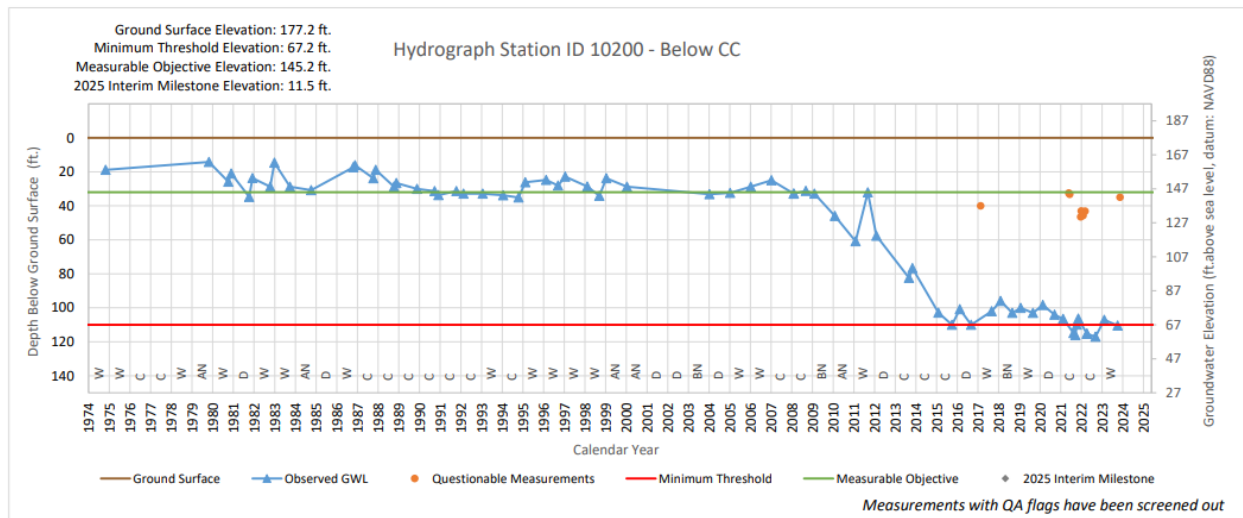
CC = Corcoran Clay

**MERCED SGMA**

Project #: 0611036.01  
Map Created: November 2018  
Data Sources: DWR groundwater subbasins, DWR GSA Boundaries, CASGEM wells and data



**Figure 17a - DWR Hydrographs with a complete history taken from the 2023 MSGSA Annual Report**



## 2.6 FACILITY GROUNDWATER QUALITY SUMMARY

The Merced Groundwater Subbasin GSP describes groundwater in the area as characterized by calcium-magnesium bicarbonate type water in the interior of the subbasin, sodium bicarbonate to the west and calcium-sodium bicarbonate to the south. Sodium chloride and calcium-sodium chloride type waters exist in small areas in the southwest area of the subbasin. Total dissolved solids (TDS) values range from 100 to 3,600 milligrams per liter (mg/L) across the subbasin with typical values ranging from 200 to 400 mg/L. Localized areas of high hardness, iron, nitrate, and chloride are found in this subbasin. Nitrate, Arsenic, TDS, and Sodium are water quality parameters of interest in the El Nido area as referenced in the GSP due to the elevated historic trends. As depicted on Table 1, the Azevedo Dairy #2 groundwater sampling dates are provided for 2019 through 2023, which relates to the annual reports. Concentration of Nitrate as N ranged from <0.1 to 7.3 mg/L, which is below the California Title 22 Primary Maximum Contaminant Limit (MCL) of 10 mg/L. Regional groundwater quality also confirms the low Nitrate concentrations in this area, see Section 2.4. Electrical Conductance ranged from 80.1 to 602 umhos/cm, which is below the Title 22 Secondary MCL of 900 umhos/cm. Chloride was observed at high levels on a regional basis and was detected at 5.3 mg/L for the 2023 well measurement, below the MCL of 250 mg/L.

**Table 1 - Historic Domestic and Irrigation Well Water Quality**

Azevedo Dairy #2 Well Results 2019-2023								
Year	Well	Sample Date	EC µmhos/cm	Nitrate (NO3)-N (mg/L)	TDS (mg/L)	TKN (mg/L)	Total Nitrogen (mg/L)	Chloride (mg/L)
2019	Domestic Well - House	12/5/2019	334	<0.1	-	-	-	-
	Domestic Well - Milk Barn	12/5/2019	324	<0.1	-	-	-	-
	Irrigation Well	12/11/2019	512	6.4	360	<1.0	6.4	-
2020	DW House "Spigot"	12/10/2020	329	<0.1	-	-	-	-
	DW MB "Hose"	12/10/2020	331	<0.1	-	-	-	-
2021	Irrigation Well	7/31/2021	522	7.3	365	ND	6.81	-
2022	DW House	12/6/2022	356	<0.1	-	-	-	-
	DW MB	12/6/2022	356	<0.1	-	-	-	-
2023	DW House	12/11/2023	292	2.1	-	-	-	-
	DW MB	12/11/2023	602	4.7	-	-	-	-
	Irrigation Well	12/11/2023	80.1	0.5	46	-	-	5.3

## 2.7 IMPAIRED SURFACE WATERS

The Central Valley Regional Water Quality Control Board (CVRWQCB) maintains and updates the impaired water bodies list for Central Valley. This list is required by the Clean Water Act Section 303(d) list and 305(b) report. The CVRWQCB requires that Total Maximum Daily Load (TMDL) goals are used to address long-term impairments to surface waters. Refer to Section 3.5 for more details.

## 2.8 FLOODING

The Flood Insurance Rate Maps (FIRM) from the Federal Emergency Management Agency (FEMA) show that the Dairy Production Area is located entirely within Zone A. Areas within the FEMA designation Zone A are defined as an area that would be inundated by a 100-year flood, but where no base flood elevations have been established. The Flood Protection Analysis is attached to the 2018 WMP. With construction of the proposed facility improvements provided in the proposed WMP attachments, the proposed Azevedo Dairy #2 site will have adequate protection from a 100 year flood event.

## **3 REGULATORY BACKGROUND**

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### **3.1 FEDERAL LAWS AND REGULATIONS**

#### **UNITED STATES ENVIRONMENTAL PROTECTION AGENCY CLEAN WATER ACT**

Federal, state, and local regulations have been implemented to protect the quality of surface water and groundwater resources. The primary federal laws for protection of water quality are the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). Federal and state regulations based on this underlying legislation range from establishing maximum contaminant levels to setting anti-degradation policies.

The primary regulatory program for implementing water quality standards is the federal National Pollutant Discharge Elimination System (NPDES) Program. The United States Environmental Protection Agency (EPA) has delegated NPDES enforcement and administration to the State of California. Under the Federal Concentrated Animal Feeding Operations (CAFO) program, owners and operators (“dischargers”) of dairies are required to apply for and receive an NPDES permit if the dairy is a Large CAFO<sup>2</sup> and discharges or proposes to discharge pollutants to the waters of the United States.

#### **FEDERAL EMERGENCY MANAGEMENT AGENCY**

The Federal Emergency Management Agency (FEMA) is the federal agency that oversees floodplains and manages the National Flood Insurance Program (NFIP), adopted under the National Flood Insurance Act of 1968. FEMA’s regulations establish requirements for floodplain management. FEMA prepares Flood Insurance Rate Maps denoting the regulatory floodplain to assist communities such as Merced County with land use and floodplain management decisions in order to meet the requirements of the NFIP.

### **3.2 CALIFORNIA LAWS AND REGULATIONS**

California’s primary water law is the Porter-Cologne Water Quality Control Act (Porter-Cologne). The regulations that implement Porter-Cologne are contained in the California Code of Regulations (CCR). The water quality control programs, plans, and policies that affect the operations of animal confinement facilities include the NPDES program, regional water quality control plans, storm water protection plans, and the Total Maximum Daily Load (TMDL) program.

