DRAFT

ENVIRONMENTAL IMPACT REPORT FOR THE VIERRA DAIRY EXPANSION PROJECT

CONDITIONAL USE PERMIT CUP20-009

COUNTY OF MERCED
DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT

Prepared with the Technical Assistance of:
Environmental Planning Partners, Inc.

SCH # 2021100002
June 2023

DRAFT

ENVIRONMENTAL IMPACT REPORT

FOR THE

VIERRA DAIRY EXPANSION PROJECT

CONDITIONAL USE PERMIT CUP20-009

COUNTY OF MERCED
DEPARTMENT OF COMMUNITY
AND ECONOMIC DEVELOPMENT
2222 'M' Street
Merced, CA 95340

Prepared with the Technical Assistance of:

environmental PLANNING PARTNERS, INC.
2934 Gold Pan Court, Suite 3
Rancho Cordova, CA 95670

SCH # 2021100002
June 2023

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

LIST OF FIGURES

FREQUENTLY USED ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
≈	Almost equal to
AAQA	Ambient Air Quality Analysis
AAQS	Ambient Air Quality Standard
ACBM	Asbestos containing building materials
ACO	Animal Confinement Ordinance
Acre	43,560 square feet
ADT	Average Daily Trips
Air Basin	San Joaquin Valley Air Basin
Ammonia (NH_3)	Gaseous ammonia released by the microbiological decay of plant and animal proteins
AMMP	Alternative Manure Management Program
APCD	Air Pollution Control District
APCO	Air Pollution Control Office
APE	Area of Potential Effect
APN	Assessors Parcel Number
ARB	Air Resources Board
AQIA	Air Quality Impact Assessment
AQMD	Air Quality Management District
ATC	Authority to Construct
AU	Animal Units
BACM	Best Available Control Measures
BACT	Best Available Control Technology
BARCT	Best Available Retrofit Control Technology
bgs	Below ground surface
BFE	Base flood elevation
BMP	Best Management Practices
BPS	Best Performance Standards

Acronym/Abbreviation	Definition
BPTC	Best Practicable Treatment or Control
BST	Bovine Somatotropin
CAA	Federal Clean Air Act
CAAA	Federal Clean Air Act Amendments of 1990
CAAQS	California Ambient Air Quality Standards
CAF	Confined Animal Facility
CAFO	Confined or Concentrated Animal Feeding Operation
CalEPA	California Environmental Protection Agency
CAP	Climate Action Plan
CARB	California Air Resources Board
CASGEM	California Statewide Groundwater Elevation Monitoring Program
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CCAT	California Climate Action Team
CCIC	Central California Information Center
CCR	California Code of Regulations
CDC	Center for Disease Control and Prevention
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEDD	Community and Economic Development Department, Merced County
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CH_4	Methane
CHRIS	California Historical Resources Information Systems
CLAQC	Confined Livestock Air Quality Committee of the USDA
CMP	Conservation Management Practices
CNDDB	California Natural Diversity Database
CNMP	Comprehensive Nutrient Management Plan
CNPS	California Native Plant Society
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon dioxide equivalent
Corps	United States Army Corps of Engineers
CRHR	California Register of Historic Resources
CUP	Conditional Use Permit
CVDRMP	Central Valley Dairy Representative Monitoring Program
CVRWQCB	Central Valley Regional Water Quality Control Board
CV-SALTS	Central Valley Salinity Alternatives for Long Term Sustainability
CWA	Clean Water Act
DDRDP	Dairy Digester Research and Development Program
DEH	Division of Environmental Health, Merced County
DEIR	Draft Environmental Impact Report

Acronym/Abbreviation	Definition
DHS	Department of Health Services
DPAG	Dairy Permitting Advisory Group
DPM	Diesel Particulate Matter
DWR	California Department of Water Resources
EIR	Environmental Impact Report
EPA	US Environmental Protection Agency
EPCA	Energy Policy and Conservation Act of 1975
ETSGSA	East Turlock Groundwater Sustainability Agency
EUI	Energy Utilization Index
FDA	United States Food and Drug Administration
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FIRM	Flood Insurance Rate Maps
GAMAQI	Guide for Assessing Air Quality Impacts, SJVAPCD 2015
gpm	Gallons per minute
GHG	Greenhouse Gas
GMP	Groundwater Management Plan
GPS	Global positioning system
GSA	Groundwater sustainability agency
GSP	Groundwater sustainability plans
HCP	Habitat Conservation Plan
HI	Health Hazard Index
HMBP	Hazardous Material Business Plan
HRA	Health Risk Assessment
ILRP	Irrigated Lands Regulatory Program
INMP	Irrigation and Nitrogen Management Plan
IPCC	International Panel on Climate Change
IS	Initial Study
LED	Light Emitting Diode
LRP	Legally Responsible Person
LSAA	Lake / Streambed Alteration Agreement
MBTA	Migratory Bird Treaty Act
MCF	Methane Conversion Factor
MCL	Maximum Contaminant Level
MID	Merced Irrigation District
MIUGSA	Merced Irrigation-Urban Groundwater Sustainability Agency
MMRP	Mitigation Monitoring and Reporting Plan
MMT	Million metric tons
MRP	Monitoring and Report Program
MSL	Mean Sea Level
MWISP	Monitoring Well Installation and Sampling Plan
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission

Acronym/Abbreviation	Definition
NAL	Numeric action level
NCCP	Natural Community Conservation Plan
NCP	Nitrate Control Plan
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NH_3	Ammonia
NHPA	National Historic Preservation Act
Nitrogen	A chemical element, commonly used in fertilizer as a nutrient, which is also a component of animal wastes
NMFS	National Marine Fisheries Service
NMP	Nutrient Management Plan
NMVOC	Nonmethane volatile organic compounds
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOP	Notice of Preparation
NO_X	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
NRCS	National Resource Conservation Service (formerly, Soil Conservation Service, USDA)
NSR	New Source Review
NUE	Nitrogen use efficiency
NWI	USFWS National Wetland Inventory
O_3	Ozone
OPR	Office of Planning and Research
OSAP	Open Space Action Plan, Merced County General Plan
OSDRS	Open Space Development Review System
OWTS	Onsite Wastewater Treatment System
PAR	Preliminary Application Review
Pb	Lead
PCSD	Planada Community Services District
PEL	Permissible Exposure Limit
PM_{10}	Suspended Particulate Matter; Ten micron Particulates
$PM_{2.5}$	Fine Particulate Matter
ppb	Parts per billion
ppm	Parts per million
PRC	Public Resources Code
PRD	Permit Registration Documents
PTO	Permit to Operate
rBGH	Recombinant Bovine Growth Hormone
REAP	Rain Event Action Plan
REL	Reference Exposure Level
RLEP	Ruminant Livestock Efficiency Program
RMP	Representative Monitoring Program
RMR	Risk Management Review
ROG	Reactive Organic Gases

Acronym/Abbreviation	Definition
ROWD	Report of Waste Discharge
RPS	Renewables Portfolio Standard
RWCQB	Regional Water Quality Control Board
SCH	State Clearinghouse
SCP	Sediment Control Plan
SDWA	Safe Drinking Water Act
SGMA	Sustainable Groundwater Management Act of 2014
SIP	State Implementation Plan
SJVAB	San Joaquin Air Valley Basin
SJVAPCD	San Joaquin Air Pollution Control District
SO_2	Sulfur Dioxide
SOx	Sulfur Oxide
SR	State Route
SWEEP	State Water Efficiency and Enhancement Program
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminants
TBWG	Tricolored Blackbird Working Group
TDS	Total Dissolved Solids
TID	Turlock Irrigation District
TLV	Threshold Limit Value
TMDL	Total Maximum Daily Load
TMR	Total Mixed Ration
TOG	Total Organic Gases
$\mu g/m^3$	Micrograms per Cubic Meter
UBC	Uniform Building Code
UNFCCC	United Nations' Framework Convention on Climate Change
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VDE	Visible Dust Emissions
VERA	Voluntary Emission Reduction Agreement
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
VWC	Valley Water Collaborative
WDR	Waste Discharge Requirement
WMP	Waste Management Plan
WTSGSA	West Turlock Subbasin Groundwater Sustainability Agency

1 INTRODUCTION

1.1 PURPOSE OF THE ENVIRONMENTAL IMPACT REPORT

The evaluation of projects to determine their effects on the physical environment is required by the California Environmental Quality Act (CEQA). When a project could have a significant effect on the environment, the agency with primary responsibility over the approval of the project (the lead agency) is required to prepare an Environmental Impact Report (EIR). As stated in the State CEQA Guidelines Section 15121[1]:

> An EIR is an informational document which will inform public agency decision makers and the public generally of the significant environmental effect of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project. The public agency shall consider the information in the EIR along with other information which may be presented to the agency *(when considering whether to approve a project).*

An EIR is the public document used to meet these requirements. The EIR must also disclose: significant adverse environmental impacts that cannot be avoided; growth inducing impacts; effects not found to be significant; and the significant cumulative impacts of all past, present and reasonably foreseeable future projects. From this point forward, an "impact" or "significant impact" is assumed to be an adverse effect on the environment.

This EIR is intended to provide information to the public and to decision makers regarding the potential environmental effects of adoption and implementation of the Vierra Dairy Expansion project. Prior to considering approval of this request, Merced County (County) must certify that this EIR is adequate under CEQA and that County decision makers have considered the information herein. Upon making this finding, the County may then consider approval of the Vierra Dairy Expansion project further described in the Project Description in Chapter 3.

1.2 TYPE OF ENVIRONMENTAL IMPACT REPORT

This EIR is being prepared as a "Project" EIR pursuant to the State CEQA Guidelines Section 15161. This project EIR is tiered from the EIRs for the *2030 Merced County General Plan* (certified on December 10, 2013) and the *Merced County Animal Confinement Ordinance Revision* as certified and adopted on October 22, 2002. (For a discussion of tiering in this document, see Section 1.5 below.) A project EIR is prepared to examine the environmental impacts of a specific development project. According to the State CEQA Guidelines Section 15161, "(t)his type of EIR should focus primarily on the changes in the environment that would result from the development project. The EIR shall examine all phases of the project, including planning, construction, and operation." This EIR is intended to serve as the environmental document for all activities related to the Vierra Dairy Expansion project described more fully in the Project Description, including issuance of a Conditional Use Permit and construction and building permits by Merced County, and appropriate permits from the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the California Central Valley Regional Water Quality Control Board (CVRWQCB).

[1] Title 14 California Code of Regulations, Chapter 3, Guidelines for Implementation of the California Environmental Quality Act.

1.3 PUBLIC REVIEW AND CEQA PROCESS

CEQA provides three opportunities for public participation during the environmental review process. These points are: (1) during the Notice of Preparation (NOP), when the public and agencies are informed that an EIR is to be prepared and are requested to comment on the scope and contents of the proposed EIR; (2) upon circulation of the Draft EIR when the public and agencies can comment on the adequacy of the environmental document; and (3) finally, after preparation of the Final EIR, when the public and agencies can evaluate the lead agency's responses to comments submitted on the Draft EIR.

In the case of the Vierra Dairy Expansion EIR, the Notice of Preparation of an EIR was filed with the Office of Planning and Research (OPR) on October 1, 2021. The NOP and Initial Study were circulated to the public, local and state agencies, and other interested parties to solicit comments on the proposed project. Environmental issues and alternatives raised by comments received on the NOP during the 30-day public review period were considered for inclusion in the EIR (see Appendices A and B). There were three comments received in response to the NOP. These comments were reviewed, and environmental issues identified in the comment letters were individually referenced in Appendix B to indicate the specific section in the EIR where these issues are addressed.

Pursuant to the State CEQA Guidelines, the focus of this Draft EIR includes the specific issues identified in the NOP, as well as concerns identified in the responses to the NOP.

This Draft EIR will be published and circulated for public comment for a period of 45 days. Written and emailed comments from the public and interested and responsible agencies may be submitted at any time during the comment period. Written and emailed comments should be submitted to:

Merced County
Community and Economic Development Department
2222 'M' Street
Merced, CA 95340
(209) 385-7654
Tiffany.Ho@countyofmerced.com

For emailed comments, please include the phrase, "Vierra Dairy Expansion EIR" in the subject line.

After the close of the comment period, the County will respond in writing to all comments submitted during that time. The comments and responses will be published for agency and public review prior to the action of the Merced County Planning Commission on certification of the EIR. The Draft EIR, the comments and responses, including any revisions of the Draft EIR contained therein, together with a Mitigation Monitoring and Reporting Program (MMRP) as described below, will constitute the Final EIR that the County will evaluate for certification, based on review and consideration of the EIR and other evidence presented in the public record.

Prior to certification of the EIR, the County will prepare written findings of fact for each significant environmental impact identified in the EIR, which in turn must be supported by substantial evidence in the administrative record. For each significant impact, the County must:

- determine that changes in the project (*typically adopted mitigation measures*) have been made to substantially reduce the magnitude of the impact;
- determine that the changes (*mitigation measures*) to the project are within another agency's jurisdiction, and have been or should be adopted; or,
- find that specific economic, social, legal, technical, or other considerations make mitigation measures or alternatives infeasible (CEQA Guidelines Section 15091(a)).

After considering the Final EIR in conjunction with making findings, if the proposed project would result in significant environmental impacts after imposition of feasible mitigation measures, the County may approve the project if the benefits of the project outweigh the unavoidable environmental effects. Under these circumstances, a Statement of Overriding Considerations would be prepared explaining why the County is willing to accept each significant effect (CEQA Guidelines Section 15093(c)).

CEQA requires that when a public agency makes findings based on an EIR, the public agency must adopt a MMRP based on those measures that the agency has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment (California Public Resources Code [PRC] Section 21081.6). The reporting or monitoring plan must be designed to ensure compliance with the adopted measures during project implementation (PRC Section 21081.6). The MMRP for this project will be prepared and circulated under separate cover for consideration by the County in conjunction with certification of the Final EIR.

1.4 APPLICATION OF THE 2030 MERCED COUNTY GENERAL PLAN, MERCED COUNTY ANIMAL CONFINEMENT ORDINANCE, AND MERCED COUNTY ZONING CODE

1.4.1 2030 MERCED COUNTY GENERAL PLAN

The 2030 Merced County General Plan guides economic development, land use, agriculture, transportation and circulation, public facilities and services, natural resource, recreation and cultural resources, health and safety, air quality, water, and other matters of public interest and concern. The General Plan is intended to provide for orderly growth, and to convey the community's values and expectations for the future. An EIR for the 2030 General Plan was certified and the General Plan adopted by Merced County in December 2013. A Draft Background Report of existing environmental conditions within the County was finalized in December 2013 with certification of the General Plan EIR. The Background Report functions as the existing setting section for the General Plan EIR. The EIR, including the Background Report as updated, is used in this Vierra Dairy Expansion EIR, along with other resources, to establish the existing setting for the proposed project. The General Plan EIR will serve as the first tier of environmental analysis for the proposed project, including the evaluation of countywide and cumulative impacts. The 2030 General Plan EIR, including the Background Report, is hereby incorporated by reference pursuant to State CEQA Guidelines Section 15150 as though fully set forth herein. A copy of the General Plan, General Plan EIR, and Background Report can be obtained at the Department of Community and Economic Development, 2222 'M' Street, Merced, CA 95340. These documents are also available for download from the Merced County General Plan website at:

https://www.countyofmerced.com/100/General-Plan

1.4.2 MERCED COUNTY ANIMAL CONFINEMENT ORDINANCE AND ZONING CODE

On October 22, 2002, Merced County adopted revisions to the County's Animal Confinement Ordinance (ACO). Additional revisions to the Merced County ACO and Merced County Code Chapter 18.10 (Zoning Code Agricultural Zones) were adopted on February 8, 2005 (the text of the ACO is included in Appendix C, bound separately). (The Merced County ACO is included as a section of Title 18 Zoning of the Merced County Code.) A comprehensive update and amendment of Title 18 of the Merced County Code was adopted by the Board of Supervisors on October 22, 2019. (No substantive changes were made to the ACO during this update.) The ACO regulates the design, construction, and operation of animal confinement facilities within the county. Because the Ordinance is regulatory rather than permissive, all existing and proposed animal confinement facilities within the county are required to comply with the terms of the Ordinance, including the proposed Vierra Dairy Expansion project.

Following is a summary of major ACO provisions. Copies of the complete text of the Ordinance are available from: the Merced County Division of Environmental Health (DEH), 260 East 15th Street, Merced, California 95341; the Merced County Community and Economic Development Department, 2222 'M' Street, Merced, California 95340; Appendix C of this document; and on the County's website at <http://www.qcode.us/codes/mercedcounty/>

Merced County's ACO provides environmental compliance regulations that affect dairies and other animal confinement facilities in Merced County. The ACO requires that all animal confinement facilities, existing and new, complete and implement a Comprehensive Nutrient Management Plan (CNMP). For the construction of a new confined animal facility, or for modification or expansion of an existing animal confinement facility, the CNMP must be completed prior to construction. The purpose of the CNMP is to ensure a balance between manure/wastewater application and nutrient uptake by crops in order to minimize impacts to groundwater. Since adoption of the ACO, the CVRWQCB issued requirements for the preparation of a Nutrient Management Plan (NMP) and Waste Management Plan (WMP), which would serve in place of the CNMP as allowed by County Code Chapter 18.64.060 K. Both the NMP and the WMP have been prepared for the Vierra Dairy Expansion project (see Appendix J, bound separately).

In addition to the CNMP, the ACO includes measures designed to increase protection of surface and groundwater resources. Both liquid and dry manure are regulated by the ACO under detailed management requirements. For example, the ACO prohibits the storage or application of manure (liquid or dry) within 100 feet of a surface water body or irrigation well unless adequate protection is provided. Dry manure storage and application is regulated to prevent groundwater or surface water contamination. In addition, the liquid manure management system must include provisions for appropriate cropland application and collection of tailwater from cropland irrigated with liquid manure. The ACO requires that all off-site discharge of drainage water from cropland application areas meet the discharge and receiving water standards of the appropriate irrigation or drainage district and the CVRWQCB.

The ACO also includes design and management provisions for the construction of retention ponds and settling basins to prevent groundwater contamination, obnoxious odors, or excessive fly or mosquito breeding. The retention pond provisions of the ACO apply only to new or expanding animal confinement facilities. The ACO measures for retention ponds and settling basins include capacity requirements, maintenance guidelines, size restrictions, and minimum design standards of 10^{-6} centimeters per second seepage velocity or less. However, the CVRWQCB's Reissued Waste

Discharge Requirements General Order for Existing Milk Cow Dairies (Order R5-2013-0122)[2] establishes performance standards for new wastewater ponds that are more stringent and replace the ACO requirements.

To prevent nuisances from odors or vectors, the ACO requires animal confinement facilities to implement both odor control measures and a vector control plan. The need for specific control measures is determined by the Merced County DEH on a site-specific basis. Additionally, the ACO prohibits the location of new animal confinement facilities within one-half mile of urban areas, areas zoned for residential uses, or concentrations of rural residences. To provide additional protection from the nuisances mentioned above, the ACO generally prohibits the location of animal confinement facilities within 1,000 feet of an off-site residence, unless written permission from the off-site resident or property owner is given.

The ACO regulates the design, construction, and operation of animal confinement facilities within the County; all existing and proposed animal confinement facilities within the County are required to comply with the terms of the Ordinance, including the Vierra Dairy Expansion project. To ensure compliance with the provisions of the ACO, the Ordinance requires routine inspections of animal confinement facilities by Merced County DEH. Enforcement of the provisions contained in the revised ACO is conducted by Merced County DEH and the Community and Economic Development Department. In addition, the ACO includes penalties for any person who violates or fails to comply with the provisions of the ACO.

1.5 TIERING FROM BOTH THE 2030 MERCED COUNTY GENERAL PLAN EIR AND THE MERCED COUNTY ANIMAL CONFINEMENT ORDINANCE EIR

"Tiering" refers to the relationship between a program-level EIR (where long-range programmatic cumulative impacts are the focus of the environmental analysis) and subsequent environmental analyses such as this subject document, which focuses primarily on issues unique to a smaller project within the larger program or plan pursuant to Section 15168 of the State CEQA Guidelines. Through tiering, a subsequent environmental analysis can incorporate, by reference, discussion that summarizes general environmental data found in the program EIR that establishes cumulative impacts and mitigation measures, the planning context, and/or the regulatory background. These broad-based issues need not be reevaluated subsequently, having been previously identified and evaluated at the program stage.

Tiering focuses the environmental review on the project-specific significant effects that were not examined in the prior environmental review or are susceptible to substantial reduction or avoidance by specific revisions in the project, by the imposition of conditions, or by other means. Section 21093(b) of the Public Resources Code requires the tiering of environmental review whenever feasible, as determined by the Lead Agency.

As stated above, this project EIR is tiered from the EIRs for the *2030 Merced County General Plan* (certified on December 10, 2013) and the *Merced County Animal Confinement Ordinance Revision* as certified and adopted on October 22, 2002, as summarized below.

[2] For additional discussion of the General Order, see Section 3.5.1, *Project Permitting History*, and Section 3.8, *Required Approvals, Other Processes, and Consultations*, and Chapter 10, *Hydrology and Water Quality*, of this EIR.

1.5.1 MERCED COUNTY ANIMAL CONFINEMENT ORDINANCE REVISION EIR

The Merced County Board of Supervisors certified the EIR and adopted the revised ACO on October 22, 2002 (SCH #2000072024). The environmental conclusions of the 2002 EIR were subsequently reconfirmed in an Addendum to the EIR prepared and certified by the County on February 8, 2005. The ACO EIR comprehensively evaluated the potential environmental effects of implementing the revisions to the ACO and from approval of new or expanding animal confinement facilities. The ACO EIR identified a number of mitigation measures that would reduce the magnitude of these potential effects. Those measures were subsequently adopted by the County as conditions of approval for the revisions to the ACO, and a Mitigation Monitoring and Reporting Program was adopted. Because the Vierra Dairy Expansion project is subject to the requirements of the ACO for new and expanding animal confinement facilities, those previously adopted mitigation measures and conditions apply to the Vierra Dairy Expansion project, and would continue to apply after approval of the currently requested actions.

INCORPORATION OF THE ANIMAL CONFINEMENT ORDINANCE EIR BY REFERENCE

The EIR for the ACO Revision contains a comprehensive analysis of environmental effects for new and expanding animal confinement facilities in Merced County, including a cumulative analysis of herd forecast conditions. The 2030 General Plan EIR updated and expanded the environmental analyses and conclusions presented in the 2002 ACO EIR regarding the cumulative condition for all project types, including proposed and expanding dairy facility projects such as the Vierra Dairy Expansion project. Because of its importance relative to understanding the environmental analysis that has occurred to date with respect to the potential environmental impacts associated with the construction and operation of animal confinement facilities in Merced County, the ACO EIR is hereby incorporated by reference pursuant to State CEQA Guidelines Section 15150 as though fully set forth herein. A copy of the ACO EIR can be reviewed at the Merced County Division of Environmental Health, 260 East 15th Street, Merced, California 95341.

SUMMARY OF THE IMPACTS ANALYSIS OF THE ANIMAL CONFINEMENT ORDINANCE EIR

The ACO EIR presents an assessment of the environmental impacts associated with the adoption of the ACO revisions in addition to construction and operation of animal confinement facilities in Merced County. The ACO EIR evaluated the environmental impacts of new and expanding animal confinement facilities on a comprehensive basis, including discussion of the full range of impacts that would occur because of future development.

The ACO EIR identified potential significant environmental impacts arising from construction and operation of animal confinement facilities for the following issue areas:

Aesthetics: light and glare.

Air Quality: fugitive dust emissions from construction activities; exhaust emissions related to construction activities; ozone precursor emissions from dairy operations, farm equipment, and increased traffic; PM_{10} emissions from fugitive dust during project operations; ammonia and hydrogen sulfide emissions from project operations; adverse odor from project operations; and cumulative increased emissions of criteria air pollutants.

Biological Resources: loss and/or degradation of riparian habitat; loss of special-status species; loss of wildlife habitat; loss and/or modification to wetlands; interference with the activities of night-active wildlife; potential interference with animal movement/migration patterns; potential selenium and heavy metals effects to biological resources; and cumulative impacts to biological resources.

Cultural Resources: disruption of known and unknown cultural resources; and cumulative impacts to unknown cultural resources.

Geology: construction storm water quality; embankment failure; seismic damage; and cumulative impacts to geological resources.

Hazards, Hazardous Materials & Human Health: mosquitoes; flies; manure pathogens; residual manure at closed facilities; and cumulative impacts from hazards.

Hydrology and Water Quality: development in the zone of high sensitivity to groundwater contamination; modification of surface water drainage patterns; increase in runoff; exposure to flood risks; water supply well pathways for pollutant migration; and cumulative impacts to groundwater resources.

Land Use: land use conflicts with urban and sensitive land uses; land use conflicts with rural residences; and cumulative impacts involving land use conflicts.

