APPENDIX K

Hydrogeologic Assessment Summary for CEQA

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HYDROGEOLOGIC ASSESSMENT SUMMARY FOR CEQA

for the

OLIVEIRA DAIRY EXPANSION PROJECT

4235 OAK AVENUE, MERCED, CA

prepared for

OLIVEIRA DAIRY

and

ENVIRONMENTAL PLANNING PARTNERS

December 2018
Project No.: 226218-00014.06
Revision 0

NV5

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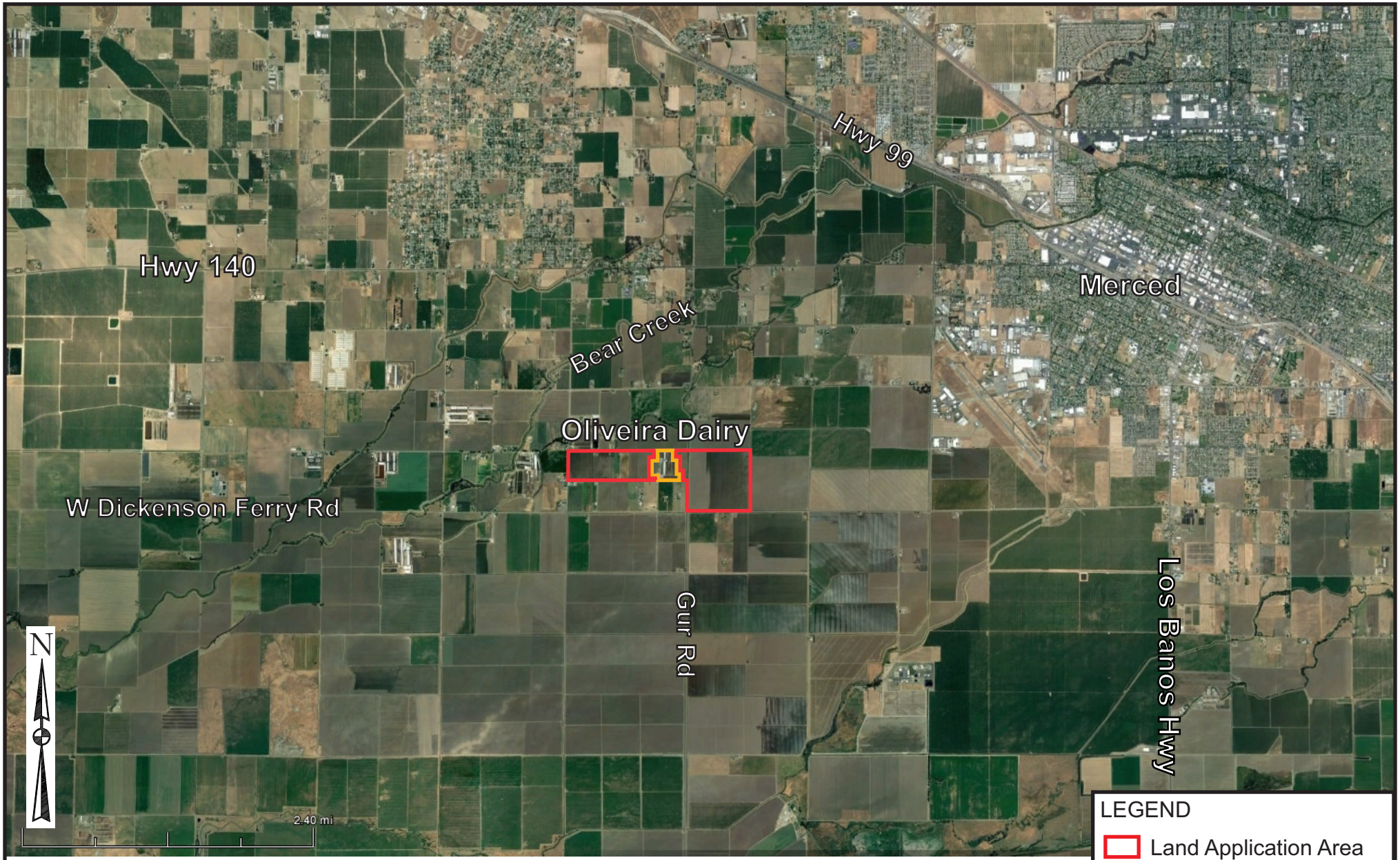
1 GENERAL INFORMATION

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

The existing Oliveira Dairy is located on 22 acres of an existing farm totaling 290 acres in unincorporated Merced County. The project site is located on the southwest corner of West Oak Avenue and North Gurr Road in the Merced area of Merced County. The project's location is within the Central Valley of California Region (see Figure 1). The project cropland application area consists of 249 acres located on portions of 7 parcels. The project site is located in Section 32, Township 7 South, Range 13 East, Mount Diablo Base and Meridians; 37◦16'47.91"N, 120°33'51.48"W. Dairy and the land application field locations are shown on Figure 2.

This hydrogeologic assessment was completed based on desktop review of existing data. On site boring investigations were not completed. A Monitoring Well Installation and Sampling Plan (MWISP) has not been prepared for the Oliveira Dairy. The existing dairy is currently operating under the Central Valley Regional Water Quality Regional Water Quality Control Board (CVRWQCB) General Order for Existing Milk Cow Dairies (Order No. R5-2013-0122). A Report of Waste Discharge (ROWD) will be finalized for the proposed expansion and Individual Waste Discharge Requirements (WDRs) for the site will be required.



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PROJECT NO:	226218-0000014.06
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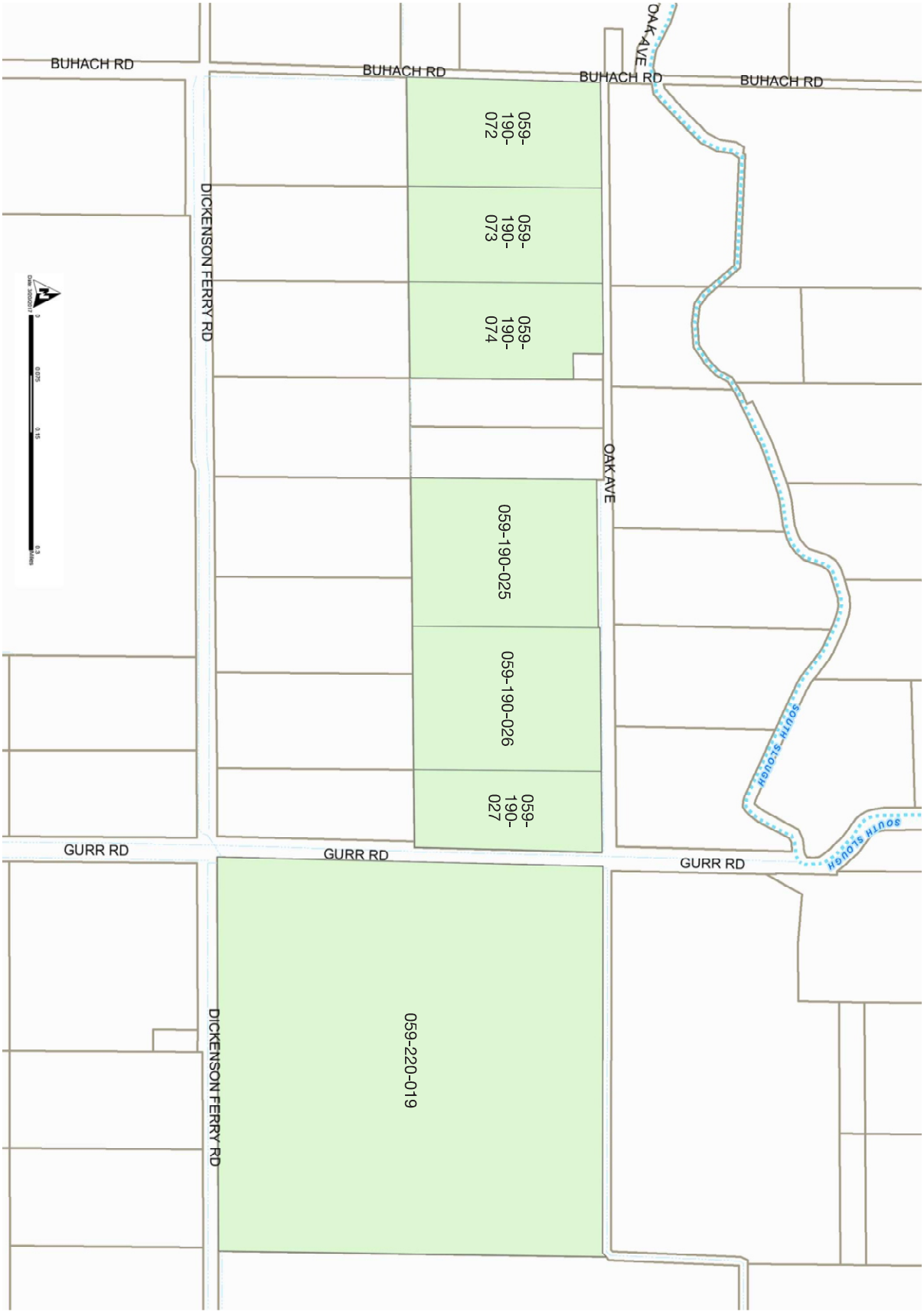
FIGURE:	1

LOCATION MAP AND WATER FEATURES
OLIVEIRA DAIRY
MERCED COUNTY, CA



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PROJECT NO: 226218-0000014.06	
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FIGURE: 2	

PROJECT SITE APNs
OLIVEIRA DAIRY
MERCED COUNTY, CALIFORNIA

2 PHYSICAL SETTING AND EXISTING CONDITIONS

2.1 EXISTING HERD AND RANCH FEATURES

As established in the Initial Study and Notice of Preparation (August 2018), the existing herd is approximately 2,218 animals at the dairy with 1,063 milk cows, 158 dry cows, and 997 support stock. The proposed expansion would increase the herd size to a total of 4,400 animals, with approximately 2,500 milk cows, 400 dry cows, and 1,500 support stock. Refer to Section 4 for additional details regarding the existing herd and ranch features as well as details related to the proposed dairy expansion and hydrologic impacts.

2.2 SURROUNDING LAND USE

There are off-site single-family residences associated with other off-site agricultural operations surrounding the project site and located within the windshed of the dairy (defined as an area of 1,320 feet upwind to 2,640 downwind of the periphery of the animal facility). The closest off-site residence is located approximately 610 and 700 feet south of active dairy facilities. There are Merced Irrigation District (MID) surface water canals within the vicinity of the proposed project. The City of Merced is located approximately two miles east of the Oliveira active dairy facilities. The project site is located 1.25 miles north of the Grasslands Ecological Area Focus Boundary, and 2.25 north of the Grasslands Ecological Area. The area land uses are provided below.

Location	Land Use	General Plan	Zoning
ON-SITE	Dairy / Agriculture / Residences	Agricultural	General Agricultural A-1
NORTH:	Agriculture	Agricultural	General Agricultural A-1
EAST:	Agriculture	Agricultural	General Agricultural A-1
SOUTH:	Agriculture / Residences / Animal Confinement Facility	Agricultural	General Agricultural A-1
WEST:	Agriculture / Residences	Agricultural	General Agriculture A-1

2.3 PROJECT SETTING AND PHYSIOGRAPHY (PHYSICAL GEOGRAPHY)

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 ranging from 135 to 170 feet above mean sea level (MSL) at the Dairy Facility and land application area elevations ranging from 135 to 145 feet MSL. As noted

on USGS topographic maps, the Bailey Lateral of Bear Creek and Thornton Lateral of Merced Irrigation District (MID) are located to the north of the site. The Deane Canal of MID flows directly through the site, just west of the New Field and just east of the dairy facility and all other existing fields.