In general, the Waste Discharge Requirements (WDR) Program regulates point discharges that are exempt pursuant to Chapter 1, Article 1, Subsection 20090 of Title 27 Division 2 of the California Code of Regulations and not subject to the Federal Water

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<sup>2</sup> A large CAFO is defined as having 700 or more mature dairy cattle. Medium and small CAFOs that propose to discharge must also apply for and receive a permit under the NPDES program.

Pollution Control Act. In California, the permitting authorities for WDRs are the Regional Water Quality Control Boards (RWQCB). The CVRWQCB has jurisdiction over the project site. In May 2007, the CVRWQCB adopted Waste Discharge Requirements General Order R5-2007-0035 for Existing Milk Cow Dairies (2007 General Order). In October 2013, the CVRWQCB adopted changes to the Order through the Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies R5-2013-0122 (General Order or Dairy Order), which rescinded and replaced the 2007 General Order. The General Order implements the State laws and regulations relevant to confined animal facilities. The General Order is not a NPDES Permit and does not authorize discharges of pollutants to surface water that are subject to NPDES permit requirements of the Clean Water Act. The General Order serves as general WDRs for discharges of waste from existing milk cow dairies and is intended to be compatible with the EPA's regulations for CAFOs discussed above. Under the General Order Waste Discharge Permit Program, Animal Feeding Operations are prohibited from discharging waste into surface water or into groundwater that is directly connected to surface water.

The General Order only applies to owners and operators of existing milk cow dairies (dischargers) in the Central Valley Region. For the purposes of the General Order, existing milk cow dairies are those that were operating as of October 17, 2005 and filed a Report of Waste Discharge (ROWD). Dairies that did not file a 2005 ROWD, new dairies, and existing dairies expanding the mature cow number established under the 2005 ROWD by greater than 15 percent may not be covered under the General Order and would be required to obtain coverage under Individual WDRs. Individual WDRs were not issued by the RWQCB since 2009. All dairies covered under the General Order are required to:

- Comply with all provisions of the General Order,
- Submit a Waste Management Plan (WMP) for the production area,
- Develop and implement a Nutrient Management Plan (NMP) for all land application areas,
- Monitor wastewater, soil, crops, manure, surface water discharges, and storm water discharges,
- Monitor surface water and groundwater,
- Keep records for the production and land application areas, and
- Submit annual monitoring reports.

The NMP and WMP describe the regulatory requirements for the facility, and together they serve as the primary tool to prevent groundwater contamination and poor operations. The General Order establishes a schedule for dischargers to develop and implement their WMP and NMP, and requires them to make facility modifications as

necessary to protect surface water, improve storage capacity, and improve the facility's nitrogen balance before all infrastructure changes are completed. In addition, Best Management Practices (BMP) intended to minimize surface water discharges and subsurface discharges at dairies are required. The General Order also requires each dairy to fully implement a WMP and a NMP as of the date of this technical study. In compliance with the requirements of the CVRWQCB, the proponents of dairies complete the required components of the WMP and NMP of the General Order.

In November 2012, a Court of Appeals in Sacramento found that the General Order violated the State Water Resources Control Board (SWRCB) antidegradation policy (*Asociacion de Gente Unida Por El Agua v. Central Valley Regional Water Quality Control Board* (2012) 210 Cal.App.4th 125). The environmental group that challenged the General Order argued the poor drinking water quality in the Central Valley was due to waste discharge from dairy farms. The court found that the General Order's monitoring system of taking samples from domestic and agricultural supply wells is insufficient to detect groundwater degradation in a timely manner, and that the General Order contains no remediation measures in the event groundwater monitoring determines that degradation occurred. The case resulted in revisions to the General Order through the Reissued Dairy General Order.

The Reissued Dairy General Order enhanced 2007 General Order requirements on existing milk cow dairies. The Reissued Dairy General Order recognizes that some of the necessary improvements to existing dairies have already occurred. Improvements may include recycling flush water, grading, establishing setbacks, installing flow meters, exporting manure, leasing, or purchasing land, etc. The dairy operator may be able to make some of these improvements relatively quickly while some improvements may require more time to implement. The General Order requires dairy operators to make any necessary interim facility modifications first to prevent discharges to surface water, improve storage capacity, and improve the facility's nitrogen balance before completing any necessary infrastructure changes.

The 2007 General Order includes a provision that requires compliance with Monitoring and Reporting Program No. R5-2007-0035. With the Reissued Dairy General Order, the Monitoring and Reporting Program (MRP) was updated (Monitoring and Reporting Program R5-2013-0122). Over the next several years, this general order will be remanded, revised and reissued to address groundwater protection concerns.

As in the past, based on an evaluation of the threat to water quality at each dairy, the CVRWQCB may require the installation of monitoring wells to comply with the General Order MRP. The Monitoring and Reporting Program requires:

- Periodic inspections of the production area and land application areas,
- Monitoring of manure, process wastewater, crops, and soil,

- Recording of operation and maintenance activities,
- Groundwater monitoring,
- Storm water monitoring,
- Monitoring of surface water and discharges to surface water,
- Annual reporting,
- Annual reporting of groundwater monitoring,
- Annual storm water reporting,
- Noncompliance reporting, and
- Discharge reporting.

The General Order and Individual WDRs also established the ability for individual dairies to participate in a Groundwater Representative Monitoring Program (RMP) as an alternative to an individual requirement for groundwater monitoring. Each dairy must notify the CVRWQCB about its decision to join the RMP. Dairies that do not notify the CVRWQCB or do not intend to join an RMP will be held to individual monitoring requirements set forth in the regulations. The Azevedo Dairy #2 joined the RMP efforts; however, in the future, they could be treated as an individual discharger required to have an individual WDR and a separate groundwater monitoring system.

The RMP establishes a regional monitoring plan for the member dairies of the Central Valley Dairy Representative Monitoring Program (Dairy Cares). The RMP was developed in accordance with General Order requirements and with review by the CVRWQCB. The regional monitoring network is established by installing individual monitoring well networks at dairies with hydrogeologic and land use characteristics typical of the area. Groundwater monitoring results for these dairies is then extrapolated to other member dairies of the RMP, theoretically removing the need to install monitoring well networks on an individual basis. Phase I of the RMP was completed during 2011 and consisted of installing monitoring well networks at 18 dairies within the Highway 99 and Interstate 5 corridor of Stanislaus and Merced County. The Phase II workplan proposed further monitoring networks in San Joaquin, Fresno, Kings, and Tulare counties, and completed the public review process in July 2012. Monitoring efforts of 42 selected dairies were initiated in 2013. The RMP currently monitors 443 monitoring wells at 42 representative dairies to cover their 1,100+ dairy members. Annual reports are submitted to the CVRWQCB. Summaries of these reports are provided below.

The Year 1 (2012) Report initial findings for the Central Valley Dairy Representative Monitoring Program (CVDRMP) included 18 dairies in the Stanislaus and Merced Counties. The summary of findings for the first encountered groundwater quality indicated that high nitrate and TDS concentrations are widespread beneath application fields and dairy facilities, with higher nitrate concentrations found in coarse sandy soils

and higher TDS concentrations in silt or clay soils. Loading rates of salts to individual fields were tracked and additional refinement in this tracking will increase the effectiveness of the analysis of the data derived from the monitoring program. Additional examination of the dairies, including field assessment, was recommended to more accurately determine the performance of dairy lagoons.

The Year 2 (2013) report expanded the dairy network to 42 total dairies from Tehama County to Kern County. The monitoring data indicated that application of fertilizer to crops (either manure or commercial fertilizer) may be a major source for impacts observed in first encountered groundwater. Elevated nitrate concentrations observed in the 2012 Report were observed in the 2013 Reporting period as well, especially for coarse-grained soil, but was also observed in other soil types. Groundwater data collection efforts for 2013 observed groundwater responses to irrigation events. As part of the continued monitoring effort, the CVDRMP proposed to refine the well network in the central area, continue collecting automated data from 10 wells at 4 dairies, continue collecting lagoon seepage testing data with memoranda submitted to the CVRWQCB, complete subsurface hydrogeologic investigation in the central area around lagoons at 12 dairies, collect age date samples from groundwater in the dairy network, and continue to suggest a framework to improve nutrient management for dairies to minimize farming effects to the environment.