Mineral Resources: loss of mineral resources; and cumulative loss of mineral resources.

Noise: creation of excessive noise levels; and cumulative noise impacts.

Transportation and Circulation: traffic and roadway effects; and cumulative impacts to traffic and circulation.

Utilities and Service Systems: interference with irrigation district facilities; and cumulative impacts to utilities and service systems.

1.5.2 2030 MERCED COUNTY GENERAL PLAN EIR

The Merced County Board of Supervisors certified the EIR and adopted the 2030 General Plan on December 10, 2013 (SCH #2011041067). The 2030 General Plan regulates the location, use, design, construction, and operation of developed land uses within the County; all existing and proposed land uses within the County are required to comply with the goals and policies of the 2030 General Plan, including the Vierra Dairy Expansion project. To reflect this, the requirements of the 2030 General Plan and conclusions of the environmental analysis contained in the 2030 General Plan EIR were incorporated into this EIR.

The 2030 General Plan EIR comprehensively evaluated the potential environmental effects of implementing the 2030 General Plan and from the approval of new or modified land uses. The 2030 General Plan EIR identified a number of mitigation measures that would reduce the magnitude of these potential effects. Those measures were subsequently adopted by the County in its approval of the 2030 General Plan, and a Mitigation Monitoring and Reporting Program was adopted. Because the Vierra Dairy Expansion project is consistent with, and implements, the 2030 General Plan, those previously adopted mitigation measures and conditions apply to the Vierra Dairy Expansion project,

and would continue to apply after approval of the currently requested actions. Therefore, the Vierra Dairy Expansion project is related to the 2030 General Plan EIR and, pursuant to Section 15152(a) of the CEQA Guidelines, tiering of environmental documents is appropriate.

The 2030 General Plan EIR can be reviewed at the location set forth above.

INCORPORATION OF THE 2030 MERCED COUNTY GENERAL PLAN EIR BY REFERENCE

Based on the reasoning set forth above, this environmental evaluation implements, and is consistent with, the environmental conclusions, mitigation measures, and study protocols adopted by Merced County in its certification of the 2030 General Plan EIR and its approval of the 2030 Merced County General Plan. Because of its importance relative to understanding the environmental analysis that has occurred to date with respect to the potential environmental impacts associated with the construction and operation of developed land uses in Merced County, the 2030 General Plan EIR is hereby incorporated by reference pursuant to CEQA Guidelines Section 15150 as though fully set forth herein.

SUMMARY OF THE IMPACT ANALYSIS OF THE 2030 MERCED COUNTY GENERAL PLAN EIR

The 2030 Merced County General Plan EIR presents an assessment of the environmental impacts associated with the implementation of the General Plan and land uses developed consistent with the Plan in Merced County. The EIR evaluated the environmental impacts of the Plan on a comprehensive basis, including discussion of the full range of impacts that would occur because of future development. The EIR identified potential significant environmental impacts arising from implementation of the General Plan and land uses developed consistent with the Plan for the following issue areas:

Aesthetics: light and glare; and cumulative impacts to visual quality.

Agriculture and Forestry: conversion of Important Farmland to non-agriculture use; conflict with zoning for agricultural use or provisions of the Williamson Act; land use changes that would result in conversion of farmland to non-agricultural uses from urban development; land use changes that would result in conversion of farmland to non-agricultural uses due to the Minor Subdivision of Rural Parcels or due to inadequate parcel sizes; and cumulative impacts to agricultural resources.

Air Quality: operational emissions of PM_{10} and $PM_{2.5}$ associated with General Plan buildout; health risks associated with locating sensitive receptors near high volume roads; cumulative impacts to air quality.

Biological Resources: adverse effects to special status species and sensitive habitats due to conversion of farmlands and open space; adverse effect on wetlands, riparian habitat, and other sensitive natural communities; loss or modification of federally protected wetlands; interference with animal movement/migration patterns; cumulative impacts to biological resources.

Cultural Resources: adverse changes to the significance of a historical resource; adverse change in the significance of archaeological resources, paleontological resources, unique geological features, or disturbances to human remains; degradation or loss of traditional cultural properties where Native American customs and traditions are practiced; cumulative impacts to cultural resources.

Geology: use of septic tanks or alternative wastewater disposal systems in unfit soils that may result in increased nutrients or other pollutants reaching and damaging groundwater resources.

Global Climate Change: increase in GHG emissions associated with 2030 General Plan buildout; increase in GHG emissions that would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions; cumulative impacts to global climate change.

Hazards and Hazardous Materials: projects located on a site that is included on a list of hazardous materials sites resulting in a significant hazard to the public or to the environment; projects located within an airport land use plan or within the vicinity of a public or private airport resulting in a safety hazard for people working or residing in the area.

Hydrology and Water Quality: depletion of groundwater supplies or interference with groundwater recharge; modification of surface water drainage patterns resulting in detrimental flooding or substantial erosion or siltation; cumulative impacts to hydrology and water quality.

Land Use Compatibility: physical division of an established community.

Mineral Resources: loss of mineral resources; and cumulative loss of mineral resources.

Noise: permanent increase in ambient noise levels; traffic noise level increases at existing sensitive uses caused by development consistent with the 2030 General Plan; exposure of people to, or generation of excessive groundborne vibration or groundborne noise levels; cumulative impacts to noise.

Population and Housing: inducement of population growth, directly or indirectly.

Transportation and Circulation: conflict with an applicable plan, ordinance or policy establishing measures of effectiveness of county roads, State Highways, or streets within incorporated cities in Merced County; increase hazards due to a design feature or incompatible uses; inadequate emergency access; conflict with policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or decrease the performance or safety of those facilities; cumulative impacts to transportation and circulation.

Utilities and Service Systems: sufficient water supply resources available to accommodate continued development through buildout of the 2030 General Plan; cumulative impacts to utilities and service systems.

Other CEQA Topics: cumulative impacts to growth inducement and irreversible environmental changes.

1.6 EIR ORGANIZATION

This Draft EIR is organized into fifteen chapters, each dealing with a separate aspect of the required content of an EIR as described in the State CEQA Guidelines. To help the reader locate information of particular interest, a brief summary of the contents of each section of the EIR is provided. The following sections are contained within the EIR:

Table of Contents: Provides a listing of content in the EIR, including environmental issue areas, appendices to support the EIR, tables and figures in the EIR, and a list of frequently used acronyms and abbreviations used in this EIR.

Chapter 1: Introduction provides an overview of the purpose of the EIR, the scope of this EIR, the environmental review process for the EIR and the proposed project, the general format of the document, and frequently used terms.

Chapter 2: Executive Summary contains a summary of environmental impacts, proposed mitigation, level of significance after mitigation, and unavoidable impacts. Also contained within this section are a summary description of project alternatives, potential cumulative impacts, and any areas of controversy regarding the proposed project known to the lead agency.

Chapter 3: Project Description defines the project location, summarizes components of the proposed project, outlines the project objectives, and describes the required approvals for the proposed project.

Chapter 4: Introduction to the Environmental Impact Report describes the framework of analysis contained in chapters 5 through 11 and includes project development standards required by the County. This chapter also contains a discussion of the relationship of the proposed project to the policies and procedures of the Merced County General Plan, the Merced County ACO, a chapter of the Merced County Zoning Code, and other provisions of the Merced County Zoning Code.

Chapters 5 through 11: These chapters describe and evaluate individual environmental issue areas, including the existing environmental setting and background, applicable environmental thresholds, environmental impacts associated with the project, policy considerations related to the particular environmental issue area under analysis, and mitigation measures to reduce environmental impacts.

Chapter 12: Required CEQA Analyses provides an analysis of the proposed project's potential growth-inducing and cumulative impacts, significant and unavoidable impacts, environmental effects of the project found not to be significant, and irreversible changes to the natural environment resulting from the proposed project.

Chapter 13: Alternatives Analysis analyzes feasible alternatives to the proposed project, including the No Project Alternative and any feasible project alternatives necessary to reduce or avoid identified significant project impacts.

Chapter 14: List of Preparers identifies all individuals responsible for the preparation of this report, including names of the EIR authors and consultants.

Chapter 15: References compiles a list of all documents used and persons, organizations, or agencies consulted in the preparation of this EIR.

Appendices set forth data supporting the analysis or contents of this EIR (such as the IS/NOP and technical studies).

1.7 FREQUENTLY USED TERMS

Implementation - This term implies that something is constructed and becomes operational, or becomes effective.

Project Site - The existing Vierra Dairy and the site of the proposed expansion are located on ±72 acres of a 695-acre site in unincorporated Merced County. For the purposes of this EIR, the "project site" refers to the area of active dairy facilities. The project site is located on the northwest corner of Williams Avenue and Washington Road in the Hilmar area. For more information regarding the location and area of the project, see Chapter 3, *Project Description*.

Project Area - Throughout this document, "project area" refers to all parcels that are part of the project, including the active dairy facilities and associated cropland. This includes the ±72 acres of active dairy facilities, the ±582 acres of the project area that are currently used for the production of crops and the application of manure process water and/or solid manure, and the remaining project acres consisting of field roads and ancillary farm uses.

Less-than-Significant Impact - A less-than-significant impact is an impact that would not result in a substantial and adverse change in the environment and would not require mitigation.

Significant Impact - CEQA (PRC Section 21068) defines a significant impact as that which has "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project." Levels of significance can vary by project, based on the change in the existing physical condition and the "...substantial body of opinion that considers or will consider the effect to be adverse..." The State CEQA Guidelines provide a list of consequences that would normally be regarded as having a significant effect on the environment. This EIR uses the CEQA definition of significant impacts together with the local environmental standards established by the County. Mitigation measures are proposed, when feasible, to reduce the magnitude of significant impacts.

Significant and Unavoidable Impact - A significant and unavoidable impact is one that would result in a substantial adverse effect on the environment which could not be mitigated to a less-than-significant level. A project could still proceed where significant and unavoidable impacts have been identified, but the County would then be required to prepare a Statement of Overriding Considerations, pursuant to State CEQA Guidelines Section 15093, that would explain why the County would proceed with the project despite the occurrence of the unavoidable impacts.

This page intentionally
left blank.

2 EXECUTIVE SUMMARY OF THE EIR

2.1 PROJECT SUMMARY

The existing Vierra Dairy is located on 72± acres of an existing farm totaling approximately 695 acres on 17 parcels in unincorporated Merced County. The dairy project site is located on the northwest corner of Williams Avenue and Washington Road in the Hilmar area of the County. Approximately 582 acres of the project site are currently used for the production of crops and application of manure process water. With the recent purchase of surrounding farmland over nine additional parcels, there would be approximately 770± acres of cropland available for wastewater and manure application with the proposed dairy expansion.

Conditional Use Permit CUP20-009 proposes to modify and expand the existing dairy to house 4,170 milk cows, 550 dry cows, and 2,397 support stock. Considering the existing animals at the dairy facility, the proposed expansion would represent an increase of 1,520 animals from existing numbers. The proposed project would include construction of two freestall barns, a hospital milking barn, commodity barn addition, heifer barn, and utility shop. Construction of the proposed facilities would result in the conversion of approximately 15 acres of cropland to active dairy facilities.

2.2 SUMMARY OF PROJECT ALTERNATIVES

Section 15126.6 of the California Environmental Quality Act (CEQA) Guidelines requires that an Environmental Impact Report (EIR) describe and comparatively evaluate a range of reasonable alternatives to a project that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. Thus, the range of alternatives evaluated in the following analysis is dictated by the range of significant impacts identified in this EIR, and evaluated alternatives are limited to those that would reduce or eliminate identified environmental impacts. As discussed in this EIR, the secondary and cumulative impacts of implementing the Vierra Dairy Expansion project would lead to significant adverse and unavoidable impacts. Accordingly, three alternatives in addition to the required No Project alternative, listed below, were formulated to illustrate the range of projects that could be implemented as an alternative to the proposed Vierra Dairy Expansion project.

- Alternative 1 – No Project Alternative
- Alternative 2 – On-Site Anaerobic Digester Alternative
- Alternative 3 – Dairy Digester Cluster Alternative

Based on the comparative evaluation contained in the EIR, other than the No Project Alternative, Alternative 3 – Dairy Digester Cluster) would reduce the magnitude of the most impacts. Several of the significant impacts identified for the project would be reduced, but not eliminated, with implementation of Alternative 3. Alternative 3 would be the environmentally superior alternative.

2.3 AREAS OF CONTROVERSY/ISSUES TO BE RESOLVED

The potential areas of controversy and issues to be resolved through the EIR process were derived from analysis conducted during preparation of the Notice of Preparation (NOP) (See Appendix A, *Notice of Preparation and Initial Study*), and review of responses received from public agencies and the public during circulation of the NOP. These areas are summarized as follows:

- Short-term construction air quality impacts and long-term air quality impacts from an increase in operational emissions, including generation of odors (see Chapter 5, *Air Quality and Odors).*
- Biological resources impacts from construction activities (see Chapter 6, *Biological Resources*).
- Cultural resources impacts from site clearing, grading, and other ground disturbing activities (see Chapter 7, *Cultural Resources and Tribal Cultural Resources*).
- Greenhouse gas emissions from direct and indirect sources (see Chapter 8, *Greenhouse Gas Emissions and Energy Use*).
- Potential generation of nuisance insects (see Chapter 9, *Nuisance Conditions from Insects*).
- Violation of water quality standards, depletion of groundwater, groundwater and surface water contamination, and impacts to water quality at off-site locations (see Chapter 10, *Hydrology and Water Quality*).
- Conflict with Merced County Zoning Code and Animal Confinement Ordinance requirements, and land use incompatibility with surrounding residences and communities (see Chapter 11, *Land Use Compatibility*).

2.4 SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Table 2-1 presents a summary of project impacts and proposed mitigation measures that would avoid or minimize potential impacts. The level of significance for each environmental impact is indicated both before and after mitigation. For a detailed discussion of the proposed project impacts and mitigation measures, see Chapters 5 through 11 of the Draft EIR.

Table 2-1 Summary of Impacts and Mitigation Measures

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
Air Quality and Odors (EIR Chapter 5)					
Impact AQ-1: Construction-related emissions	LS		**Recommended Measure AQ-1:** The applicant shall provide a Dust Control Plan approved by the SJVAPCD to the County, and implement all measures of applicable SJVAPCD Rules and Regulations.	LS	
Impact AQ-2: Carbon monoxide emissions from operational equipment and increased traffic	LS		**Mitigation Measure AQ-2:** None required.	LS	
Impact AQ-3: Ozone precursor emissions from dairy operations, farm equipment, and increased traffic	LS		**Mitigation Measure AQ-3:** None required.	LS	
Impact AQ-4: PM_{10} and $PM_{2.5}$ emissions from fugitive dust during project operations	LS		**Mitigation Measure AQ-4:** None required.	LS	
Impact AQ-5: Expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants from project construction and operations		PS	**Mitigation Measure AQ-5a:** The onsite residence 13 shall not be occupied by children during construction periods. **Mitigation Measure AQ-5b:** The applicant shall apply SJVAPCD-approved control measures to reduce PM_{10} emissions below SJVAPCD health risk thresholds.	LS	
Impact AQ-6: Expose nearby residents to substantial pollutant concentrations from emissions of criteria air pollutants	LS		**Mitigation Measure AQ-6:** None required.	LS	
Impact AQ-7: Adverse odor from project operations		PS	**Mitigation Measure AQ-7a:** The applicant shall continue to implement an Odor Control Plan. **Mitigation Measure AQ-7b:** Implement the nuisance control measures set forth in MM HAZ-1, which would also act to control odors.	LS	

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
Impact AQ-8: Health impacts due to Valley Fever	LS		**Recommended Measure AQ-8a:** Implement Recommended Measure AQ-1, which requires receipt of a SJVAPCD approved Dust Control Plan. **Recommended Measure AQ-8b:** Implement the Dust Control Plan, which shall include controls and work practices that reduce workers' exposure. **Recommended Measure AQ-8c:** Provide training and personal protective respiratory equipment to construction workers regarding Valley Fever.	LS	
Impact AQ-9: Health effects as a result of exposure to bioaerosols during dairy operations	LS		**Mitigation Measure AQ-9:** None required.	LS	
Impact AQ-10: Conflict with or obstruct implementation of the applicable air quality plan	LS		**Mitigation Measure AQ-10:** None required.	LS	
Biological Resources (EIR Chapter 6)					
Impact BIO-1: Nest disturbance and loss of foraging habitat for Swainson's hawk		PS	**Mitigation Measure BIO-1a:** *Protocol Surveys*: A qualified biologist shall conduct protocol surveys if work begins between March 1 and August 30. Mitigate for loss of Swainson's hawk nesting habitat. **Mitigation Measure BIO-1b:** *Nest Avoidance*: Implement measures to minimize potential impacts to Swainson's Hawk nests. **Mitigation Measure BIO-1c:** *Foraging Impacts:* The project applicant shall consult with CDFW to determine if mitigation is necessary for the loss of approximately 26 acres of potential Swainson's hawk foraging habitat, and implement measures as required.	LS	

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
Impact BIO-2: Loss of foraging and nesting habitat for sensitive and migratory bird species		PS	**Mitigation Measure BIO-2a:** Implement MM BIO-1, if necessary, which includes measures that would benefit other bird species. **Mitigation Measure BIO-2b:** Implement measures to reduce project-related impacts to active bird nests and to reduce the potential for construction activities to interrupt breeding and rearing behaviors of birds.	LS	
Impact BIO-3: Loss of nesting habitat for tricolored blackbird		PS	**Mitigation Measure BIO-3a:** Implement MM BIO-1, if necessary, which includes measures that would benefit other bird species. **Mitigation Measure BIO-3b:** Implement measures as set forth in MM BIO-2b. **Mitigation Measure BIO-3c:** If a TCBB nest colony is discovered during preconstruction surveys, CDFW will be consulted to determine the appropriate actions or required mitigation.	LS	
Impact BIO-4: Impacts to the San Joaquin kit fox and/or American badger		PS	**Mitigation Measure BIO-4:** The project applicant must follow the USFWS guidelines for protection of San Joaquin Kit Fox. Measures include preconstruction surveys for the kit fox and badger, preventative measures to avoid potential impacts to these species, and compulsory action should any animal be encountered.	LS	
Impact BIO-5: Loss and/or degradation of special-status plant species	LS		**Mitigation Measure BIO-5:** None required.	LS	
Impact BIO-6: Loss and/or degradation of riparian and vernal pool habitat or sensitive natural communities; loss or modification of wetlands	LS		**Mitigation Measure BIO-6:** None required.	LS	
Impact BIO-7: Interference with on-site wildlife movement corridors or wildlife nursery sites	LS		**Mitigation Measure BIO-7:** None required.	LS	
Impact BIO-8: Potential selenium and heavy metals effects to on-site biological resources	LS		**Mitigation Measure BIO-8:** None required.	LS	
Impact BIO-9: Conflict with local policies or ordinances protecting biological resources	LS		**Mitigation Measure BIO-9:** None required.	LS	

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
Cultural Resources and Tribal Cultural Resources (EIR Chapter 7)					
Impact CUL-1: Cause a substantial adverse change in the significance of historical, archaeological, or paleontological resource, or a unique geological feature		PS	**Mitigation Measure CUL-1:** The project applicant and construction contractor shall implement a plan to address discovery of unanticipated cultural or paleontological resources. If any features are discovered, work shall be suspended until a qualified archaeologist assesses the discovery and provides consultation with appropriate agencies. Appropriate mitigation shall be implemented as advised.	LS	
Impact CUL-2: Result in the accidental discovery and disturbance of human remains		PS	**Mitigation Measure CUL-2a:** The project applicant and construction contractor shall implement the plan to address discovery of unanticipated cultural resources set forth in MM CUL-1. **Mitigation Measure CUL-2b:** The project applicant and construction contractor shall implement a plan to address discovery of human remains. In the event human remains are discovered, no further disturbance shall occur until the county coroner has made the necessary findings as to the origin and disposition of the remains, and notified the appropriate parties.	LS	
Impact CUL-3: Cause a substantial adverse change in the significance of a tribal cultural resource	LS		**Mitigation Measure CUL-3:** None required.	LS	
Greenhouse Gas Emissions and Energy Use (EIR Chapter 8)					
Impact GHG-1: Greenhouse gas emissions from project construction and operation		PS	**Mitigation Measure GHG-1a:** Implement MM AQ-3a, which requires implementation of all air quality provisions of the ACO and compliance with SJVAPCD Rules. **Mitigation Measure GHG-1b:** If determined feasible, implement Alternative 3, and install a manure digester.		SU
			Implementation of Alternative 1, No Project, would reduce the magnitude and significance of this effect.	LS	
			Implementation of Alternative 2, On-Site Anaerobic Digester, would potentially increase the magnitude but not the significance of this effect.	LS	

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
			Implementation of Alternative 3, Dairy Digester Pipeline Cluster, would potentially increase the magnitude but not the significance of this effect.	LS	
Impact GHG-2: Wasteful or inefficient consumption of energy	LS		**Mitigation Measure GHG-2:** None required.	LS	
Impact GHG-3: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LS		**Mitigation Measure GHG-3:** None required.	LS	
Nuisance Conditions from Insects (EIR Chapter 9)					
Impact HAZ-1: Increased fly production and related nuisance effects		PS	**Mitigation Measure HAZ-1:** The project applicant shall continue to implement operational measures included in the Vector Control Plan.	LS	
Impact HAZ-2: Create significant nuisance conditions due to increased mosquito production	LS		**Mitigation Measure HAZ-2:** None required.	LS	
Hydrology and Water Quality (EIR Chapter 10)					
Impact HYD-1: Degradation of water quality due to storm water runoff during project construction	LS		**Recommended Measure HYD-1:** The project applicant shall Submit permit registration documents for the Construction General Permit Order 2009-0009-DWQ to the SWRCB, and comply with all requirements of the permit.	LS	
Impact HYD-2: Degradation of surface water quality from project operations		PS	**Mitigation Measure HYD-2a:** The project applicant shall provide written agreement with TID to complete annual testing of the Vierra Dairy subsurface drain. **Mitigation Measure HYD-2b:** Implement Mitigation Measure HY-3j, which states that the CVRWQCB should develop a revised Dairy General Order with updated standards.		SU
			Implementation of Alternative 1, No Project, would reduce the magnitude and significance of this effect.	LS	
			Implementation of Alternative 2, On-Site Anaerobic Digester, would potentially increase the magnitude but not the significance of this effect.		SU
			Implementation of Alternative 3, Dairy Digester Pipeline Cluster, would potentially increase the magnitude but not the significance of this effect.		SU

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
Impact HYD-3: Groundwater contamination from project operations		PS	**Mitigation Measure HYD-3a:** The project applicant shall implement BMPs to prevent contamination of groundwater. **Mitigation Measure HYD-3b:** The applicant shall comply with requirements of the NMP/WMP, the individual WDR, and all Merced County ACO requirements not superseded by the conditions of the individual WDR. **Mitigation Measure HYD-3c:** The project applicant shall apply liquid and solid manure to not exceed agronomic rates as set forth in the NMP, and shall confirm agronomic rates with soil testing as described in the NMP. **Mitigation Measure HYD-3d:** The applicant shall comply with the permit requirements to protect surface waters and groundwater from salts in wastewater, to be issued by the CVRWQCB as set forth in Board Resolution R5-2018-0034. **Mitigation Measure HYD-3e:** The project applicant shall maintain continued membership in the groundwater monitoring network or install a site-specific groundwater monitoring system. **Mitigation Measure HYD-3f:** The project applicant shall continue groundwater monitoring of the on-site domestic and irrigation wells, and develop an updated well monitoring schedule and submit to the County DEH. **Mitigation Measure HYD-3g:** After monitoring, if groundwater contamination is shown, the project applicant shall submit a new ROWD to the CVRWQCB. **Mitigation Measure HYD-3h:** The Department of Community and Economic Development and the DEH shall make a final inspection of the facility to confirm the dairy meets local and state requirements. **Mitigation Measure HYD-3i:** During construction, all soils that contain manure or process water residue shall be maintained on the project site.		SU