Under existing conditions, there is one settling basin and two wastewater storage ponds on site for wastewater storage and treatment. Irrigation water for the project farming operations is primarily mixed with canal water supplied by primarily MID canal water, or three dairy farm groundwater irrigation wells. For the entire land application area of the operation, in normal years approximately 20 percent of the irrigation water comes from groundwater. In drought years, as much as 30 percent might come from groundwater. Two groundwater wells are used for residential domestic purposes. Flood and furrow irrigation methods are used to distribute fresh irrigation water and wastewater (manure) mix to cropped fields. This existing irrigation system would continue to be used to mix and apply wastewater in the future. Land application fields receiving manure wastewater have been graded and developed with tailwater return systems to circulate irrigation water across the project site or maintain wastewater on individual application fields.

2.4 GEOLOGY

REGIONAL GEOLOGY

The project site lies within the San Joaquin Valley and the larger Central Valley of California. The Central Valley is composed primarily of alluvial deposits from erosion of the Sierra Nevada 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 (the location of the Oliveira Dairy Expansion project) consist of the Modesto and Riverbank Formations (Bulletin 118). The Modesto and Riverbank Formations are characterized by silica-rich intermixed clay, silt, sand and gravel deposits derived from the granitic Sierra Nevada Mountains. Turlock Lake, Laguna and Mehrten Formations underlie these deposits.

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

SITE SPECIFIC SOILS AND GEOLOGY

Predominant soils underlying the project site as classified by the Natural Resources Conservation Service (NRCS) consist primarily of Landlow silty clay loam, 0 to 1 percent slopes (73.1%) and Lewis silty clay loam, 0 to 1 percent slopes (24.2%). Other minor soils include Burchell silty clay loam, 0 to 1 percent (2.7%).

Near surface geology at the project site consists of Modesto Formation. The Geologic Map of the Area, Geologic map of the San Francisco-San Jose quadrangle, California, Wagner et. al., 1991, California Division of Mines and Geology, depicts surface geologic units as the Riverbank Formation and quaternary alluvium nearby. The main subsurface geologic unit found in the area are the Turlock Lake, Laguna and Mehrten Formations. The Mehtren Formation consists of characteristic black sands.

Well Logs were collected from the Department of Water Resources (DWR) for wells within 1 mile of the site. A total of over 140 wells logs from Merced County were available for review and the average depth for wells drilled in the area was approximately 200 feet below ground surface (bgs). Completed well depths averaged 244 feet bgs. Select well logs were used to create a southwest-northeast trending cross section through the project area (see Figure 3 for the cross-section line location and Figure 4 for the Hydrogeologic Cross-section). The cross section indicates that clay and sand beds generally dominate the near surface geology in proximity to the dairy. Sand beds, generally greater than 20 feet and up to 60 feet thick, were identified below 100 feet bgs. Continuous clay deposits from 10 feet to greater than 150 feet in thickness are found from near surface to depths of over 100 feet bgs.

2.5 HYDROGEOLOGY

REGIONAL HYDROGEOLOGY

Regional groundwater in Merced County is composed of four subbasins of the San Joaquin Hydrologic Region: the Turlock, the Merced, the Chowchilla, and the Delta-Mendota. The dairy site lies within the Merced Subbasin (5-22.04). The Merced Subbasin is restricted by to the west by the San Joaquin River, to the north by the Merced River, to the east by the crystalline rocks of the Sierra Nevada Mountains, and to the south by County and municipal boundaries.

Each of the subbasins is split into the following three different water bodies depending upon depth and geology: an unconfined aquifer, a semi-confined aquifer, and a confined aquifer. The geologic formations of the Merced Subbasin include the Modesto Formation, Riverbank Formation, alluvium and flood-basin deposits. The Corcoran Clay is included as a member in the Tulare or Turlock Lake Formation. Referred to as

Turlock Lake Formation typically east of San Joquin River. Significant land subsidence has been observed in the southern portion of the subbasin due to artesian head decline and loss of storage.

Per the DWR Bulletin 118 and based on our knowledge of the area, the project area is located within the Merced subbasin. Water bearing formations are expected to range from unconsolidated alluvial deposits (Turlock Lake and Laguna Formations) to consolidated sediments within the Mehrten Formation. The Corcoran Clay is a prominent aquitard in the San Joaquin Valley, found in this Subbasin at depth ranging from 100 to 500 feet bgs. Ground water above the Corcoran Clay is typically unconfined to semi-confined and groundwater found below the Corcoran Clay exists under confined conditions. Bulletin 118 reports maximum well yields for the subbasin at 4,450 (gallons per minute) gpm with average production from 1,500 to 1,900 gpm.

Merced Airport, about 2 miles east

A'

07S13E33G001M_00120454

07S13E32_E0015346

07S13E32_00940538

Oliveira Dairy

07S13E31_00785656

08S13E06_E0243937

A

LEGEND

- Wells used for cross section
- Cross section line

N

0 1000 2000 3000 4000 5000 ft

HYDROGEOLOGIC CROSS SECTION MAP
OLIVEIRA DAIRY
MERCED COUNTY, CALIFORNIA

DATE: 10/30/2018
SCALE: 1:12,000
PROJECT NO: 226218-0000014.06
DRAWN: MR
CHECKED: PFD
FIGURE: 3

N V 5

A

PROJECT SITE LOCATION

A’

WEST

EAST

07S13E31_00785656
217 ft.

08S13E06_E0243937
340 ft.

07S13E32_E0015346
240 ft.

07S13E32H001M_00120388
414 ft.

07S13E32_00940538
203 ft.

07S13E33G001M_00120454
412 ft.

Elevation MSL (feet)

0

-100

-200

-300

-400

0

1,000

2,000

3,000

4,000

5,000

6,000

7,000

8,000

9,000

Distance (feet)

LEGEND

CL

ML

SP

TS

HP

SC

SW

Well Screen

Note: Distance below well number is approximate projected distance of well from cross section.

HYDROGEOLOGIC CROSS SECTION A-A’
OLIVEIRA DAIRY
MERCED COUNTY, CALIFORNIA

DATE: 10/30/2018
SCALE: H 1’: 690’ V 1’:69’
PROJECT NO: 226218-0000014.06
DRAWN: MR
CHECKED: PFD
FIGURE: 4

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AREA SITE SPECIFIC HYDROGEOLOGY

The hydrogeologic cross-section depicts the interbedded nature of the subsurface sediments (see Figure 4). Water supply wells in the area have an average well depth of 200 feet bgs, but range from less than 100 to 575 feet bgs. Due to the presence of continuous clay layers near surface, limited perched groundwater conditions may exist at near surface depths. As discussed above, significant continuous sand units greater than 20 feet and up to 60 feet thick, were identified below 100 feet bgs. Continuous clay deposits from 10 feet to greater than 150 feet in thickness are found from near surface to depths of over 100 feet bgs.

Area knowledge and data available from the Groundwater Information Center Interactive Map Application indicate that groundwater may exist within 20 to 30 feet of surface. First encountered groundwater is anticipated to be found in unconfined aquifers within laterally extensive sands units or as isolated perched units. DWR hydrographs for nearby wells 3772838N1205602W001 and 371582N1205W001 are depicted on Figure 5. Groundwater depth and elevations have shown generally stable water level trends historically, except from 2014 to 2016. The drought conditions of 2014 through 2016 resulted in generally lower groundwater levels, though the effect was heavily offset by proximity to the San Joaquin River. Groundwater elevations have varied from approximately 72 to 135 feet MSL for the two wells.

Groundwater flow in the Merced Subbasin within the project vicinity is generally to the east or northeast, towards the San Joaquin River. Groundwater follows the dip of the crystalline and sedimentary units. In general, groundwater depths are shallowest near San Joaquin River and increase away from the river as surface elevation increases.

Regional contour maps for data collected in Fall 2017 and Spring 2018 for the area, provided by the DWR Groundwater Information Center Interactive Map Application, indicate that depth to groundwater in the vicinity of the project area ranges from 20 to 40 feet bgs - refer to Figures 6 through 7. Groundwater elevation in the project vicinity ranges from 20 to 110 feet.

With the adoption of the Sustainable Groundwater Management Act of 2014 (SGMA), Merced County has adopted a groundwater ordinance No. 1930, which prohibits the unsustainable extraction of groundwater or conveyance of groundwater outside of a subbasin. This ordinance is a transition document until documents required by the SGMA are published and implemented. Two prohibitions were set in place as part of the ordinance. The first prohibits the construction of new wells within unincorporated areas of the county showing excess extraction patterns from 1995 through 2013. The second prohibits the export of groundwater from Merced County to areas outside of the

groundwater basin where it originated. Multiple exemptions are in place to allow water districts and water agencies to continue to operate.

Project area groundwater beneficial use is for domestic and irrigation purposes. Agricultural practices and several dairies are present in the project vicinity. Domestic water is supplied by existing on-site wells. The proposed project would continue to use surface water from the primarily the MID, and supplemental groundwater for irrigation at the dairy.