The Year 3 (2014) report confirmed that the 42 dairies used for monitoring are representative of a range of site conditions and farming practices observed in Central Valley dairies. The findings for January 2012 through December 2014 confirmed that first encountered groundwater was affected by historic and current dairy farming practices and indicates that crop fields are the primary source of nutrient emissions to groundwater. Assessment of lagoon effects on groundwater is limited as the CVDRMP determined that groundwater monitoring provides more qualitative assessment for lagoon and crop field nutrient loading. CVDRMP continues to work towards development of evidence-based industry recommendations to improve groundwater protection.

The Year 4 (2015) report provides cumulative data collected from January 2012 through December 2015 and confirms findings are consistent with previous studies. The data confirms that first encountered groundwater is affected by current and/or historic dairy practices and indicates that crop fields are the primary source of contaminant migration. In addition to the regulatory monitoring, the program initiated an investigation of lagoon seepage and testing was completed during the winters of 2013/2014 and 2014/2015. Based on data collected to date, the report indicates that most dairies likely will not be able to meet CVRWQCB standards for groundwater protection. The RMP teamed with University of California researchers to determine a path to



improve nutrient management and determine Nitrogen Use Efficiency (NUE). While the concept of NUE is universal, actions to achieve optimal NUE will be site-specific. The report determined seven major findings: 1) Groundwater monitoring with respect to lagoon performance is not especially useful and can only be used in a qualitative approach, i.e., water quality can indicate impacts but cannot provide seepage rates, etc., 2) Improvements to NUE aim to reduce subsurface nutrient contamination; however, water quality does not necessarily reflect the improved NUE, 3) Whole-lagoon seepage rates ranged from 0 to 2.2 mm/day with mean seepage of 1.1 mm/day and median seepage of 0.7 mm/day. Ten of the seventeen lagoons reported seepage rates of less than 0.8 mm/day. The results are consistent with academic research and confirms that small seepage rates and a narrow range of seepage rates were observed across fine and coarse sediments, likely due to the presence of a low hydraulic conductivity sludge layer, 4) Nitrogen loading rates strongly indicate that nitrogen emissions originate from croplands and not lagoons, 5) Management measures for lagoons tend to be common-sense based but the effectiveness of such measures lack quantitative evaluation and data, 6) While the injection of liquid manure into irrigation systems is conceptually similar to the use of synthetic fertilizers, there does not appear to be a method or technology to make real-time adjustments to maintain a constant application rate of nitrogen, 7) The methodology for application ratio calculation is very sensitive and inaccuracies of +/- 15% can yield a great variance in application ratios and may explain year over year field-specific variabilities.

The Year 5 (2016) report confirmed the continued observed impacts to shallow groundwater from the previous reports. The RMP continued to implement research projects for investigations of different portions of dairy components. In 2016, the RMP launched NUE research projects in Merced, Madera and Fresno Counties. Key findings for the 2016 report were similar to the 2015 report key findings, emphasizing that groundwater monitoring, while a useful tool to determine the extent of contamination, is not beneficial for determining point source or management for pollution sources.

The Year 6 (2017) report provides cumulative data collected from January 2012 through December 2017 and confirms the continued observed impacts to shallow groundwater due to historical and/or current farming practices. In addition to the regulatory monitoring, the program continues the voluntary investigation of lagoons, croplands, and earthen floored animal housing. In summer of 2017, the RMP launched a two-year NUE research project in Tulare County. Key findings for the 2017 report emphasize that groundwater monitoring alone is not suitable for evaluation of on-farm management practices or for recommendation of solutions and/or upgrades. Furthermore, many annual reports do not attempt to explain groundwater quality based on management practices or to infer the adequacy of these management practices in protecting groundwater based on groundwater quality. The RMP is developing recommendations

for management practices, solutions, and upgrades to help reduce subsurface nitrogen and salt emissions. The RMP made steady progress toward developing industry recommendations to meet the April 1, 2019 schedule mandated by the 2013 General Order.

The Year 8 (2019) report provides cumulative data collected from January 2012 through December 2019, the RMP observations confirm that first encountered groundwater is affected by historical and/or current dairy farming practices. With few exceptions, nitrate-N concentrations beneath lagoons, animal housing, and crop fields are greater than 10 mg/L. From quarterly observations (first quarter 2012 to the third quarter 2019) collected from CVDRMP's dedicated monitoring wells indicate the following groundwater TN concentration trends:

- a. 34% (88 data sets) increasing,
- b. 26% (63 data sets) decreasing,
- c. 41% stable conditions (106 data sets).

The 2019 mean TN concentration across all dairies was 46 mg/L; it was the highest in light soils and in shallow groundwater (55 and 49 mg/L, respectively); and 33 mg/L in both deep groundwater and heavy soils.

Of the three management units, the 2012-2019 TN concentration increase in wells associated with fields was similar to the Comprehensive (All) subgroup (11 mg/L compared to 13 mg/L). This is consistent with the fact that field wells contribute the largest subset of data points. Groundwater near lagoons exhibited the greatest concentration increase over the 8-year monitoring period (30 mg/L;  $p=0.02$ ).

The Year 9 (2020) report provides cumulative data collected from January 2012 through December 2020, the RMP observations confirm that first encountered groundwater is affected by historical and/or current dairy farming practices. With few exceptions, nitrate-N concentrations beneath lagoons, animal housing, and crop fields are greater than 10 mg/L. From quarterly observations (first quarter 2012 to the third quarter 2020) collected from CVDRMP's dedicated monitoring wells indicate the following groundwater TN concentration trends:

- a. 35% (92 data sets) increasing,
- b. 23% (60 data sets) decreasing,
- c. 42% stable conditions (109 data sets).

The 2020 mean TN concentration across all dairies was 44 mg/L; it was the highest in light soils and in shallow groundwater (55 and 46 mg/L, respectively); and 34 mg/L in deep groundwater and 28 mg/L in heavy soils.

Of the three management units, the 2012-2020 TN concentration increase in wells associated with fields was similar to the Comprehensive (All) subgroup (12 mg/L

compared to 14 mg/L). This is consistent with the fact that field wells contribute the largest subset of data points. Groundwater near lagoons exhibited the greatest concentration increase over the monitoring period (28 mg/L;  $p=0.02$ ).

The Year 10 (2021) report provides cumulative data collected from January 2012 through December 2021, the RMP observations confirm that first encountered groundwater is affected by historical and/or current dairy farming practices. With few exceptions, nitrate-N concentrations beneath lagoons, animal housing, and crop fields are greater than 10 mg/L.

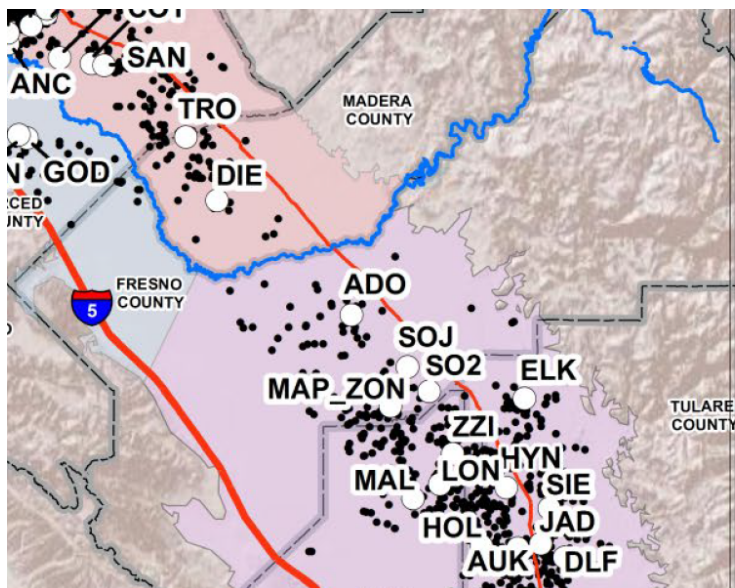
- TN concentrations associated with wells that have onsite sources increased by 16 mg/l from 2012 to 2021.
- TN concentrations associated with wells that have off site sources increased by 8 mg/l from 2012 to 2021.

