APPENDIX I

Hydrogeologic Assessment Summary for CEQA

This page intentionally
left blank.

HYDROGEOLOGIC ASSESSMENT SUMMARY FOR CEQA

for the

SILVA DAIRY FARMS
1499 N. EDMINSTER ROAD AND
1904 N. EDMINSTER ROAD, STEVINSON, CA

prepared for

SILVA DAIRY FARMS

and

ENVIRONMENTAL PLANNING PARTNERS

June 2024

Final

TABLE OF CONTENTS

List of Figures

List of Tables

1 GENERAL INFORMATION

On behalf of the Silva Dairy Farms and Environmental Planning Partners, Inc., NV5 has prepared the following Hydrogeologic Assessment Summary for CEQA. This report documents existing hydrogeologic conditions at the Silva Dairy Farms 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 existing Silva Dairy Farms Facilities are located 2.5 miles west of Stevinson, CA. The operation consists of two separate dairy facilities located on the north and south side of State Route (SR) 140 at the intersection of Edminster Road. The facility addresses are 1499 and 1904 N. Edminster Road in Merced County, referenced as the South and North Dairies. Figures 1 and 2 provide the Site locations. The main dairy facility is located south of SR 140 on approximately 25 acres, and the north facility is located on approximately 18 acres; the total existing farm area includes 414 acres on 22 parcels (8 of which are leased) in unincorporated Merced County. The project's location is within the central California region (see Figures 1 and 2). The south dairy facility is located on portions of two parcels identified as Merced County Assessor's Parcel Numbers (APN) 055-210-020 (19.4 acres) and 055-210-049 (33.8 acres). The north dairy site is located on one parcel identified as APN 055-210-024 (18.2 acres). The project cropland application area consists of approximately 364 acres (see Figure 2 for application areas). The dairy project site is located in Section 20, Township 7 South, Range 10 East, Mount Diablo Base and Meridian.

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 Silva Dairy Farms.

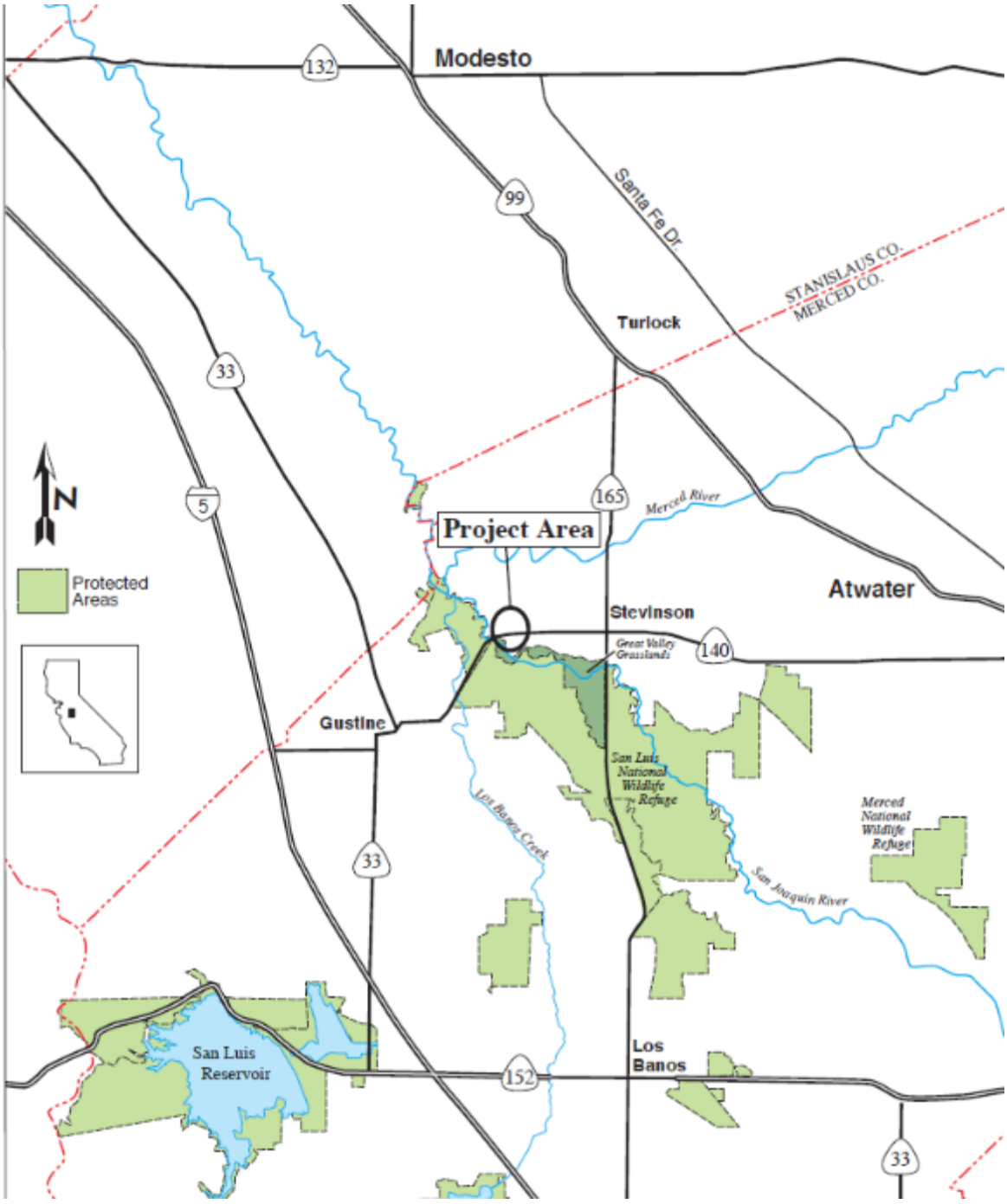


Figure 1 – Facility Location Map (Map Taken from the 2022 IS/NOP)

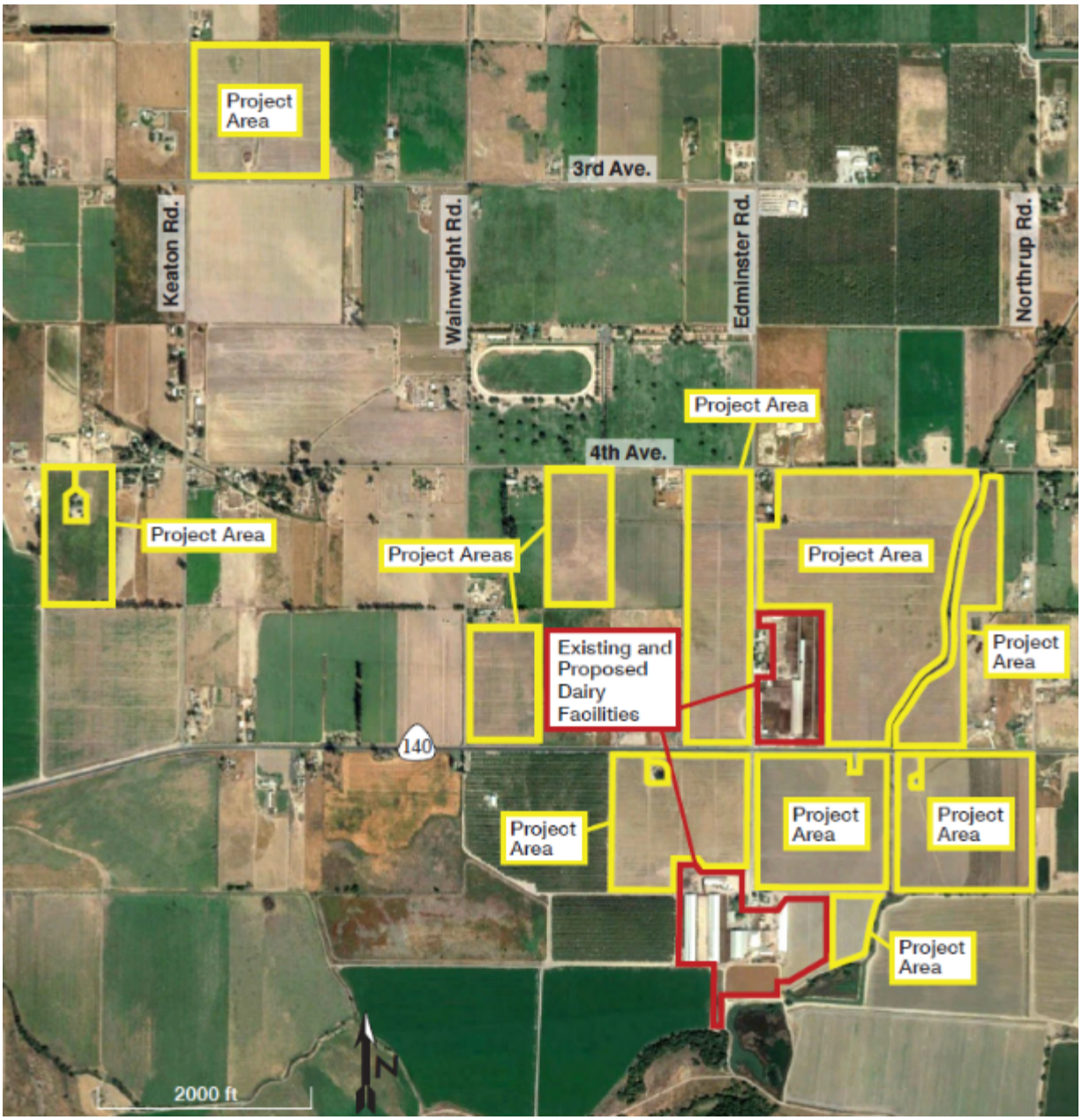


Figure 2 – Facility, Field Application Map (Map Taken from the 2022 IS/NOP)

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 August 2022, contains project details. The existing herd is approximately 2,953 animals at the dairy with 1,420 milk cows, 185 dry cows and 1,348 support stock. The proposed expansion will increase herd size by a total of 4,347 animals, with approximately 4,000 milk cows, 550 dry cows, 1,000 bred heifers 15-24 months, 1,000 large heifers 7-14 months, 400 calves 4-6 months, and 400 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 off-site single-family residences associated with neighboring agricultural operations surrounding the project site to the north, west, and east. There are several off-site residences 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). Table 2 lists the immediate surrounding land uses and corresponding General Plan and zoning designations to the Silva Dairy Farms active animal confinement facilities.

Location	Land Use	General Plan	Zoning
ON-SITE	Dairy / Agriculture / residences	Agricultural	General Agricultural A-1
NORTH:	Agriculture / Residences / Horse Arena	Agricultural	General Agricultural A-1
EAST:	Agriculture / Dairy / Residences / animal operations	Agricultural	General Agricultural A-1
SOUTH:	State Park/National Wildlife Refuge/Open Space	Agricultural	General Agricultural A-1
WEST:	Agriculture / Residences	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 nearly flat with surface elevations from 72 to 78 feet above mean sea level (MSL).