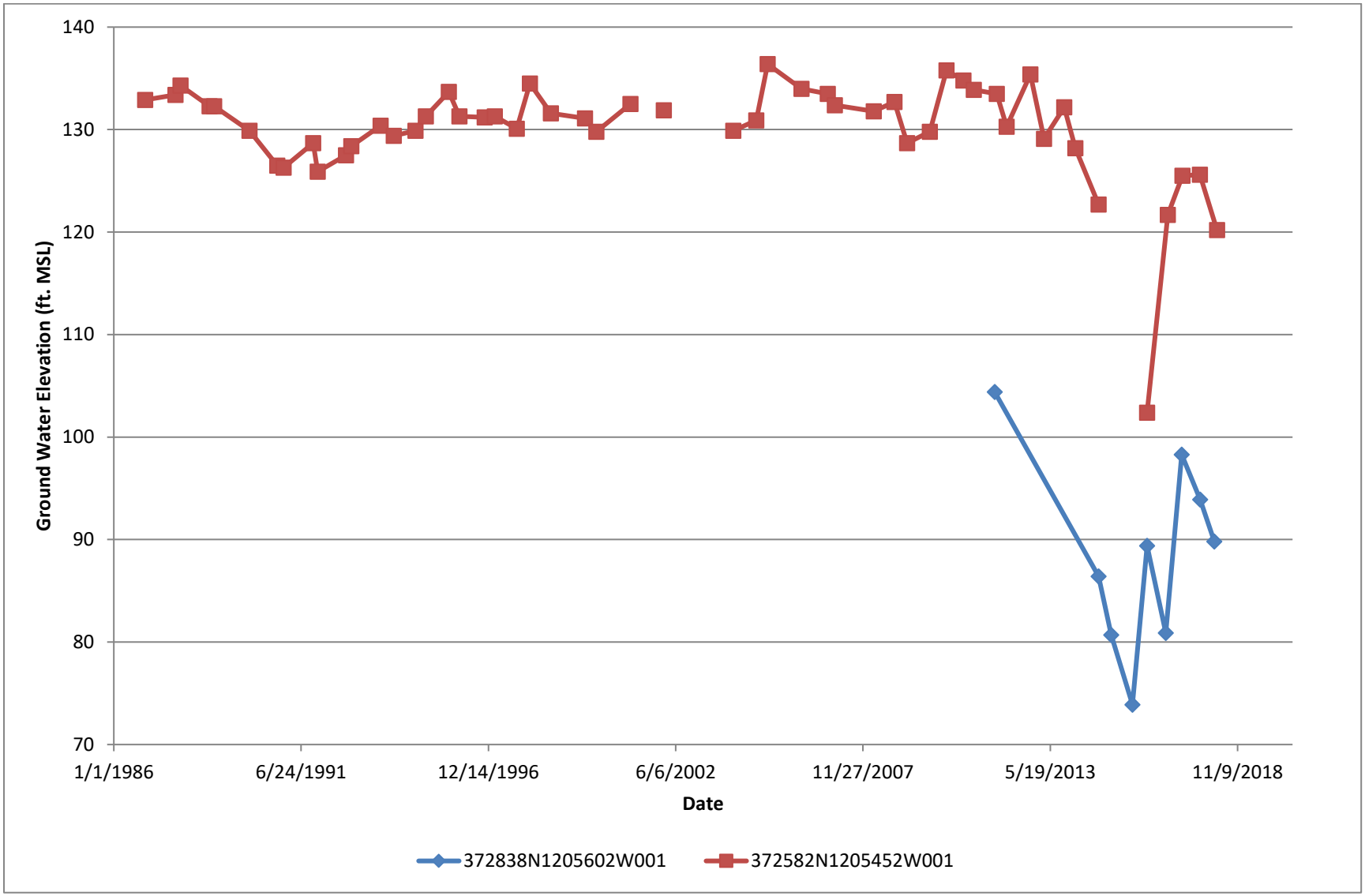
REGIONAL GROUNDWATER QUALITY

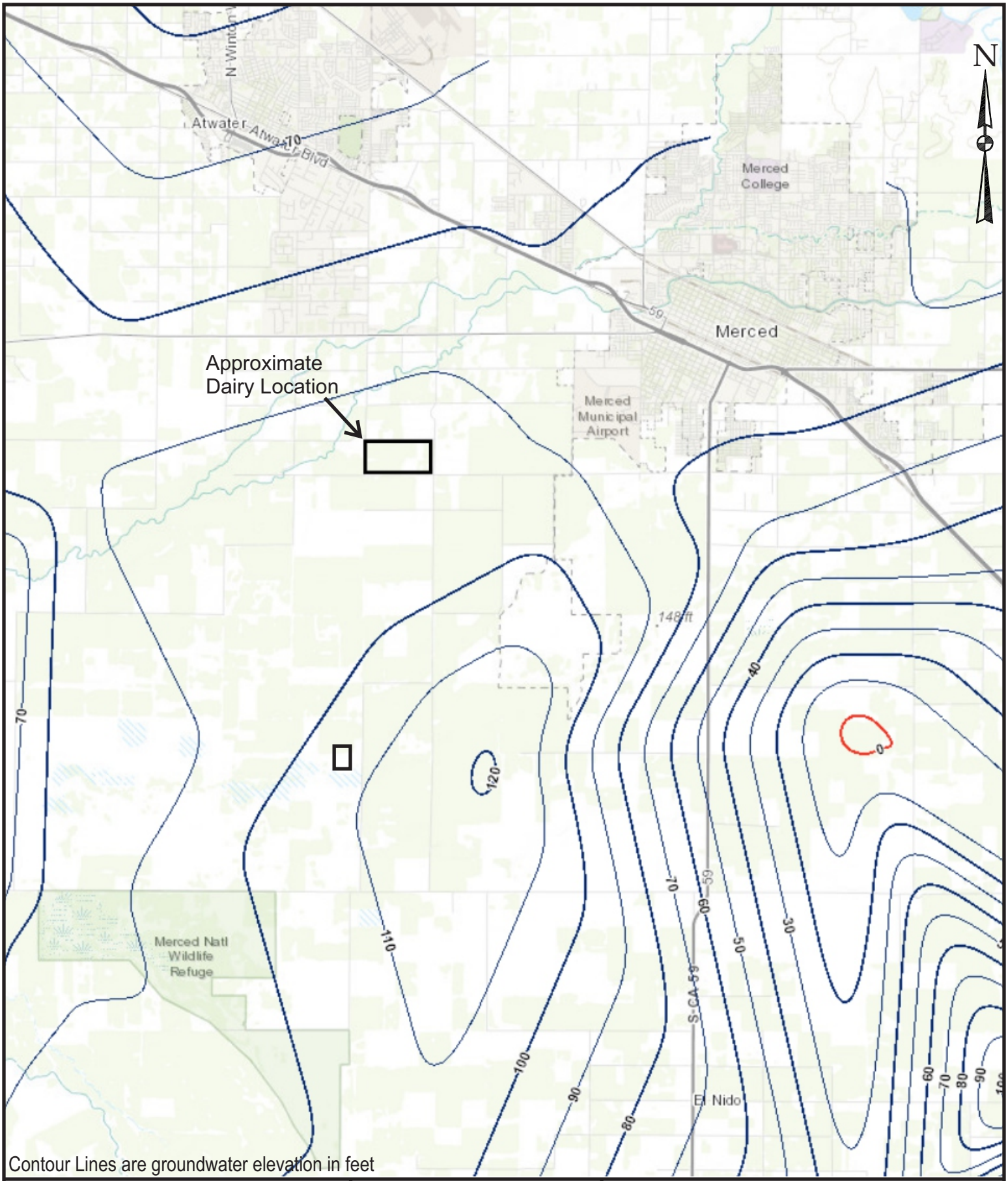
In order to depict the regional groundwater quality, the following nearby sources have been summarized. The Merced Subbasin water quality data per DWR Bulletin 118 indicates total dissolved solids range from 100 to 3,600 mg/L in the subbasin, and averaged 200 to 400 mg/L. High TDS content in the western side of the basin is due to stream water recharge from marine sediments in the Coast Ranges. The depth of saline or connate water is not indicated in Bulletin 118, but based upon a DWR well search and the maximum depth of wells in the area; connate (old saline water) water is anticipated to be below 700 feet bgs. Areas with high concentrations of parameters iron, fluoride, nitrate, and boron are known to exist within the subbasin. Water quality data summarized within Bulletin 118 indicates that the Maximum Contaminant Level (MCL) for nitrate is 45 mg/L and 4 Primary MCL exceedances and 18 Secondary MCL exceedances were reported for 51 sampled wells.

Typically, anoxic or mixed reduction-oxidation (redox) groundwater with long residence times undergoes de-nitrification. These conditions are typical for confining clays of the Tulare Formation. Older groundwater is also less likely to be enriched with nitrate by irrigation and fertilization processes. However, anoxic conditions can also be associated with higher arsenic and manganese, and high pH conditions can interact with iron oxides and release arsenic. By using depth discrete methods and exploring below depths of known nitrate contamination, preferred water quality zones can be located.

Area water quality data was available through the United States Geological Survey Groundwater Ambient Monitoring and Assessment Program (GAMA) for two municipal supply wells for the City of Merced from 1985 to 2002 and 1990 to 2018. For the City of Merced wells, nitrate as NO3 concentrations ranged from 2.5 to 45.6 mg/L, total dissolved solids was 180 to 417 mg/L and EC was 240 to 640 μmhos/cm. The area water quality is used to assess conditions related to potential impact.

FIGURE 5 DWR HYDROGRAPHS





DATE: 10/30/2018	REGIONAL GROUNDWATER CONTOUR MAP FALL 2017 OLIVEIRA DAIRY MERCED COUNTY, CALIFORNIA
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PROJECT NO: 226218-0000014.06	
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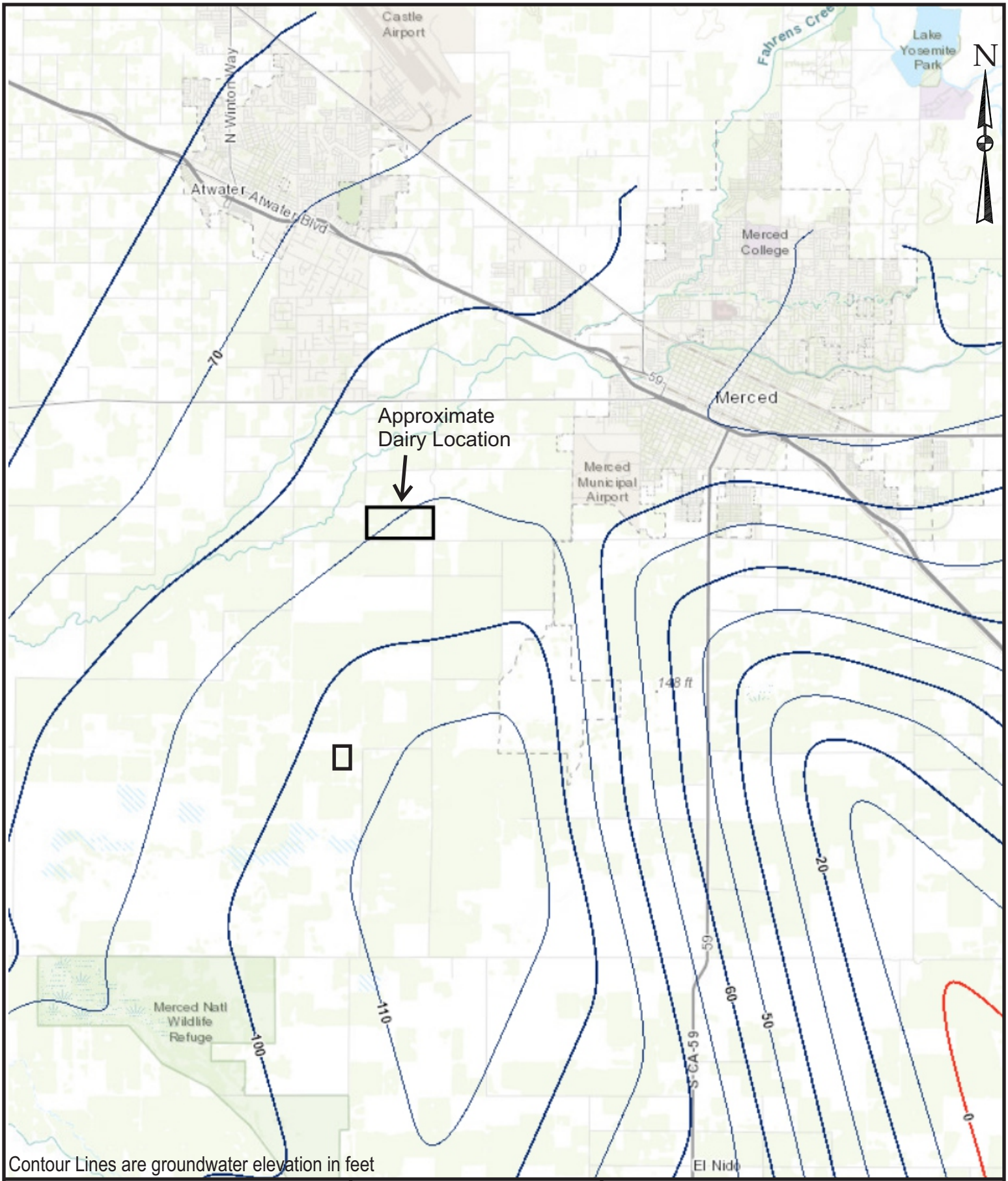
FIGURE: 6	



Contour Lines are groundwater elevation in feet

DATE:	10/30/2018
SCALE:	
PROJECT NO:	226218-0000014.06
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FIGURE:	7

REGIONAL GROUNDWATER CONTOUR MAP SPRING 2018 OLIVEIRA DAIRY MERCED COUNTY, CALIFORNIA

2.6 PROJECT GROUNDWATER QUALITY SUMMARY

Water quality data was available from July 2015 to November 2017 on a variable basis for the irrigation wells (IW) and domestic well (DW). The referenced wells are as follows: Diesel IW, IW Heifers, and DW Milk Barn. For the well water quality, Electrical Conductivity (EC) ranged from 549 to 1,390 µS/cm and nitrate as nitrogen ranged from 4.8 to 12.5 mg/L. Total Dissolved Solids (TDS) ranged from 0 to 644 mg/L. Primary maximum contaminant level (MCL) exceedances were reported for nitrate as nitrogen in IW Heifers and secondary MCL exceedances were reported TDS in both irrigation wells. Table 1 summarizes the indicator water quality data for specific parameters.

Even though the Oliveira Dairy is part of the Groundwater Monitoring Coalition and potentially a test dairy site, per the General Order, a monitoring well network may be required by the CVRWQCB individual discharger WDR/MRP to be installed and monitored at the site.