The 2021 mean TN concentrations across all dairies were higher in shallow and light soil wells (47 and 57 MG/l, respectively) than in deep and heavy soils (34 and 28 Mg/l respectively). Of the three management units, the 2012-2021 TN concentration increase in wells associated with fields (17 mg/l) was similar to the Comprehensive (All) subgroup (16 mg/L). This is consistent with the fact that field wells contribute the largest subset of data points. The 2021 mean TN concentration was 40 mg/l. (Luhdroff, 2022)

The CVDRMP site specific information provides another assessment of the area near the Azevedo Dairy #2. The closest CVDRMP monitored dairy located in the eastern part of the basin is the J. Troost Dairy (TRO) dairy, located at 24868 Road 9 in Madera County. This site is approximately five miles to the south of Azevedo Dairy #2, see the CVDRMP Report Map depiction below.

As stated in the Year 8 - 2018 RMP report, TRO has three monitoring wells that have been sampled over the several year monitoring period. The monitoring well groundwater levels have dramatic seasonal changes.

Regarding groundwater quality, the MW1, nitrate-N concentrations ranged from 9.4 to 12.9 mg/L in 2006 and from 11 to 15 mg/L in 2018. In MW2, nitrate-N concentrations ranged from 40.4 to 54.8 mg/L in 2006 and from 36 to 45 mg/L in 2018. In MW3, nitrate-N concentrations ranged from 6.9 to 32.1 mg/L in 2006 and from 36 to 45 mg/L in 2018.



**Figure 2-1: Location Map of Monitored CVDRMP**

**Figure 18 - Locations of RMP Dairies (Taken from CVDRMP Annual Report)**

Luhdorff and Scalmanini, as part of the Dairy RMP program, published an extensive report related to earthen liquid dairy lagoons. The report compiled groundwater quality data from the RMP network, data from whole-lagoon seepage testing, lagoon liquor quality, and perimeter soil borings around lagoons and groundwater quality and geophysical surveys. Conclusions were provided for seepage rates and nitrogen mass emissions, salinity effects on soils and groundwater and utility of concentration-based assessment of lagoons. The report determined that a majority of nitrogen loading was related to cropland and not lagoon operations. Salinity effects tended to be near the lagoons in most cases and little to no impact was observed at a distance of 50 to 150 feet from the lagoon perimeter. Furthermore, the RMP concluded field work associated with its Corral Subsurface Hydrogeology.

In accordance with Provision 29 of the General Order, all dairies must comply with Title 27. As explained in the General Order Information Sheet, the Title 27 design standards for ponds were determined to not be protective of groundwater quality, and there are technologies available which can provide greater groundwater protection. Because Section 13360 of the California Water Code (CWC) requires that WDRs not specify the design, location, type of construction, or particular manner in which compliance may be had with the requirements, the General Order cannot specify any particular pond design. However, the General Order establishes performance standards for new wastewater ponds that are more stringent than Title 27 to provide increased groundwater protection.

The Azevedo Dairy #2 facilities are separately regulated under the Reissued Dairy General Order (R5-2013-0122). Since the proposed expansion would increase the mature cow number established under the WDR by greater than 15 percent, the proposed expansion may require a new individual WDR. Significant operational and reporting requirements will be required as part of the individual WDR process. Nutrient management practices required by the individual WDR will continue as follows:

- Discharge reporting.
- Groundwater monitoring,
- Wastewater sampling and application monitoring,
- Irrigation application monitoring,
- Facility and land application visual inspections,
- Crop nitrogen/phosphorus uptake monitoring, and
- Field specific nutrient budgeting.

## **REGIONAL WATER QUALITY CONTROL PLAN**

Individual RWQCBs regulate animal confinement facilities, including dairies and other types of facilities, by developing and enforcing a Basin Plan that identifies beneficial uses of waters in the region and establishes policies to protect those uses. Agriculture and dairies are designated as beneficial uses of water resources in the Basin Plan.

The RWQCB regulates dairies under the provisions of Article 1, Subchapter 2, Chapter 7, Division 2, Title 27 of the California Code of Regulations, and the Porter Cologne Water Quality Control Act. The Basin Plan for the Sacramento-San Joaquin Valley (Basin Plan) developed by the Central Valley RWQCB generally regulates agriculture practices.

One mechanism used to protect water quality is for RWQCBs to issue WDRs that specify waste management practices and impose reporting requirements as discussed above. The CVRWQCB regulates some animal confinement facilities under individual WDRs depending upon site-specific conditions and regulatory assessment, as described above. Planning documents related to these permits include a Nutrient Management Plan and Waste Management Plan.

## **NUTRIENT MANAGEMENT PLAN AND WASTE MANAGEMENT PLAN**

The NMP/WMP planning process is used to implement best management practices for dairies. The NMP/WMP are planning documents used to describe facility operations, develop wastewater disposal options, and outline mitigation measures for each dairy. These documents are required to be revised as appropriate for the operation. Specific elements related to the number and type of animals dictate the size of a facility, fresh/flush water needs, and wastewater generation. Nitrogen and salt balance calculations based on the herd description, housing requirements (i.e., flush freestalls or



dry lots), acreage available for land application, and crop nutrient removal rates are made to determine the nitrogen and salt uptake for the proposed cropping pattern. On-site wastewater plans, storage elements, and storm water planning may be modified based on the calculations contained in the NMP/WMP.

As mandated by the ACO, a NMP/WMP in place of a Comprehensive Nutrient Management Plan (CNMP)<sup>3</sup> for the Azevedo Dairy #2 facility was prepared pursuant to the requirements of the CVRWQCB (see Appendix J of the Environmental Impact Report for the expansion Project). The NMP and WMP for the proposed dairy expansion, referenced, were used for the evaluation in this technical study. To establish a baseline, the referenced NMP and WMP were used to represent existing conditions. Annual reports are used to confirm the planning efforts.

## **CALIFORNIA STATEWIDE SUSTAINABLE GROUNDWATER MANAGEMENT ACT**

The Sustainable Groundwater Management Act (SGMA) was signed into law on September 16, 2014 and is a package of three groundwater laws. The law was then amended in 2015 and these changes were effective as of January 1, 2016.

The SGMA allows customized groundwater sustainability plans to be designed by groundwater sustainability agencies (GSA) to manage groundwater resources while being sensitive to local economic and environmental needs. GSAs were formed and plans were developed addressing basins in critical overdraft and by January 31, 2022 for all other basins.

The GSAs are responsible for submitting an annual report summarizing groundwater elevation data, groundwater extraction, groundwater recharge (from surface water supply used or available for use), total water use, and change in groundwater storage. As part of the annual reporting effort, individuals who are outside groundwater adjudication boundaries and within medium or high priority basins and who use more than 2 acre-feet (651,702 gallons) per year of groundwater may be required to track their usage and provide an annual report to their respective GSA and SWRCB.

As referenced in Section 1, the Azevedo Dairy #2 is located in the jurisdiction of the Merced Subbasin GSA. The combined three GSAs developed the one referenced GSP.

After years of implementation efforts under the GSP, the SWRCB will be authorized to intervene if local agencies prove unable or unwilling to correct groundwater management problems. The goal of the implementation of the GSP is to help avoid chronic lowering of groundwater levels, avoid significant and unreasonable

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<sup>3</sup> Since adoption of the ACO, the CVRWQCB required the preparation of a NMP and WMP, which would serve in place of the CNMP as allowed by Merced County Code Chapter 18.64.060 K.

groundwater storage reduction, seawater intrusion, water quality degradation or land subsidence, and avoid surface water depletions that have adverse impacts on surface water beneficial uses. Sustainable groundwater management, with successful implementation of GSP, should be reached by 2040 for basins in critical overdraft and by 2042 for other basins.

As stated in the GSP, a summary depiction is provided of the primary hydrogeological considerations across the Subbasin with respect to sustainable management criteria selection. Icons of the five applicable sustainability indicators have been generally placed around the Subbasin for illustration purposes. Characterization of groundwater quality identified six constituents of concern to track and analyze from existing drinking water monitoring programs for potential water quality impacts from future GSA management activities. Interconnected surface water criteria have been selected to protect each river boundary. As referenced above in the in Section 2, land subsidence has been a significant issue in the southern portion of the Subbasin.