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
			Mitigation Measure HYD-3j: The CVRWQCB should develop a revised Dairy General Order with updated standards that apply to all confined animal facilities within the Central Valley.		
			Implementation of Alternative 1, No Project, would reduce the magnitude and significance of this effect.	LS	
			Implementation of Alternative 2, On-Site Anaerobic Digester, would potentially increase the magnitude but not the significance of this effect.		SU
			Implementation of Alternative 3, Dairy Digester Pipeline Cluster, would potentially increase the magnitude but not the significance of this effect.		SU
Impact HYD-4: Decrease groundwater supplies	LS		**Mitigation Measure HYD-4:** None required.	LS	
Impact HYD-5: Modification of surface water drainage patterns and an increase in runoff	LS		**Mitigation Measure HYD-5:** None required.	LS	
Impact HYD-6: Risk release of pollutants due to project inundation in flood zones		PS	**Mitigation Measure HYD-6:** Implement flood protection report measures.	LS	
Impact HYD-7: Water supply pathways for pollutant migration	LS		**Mitigation Measure HYD-7:** None required.	LS	
Impact HYD-8: Impacts to water quality at off-site locations as a result of project operations		PS	**Mitigation Measure HYD-8:** The project applicant shall obtain written agreement from the recipients of manure exported off site, and provide the most recent analysis of the dry manure, in writing, to the manure recipient.		SU
			Implementation of Alternative 1, No Project, would reduce the magnitude and significance of this effect.	LS	
			Implementation of Alternative 2, On-Site Anaerobic Digester, would not change the magnitude or significance of this effect.		SU
			Implementation of Alternative 3, Dairy Digester Pipeline Cluster, would not change the magnitude or significance of this effect.		SU
Impact HYD-9: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan		PS	**Mitigation Measure HYD-9a:** Implement MM HYD-3, which requires compliance with Merced County and RWQCB regulations to minimize impacts to surface and groundwater quality.		SU

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
			Mitigation Measure HYD-9b: Implement MM HYD-8, which requires compliance with Merced County and RWQCB regulations to minimize impacts to surface and groundwater quality from manure applied to cropland off site.		
			Implementation of Alternative 1, No Project, would reduce the magnitude and significance of this effect.	LS	
			Implementation of Alternative 2, On-Site Anaerobic Digester, would potentially increase the magnitude but not the significance of this effect.		SU
			Implementation of Alternative 3, Dairy Digester Pipeline Cluster, would potentially increase the magnitude but not the significance of this effect.		SU
Land Use Compatibility (EIR Chapter 11)					
Impact LU-1: Consistency with Merced County Land Use Plans and policies adopted to protect the environment, including setback standards	LS		**Mitigation Measure LU-1:** None required.	LS	
Impact LU-2: Land use compatibility with existing off-site residential uses adjacent to the project area		PS	**Mitigation Measure LU-2a:** Implement the odor control measures set forth in MM AQ-7a. **Mitigation Measure LU-2b:** Implement the nuisance control measures set forth in MM HAZ-1.	LS	
Cumulative Impacts					
Aesthetics	LS		No cumulatively considerable contribution.	LS	
Agricultural Resources	LS		No cumulatively considerable contribution.	LS	
Air Quality		PS	The project would have a cumulatively considerable contribution.		SU
Biological Resources		PS	The project would have a cumulatively considerable contribution.		SU
Cultural Resources	LS		No cumulatively considerable contribution.	LS	
Geological and Mineral Resources	LS		No cumulatively considerable contribution.	LS	
Greenhouse Gas Emissions			See Impact GHG-1		
Hazards (Nuisance Insects)	LS		No cumulatively considerable contribution.	LS	
Hydrology and Water Quality		PS	The project would have a cumulatively considerable contribution.		SU
Land Use	LS		No cumulatively considerable contribution.	LS	
Noise	LS		No cumulatively considerable contribution.	LS	

Environmental Impact	Level of Significance Before Mitigation		Summary of Mitigation Measure/Alternative	Level of Significance After Mitigation	
	LS	**PS**		**LS**	**SU**
Population and Housing	LS		No cumulatively considerable contribution.	LS	
Public Services	LS		No cumulatively considerable contribution.	LS	
Recreation	LS		No cumulatively considerable contribution.	LS	
Transportation and Circulation	LS		No cumulatively considerable contribution.	LS	
Utilities and Service Systems	LS		No cumulatively considerable contribution.	LS	
Growth Inducement and Secondary Effects	LS		None required.	LS	
Irreversible Commitment of Resources	LS		None required.	LS	
Potential Environmental Damage from Accidents	LS		None required.	LS	

LS = Less than significant impact; PS = Potentially significant impact with mitigation; SU = Significant and unavoidable impact

This page intentionally
left blank.

3 PROJECT DESCRIPTION

3.1 ENVIRONMENTAL SETTING

3.1.1 PROJECT LOCATION

The existing Vierra Dairy is located on 72± acres of an existing farm totaling approximately 695 acres on 17 parcels in unincorporated Merced County. The dairy project site is located on the northwest corner of Williams Avenue and Washington Road in the Hilmar area of the County. The project's location is within the central California region (see Figures 3-1 and 3-2). The main project site is located on five parcels, identified as Merced County Assessor's Parcel Numbers (APN) 045-190-015 (39.4 acres), 045-190-052 (9.4 acres), 045-190-063 (9.7 acres), 045-190-077 (63.7 acres), and 045-190-017 (39.4 acres) (see Table 3-1 and Figure 3-3a). The project cropland application area consists of 582± acres located on portions of 12 additional parcels associated with the project (see Figure 3-2 for application areas, and Figure 3-3a, Figure 3-3b, and Table 3-1 for Merced County APNs). The dairy project site is located in Section 19, Township 6 South, Range 10 East, Mount Diablo Base and Meridian; 37°23′25.00″N, 120°54′21.00″W.

The project applicant recently purchased an additional 264± gross acres of surrounding farmland over nine additional parcels (included on Figure 3-2, Figure 3-3a, and Figure 3-3b), expanding the total dairy farm acreage to 949± acres. This additional cropland was purchased to be used for wastewater and manure application with the proposed dairy expansion. With the proposed expansion, net cropped acreage associated with the farm would increase from 582± acres to 770± acres.

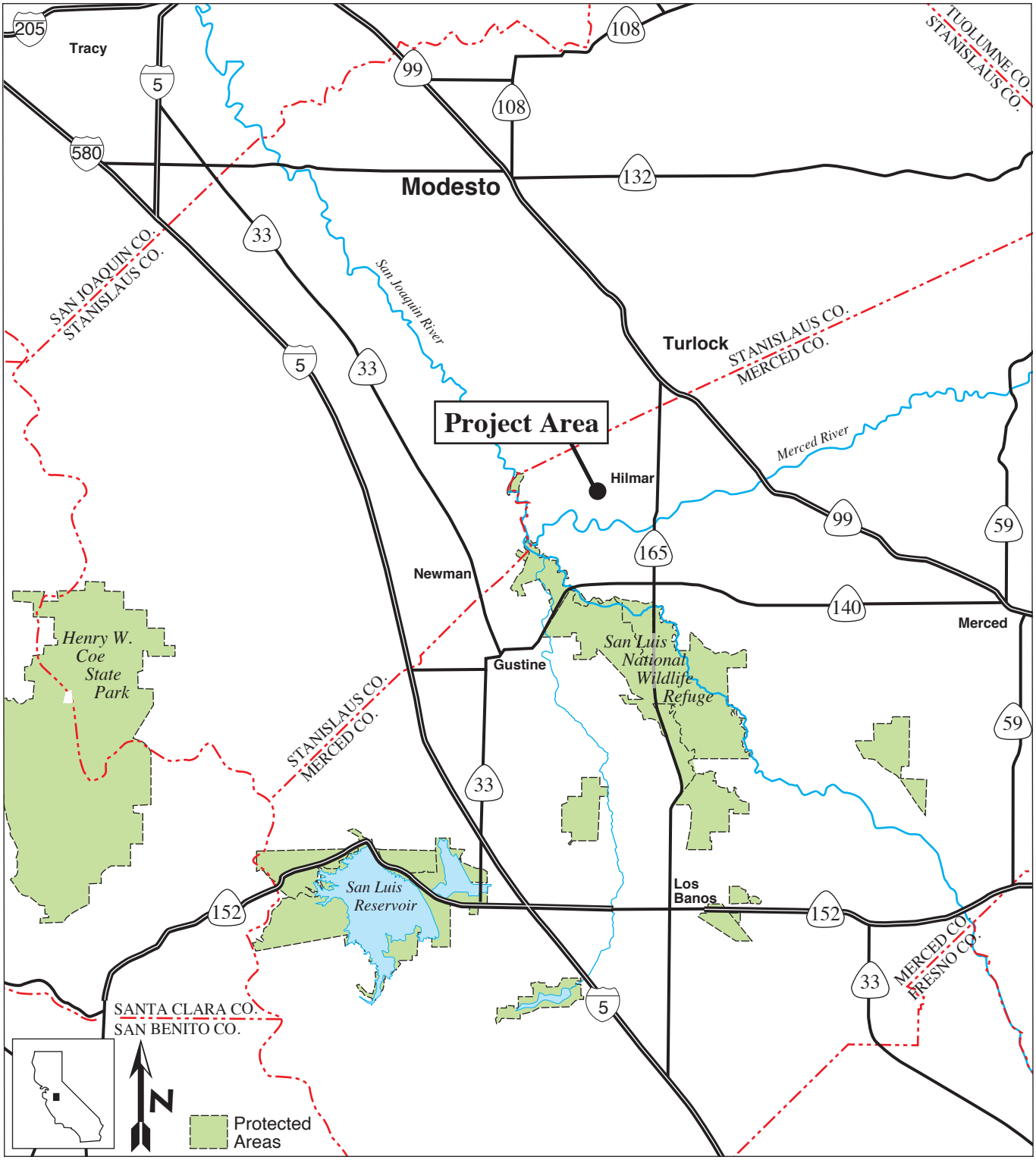
3.1.2 EXISTING CONDITIONS

The existing dairy facilities include approximately 597,876 square feet of roofed structures that are located on a 72±-acre portion of the dairy farm. See Figure 3-4 for existing facilities, including:

- four freestall barns
- rotary dairy milk barn
- corrals
- manure drying and storage areas
- five on-site residences
- raised calf hutches
- three commodity barns
- heifer barn
- storage barn
- utility shop
- modular office
- feed/silage areas
- four solid settling ponds
- one wastewater storage pond
- equipment area
- shade barn
- loafing barn
- calf pens

Approximately 582± acres of the dairy site project parcel are currently used for the production of crops and the application of manure process water and/or solid manure[1], including application areas on portions of parcels adjacent to the existing dairy facility (see Table 3-1). The remaining project acres consist of field roads and ancillary farm uses.

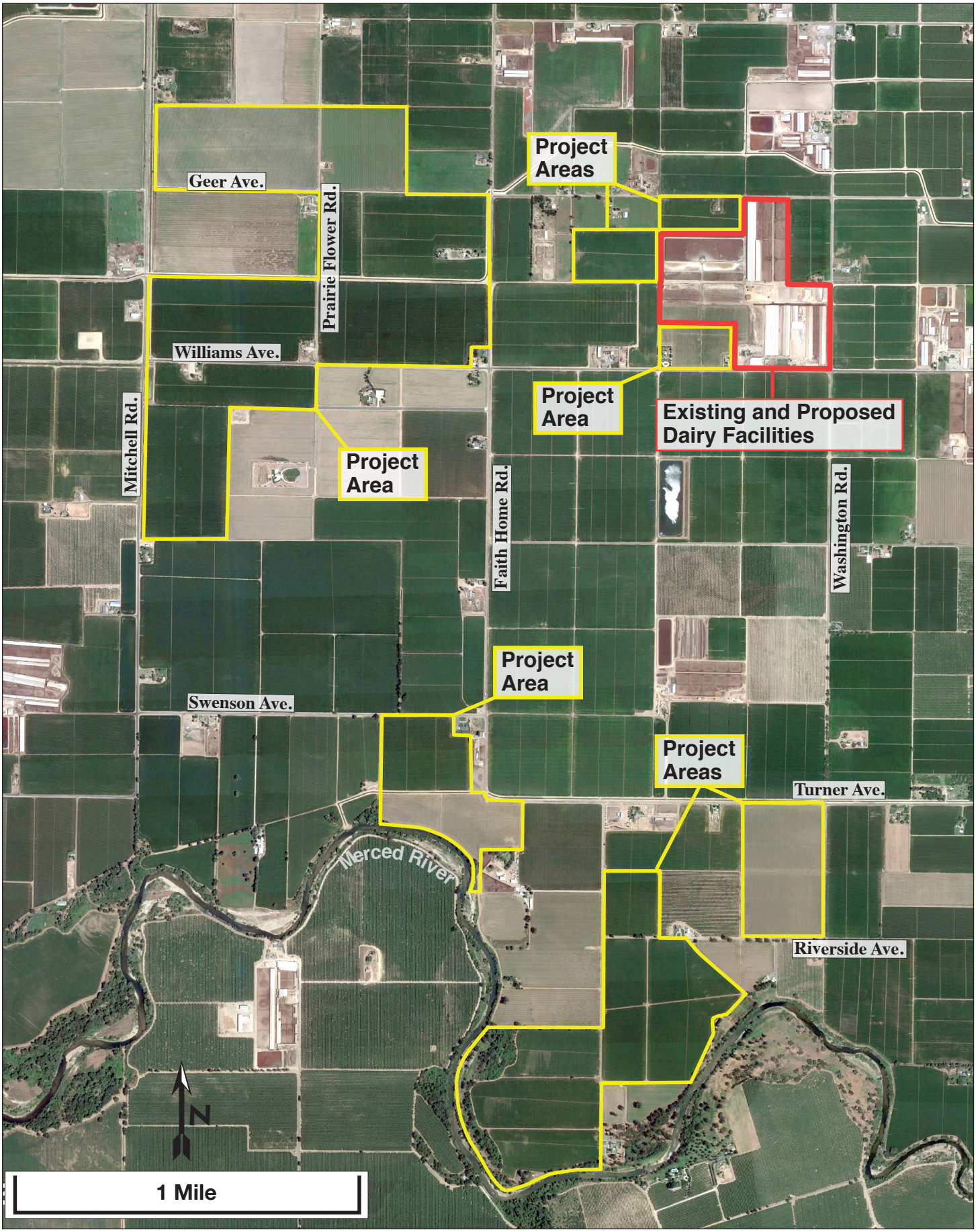
[1] While the details of cropland parcels may vary throughout operations, the disposal of wastewater and solid manure and the acreage necessary to properly dispose of manure liquids and solids would be accounted for in an updated project Nutrient Management Plan (NMP).



SOURCE: Planning Partners, 2023.

Vierra Dairy Expansion Project CUP20-009

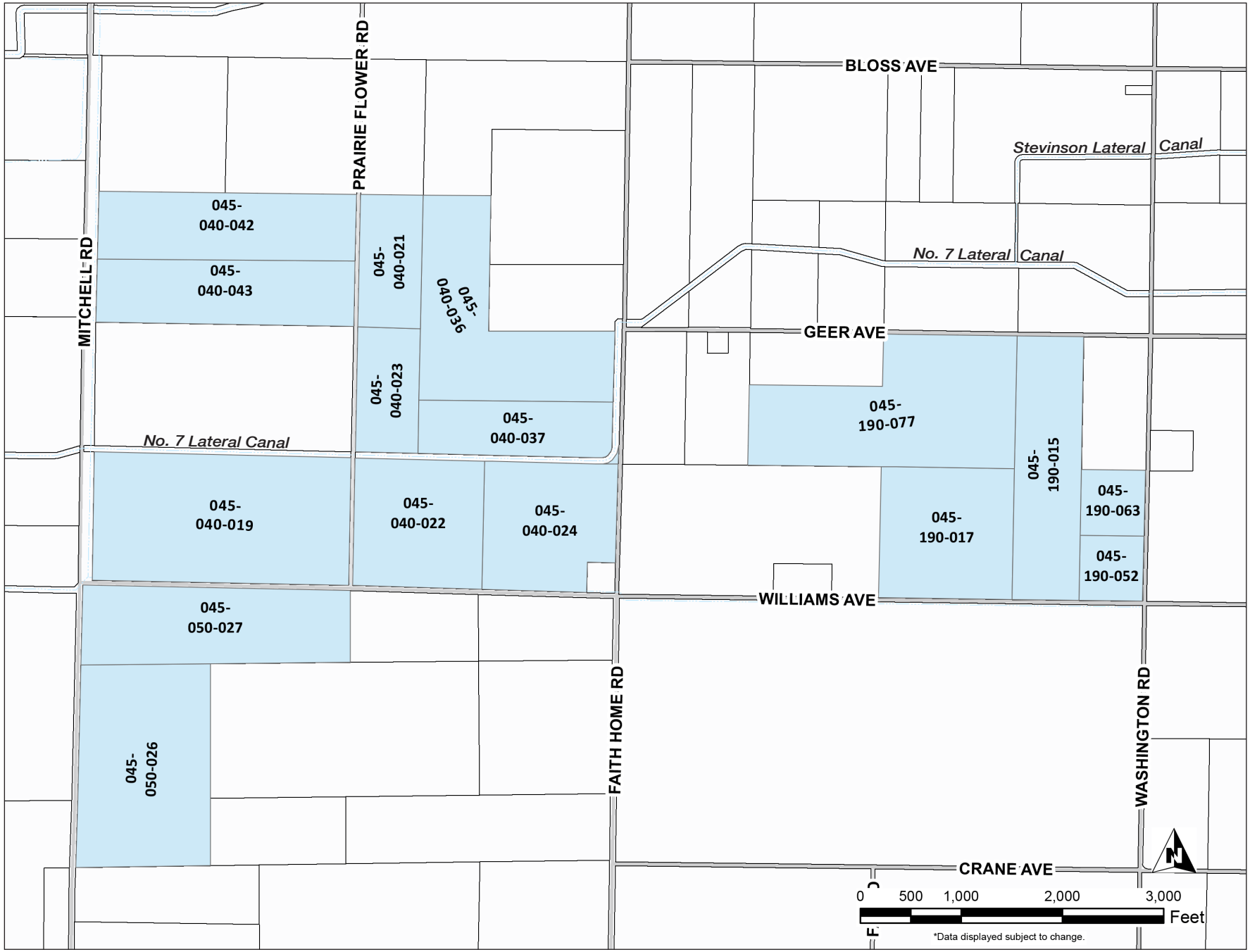
Figure 3-1
Regional Location



Vierra Dairy Expansion Project CUP20-009

SOURCE: Planning Partners, 2023.

Figure 3-2
Project Location

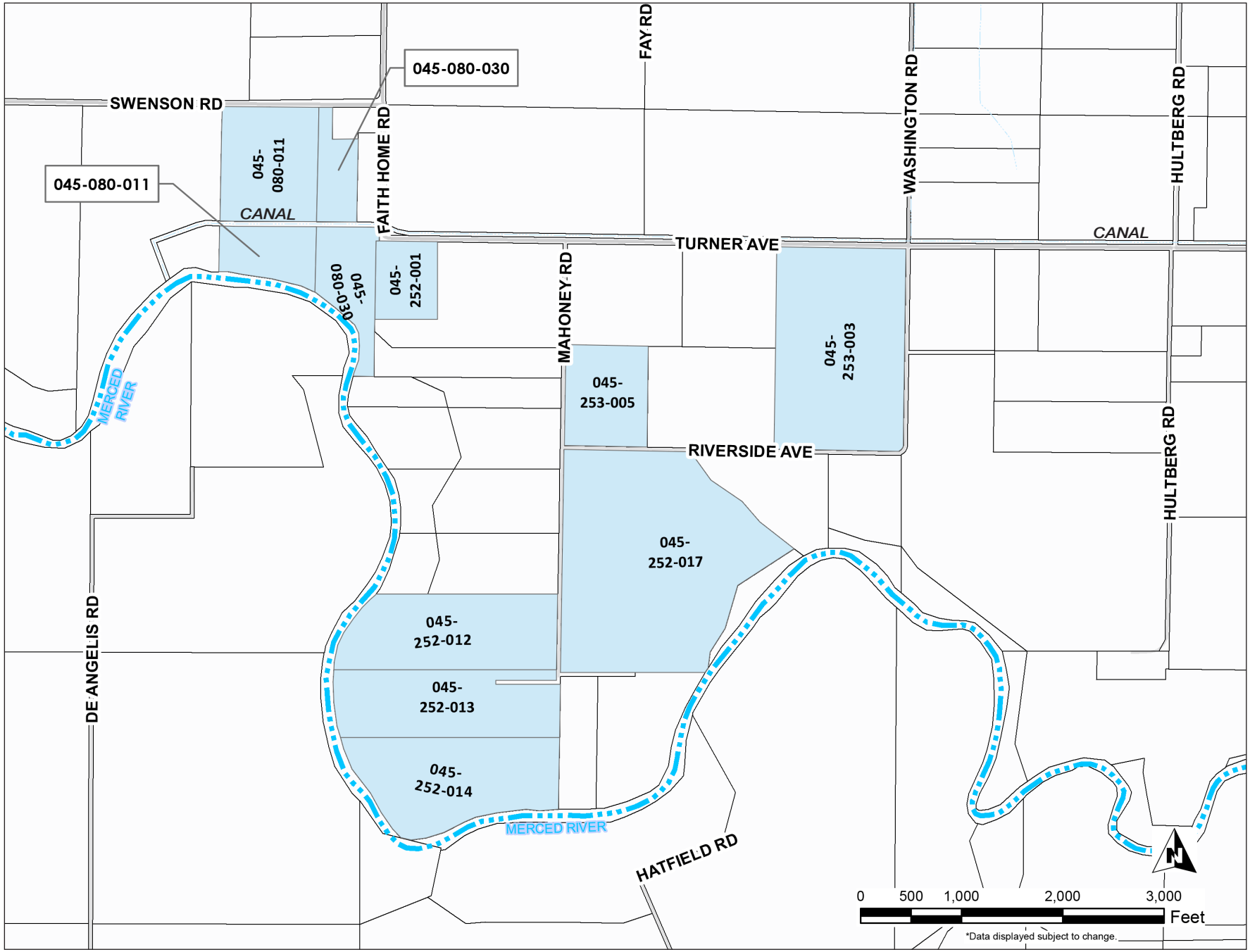


Vierra Dairy Expansion Project CUP20-009

SOURCE: Merced County GIS 2021

Figure 3-3a

Project Site Merced County Assessor Parcel Numbers - North



Vierra Dairy Expansion Project CUP20-009

SOURCE: Merced County GIS 2021

Figure 3-3b

Project Site Merced County Assessor Parcel Numbers - South

Vierra Dairy Expansion Project CUP20-009

SOURCE: Planning Partners 2023; FR Ag Services, Inc. 2017.

Figure 3-4
Existing Facilities

Table 3-1 Existing Conditions: Vierra Dairy Project Parcels, Acreage, and Use

APN	Field Name	Gross Acreage	Cropped Acreage *	Use
Dairy Owned Operational Acres				
045-190-015	Dairy	39.4	0	Active dairy facilities, residence
045-190-052	Dairy	9.4	0	Active dairy facilities, residence
045-190-063		9.7	0	Active dairy facilities
045-190-017	Williams 3	39.4	32	Active dairy facilities, residences, cropland: oats/corn/sudangrass
045-190-077	Geer 1	63.7	15	Wastewater ponds, residence, cropland: oats/corn/sudangrass
	Geer 2		25	
045-040-036	Faith Home 4	51.16	32	Cropland: oats/corn/sudangrass
	Faith Home 5		18	Cropland: oats/corn/sudangrass
045-040-023	Prairie Flower 6	18.6	18	Cropland: oats/corn/sudangrass
045-040-019	Williams 8	74.5	72	Cropland: oats/corn/sudangrass
045-040-022	Williams 7	37.7	72	Cropland: oats/corn/sudangrass
045-040-024		36		
045-050-027	Williams 9	41.4	32	Cropland: oats/corn/sudangrass
045-050-026	Mitchell 10	58.7	58	Cropland: oats/corn/sudangrass
045-080-011	Turner 11/12	37	68	Cropland: oats/corn
045-252-001		10.1		
045-080-030		24.6		
045-252-017	Riverside 14	86	84	Cropland: oats/corn
045-252-003	Washington 13	57.7	56	Cropland: oats/corn
Total		**695**	**582**	

Notes: APN = Assessor's Parcel Number; TID = Turlock Irrigation District

The existing NMP cited irrigation sources include both TID Canal surface water and groundwater from two on-site irrigation wells. While the NMP indicates that the TID Canal is the primary source of irrigation water for on-site fields, the irrigation wells can be used at the dairy operator's discretion. Similarly, the NMP materials indicate only liquid manure is applied to cropped fields, but both liquid and/or solid manure can be applied at the dairy operator's discretion as long as nutrient planning targets are met.

* Approximate acreage. Cropped acreage is based on the Existing Conditions Nutrient Management Plan dated 08/22/2017. Nutrients may not be applied to the gross acreage of the parcel listed, but only the cropped acreage listed.

Source: Vierra Dairy Farms Existing Conditions Nutrient Management Plan (08/22/2017)

As reported by the project applicant and established at the time of Initial Study preparation (August 2021), there are approximately 2,650 milk cows and 550 dry cows with 2,397 support stock, totaling 5,597 animals at the dairy. The predominant breed of cows housed at the dairy is Holstein and Jersey-Holstein cross.