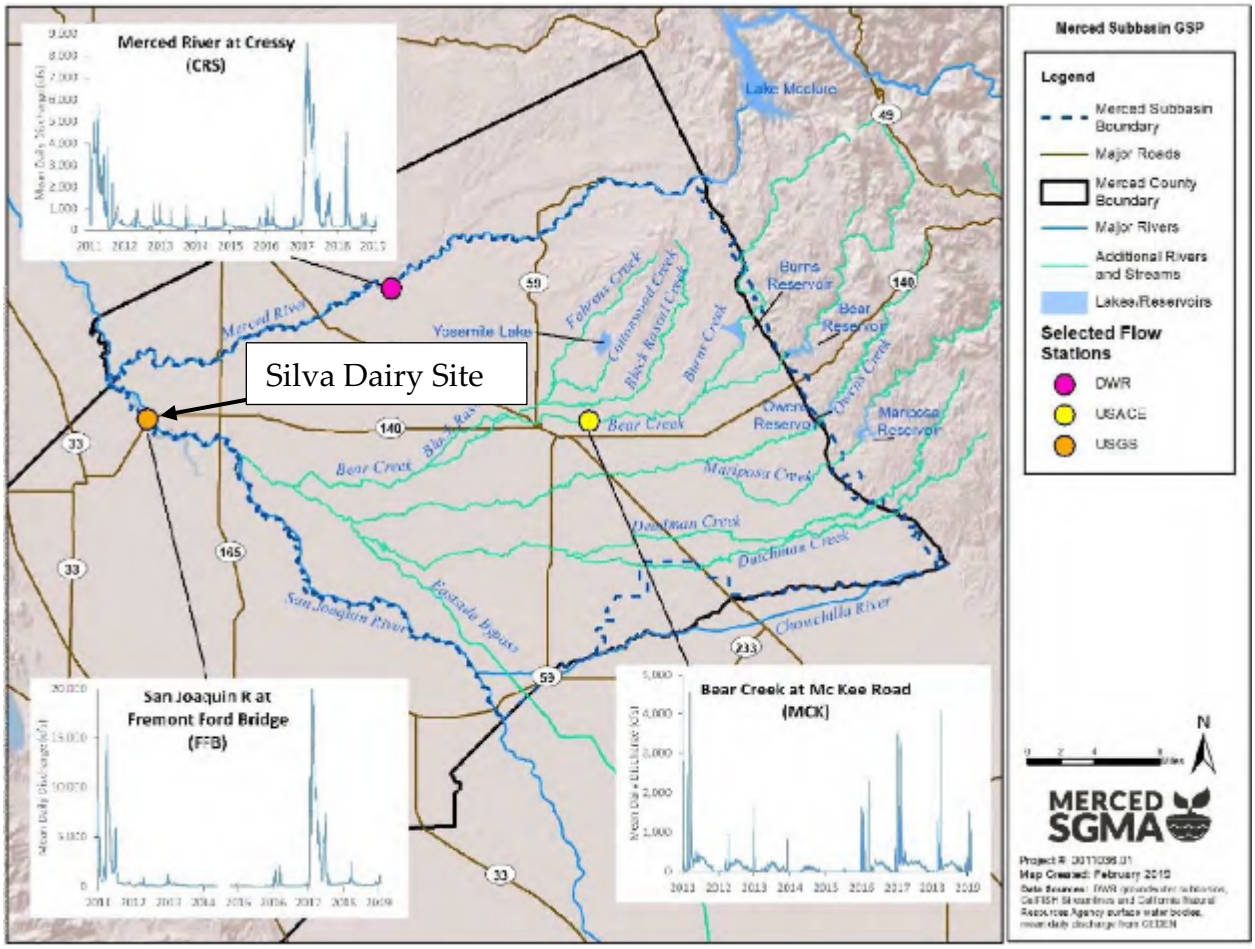


Figure 3 - Surface Water Flows (Map Taken from the 2022 GSP), Figure 2-5)

The Silva Dairy land application fields are within a half mile of the San Joaquin River and near the Fremont Ford Bridge Flow Station as depicted on Figure 3.

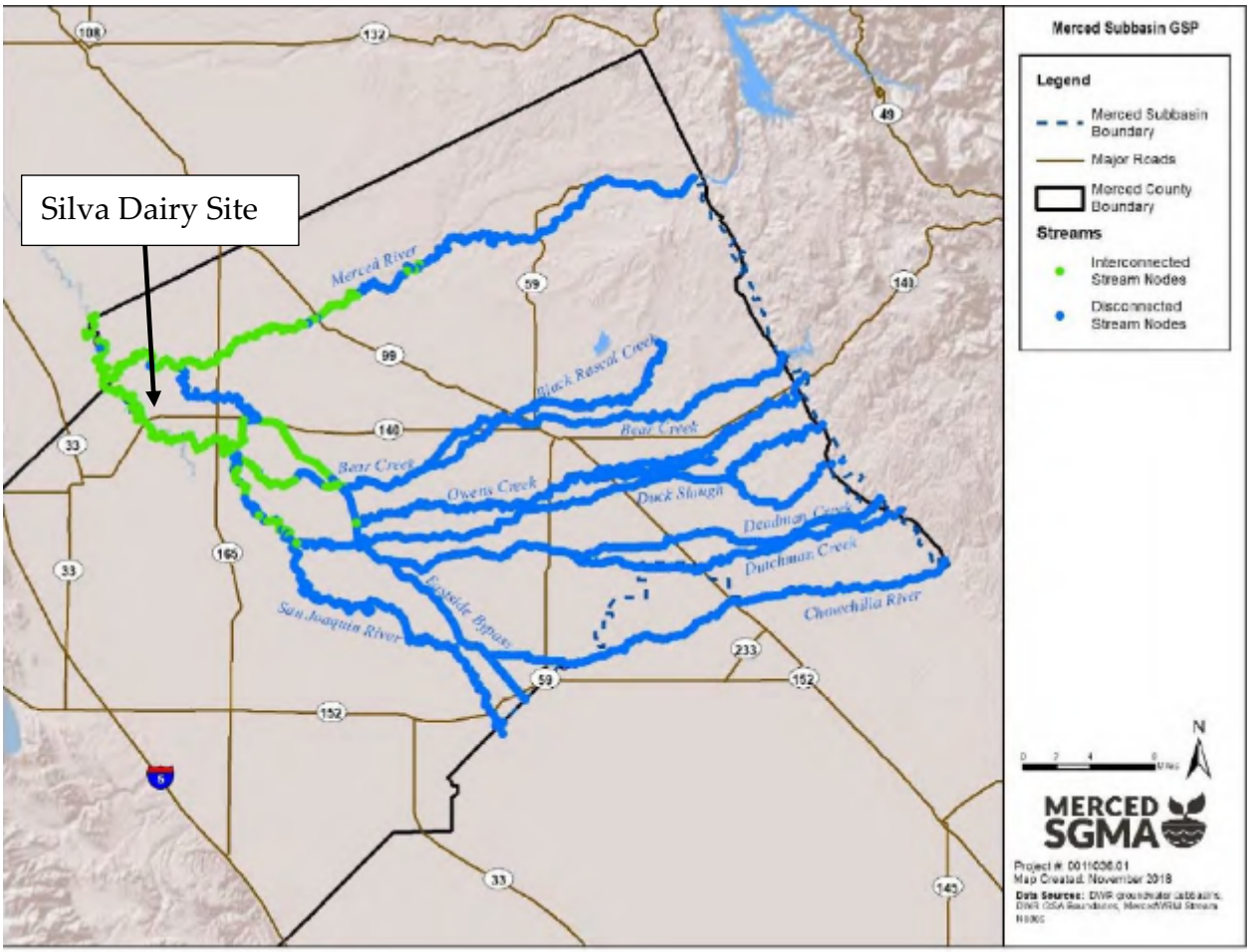
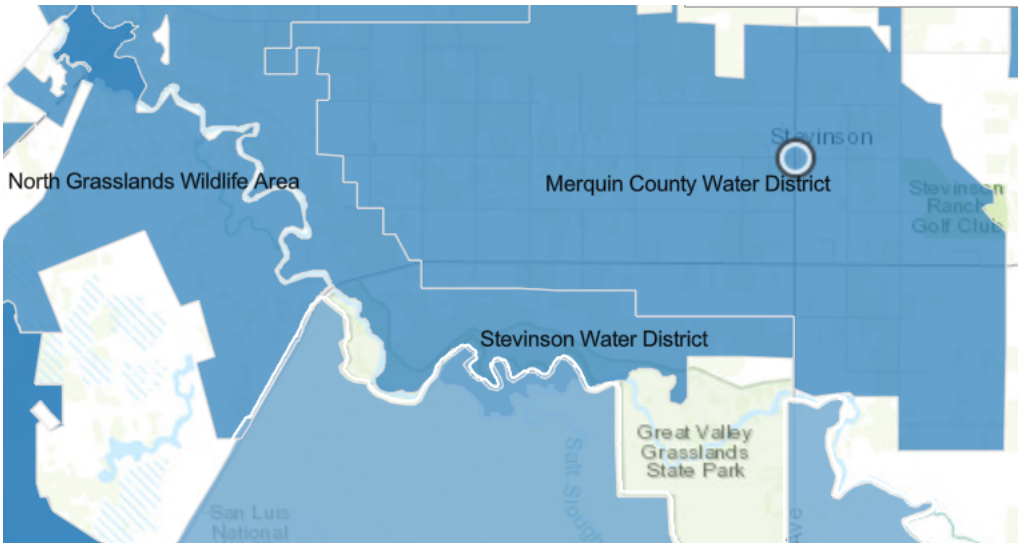


Figure 4 - Groundwater and Surface Water Interconnection (Map Taken from the 2022 GSP), Figure 2-10)

Figure 4 depicts that natural surface water features in the subbasin. No natural surface water features are on Silva Dairy. Groundwater and surface water interconnection is depicted on Figure 4. This interconnection is also referenced as gaining portions of the river. The primary source of irrigation water for the Silva Dairy is surface water from the Stevinson Corporation and the Merquin Canal. The Silva Dairy project area lies within both of these water district boundaries shown below. Due to the extensive tree planting and wildlife reserve land shown below, the water district drainage canal system is limited or non-existent. The Silva Dairy owned irrigation containment and return facilities are detailed in Section 4. The wildlife areas district maps are below.



2.4 GEOLOGY

The Silva Dairy Farm 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[1] 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 Line Map, Figure 5, and Cross-Sections B-B' and E-E' on Figures 6 and 7 were taken from the Merced Subbasin 2022 GSP to convey the hydrogeology description presented herein. The selected Cross-Section B-B' is a transect of the earth along the Merced County Line from the east and San Joaquin River to the west. The Cross-Section depicts 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),

[1] Lacustrine means "of a lake" or "relating to a lake."

- 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 (CC Member) are discussed further in the hydrogeology section. Lastly, Quaternary Age 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.

2.5 REGIONAL HYDROGEOLOGY

As referenced in Section 3, the 2022 Merced Subbasin Groundwater Sustainability Plan (GSP) has been cited extensively to update the regional hydrogeologic setting and utilize significant surface water and groundwater data.

Geologic units located east of the San Joaquin River consist of the Tulare Formation, terrace deposits, alluvium and flood basin deposits. The CC Member is contained within the Tulare Formation deposits; this member is the prominent aquitard[2] found throughout the region. Quaternary river and flood plain deposits, consisting of clays, silts, sands, and gravels, overlay the Tulare Formation. The interbedded and clay-rich nature of these deposits dominates the hydrogeology.