Table 1
Well Water Quality
Oliveira Dairy

Sample Name	Date	Electrical Conductivity (EC)	Nitrate as N	Total Nitrogen	Total Dissolved Solids
		(µS/cm)	(mg/L)	(mg/L)	(mg/L)
Water Quality Standard		NA	**10***	NA	**500‡**:
Diesel IW	11/20/2017	**907**	9.8	10.05	0
IW Hiefers	11/20/2017	**1,130**	**12.5**	12.75	0
	7/18/2016	**1,390**	8.24	8.24	**508**
	8/5/2015	**1,130**	NA	8.49	**644**
	7/30/2015	**980**	NA	11.9	**560**
DW Milk Barn	10/05/2017	549	5.2	5.2	0
	11/1/2016	556	4.8	NA	370
	11/17/2015	552	4.82	4.82	NA

* California Title 22 Primary Maximum Contaminant Limit, ‡: California Title 22 Secondary Maximum Contaminant Limit, Bold: MCL exceedance; NA – parameter not measured or not available.

Dairy Industry Study - In a 2002 study published in the Journal of Contaminant Hydrology, titled *Shallow Groundwater Quality on Dairy Farms with Irrigated Forage Crops,* impacts to shallow groundwater quality by dairy farms with irrigated forage crops in the San Joaquin Valley were extrapolated from studies performed at five dairies. The dairy facilities were separated into three contaminant or management units: 1 – the lagoons/ponds, 2 – the feedlots and storage areas and 3 – the irrigated fields. Data was collected from monitoring wells installed at the dairies over four years and were compared to upgradient water quality. Data indicated that nitrate-N and salinity concentrations were similar across the five sites involved in the study. Shallow groundwater nitrate-N concentrations were generally higher than upgradient sources and averaged at approximately 64 mg/L within the dairies compared to 24 mg/L upgradient. EC concentrations in the dairies were also higher than upgradient and averaged 1,900 microSiemens (µs/cm) compared to 800 µs/cm upgradient. Nitrate-N concentrations did not tend to vary greatly between the three dairy management units; however, EC concentrations tended to be higher in corral and pond areas than in the land application areas, which indicates that the corrals and ponds were leaching to groundwater. Pond leaching was also inferred from the reduced nitrate concentrations observed in three of four wells immediately downgradient of pond berms. The study determined that land application areas had the greatest chance to impact groundwater

based on the footprint surface area of land application areas compared to the surface area of the other management units. Impacts from corrals and ponds are more difficult to determine due to historic land use practices and potential impacts from previous practices.

The study determined that the average leaching rate of ponds was on the order of 1 m/year which is consistent with state and federal guidelines for pond liners, but noted that even after multiple years of operations, ponds never obtained complete self-sealing. Additionally, water quality impacts from dairy operations were observed in the shallow groundwater wells, but were generally not observed in deeper production wells, and production wells displayed better water quality. The study did recommend, however, that proper nutrient management for land application areas is extremely important and is the most critical component for dairy operators to follow in order to protect long-term groundwater quality (Harter, 2002).

Another study by Harter examined 2007 data from California farms in which 740,000 tons of nitrogen from fertilizers were applied to 2.7 million acres of farmland (Harter, 2009). Crops were able to take up less than 50% of the applied nitrogen, and over 110 lbs N/acre/year went unused by the crops. Roughly one-quarter of the nitrogen was volatilized to the atmosphere from the root zone as nitrogen gas and ammonia, and less than 10 lbs N/acre/year went to surface water in the form of nitrate, ammonia, or organic nitrogen. Thus, over 80 lbs N/acre/year was available to leach to groundwater supplies underlying irrigated crops, typically as nitrate (Harter, 2009). Where animal or human wastewater application occurs, dairy manure accounted for an additional 240,000 tons of nitrogen produced, the majority of which was applied to forage crops. Unused nitrogen which makes it below the root zone would be available to leach to groundwater below these crops. The study concluded that 80 lbs N/acre/year of nitrogen would lead to nitrate concentrations in groundwater at two to four times the MCL of 10 mg/L, if un-attenuated (Harter, 2009). The study noted that, generally, nitrate concentrations were lowered in anoxic conditions, such as clay rich soils, or with prolonged flooding conditions from irrigation. In California, nitrate concentrations tended to match groundwater contamination risk estimated from land-use characteristics and groundwater vulnerability (Harter, 2009). This relationship can be used so that potentially higher risks of groundwater contamination can be inferred from certain dairy operations or wastewater land application operations. However, the complexity of these relationships support the need to perform confirmation sampling to determine actual impacts.

2.7 IMPAIRED SURFACE WATERS

The Central Valley Regional Water Quality Control Board (CVRWQCB) maintains and updates the impaired water bodies list for Central Valley. This list is required by the Clean Water Act Section 303(d) list and 305(b) report. The CVRWQCB requires that Total Maximum Daily Load (TMDL) goals are used to address long-term impairments to surface waters. Refer to Section 3.3 for more details.

2.8 FLOODING

The Flood Insurance Rate Maps (FIRM 2008) from the Federal Emergency Management Agency (FEMA) show that the dairy site is in Zone A. Zone A is an area with subject to inundation by the 100-year storm event, but for which a Base Flood Elevation (BFE) has not been established. However per the Flood Protection Analysis report, as recommended by FEMA, the estimated flood elevation for this Zone A site was determined by superimposing the Zone A boundary over USGS quadrangle map and interpolating the elevation along the boundary. Estimated BFEs were determined using these maps and an engineering survey for the site dairy production area and proposed expansion area (DPA). Elevations for the DPA range between 136' and 137.5' (NGVD29 datum).

Sousa Engineering prepared a Flood Protection Analysis report as part of the proposed Waste Management Plan, dated July 2018. Per the report, approximately 70% of the DPA is constructed to finished elevations of 136.7' or higher, therefore located above the estimated BFEs. Approximately 30% of the existing DPA would be subject to inundation levels of 1'-2' based on estimated 100-yr BFEs. These areas include feed storage areas, about 10% of corral area, and wastewater storage basins.

The study prepared a Conceptual Grading Plan/Flood Protection Plan that proposed constructing an access road along the west, south, and southeast boundary of the project site and new structures with finished floor elevations higher than the base flood elevation. With the incorporation of these improvements, the study confirmed that the Oliveira Dairy facility would have adequate protection from the 100-year flood event.

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 and discharges or proposes to discharge pollutants to the waters of the Unites States.

The CVRWQCB administers the federal NPDES program in the Central Valley. The CVRWQCB adopted the General Waste Discharge Requirements and General NPDES Permit for Existing Milk Cow Dairy Concentrated Animal Feeding Operations within the Central Valley Region, Board Order No. R5-2013-0122 on October 3, 2013. The CAFO Order was written to follow the format of the 2007 General Order for Existing Milk Cow Dairies and Individual Waste Discharge Requirements (discussed under California Laws and Regulations, NPDES Program and the General Order for Existing Milk Cow Dairies and Individual Waste Discharge Requirements below), as closely as possible, while incorporating requirements of the Federal CAFO rule. The CAFO Order will serve as a NPDES permit for those existing milk cow dairies that are classified as CAFOs.

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.

NPDES PROGRAM AND THE GENERAL ORDER FOR EXISTING MILK COW DAIRIES AND INDIVIDUAL WASTE DISCHARGE REQUIREMENTS

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 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), 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 are not covered under the General Order and would be required to obtain coverage under Individual WDRs. 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 have fully implemented a WMP and a NMP as of the date of this technical study. In compliance with the requirements of the CVRWQCB, the proponents of the Oliveira Dairy Expansion have completed the required components of the WMP and NMP of the General Order.

The Reissued Dairy General Order is intended to enhance 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 in order 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) has been updated (Monitoring and Reporting Program R5-2013-0122). 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 Oliveira Dairy may be treated as an individual discharger required to have an individual WDR and a separate groundwater monitoring system. An updated ROWD has been submitted by the Oliveira Dairy to the RWQCB.

The RMP establishes a regional monitoring plan for the member dairies of the Central Valley Dairy Representative Monitoring Program (Dairy Cares). The RMP has been 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 newly selected dairies was 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.

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 approximately 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 has 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 has been 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 has 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 has 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 has 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 has made steady progress toward developing industry recommendations to meet the April 1, 2019 schedule mandated by the 2013 General Order.

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 from 2012 through 2016, 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 in close proximity to 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 Hydrogeologic Investigation in 2017 and the report is expected to be completed in 2018.

In accordance with Provision 29 of the General Order, all dairies must be in compliance with Title 27. As explained in the General Order Information Sheet, the Title 27 design standards for ponds have been 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 in order to provide increased groundwater protection.

The Oliveira Dairy has been previously regulated under the 2007 General Order with 2011 revisions, which has been replaced by the Reissued Dairy General Order (R5-2013-0122). As established by the ROWD submitted for the existing dairy to the CVRWQCB in October 2005, the State-permitted herd size for the dairy is 943 milk and dry cows combined[2], with regulatory review required for expansions of greater than 15 percent above this value. Since the proposed expansion would increase the mature cow number established under the WDR by greater than 15 percent, the proposed expansion would require a new individual WDR. Significant operational and reporting requirements will

[2] The CVRWQCB regulates only mature cows (milk and dry) and does not establish any limits on calves, heifers, and other support stock.

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.

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 has occurred. The case has resulted in the revisions to the General Order through the Reissued Dairy General Order.

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)[3] for the Oliveira Diary facility has been prepared pursuant to the requirements of the CVRWQCB (see Appendix I of the Environmental Impact Report for the expansion Project). The NMP and WMP for the proposed dairy expansion, referenced, have been used for the evaluation in this technical study. To establish a baseline, the referenced NMP and WMP were used to represent existing conditions.

CALIFORNIA STATEWIDE GROUNDWATER ELEVATION MONITORING PROGRAM AND SUSTAINABLE GROUNDWATER MANAGEMENT ACT

The California Statewide Groundwater Elevation Monitoring Program (CASGEM) was signed into law in 2009. CASGEM is a collaboration between the Department of Water Resources (DWR) and local agencies to collect and report groundwater elevations for Bulletin 118 basins across the state of California. As part of the CASGEM program, the DWR was required to submit reports to the Governor's office regarding the status of groundwater elevations across the state. In June 2014, the DWR announced its draft Basin Prioritization results. The Basin Prioritization determined groundwater use, groundwater supply, groundwater overdraft, and other factors for each basin to give them priority for action. Medium and high priority basins are those identified with medium or high risk for overdraft or adverse groundwater impacts. These at-risk groundwater basins would be first to receive state funds for drought management and other groundwater funding programs.

[3] Since adoption of the ACO, the CVRWQCB has required the preparation of a NMP and WMP, which would serve in place of the CNMP as allowed by Merced County Code Chapter 18.48.055 K.

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 (GSP) to be designed by groundwater sustainability agencies (GSA) to manage groundwater resources while being sensitive to local economic and environmental needs. GSAs are to be formed by June 30, 2017 and GSPs are due by January 31, 2020 for basins in critical overdraft and by January 31, 2022 for all other basins. The Merced Irrigation – Urban Groundwater Sustainability Agency (MIUGSA), in the area around the Oliveira Dairy, was formed on 4/24/17. Once GSPs are implemented, the GSAs will be responsible to submit an annual report summarizing groundwater elevation data, groundwater extraction, groundwater recharge (from surface water supply used or available for use), total water use, and change in groundwater storage. As part of the annual reporting effort, individuals who are outside groundwater adjudication boundaries and within medium or high priority basins and who use more than 2 acre-feet (651,702 gallons) per year of groundwater will be required to track their usage and provide an annual report to their respective GSA and SWRCB.

After implementation of the GSPs, 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 GSPs are 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 GSPs, should be reached by 2040 for basins in critical overdraft and by 2042 for other basins.

3.3 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 (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.

As mentioned above, Bear Creek is located within one-mile north of the project site. Bear Creek is listed as impaired under §303(d). The affected segments stretch from Bear Valley to the San Joaquin River, crossing over Mariposa and Merced counties. The 84-mile segment is impaired for Escherichia coli (E. coli) and an unknown toxicity.