The existing dairy facility consists of flush and scrape systems that are used to collect and process wastewater and solid manure. Animal wastes from animal barns and other concrete-surfaced areas are flushed with recycled water to an on-site waste management system that consists of four solid settling basins and one wastewater storage pond. All ponds are earthen-lined. The area of active dairy facilities has been graded to direct corral runoff to the existing waste management system. Stormwater runoff from impervious surfaces and roofed areas is routed to the wastewater pond, except for stormwater from a shade barn and heifer shade, which is routed to fields. Recycled water is used to clean the milk parlor floor and is the source of sprinkler pen water.

Definition of the Project Site – For the purposes of this Environmental Impact Report, the "project site" refers to the area of active dairy facilities. The larger project also includes cropland associated with the dairy farm. Throughout this document, "project area" refers to all parcels that are part of the project, including the active dairy facilities and associated cropland.

Dry manure is scraped from corrals once per year. Manure solids are separated from liquids in a separation system combined with four separation basins. The mechanical separators on the facility are generating material daily. This material is moved from the separator pad several times a week and transferred into the manure drying area where it is placed in windrows. Once in windrows, the dairy has a windrow turner that dries and conditions the material. Once the drying process is completed (typically several weeks depending upon the weather), the material can then either be used for freestall bedding (consisting of dry manure and almond shells), applied on the project site, or sold to brokers and hauled off-site to fields in the project vicinity. As reflected in the NMP, approximately 30,000 tons of solid manure and separated solids (or approximately 485,000 pounds of nitrogen) (approximately 25-30 percent of the dry manure generated at the dairy) is exported and applied to off-site fields not owned by the dairy operator.

The dairy facility uses both surface water and groundwater resources for farm operations. Domestic water to the site and dairy barns is provided by three on-site water wells (there are four additional domestic wells associated with the project area). Irrigation water is supplied by surface water sources from Turlock Irrigation District (TID) canals and two irrigation wells. Wastewater is mixed with irrigation water supplied by TID canal surface water or on-site wells and applied to cropland (see Table 3-1). Receiving fields are graded to guide excess applied irrigation water to an existing tailwater return and/or retention system. Collected tailwater is recycled and returned to the nearest field pipe access for reapplication. Field application of wastewater would include surface irrigation via pipeline.

For a portion of the Vierra Dairy land application area, there is a tile drain system that was installed by the private landowner in 1999. The tile drains are composed of corrugated 6- to 12-inch pipes surrounded by a gravel envelope. The number and depth of these lines vary based on soil drainage capacity and field slope. The depths range from 6 to 12 feet, and typically one to three pipes are installed per field using a deep rip backhoe. These pipe systems control shallow groundwater levels with a groundwater control pump; when groundwater reaches the tile drain elevation, the pump is activated to draw groundwater levels down. Groundwater pumped from the tile drain system is discharged to the TID irrigation lateral system in the area.

The Vierra Dairy is a member of the Central Valley Dairy Representative Monitoring Program (CVDRMP). The CVDRMP has established a regional groundwater monitoring plan for member dairies in order to monitor groundwater quality and evaluate impacts from management practices.

Crops grown on-site are used as animal feed for the dairy and supplement imported grain and hay. Crops include oats silage-soft dough, corn silage, and sudangrass silage. Feed is stored in silage piles and in an on-site commodity barn.

The Vierra Dairy uses a weekly pest control service, and all structures are sprayed for basic insect control. Additionally, the dairy operator also periodically sprays for flies. The dairy facility stores diesel fuel for agricultural use in a 200-gallon aboveground tank. There is a permitted emergency generator on-site. Hazardous materials used in dairy operations are stored in both the milk barn and the shop. As reported by Merced County Division of Environmental Health (DEH) during the preliminary application review, the facility has a current Hazardous Materials Business Plan (HMBP).

There are five residences located at the Vierra Dairy facility. One residence is occupied by the owner's family member, three residences are occupied by employees and their families, and one residence is currently vacant. Domestic water is delivered to the residences via the on-site water wells. Sewer service is provided by existing on-site septic systems.

Operations at the dairy are 24 hours per day, 365 days per year, with most operations concentrated during daylight hours. Night lighting at the facility includes LED lights on the freestall barn and milk barn. The dairy currently employs a staff of approximately 32 workers.

Currently, heavy trucks (milk tankers, commodity deliveries) and other vehicles serve the project site. Existing daily trips by all classes of vehicles are estimated at 77.8 average daily trips (ADT), with approximately 7.5 heavy truck trips. All trips currently access Williams Avenue or Washington Road. Regional access is provided by Highway 165 to the east. The dairy provides on-site parking areas for employees and suppliers/vendors.

The majority of the project site is located within Flood Zone X, which is defined as an area with an annual flooding probability of 0.2 percent, outside of the 100-year flood zone. A small portion of the project site is located within Flood Zone A, an area subject to inundation by the 100-year storm, but for which a Base Flood Elevation has not been established.

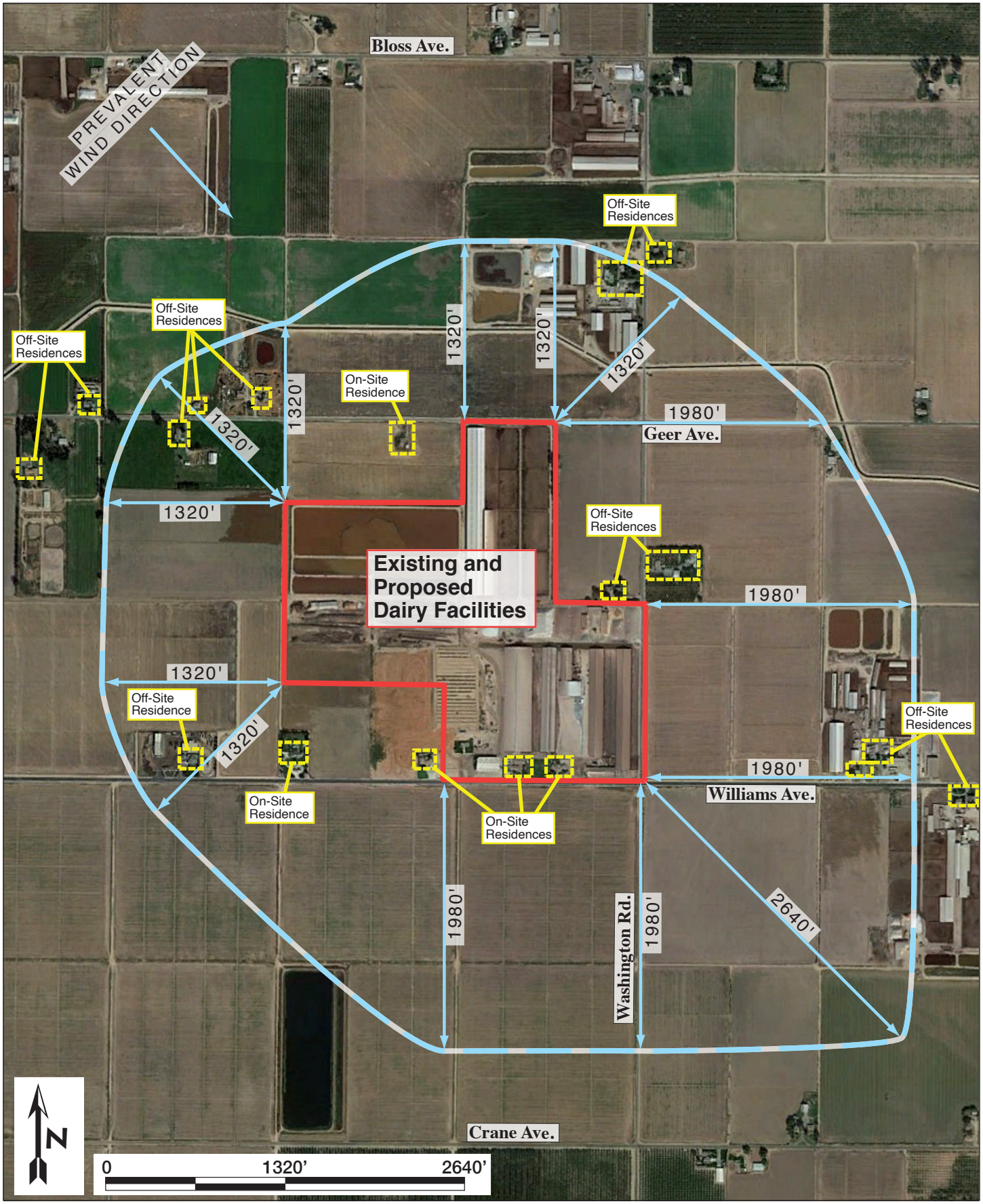
3.2 SURROUNDING LAND USES AND SETTING

There are off-site single-family residences associated with neighboring agricultural operations surrounding the project site to the north, west, and east. There are several off-site residences located within the windshed of the dairy (defined as an area of 1,320 feet upwind to 2,640 downwind of the periphery of the animal facility) (see Figure 3-5). Table 3-2 lists the immediate surrounding land uses and corresponding General Plan and zoning designations to the Vierra Dairy active animal confinement facilities.

Table 3-2 Surrounding Land Uses at the Vierra Dairy Farm

Location	Land Use	General Plan	Zoning
ON-SITE	Dairy / Agriculture / 5 residences	Agricultural	General Agricultural A-1
NORTH	Agriculture / Residences / Dairy	Agricultural	General Agricultural A-1
EAST	Agriculture / Dairy / Residences	Agricultural	General Agricultural A-1
SOUTH	Agriculture / Residences / Dairies / Merced River	Agricultural	General Agricultural A-1
WEST	Agriculture / Residences / Dairies	Agricultural	General Agricultural A-1

Source: Project Site Visit, November 24, 2020; Project Applicant, November 2020; Merced County GIS 2021.



Vierra Dairy Expansion Project CUP20-009

SOURCE: Planning Partners, 2023.

Figure 3-5

Active Dairy Facilities and Nearby Residences Located in the Windshed

The community of Hilmar is located approximately 2.5 miles to the east-northeast of the existing active dairy facilities. The Merced River is located approximately 1.5 miles south of active dairy facilities, and immediately adjacent to several application area fields (see Figure 3-2).

Project details such as adjacent land uses and cropping patterns could change over the course of evaluation, and from those existing at the time of this Environmental Impact Report (EIR). These changes, however, would consist of agricultural and ancillary uses consistent with the 2030 Merced County General Plan, and would not affect the analysis contained in this EIR.

3.3 GOALS AND OBJECTIVES OF THE PROJECT APPLICANT

As required by California Environmental Quality Act (CEQA) Guidelines Section 15124(b), the following is a discussion of the project applicant's objectives in proposing the Vierra Dairy Expansion project. The objectives include the underlying purpose of the project, and also identifies project benefits. The applicant has identified the following goals in proposing the project:

- To maintain a modern, efficient, and competitive dairy operation that operates in full compliance with applicable county, state, and federal laws and regulations.
- To fully use land and facilities currently owned and operated by the project applicant.
- To use all available land (which is not otherwise used for the dairy) for the production of feed for the herd. This allows for the application, at appropriate agronomic rates, of dairy process water from dairy operations, which in turn reduces the need for imported fertilizers.
- To generate dry manure that can be land applied and/or sold as a commodity for use as fertilizer in the region.
- To construct improvements that could be permitted within a reasonable time frame and would represent commensurate benefit with cost.
- To provide year-round employment opportunities, at competitive wages, for Merced County residents. Unlike other agricultural operations, which provide only seasonal employment, dairies provide year-round employment.

The objectives identified above "will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary" (CEQA Guidelines Section 15124(b)).

3.4 DESCRIPTION OF THE PROPOSED ACTION

The project sponsor has applied for a new Conditional Use Permit (CUP20-009) from Merced County to modify and expand the existing dairy to house 4,170 milk cows, 550 dry cows, and 2,397 support stock (see Table 3-3). Considering the existing animals at the dairy facility, the proposed expansion would represent an increase of 1,520 milk cows from existing numbers.

Table 3-3 Existing and Proposed Herd at the Vierra Dairy

	Milk Cows	Dry Cows	Bred Heifers (15-24 mo.)	Heifers (7-14 mo.)	Calves (4-6 mo.)	Calves (0-3 mo.)	Total Animals
Existing Herd	2,650	550	797	800	400	400	5,597
Proposed Herd	4,170	550	797	800	400	400	7,117
Change	**1,520**	**0**	**0**	**0**	**0**	**0**	**1,520**

Note: This evaluation considers maximum buildout.

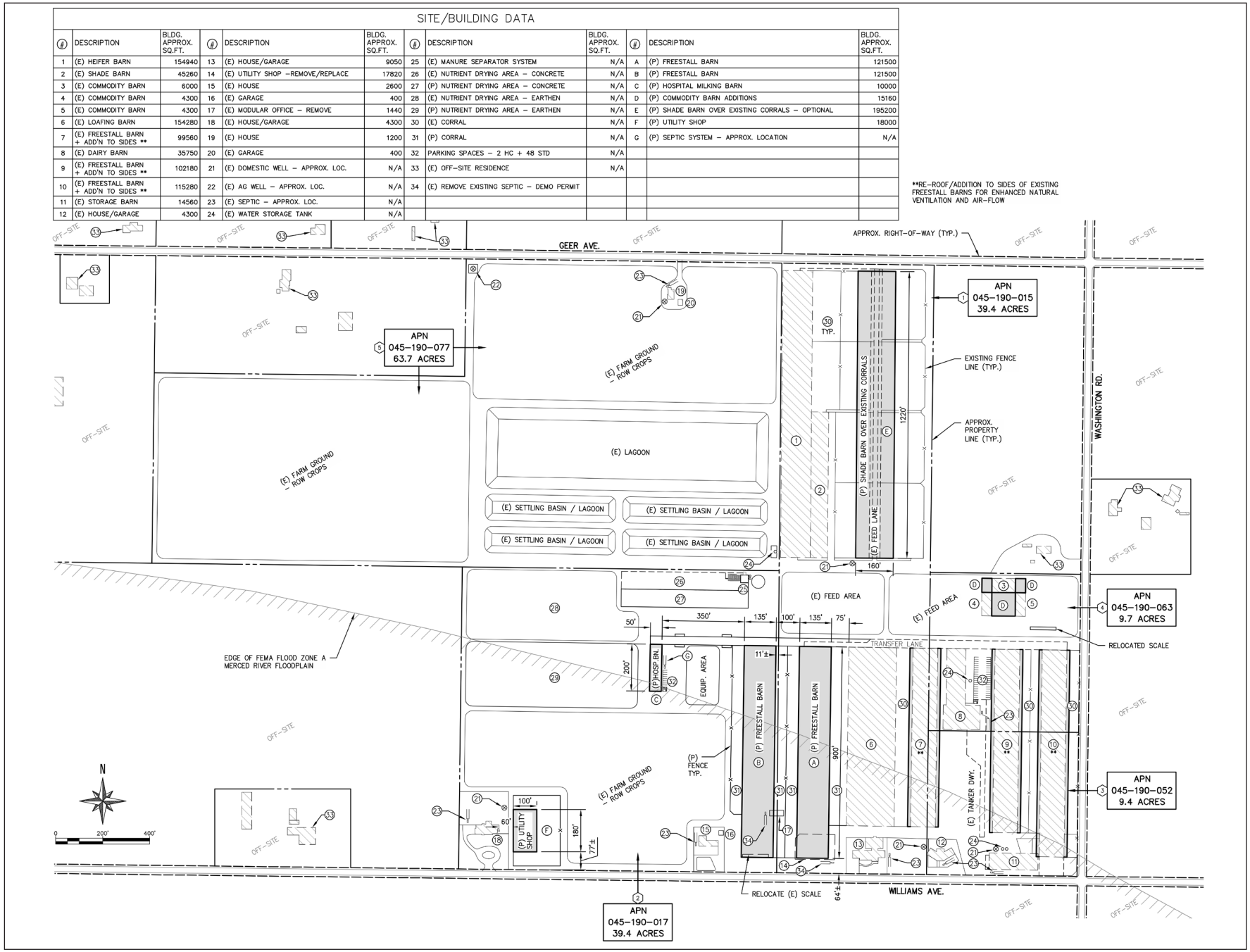
Source: Existing Conditions Nutrient Management Plan (08/22/2017); Proposed Conditions Nutrient Management Plan (06/04/2020).

The proposed project would include the construction of supporting buildings and structures at the existing dairy, including:

- two (2) freestall barns of approximately 121,500 square feet each and associated corrals
- 10,000 square-foot hospital milking barn
- 15,160 square-foot commodity barn addition
- 195,200 square-foot heifer barn (covering existing corrals)
- 18,000 square-foot utility shop

See Figure 3-6 for the proposed dairy site plan. Further dairy modifications would include additional concrete and earthen manure drying areas, a mechanical manure separator, and a septic system near the proposed hospital milking barn. The existing calf pens, utility shop, modular office, and associated septic systems would be removed with construction of the proposed facilities.

Construction of the proposed facilities would result in the conversion of approximately 15 acres of cropland, and cropped acreage on Williams 3 would be reduced from 32 acres to 17 acres (see Table 3-4). With the recent purchase of surrounding farmland over nine additional parcels, there would be a total of approximately 770± acres of cropland available for wastewater and manure application with the proposed dairy expansion (see Table 3-4 and Figures 3-7a and 3-7b for the layout of the dairy fields). (All new cropped fields are already equipped with pipelines and tailwater return and/or retention systems.) Crops grown on-site, including double-cropped oats silage and corn silage, would be used for dairy feed crops and supplement imported grain and hay. Silage piles would remain the same as existing operations.

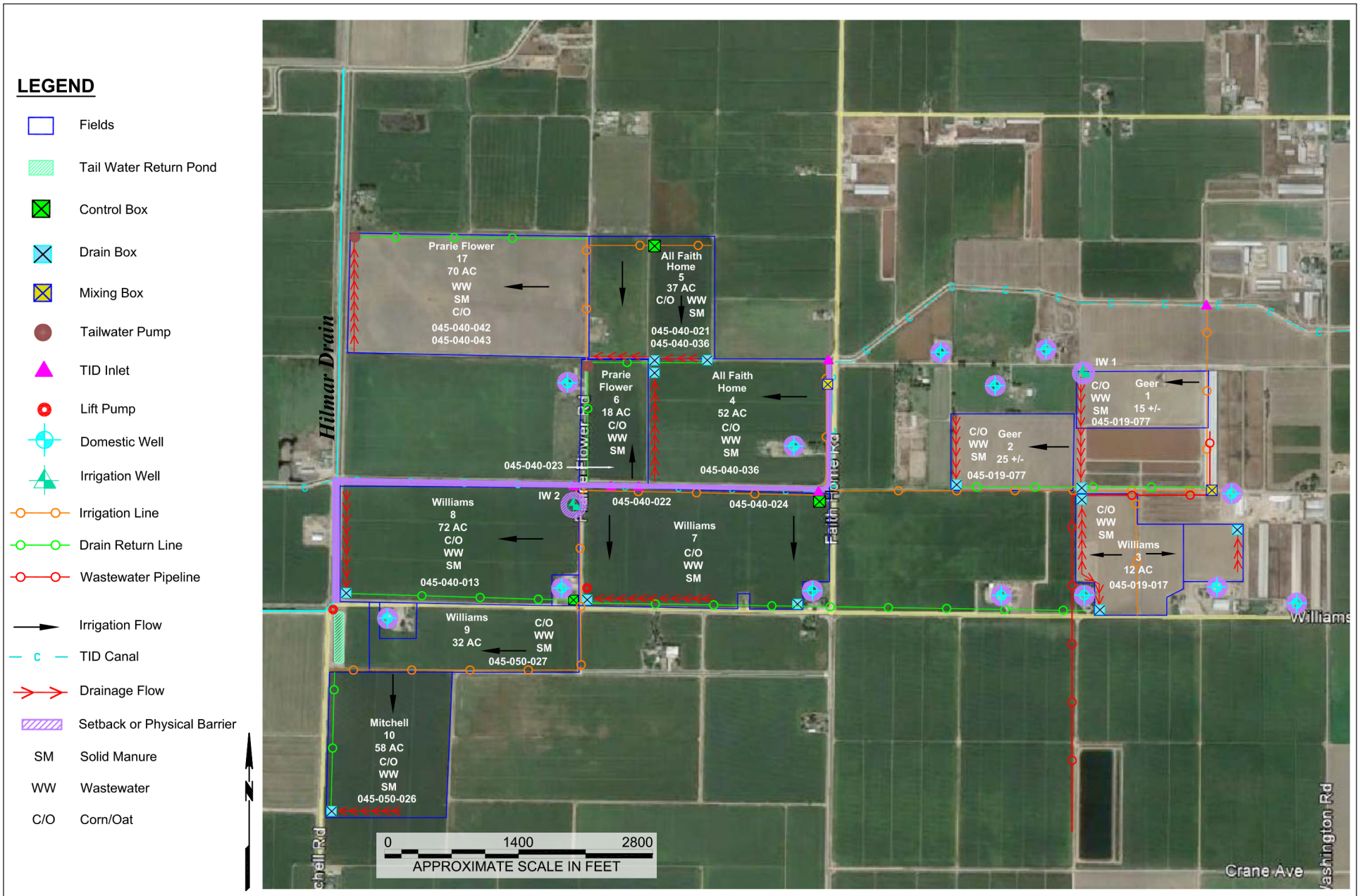


Vierra Dairy Expansion Project CUP20-009

SOURCE: JToste Engineering 2020

Figure 3-6

Proposed Dairy Facilities

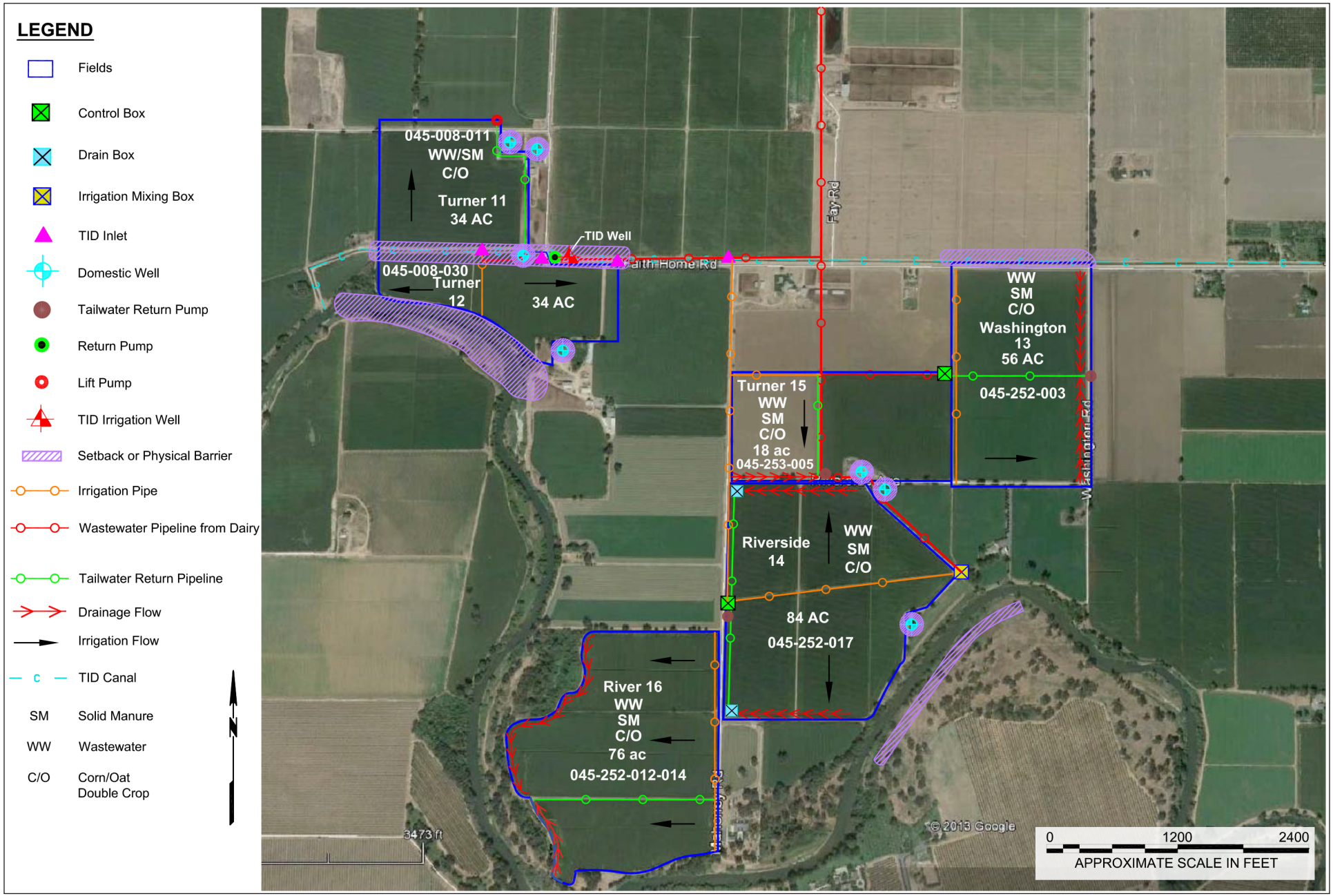


Vierra Dairy Expansion Project CUP20-009

SOURCE: FR Ag Services, Inc. 2020

Figure 3-7a

Land Application Areas - North



Vierra Dairy Expansion Project CUP20-009

SOURCE: FR Ag Services, Inc. 2019

Figure 3-7b

Land Application Areas - South

Table 3-4 Proposed Conditions: Vierra Dairy Project Parcels, Acreage, and Use				
APN	**Field Name**	**Gross Acreage**	**Cropped Acreage***	**Use**
Dairy Owned Operational Acres				
045-190-015	Dairy	39.4	0	Active dairy facilities, residence
045-190-052	Dairy	9.4	0	Active dairy facilities, residence
045-190-063	Dairy	9.7	0	Active dairy facilities
045-190-017	Williams 3 **	39.4	17	Active dairy facilities, residences, cropland: oats/corn
045-190-077	Geer 1	63.7	15	Wastewater ponds, residence, cropland: oats/corn
	Geer 2		25	
045-040-037	Faith Home 4	24.96	52	Cropland: oats/corn
045-040-036		51.16		
	Faith Home 5		37	Cropland: oats/corn
045-040-021		19.4		
045-040-023	Prairie Flower 6	18.6	18	Cropland: oats/corn
045-040-019	Williams 8	74.5	72	Cropland: oats/corn
045-040-022	Williams 7	37.7	72	Cropland: oats/corn
045-040-024		36		
045-050-027	Williams 9	41.4	32	Cropland: oats/corn
045-050-026	Mitchell 10	58.7	58	Cropland: oats/corn
045-080-011	Turner 11/12	37	68	Cropland: oats/corn
045-252-001		10.1		
045-080-030		24.6		
045-252-017	Riverside 14	86	84	Cropland: oats/corn
045-252-003	Washington 13	57.7	56	Cropland: oats/corn
045-040-042	Prairie Flower 17	39.25	70	Cropland: oats/corn
045-040-043		39.26		
045-252-012	River 16	34.7	76	Cropland: oats/corn
045-252-013		29.4		
045-252-014		47.3		
045-253-005	Turner 15	19.2	18	Cropland: oats/corn
Total		**949**	**770**	

Notes: APN = Assessor's Parcel Number; TID = Turlock Irrigation District

Shaded parcels indicate cropland recently purchased to be available for wastewater and manure application with the proposed dairy expansion.