Merced County covers four surface and groundwater subbasins within the Central Valley Groundwater Basin. The Silva Dairy is within the Merced Subbasin. The boundaries are defined by the Chowchilla River to the south, Merced River to the north, San Joaquin River on the west. The eastern boundary approximates the contact between Subbasin sediments and the crystalline basement rocks of the Sierra Nevada foothills.

Three groundwater sustainability agencies (GSAs) have been formed with the authority of the 2014 Sustainable Groundwater Management Act (SGMA). The Merced Subbasin GSAs are: Merced Irrigation-Urban Groundwater Sustainable Agency (MIUGSA), Merced Subbasin GSA (MSGSA) and Turner Island Water District GSA # 1 (TIWD GSA-1). Silva Dairy lies within the MSGSA. The Dairy is located in northwest part of the subbasin as shown on the map below.

[2] An aquitard is made up of materials with low permeability, such as layers of clay and shale, which prevent any significant movement of water from the adjacent aquifer.

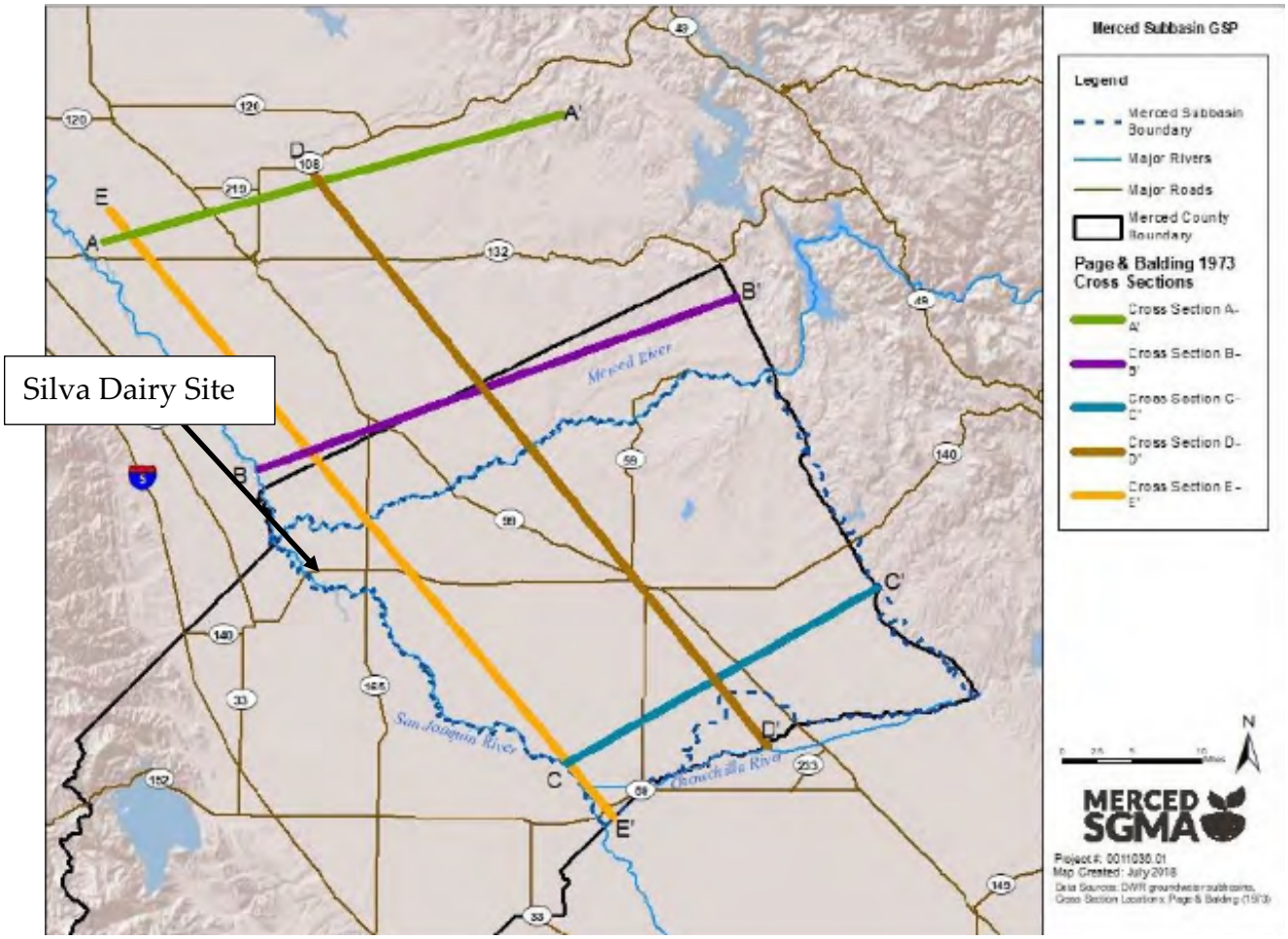


Figure 5 - Location of Geologic Cross Sections (Map Taken from the 2022 GSP, Figure 2-12)

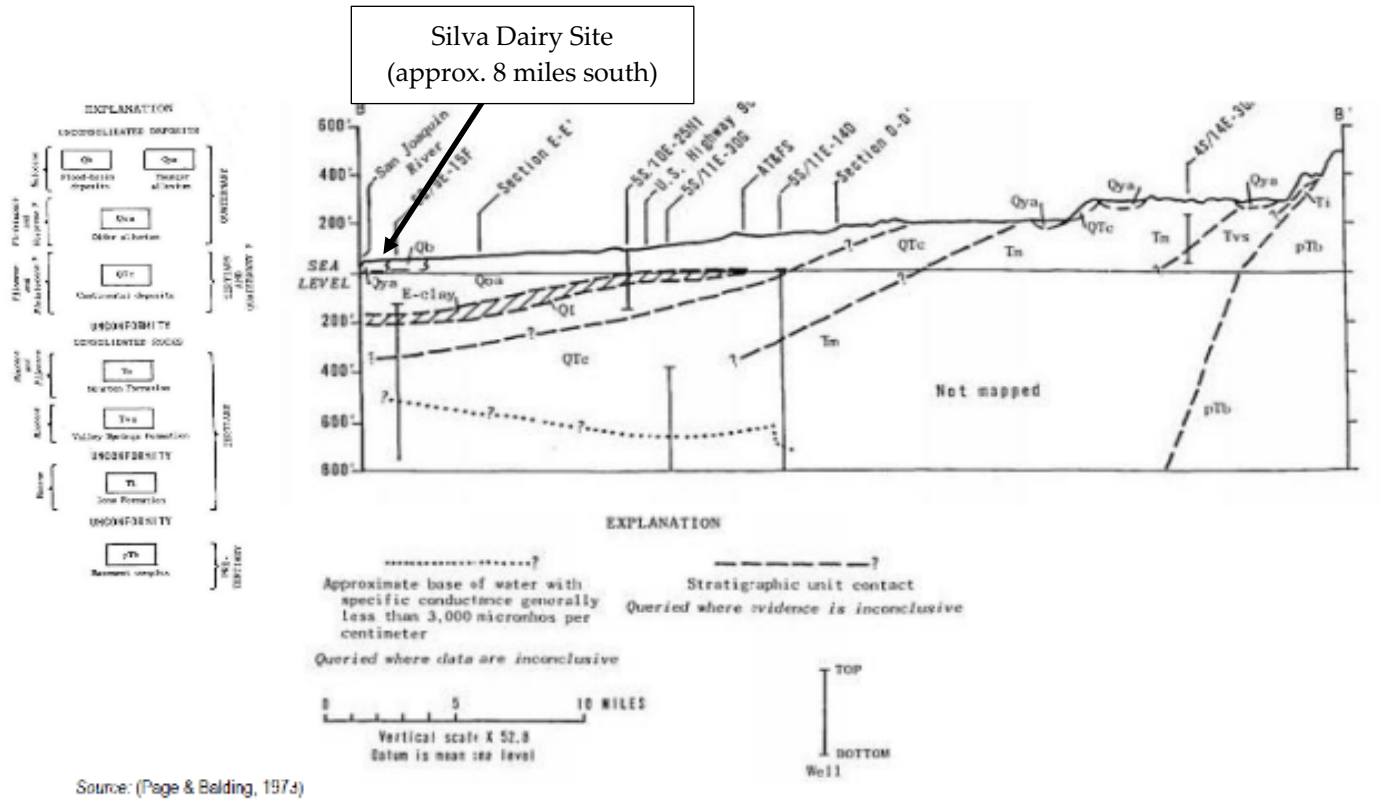


Figure 6 - Geologic Cross Section B-B' (Map Taken from the 2022 GSP, Figure 2-14)

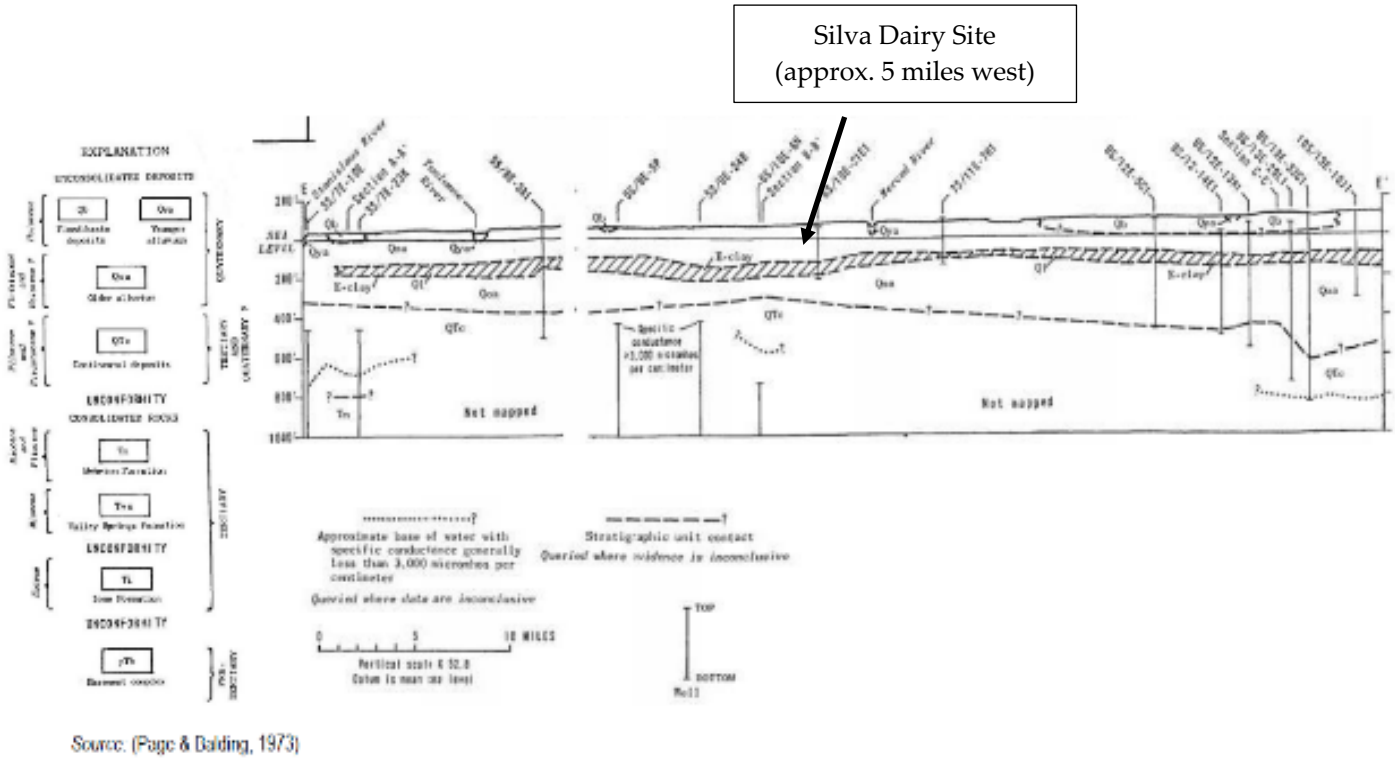


Figure 7- Geologic Cross Section E-E' (Map Taken from the 2022 GSP, Figure 2-17)

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 8, 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 Silva Dairy, 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.