The proposed TMDL completion date for Bear Creek is 2021.

3.4 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 have 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 have been adopted by the RWQCB as of preparation of this Hydrogeologic Report:

- East San Joaquin River Watershed General Order (Order R5-2012-0116-R3) – adopted in December 2012 and revised in October 2013, March 2014, April 2015 and October 2015, February 2016, May 2017, and February 2018. 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) – adopted in July 2015 and amended by Order No. R5-2016-0015 adopted February 2016. This program regulated discharge to groundwater in the Grassland Drainage Area and is similar to other IRLP orders. Additional revisions to this adopted General Order were adopted in May 2017.
- Individual Discharger General Order (Order R5-2013-0100) - adopted in July 2013, this Order regulates waste discharges from irrigated lands for individuals that are not enrolled under WDRs administered by a third-party.
- Tulare Lake Basin Area General Order (Order R5-2013-0120) – adopted in September 2013, this Order provides WDRs and MRP for discharges from irrigated lands within the Tulare Lake Basin. This order has been amended by Orders R5-2014-0143 (December 2014), R5-2015-0115 (October 2015), R5-2016-0015 (February 2016), and R5-2016-0095 (December 2016). Additional revisions to this adopted General Order were issued in April 2017 and May 2017.

- Western San Joaquin River Watershed General Order (Order R5-2014-0002) – adopted in January 2014, this Order provides WDRs and MRP for discharges from irrigated lands within the western San Joaquin River Watershed. The order has been amended by Orders R5-2015-0115 (October 2015) and R5-2016-0015 (February 2016). Additional revisions to this adopted General Order were issued in April 2016, May 2017, and November 2017.
- Western Tulare Lake Basin Area General Order (Order R5-2014-0001) – adopted in January 2014, this Order provides WDRs and MRP for discharges from irrigated lands within the western Tulare Lake Basin. This order was updated by Order No. R5-2015-0001, adopted in February 2015. The order has been further amended by Orders R5-2015-0056 (April 2015), R5-2015-0103 (July 2015), R5-2015-0115 (October 2015), R5-2016-0115 (February 2016), and R5-2016-0095 (December 2016). Additional revisions to this General Order were issued in May 2017.
- Sacramento Valley Rice Growers General Order (Order No. R5-2014-0032) – adopted March 2014, this order provides the WDR and MRP for discharges from irrigated lands for rice growers in the Sacramento Valley. The order has been amended by Order R5-2015-0115 (October 2015).
- Sacramento River Watershed General Order (Order No. R5-2014-0030) – adopted March 2014, this order provides the WDR and MRP for discharges from irrigated lands within the Sacramento River Watershed. The order has been amended by Orders R5-2014-0030 (May 2017), R5-2015-0088 (June 2015), R5-2015-0115 (October 2015), R5-2016-0014 (February 2016) and R5-2016-0015 (February 2016).
- San Joaquin County and Delta Area General Order (Order No. R5-2014-0029) – adopted March 2014, this order provides the WDR and MRP for discharges from irrigated lands within the San Joaquin County and Delta Area. The order has been amended by Orders R5-2014-0029 (May 2014), R5-2015-0055 (April 2015), and R5-2016-0015 (February 2016).

In implementing the ILRP, the CVRWQCB has 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 about 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 have been 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 Oliveira Dairy is not anticipated or likely to be regulated under the ILRP program. If site conditions change (i.e. the Dairy Program regulations no longer apply) and a regulatory assessment warrants action under the ILRP, the Oliveira Dairy 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 Coalition-specific Waste Discharge Requirements / Monitoring and Reporting Program.

3.5 CENTRAL VALLEY SALINITY SLATERNATES FOR LONG TERM SUSTAINABILITY (CV-SALTS)

CV-SALTS is coalition of agencies tasked with developing a Salt and Nitrate Management Plan for the Central Valley RWQCB. The efforts will be used to direct water quality management policies. Policies will be used for comprehensive regulatory and programmatic approaches for better management of salt and nitrates. The impact to individual dairy permits will not be known until regulations are finalized.

3.6 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 has 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.

3.7 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 Oliveira Dairy projects. The Merced County ACO is included as a section 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 has 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 18.48.055 K.

The Merced County ACO contains additional provisions to protect water quality. For example, Chapters 18.48.050 E and I of the ACO require that all wastewater or storm water that has come into contact with manure be maintained on the project site, or applied to other sites only upon written approval of the landowner. Chapter 18.48.050 J requires that off-site property owners accepting wastewater (liquid manure) complete written agreements to accept responsibility for proper land application. Chapter 18.48.050 G requires notification of Merced County Division of Environmental Health (DEH) for any off-site discharge of wastewater. Chapter 18.48.050 BB requires application of manure at agronomic rates. For the permanent closure of an animal confinement facility, Chapter 18.48.050 R requires DEH to review and approve specific collection of soil samples from underneath existing ponds to be abandoned after liquid and solids have been removed. Chapter 18.48.060 contains guidelines for new or modified retention ponds and settling basins. 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 include: Chapters 18.48.050 D, E, F, G, H, J, K, M, N, O, P, Q, R, T, V, Z, AA, BB, CC, DD, EE, II, JJ, KK, LL, MM, NN, QQ; 18.48.055 A, B, C, D, E, F, H, K; and 18.48.060 A, D, E, G, H, I, K, L, M, P, Q, S, and T (see Appendix C of the Environmental Impact Report for the Oliveira Dairy Project for the full text of the ACO).

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:

Minimum Well Distance from:	Domestic Well	Public Well
Septic tank or sewer line	50 feet	100 feet
Leach line or disposal field	100 feet	100 feet
Seepage pit or cesspool	150 feet	150 feet
Elevated sewage disposal field	150 feet	150 feet
Areas of intense animal confinement	100 feet	100 feet
Agricultural wells	300 feet	300 feet
Unlined canals, surface water course, or drainage retention ponds	100 feet	100 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.

4. Gravel packing. In gravel packed wells that furnish water for human consumption, the gravel packing shall not extend above fifty (50) feet below ground surface, except in areas where the only potable water is at a depth of less than fifty (50) feet. In such instances, the gravel packing shall not extend more than five (5) feet above the first perforations.

5. Well seals. All wells shall have a sanitary seal, surface seal and an annular seal. An access opening in the well cap, well casing, or pump base for the purpose of disinfecting the well or measuring the water level shall be protected with a threaded, watertight plug or cap. Wells requiring air vents shall be installed in an approved manner.

a. Annular seal. On all wells the annular space between the well casing and the wall of the drilled hole shall be effectively sealed with cement grout or other approved sealant material to protect against contamination or pollution by surface or shallow subsurface waters. The annular seal shall begin no more than twenty (20) feet above the most shallow perforation. The following minimum annular seal depths shall be required.

Type of Well	Depth of Annular Seal Below Ground Surface
Domestic wells	50 feet
Public wells	50 feet
Dairy wells	50 feet
Industrial wells	50 feet
Agricultural wells	50 feet
Cathodic protection wells	20 feet
Observation and monitoring wells	20 feet

MERCED COUNTY GENERAL PLAN

The Water Element of the Merced County General Plan contains goals and policies pertaining to protection of water resources in Merced County. Those 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 18.34.050, 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 of the relevant requirements of the Flood Ordinance have been satisfied. These requirements as set forth in Section 18.34.050 of 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 Community and Economic Development Department requests regulatory compliance audits of expanding dairies from the Division of Environmental Health as part of the Conditional Use Permit (CUP) evaluation process prior to project approval. The DEH staff performed an inspection of the Oliveira Dairy on June 6, 2018. The dairy inspection evaluated the facility for compliance with the Merced County Animal Confinement Ordinance (ACO) (Merced County Code Chapter 18.48). In the initial staff report, the DEH staff recommended revisions to the WMP and NMP to more accurately reflect proposed practices at the facility. Revisions to the WMP and NMP were completed in September 2018, and the DEH concluded that the dairy facility was in substantial compliance with the ACO on October 10, 2018.

4 EXISTING AND PROPOSED DAIRY CONDITIONS

4.1 EXISTING AND PROPOSED PROJECT OPERATIONS AND NMP & WMP SUMMARY

The project applicant has prepared the proposed NMP/WMP, both dated September 2018, as required by the CVRWQCB General Order for Existing 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 NMP and WMP for the existing dairy operations both dated August 2016, were used to establish a baseline of existing conditions.

Animal wastes from feed alleys and other concrete-surfaced areas are flushed with recycled water and scraped to an on-site waste management system that consists of one settling basin and two wastewater storage ponds (retention pond). Solid manure within pen areas are scraped approximately 3 times per year and removed from the site as material accumulates. Currently, approximately 3,800 tons of solid manure is exported or applied to off-site fields not owned by Oliveira Dairy.

Wastewater is mixed with irrigation water, either groundwater or Merced Irrigation District (MID) canal surface water, and applied to cropland. Stormwater runoff from impervious surfaces is routed to the wastewater ponds. Stormwater from all roofed areas is routed to a nearby field, except for stormwater from the commodity barn roof, which is routed to a wastewater pond. Receiving fields are graded to guide excess applied wastewater to an existing tailwater return or retention system. Most collected tailwater is retained by berms, and for the Pump Field tailwater is returned to the storage pond.

Stormwater runoff from impervious areas would continue to be directed to the wastewater management system. Animal wastes from barns and other concrete-surfaced areas of the facility would continue to be flushed to the on-site waste management system, except for solid manure within corral areas, which would continue to be scraped and removed 3 times per year.

With the proposed expansion, dry manure continue to be stockpiled on site at the existing dry manure storage area, to be used for bedding or sold and hauled off site weekly for use as fertilizer and soil amendments. As reported in the NMP, exported corral solids applied to agricultural fields not owned by the Oliveira dairy would increase from 3,800 tons to 7,000 tons. In addition, wastewater slurry would exported from the facility and applied to adjacent off-site agricultural fields not owned by the Oliveira dairy would increase from none to 5,500,000 gallons. While the exact location of the off-site cropland parcels may vary during operations, the off-site disposal of

manure and the necessary acreage for disposal of manure liquids and solids are accounted for the in the NMP. One existing settling pond and two wastewater storage ponds would continue to be used to store and treat manure.

The existing liquid waste management system consists of one settling pond, two wastewater treatment/storage ponds, and pipelines and irrigation facilities to apply the wastewater to irrigated crops on the remainder of the project site.

The scraped dry manure would be hauled off site for use as fertilizer and soil amendments or accumulated on site for processing for application to cropland as fertilizer and soil amendments. Dry manure would continue to be scraped from the corrals at least 3 times per year and removed from the site as material accumulates.

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 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.

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

Under existing conditions as reported in the August 2016 NMP, total annual gross nitrogen generated by the facility is approximately 471,812.5 pounds/year. Nitrogen exports currently total 154,547.5 pounds/year. After ammonia losses, existing operations reflect a whole farm nitrogen balance ratio of 1.65. The applied to removal nitrogen ratio is 1.4, which meets but does not exceed the recommended maximum field by field nutrient balance of 1.4.

With implementation of the proposed expansion as reported by the September 2018 proposed conditions NMP, total annual gross nitrogen generated by the facility would increase to 1,001,769.5 pounds/year. A total of 518,326.2 pounds/year of nitrogen would be removed through nitrogen exports as solid manure. After ammonia losses, the whole farm balance ratio will be 1.38. The applied to removal nitrogen ratio would decrease to

1.39. The net volume of nitrogen exported would increase as referenced over existing conditions and reduce the whole farm nitrogen value.