As referenced on Table 7-1 of the 2022 GSP, the five-year GSP updates will be part of an implementation schedule.

2020	2025	2030	2035	2040
Monitoring and Reporting	Preparation for Allocations and Low Capital Outlay Projects	Prepare for Sustainability	Implement Sustainable Operations	
<ul style="list-style-type: none"> <li>Establish Monitoring Network</li> <li>Install New Groundwater Wells</li> <li>Reduce/Fill Data Gaps</li> </ul>	<ul style="list-style-type: none"> <li>GSAs conduct 5-year evaluation/update</li> <li>Monitoring and reporting continue</li> </ul>	<ul style="list-style-type: none"> <li>GSAs conduct 5-year evaluation/update</li> <li>Monitoring and reporting continue</li> </ul>	<ul style="list-style-type: none"> <li>GSAs conduct 5-year evaluation/update</li> <li>Monitoring and reporting continue</li> </ul>	
<ul style="list-style-type: none"> <li>GSAs allocated initial allocations</li> <li>GSAs establish their allocation procedures and demand reduction efforts</li> <li>Develop Metering Program</li> </ul>	<ul style="list-style-type: none"> <li>As-needed demand reduction to reach Sustainable Yield allocation</li> <li>Metering program continues</li> </ul>	<ul style="list-style-type: none"> <li>As-needed demand reduction to reach Sustainable Yield allocation</li> </ul>	<ul style="list-style-type: none"> <li>Full implementation demand reduction as needed to reach Sustainable Yield allocation by 2040</li> </ul>	
<ul style="list-style-type: none"> <li>Funded and smaller projects implemented</li> </ul>	<ul style="list-style-type: none"> <li>Planning/ Design/ Construction for small to medium sized projects</li> </ul>	<ul style="list-style-type: none"> <li>Planning/ Design/ Construction for larger projects begins</li> </ul>	<ul style="list-style-type: none"> <li>Project implementation completed</li> </ul>	
<ul style="list-style-type: none"> <li>Extensive public outreach regarding GSP and allocations</li> </ul>	<ul style="list-style-type: none"> <li>Outreach regarding GSP and allocations continues</li> </ul>	<ul style="list-style-type: none"> <li>Outreach continues</li> </ul>	<ul style="list-style-type: none"> <li>Outreach continues</li> </ul>	

During 2025, the preparation of the sustainable groundwater yield allocations will be presented in the an updated GSP and Annual Reports. Water allocations determinations may include specific dairy operation elements. For example, dairy milk

houses will have a water usage and demand reduction incentive. Efforts to achieve the sustainability goal for the Merced Subbasin, and to avoid undesirable results over the remainder of a 50-year planning horizon. Projects and Management Actions have been developed by the GSAs. Most projects and management actions relate to the increase of aquifer recharge. The GSP Annual reports provide a summary of the results from monitoring/construction projects and management action.

## **IRRIGATED LANDS REGULATORY PROGRAM**

A range of pollutants can be found in runoff from irrigated lands, such as pesticides, fertilizers, salts, pathogens, and sediment. The Irrigated Lands Regulatory Program (ILRP) of the CVRWQCB regulates discharges from irrigated agricultural lands. Its purpose is to prevent agricultural discharges from impairing the surface waters that receive the discharges. To protect these waters, RWQCBs issued conditional waivers of WDRs to growers that contain conditions requiring water quality monitoring of receiving waters and corrective actions when impairments are found. The development of the Long-term Irrigated Lands Regulatory Program General Orders, which will protect both surface water and groundwater, are underway, and the following Orders were adopted by the RWQCB in preparation of this report:

- Eastern San Joaquin River Watershed General Order (Order R5-2012-0116-09) – includes revisions through February 28, 2020. This Order provides WDRs and MRP for discharges from irrigated lands within the eastern San Joaquin River watershed.
- Grassland Drainage Area General Order (Order R5-2015-0095 -04) includes revisions through February 28, 2020. This program regulated discharge to groundwater in the Grassland Drainage Area and is similar to other IRLP orders.
- Individual Discharger General Order (Order R5-2013-0100) - adopted in July 2013. This Order regulates waste discharges from irrigated lands for individuals who are not enrolled under WDRs administered by a third-party.
- Tulare Lake Basin Area General Order (Order R5-2013-0120 - 08) – adopted in September 2013 and includes revisions through February 28, 2020. This Order provides WDRs and MRP for discharges from irrigated lands within the Tulare Lake Basin.
- Western San Joaquin River Watershed General Order (Order R5-2014-0002-09) includes revisions through February 28, 2020. This Order provides WDRs and MRP for discharges from irrigated lands within the western San Joaquin River Watershed.
- San Joaquin County and Delta Area General Order (Order No. R5-2014-0029 - 05) includes revisions through February 28, 2020.

In implementing the ILRP, the CVRWQCB allowed growers to combine resources by forming water quality coalitions. The coalition groups work directly with their member growers to assist in complying with CVRWQCB requirements by conducting surface water monitoring and preparing regional plans to address water quality problems. Of the estimated 35,000 growers in the Central Valley, there are approximately 25,000 landowners/operators who are part of one of eight water quality coalition groups. If growers do not obtain regulatory coverage with payment of a membership fee for their waste discharges as a part of a Coalition Group, they must file a ROWD and filing fee with the CVRWQCB to obtain a grower-specific permit. The Conditional Waiver requires that coalition groups comply with General Order WDRs, implement Monitoring and Reporting Program plans, and submit periodic monitoring reports and monitoring data. When there were two or more exceedances of the same pollutant at the same site within a three-year period, Management Plans must be prepared and implemented.

There is significant overlap between the ILRP and the Dairy Programs with regard to regulatory requirements, monitoring, and best management practices. The Azevedo Dairy #2 may be regulated in the future under the ILRP program if regulations change. If site conditions change (i.e., the Dairy Program regulations no longer apply, or if project area cropland is not included in the dairy's NMP) and a regulatory assessment warrants action under the ILRP, the farm could potentially participate in the East San Joaquin Water Quality Coalition by paying a membership fee. This Coalition represents all member dischargers as the monitoring and reporting entity for the Eastern San Joaquin River Watershed General Order (Order R5-2012-0116-09).

### **CENTRAL VALLEY SALINITY ALTERNATIVES FOR LONG TERM SUSTAINABILITY (CV-SALTS) ALONG WITH THE NITRATE CONTROL PROGRAM (NCP)**

In 2018, the CVRWQCB adopted Basin Plan amendments (Resolution R5-2018-0034) (and as amended in the 2020 Resolution R5-2020-0057) that established valley-wide Salt and Nitrate Control Programs. Central Valley Salinity Alternatives for Long Term Sustainability (CV-SALTS) is a collaborative stakeholder driven and management effort to develop sustainable salinity and nitrate management planning. The long-term solutions for managing salt in the Central Valley will be developed and implemented through a phased Salt Control Program. The three phases of the Salt Control Program include: (1) Complete a comprehensive study and analysis to define long-term salt management actions, beginning in 2021 over 10 to 15 years; (2) Complete design and permitting of projects identified in Phase 1; and (3) Construct projects to manage salts. The program approach is intended to protect beneficial uses by maintaining water quality that meets applicable objectives, allow some salt accumulation in areas where

salt can be stored without impairing beneficial uses of water, and through long-term management, restore water quality where reasonable, feasible, and practicable. In 2020 and 2021, initiatives were made through the IRLP coalitions, the CVDRMP, and private WDR holders to fund the 20-year salinity study. The CVDRMP is paying the fee for participation in the CV-SALTS Salt Control Program on behalf of its members.

The Nitrate Control Program is a prioritized program that will require facilities that discharge nitrates at levels that are causing exceedances of drinking water standards (including most dairies) to upgrade their facilities and/or waste management practices over a timeframe that may extend as long as 35 years. While upgrades are being developed and implemented, facilities responsible for adverse nitrate impacts are required to supply impacted communities with replacement drinking water. Facilities such as dairies may comply with the Nitrate Control Program individually or may elect to participate in Management Zones, which are collectives of permittees that collaborate on enhancing water quality management practices while providing affected communities replacement drinking water. Regulatory requirements under the Nitrate Control Program are triggered by the issuance of a Notice to Comply.