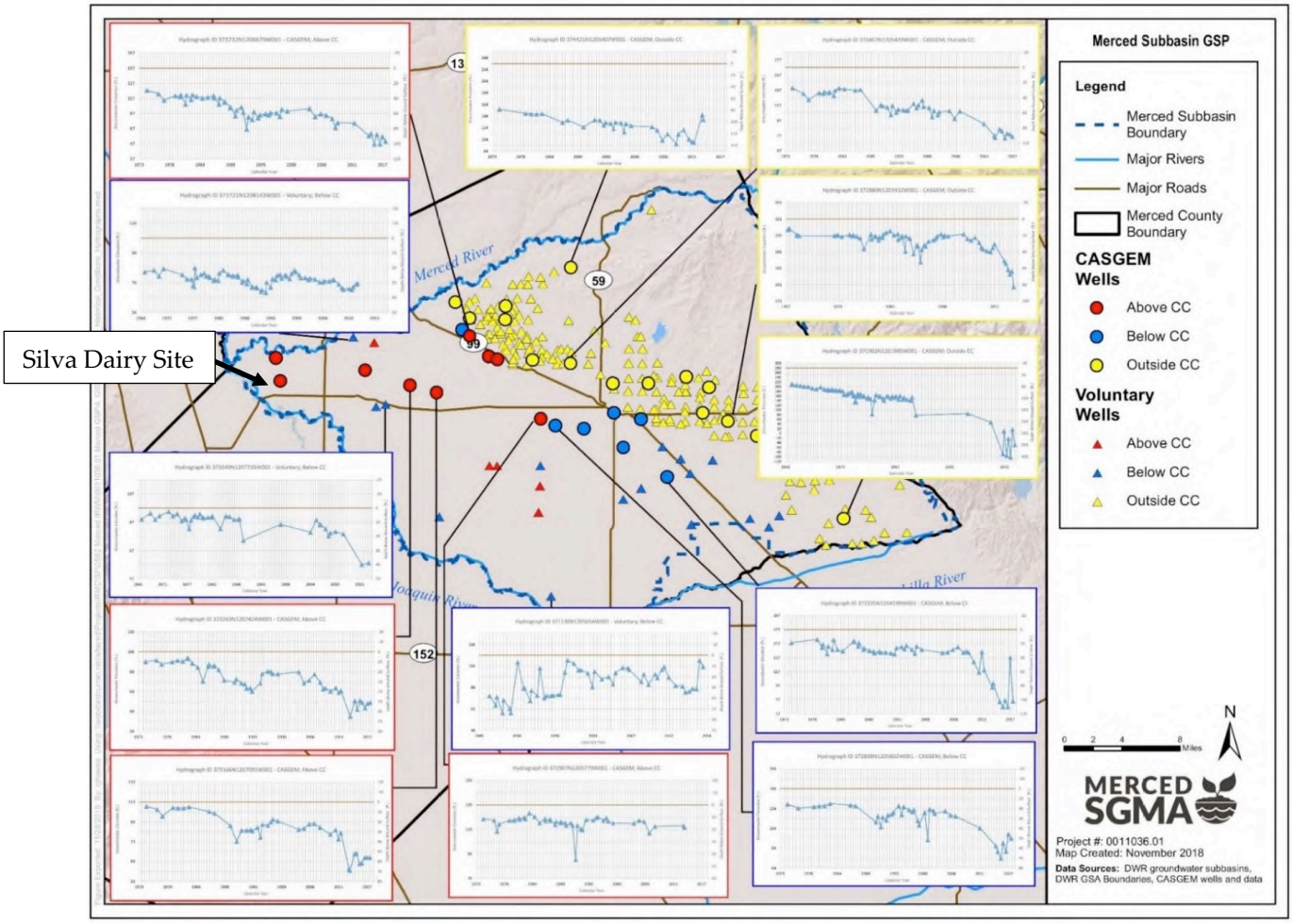


Figure 8 - Hydrographs for Selected Wells in the Merced Subbasin

(Map Taken from the 2022 GSP, Figure 2-40)

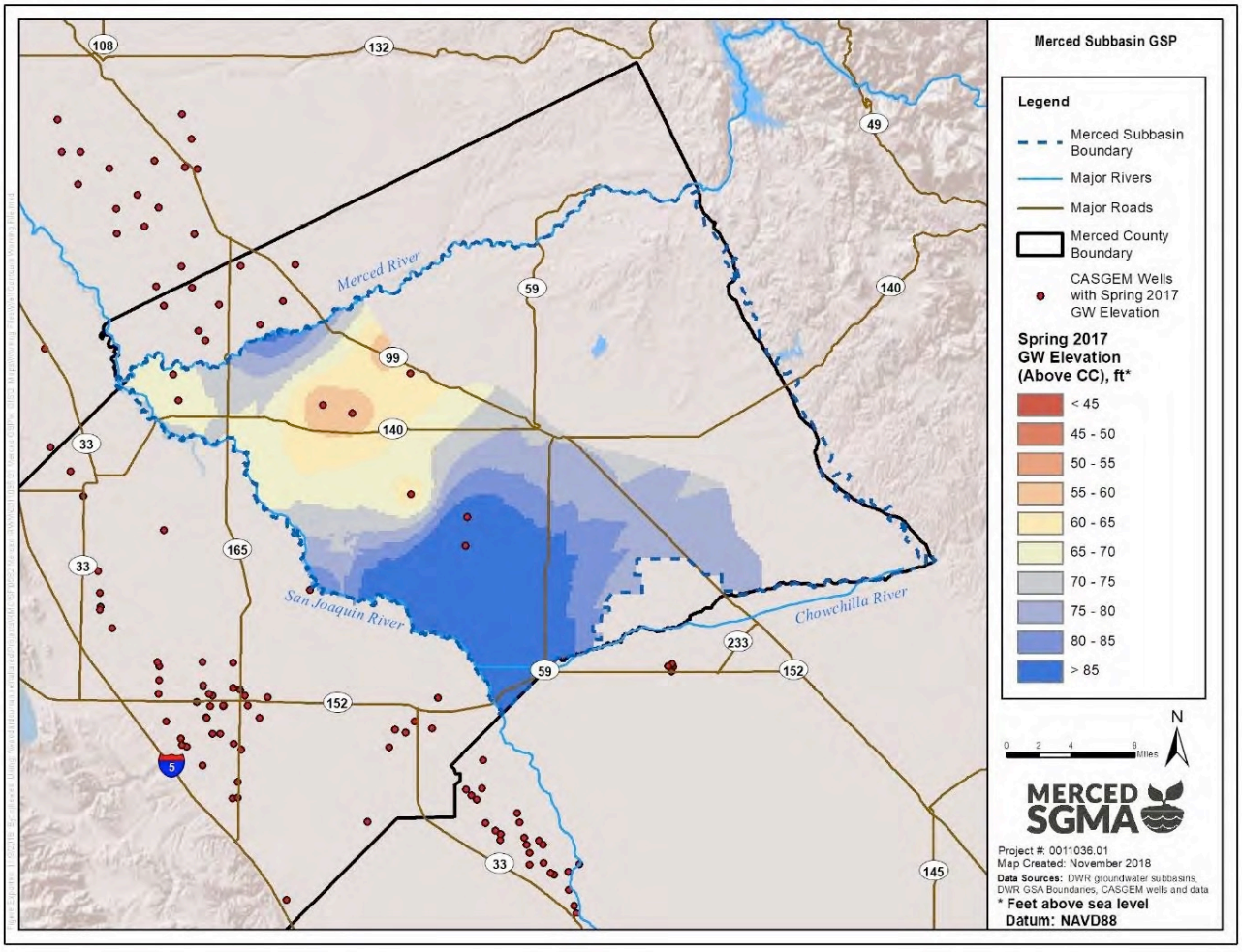


Figure 9 - Spring 2017 Groundwater Elevation, Principal Aquifer Above CC (Map Taken from the 2022 GSP, Figure 2-44)

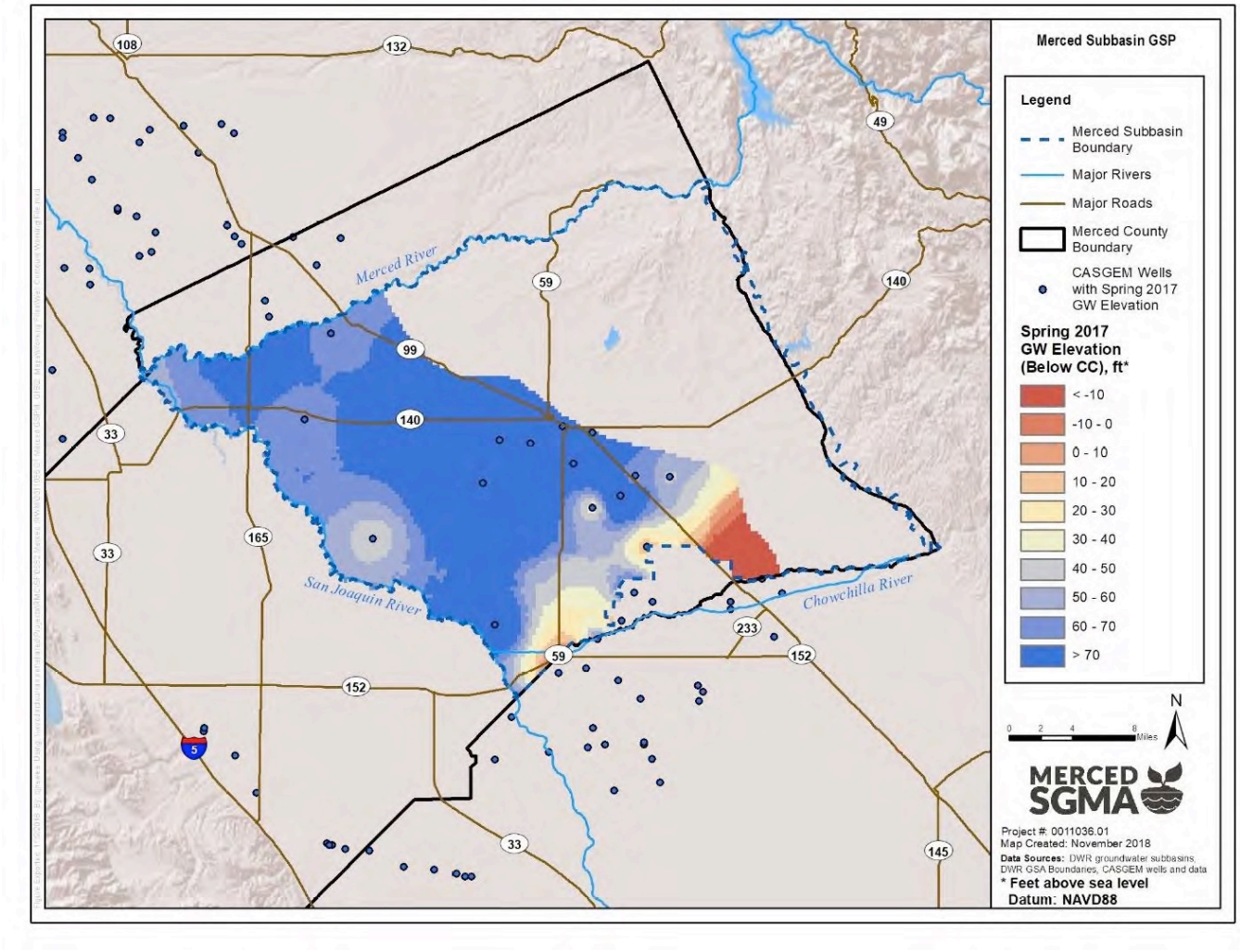


Figure 10 - Spring 2017 Groundwater Elevation, Principal Aquifer Below CC (Map Taken from the 2022 GSP, Figure 2-45)

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 low (GSP, 2022). Nitrate is typically associated with agricultural practices. For the limited number of monitoring wells near the Silva Dairy, the observed proximal average Nitrate concentration above the CC and below the CC is lower than the Maximum Contaminant Level (MCL) of 10 mg/l.