Based on a normal precipitation year, there are currently 57,223 gallons per day of wastewater (approximately 21 million gallons per year) generated by the existing dairy herd. The proposed expanded dairy would generate approximately 69,288 gallons/day of wastewater (approximately 25 million gallons/year). There would be a 4 million gallon per year increase in wastewater generated with the proposed dairy expansion. This increase in water use is related to an increase in milk cows per string, pipeline wash water and milkbarn/parlor wash water. Plate coolers volume wastewater is anticipated to reduce substantially between the existing conditions and proposed expansion, from 17,300 gallons/day to none, due to change in plate coolers type from existing well water cooled to mechanically/air cooled. Sprinkler pen wastewater is anticipated to reduce slightly between the existing conditions and proposed expansion. Recycled water use is anticipated to increase under the proposed conditions. Wastewater would be mixed with irrigation water and applied to crops.

The irrigation water demand of the existing farming operations is estimated by multiplying the croppable acres by the estimated average irrigation demand per acre. The existing NMP estimates an irrigation demand of over 4 feet of water for cropped oat and corn silage. As reported in the existing conditions NMP, there are approximately 249 acres currently double-cropped with oats silage – soft dough and corn silage, for a total irrigation demand of approximately 1,141.0 acre-ft, or 3.7 billion gallons of water.

The estimated wastewater component of the total irrigation demand is estimated at 6 percent of total water volume, not accounting for pond evaporation and evapotranspiration. The estimated wastewater component was determined by calculating the percentage of total irrigation water demand, 3.7 billion gallons, provided by the wastewater generated per year, in this case 21 million gallons per year.

Note that under proposed conditions, total land application area would be slightly adjusted from 249 acres to 242 acres. This is due to the approximately seven acres of Pump Field being converted to active dairy facilities. The cropping pattern would also be adjusted slightly on all fields to include the planting of sudangrass, silage in the middle of September and harvesting in early November.

The proposed NMP estimates an irrigation demand of over 6 feet of water for cropped oat, corn, and sudangrass silage. As reported in the proposed conditions NMP, there are approximately 242 acres proposed to be triple-cropped with oats silage – soft dough, corn silage, and sudangrass silage, for a total irrigation demand of approximately 1,488.3 acre-ft, or 4.8 billion gallons of water.

The estimated wastewater component of the total irrigation demand is estimated to be 5 percent of total water volume, not accounting for pond evaporation and evapotranspiration. The estimated wastewater component was determined by calculating the percentage of total irrigation water demand, 4.8 billion gallons, provided by the wastewater generated per year, in this case 25 million gallons per year.

In summary, the proposed NMP/WMP establishes the following required facility improvements for the herd and potential areas of sensitivity under the proposed expansion[4]:

- Proposed nutrient application rates meet required agronomic rates of 1.4 or less for best management farming practice mandated by the CVRWQCB. The applied to removal nitrogen ratio would be 1.39 under proposed conditions. With exported solid manure and evaporative losses under proposed conditions, the nitrogen whole farm balance ratio would be 1.38.
- The recommended amount of salt applied to cropland will be provided in the future versions of the approved NMP for the dairy.
- The 8,121,772 gallons of storage capacity for the existing treatment and wastewater pond would be sufficient to permit storage of wastewater generated by the facility for a 120-day cycle during normal precipitation periods and 1.5 factor normal precipitation periods. Under proposed conditions, no change in the pond sizes are planned. Pond freeboard capacity is used to address 100-year storm events. Pond construction information was not available for review. Based on permitting information provided in the IS/NOP, the dairy lagoons were likely constructed with the facility in the mid-1970's.
- A tailwater return system, composed of berms, piping, sumps, and pumps, is used to prevent the movement of water off site and for the Pump Field to allow tailwater to be returned to the storage pond.
- 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.

[4]These standards and improvements do not address potential environmental effects from the proposed expansion. For an evaluation of these effects and required additional mitigation, see Impacts HYD-1 through HYD-7 in this chapter.

- The site is located in the Federal Emergency Management Agency (FIRM 2008) Zone A, as discussed in Section 2.8. Zone A is an area with subject to inundation by the 100-year storm event. Approximately 30% of the existing dairy production area (DPA) would be subject to inundation levels of 1'-2' based on estimated 100-yr base flood elevations (BFEs). The study prepared a Conceptual Grading Plan/Flood Protection Plan that proposed constructing an access road along the west, south, and southeast boundary of the project site and new structures with finished floor elevations higher than the base flood elevation. With the incorporation of these improvements, the study confirmed that the Oliveira Dairy facility would have adequate protection from the 100-year flood event.
- With construction of the proposed facilities, approximately seven acres of cropped acreage would be converted to active dairy facilities. This leaves 81 acres of the fields receiving only solid manure and 161 acres of the fields receiving both wastewater and solid manure. All four fields would be cropped in oats silage-soft dough, corn silage, and sudangrass 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 to 1.38 with the proposed expansion, and the balance ratio would remain below the regulatory limit of 1.65.

4.2 SIGNIFICANCE CRITERIA

As set forth in Appendix G to the State CEQA Guidelines, Section IX, *Hydrology and Water Quality*, the following criteria have been established to quantify the impact of an adverse effect for evaluation pursuant to CEQA. A project would normally result in a significant impact if the project would:

- Violate any water quality standards or waste discharge requirements (*IX.a*);
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted) (*IX.b*);
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which

would result in substantial erosion or siltation on- or off-site, or would result in flooding on- or off- site (*IX.c and IX.d*);
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff (*IX.e*);
- Otherwise substantially degrade water quality (*IX.f*); or,
- Place within a 100-year flood hazard area structures which would impede flood flows, expose people or structures to risk involving flooding as a result of a failure of a dam or levee (*IX.h and IX.i*).

Additional hydrology and water quality assessment criteria previously evaluated in the project Flood Protection Analysis included whether the project would:

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map (*IX.g),*
- Be subject to inundation by seiche, tsunami, or mudflow (*IX.j*).

4.3 HYDROLOGIC IMPACTS

IMPACT HYD-1: DEGRADATION OF WATER QUALITY DUE TO STORM WATER RUNOFF DURING PROJECT CONSTRUCTION

Construction of the proposed project could result in the erosion of on-site soils or the loss of topsoil, which could cause degradation of water quality in waterways draining the site by reducing the quality of storm water runoff during project construction. This would be a significant impact.

The proposed new facilities would be constructed within the existing facility footprint and within seven acres of existing cropland. Storm water runoff during the construction period could result in the siltation and sedimentation of waterways draining the site or in the transport of pollutants used during construction.

Construction activities disturbing one or more acres are required by the State Water Resources Control Board (SWRCB) to obtain a Construction General Permit. Effective July 1, 2010 all dischargers are required to obtain coverage under the Construction General Permit Order 2009-0009-DWQ adopted on September 2, 2009. This Construction General Permit is a risk-based approach to managing stormwater discharge. The Construction General Permit has three risk level categories based on sedimentation risk and receiving water risk. Each risk category has specific Best Management Practices (BMP) that must be implemented with specific monitoring, sampling, and reporting requirements. The Construction General Permit also sets specific numeric action levels (NAL) for pH and turbidity. A judgment by the

California Superior Court on December 27, 2011 struck down the numeric effluent limitations (NEL) requirements and associated receiving water monitoring for Risk Level 3 sites. Other parts of the Construction General Permit remain in effect. In March 2012, the State Water Resources Control Board developed draft amendments to the Construction General Permit to modify NEL requirements, and issued revised amendments in July 2012.

The Construction General Permit requires a Storm Water Pollution Prevention Plan (SWPPP) and a Rain Event Action Plan (REAP) (another dynamic, site-specific plan) to be developed by the discharger, who must implement these plans – and also comply with specific requirement of the Construction General Permit. The SWPPP must list BMPs the discharger will use to protect storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan.

Although compliance with the RWQCB's Construction General Permit and its requirement that a SWPPP be prepared and implemented would reduce potential effects from storm water runoff, to ensure implementation of storm water regulatory requirements and coordination with standard County building review processes to reduce the potential water quality impacts during construction, the following mitigation measure would be required. This would be a significant impact.

Mitigation Measure HYD-1:

The project applicant shall submit Permit Registration Documents (PRD) for the Construction General Permit Order 2009-0009-DWQ to the State Water Resources Control Board, and comply with, and implement, all requirements of the permit. A Legally Responsible Person (LRP) shall electronically submit PRDs prior to commencement of construction activities in the Storm Water Multi-Application Report Tracking System (SMARTS). PRDs consist of the Notice of Intent, Risk Assessment, Post-Construction Calculations, a Site Map, the Storm Water Pollution Prevention Plan (SWPPP), a signed certification statement by the LRP, and the first annual fee. Following submittal of a Notice of Intent package and development of a SWPPP in accordance with the Construction General Permit, the applicant will receive a Waste Discharge Identification Number from the SWRCB. All requirements of the site-specific SWPPP with revisions shall be included in construction documents and must be available on site for the duration of the project.

IMPACT HYD-2: DEGRADATION OF SURFACE WATER QUALITY FROM OPERATION OF THE OLIVEIRA DAIRY EXPANSION

The project would not result in the degradation of surface water quality during project operations. Crop fields associated with the existing and proposed expansion of the dairy are developed with an existing tailwater return system. Wastewater is applied, and would continue to be applied, in accordance with ACO and CVRWQCB requirements. This impact is considered less than significant.

As noted on USGS topographic maps, South Slough, a tributary of Bear Creek, is located less than 0.25 miles north and west of the Dairy Operations. The South Slough is adjacent to Thornton Lateral of MID that runs parallel to the site and Deane Canal of MID. The Deane Canal of MID flows directly through the site, just west of the New Field and just east of the dairy facility and all other existing fields.

There is an existing irrigation system that consists of a surface flood system and broadcast system coupled with tailwater return and retention. The tailwater return and retention system, composed of berms, piping, sumps, and a pump system to return excess irrigation water to the waste storage ponds or to the top of the field for reapplication, is used to prevent the movement of water off site and allow the recycling of applied wastewater. The existing, extensive field ditch and berm system with tailwater return has been used to minimize irrigation water use and subsequently minimize the potential for runoff.

As required by the General Order WDRs, the dairy operator must document compliance with provisions to prevent backflow or direct discharge of wastewater away from surface water resources. Locations of cross-connections with wastewater and surface water must be identified, along with how backflow can or does occur at each location and any current backflow preventive measures. No surface water connections for irrigation are known to exist at the site at this time. Backflow prevention and documentation (dated February 2016) for the site has been completed in compliance with the General Order and identified no locations where backflow can occur.

Because of regular inspection requirements, water testing schedule, and implementation of a site specific NMP and future WDR/MRP, ongoing maintenance would occur for the wastewater application system and tailwater return system. The continued use of good farming practices and application of wastewater at agronomic rates detailed in the NMP and as required by the ACO and the individual WDRs would minimize potential impacts to surface water. Due to the extensive tailwater return system, and the best management practices for liquid and solid manure application, no surface water discharge from these manured areas is anticipated, and no adverse impacts to surface water would occur as a result of the proposed dairy expansion.

IMPACT HYD-3: GROUNDWATER CONTAMINATION FROM OPERATION OF THE OLIVEIRA DAIRY EXPANSION

Expanded operations at the Oliveira Dairy could result in degradation of groundwater resources. This would be a significant impact.

The proposed dairy expansion has the potential to impact the underlying groundwater quality with nutrients, salts, and other compounds. Water quality samples were available from several on-site domestic wells and one irrigation well and water quality impacts were noted. TDS was reported above the secondary MCL (see Table 1 for water quality data) for both irrigation wells, but below for the Milk Barn DW. Nitrate as N was reported above the MCL for IW Heifers and below for the other two wells. The Milk Barn DW generally displayed very good water quality. Historical water quality results prior to July 2015 were not available. Area water quality reported by the GAMA and DWR indicated elevated levels for Nitrate above the MCL, especially noted for the City of Merced. GAMA reports TDS levels ranging from 180 to 417 mg/l which is below the MCL of 500 mg/l.

Due to the proposed project operation and the existing area wells elevated nitrate as N and TDS levels, increased impacts to water quality from the proposed dairy expansion would be possible. Sources of potential additional contamination from the expanded dairy are discussed below.