The Nitrate Control Program occurs in priority-based stages. The Basin Plan identified Priority 1, Priority 2, and Non-Prioritized basins based on estimated nitrate water quality impacts. Priority 1 areas had the highest nitrate concentrations, so efforts began there first. For the purposes of compliance with the Nitrate Control Program, the Azevedo Dairy #2 is in Priority Area 2, which were sent Notices to Comply in December 2023. The Nitrate Control Program has officially initiated the second stage in Priority 2 areas. In each of the basins, a new Management Zone is being developed to begin planning and early actions in the Priority 2 areas. Priority 2 groundwater subbasins include Delta Mendota, Eastern San Joaquin, Kern County (Poso), Kern County (West Side South), Madera, Merced, Tulare Lake, and Yolo. The Nitrate Control Program collaboratives will be developed in Merced County within subbasins. The collaboratives will be charged with developing and implementing action plans to provide safe drinking water, reducing nitrate impacts and restoring groundwater quality. Discharges off site would have to comply with discharge limits outlined in the Basin Plan and the 2020 Revised Salt and Nitrate Program Resolution R5-2020-0057.

Azevedo Dairy #2 (by membership in the CVDMP) will become part of future coalition efforts for planning management.

## **TMDL AND IMPACTED WATERWAYS NEAR THE PROJECT SITE**

Under Section 303(d) or §303(d) of the CWA, states are required to identify and list water bodies that do not meet applicable water quality standards. Such water bodies receive a ranking for the establishment of TMDL for all listed water contaminants that do not meet water quality standards. States are required to establish a TMDL for these



water bodies that will lead to achieving the applicable water quality standards, and to allocate the TMDL among all contributing sources. The assessment of sources may indicate that a water body is impaired because of nutrient or pathogen problems attributable to animal manure or wastewater, or because a watershed has more manure generated than there is land available for application. The TMDLs will be implemented through NPDES permits, nonpoint source control programs, and other local and state requirements.

Several streams or rivers in this area of Merced County have §303(d) listing as per the California 2020-2022 Integrated Report (Appendix A 303(d) List) and web link:

2020-2022 California Integrated Report | California State Water Resources Control Board

The San Joaquin River is 303d listed. See Section 3.5 for more specific details.

### **3.3 CALIFORNIA DEPARTMENT OF WATER RESOURCES FLOOD MANAGEMENT**

The California Department of Water Resources Division of Floodplain Management constructs and operates regional scale flood protection systems in partnership with federal and local agencies, and provides technical, financial, and emergency response assistance related to flooding. The DWR prepared non-regulatory Best Available Maps showing 100, 200, and 500-year floodplains using data compiled from various sources intended to support community-based planning and flood risk management. The 100-year areas are similar to those of FEMA maps, with some additional areas and localized differences. Refer to Section 2 for specific site details.

### **3.4 MERCED COUNTY**

#### **ANIMAL CONFINEMENT ORDINANCE**

The Merced County Animal Confinement Ordinance regulates the design, construction, and operation of animal confinement facilities within the county. Because the ACO is regulatory rather than permissive, all existing and proposed animal confinement facilities within the county are required to comply with the terms of the ACO, including the Azevedo Dairy #2 project. The Merced County ACO is included as article 4 of Title 18 Zoning of the Merced County Code.

Merced County regulations under the ACO maintain water quality standards that are consistent with the CVRWQCB Basin Plan. The Merced County ACO addresses potential impacts to water quality primarily through preparation and implementation of a CNMP. If a site-specific CNMP is followed and if best management practices are used, nitrogen loading and salt loading to groundwater will be minimized. Since adoption of the ACO, the CVRWQCB required the preparation of a NMP and WMP as

described above, which would serve in place of the CNMP as allowed by County Code Chapter 18.64.060.

The Merced County ACO contains additional provisions to protect water quality. For example, ACO require that all wastewater or storm water that comes into contact with manure be maintained on the project site, or applied to other sites only upon written approval of the landowner. ACO requires that off-site property owners accepting wastewater (liquid manure) complete written agreements to accept responsibility for proper land application. As per the ACO notification of Merced County Division of Environmental Health (DEH) for any off-site discharge of wastewater and application of manure at agronomic rates. For the permanent closure of an animal confinement facility, ACO requires that DEH to review and approve specific collection of soil samples from underneath existing ponds to be abandoned after liquid and solids are removed. Permits must be obtained from DEH prior to construction and an inspection must be performed prior to use of a newly constructed pond or basin. Portions of the ACO that specifically apply to protection of water quality (see the appendices of the Environmental Impact Report for the Azevedo Dairy #2 Project) for the full text of the ACO or web search link:

< <https://ecode360.com/ME4967> >

To address potential impacts to water resources, the EIR prepared for the ACO contains mitigation measures to be implemented during environmental review of animal confinement facility projects such as the proposed project. Mitigation measures adopted as policy in the EIR for the ACO include:

- Measures to reduce groundwater contamination; and,
- Measures to reduce the risk of contamination of surface waters during flood events.

These mitigation measures as contained in the EIR for the ACO, are incorporated as study protocols for this technical study and serve as the basis for mitigation measures identified in this document.

## **MERCED COUNTY WELL ORDINANCE**

The Merced County Code Chapter 9.28, *Wells* contains Water Well Standards (Chapter 9.28.060) that would minimize the potential for contaminated water to enter the well and contaminate groundwater. The standards include well setback distances from potential sources of contamination and pollution, and standards for construction as set forth below:

## Merced County Code, Chapter 9.28.060 - Water Well Standards

### C. Well Construction

1. Well location. All wells shall be so constructed as to prevent the entrance of surface water and contaminated groundwater into the well or into the producing aquifer, and shall be separated a safe distance from potential sources of contamination and pollution. The following minimum horizontal distances shall be maintained for all wells furnishing potable water for human consumption:

	Water Well (feet)	Public Well (feet)
Septic tank or sewer line	50	100
Leach line or disposal field	100	150
Leaching/seepage pit	150	200
Areas of intense animal confinement	100	150
Agricultural well	300	300
Unlined canals, surface body or course or drainage water pond	100	100
Swimming pool	10	10

2. Property Line Setback. All wells shall be located with a minimum setback of fifteen (15) feet from a property line. The health officer may authorize an exception to this requirement where space restrictions on existing small lots necessitate, but in no case shall the minimum setback of the well from the property line be less than five feet.
3. Casing perforations. All wells supplying water for human consumption shall be constructed with a fifty (50) foot minimum continuous, unperforated casing, except in areas where the only potable water is at a depth of less than fifty (50) feet. In such instances, the depth to the first perforations in the well may be reduced to less than fifty (50) feet below ground surface if prior approval is granted by the Health Officer. In no case shall the depth of the annular seal or the depth of the first perforations be reduced to less than twenty (20) feet below ground surface.

- a. Corcoran clay. All wells penetrating Corcoran clay shall be constructed in a manner such as to prevent the intermixing of waters above and below the Corcoran clay layer. There shall be no perforations above and below the Corcoran clay layer in the same casing.

Sections C.4 – C.12 have been modified.

## **MERCED COUNTY GENERAL PLAN**

The Water Element of the 2030 Merced County General Plan, dated December 10, 2013, contains goals and policies pertaining to protection of water resources in Merced County. Those water policies that are relevant to the project site are presented below:

### **Policy W-2.4: Agricultural and Urban Practices to Minimize Water Contamination**

Encourage agriculture and urban practices to comply with the requirements of the Regional Water Quality Control Board for irrigated lands and confined animal facilities, which mandate agricultural practices that minimize erosion and the generation of contaminated runoff to ground or surface waters by providing assistance and incentives.

### **Policy W-2.5: Septic Tank Regulation**

Enforce septic tank and onsite system regulations of the Regional Water Quality Control Board to protect the water quality of surface water bodies and groundwater quality.