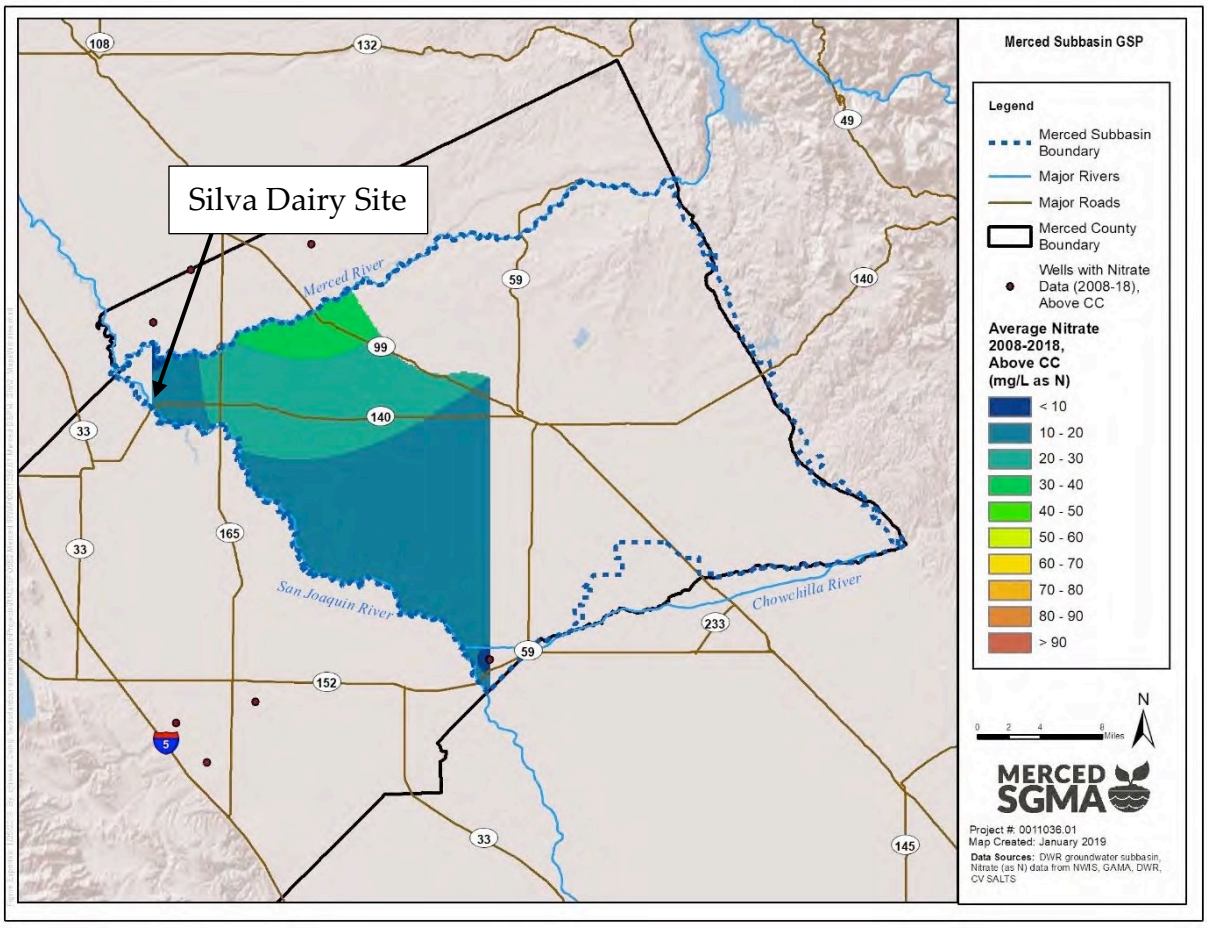


Figure 11 - Average Nitrate (as N) Concentration 2008-2018, Above Corcoran Clay (Map Taken from the 2022 GSP, Figure 2-59)

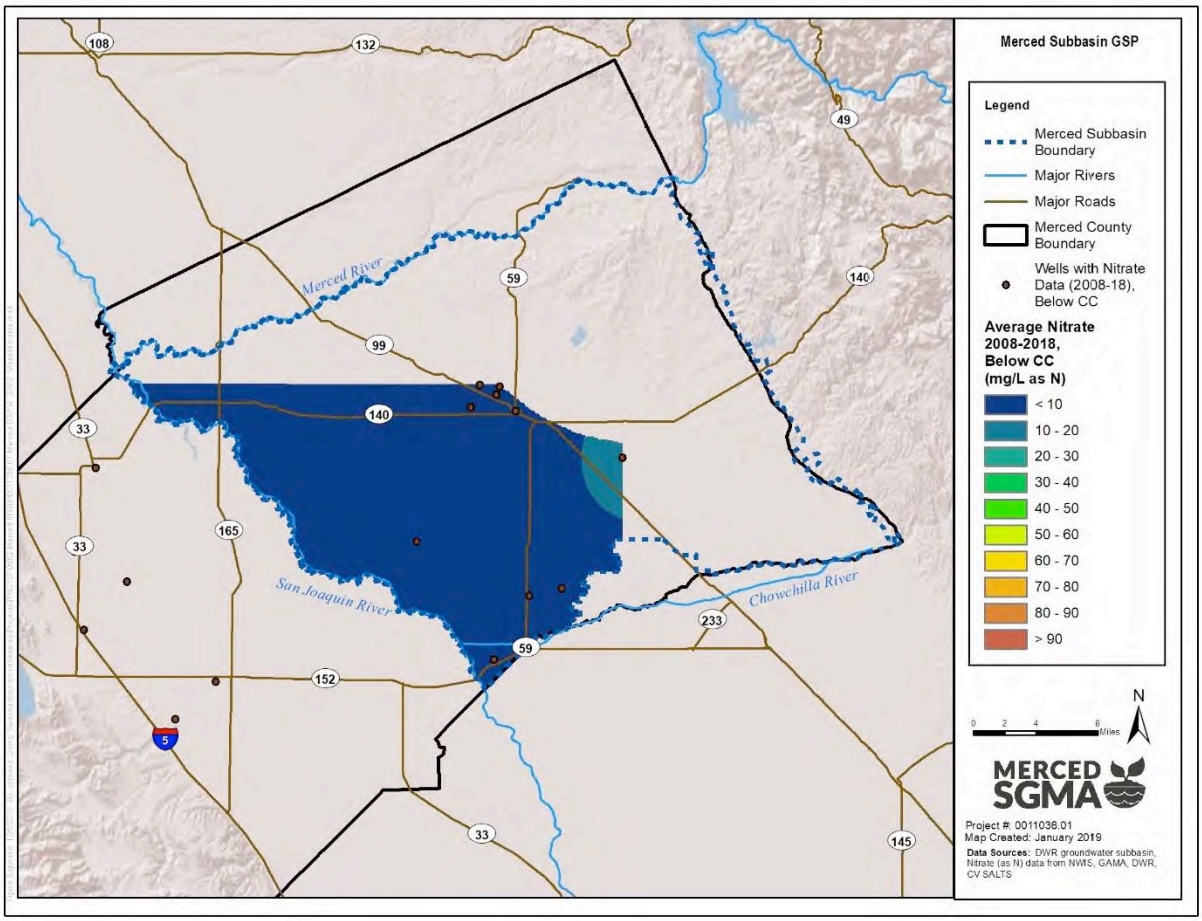


Figure 12 - Average Nitrate (as N) Concentration 2008-2018, Below Corcoran Clay (Map Taken from the 2022 GSP, Figure 2-60)

As sited in the 2022 GSP and depicted below on Figures 13 and 14, TDS is associated with saline or water impacted from agricultural. In the western portion of the subbasin TDS is elevated (GSP, 2022). For the limited monitoring data near the Silva Dairy, TDS average concentration above the CC and below the CC was elevated above 800 mg/l, which is above the secondary MCL of 500 mg/l.