AREAS OF POTENTIAL GROUNDWATER CONTAMINATION FROM WASTE STORAGE AND APPLICATION ON THE DAIRY

The Oliveira 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 WMP.

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, though based on permitting history, the ponds were likely constructed in the mid-1970's. According to the project applicant, the ponds are earthen embankment structures constructed to the standards in place at that time. Following solids removal and additional settling in the storage pond, the wastewater with dissolved constituents would be stored in the treatment pond for later application in irrigation water to crops. Wastewater would be applied as a mixture of irrigation water and wastewater. All basin structures would continue to be subject to regular maintenance.

Predicted Percolation Rates from Onsite Wastewater Ponds. 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 ponds has been estimated based on the soil permeability at the base of the ponds (estimated as 10^{-6} centimeters per second or 1 feet per year), which is reflective of research conducted by the RMP on dairy lagoon seepage rates. Though the ponds are underlain by sandy silt soil for the sandy loam soil types, the RMP research determined that seepage rates in lagoons are impeded by the sludge layer which accumulates at the bottom of the pond and mean and median seepage rates were 1.3 feet per year and 0.8 feet per year, respectively. Therefore, loading to groundwater without a synthetic liner may approach a rate of 1.0 feet per year and up to 9 feet of head on the pond bottom. Based on the combined existing pond surface area of approximately 195,000 square feet, the total leakage through the base of the ponds is estimated at 14 million gallons per year. With the proposed dairy expansion, the pond leakage would remain the same due to no change in pond storage capacity.

Corrals and Freestalls. The dairy expansion would continue to use open-air, concrete-lined feed lanes which are roofed (freestalls), where animals are fed and watered and waste is collected. Outside of the feed lanes, cows are allowed to roam in uncovered areas where manure is collected three times a year, which minimizes the potential impact. Liquid discharge from corrals is minimal.

Crop Fields. Dry and liquid manure are used to fertilize dairy cropland. A tailwater return system, composed of berms, piping, sumps, and a pump system, 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 slightly adjusted from 249 acres to 242 acres. This is due to the approximately seven acres of Pump Field being converted to active dairy facilities.

POTENTIAL IMPACTS FROM WASTEWATER CONSTITUENTS

The proposed operations must comply with the NMP and WMP as follows:

- 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 1.4 or less, and a whole farm nitrogen balance ratio of 1.65 or less. In order to maintain the nitrogen balance, a net 518,326 lbs/nitrogen would be exported off-site through solid manure. No nitrogen would be imported to the site from commercial fertilizer.

- With implementation of the proposed operations NMP/WMP, the total phosphorus generation would be 162,808 lbs/yr, and the phosphorus crop nutrient removal potential would be 19,521.2 lbs/yr. Approximately 136,777.9 lbs/yr of phosphorus would be exported off site. After losses, the calculated whole farm balance for phosphorus would be 1.33.

Field application of phosphorus, potassium, and salts are calculated and managed under the General Order. Salt tolerance of crops and yield reductions can vary depending on various factors, such as irrigation management, the crop being grown, and the site conditions. While the General Order does not regulate a nutrient balance ratio for phosphorus, potassium, and salts, it does require that if monitoring indicates levels of these elements are causing adverse impacts, then application rates must be adjusted downward to prevent or correct the problem. The intent of regulatory requirements is to implement operational improvements and monitor groundwater quality to assess impacts. Long-term groundwater and soil monitoring would be used to determine the success of the program on a regular basis and determine the need for additional action. Specific details of monitoring requirements may in the future be issued in a site specific WDR and MRP to be established by the CVRWQCB for the Oliveira Dairy.

Despite attempts to apply pond wastewater at agronomic rates in the area, groundwater quality beneath crop fields have indicated elevated levels above MCL for TDS (500 mg/L for TDS). Nitrate as Nitrogen increased in 2017 slightly and also just above the MCL. The value of one well increased to 12.5 mg/l compared to the MCL of 10 mg/l. Samples were available for a domestic wells and two irrigation wells for the facility as referenced in Section 2.8.

As discussed above, per the CVDRMP monitoring, shallow groundwater has been affected across the Central Valley due to historic or current dairy operations, especially beneath cropland. The NMP allows application of nitrogen at greater rates than the plant crops actually need with a maximum of 1.4 times crop uptake, and coupled with potential inefficiencies in application and variations in weather, over-application of nitrogen and other nutrients could occur. Also, applying manure with high organic nitrogen content may not meet a crop's nitrogen need during the most rapid growth stage, while exceeding the crop nitrogen uptake during the remainder of the crop's growing season, when the nitrogen may be subject to leaching (Bradford 2012). The existing on-site monitoring system, including installation and monitoring of groundwater monitoring wells if required, would be used to assess future changes in water quality and to determine if further degradation occurs.

Chapters 18.48.050 D, E, F, G, H, J, K, M, N, O, P, Q, R, T, V, Z, AA, BB, CC, DD, EE, JJ, KK, LL, MM, NN, QQ; 18.48.055 A, B, C.8.d, D, E, F; and 18.48.060 A, D, E, G, H, I, K, L, M, P, Q, S, and T of the ACO apply to this potential effect.

Since first encountered groundwater conditions have shown some impacts to water quality, the proposed dairy expansion may result in additional groundwater impacts. The proposed project as planned would be required to use best management practices, engineering, and design consistent with local and state regulations that would limit the amount of groundwater degradation that would occur. As set forth by the CVRWQCB, the General Order would limit degradation so that discharges from dairy facilities would not cause long-term impacts to beneficial uses. The proposed dairy expansion would be required to obtain coverage under Individual WDRs to be issued by the CVRWQCB, which would be more protective than the General Order. To ensure the implementation of Individual WDR requirements and implementation of corrective measures should groundwater impacts occur, the following mitigation would be required.

Mitigation Measure HYD-3a:

The following Best Management Practices shall be implemented by the Oliveira Dairy:

1. Positive drainage shall be included in project design and construction to ensure that excessive ponding does not occur. The design shall comply with Title 3, Division 2, Chapter 1, Article 22, Section 646.1 of the Food and Agriculture Code for construction and maintenance of dairy or facility surroundings, corrals, and ramps, as described below.
2. Dirt or unpaved corrals, or unpaved lanes, shall not be located closer than 25 feet from the milking barn or closer than 50 feet from the milk house. Corral drainage must be provided.
3. A paved (concrete or equivalent) ramp or corral shall be provided to allow the animals to enter and leave the milking barn. This paved area shall be curbed (minimum of 6 inches high and 6 inches wide) and sloped to a drain. Cow washing areas shall be paved (concrete or equivalent) and sloped to a drain. The perimeter of the area shall be constructed in a manner that will retain the wash water to a paved drained area. Paved access shall be provided to permanent feed racks, mangers, and water troughs. Water troughs shall be provided with: (1) a drain to carry the water from the corrals; and (2) pavement (concrete or equivalent) which is at least 10 feet wide at the drinking area.
4. The cow standing platform at permanent feed racks shall be paved with concrete or equivalent for at least 10 feet back of the stanchion line.

5. As unpaved areas are cleaned, depressions tend to form, allowing ponding and increased infiltration. Regular maintenance shall include filling of depressions. Personnel shall be taught the correct use of manure collection machines (wheel loaders or elevating scrapers).

Mitigation Measure HYD-3b:

The applicant shall comply with requirements of the NMP/WMP, implement CVRWQCB requirements included in the individual WDR provided for the proposed expansion, and with all Merced County ACO requirements not superseded by the conditions of the individual WDR.

Mitigation Measure HYD-3c:

As set forth in the NMP, proposed application rates of liquid and/or solid manure shall not exceed agronomic rates. Nutrient samples shall be collected prior to and during applications periods to confirm agronomic rates within all portions of cropped areas receiving manure, and to protect water supplies. Soil testing frequency for nitrogen, potassium, phosphorus, and salts are described in the NMP. Modifications to the NMP may be required as outlined in the individual WDR for the proposed expansion to be issued by the CVRWQCB.

Mitigation Measure HYD-3d:

The CVRWQCB may require an industry-wide or site-specific salinity report to be submitted to the CVRWQCB for review and approval prior to operation or final inspection. The County understands that the salinity report will identify sources of salt in waste generated at the dairy, and evaluate measures that can be taken to minimize salt in the dairy waste. Should a salinity report define measures necessary to reduce salt loading from dairy operations, the owner/operator of the Oliveira Dairy shall implement measures identified to minimize salt in the dairy waste to meet Basin Plan or other CVRWQCB requirements. As specified by the Regional Board, necessary measures may be incorporated into the WDR issued for the facility or become a required deliverable of the WDR.

Mitigation Measure HYD-3e:

Because the Oliveira Dairy is a member of a Groundwater Monitoring Coalition, no site-specific shallow groundwater monitoring system has been implemented at the project site. As a condition of the individual WDR issued for the facility, the applicant shall maintain continued membership in the groundwater monitoring network or install a site-specific groundwater monitoring system. The resulting groundwater monitoring objectives for either the regional program or an individual site are intended to be used by the Regional Board to assess and mitigate groundwater impacts.

Mitigation Measure HYD-3f:

Groundwater monitoring of the on-site domestic and irrigation wells as required under the General Order and a future individual WDR shall be continued by the dairy operator. If appropriate, surrounding properties with domestic water supply wells within 500 feet of the land application property could be considered for sampling for nitrate and E.C. at a minimum. An updated well monitoring schedule will be fully incorporated into the WDR issued for the facility.

Mitigation Measure HYD-3g:

After project implementation and subsequent groundwater monitoring, if the dairy shows increased concentration in groundwater of constituents of concern, additional manure exportation, a reduction in herd size, or additional crop acres may be necessary to accommodate the proposed expansion. The project applicant shall clearly demonstrate that the herd size will not constitute a threat to groundwater quality, and the County may alter conditions of the Conditional Use Permit, if necessary. In addition, a new Report of Waste Discharge (ROWD) may be required by the CVRWQCB. If necessary, the CVRWQCB may revise the WDR issued to the facility.

Mitigation Measure HYD-3h:

The Department of Community and Economic Development and the Division of Environmental Health shall make a final inspection of the facility prior to the commencement of expanded operations to confirm the dairy meets local and state requirements.

IMPACT HYD-4: DEPLETION OF GROUNDWATER RESOURCES

Implementation of the proposed project could result in depletion of groundwater resources since there could be an overall increase of groundwater use with the proposed dairy expansion. However, because the majority of the water would be used for irrigation, this would be a less-than-significant impact.

Area knowledge and DWR hydrographs indicate that groundwater exist within sand units above 50 feet bgs. First encountered groundwater is anticipated to be found in unconfined aquifers within laterally extensive sands units or as isolated perched units. DWR hydrographs for nearby wells depict multi-year groundwater elevation changes (see Figures 6 through 8). Groundwater depth and elevations have shown generally stable water level trends from 1987 to 2017. An impact to groundwater levels from the drought conditions of 2014 through 2016 has resulted in generally lower groundwater levels, though the effect is heavily offset by proximity to the San Joaquin River. Groundwater elevations have varied from approximately 20 to 110 feet MSL.

The Oliveira Dairy Expansion would continue to rely on surface water, groundwater, and wastewater recycling for irrigation. At the time of the NOP (2016) under existing conditions, both surface water and groundwater were used for crop irrigation. For the entire land application area of the operation, in normal years approximately 20 percent of the irrigation water comes from groundwater. In drought years, as much as 30 percent of the irrigation water might come from groundwater. Due to the past few years of drought, regional water well drilling efforts have increased to meet irrigation water demand. No new irrigation wells are proposed as part of the dairy expansion project. Per the existing and proposed NMP, groundwater wells and surface water from the MID are the irrigation sources for the application area. With implementation of the proposed dairy expansion, the overall acreage for the land application area would be reduced by 7 acres.. As detailed above, the estimated annual crop water demand would be increased by one billion gallons.