### **Policy W-2.6: Wellhead Protection Program**

Enforce the wellhead protection program to protect the quality of existing and future groundwater supplies by monitoring the construction, deepening, and destruction of all wells within the County.

### **Policy W-3.13: Agricultural Water Reuse**

Promote and facilitate using reclaimed wastewater for agricultural irrigation, in accordance with Title 22 and guidelines published by the State Department of Public Health.

These policies were considered in the evaluation of the proposed project and the formulation of appropriate mitigation measures below.

## **MERCED COUNTY ZONING CODE**

Merced County is responsible for implementing FEMA floodplain management regulations. The Zoning Code Section 18.26.050, Provisions for Flood Hazard Reduction (Flood Ordinance) contains specific requirements limiting and discouraging development in various flood zones, as designated on FIRMs. The County's Flood Ordinance defines areas of special flood hazard as Zones A, AO, AE, or AH. For areas in a special flood hazard zone, no development may occur on the site until all relevant requirements of the Flood Ordinance are satisfied. These requirements as set forth in the Zoning Code include construction standards for both occupied and non-occupied structures, utilities, mobile homes, and for non-residential structures. These standards include anchoring structures to prevent flotation, collapse or movement, raising structures above the base flood elevation or otherwise flood proofing them, constructing adequate drainage paths around structures to guide floodwaters around and away from proposed structures, providing a determination of the base flood elevation as determined by a licensed engineer, and drafting all subdivision plans so that they identify the flood hazard area and elevation of the base flood, and provide an update to the elevation of proposed structures and pads.

## **REGULATORY COMPLIANCE AUDIT**

The Merced County Planning and Community Development Department requests regulatory compliance audits of expanding dairies from the Division of Environmental Health (DEH) as part of the Conditional Use Permit (CUP) evaluation process prior to project approval. DEH staff completed a regulatory compliance audit of the Azevedo Dairy #2 on August 11, 2021. The dairy inspection included an evaluation of the facility for compliance with the operations, nutrient and waste management as per Merced County Animal Confinement Ordinance (Merced County Code Chapter 18.64). The DEH concluded that the dairy facility was in substantial compliance with the ACO on August 25, 2021.

### **3.5 TMDL AND IMPACTED WATERWAYS NEAR THE PROJECT SITE**

Under Section 303(d) of the CWA, states are required to identify and list water bodies that do not meet applicable water quality standards. Such water bodies receive a ranking for the establishment of Total Maximum Daily Load<sup>4</sup> for all listed water contaminants that do not meet water quality standards. TMDLs are action plans to restore clean water by defining how much of a pollutant a water body can tolerate and meet water quality standards. States are required to establish a TMDL for these water

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<sup>4</sup> A Total Maximum Daily Load, or TMDL, is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.



bodies that will lead to achieving the applicable water quality standards, and to allocate the TMDL among all contributing sources. The assessment of sources may indicate that a water body is impaired because of nutrient or pathogen problems attributable to animal manure or wastewater, or because a watershed has more manure generated than there is land available for application. The TMDLs are adopted by the Regional Water Quality Control Board as amendments to the Basin Plan. The TMDLs are implemented through NPDES permits, nonpoint source control programs, and other local and state requirements.

The San Joaquin River is approximately seven miles to the southwest.

Deadman Creek, located approximately 1.25 miles north of the Site, is listed as impaired under Section 303(d). As listed under the 2020-2022 California Section 303(d) List of Water Quality Limited Segments of the San Joaquin River, the segment is impaired for the pollutants/stressors of arsenic, indicator bacteria, dissolved oxygen, pH, and toxicity. The likely source of pollutants is agriculture.

The CVRWQCB adopted Amendments to The Water Quality Control Plan For The Sacramento River and San Joaquin River Basins in February 2019. TMDLs or regulatory programs required to address water body impairments are identified by the CVRWQCB and include monitoring strategies that will be used to evaluate the effectiveness of the program. As set forth in the 2020-2022 Integrated Report, regulatory programs such as the Irrigated Lands Regulatory Program (ILRP) address water quality impairments throughout the Region.

## 4 EXISTING AND PROPOSED DAIRY CONDITIONS

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### 4.1 EXISTING AND PROPOSED PROJECT OPERATIONS AND NMP & WMP SUMMARY

The project applicant has prepared a NMP/WMP as required by the CVRWQCB General Order for Milk Cow Dairies. A professional engineer registered in the State of California and a Certified Crop Advisor completed the required elements of the NMP/WMP. The previously prepared WMP and NMP for the existing dairy operations, both dated in 2018, were used to establish a baseline of existing conditions.

The existing facility consists of the following as referenced in the IS/NOP. The existing dairy is located at 7618 Highway 59 on approximately 33 acres and includes the following facilities:

- shade barns
- open corrals
- shop
- milking parlor
- commodity barn
- wastewater storage pond
- 4 residences

The existing dairy facility consists of flush and scrape systems that are used to collect and process wastewater and solid manure. Animal wastes from animal barns and other concrete-surfaced areas are flushed with recycled water to an on-site waste management system that consists of one wastewater storage pond (retention pond). The existing pond is earthen-lined. The area of active dairy facilities has been graded to direct corral runoff to the existing waste management system. Stormwater runoff from impervious surfaces and roofed areas is routed to the wastewater pond, except for rainwater from several animal shelter roofs, which would be routed to a nearby field. Recycled water is used to clean the milk parlor floor and is the source of sprinkler pen water.

Solid manure that accumulates within corrals would continue to be scraped and stock piled onsite. Dry manure would continue to be used for bedding; additional manure would be sold and hauled off site for use as fertilizer and soil amendments. As reported in the NMP, exported solid manure applied to off-site agricultural fields not owned by the project applicant would increase from 12,500 tons of solid manure (currently) to 30,600 tons of solid manure with the proposed expansion (approximately 36 percent of previously separated solids). While the exact location of these off-site cropland parcels may vary throughout operations, the disposal of manure at off-site locations and the acreage necessary to properly dispose of manure liquids and solids are accounted for in the project NMP.

The dairy facility uses groundwater resources for farm operations. Domestic water to the dairy barn and the four employee residences is provided by three on-site water wells. Irrigation water is supplied by groundwater from one irrigation well. Wastewater is mixed with irrigation water and applied to cropland. Receiving fields are graded to guide excess applied irrigation water to an existing tailwater return and/or retention system. Collected tailwater is either returned to the retention pond (Field 2), or retained by berms (Field 1). Field application of wastewater is via pipeline.

According to the General Order, nitrogen application rates shall not result in total nitrogen applied to the land application areas exceeding 1.4 times the nitrogen that will be removed from the field

in the harvested portion of the crop, unless plant tissue sampling identifies a need to increase fertilizer application of a specific crop. The whole farm nitrogen balance is a ratio that reflects the total nitrogen generated by the operation minus losses and

$$\text{field nutrient balance ratio} = \frac{\text{nitrogen applied (from irrigation/fertilizer/manure)}}{\text{total N removed by crops}}$$

$$\text{whole farm nitrogen balance} = \frac{(\text{N stored} + \text{N imported} + \text{atmospheric N} - \text{N exported})}{\text{total N removed by crops}}$$

exports, divided by the nitrogen removed by crops. The General Order requires that if the whole farm nitrogen balance is greater than 1.65, a review must be made of nitrogen inputs and outputs at the facility to identify how to reduce inputs to meet the standard.

Under existing conditions as reported in the April 2018 NMP total annual gross nitrogen generated by facility is estimated at 567,275.1 pounds/year. Nitrogen exports currently total 345,530.0 pounds/year. After ammonia losses, existing operations reflect a whole farm nitrogen balance ratio of 1.60.

With implementation of the proposed expansion as reported by the March 2020 proposed conditions NMP, total annual gross nitrogen generated by the expanded facility would increase to 1,121,823.4 pounds/year. A total of 746,737.6 pounds/year of nitrogen would be removed through nitrogen exports as solid manure. After ammonia losses, the whole farm balance ratio will be 1.34. Overall management of nitrogen on the farm, including increasing nitrogen exported, would result in a reduction in the whole farm nitrogen value.