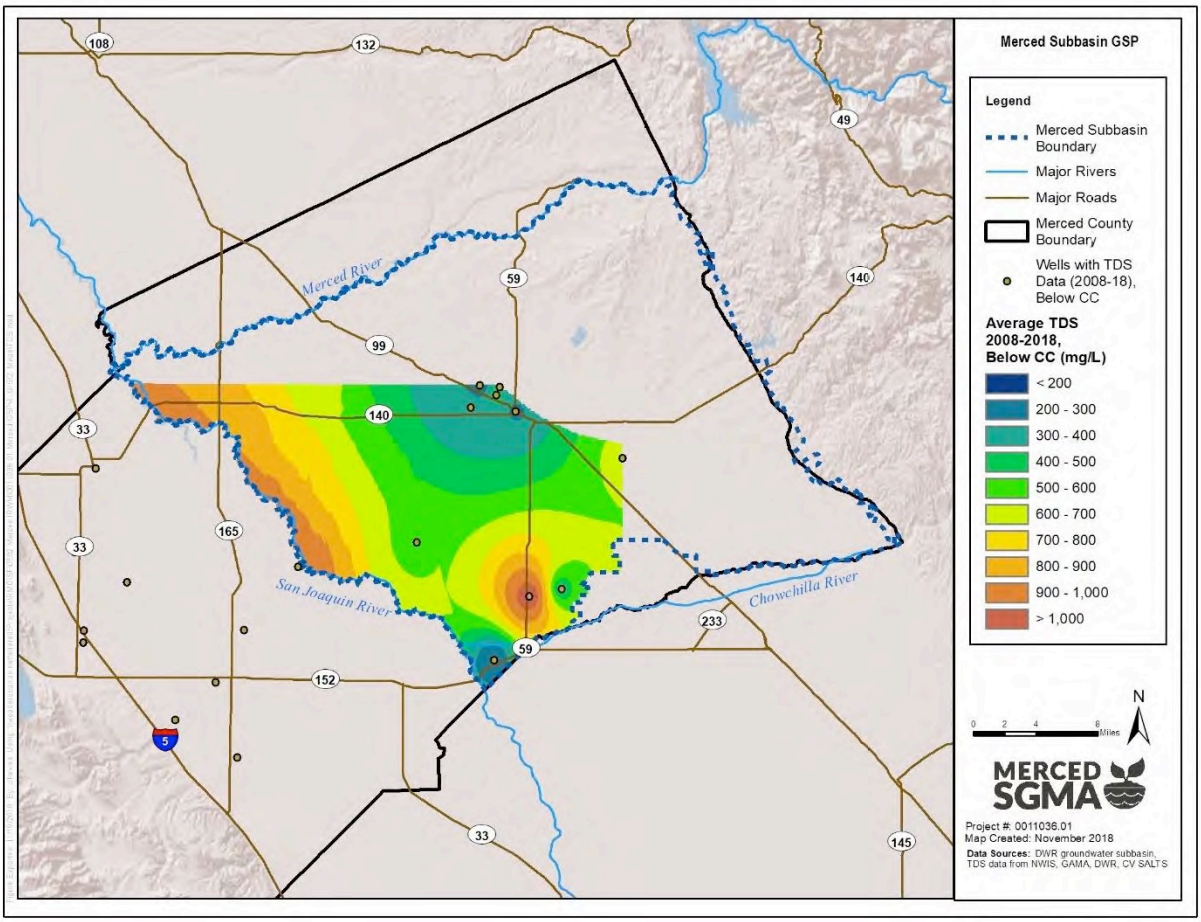


Figure 13 - Average TDS Concentration 2008-2018, Below Corcoran Clay

(Map Taken from the 2022 GSP, Figure 2-63)

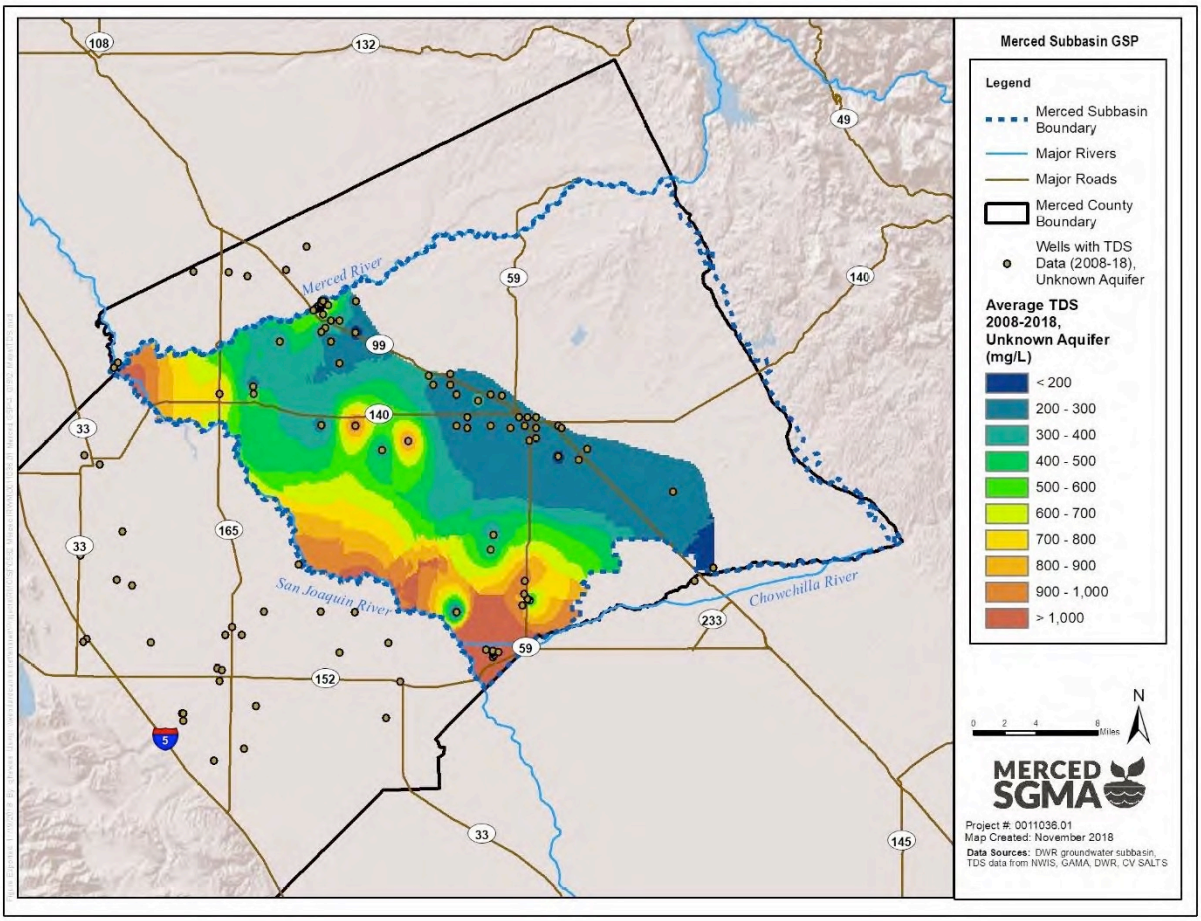


Figure 14 - Average TDS Concentration 2008-2018, Unknown Aquifer

(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 TDS is elevated (GSP, 2022). For the limited monitoring wells, data shows concentrations above 600 mg/l as a 5 year average value. The MCL is 250 mg/l.

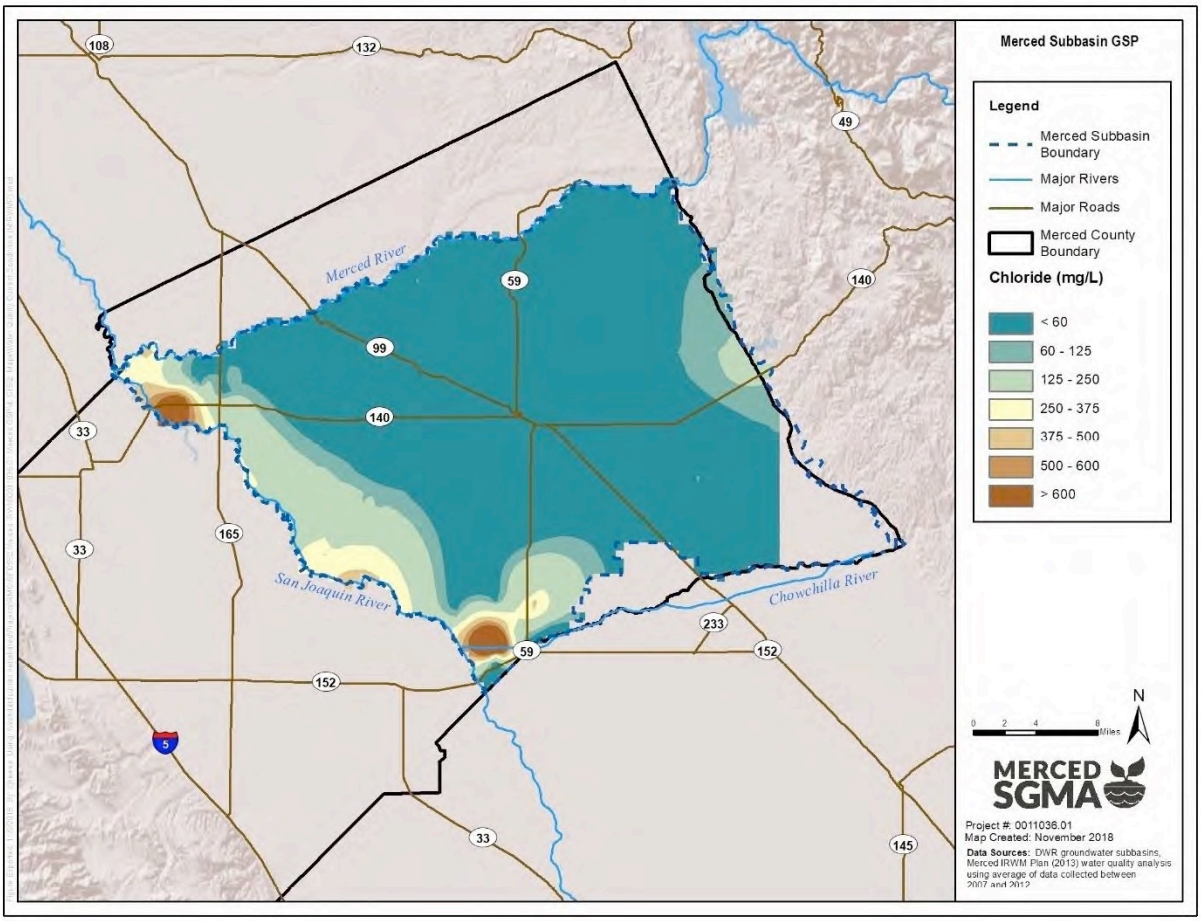


Figure 15 - 5-Year Average Distribution of Chloride in Groundwater (2007-2012)

(Map Taken from the 2022 GSP, Figure 2-66)

2.6 SITE SPECIFIC SOILS AND HYDROGEOLOGY

Predominant soils underlying the existing and proposed Silva Dairy Expansion facilities as classified by the USDA Conservation Service. They investigated and found 200 unique soil types in the Merced Subbasin. Near the Silva Dairy loamy sands and clay loams were found. The 2022 GSP Figure 2-3 provides a map of the soil types.

Near surface geology at the project site consists of Modesto Formation Alluvium underlain by Tulare Formation clay deposits. Quaternary Alluvium is present along the banks of the is present along the San Joaquin River.

As sited further in the GSP, compressible clay layers within and below the Corcoran Clay have been associated with land subsidence in many areas of the Central Valley. In these areas, water levels have declined, depressurizing or dewatering these clay layers. This has resulted in subsurface compaction of the clays, which allow the overlying ground surface to subside. In the Merced Subbasin, data from remote sensing and local global positioning system (GPS) stations indicate only small amounts of vertical displacement of the land surface in local areas. Land subsidence has been identified to date in the Sliva Dairy Farm area (GSP, 2022). The subsidence is 0 to 0.45 feet per year from 2011 to 2017. As per the Annual Report 2023, near the Silva Dairy no subsidence was observed from 2018 to 2023.

SITE SPECIFIC HYDROGEOLOGY

Groundwater flow in the Merced Subbasin (as detailed in the GSP) is generally to the west towards the San Joaquin River. Groundwater follows the dip of the crystalline and sedimentary units. Regional groundwater flow contours have been influenced because of weak groundwater depressions north of the site. The impact on water levels from localized pumping centers are minimized due to the near surface groundwater presence and resulting use of an extensive surface drainage system (see Figures above). The proximity of San Joaquin Rivers and MID or owner drainage laterals have influenced groundwater elevations at the Silva Dairy. Due to the presence of near surface, semi-continuous clay layers, perched groundwater conditions also exist near surface depths.

Groundwater beneficial use in the area and on site is for domestic and irrigation purposes. Silva Dairy has four domestic wells and two irrigation wells that are located on the active dairy facilities and associated cropland. Primary water use for the Silva Dairy is from surface water from the "River Pump" water from Stevinson Corporation surface water and the Merquin Canal and, if needed, groundwater from the existing irrigation well.