Dairy cows require large amounts of water daily. While 10 to 20 percent of the daily water requirements come from feed, lactating cows require anywhere from 25 to 40 gallons of drinking water per day. For the Oliveira Dairy, drinking water for the dairy herd would continue to be derived from groundwater. Compared to irrigation water use, consumptive use at the dairy would be approximately 2 percent of total water use at the dairy.

Domestic water supply would continue to be derived from groundwater. Currently, the wastewater generated from daily water use from the milkhouse equipment and floor wash at the Oliveira Dairy is 6 million gallons annually. With the proposed expansion, wastewater generated would decrease to 3 million gallons annually due to efficiency of the wash wastewater and milkbarn/parlor floor wash volume. The decrease in water use would be directly related to the efficiency of new milk parlor.

While there would be a decrease in wastewater generated, the wastewater would continue to be used to irrigate the existing cropland.. As discussed above, the source of irrigation water includes both surface water and usually less than 30% from groundwater.

Groundwater overdraft conditions have been documented as downward but stable during the drought within Merced County and specifically the Merced Subbasin.

Additionally, with the passage of the SGMA legislation, the Merced Subbasin has had a GSA notice submitted by the MIUGSA Groundwater Sustainability Agency to prepare the Groundwater Sustainability Plan for the area. With implementation of the GSP, as part of the SGMA program, multiple wells will be used in the region to determine groundwater level trends and to monitor for undesirable effects, such as groundwater depletion or subsidence. The Oliveira Dairy, depending on groundwater use, may be required to report groundwater extraction to the GSA as part of the monitoring

program. The Oliveira Dairy will be expected to follow the guidelines within the GSP, as applicable, to monitor groundwater depletion.

While the proposed dairy expansion would result in an increase in overall water use, the majority of the water would be used for irrigation, which could result in groundwater recharge via irrigation percolation. Further, the proposed dairy expansion would be subject to the requirements of the GSP for the region, if and when adopted, which would further minimize impacts to groundwater depletion. Therefore, impacts from groundwater depletion from this operation would be considered less than significant.

IMPACT HYD-5: MODIFICATION OF SURFACE WATER DRAINAGE PATTERNS AND AN INCREASE IN RUNOFF

Implementation of the proposed dairy expansion project would not modify surface water drainage patterns, and would not cause localized off-site migration of runoff, erosion, and/or flooding since the expansion could require minimal grading over a previously disturbed area. Because all storm water generated by the project would be collected and maintained within the project proponent's larger property, this would be a less than significant impact.

Construction activities are proposed for the project and would result in the conversion of seven acres of cropland and expansion of existing structures within the existing dairy facility footprint. The facility includes an existing irrigation and tailwater return system for the land application areas that minimizes the potential for runoff. Stormwater generated at the project site is collected and routed to the existing on-site ponds, which would continue with project implementation, except for several roofed sections, which would be diverted to adjacent dairy-owned crop fields. Because stormwater generated by the project would be collected and maintained within the project proponent's larger property, no additional drainage would reach regional waterways as a result of the project. Run-on and runoff water would be prevented from entering or leaving the facility.

Chapters 18.48.050 E and I of the ACO require that all wastewater or stormwater that has come into contact with manure be maintained on the project site, or applied to other sites only upon written approval of the landowner. Chapter 18.48.050 G requires notification of Merced County Division of Environmental Health for any off-site discharge of wastewater. Chapter 18.48.050 BB requires application of manure at agronomic rates. Additionally, Chapter 18.48.050 O requires a separation of at least 100 feet between waste application areas and any surface water feature. However, application of manure (liquid or dry) may be closer than 100 feet to a surface water body or irrigation well if adequate protection to the surface water body or irrigation

well is provided. While the Oliveira Dairy fields are in the vicinity of the MID canals, the fields and canals are separated by roadways with a pipe drain to the waterway that can be closed to avoid off-site discharge, and/or berms and levees. Chapter 18.48.060 M requires a separation of at least 50 feet between waste management ponds and settling basins and any public irrigation facilities, with a maintained drainage area between the two facilities. As noted in the DEH inspection, the Oliveira Dairy is in substantial compliance with ACO requirements.

Under State regulations and according to the WMP, the Oliveira Dairy has been designed to retain all facility wastewater generated, together with all precipitation on, and drainage through, manured areas during a 100-year, 24-hour storm event, including 120-day storage period. All precipitation and surface drainage outside of manured areas would be diverted away from manured areas unless it would be fully retained (CCR Title 27, Division 2, Subdivision 1 22562(a)). On-going maintenance inspections of the storage ponds as outlined in the WMP Operation and Maintenance Plan would ensure compliance with stormwater retention requirements.

The runoff from increased impervious surfaces outside of manured areas may be substantial during intense storm events. However, the annual rainfall for the project area is relatively low, and under normal circumstances, little runoff would be expected. Conformance with the County ACO requirements and individual WDR process would reduce surface drainage impacts associated with runoff from dairy facilities to a less than significant level. Additional regulatory requirements for the proposed dairy expansion may be included in the individual WDR issued by the CVRWQCB for the facility. Because all stormwater generated by the project would be collected and maintained within the project proponent's larger property, no adverse effects due to runoff would occur and no mitigation would be necessary.

IMPACT HYD-6: EXPOSURE TO FLOOD RISKS

The project site could be subject to a flood event, during which dairy facilities could be damaged, or floodwaters could inundate dairy facilities and fields where wet or dry manure had been applied recently, causing impacts to surface water quality. This would be a significant impact.

Dairies located within flood hazard zones could be damaged by floodwaters or be required to shut down for extended periods. Flood waters could mingle with wet or dry manure storage areas at the facilities, cause releases of process water from ponds, and/or come into contact with freshly applied manure on fields, impacting surface water quality. The project is generally contained within Flood Zone A, defined as an

area subject to inundation by the 100-year storm event, but for which a Base Flood Elevation (BFE) has not been established.

The Merced County floodplain management ordinance (Zoning Code Section 18.34) meets the minimum federal standard for participation in the National Flood Insurance Program. This ordinance requires that the BFE on a project site be established, if within a regulated zoned, that structures be flood proofed, and that a development permit demonstrating compliance with the provisions of the floodplain management ordinance be obtained prior to the initiation of construction. In addition, Section 7.13.050 Q of the Animal Confinement Ordinance requires that wastewater retention ponds/settling basins be protected against the 100-year flood hazards. Compliance with Merced County regulations regarding floodplain management would provide protection of active dairy facilities from flood inundation.

For non-residential structures, either an elevation certificate or flood proofing certificate is required in accordance with Section 18.34.050 of the Merced County Code. A Flood Protection analysis was completed for the Oliveira Dairy (Sousa Engineering, 2018). The Flood Protection Analysis shows the existing and proposed dairy footprint within the Zone A designation.

As mentioned in section 2.8, Sousa Engineering prepared a Flood Protection Analysis report as part of the proposed Waste Management Plan, dated July 2018. Per the report, approximately 30% of the existing DPA would be subject to inundation levels of 1'-2' based on estimated 100-yr BFEs. These areas include feed storage areas, about 10% of corral area, and wastewater storage basins.

A Conceptual Grading Plan/Flood Protection Plan was prepared as part of the Flood Protection Analysis report that proposed constructing an access road along the west, south, and southeast boundary of the project site and new structures with finished floor elevations higher than the base flood elevation. With the incorporation of these improvements, the study confirmed that the Oliveira Dairy facility would have adequate protection from the 100-year flood event.

Manure and process water applied to fields may contain substantial quantities of nutrients (e.g., nitrogen and phosphorus) and microorganisms, including pathogens (disease causing organisms). If these substances enter the surface or groundwater environments in sufficient concentrations, they could cause water quality degradation. Potential impacts to surface water quality associated with the flooding of manure-fertilized agricultural fields would be minimized by the measures identified below and existing conditions as follows:

- The ACO, individual WDRs, and NMP/WMP would require operational practices that would keep flood waters from coming into contact with recently applied manure or process water (Merced County Code 18.48.050 E, F, and G);
- Domestic wells are required to have sanitary seals to prevent surface water contamination into the well casing (Merced County Code Chapter 9.28.060 C5 Water Well Standards);
- A significant amount of adsorption of nutrients to soil particles and inactivation of pathogenic organisms would be expected to occur in the fields prior to contact with any flood waters;
- Neither the flood water nor the receiving waters would be used as a drinking water source without prior treatment, and therefore any pollutants contained in the flood water would not be expected to be ingested by the public;
- During widespread regional flooding, all surface waters are expected to be degraded; precautions are already in place that minimize the likelihood of inadvertent ingestion of pollutants by the public (i.e., public advisories to boil water before use, maintenance and disinfection of wells after flood waters recede).

As discussed above, the majority of the dairy facilities currently meet the requirements of the General Order and Merced County regulations for flood protection. However, because a portion of the dairy facilities could be subject to flood inundation in the event of a 100-year storm, the following measures would be required to bring the facility into compliance with the General Order.

Mitigation Measure HYD-6:

- As recommended by the Flood Protection Analysis report (Sousa 2018), the following measures shall be implemented to bring the proposed facilities into compliance with General Order requirements for flood protection: The project shall include construction of an access road along the west, south, and southeast boundary of the project site and new structures with finished floor elevations higher than the base flood elevation.

- Following construction of the proposed facilities and prior to commencement of dairy expansion operations, the project applicant shall obtain a flood proofing certificate in accordance with Section 18.34.050 of the Merced County Code from the Merced County Public Works Building Department. If any portion of the dairy facility is found not to comply with flood proofing requirements, the project applicant shall complete flood proofing as necessary to obtain the flood-proofing certificate from the County.

IMPACT HYD-7: WATER SUPPLY PATHWAYS FOR POLLUTANT MIGRATION

Existing water supply wells on site and adjacent to the proposed dairy expansion may represent preferred pathways for pollutant migration to groundwater. This would be a significant impact.

Existing irrigation and domestic water wells (either active or abandoned) in proximity of the site that do not meet current wells standards of construction may act as conduits for pollutant migration to the subsurface. If any of the wells were not constructed with effective sanitary seals upon construction, or have been damaged since installation, surface water may seep into the wells and the underlying aquifer, causing water quality degradation. The Oliveira Dairy has not received a notice that they are out of compliance with the Merced County well ordinance standards of construction.

The Merced County ACO, together with the Merced County Well Ordinance, recognizes the importance of protecting water quality from the release of animal pathogens. One ACO requirement addresses the specific issue of potential pollutant migration into wells. Chapter 18.48.050 establishes a minimum setback of 100 feet between any manured areas and water wells. However, application of manure (liquid or dry) may be closer than 100 feet to a surface water body or irrigation well if adequate protection to the surface water body or irrigation well is provided. The Merced County Code, Chapter 9.28 Wells, requires a minimum setback of 100 feet between a non-public water well and areas of intense animal confinement (9.28.060 (C)(1)). Two domestic wells (West well and East well) are located near the existing and proposed milk parlors. The East well is currently less than 100 feet from areas of intense animal confinement, primarily to the north and east. The proposed changes appear to decrease the amount of intense animal confinement within the 100-foot setback to the north, due to placement of the new milk parlor. The proposed expansion would not place any additional (new) unpaved areas of intense animal confinement within the 100-foot well setback. Following the Division of Environmental Health (DEH) inspection and review, the project applicant has documented compliance with setback requirements or adequate well protection for on-site wells.

The ACO requires that all wastewater be maintained on-site and discharged into the manure management system, and that it does not create a nuisance or pollution condition (Chapter 18.48.050 E, K, LL). In the event of groundwater pollution, the project applicant must submit a plan to abate the groundwater impacts to the Merced County Division of Environmental Health (Chapter 18.48.050 T). In addition, the CVRWQCB requires that all process water that comes into contact with wastewater be collected and stored in the ponds with low permeability liners, reducing the potential release of pathogens to water supplies.

The existing wells at the project have been evaluated by Merced County DEH without notice, and there would be no potential conduits for groundwater contamination. This would be a less-than-significant impact.

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