The proposed NMP sited irrigation sources include both TID Canal surface water and groundwater from two on-site irrigation wells. While the NMP indicates that the TID Canal is the source of irrigation water for on-site fields, the irrigation wells can be used at the dairy operator's discretion. Similarly, the NMP materials indicate only liquid manure is applied to cropped fields, but both liquid and/or solid manure can be applied at the dairy operator's discretion as long as nutrient planning targets are met.

* Approximate acreage. Cropped acreage is based on the Existing and Proposed Conditions Nutrient Management Plan dated 08/22/2017 and 06/04/2020, respectively. Nutrients may not be applied to the gross acreage of the parcel listed, but only the cropped acreage listed.

** With the proposed dairy expansion, cropped acreage on Williams 3 would be reduced from 32 acres to 17 acres.

Source: Project Applicant, March 2021; Proposed Conditions Nutrient Management Plan (06/04/2020); Merced County GIS March 2021.

There are six off-site residences located within 1,000 feet of active areas of the dairy. With the proposed dairy expansion, distances to five of these residences would not be reduced (see Figure 3-8). The distance of active animal facilities to a residence located along Williams Avenue would be reduced from 900 feet to 750 feet with the proposed dairy expansion.

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

Stormwater runoff from impervious surfaces and roofed areas would continue to be routed to the wastewater pond, except for rainwater from several barns, which would be routed to nearby fields and yards. Wastewater would continue to be mixed with irrigation water and applied to the fields. As shown in Figures 3-7a and 3-7b, there are setbacks or physical barriers for wells, canals, and drains. These consist of primarily elevated physical barriers on the canals and drains that protect surface water resources from pollution.

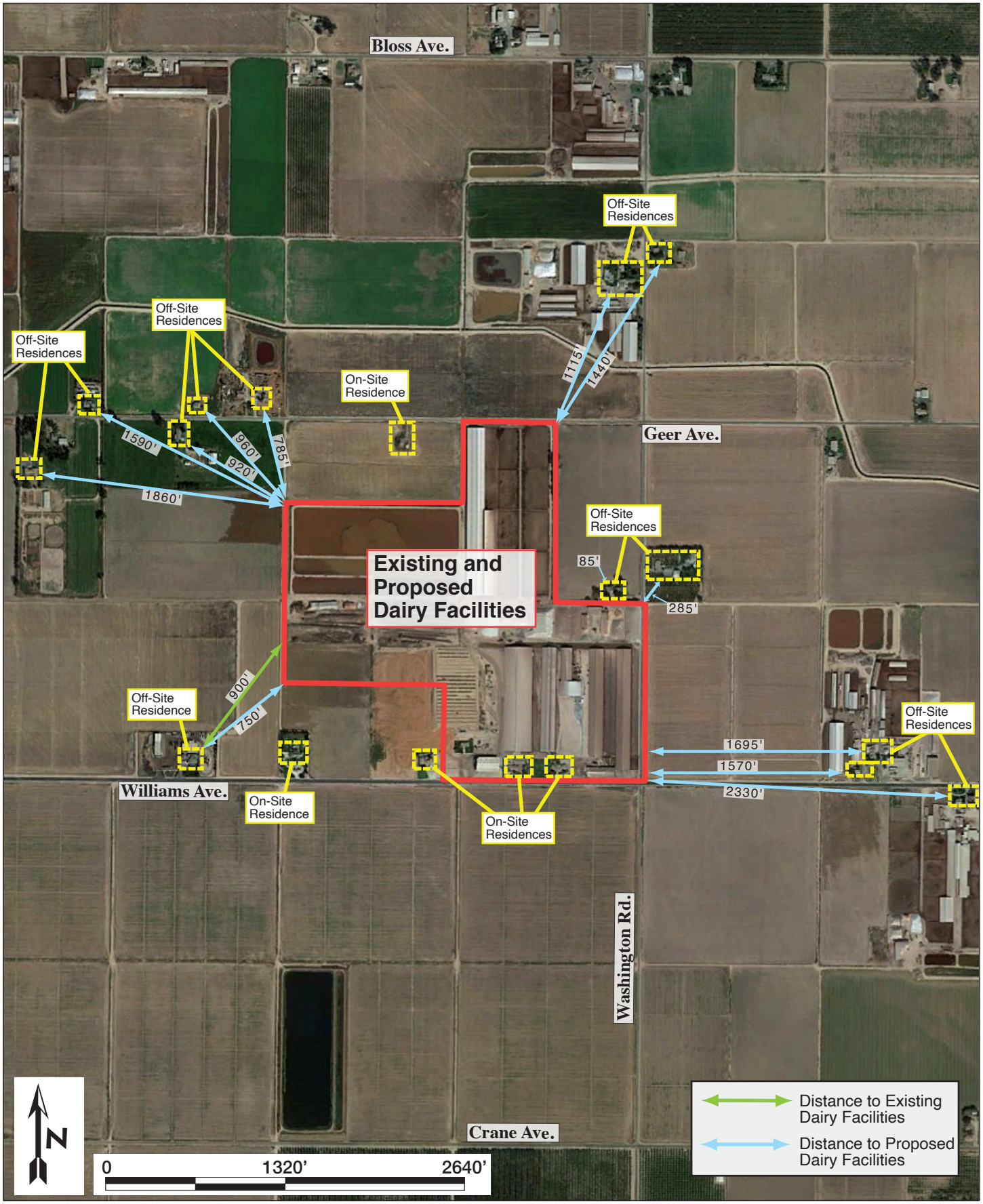
Solid manure that accumulates within corrals would continue to be scraped. With the proposed dairy expansion, dry manure would continue to be composted on-site and removed once a month. Dry manure and almond shells would continue to be used for bedding; additional manure would be sold and hauled off-site for use as fertilizer and soil amendments. Manure solids would continue to be separated from liquids in a separation system combined with four separation basins. As reported in the NMP, exported solid manure applied to off-site agricultural fields not owned by the project applicant would increase from 30,000 tons of solid manure from the dairy facility to 34,000 tons of solid manure with the proposed expansion (increasing from approximately 25-30 percent under existing conditions to 35-40 percent of previously separated solids under proposed conditions[2]). While the exact location of these off-site cropland parcels may vary throughout operations, the disposal of manure at off-site locations and the acreage necessary to properly dispose of manure liquids and solids are accounted for in the project NMP. Figure 3-9 shows a cross-section of a freestall dairy barn and Figure 3-10 illustrates the processes that occur at a dairy farm.

The dairy facility uses and stores diesel fuel, motor oil, hydraulic oil, and other petroleum products associated with the operation of heavy equipment. The dairy facility also uses and stores cleaning and maintenance materials that may be categorized as hazardous. The types and quantities of these materials are documented in the HMBP prepared for this facility, which would be updated as necessary.

The proposed dairy expansion would rely on existing utilities, including domestic water, stormwater, and electrical services. Electrical service is provided by the Turlock Irrigation District. The project does not include any new lighting.

Operations at the dairy would continue to occur 24 hours per day, 365 days per year, with most operations concentrated during daylight hours. With implementation of the proposed project, the number of employees would increase from 32 to approximately 45 workers.

[2] The dairy facility has a limited land base, which would be reduced with the proposed expansion. The proposed increase in herd would result in an associated increase in manure and greater increase in exports. With the amount of irrigated land in the area, there is a high demand for dairy manure as an economical fertilizer source for other growers, and the increased manure to be exported would easily be sold to third-party fertilizer companies.

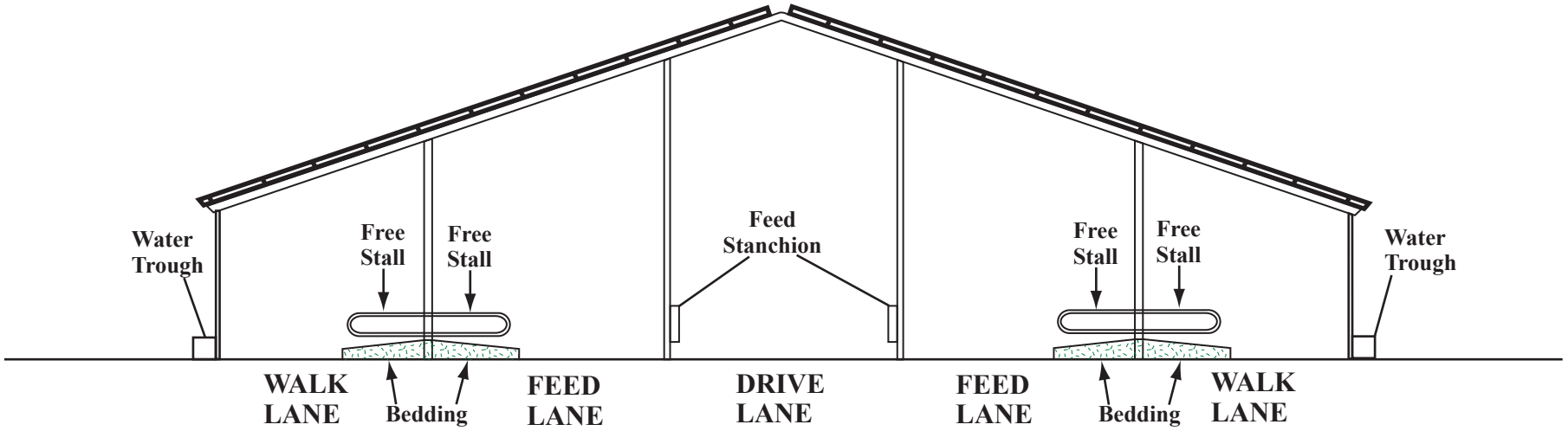


Vierra Dairy Expansion Project CUP20-009

SOURCE: Planning Partners, 2023.

Figure 3-8

Distance of Nearest Off-Site Residences to Existing and Proposed Active Dairy Facilities

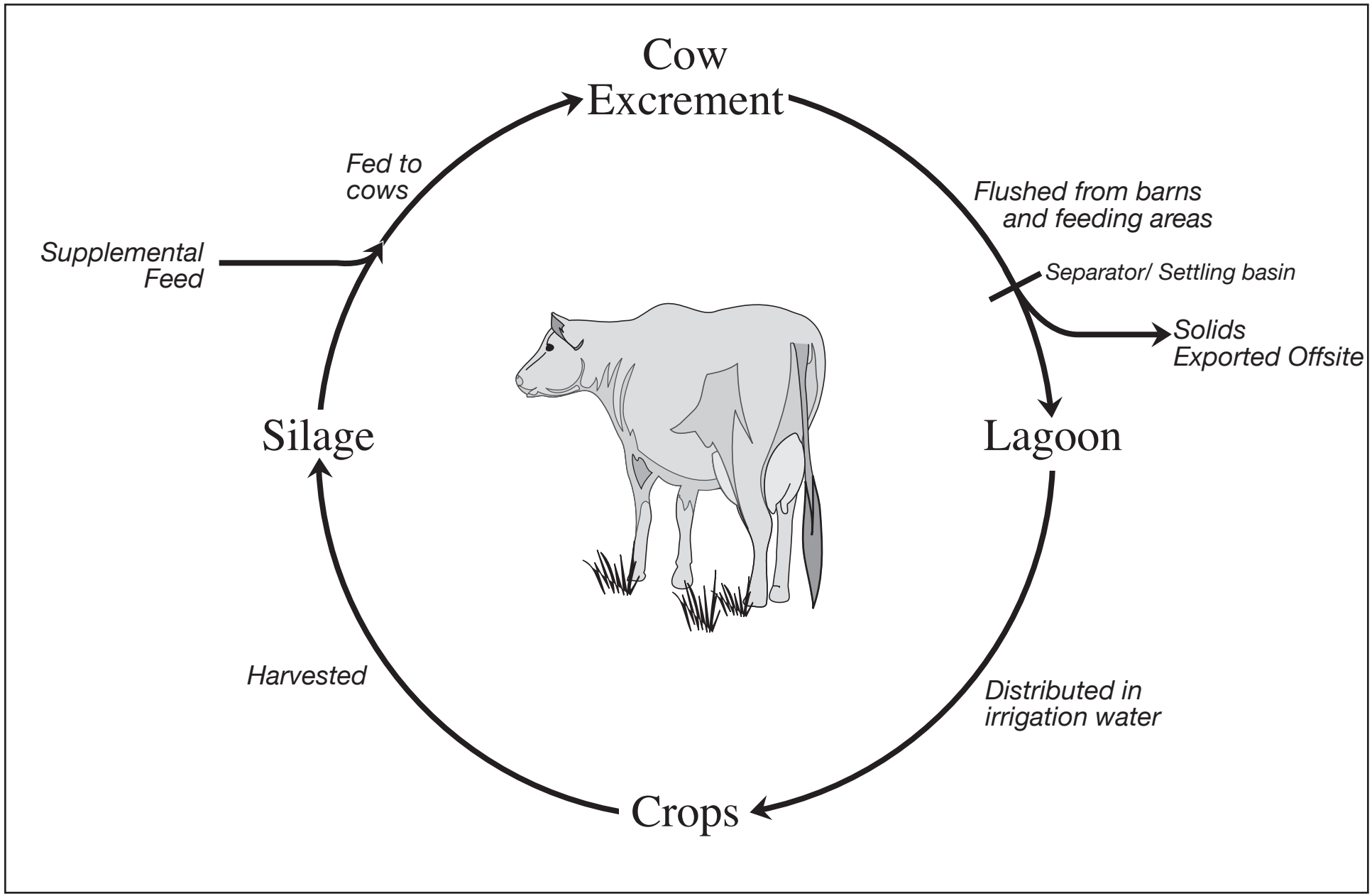


Vierra Dairy Expansion Project CUP20-009

SOURCE: Planning Partners, 2023.

Figure 3-9

Freestall Dairy Barn - Schematic Cross-Section



Vierra Dairy Expansion Project CUP20-009

SOURCE: Planning Partners, 2023.

Figure 3-10
Process Diagram

The project applicant has prepared an Odor Control Plan and Vector Control Plan in accordance with ACO Chapter 18.64.060. As part of the Odor Control Plan, the dairy operator will provide a point of contact to residents within the windshed of the dairy should nuisance odors occur. As required by the ACO, the dairy operator will respond to neighbors who are adversely affected by odors and take corrective action.

3.4.1 CIRCULATION AND PARKING

The project site would continue to be served by heavy trucks (milk tankers, commodity deliveries), and other vehicles. Daily trips by all classes of vehicle are estimated to increase from approximately 77.8 to 109.1 average daily trips (an increase of 31.3 daily trips), including 4.3 heavy truck trips per day (see Table 3-5). The majority of trips would consist of auto and light truck trips. All trips would continue to be made via Williams Avenue. There would be adequate parking for 48 spaces, with 2 accessible parking spots.

Table 3-5 Vierra Dairy Expansion Project Trip Generation and Assignment

Trip Type/Purpose	Daily Trip Generation Factor	Type of Vehicle	Daily Trips		Local Route of Trip
			Existing	With Project	
Residential Dwellings (on site)	2/residence *See Note 1	Auto/Light Truck	8	8	Williams Ave
Employees (dwelling off site)	2/employee *See Note 2	Auto/Light Truck	58	84	Williams Ave
Milk Tanker	*See Note 3	Heavy Truck	5	8	Williams Ave
Commodities transport from off site	*See Note 4	Heavy Truck	2	3	Williams Ave
Solid manure transport to off-site fields	*See Note 5	Heavy Truck	0.5	0.8	Williams Ave
Rendering Service/Other	*See Note 6	Medium Truck	2	3	Williams Ave
Veterinarian	2/week	Light Truck	0.3	0.3	Williams Ave
Purveyor sales	2/facility office	Auto/Light Truck	2	2	Williams Ave
Total Auto/Light Truck Trips			**68.3**	**94.3**	
Total Medium Truck Trips			**2**	**3**	
Total Heavy Truck Trips			**7.5**	**11.8**	
Total Trips			**77.8**	**109.1**	

Notes: Trip Generation table based on Planning Partners assumptions and information obtained from project applicant.

1. There are five existing residential dwellings located on-site. One residence is occupied by the owner's family member, three residences are occupied by employees and their families, and one residence is currently vacant. For a dairy farm operation, a trip generation factor of 2 trips per day was used for both on-site residences and off-site employees.
2. There are 32 employees existing and there would be approximately 45 employees with the proposed expansion. Because 3 employees currently live on-site, the existing dairy facility consists of 29 off-site employees and the proposed dairy facility would include 42 off-site employees.
3. There are 5 milk tanker truck trips to the dairy per day, and there would be 8 with the proposed expansion.
4. There are 2 commodity truck trips from off-site per day, and there would be 3 with the proposed expansion.
5. Currently all exported manure is removed off-site by outside hired trucks; approximately 200 trucks loads export manure off-site under existing operations and approximately 300 truck loads would be required to export manure off-site annually under proposed operations.
6. There are approximately 2 truck trips per day for rendering service/springer heifers/others, and there would be 3 with the proposed expansion.

Source: Planning Partners 2021. Project Applicant 2021.

3.5 PROJECT CONSTRUCTION AND PHASING

The proposed dairy expansion would be constructed in one phase over an approximate two (2) year construction period. There would be cut and fill with construction, but all soils would be balanced on-site.

3.5.1 PROJECT PERMITTING HISTORY

Merced County records indicate there are several old permits on file for the project site, including permits for additional dwellings, Williamson Act Contracts, and the original dairy and dairy lagoon. There is an existing use permit issued by the County (CUP12-005) on file for the dairy, which allowed for a dairy expansion in 2012 to 5,600 total animals. The NMP indicates that the facility has been in operation since 1967.

The existing dairy is operating in accordance with the Central Valley Regional Water Quality Control Board (CVRWQCB) Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies (Order R5-2013-0122). The General Order requires approval and implementation of a NMP for the application of waste to land application areas, and a Waste Management Plan (WMP) to ensure proper compliance with the General Order (see Appendix J for a copy of the proposed conditions WMP and NMP). As established by the Report of Waste Discharge (ROWD) submitted for the existing dairy to the CVRWQCB in October 2005, the State-permitted herd size for the dairy was 1,573 milk and dry cows combined[3], with regulatory review required for expansions of greater than 15 percent above this value. Following the 2012 expansion of the Vierra Dairy, the ROWD submitted to the CVRWQCB established a herd size of 3,200 milk and dry cows combined. Individual Waste Discharge Requirements (WDRs) were never issued by the CVRWQCB for the 2012 Vierra Dairy Expansion.

The Permit to Operate (PTO) on file for the dairy facility (expiration date 12/31/2023) issued by the San Joaquin Valley Air Pollution Control District (SJVAPCD) allows 2,650 milk cows (not to exceed a combined total of 3,200 mature cows) and 1,997 support stock, in addition to 400 calves.

3.6 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 evaluation process prior to project approval. The DEH staff performed an inspection of the Vierra Dairy on February 25, 2021. The DEH concluded that the dairy facility was in substantial compliance with the ACO on March 2, 2021.

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

3.7 ESTABLISHING THE PROPER "BASELINE" FOR THE PROPOSED DAIRY EXPANSION

To determine whether an impact is significant, a "baseline" set of environmental conditions is required against which agencies can assess the significance of project impacts. As established by CEQA Guidelines Section 15125(a), the existing environmental setting, usually established at the time a Notice of Preparation is issued, should normally constitute the baseline. In this case, "the impacts of a proposed project are ordinarily to be compared to the actual environmental conditions existing at the time of CEQA analysis, rather than to allowable conditions defined by a plan or regulatory framework" (*Communities for a Better Environment v. South Coast Air Quality Management District* (2010) 158 Cal.App.4th 1336). Essentially, prior operating permits or permit levels do not in themselves establish a baseline for CEQA review of a new project. As set forth in *Communities for a Better Environment v. South Coast Air Quality Management District*, a long line of California Court of Appeals decisions has upheld this line of reasoning. These decisions have included cases where a plan or project allowed for greater development or more intense activity than had so far actually occurred, as well as cases where actual development or activity had, by the time CEQA analysis was begun, already exceeded that allowed under the existing regulations.

The purpose of defining the environmental setting is to give decision-makers and the public an accurate picture of the project's likely impacts, both near-term and long-term. In some cases, "[e]nvironmental conditions may vary from year to year and … it is necessary to consider conditions over a range of time periods" (quoting *Save Our Peninsula Committee v. Monterey County Bd. of Supervisors* (2001) 87 Cal.App.4th 99, 125). Lead agencies should choose the baseline that most meaningfully informs decision-makers and the public of the project's possible impacts.

In the case of the Vierra Dairy Expansion project, existing permits from both the SJVAPCD and CVRWQCB allow for 3,200 mature cows, and Merced County permits allow for 5,600 total animals. In accordance with CEQA, the baseline herd to be used in this environmental analysis is the herd count at the time that the NOP is circulated, which is the same as permitted of 3,200 mature cows. This herd size and dairy configuration accurately depicts the environmental baseline with which to identify the changes in the physical environment caused by the proposed project pursuant to Section 15064(d) of the State CEQA Guidelines.

3.8 REQUIRED APPROVALS, OTHER PROCESSES, AND CONSULTATIONS

To allow for the expansion of the dairy, the applicant has submitted an application for issuance of a new Conditional Use Permit (CUP20-009) from the County. It is this action that is the subject of this EIR. The CVRWQCB and the SJVAPCD both regulate the existing dairy. As responsible agencies, they will be required to use the County's environmental document in their consideration of the proposed dairy expansion and permit approvals.

A listing and brief description of the regulatory permits and approvals required to implement the proposed project is provided below. This environmental document is intended to address the environmental impacts associated with all of the following decision actions and approvals.