The localized hydrogeologic cross-sections depict the extremely variable interbedded nature of the subsurface sediments (see Figures 6 and 7). This finding was confirmed by reviewing the available well logs on site that have been sampled for water quality since 2018. Two of the four domestic wells and one irrigation well logs have been reviewed. The well logs are numbered as DWR permits: 465215 and 2019-001877 and 071020055, respectively. The domestic wells have been completed to a depth of 130 feet and 190 feet bgs. The gravel envelopes were positioned from 70 to 115 feet bgs and 60 to 110 ft bgs, respectively. The irrigation well was completed to a depth of 360 feet with perforations and gravel envelope completed from 140 to 360 feet bgs.

The other domestic and irrigation water supply wells in the area are generally less than 200 feet in depth which confirms the shallow unconfined aquifer nature above the Corcoran Clay.

Area knowledge and DWR hydrographs, shown above, indicate that groundwater may exist within saturated sand units found less than 25 feet bgs. First encountered groundwater is anticipated to be found shallow and unconfined within Principal Aquifer above the CC and within laterally extensive sands units or as isolated perched units. DWR hydrographs for nearby wells referenced in the depictions above on Figures 10 through 12. These minor variations in groundwater are likely due to pump use during or immediately prior to the measurement.

2.7 FACILITY GROUNDWATER QUALITY SUMMARY

Silva Dairy groundwater quality information was available for four on site domestic wells and irrigation well (see Table 1). DWR groundwater well logs have only a limited link with the referenced wells on site, as noted above, to the facility groundwater monitoring network or sampling locations. Attempts to obtain this data included contacting the owner, past owner, sampling team and laboratory. As referenced above, the DWR irrigation well log lies within the Principal Aquifer below the CC, and the drinking water or domestic groundwater wells are less than 130 feet bgs because of the confining nature of the underlying Corcoran Clay.

As depicted on Table 1, the Silva Dairy groundwater sampling dates are provided for 2018 through 2022, which relates to the annual reports. Concentration of Nitrate as N ranged from <0.1 to 12 mg/L, with only one of seventeen measurements detected above 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 1,960 to 5,500 umhos/cm, with all of the nineteen measurements above the Title 22 Secondary MCL of 900 umhos/cm. Chloride was observed at high levels on a regional basis and below for the 2020 well measurement.

Table 1 - Historic Domestic and Irrigation Well Water Quality

Silva Dairy Well Results
2018-2022

Year	Well	Sample Date	Sample Time	TDS (mg/L)	EC (µmhos/cm)	Nitrate (NO_3-N) (mg/L)	Cl (mg/L)
2018	HB-3 IW	2/28/2018	15:00	1390	2210	12.0	281
	IW	8/9/2018	9:30	-	5250	1.8	-
	DW Dairy	12/15/2018	10:00	-	1960	<0.1	-
	DW Heifers	12/15/2018	10:10	-	5500	<0.1	-
2019	DW Dairy	11/25/2019	10:17	-	2300	1.2	-
	DW Heifers	11/25/2019	10:03	-	3350	<0.1	-
	IW Dairy	9/4/2019	11:00	2450	4170	3.0	-
2020	DW Dairy	12/7/2020	11:00	-	2060	<0.10	-
	DW Heifers	12/7/2020	11:00	-	3070	<0.10	-
	IW Dairy	9/30/2020	13:00	2340	3620	2.1	947
2021	DW Dairy	11/8/2021	11:13	1250	2050	0.5	243
	DW Heifers	11/8/2021	11:25	1750	3020	<0.01	<0.01
	IW Dairy	12/1/2021	16:30		4620	1.1	-
2022	DW Dairy	12/5/2022	10:13	-	2190	0.3	-
	DW Heifers	12/5/2022	10:17	-	3140	0.50	-
	DW Office	12/5/2022	10:22	-	2980	4.40	-
	IW	12/5/2022	10:07	-	4510	1.60	-

With the exception of Nitrate values, note that all the concentrations in Table 1 are above the respective MCLs. The HB-3 IW Nitrate value of 12 mg/l is above the MCL of 10 mg/l and the November 2021 DW Heifers Dairy chloride value was non-detect.

2.8 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.

2.9 FLOODING

The Flood Insurance Rate Maps (FIRM) from the Federal Emergency Management Agency (FEMA) show that the Dairy Production Area (Dairy Facility, North, South and application area) is located partially within Zone A and partially within Zone X. 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 May 2021 Flood Protection Analysis is attached to the proposed WMP. With construction of the proposed facility improvements provided in the proposed WMP attachments, the proposed Silva Dairy Farms site will have adequate protection from a 100 year flood event.

Project areas within the FEMA designation Zone X are outside the 0.2 percent annual chance flood zone. (FIRM 2008).

3 REGULATORY BACKGROUND

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[3] and discharges or proposes to discharge pollutants to the waters of the Unites 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

[3] A large CAFO is defined has 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 Silva Dairy Farm 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 Silva Dairy. The CVDRMP nearby dairies include: P. and L. Souza Dairy (PLS) located at 20633 Crane Avenue in Hilmar, CA and the Fran J. Gomes Dairy #1 Dairy (FG1) located at 5301 North DeAngelis Road, Stevinson, CA. Both of the sites are approximately five miles to the northeast and northwest respectively from the Dairy, see the aerial depiction below.

As stated in the Year 10 RMP report, PLS has seven monitoring wells that have been sampled over the monitoring period. Groundwater levels have remained stable and Nitrate ranges from 35 to 120 mg/l over the monitoring period. As stated in the Year 10 RMP report, FG1 has nine monitoring wells that have been sampled over the monitoring period. Due to the close proximity to the river, groundwater levels have had some variability and Nitrate ranges from non-detect to 120 mg/l over the monitoring period..

Figure 16 - Aerial Locations of RMP Dairies (Google Earth, 2024)

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 Silva Dairy 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)[4] for the Silva Dairy 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

[4] 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.

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 Silva Dairy 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 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. Very low impacts from land subsidence have been documented to date in the Merced Subbasin, although the area within the extent of the Corcoran Clay may be susceptible to future subsidence if water levels continue to decline.

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**	
• Establish Monitoring Network • Install New Groundwater Wells • Reduce/Fill Data Gaps	• GSAs conduct 5-year evaluation/update • Monitoring and reporting continue	• GSAs conduct 5-year evaluation/update • Monitoring and reporting continue	• GSAs conduct 5-year evaluation/update • Monitoring and reporting continue	
• GSAs allocated initial allocations • GSAs establish their allocation procedures and demand reduction efforts • Develop Metering Program	• As-needed demand reduction to reach Sustainable Yield allocation • Metering program continues	• As-needed demand reduction to reach Sustainable Yield allocation	• Full implementation demand reduction as needed to reach Sustainable Yield allocation by 2040	
• Funded and smaller projects implemented	• Planning/ Design/ Construction for small to medium sized projects	• Planning/ Design/ Construction for larger projects begins	• Project implementation completed	
• Extensive public outreach regarding GSP and allocations	• Outreach regarding GSP and allocations continues	• Outreach continues	• Outreach continues	

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 Silva Dairy

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 permitees 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 Silva Dairy 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.

Silva dairy (by membership in the CVDMRP) 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 (Appenidix A 303(d) List) and web link:

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

The San Joaquin Rivers are 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 Silva Dairy 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 Silva Dairy Project) for the full text of the ACO or web search link:

< http://www.qcode.us/codes/mercedcounty/>).

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, data December 10, 2 013 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 Silva Dairy. 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 facility was found to be in compliance and they gained approval to proceed with the conditional use permitting process.

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[5] 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 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 TDMLs 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 less than a mile to the west. The river and the nearby laterals are 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

5 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.

segment is impaired for the pollutants/stressors of boron, chlorpyrifos, DDE, DDT, electrical conductance (E.C.), Group A Pesticides, mercury, temperature, unknown toxicity, and alpha BHC - the likely source of pollutants is agriculture. The section from Bear Creek to Mud Slough specifically is impacted by Temperature, metals, DDT, EC, Boron and Group A Pesticides.

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

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 May 2021, were used to establish a baseline of existing conditions.

The existing facility consists of the following as referenced in the IS/NOP. The existing south dairy is located at 1499 N. Edminster Road on approximately 25 acres and includes the following facilities:

- double parallel (40 stall) milking parlor
- 4 freestalls and corrals
- commodity barn
- old milking parlor 1 (not used)
- office
- mechanical separator
- 1 residence
- storage building
- special needs barn
- shade barns
- one settling basin
- one wastewater pond
- feed and manure storage area

The existing north dairy is located at 1904 N. Edminster Road on approximately 18 acres and includes the following facilities:

- 20 stall milking parlor
- 2 freestalls and corrals
- shed and carport
- old milking parlor 2 (not used)
- four on-site residences -
- animal shade
- commodity barn
- calf hutches
- one wastewater pond

Only support stock are housed on the north dairy facility. Both the north and south dairy facilities are managed as one facility/operation and are covered by the same existing conditions NMP and WMP; however, they are technically under separate permit by the CVRWQCB and the SJVAPCD. Animals are moved back and forth between the north and south facilities with trailers hauled by heavy duty trucks.

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 settling basin, two wastewater ponds, and a mechanical separator. All ponds are earthen embankment structures constructed with native soils. 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 ponds, except for stormwater from two freestall barns, which is routed to fields. Recycled water is used to clean the milk parlor floor and is the source of sprinkler pen water.

The surfaces of the freestall exercise pens and open corrals are scraped in the morning on a biweekly basis to reduce dust conditions. Dry manure is removed from corrals twice per year, in the spring and fall after harvest. Solid manure handling consists of manure stock piles, windrows, solid manure application to land, used for freestall bedding, or sold to brokers and hauled off-site to fields in the project vicinity. Approximately 215,324 pounds of nitrogen via solid manure or dairy wastewater is exported and applied to off-site fields not owned by the dairy operator. The NMP indicates that the nitrogen is exported via 9,300 tons of corral manure and separated solids (approximately 19 percent of the dry manure generated at the dairy), though this nitrogen can also be exported as lagoon water via pipeline owned by Stevinson Corporation to Stevinson Corporation fields northwest of the project site, as long as nitrogen export requirements are met.

The dairy facility uses both surface water and groundwater resources for farm operations. Domestic water to the site and dairy is provided by four on-site water wells (there is one well located at the north dairy and three domestic wells at the south dairy). Irrigation water is supplied by surface water sources from the Merquin Canal and the River Pump, and groundwater from two project area irrigation wells. Surface water supplies from the Merquin Canal are applied to the fields to the north of Highway 140, and the fields south of 140 receive "River Pump" water from Stevinson Corporation water due to water rights associated with that facility. According to the dairy operator, there are no guaranteed water rights allocation from these surface water sources. Surface water is used during wet years, and irrigation wells are used during drought years when surface water is not available.

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 collected by berm for retention, or recycled and returned to the top of the field retention pond. Field application of wastewater would include surface irrigation via pipeline. Solid manure would be applied via broadcasting onto cultivated fields and incorporating the manure in the soil.