From the existing facility WMP, dated August 2018 and a for a referenced normal precipitation year, there are currently 93,637 gallons per day of wastewater (approximately 34 million gallons per year) generated by the existing dairy herd (which includes process water from the milkbarn and manure and bedding, rainfall runoff into

ponds, and direct rainfall onto ponds). The proposed expanded dairy would generate approximately 113,673 gallons/day of wastewater (approximately 41 million gallons/year for a normal precipitation year).

There would be a 7 million gallon per year increase in process wastewater generated with the proposed dairy expansion and sent to the pond. An increase in water use is related to an increase in milkbarn and equipment water and other reusable water. Process wastewater from the pond would continue to be mixed with irrigation water and applied to crops.

The irrigation water demand of the existing farming operations is estimated by multiplying the cropable acres by the estimated average irrigation demand per acre. The existing NMP estimates an irrigation average demand of over 4 feet of water for pasture and cropped acres. As summarized in the IS/NOP, there are approximately 82 acres currently single and double cropped with pasture, oats or corn and silage – soft dough.

The proposed NMP estimates an irrigation demand of over 4.5 feet of water for cropped acres. Note that under proposed conditions, total land application area would be decreased from 82 acres to 80 acres. With the proposed changes in cropping patterns as detailed above, the estimated crop water demand would stay at about the same at 117 million gallons of water annually (small increase from 107 to 117 million gallons).

Using 41 million gallons of wastewater annually, the estimated wastewater component of the total irrigation the water demand is approximately 35 percent of total water volume, not accounting for pond evaporation and evapotranspiration. This calculation is simply 41 million gallons of wastewater volume divided by a total of 117 million gallons.

In summary, the proposed NMP/WMP establishes the following required facility improvements for the herd and potential areas of sensitivity under the proposed expansion:

- Proposed nutrient application rates meet required agronomic rates of 1.4 or less for best management farming practice mandated by the CVRWQCB. The whole farm nitrogen balance under existing conditions is 1.60 and would decrease to 1.34 under proposed conditions.
- The recommended amount of salt applied to cropland will be provided in the future versions of the approved NMP for the dairy.
- The proposed 15,487,548 gallons of storage capacity for the one wastewater pond would be sufficient to permit storage of wastewater generated by the facility for a 120-day cycle during normal precipitation periods and normal precipitation

periods (13,636,425 gallons). Pond freeboard capacity is used to address 100-year storm events.

- A tailwater return and/or retention system, composed of berms, piping, and sumps, is used to prevent the movement of water off site.
- Rainwater would not be separated and would be co-mingled with on-site wastewater. Stormwater runoff from impervious areas would continue to be directed to the wastewater management system, except for rainwater from several animal shelter roofs, which is routed to a nearby field.
- Based on the WMP assessment, the site is partially in the Federal Emergency Management Agency (FIRM 2008) Zone A, and as discussed in Section 2.8 the proposed construction grading will protect against floods.
- With construction of the proposed facilities, approximately 2 acres of cropped acreage would be converted to active dairy facilities. This leaves 80 acres of the fields receiving both wastewater and solid manure. Fields would be cropped in pasture, oats silage-soft dough, and corn silage. Future crops could vary from those discussed above as long as nitrogen balance requirements are met. Additional off-site fields not owned by the dairy operator would receive solid manure and wastewater as a soil amendment purchase.

The NMP demonstrates that the proposed dairy facility would, after off-site disposal of solid wastes, comply with the nitrogen loading groundwater protection requirements of the CVRWQCB and the Merced County ACO. The NMP shows the whole farm balance would be reduced from 1.60 at the existing dairy facility, to 1.34 with the proposed expansion. The balance ratio would remain below the regulatory limit of 1.65.

#### **4.2 SUMMARY OF POTENTIAL GROUNDWATER RESOURCE DEGRADATION FROM OPERATION OF THE AZEVEDO DAIRY #2 EXPANSION**

Expanded operations at the Azevedo Dairy #2 have the potential to result in the degradation of the area groundwater resources for the following reasons:

- With the increased dairy herd (which results in more wastewater processing), the expanded operations may contribute to the decline of groundwater elevation and groundwater quality. However, the acres used and the percentage of wastewater applied for the land application would reduce the whole farm risk of surface water and groundwater quality impacts. As referenced in the 2022 GSP, groundwater chemistry and depressions are minimally impacted in the subbasin area around the Azevedo Dairy #2.



- The Azavedo Dairy #2 proposed expansion would have a higher wastewater component to the total application amount from 29 to 35 percent of the crop water demand. Note that due to the off-site export of solid manure and/or liquid manure, cropping patterns and other farm practices, the whole farm nitrogen balance has improved even with the higher wastewater percentage of land application water.
- The referenced annual reports from the CVDRMP demonstrate the level of concern related to waste containment and land application of manure wastewater to irrigation lands. Good farming practices have been followed by the Azevedo Dairy #2. The proposed expansion may impact the underlying groundwater quality with the continued land application of nutrients, salts, and other constituents. The rationale associated with this finding is related primarily to the CVDRMP documented impacts of the regulatory approved and herein referenced existing and proposed whole farm balance that exceeds the crop uptake need which results in the excess nutrients available to groundwater.
- The potential impact to groundwater quality is demonstrated by the on-site domestic wells and irrigation well sporadic values for the indicator parameters. EC and Nitrate were reported below the MCL for all wells. Area groundwater quality reported by the 2022 GSP depicts low impacts to groundwater. The CVDRMP and California CV-SALTS control efforts to date indicate impacts related to Nitrate, EC and other salt indicators. The referenced programs will be used to monitor results toward the future implementation of a corrective action plan elements.

The Azevedo Dairy #2 Expansion project would concentrate animals and their wastes within the feeding areas, and to a lesser degree, within open corrals. The lined feed lanes would flush wastes to the on-site wastewater management system for treatment and storage in a pond as referenced in the existing and proposed WMP as summarized below.

**Existing Wastewater Storage Pond.** The storage pond capacity can facilitate the storage of wastewater as described in the project NMP/WMP. According to the project applicant, the pond is earthen-lined constructed to the standards in place at that time. The existing dairy wastewater pond has the potential to impact groundwater because it contains elevated concentrations of inorganic and organic constituents, and because hydraulic pressure and gravity force liquids downward through soils to groundwater. However, since no changes to the existing pond construction or operation are proposed with the dairy modification, the hydraulic pressure within the existing pond and overall pond leakage would stay the same. Therefore, there would be no anticipated increase to

groundwater quality impacts from the pond with implementation of the proposed project.

**Corrals and Housing/Shade Barns.** The dairy expansion would continue to use open-air, concrete-lined feed lanes which are roofed, where animals are fed and watered, and waste is collected. Outside of the feed lanes and covered loafing areas, cows are allowed to roam in uncovered areas where manure is collected two times a year, which minimizes the potential impact. Liquid discharge from corrals is minimal.

**Crop Fields.** Dry and liquid manure is used to fertilize dairy cropland. A tailwater collection system, composed of berms, piping and sumps, is used to prevent the movement of water off site and allow the recycling of applied wastewater. As indicated by monitoring data by the CVDRMP, crop fields are the primary source of nutrient emissions to groundwater on a dairy. As mentioned previously, under proposed conditions, total land application area would be reduced.

With implementation of the proposed operations NMP/WMP, field application of manure using the proposed cropping pattern and land application area would result in a lower field by field nutrient balance. Farming cropping pattern, fresh water mix and exportation of manure off site results in a reduced whole farm nitrogen. The whole farm nitrogen balance ratio would be reduced to 1.34 for the proposed operation from 1.60 at the existing dairy facility, respectively.

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[http://www.waterboards.ca.gov/gama/geotracker\\_gama.shtml](http://www.waterboards.ca.gov/gama/geotracker_gama.shtml).

Merced Subbasin Groundwater Sustainability Agency, 2022 Merced Subbasin Groundwater Sustainability Plan, July 2022.

Merced Subbasin Groundwater Sustainability Agency, 2024 June 7 conversation with staff and consultant.

U.S. Federal Emergency Management Agency, Flood Insurance Rate Maps;  
<https://msc.fema.gov/portal/search?AddressQuery=Merced>