MERCED COUNTY AND OTHER LOCAL AND REGIONAL AGENCIES

Merced County

The County has the following permitting authority related to the proposed Vierra Dairy Expansion project:

- Preparation and approval of an Environmental Impact Report - Merced County will act as the lead agency as defined by CEQA, and will have authority to determine if the Environmental Impact Report is adequate under CEQA.
- Approval of the Conditional Use Permit - Merced County will consider the proposed dairy project as a "Conditional Use Permit." Conditional Use Permits are discretionary permits for uses of land that require special review to ensure that they are compatible with the neighborhood and surrounding land uses. They are considered more likely to affect surrounding land uses than uses permitted by right in a zoning district or those uses permitted under Administrative Permits.
- Building Permit - Merced County will require a building permit for the proposed dairy expansion project.
- Demolition Permits – Merced County will require a demolition permit for each feature to be demolished, including the shop, office, and associated septic systems. Merced County DEH will approve the building demolition permit only if a separate demolition permit application for the associated septic systems has been received by MCDEH.
- Encroachment Permit - The Merced County Department of Public Works will require an Encroachment Permit to allow the applicant to improve all driveways used by heavy truck operations associated with the dairy with either paved or concrete approaches onto the adjacent County roadway, in accordance with Chapter 7 of the Merced County Department of Public Works Improvement Standards and Specifications.
- Roadway Impact Evaluation or Roadway Impact Agreement - The Merced County Public Works Department has instituted roadway improvement conditions for new or expanding projects that would impact the County's road system. A roadway impact evaluation or a roadway impact agreement has been identified by the Public Works Department, Roads Division as a condition of approval to fund or complete needed improvement of adjacent roads and maintain adequate traffic circulation.
- Hazardous Material Business Plan - The on-site storage of any hazardous material over threshold quantities (55 gallons; 200 cu. ft.; or 500 pounds) would require a HMBP to be filed with the Merced County DEH. Any quantity of hazardous waste generated on-site also requires that a HMBP be filed. A revision to the Hazardous Material Business Plan for the proposed dairy expansion will be submitted to the Merced County Division of Environmental Health.

San Joaquin Valley Air Pollution Control District

- Authority to Construct / Permit to Operate – The owner or operator of any facility or activity (including agricultural activities) that emits criteria air pollutants or their precursors above certain thresholds must first obtain an Authority to Construct (ATC) from the SJVAPCD. All new sources exceeding thresholds will be required to apply for an ATC and PTO; this essentially is one permit that is issued in two steps. The applicant first obtains an ATC with specific conditions for implementation during construction; then an inspection is completed and, if all the conditions of the ATC are met during construction, the applicant is issued a PTO. An ATC application would be required by the project applicant to modify the PTO from the SJVAPCD for the proposed dairy expansion. Beyond the ATC and PTO, preparation of an air quality impact assessment would be required, in addition to compliance with other SJVAPCD regulations. According to the project applicant, the SJVAPCD permit applications have been submitted to the District.
- Conservation Management Practices Plan – The owner or operator of any agricultural facility of 100 acres or more, or an animal confinement facility in excess of 500 mature cows (for a dairy operation), must have submitted a Conservation Management Practices Plan (CMP) plan to the SJVAPCD prior to June 30, 2004 for existing uses, and prior to operation for proposed uses. A CMP plan requires that farm operators implement dust reduction practices for each of the following categories: harvest; unpaved roads; unpaved equipment/vehicle yards; and, other. One CMP Plan must be submitted for each crop currently grown or that will be grown within the two-year time frame of each Plan. The project applicant may be required to submit a modification request to their existing CMP Plan based on their proposed dairy expansion.

STATE OF CALIFORNIA

State agencies have the following permitting authority related to the proposed Vierra Dairy Expansion project:

State Water Resources Control Board

- General Construction Activity – The State Water Resources Control Board (SWRCB) has adopted a General Construction Activity Storm Water Permit for storm water discharges associated with any construction activity, including clearing, grading, excavation, reconstruction, and dredge and fill activities, that results in the disturbance of at least one acre of total land area.
- Public Water System – Based on the number of people on the site, the applicant must obtain a permit to operate a public water system. The facility shall then maintain compliance with that permit as long as 25 or more persons work at the facility on 60 or more days of the year. The permit requires demonstration that a sufficient volume and quality of drinking water is available from the water system's sources and distribution storage facilities to provide adequate water service. The need for a Public Water System Permit has been identified by Merced County DEH as a condition of approval.

Regional Water Quality Control Board - Central Valley Region

- Waste Discharge Requirements – The owner or operator of any facility or activity that discharges, or proposes to discharge, waste that may affect groundwater quality or from which waste may be discharged in a diffused manner (e.g., erosion from soil disturbance) must first obtain a WDR permit from the CVRWQCB. The CVRWQCB regulates discharges from dairies and other confined animal facilities according to the anti-degradation requirements of the Porter-Cologne Water Quality Control Act and the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins under the Reissued Waste Discharge Requirements General Order for Existing Milk Cow Dairies (Order R5-2013-0122) (General Order). The project applicant has submitted a Report of Waste Discharge for the proposed dairy expansion. According to the General Order, the CVRWQCB should issue Individual WDRs[4] for the Vierra Dairy Expansion. The proponents of the dairy plan to comply with the evolving CVRWQCB Salt and Nitrate Control Program as well.

FEDERAL GOVERNMENT

It is anticipated that no permitting from federal agencies would be required.

[4] The CVRWQCB has stated the existing management practices under the NMP, WMP, and the Dairy General Order are not, nor have they been, adequate to prevent groundwater pollution underlying the dairy facilities and under lands receiving dairy wastes. The CVRWQCB is deferring the issuance of individual WDRs, and reviewing significant aspects of its Dairy General Order. State water quality permit coverage for dairy expansion projects, such as that assessed in this EIR, is likely to be significantly delayed. For additional discussion, see Chapter 10, *Hydrology and Water Quality*, of this EIR.

4 INTRODUCTION TO THE ENVIRONMENTAL ANALYSIS

4.1 SCOPE OF THE EIR

On September 28, 2021 the Notice of Preparation (NOP) for this Environmental Impact Report (EIR) was filed with the Office of Planning and Research (OPR). The NOP and Initial Study were circulated to the public, local and state agencies, and other interested parties to solicit comments on the proposed project. (See Appendix A, *Notice of Preparation and Initial Study*, and Appendix B, *Comments on the Notice of Preparation.*) The following issues to be evaluated in the environmental document were identified in the NOP or raised in public and agency comments on the NOP:

- Air Quality and Odors
- Biological Resources
- Cultural Resources and Tribal Cultural Resources
- Greenhouse Gas Emissions and Energy Efficiency
- Nuisance Conditions from Insects
- Hydrology and Water Quality
- Land Use Compatibility

The 2030 Merced County General Plan (2030 General Plan) EIR comprehensively evaluated the potential environmental effects of implementing the 2030 General Plan, and from the approval of new or modified land uses. As set forth in Section 1.5 of this document, the environmental analysis for this EIR is tiered from the EIR for the 2030 General Plan. Therefore, this environmental evaluation implements, and is consistent with, mitigation measures and study protocols adopted by Merced County in its certification of the EIR for the 2030 General Plan and adoption of the General Plan. This environmental analysis also applies mitigation measures previously adopted in the in the EIR for the Merced County Animal Confinement Ordinance Revision (ACO), as applicable.

4.2 PRESENTATION OF THE IMPACT ANALYSIS IN THE EIR

The environmental analysis section of this EIR (Chapters 5 through 11) is organized and carried out in accordance with the California Environmental Quality Act (CEQA) Environmental Checklist Appendix G of the CEQA Guidelines; each section presents the setting, an assessment of the potential direct environmental impacts, and mitigation measures for each environmental issue area identified above and in Chapter 2, *Executive Summary*. Cumulative impacts are evaluated in Chapter 12, *Required CEQA Analyses*. For each resource category, the following conditions are discussed:

- **Environmental Setting**. This section provides a general overview of the environmental resource and the conditions on and adjacent to the project site. The setting is presented from site-specific, local, and regional perspectives, as appropriate for each environmental topic.
- **Regulatory Framework**. This section presents applicable laws, ordinances, regulations, and guidance for the resource, including the Merced County ACO. Where compliance with a cited regulation reduces or avoids a potential environmental effect, the relevant portions of the regulation are set forth.

- **Environmental Effects**. This section provides significance criteria with which to judge whether an environmental impact is significant, or less than significant. Significance criteria are established both by the State CEQA Guidelines and by the significance thresholds of federal, state, and local agencies. For evaluated impact categories, environmental topics evaluated in the EIR that were found to be less than significant in the Initial Study are summarized in this section. Potential environmental impacts associated with the proposed project are evaluated, the impacts' level of significance prior to mitigation is identified, and feasible mitigation measures for reducing the associated impacts are set forth. The level of significance after mitigation is then assessed.

4.3 PRESENTATION OF MITIGATION IN THE EIR

Mitigation measures identified in this report are characterized in one of two categories: (1) those necessary to reduce the identified impact below a level of significance; and, (2) those recommended to reduce the magnitude of a significant impact, but not below a level of significance. Where implementation of more than one mitigation measure is needed to reduce an impact below a level of significance, this fact is noted.

Mitigation measures in this EIR are formulated to be consistent with the strategy as set forth in State CEQA Guidelines Section 15370 as follows:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- Compensating for the impact by replacing or providing substitute resources or environments.

4.4 DEVELOPMENT STANDARDS

Merced County development standards for private development projects have evolved over time to incorporate many construction requirements to lessen or eliminate environmental harm.

County procedures to minimize negative environmental effects and disruptions include analysis of existing features, responsible agency and public input to the design process, engineering and design standards, and construction controls. The activities to be implemented by the County during the project review, design, and construction phases, which serve to mitigate typical environmental impacts, are described in greater detail below. These measures are hereby incorporated into the project description.

These requirements are set forth in Performance Standards of the County Zoning Code (Merced County Code Chapter 18.40). The requirements of this Chapter are set forth below, and hereby incorporated by reference as though fully set forth herein. Copies of this document may be reviewed at Merced County, Community and Economic Development Department, 2222 M Street, Merced, California 95340.

4.4.1 STANDARD CONDITIONS FOR PRIVATE PROJECTS

Merced County has drafted standard conditions of approval for private development projects that are submitted to the County for review and approval. These standard conditions have been adopted by the Merced County Planning Commission (Resolution 20-001), are administered by the Community and Economic Development Department, and reflect the regulatory requirements of that Department, as well as the needs of the County Fire Department, the Division of Environmental Health, and the Public Works Department. These standard conditions include:

Compliance with Permit Conditions: All development on the project property shall be constructed and thereafter maintained and operated in accordance with the conditions of the permit.

Regulation in General: The applicant shall comply with all applicable regulations administered by the County. These regulations shall include, but not be limited to, standards administered by the County Fire, Health, Public Works, and Merced County Community and Economic Development Departments.

Disturbances: No use shall be permitted which creates dust, dirt, mud, fumes, odors, vibrations, heat, glare, or electrical disturbances beyond the boundaries of the site.

Lighting: All exterior lighting shall be designed and maintained in a manner so that glare and reflections are contained within the boundaries of the subject parcel. Exterior lighting shall be hooded and directed downward and away from adjoining properties and public rights-of-way. Field performance monitoring shall be conducted by the Merced County Community and Economic Development Department.

Cultural Resources: The applicant shall inform in writing all contractors and subcontractors for the project of the potential discovery of significant archaeological and historical resources below the ground surface in the project area. If any cultural resources are found or disturbed during project activities, all work must be halted within the area, and the Merced County Community and Economic Development Department and a qualified archaeologist must be contacted to evaluate the find.

Erosion Control: If the construction site has been disturbed (cleared, graded or excavated) and is to remain inactive for a period of three or more months, it shall be seeded with an annual grass and watered until growth is evident. If after disturbance, the site is inactive for three or more months during the dry period (June-October), as an alternative to seeding, a soil-binding dust palliative, such as Hemicellulose extract (wood molasses) solution, may be applied.

If seeded, grass shall be mowed (not disced under) to a maximum height of four inches for fire control. Grasses do not need to be maintained in a green/growing condition. Mowing should occur before the grass dries out to avoid fires that may result from blades striking rocks.

Field performance monitoring shall be conducted on a random basis by the Merced County Community and Economic Development Department.

Dust Control: During clearing, grading, earth-moving and other site preparation activities, and all construction, exposed earth surfaces shall be watered whenever needed, in order to prevent dust

from leaving the project site on that phase of the project presently under development. Mud and dirt carried from the development onto adjacent roadways shall be cleaned up daily. Litter and debris shall be cleaned up daily to prevent it from leaving the project site and littering adjacent properties. Field performance monitoring shall be conducted on a random basis by the Merced County Community and Economic Development Department.

Storm Water Runoff: All storm water runoff from the site shall be disposed of subject to approval of the County Department of Public Works in one of the following ways: a) Uniform on-site percolation over widespread area; b) Use of on-site detention or retention basin; or 3) Off-site drainage to community drainage system.

Mosquito Abatement District Requirements: Compliance with all District requirements is required.

4.4.2 PROJECT-SPECIFIC CONDITIONS OF APPROVAL

As discussed in the Initial Study / Notice of Preparation (see Appendix A), the project site is in an area with rural levels/standards of fire protection. In response to this common condition in agricultural areas of the county, the Merced County Fire Department generally imposes requirements for on-site water storage for fire protection. The following condition of approval would apply:

The project shall comply with all applicable Merced County regulations including, but not limited to:

1) Fuel Storage: The applicant shall provide information on on-site fuel storage, amounts, types of fuel and oil, storage container sizes, mobile/stationary, dispensing equipment, and Spill Prevention Control and Countermeasure documents.
2) On-Site Water: The applicant shall describe on-site water storage containment, amounts of water, whether Fire Department connections are in place, apparatus access to flush tank, or other onsite water. [California Fire Code (CFC) Sec. 507.1]
3) Fire Department Access: All driveways accessing the parcel shall be surfaced with an approved all weather driving surfacing material. The roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be surfaced so as to provide all-weather driving capabilities. Fire apparatus access roads shall have an unobstructed width of not less than 20 feet except for approved security gates in accordance with Section 503.6 and an unobstructed vertical clearance of not less than 13 feet 6 inches. (CFC 503.2.1)
4) Address Identification: New and existing buildings shall have approved address numbers, building numbers, or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. (CFC 505.1)
5) Occupancy Class: The applicant must clarify the intended use of the proposed 18,000 square-foot 'Utility shop' as certain requirements may apply depending on the occupancy class. Provide a signed statement of intended use. Include amounts and types of any hazardous materials that exceed minimum allowable quantities.

The Merced County Department of Public Works, Roads Division, has reviewed the proposed project and has identified the following conditions of approval:

1. The applicant shall enter a Roadway Impact Agreement with the County in order to determine the amount of the impact fee Vierra Dairy Farms will need specific to what road(s) will be used to access the project site.
2. The applicant shall construct an agricultural paved driveway. An Encroachment Permit shall be obtained from the Department of Public Works prior to any construction.
3. The applicant shall maintain all storm water runoff on-site. Calculations for proposed basin or Low-Impact Development design systems, compliant to the Merced County Storm Drainage Design Manual and Merced County Code Chapter 9.53, shall be submitted to the Roads Division for review.

The Merced County Division of Environmental Health (DEH) has reviewed the proposed project and has identified the following condition of approval:

- The existing milking barn septic system is located in an area subject to vehicle traffic, which can compact the soil over the leach lines and interfere with leach line function and life span. Placement of a barrier to protect the leach lines and septic tank from traffic will be required by Merced County DEH as a condition of approval.

This page intentionally
left blank.

5 AIR QUALITY AND ODORS

This chapter provides an evaluation of the generation and influence of air pollutant emissions and odors generated by the proposed Vierra Dairy Expansion project. As established in the Initial Study (IS) for the proposed project (see Appendix A, *Notice of Preparation and Initial Study*), the construction and operation of the Vierra Dairy Expansion could result in the generation of air pollutants and nuisance odors.

The technical analysis of air quality and odors prepared for this EIR has been conducted to comply with the requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD), the Merced County 2030 General Plan, and the County's Animal Confinement Ordinance (ACO). Merced County adopted mitigation measures and study protocols in its certification of the 2030 Merced County General Plan EIR and the EIR for Revisions to the ACO, and in its approval of the ACO. The following evaluation implements, and is consistent with, these mitigation measures and study protocols.

INTRODUCTION

Air Quality

Air quality influences public health and welfare, the economy, and quality of life. Air pollutants have the potential to adversely impact public health, the production and quality of agricultural crops, visibility, native vegetation, and buildings and structures.

Criteria pollutants are those that are regulated by either the state or federal Clean Air Acts. Non-criteria pollutants are not regulated by these Acts, but are a concern as precursors to criteria pollutants and/or for their potential for harm or nuisance.

The criteria pollutants of most interest in the San Joaquin Valley associated with dairy sources are ozone and particulates (dust). Ozone is not emitted directly into the environment; rather, it is generated from complex chemical reactions in the presence of sunlight between reactive organic gases (ROG) (or non-methane hydrocarbons), and oxides of nitrogen (NO_X). Ozone is a powerful respiratory irritant. Particulate matter is classified as respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). Exposure to elevated levels of particulate matter causes irritation of the eyes and respiratory system, and exposure is implicated in increased levels of disease and death.

Important non-criteria pollutants include air toxics. Air toxics are generated from industrial processes (e.g., gas stations, dry cleaners, or car repairs), mobile sources using diesel engines, and agricultural sources such as dairies.

Odors associated with dairy and other animal confinement operations are primarily generated from manure and silage. Odor from these operations is the composite of as many as 170 or more specific gases, including ammonia, hydrogen sulfide, amines, organic acids, and heterocyclic nitrogen-bearing compounds. The odor characteristics that contribute to nuisance conditions include the intensity, concentration or strength of the odor, the odor frequency, the duration that the odor remains detectable, and the perceived offensiveness and character or quality of the odor.

5.1 REGULATORY FRAMEWORK

5.1.1 FEDERAL REGULATORY FRAMEWORK

AIR QUALITY

The United States Environmental Protection Agency (EPA) is responsible for enforcing the many federal environmental and hazardous waste laws, including the federal Clean Air Act (CAA). California is within the jurisdiction of EPA Region IX, with offices in San Francisco. The CAA, established in 1963, was substantially modified in 1970 and again amended in 1990 to authorize the establishment of national health-based air quality standards, set deadlines for their attainment, and establish actions required of areas in the nation that exceeded these standards. Under the CAA, state and local agencies in areas that exceed the National Ambient Air Quality Standards (NAAQS) are required to develop state implementation plans (SIP) to show how they will achieve the NAAQS for ozone and particulate matter by specified dates (42 USC 7409, 7411). The EPA's responsibility to control air pollution in individual states is primarily to review submittals of SIPs that are prepared by each state.

The EPA requires that farms operating diesel-powered engines for farming operations submit an application for permit under Title V of the CAA if emissions from the engines exceed half of the major source threshold. Title V permits are operating permits issued by state or local permitting authorities to mostly large sources and some smaller sources of air pollution. Other agricultural operations, including animal confinement facilities over a certain size, are also required to apply for a Title V permit. Issuance of the Title V permit in California is delegated to local air districts in California; in this case, the SJVAPCD.

ODOR CONTROL

No federal laws exist for odor emissions; regulation is achieved through County ordinances, and enforced based upon complaints.

5.1.2 STATE OF CALIFORNIA REGULATORY FRAMEWORK

AIR QUALITY

In California, the California Air Resources Board (CARB) is responsible for preparing and enforcing the federally-required SIP in an effort to achieve and maintain NAAQS and California Ambient Air Quality Standards (CAAQS), which were developed as part of the California Clean Air Act (CCAA) adopted in 1988. CAAQS for criteria pollutants equal or surpass NAAQS, and include other pollutants for which there are no NAAQS. In addition, the CARB is responsible for assigning air basin attainment and nonattainment designations in California. Air basins are designated as being in attainment if the levels of a criteria air pollutant meet the NAAQS or CAAQS for the pollutant, and are designated as being in nonattainment if the level of a criteria air pollutant is higher than the corresponding NAAQS or CAAQS.

The CARB is the oversight agency responsible for regulating statewide air quality, but implementation and administration of NAAQS and CAAQS is delegated to the several regional Air Pollution Control Districts (APCD) and Air Quality Management Districts (AQMD). These districts have been created for specific air basins, and have principal responsibility for:

- Developing plans to meet CAAQS and NAAQS;
- Developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain CAAQS and NAAQS;
- Implementing permit programs established for construction, modification, and operational air pollution sources;
- Enforcing air pollution statutes and regulations governing non-vehicular sources; and,
- Developing employer-based trip reduction programs.

To regulate air pollutant emissions within California, the state has been divided into 15 Air Basins based upon similar meteorological and geographic conditions, and in consideration of political boundary lines whenever practicable. Merced County is located in the San Joaquin Valley Air Basin (SJVAB), which is the second largest air basin in California. This Air Basin also includes San Joaquin County, Stanislaus County, Madera County, Fresno County, Kings County, Tulare County, and a portion of Kern County (see Figure 5-1).

Any stationary source equipment used in agricultural operations in the growing of crops or the raising of animals that may cause emissions of air contaminants is required by state law to obtain a permit from the local Air Pollution Control District.

ODOR CONTROL

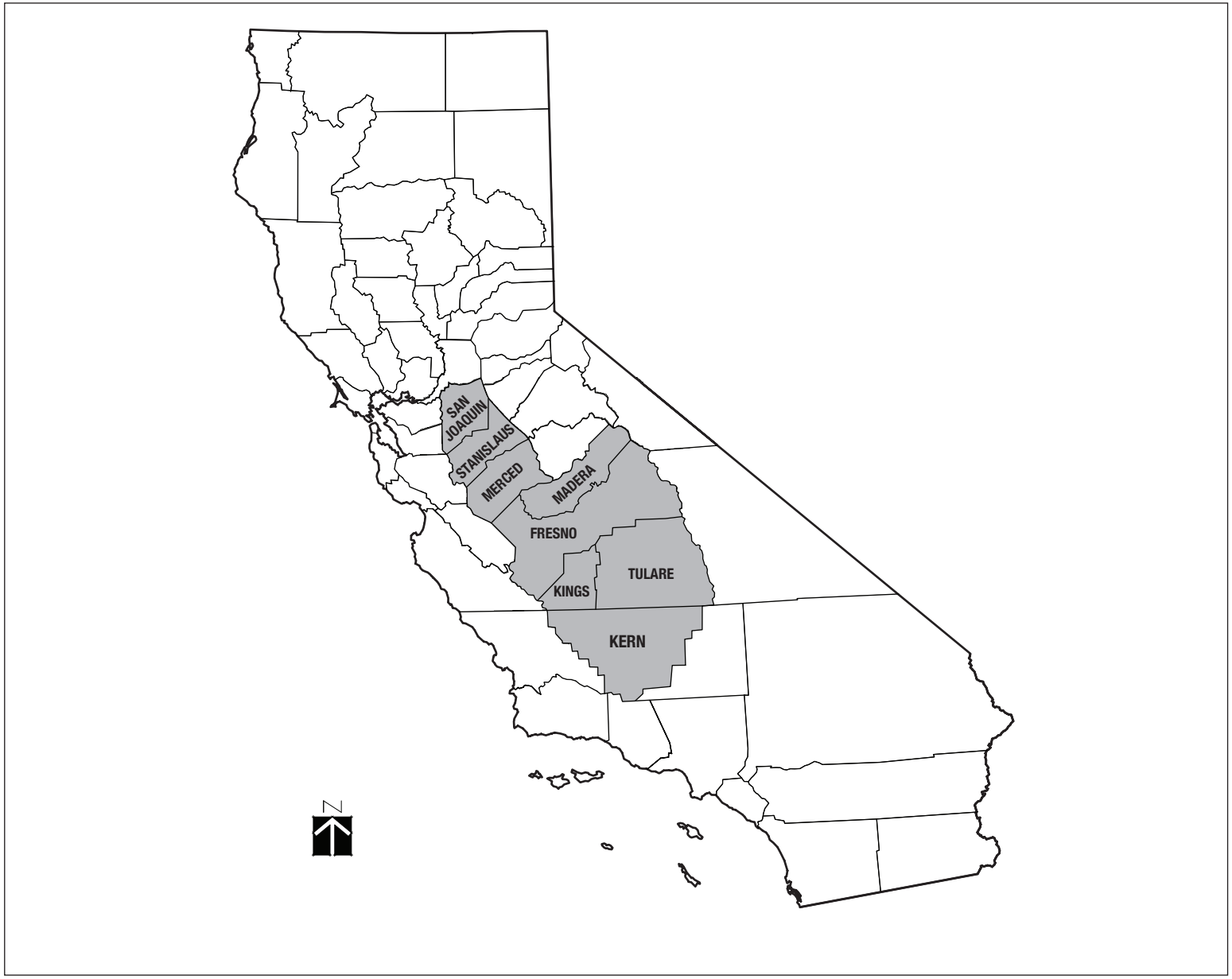
No state laws exist for odor emissions; regulation is achieved through County ordinances, and enforced based upon complaints.

5.1.3 SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT

The SJVAPCD is the lead air quality regulatory agency for the San Joaquin Valley Air Basin. The SJVAPCD has jurisdiction over all point and area sources of air emissions except for mobile sources (such as motor vehicles), consumer products, and pesticides. The SJVAPCD and CARB have joint responsibility for attaining and maintaining the NAAQS and CAAQS in the Air Basin.