As referenced in the IS/NOP, the proposed project would include the construction of supporting buildings and structures totaling 353,572 square feet at the existing dairy, including:

North facility:

- three (3) freestall barns of approximately 59,110 square feet, 27,825 square feet, and 15,360 square feet
- two (2) loafing barns of approximately 42,665 square feet and 41,472 square feet and associated corrals
- 60,000 square feet dry manure storage and calf hutch area.

South facility:

- two (2) freestall barns of approximately 35,700 square feet and 63,000 square feet
- 44,000 square-foot commodity barn
- 22,040 square-foot milking parlor expansion
- 2,400 square-foot shop (see IS/NOP Figure 5).

The proposed project would reduce the area of open corral space and increase the area of covered animal housing structures. There is an existing mechanical manure separator at the south facility, and a separator also would be installed at the north facility. There would be construction of one (1) new wastewater pond east of the south facilities. With construction of the wastewater storage pond, there would be 7 acres of cropland converted to active dairy facilities. The new pond would be built to the Central Valley Regional Water Quality Control Board (CVRWQCB) Tier 1 pond standard, using a double 60-mil HDPE liner or approved equivalent. See IS/NOP Figure 5 for the proposed dairy site plan.

With construction of the proposed facilities, an existing storage building, residence, old milking parlor, shade barns, commodity barns, and corrals would be removed (a total of 19,485 square feet of structures). As shown on the proposed site plan (see Notes 1 and 2 on Figure 5), a replacement dairy domestic well would be drilled west of the existing milking parlor to replace the existing well that must be decommissioned prior to construction of Freestall Barn 8. The existing residence at the south facility would be demolished prior to construction of proposed Freestall Barn 8. Cropped acreage associated with the expanded dairy operations would include approximately 357 acres, with the conversion of 7 acres of cropland in the Behind Heifers field for construction of the proposed wastewater storage pond (see IS/NOP Table 1 and Figures 6a and 6b for the layout of the dairy fields). Crops grown on-site would continue to be used for dairy

feed crops and supplement imported grain and hay. Silage piles would remain the same as existing operations.

Animal wastes from freestall and other concrete-surfaced areas would continue to be flushed to an onsite waste management system, except for solid manure within corral areas, which would continue to be scraped. Liquid manure would continue to be directed to the wastewater storage ponds.

Stormwater runoff from impervious surfaces and roofed areas would continue to be routed to the wastewater pond, except for rainwater from several barns, which would be routed to nearby fields and irrigation pipelines. Wastewater would continue to be mixed with irrigation water and applied to the fields.

Solid manure that accumulates within corrals would continue to be scraped. Dry manure would continue to be stockpiled on-site at existing and proposed manure storage areas and used for bedding; additional manure would be sold and hauled off-site for use as fertilizer and soil amendments. Manure solids would be separated from liquids by two solid manure separators, one at the south facility and one at the north facility. As reported in the NMP, exported solid manure applied to off-site agricultural fields not owned by the project applicant would increase from 9,300 tons of solid manure from the dairy facility to 49,200 tons of solid manure with the proposed expansion (approximately 41 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.

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 exports, divided by the nitrogen removed by crops. The General Order requires that if the whole farm nitrogen

field nutrient balance ratio =
nitrogen applied (from irrigation/fertilizer/manure) ÷ total N removed by crops

whole farm nitrogen balance =
(N stored + N imported + atmospheric N – N exported) ÷ total N removed by crops

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 NMPs (combined for the north and south facilities), total annual gross nitrogen generated by facility is estimated at 601,935.4 pounds/year. Nitrogen exports currently total 215,323.7 pounds/year. After ammonia losses, existing operations reflect a whole farm nitrogen balance ratio of 1.38.

With implementation of the proposed expansion as reported by the May 2021 proposed conditions NMP, total annual gross nitrogen generated by the expanded facility would increase to 1,577,520.6 pounds/year. A total of 914,385.6 pounds/year of nitrogen would be removed through nitrogen exports as solid manure. After ammonia losses, the whole farm balance ratio will be 1.31. 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 February 2018 and a for a referenced normal precipitation year, there are currently 103,312 gallons per day of wastewater (approximately 37 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 172,318 gallons/day of wastewater (approximately 62 million gallons/year for a normal precipitation year). There would be a 25 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 364 acres currently single and double cropped with pasture, oats or corn and silage – soft dough.

The proposed NMP estimates an irrigation demand of over4 feet of water for cropped acres. Note that under proposed conditions, total land application area would be decreased from 364 acres to 357 acres. With the proposed changes in cropping patterns as detailed above, the estimated crop water demand would stay at about the same at 465 million gallons of water annually.

Using 62 million gallons of wastewater annually, the estimated wastewater component of the total irrigation the water demand is approximately 13 percent of total water

volume, not accounting for pond evaporation and evapotranspiration. This calculation is simply 62 million gallons of wastewater volume divided by a total of 465 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 1.38 and would decrease to 1.31 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 20,678,141 gallons of storage capacity for the one settling and three wastewater ponds 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. Pond freeboard capacity is used to address 100-year storm events. Existing pond construction information was not available for review. Based on permitting information provided in the IS/NOP, there would be construction of one (1) new wastewater pond east of the south facilities. With construction of the wastewater storage pond, there would be 7 acres of cropland converted to active dairy facilities. The new pond would be built to the Central Valley Regional Water Quality Control Board (CVRWQCB) Tier 1 pond standard, using a double 60-mil HDPE liner or approved equivalent.
- 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 two freestall barn roofs, which is routed to fields.
- 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 7 acres of cropped acreage would be converted to active dairy facilities. This leaves 357 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 1.38 at the existing dairy facility, respectively. The proposed dairy facility whole farm balance is 1.31. The balance ratio would remain below the regulatory limit of 1.65.

4.2 SUMMARY OF POTENTIAL GROUNDWATER RESOURCE DEGRADATION FROM OPERATION OF THE SILVA DAIRY EXPANSION

Expanded operations at the Silva Dairy 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 elevations. However, the acres used for the land application of wastewater 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 Silva Dairy. This western area of the basin is a net groundwater recharging area. The GSA confirms this finding in their annual reports.
- The Silva Dairy proposed expansion would have a higher wastewater component to the total application amount of over 13 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 Silva Dairy. 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 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 two irrigation wells sporadic values for the indicator parameters. EC was reported above the secondary MCL (see Table 1 for water quality data). Nitrate as N was reported above the MCL in only one well on site wells with the highest reported value of 12 mg/l. The domestic wells and irrigation wells demonstrated improved water quality over time. 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 Silva Dairy Expansion project would concentrate animals and their wastes within the feeding areas, and to a lesser degree, within open corrals. Concrete lined feed lanes would flush wastes to the on-site wastewater management system for treatment and storage in ponds as referenced in the existing and proposed WMP as summarized below.

Existing Wastewater Storage and Treatment Ponds. The treatment and storage ponds receive wastewater as described in the project NMP/WMP. Pond construction information was not available for review of the existing ponds. According to the project applicant, the ponds are earthen embankment structures constructed to the standards in place at that time. The existing dairy wastewater ponds have the potential to impact groundwater because they contain elevated concentrations of inorganic and organic constituents, and because hydraulic pressure and gravity force liquids downward through soils to groundwater. The flux of liquid through the base of the existing pond has been estimated based on the soil permeability at the base of the ponds (estimated as 10-6 centimeters per second or 1 foot per year). Based on the existing wastewater pond size of approximately 289,000 square feet of the existing three ponds, the total leakage through the sides and base of the ponds is estimated at 2.2 million gallons per year. However, since no changes to the existing ponds construction or operation are proposed with the dairy modification, the hydraulic pressure within the existing ponds and overall pond leakage would stay the same. Pond leakage would be minimized with a new lined pond. Therefore, there would be no anticipated increase to groundwater quality impacts from the ponds with implementation of the proposed project. The Silva Dairy was given a directive on January 2020 by the RWQCB to install piezometers near

the wastewater ponds. The installations were complete 2021 and the groundwater levels reported were supportive of some groundwater separation from the base of the ponds and collection over 5 month time period during a drought.

Corrals and Freestall/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 maintain a field by field nutrient balance of less than 1.38. Farming cropping pattern, fresh water mix and exportation of manure off site resulted in a reduced whole farm nitrogen. The whole farm nitrogen balance ratio would be reduced to 1.31 for the proposed operation from 1.38 at the existing dairy facility, respectively.

5 REFERENCES

Bradford, 2012. Transport and Fate of Nutrients and Indicator Microorganisms at a Dairy Lagoon Water Application Site: An Assessment of Nutrient Management Plans. Bradford, S. U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-10/116, 2012.

California Regional Water Quality Control Board – Central Valley Region, Order No. R5-2007-0035, Waste Discharge Requirements General Order For Existing Milk Cow Dairies, May 3, 2007 with MRP. Amended by Order No. R5-2009-0029, April 29, 2009. Revised MRP, February 23, 2011.

California Regional Water Quality Control Board – Central Valley Region, Order No. R5-2010-0118 (as revised by Order R5-2011-0091) NPDES No. CAG015001 General Waste Discharge Requirements And General National Pollutant Discharge Elimination System (NPDES) Permit For Existing Milk Cow Dairy Concentrated Animal Feeding Operations Within The Central Valley Region, December 1, 2011.

Department of Water Resources, California's Groundwater, Bulletin 118, October 2003.

Department of Water Resources, California's Groundwater, Bulletin 118, San Joaquin Valley Groundwater Basin, Delta-Mendota Subbasin, January 20, 2006.

Department of Water Resources, Groundwater Information Center Interactive Map Application, https://gis.water.ca.gov/app/gicima/.

Department of Water Resources, Water Data Library, http://www.water.ca.gov/waterdatalibrary/.

Harter, Thomas, Davis, Harley, Mathews, Marsha C., and Meyer, Roland D. 2002. Shallow Groundwater Quality on Dairy Farms With Irrigated Forage Crops. Journal of Contaminant Hydrology. Volume 55, pg. 287-315.

Harter, Thomas. 2009. Agricultural Impacts on Groundwater Nitrate. Southwest Hydrology. July/August, pg. 22-23, 35.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 1 Annual Report (2012), April 1, 2013.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 2 Annual Report (2013), April 1, 2014.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 3 Annual Report (2014), April 1, 2015.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 4 Annual Report (2015), April 1, 2016.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 5 Annual Report (2016), April 1, 2017.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 6 Annual Report (2017), April 1, 2018.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 8 Annual Report (2019), April 1, 2020.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 9 Annual Report (2020), April 1, 2021.

Luhdorff and Scalmanini Consulting Engineers, Central Valley Dairy Representative Monitoring Program Year 10 Annual Report (2021), April 1, 2022.

Luhdorff and Scalmanini Consulting Engineers, Evaluation of Earthern Liquid Dairy Manure Lagoons in the Central Valley of California: Seepage, Mass Emissions and Effects on Groundwater Quality, April 6, 2017.

Merced County – Conditional Use Project Description, Initial Study and Notice of Preparation – Silva Dairy Farm, Expansion CUP21-001, August, 2022

Merced County Ordinances

Merced County 2030 General Plan, December 10, 2013

National Resources Conservation Service, Web Soil Survey, http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.

Sousa Engineering, Flood Protection Analysis for Silva Dairy Farms, Merced County, California, May 4, 2021 attached to the Proposed WMP.

State Water Resources Control Board, GAMA – Groundwater Ambient Monitoring and Assessment Program, 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