The SJVAPCD is required to prepare ozone and $PM_{2.5}$ attainment demonstration plans to identify the regulatory framework necessary to bring the San Joaquin Valley into compliance with the ozone and $PM_{2.5}$ NAAQS. These attainment plans are described below.

The SJVAPCD is a CEQA Responsible Agency for the proposed Vierra Dairy Expansion project via the SJVAPCD Permits Required Rule (Rule 2010) and New Source Review Rule (Rule 2201) (State CEQA Guidelines Section 15381).



Vierra Dairy Expansion Project CUP20-009

SOURCE: SJVAPCD, August 2003; Planning Partners 2023

Figure 5-1

San Joaquin Valley Air Basin

OZONE ATTAINMENT DEMONSTRATION PLAN (OZONE PLAN)

The SJVAB is designated as an extreme ozone nonattainment area for the EPA's 2008 8-hour ozone standard of 75 parts per billion (ppb). The SJVAPCD 2016 Ozone Plan addresses the EPA's 2008 8-hour ozone standard and identifies strategies to reduce NOx emissions by over 60 percent between 2012 and 2031. The plan demonstrates attainment by no later than December 31, 2031.

The EPA set the newest NAAQS for 8-hour ozone at 70 ppb effective December 28, 2015. EPA has designated the San Joaquin Valley as Extreme Nonattainment for this standard, with an attainment deadline of 2037. The District adopted the 2022 Plan for the 2015 8-Hour Ozone Standard on December 15, 2022. This Plan satisfies Clean Air Act requirements and ensures expeditious attainment of the 70 parts per billion 8-hour ozone standard.

The control measures included in the attainment plan apply to currently regulated sources under SJVAPCD jurisdiction, but the cooperation of other federal, state, and local agencies is required to achieve attainment with federal ozone standards. The EPA and CARB are responsible for emission controls of aircraft, farming equipment, pesticides, consumer products, and motor vehicles that significantly contribute to the ozone pollution in the Air Basin.

Although EPA revoked its 1979 1-hour ozone standard in June 2005, many planning requirements remain in place, and the SJVAB must still attain this standard. The SJVAPCD 2013 Plan for the Revoked 1-Hour Ozone Standard (2013 Ozone Plan) includes modeling confirming that the SJVAB attained EPA's 1-hour standard by 2017 (SJVAPCD 2023). Thus, the SJVAB now meets the 1-hour ozone standard based on air monitoring data. On June 30, 2016, EPA took final action determining that the San Joaquin Valley had attained the 1-hour ozone national ambient air quality standard.

PM_{10} PLAN

Based on a decline in PM_{10} emissions, the San Joaquin Valley became the first air basin classified as "serious nonattainment" to be reclassified by EPA as in "attainment" of the PM_{10} standards. The SJVAPCD adopted the 2007 PM_{10} Maintenance Plan to assure the San Joaquin Valley's continued attainment of EPA's PM_{10} standard.

$PM_{2.5}$ PLAN

The San Joaquin Valley is classified as "serious" nonattainment for federal $PM_{2.5}$ (fine particulate matter) standards. The SJVAPCD adopted the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards on November 15, 2018. This plan addresses the EPA federal 1997 annual $PM_{2.5}$ standard of 15 micrograms per cubic meter ($\mu g/m^3$) and 24-hour $PM_{2.5}$ standard of 65 $\mu g/m^3$; the 2006 24-hour $PM_{2.5}$ standard of 35 $\mu g/m^3$; and the 2012 annual $PM_{2.5}$ standard of 12 $\mu g/m^3$. This Plan includes aggressive incentive-based control measures that achieve the massive emissions reductions needed to bring the Valley into attainment and will require significant funding estimated at $5 billion.

SJVAPCD RULES AND REGULATIONS APPLICABLE TO DAIRIES

Rule 2010 Permits Required. SJVAPCD Rule 2010 applies to agricultural uses, including dairies, and states that "any person who plans to or does operate, construct, alter, or replace any source of

emission of air contaminants" must obtain the approval of the Air Pollution Control Officer and receive an Authority to Construct (ATC) and a Permit to Operate (PTO). The SJVAPCD requires an ATC/PTO for new animal confinement facilities with emissions in excess of five tons[1] per year[2] of volatile organic compounds (VOC), which are often referred to as reactive organic gases[3], or for expanding facilities with an existing ATC/PTO. An ATC must be obtained before building or installing a new emissions unit or modifying an existing emissions unit that requires a permit. A PTO is issued after all construction is completed and the emission unit is ready for operation.

Dairy operations with non-fugitive emissions that exceed 10 tons/year for VOC and NO_X by either exceeding milk cow equivalents or from multiple agricultural engine emissions are required to obtain a federal Title V permit in compliance with the CAA. The SJVAPCD manages the Title V permit process, and issues both the District and Title V permit as a single permit. Emission estimates that contribute toward determining if a facility is subject to Title V permitting would include non-fugitive emissions from animal feeding operations, stationary internal combustion engines, and any other stationary equipment that may emit air contaminants. The process for obtaining a Title V permit involves additional steps beyond obtaining an ATC/PTO.

The ATC/PTO permit process is separate from the Conservation Management Practice (CMP) plans (see Rule 4550 below). However, if a facility submits their PTO application and CMP plan at the same time, the SJVAPCD will process the two permits concurrently. If a source requires both a CMP and PTO, the SJVAPCD will not charge any CMP fees for that facility (Rule 3190, Section 4.0).

Regulation VIII Fugitive PM_{10} Prohibitions: Rules 8011-8081. Regulation VIII includes specific emission control strategies for fugitive dust from construction/demolition, bulk materials, carryout, open areas, paved and unpaved roads, equipment on unpaved roads, paved road dust, fugitive windblown dust, and farming operations. Regulation VIII Rules 8011-8081, including preparation of a dust control plan, apply to the Vierra Dairy Expansion project and are designed to reduce PM_{10} emissions.

Rule 2201: New and Modified Source Review. New sources of air pollution, and modifications of existing sources, must comply with District Rule 2201, also known as New Source Review (NSR). The NSR rule provides the mechanism for the District to issue permits to new and expanding businesses without interfering with efforts to meet the state and federal health-based air quality standards. NSR contains several main requirements – Best Available Control Technology (BACT), Best Available Retrofit Control Technology (BARCT), and offsets. However, agricultural sources are generally exempt from offsets, unless that agricultural source is also a major stationary source. If total operations of new dairies exceed five tons per year of emissions (i.e., VOCs and NO_X), NSR rules apply. This triggers BACT and BARCT for the new "emissions sources," applied through the

1 A United States ton, or short ton, is equal to 2,000 pounds (907 kg), while a metric ton, or tonnes, is equal to 2,205 pounds (1,000 kg).

2 District Rule 2020, Exemptions, Section 6.20.1, exempts Agricultural sources that, in aggregate, produce actual emissions less than one-half of the major source thresholds (10 tons/year for NOx and VOC).

3 The EPA defines volatile organic compounds (VOC) as any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. The California Air Resources Board uses the term reactive organic gases (ROG) in its emission inventory, which means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate. However, not all identified VOCs are ROG, as some are non-reactive hydrocarbons that may not significantly contribute to ozone formation.

ATC and PTO permits. If any existing source makes modifications to its operations, and those modifications generate two pounds or more per day of any criteria emissions, the NSR is also triggered.

Rule 3135: Dust Control Plan Fee. This rule requires the applicant to submit a fee in addition to a dust control plan (per Rules 8011-8081).

Rule 4002: (National Emission Standards for Hazardous Air Pollutants). In the event that any portion of an existing building will be renovated, partially demolished, or removed, the project will be subject to District Rule 4002. Prior to any demolition activity, an asbestos survey of existing structures on the project site may be required to identify the presence of any asbestos containing building material (ACBM). In accordance with CAL-OSHA requirements, a certified asbestos contractor must remove any identified ACBM having the potential for disturbance.

Rule 4102: Nuisance. This rule applies to any source operation that emits or may emit air contaminants or other materials. In the event that the project or construction of the project creates a public nuisance, it could be in violation and be subject to District enforcement action. Odors emanating from agricultural operations, however, are exempt.

Rule 4550: Conservation Management Practices. The purpose of this rule is to limit fugitive dust emissions from agricultural operations. The rule outlines requirements for owner/operators of agricultural operations to prepare CMP plans for all agricultural producers with 100 contiguous acres or more to reduce dust emissions in areas of crop production, animal feeding operations, and unpaved roads/equipment areas.

Rule 4570: Confined Animal Facilities. Rule 4570 requires that all owners/operators of any Confined Animal Facility (CAF) shall submit a permit application for each CAF – this applies to dairies with greater than or equal to 500 milk cows. The application shall include an emission mitigation plan that lists the VOC mitigation measures that the facility will use to comply with all applicable requirements of Rule 4570. All dairies that are currently subject to the rule must comply with Phase II mitigation measures. These mitigation measures include management practices that minimize the formations of VOCs or control VOCs by moving the VOC-forming material to a controlled situation. Examples of management practice type mitigation measures are feed manipulation, frequent scraping of animal housing, and covering of silage piles. Operators must choose a certain number of management practices from a limited menu of options for each operation (for a list of mitigation options, see Appendix D of this EIR).

Rule 4601: Architectural Coatings. This rule applies if there are any architectural coatings applied to structures. The purpose of this rule is to limit VOC emissions from architectural coatings. This rule specifies architectural coatings storage, cleanup, and labeling requirements.

Rule 4641: Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations. The purpose of this rule is to limit VOC emissions by restricting the application and manufacturing of certain types of asphalt for paving and maintenance operations.

Rule 4702: Internal Combustion Engines – If internal combustion engines or spark-ignited internal combustion engines (such as diesel generators) are used as part of the dairy operations, these rules limit the emissions of nitrogen oxides (NO_X), carbon monoxide (CO), sulfur oxides (SO_X), and

VOC from internal combustion engines or spark-ignited internal combustion engines rated at 25 brake horsepower or greater.

SJVAPCD Policy for Risk Management Review: The purpose of a Risk Management Review (RMR) is to ensure on-going compliance with the Air Toxics "Hot Spots" information and Assessment Act of 1987 (AB 2588). SJVAPCD's Technical Services unit performs the RMRs for dairies being permitted by the District for those activities covered under the permits. The health risk assessment addresses emissions from: ammonia; hydrogen sulfide; particulate matter and its toxics components (e.g., aluminum, lead, manganese, nickel, etc.); and xylenes, formaldehydes, carbon tetrachloride, and other components from VOCs.

ODOR CONTROL

The SJVAPCD 2015 *Guide for Assessing Air Quality Impacts* (GAMAQI) includes a screening tool for odor sources to qualitatively assess a project's potential to adversely affect area receptors. According to the screening tool, if there are sensitive receptors (e.g., hospitals, schools, and residential areas) within one mile of a feed lot or dairy, then a more detailed investigation should be provided due to a greater possibility of nuisance[4]. Because of the subjective nature of odor impacts, the many variables that can influence odors, and the many types of odor sources, the SJVAPCD does not prescribe any quantitative methodologies to determine if potential odors would have a significant impact. Rather, lead agencies are encouraged to make a determination of significance based on a review of complaint records. The SJVAPCD defines a significant odor problem as more than one confirmed complaint per year or three unconfirmed complaints per year averaged over a three-year period.

5.1.4 MERCED COUNTY

Chapter 18.64.050, Sections U and HH[5] of the Merced County Animal Confinement Ordinance (see Appendix C of this EIR) require compliance with requirements of the SJVAPCD and reduction of air emissions as set forth below.

18.64.050 General

U. The animal confinement facility and access roads shall meet the requirements of the San Joaquin Valley Unified Air Pollution Control District.

HH. New or expanding animal confinement facilities shall provide and maintain one or more of the following dust control measures on unpaved roads within the facility area:

1. A uniform layer of washed gravel; or
2. Chemical/organic dust suppressants; or
3. Vegetative materials; or
4. Paving; or
5. Any other method that effectively limits visible dust emissions to 20 percent opacity.

[4] Odors emanating from agricultural operations such as dairies are exempt from District Rule 4102 Nuisance.

[5] As noted above, the SJVAPCD has adopted Rules 4550 and 4570 for the control of PM_{10} and ROG emissions from dairies, thereby voiding Section 18.64.050 OO of the Animal Confinement Ordinance that previously applied.

MERCED COUNTY GENERAL PLAN

The Air Quality Element of the Merced County General Plan contains goals and policies pertaining to the protection of air quality in Merced County. Those policies that are relevant to the proposed project are presented below:

Policy AQ-2.2: Development Review Process
Use the development review process to achieve measurable reductions in criteria pollutant, toxic air contaminants, and greenhouse gas emissions.

Policy AQ-2.3: Cumulative Impacts
Encourage the reduction of cumulative air quality impacts produced by projects that are not significant by themselves, but result in cumulatively significant impacts in combination with other development.

Policy AQ-2.4: Mitigation
Require that local and regional air quality impacts identified during CEQA review for projects reviewed and approved by the County are consistently and fairly mitigated.

Policy AQ-2.5: Innovative Mitigation Measures
Encourage innovative mitigation measures and project redesign to reduce air quality impacts by coordinating with the San Joaquin Valley Air Pollution Control District, project applicants, and other interested parties.

Policy AQ-2.7: Air District Best Performance Standards
Require the County to use the Best Performance Standards adopted by SJVAPCD during the development review and decision-making process to ensure new projects meet the targets set by the district.

Policy AQ-6.1: Particulate Emissions from Construction
Support the San Joaquin Valley Air Pollution Control District's efforts to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible and consistent with State and Federal regulations.

Policy AQ-6.8: Voluntary Emissions Reduction Agreement
Require all project applicants, where project emissions have been evaluated to exceed SJVAPCD significance thresholds, to consult with the SJVAPCD regarding the establishment of a Voluntary Emissions Reduction Agreement between the applicant and the SJVAPCD. Support the SJVAPCD in its efforts to fund the Emission Reduction Incentive Program.

These policies were considered in the evaluation of the proposed project and the formulation of appropriate mitigation measures below. A more detailed discussion of the relevance of these policies to the proposed project is located in Table 11-1 of Chapter 11, *Land Use Compatibility*.

ODOR CONTROL

Merced County uses a setback approach to odor nuisance control, requiring setbacks between animal confinement facilities and other uses of 0.5 mile for urban areas and sensitive uses, and 1,000 feet for isolated rural residences. The following provision of the ACO (see Appendix C) addresses nuisance effects from odors.

18.64.060 Comprehensive Nutrient Management Plan

C. The CNMP shall contain the following components and other information as required by the Division of Environmental Health:

8. Operation and Maintenance of the Facility

a. Describe odor control measures.

The Merced County Code also includes a Right-to-Farm Ordinance (Chapter 17.08.080(H)) that seeks to reduce the opposition of residential neighbors to nuisances created by commercial farming, such as odors. Since 1986, Merced County's Right-to-Farm Ordinance has been administered by the Community and Economic Development Department (CEDD). The Ordinance is an educational and disclosure measure, not a regulatory requirement. It informs purchasers of property during the residential development process, when subdivisions or parcel splits are approved and building permits are issued, about the local importance of agriculture and the possible negative impacts of locating residences near common farm operations.

The 2030 Merced County General Plan contains policies that seek to reduce nuisance conditions consistent with the ACO measures and Right-to-Farm Ordinance cited above. Those policies that are relevant to the proposed project are presented below:

Policy AG-3.1: Right-to-Farm Ordinance
Continue to implement the Right-to-Farm Ordinance to define and limit instances where agricultural operations may be considered a nuisance to surrounding rural residential, residential or urban development.

Policy AG-3.9: New Confined Animal Facility Location Requirements
Require new or expanded confined animal facilities to be located, at a minimum:

a) One-half mile from any Rural Center or Urban Community boundary; residentially-designated or zoned property; sensitive uses such as schools, hospitals, jails, Federal wildlife areas, State wildlife areas, and public parks; or concentrations of five or more off-site residences. This does not include areas for municipal uses such as wastewater treatment facilities, airports, or solid waste recycling or disposal facilities located outside urban areas; and
b) One thousand feet from any off-site residence, unless there is written permission from the off-site property owner.

These policies were considered in the evaluation of the proposed project and the formulation of appropriate mitigation measures below. A more detailed discussion of the relevance of these policies to the proposed project is located in Table 11-1 of Chapter 11, *Land Use Compatibility*.

5.1.5 AIR QUALITY STANDARDS

The EPA has set NAAQS for ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, respirable particulate matter (PM_{10}), and airborne lead. In addition to the NAAQS, the CARB has established CAAQS to protect public health and welfare. Standards have been set for ozone, sulfur dioxide, PM_{10}, sulfates, airborne lead, hydrogen sulfide, and vinyl chloride, at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases. An area where the standard for a pollutant is exceeded is considered a

nonattainment area, and is subject to planning and pollution control requirements that are more stringent than normal requirements. The CARB is responsible for assigning air basin attainment and nonattainment designations for federal and state criteria pollutants.

State and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies on the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (i.e., one hour), or to a relatively lower average concentration over a longer period (e.g., eight hours, 24 hours, or one month). For some pollutants, there is more than one air quality standard, reflecting both its short-term and long-term effects.

Table 5-1 presents the CAAQS and NAAQS for selected pollutants. Table 5-2 summarizes the attainment status of the Air Basin. Of the criteria pollutants, the Air Basin is in nonattainment for ozone, $PM_{2.5}$, and state PM_{10}. As discussed above, the SJVAPCD has enacted plans designed to bring the basin back to attainment status for ozone and $PM_{2.5}$.

Table 5-1 Federal and California Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California Standards Concentration	Federal Primary Standards Concentration
Ozone (O_3)	8-hour	0.07 ppm (137 μg/m³)	0.070 ppm (137 μg/m³)
	1-hour	0.09 ppm (180 μg/m³)	---
Respirable Particulate Matter (PM_{10})	24-hour	50 μg/m³	150 μg/m³
	Annual Arithmetic Mean	20 μg/m³	---
Fine Particulate Matter ($PM_{2.5}$)	24-hour	---	35 μg/m³
	Annual Average	12 μg/m³	12 μg/m³
Carbon Monoxide	8-hour	9.0 ppm (10 mg/m³)	9 ppm (10 mg/m³)
	1-hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)
Nitrogen Dioxide	Annual Average	0.03 ppm (57 μg/m³)	0.053 ppm (100 μg/m³)
	1-hour	0.18 ppm (339 μg/m³)	0.100 ppm (188 μg/m³)
Lead	30-day Average	1.5 μg/m³	---
	Rolling 3-Month Average	---	0.15 μg/m³
Sulfur Dioxide	24-hour	0.04 ppm (105 μg/m³)	0.14 ppm (for certain areas)
	3-hour	---	---
	1-hour	0.25 ppm (655 μg/m³)	0.075 ppm (196 μg/m³)
Sulfates	24-hour	25 μg/m³	No Federal Standard
Hydrogen Sulfide	1-hour	0.03 ppm (42 μg/m³)	No Federal Standard
Vinyl Chloride	24-hour	0.01 ppm (26 μg/m³)	No Federal Standard

Notes: ppm = parts per million; mg/m³ = milligrams per cubic meter; μg/m³ = micrograms per cubic meter
Shaded areas indicate that Merced County is in non-attainment for that air pollutant standard.

Source: CARB 2022, CARB 2016, EPA 2023.

Table 5-2 San Joaquin Valley Air Basin Attainment Status		
Pollutant	**State of California Attainment Status**	**Federal Attainment Status**
Ozone – 1-hour	Nonattainment/Severe	Attainment [a]
Ozone – 8-hour	Nonattainment	Nonattainment (Extreme)
Respirable Particulate Matter (PM_{10})	Nonattainment	Attainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment	Nonattainment (Serious)
Carbon Monoxide	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide	Attainment	Attainment/Unclassified
Lead	Attainment	No designation
Sulfur Dioxide	Attainment	Attainment/Unclassified
Sulfates	Attainment	No Federal Standard
Hydrogen Sulfide	Unclassified	No Federal Standard

Notes:
a On June 30, 2016, the EPA made a determination of attainment of the 1-hour ozone standard in the San Joaquin Valley.

Source: CARB 2022, EPA 2023a.

5.2 ENVIRONMENTAL SETTING

5.2.1 AIR QUALITY

CLIMATE AND METEOROLOGY

The San Joaquin Valley is bounded by the Sierra Nevada mountain range to the east, the coastal mountain ranges to the west, the Tehachapi mountains to the south, and San Joaquin County to the north. The Valley is approximately 250 miles long and averages approximately 35 miles in width.

From west to east, elevations in and adjacent to the San Joaquin Valley range from approximately 3,000 feet above mean sea level (MSL) along the crest of the coastal mountain ranges, to below sea level in areas of the Valley itself, and above 10,000 feet msl along the crest of the Sierra Nevada. The predominant wind direction in the Valley is from the northwest toward the southeast.

The climate in Merced County is semiarid, characterized by hot, dry summers and cold, moist winters. The warmest month is July with average temperatures in the 90°s Fahrenheit and midday temperatures ranging up to 100° to 110°. The coldest month is January with average low temperatures in the 30°s.

Annual precipitation, mostly rainfall, ranges from 8 to 13 inches in the San Joaquin Valley, 9 to 14 inches in the foothills of the Sierra Nevada, to 13 to 24 inches in the Sierra Nevada. The average length of the frost-free season in Merced County is approximately 250 days per year. Precipitation occurs mainly from November to April; January typically has the highest rainfall. Fog is prevalent in the Valley from December to March.

The mountains surrounding the San Joaquin Valley Air Basin (Air Basin) restrict air movement through and out of the basin, and, as a result, impede the dispersion of pollutants from the basin. Inversion layers are formed in the Air Basin throughout the summer and winter. These layers occur

when cooler air near the ground surface is overlain by warmer air that prevents the vertical dispersion of pollutants. During the summer, the San Joaquin Valley experiences daytime temperature inversions at elevations from 2,000 to 2,500 feet above the valley floor, and during the winter, inversions occur at elevations from 500 to 1,000 feet above the valley floor.

CRITERIA AND NON-CRITERIA AIR POLLUTANTS

Criteria pollutants are those that are regulated by either the state or federal Clean Air Acts. Non-criteria pollutants are not regulated by these Acts, but are nonetheless of concern for animal confinement facilities because they may be precursors to criteria pollutants, or because of their potential for harm or nuisance. Table 5-3 provides a description of each of the criteria air pollutants and their known health effects.

Table 5-3 Air Pollutants and Associated Health Effects

Pollutant	Major Source	Human Health Effects
Ozone (O_3)	Formed from chemical reactions between reactive organic gases/volatile organic compounds (ROG or VOC), or non-methane hydrocarbons, and nitrogen oxides in the presence of sunlight. Major ROG and NO_x generators in the San Joaquin Valley include: motor vehicles and farming equipment such as tractors, feed trucks, and pumps; farming operations; and solvent evaporation.	Eye irritation and damage to lung tissue. Increased risk of premature mortality, pulmonary inflammation, the risk of asthma attacks, and the need for medical treatment and for hospitalization of persons with asthma. Ozone also harms vegetation, reduces crop yields, and accelerates deterioration of paints, finishes, rubber products, plastics, and fabrics. People most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers.
Particulate Matter (PM_{10} and $PM_{2.5}$)	The main sources of fugitive dusts are unpaved roads, construction, and paved roads. Additional sources of PM_{10} include fuel combustion, mobile sources, industrial processes, agriculture, fires, solvents, and miscellaneous sources. In animal confinement facility operations, particulates are primarily produced as a result of animal movement on dry manure, soil tillage, harvesting, and vehicle travel on unpaved roads. Secondary PM_{10} formation occurs as a result of the reaction of ammonia with nitrous oxides/sulfur oxides to form aerosols. Ammonia emissions from dairies are considered to be precursors to $PM_{2.5}$ formation. Federal and state standards have not been developed for ammonia, but it is listed in AB 2588 as a substance for which emissions must be estimated for facilities that exceed certain thresholds. These thresholds include facilities that emit 10 or more tons of PM_{10} annually.	Irritation of the eyes and respiratory system. Longer-term exposure to particulate matter is associated with chronic respiratory inflammation, rhinitis, asthma, increased susceptibility to respiratory tract infections, and increased mortality. Also, irregular heartbeat and heart attacks may result. People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution exposure.

Table 5-3 Air Pollutants and Associated Health Effects

Pollutant	Major Source	Human Health Effects
Carbon monoxide (CO)	Carbon monoxide is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. Because rural areas of the San Joaquin Valley and Merced County are classified as attainment for CO, and animal confinement facilities and activities associated with them are very minor sources of CO, this pollutant will not be discussed further.	Reduces the ability of blood to deliver oxygen to vital tissues, affecting the cardiovascular and nervous system. Impairs vision, causes dizziness, and can lead to unconsciousness or death. Very high levels of CO are not likely to occur outdoors.
Nitrogen Oxides	Nitrogen oxides react photochemically with hydrocarbons in the presence of sunlight to form ozone. Nitrogen oxides are major contributors to smog formation and acid deposition. Sources include on-road motor vehicles; other mobile sources such as aircraft, trains, boats, and farm equipment; and stationary sources of fuel combustion such as oil and gas production and industrial facilities. In agriculture, nitrous oxides are released from the nitrification of ammonia in livestock waste, but more is released directly from soil.	NO_2 is a deep lung irritant and may cause pulmonary edema when inhaled in sufficient quantities. Chronic exposures to NO_2 may cause pulmonary damage, decreased pulmonary function, and increased susceptibility to respiratory infection. Other studies have shown that short-term or long-term exposures to NO_x can increase susceptibility to respiratory infection by bacterial pneumonia or influenza virus. People with asthma, as well as children and the elderly are generally at greater risk for the health effects of NO_2.
Lead	Sources of lead resulting in concentrations in the air include industrial sources and crustal weathering of soils followed by fugitive dust emissions. Because the San Joaquin Valley and Merced County are classified as attainment for lead, and animal confinement facilities and activities associated with them are very minor sources of lead, this pollutant will not be discussed further.	Health effects from exposure to lead include brain damage, kidney damage, and learning disabilities. The lead effects most likely to be encountered in current populations are neurological effects in children.
Sulfates	Sulfates are the product of further oxidation of sulfur dioxide, which is produced when any sulfur-containing fuel is burned, or by chemical plants that treat or refine sulfur or sulfur containing chemicals. Sulfates contribute to acid deposition problems, and form aerosols, which contribute to $PM_{2.5}$. Because the San Joaquin Valley and Merced County are classified as attainment for sulfates, and animal confinement facilities and activities associated with them are very minor sources of sulfates, this pollutant will not be discussed further.	Respiratory irritant. Aggravates lung and heart problems. People with asthma, particularly children, are sensitive to these effects of SO_2. In the presence of moisture and oxygen, sulfur dioxide converts to sulfuric acid which can damage marble, iron and steel. Damages crops and natural vegetation. Impairs visibility. Precursor to acid rain.

Source: California Air Pollution Control Officers Association 2021, United States Environmental Protection Agency 2023b.

As described above, the Air Basin is currently in nonattainment for several criteria pollutants. In general, increased emissions could be expected to increase existing levels of chronic lung disease and to increase morbidity[6] and mortality. While the CARB is continually refining livestock emission estimates and incorporating this data into its regional air quality models for ozone and particulate matter, there is a lack of commonly accepted epidemiological models to forecast health impacts from dairies and other confined animal facilities (Mitloehner 2007). However, it has been well

[6] Illness or disease.

documented that there are adverse respiratory effects from exposure in agricultural occupations. Harmful air emissions from animal confinement facilities result from feed handling, animal movement, and manure storage and removal; these emissions tend to impact farm workers, who experience higher exposure, more than neighboring residents, who experience lower exposures (Mitloehner 2007).

AIR QUALITY MONITORING

The San Joaquin Valley Air Basin's air quality monitoring network provides information on ambient concentrations of air pollutants. The SJVAPCD operates several monitoring stations in the SJVAB, including two stations in Merced County, where the air quality data for ozone, $PM_{2.5}$, and PM_{10} were obtained. Table 5-4 compares a five-year summary of the highest annual criteria air pollutant emissions collected at these monitoring stations with applicable CAAQS, which are more stringent than the corresponding NAAQS. Due to the regional nature of these pollutants, ozone, $PM_{2.5}$, and PM_{10} are expected to be fairly representative of the project area.

As indicated in Table 5-4, the O_3, $PM_{2.5}$ and PM_{10} federal and state standards have been exceeded in Merced County over the past five years.

Table 5-4 Annual Air Quality Data for Merced County Air Quality Monitoring Stations

Pollutant	2017	2018	2019	2020	2021**
Ozone (O_3) 1-hour: *Monitoring location: Merced County – S Coffee Avenue*					
Maximum Concentration (ppm)	0.093	0.104	0.087	0.100	0.099
Days Exceeding State Standard (1-hr avg. > 0.09 ppm)	0	4	0	2	2
Ozone (O_3) 8-hour: *Monitoring location: Merced County – S Coffee Avenue*					
Maximum Concentration (ppm)	0.085	0.084	0.077	0.088	0.090
Days Exceeding State Standard (8-hr avg. > 0.070 ppm)	17	23	6	21	24
Days Exceeding National Standard (8-hr avg. > 0.075 ppm)	8	7	1	5	7
PM_{10}: *Monitoring location: Merced County – 2334 M Street*					
Days Exceeding State Standard (Daily Standard 50 μg/m³)	76.6	59.6	54.4	*	*
Maximum State 24-Hour Concentration (μg/m³)	144.0	142.7	99.1	209.9	85.5
Days Exceeding Federal Standard (Daily Standard 150 μg/m³)	0	0	0	5.8	*
Maximum Federal 24-Hour Concentration (μg/m³)	146.6	137.0	96.1	210.7	86.9
$PM_{2.5}$: *Monitoring location: Merced County – 2334 M Street*					
Days Exceeding National 2006 Standard (Daily Standard 35 μg/m³)	20.4	29.7	3.0	27.7	14.3
Maximum National 24-Hour Concentration (μg/m³)	66.7	94.7	41.6	86.0	72.9

Notes: Underlined Values in excess of applicable standard / ppm = parts per million / μg/m³ = micrograms per cubic meter.
*Insufficient data to determine the value
**2021 is the latest year of data available as of preparation of this chapter (April 2023).

Source: California Air Resources Board 2023. Air Quality Trend Summaries. Accessed at <www.arb.ca.gov/adam>.

5.2.2 ODORS AND OTHER EMISSIONS

The most significant source of nuisance odors from animal confinement facilities is the anaerobic decomposition of manure. Odor offensiveness varies with the moisture content of the manure. Studies have shown that pen odors have been found to increase up to 60 times under wet conditions (Augustin et al 2017).

Typically, the surface (aerobic) layer of feedlot manure and dairy waste ponds provides a physical barrier to atmospheric emission of the odors created by the underlying anaerobic layer. Further, the topography surrounding the dairy operation affects how and where odors move. Odorous air may be confined within depressions or valleys, and odors tend to move downhill under calm conditions. Odorous air will also either go around elevated areas or be dispersed more quickly when moved over higher and varied terrain (Henry and Stowell, undated).

The four basic approaches to control odor and odorants are diet manipulation, manure treatment, capture and treatment of emitted gases, and enhanced dispersion (USDA CLAQC 2000). Vegetative barriers such as purposefully planted linear arrangements of trees and shrubs can help obstruct, modify, absorb, and/or dissipate livestock odor plumes and other emissions prior to contact with people. Baseline data has shown that vegetative barriers can contribute up to 10 percent reduction in the movement of odor downwind (Tyndall and Colletti 2007). Vegetative barriers may also provide an aesthetic benefit, and could affect how people perceive agriculture and livestock odor.

Emissions from Animal Confinement Facilities. Though animal confinement facilities emit odors, the formation of odorous compounds is dependent upon a number of independent variables, including moisture content, aerobic versus anaerobic decomposition, and other aspects of manure management, local meteorology, and diet. Thus, it is not possible to develop an odor emission factor based on the number of head. However, it is probable that odor emission rates at a particular facility could increase with expanded operations and herd size.

Health Effects: A literature search conducted for the EIR prepared and certified by Merced County for Revisions to the Animal Confinement Ordinance indicated that no scientific studies have validated adverse health effects from dairy odors, though they can be a source of great nuisance.

For the purpose of this document, **receptors** are defined as people – children, adults, and seniors – occupying or residing in:

- Residential dwellings;
- Schools;
- Daycares;
- Hospitals;
- Senior-care facilities.

Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and designated residential areas are examples of sensitive receptors.

Sensitive uses include jails, public parks, Federal or State owned and managed wildlife areas, in addition to sensitive receptors listed above.

Existing Sensitive Uses and Receptors: There are several off-site residences located within the windshed of the dairy (defined as an area of 1,320 feet upwind to 2,640 downwind of the periphery of the animal facility). There are six residences located within 1,000 feet of active dairy facilities: two located along Washington Road approximately 85 feet and 285 feet north and east of active animal facilities; three located along Geer Avenue approximately 785 feet, 960 feet, and 920 feet north of active animal facilities; and one located along Williams Avenue approximately 900 feet south of existing active animal facilities. The distance of active animal facilities to the residence located along Williams Avenue would be reduced from 900 feet to 750 feet with the proposed dairy expansion. Distances to the other five residences would not be reduced (see Figure 3-8 in Chapter 3, *Project Description*). The community of Hilmar is located approximately 2.5 miles to the east-northeast of the existing active dairy facilities. The nearest school, Hilmar Middle School, is located approximately four miles east of the project site. (Impact AQ-6 evaluates the potential impacts from exposure of both on-site and off-site receptors to substantial pollutant concentrations from the emissions of air contaminants that cause odor.)

BIOAEROSOLS AND VALLEY FEVER

Bioaerosols are airborne particles that originate from biological sources including animals, plants, fungi, bacteria, protozoa, and viruses. While many of these organisms are harmless, and may even be considered beneficial, some bioaerosols can carry pathogens that can cause illness in humans after entry into the respiratory system. Examples of bioaerosols encountered in occupational environments include plant pollen, algae, fungal spores, bacteria such as actinomycetes, droplets produced during coughing and sneezing that may contain bacteria and viruses, dust containing insect excreta, animal dander, and fragments derived from each of these sources. Bioaerosols are found in most enclosed environments owing to their ubiquitous presence in nature.

The major sources of bioaerosols on a dairy are animals, animal wastes, feed, and bedding materials. It has been reported that bioaerosols from livestock in substandard environments (e.g. overcrowded conditions, cold, poor hygiene, poor feeding, high relative humidity, stress, contaminated feeding) may cause infectious diseases in farm animals, as well as in human farm workers and residents living in close proximity to farms. Bioaerosol concentrations generally have considerable variation over time and space because bioaerosol sources don't necessarily generate bioaerosols continuously. Bioaerosol dispersion is affected by weather and climate and can be carried on dust by wind, while precipitation reduces the dispersion of bioaerosols. (CDC 2017; USDA 2012)

Valley fever (also called coccidioidomycosis or "cocci") is a disease caused by a fungus that grows in the soil and dirt in some areas of California and the southwestern United States. While not considered a criteria pollutant, people and animals can get sick when they breathe in dust that contains the Valley fever fungus, *Coccidioides immitis*. Like seeds from a plant, a fungus grows and spreads from tiny spores that are too small to see. It is generally found in the top two to 12 inches of the soil. Cultivated, irrigated soil may be less likely to contain the fungus compared to undisturbed soils. When soil or dirt is stirred up by strong winds or while digging, dust containing these fungus spores can get into the air. Anyone who lives, works, or travels in an area where the Valley fever fungus grows can breathe in these fungus spores from outdoor dust without knowing it and become infected. However, there is no reliable way to test the dirt around a worksite for Valley fever. (CDPH 2022)

Valley fever is most common in California in the Central Valley and Central Coast. More than half of people (about 60 percent) infected with Valley fever have no symptoms, and their bodies will fight off the infection naturally. People who get sick usually develop symptoms one to three weeks after breathing in the fungus. Valley fever usually infects the lungs, and some people can develop respiratory symptoms or pneumonia. Common Valley fever symptoms can be mistaken for a cold, influenza, or pneumonia, but last longer than one week, though Valley fever is not contagious. Each year in California, there are around 80 deaths from Valley fever and more than 1,000 people are hospitalized with it. (CDPH 2022)

5.3 ENVIRONMENTAL EFFECTS

5.3.1 SIGNIFICANCE CRITERIA

In accordance with Appendix G to the State CEQA Guidelines, Section III, *Air Quality*, this analysis considers impacts to be significant if implementation of a proposed action would:

- Conflict with or obstruct implementation of the applicable air quality plan. *(III.a)*
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard. *(III.b)*
- Expose sensitive receptors to substantial pollutant concentrations? *(III.c)*
- Result in other emissions (such as those leading to odors affecting a substantial number of people. *(III.d)*

SIGNIFICANCE THRESHOLDS

The SJVAPCD's GAMAQI (SJVAPCD 2015) has established thresholds for certain criteria pollutants for determining whether a project would have a significant air quality impact. Construction and operational emissions are calculated separately. The SJVAPCD significance thresholds are presented in Table 5-5.

Table 5-5 SJVAPCD Significance Thresholds – Criteria Pollutants

Pollutant/Precursor	Threshold of Significance		
	Construction Emissions (*tons/year*)	Operational Emissions	
		Permitted Equipment and Activities (*tons/year*)	Non-Permitted Equipment and Activities (*tons/year*)
Reactive Organic Gases (ROG)	10	10	10
Oxides of Nitrogen (NO_X)	10	10	10
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15
Carbon Monoxide (CO)	100	100	100
Sulfur Oxide (SO_X)	27	27	27

Notes: The significance of the impacts of the emissions from construction, operational non- permitted equipment and activities, and operational permitted equipment and activities are evaluated separately. The thresholds of significance are based on a calendar year basis. For construction emissions, the annual emissions are evaluated on a rolling 12-month period.

Source: San Joaquin Valley Air Pollution Control District "Guidance for Assessing and Mitigating Air Quality Impacts" 2015.

The SJVAPCD's GAMAQI includes screening-level thresholds for construction and operational emissions to help determine when an ambient air quality analysis (AAQA) must be performed. An AAQA would entail the use of air dispersion modeling to determine whether emission increases from a project will cause or contribute to a violation of the CAAQS or NAAQS. The SJVAPCD's AAQA screening-level thresholds are 100 pounds per day of any criteria pollutant, after compliance with Rule 9510 requirements and implementation of all enforceable mitigation measures; projects with emissions in excess of this threshold would require dispersion modeling, while projects below this threshold are presumed to not result in a violation of the CAAQS or NAAQS.

As used in the Health Risk Assessment (HRA), the SJVAPCD level of significance for carcinogenic risk is twenty in one million (20×10^{-6}), which is understood as the possibility of causing twenty additional cancer cases in a population of one million people. The level of significance for acute and chronic non-cancer risk is a hazard index of 1.0.

In relation to objectionable odors, the Merced County CEDD uses a setback approach to odor nuisance control, requiring setbacks between animal confinement facilities and other uses of 0.5-mile for urban areas and sensitive uses, and 1,000 feet for isolated rural residences. If the specified uses are within the setback distances, the County presumes an increased potential for odor nuisance conditions, though it relies on a record of odor complaints to confirm the presence or absence of nuisance conditions.

Odor modeling was not used in the evaluation of odor impacts in this EIR because it is highly subjective. Unlike HRAs and AAQAs, there is a lack of agency guidance in conducting an adequate odor model analysis. Odors can be detected within very short timeframes (on the order of seconds), and the minimum averaging period for the most-used dispersion models is one-hour, requiring the use of lesser-known and understood models, or manually adjusting the averaging period. In addition, there is a huge variability among the general population in the ability to detect odor. Since odor is a nuisance, an odor study generally uses the most conservative odor detection threshold available. Finally, it is almost impossible to change someone's perception of odors of particular uses, such as dairies, and model results will often be ignored if an individual claims the detection of a nuisance odor.

5.3.2 ENVIRONMENTAL IMPACTS

The evaluation of the Vierra Dairy Expansion project addresses the emissions associated with the expansion of the existing herd size from 5,597 cows to the proposed level of operations at 7,117 cows, an increase of 1,520 cows (see Table 3-3 in Chapter 3, *Project Description* of this EIR for a breakout of the herd by age-class).

The existing operation includes a dairy facility located on an approximate ±72-acre portion of the dairy farm. The developed facilities include freestall barns and corrals, additional animal housing, milking barn, commodity barns, feed storage areas, four settling basins, one wastewater storage pond, and manure drying and storage areas.

The proposed project would include the construction of supporting buildings and structures, including two (2) freestall barns of approximately 121,500 square feet each and associated corrals, one 10,000 square-foot hospital milking barn, one 15,160 square-foot commodity barn addition, 195,200 square-foot heifer barn (covering existing corrals), and 18,000 square-foot utility shop. Proposed improvements would add approximately 481,360 square feet of new structures. Further dairy modifications would include additional concrete and earthen manure drying areas, mechanical manure separator, and a septic system near the proposed hospital milking barn. The existing calf pens, utility shop, modular office, and associated septic systems would be removed with construction of the proposed facilities. With the recent purchase of surrounding farmland over nine additional parcels, there would be approximately 770± acres of cropland available for wastewater and manure application with the proposed dairy expansion. With implementation of the proposed project, the number of employees would increase from 32 to approximately 45 workers. All project-related construction and operational activities would generate some level of air quality emissions, and thus are being assessed as part of this EIR.

Impact AQ-1: Construction-related emissions (Criterion III.b)

Construction activities associated with the Vierra Dairy Expansion project would result in short-term air emissions including ROG, CO, SO_2, NO_X, and fugitive dust. For projects in which construction related activities would disturb equal to or greater than one acre of surface area, the SJVAPCD requires implementation of an approved Dust Control Plan. Because construction emissions would not exceed SJVAPCD significance thresholds, this would be a less-than-significant impact.

Setting information is set forth above in this chapter regarding ozone precursors and fugitive dust, including the major sources of the pollutant; its potential for adverse environmental effects; the role of animal confinement facilities in the emissions; and potential human health effects. The San Joaquin Valley, including Merced County, is designated as a nonattainment area for federal 8-hour ozone standards, federal $PM_{2.5}$ standards, state 1- and 8-hour ozone standards, and state PM_{10} and $PM_{2.5}$ standards.

Construction-related emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2020.4.0 (see Appendix G, *Health Risk Assessment and Ambient Air Quality Analysis* for construction modeling results). The individual components of construction emissions include employee trips, exhaust emissions from construction equipment, and fugitive dust emissions. The proposed dairy expansion would be constructed in one phase over an approximate two (2) year construction period. CalEEMod default equipment for construction was used.

Table 5-6 presents an estimate of annualized construction emissions for the Vierra Dairy Expansion project. Construction of the proposed project would produce maximum unmitigated annual emissions of 0.18 tons of ROG, 1.49 tons of NO_X, 0.25 tons of PM_{10}, and 0.18 tons of $PM_{2.5}$. Construction of the proposed project would not exceed the significance criteria of 10 tons/year of ROG, 10 tons/year of NOx, 15 tons/year for PM_{10}, or 15 tons/year for $PM_{2.5}$.

Table 5-6 Construction Related Emissions

	ROG (tons/year)	**NO_X** (tons/year)	**PM_{10}** (tons/year)	**$PM_{2.5}$** (tons/year)
2022 Emissions [(1)]	0.18	1.49	0.34	0.18
2023 Emissions	0.11	0.88	0.12	0.06
Maximum Annual Emissions	0.18	1.49	0.34	0.18
SJVAPCD Significance Criteria	10	10	15	15
Criterion Exceeded?	No	No	No	No

Notes: Calculations completed in May 2022.

1 See CalEEMod calculation assumptions in Appendix A of the Health Risk Assessment and Ambient Air Quality Analysis included as Appendix G of this EIR.

Source: Trinity Consultants 2023, Planning Partners 2023.

Although the project would not exceed significance thresholds, the applicant would still be required to comply with Regulation VIII and all applicable SJVAPCD Rules and Regulations. SJVAPCD's Regulation VIII (Rule 8021) specifies control measures for PM_{10} emissions from construction related activities, including demolition. In addition, Rule 3135 establishes a Dust Control Plan Fee, which would also be required. A summary of control measures for construction and other earthmoving activities included in Regulation VIII are as follows:

Pre-Activity:

- Pre-water site sufficient to limit Visible Dust Emissions (VDE) to 20% opacity, and
- Phase work to reduce the amount of disturbed surface area at any one time.

During Active Operations:

- Apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20% opacity; or
- Construct and maintain wind barriers sufficient to limit VDE to 20% opacity.
- Apply water or chemical/organic stabilizers/suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit VDE to 20% opacity and meet the conditions of a stabilized unpaved road surface.

Temporary Stabilization During Periods of Inactivity:

- Restrict vehicular access to the area; and
- Apply water or chemical/organic stabilizers/suppressants, sufficient to comply with the conditions of a stabilized surface. If an area having 0.5 acres or more of disturbed surface area remains unused for seven or more days, the area must comply with the conditions for a stabilized surface area as defined in section 3.53 of Rule 8011.

Speed Limitations and Posting of Speed Limit Signs on Uncontrolled Unpaved Access/Haul Roads on Construction Sites

- Limit the speed of vehicles traveling on uncontrolled unpaved access/haul roads within construction sites to a maximum of 15 miles per hour.
- Post speed limit signs that meet State and federal Department of Transportation standards at each construction site's uncontrolled unpaved access/haul road entrance. At a minimum, speed limit signs shall also be posted at least every 500 feet and shall be readable in both directions of travel along uncontrolled unpaved access/haul roads.

Wind Generated Fugitive Dust Requirements

- Cease outdoor construction, excavation, extraction, and other earthmoving activities that disturb the soil whenever VDE exceeds 20% opacity. Indoor activities such as electrical, plumbing, dry wall installation, painting, and any other activity that does not cause any disturbances to the soil are not subject to this requirement.
- Continue operation of water trucks/devices when outdoor construction excavation, extraction, and other earthmoving activities cease, unless unsafe to do so.

The SJVAPCD requires that animal confinement facilities obtain an ATC permit prior to initiating construction on a new facility if the facility results in emissions in excess of five tons/year of VOCs, or for expanding facilities with an existing ATC/PTO. The proposed dairy expansion project would require a new ATC and PTO from the SJVAPCD for the expanded herd and modification of the existing facilities. The project's compliance with Regulation VIII would be enforced through the ATC permit. For projects in which construction related activities would disturb equal to or greater than one acre of surface area, the SJVAPCD recommends that the County's conditions of approval require that the applicant provide a receipt of a SJVAPCD approved Dust Control Plan or Construction Notification form prior to the issuance of the first building permit.

Emissions of construction-related ozone precursors and fugitive dust would not exceed the threshold values used by the SJVAPCD. In addition, the project would be required to implement construction dust control measures and comply with SJVAPCD rules described above to reduce construction emissions. Therefore, the magnitude of construction-related emissions would be considered to be less than significant.

To ensure project compliance with applicable SJVAPCD Rules and Regulations, the following measure would be recommended.

Significance of Impact: Less than significant.

Recommended Measure AQ-1:
Prior to the release of the first-issued building permit, the applicant shall provide to the County a receipt of a SJVAPCD approved ATC permit, in addition to a Dust Control Plan or Construction Notification form in compliance with Regulation VIII – Fugitive Dust PM_{10} Prohibitions. The proposed animal confinement facility expansion may be subject to additional rules, including, but not limited to Rule 4570, Confined Animal Facilities, Rule 4102 (Nuisance), Rule 4601 (Architectural Coatings), Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations), and Rule 4002 (National Emission Standards for Hazardous Air Pollutants). The project applicant will be required to implement measures of applicable SJVAPCD Rules and Regulations as noted.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project area. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Project implementation of SJVAPCD rules and regulations to be included in the SJVAPCD permit process would reduce construction emissions further and the proposed project construction emissions would continue to be considered less than significant following implementation of the recommended measure.

Implementation/Monitoring: Implementation of the measure would be the responsibility of the project applicant. The Merced County Division of Environmental Health and the SJVAPCD shall monitor for compliance. Implementation of AQ-1 shall be implemented prior to the release of the first-issued building permit, during construction, and throughout ongoing operations.

Impact AQ-2: Carbon monoxide emissions from operational equipment and increased traffic (Criteria III.b)

Operation of equipment used at the Vierra Dairy Expansion for processing and farming would result in emissions of carbon monoxide. Because the magnitude of emissions from the Vierra Dairy Expansion would not exceed SJVAPCD significance criteria, this would be a less-than-significant impact.

Setting information regarding CO, including the major sources of the pollutant; its potential for adverse environmental effects; the attainment status of the San Joaquin Valley and Merced County; the role of animal confinement facilities in the emissions; and potential human health effects, is presented in the environmental setting, above. As set forth in Table 5-2, the San Joaquin Valley air basin, including Merced County, is in attainment for CO under both state and federal standards.

Equipment such as tractors and milk tankers are used at the Vierra Dairy, and the use of this equipment results in exhaust emissions. On-site mobile source emissions from the feed loading tractor, a feed delivery tractor, milk tankers, solids manure removal trucks, and commodity delivery trucks would result in a minimal increase of CO emissions with the proposed expansion (see Appendix F-1 of this EIR). Other diesel-fueled sources that would not have an increase in usage as a result of the project are bedding delivery tractor, manure scraping tractor, and manure loading

tractor. Additionally, the SJVAPCD has implemented Rules 4701 and 4702 regulating the operations of internal combustion engines to further reduce potential CO, ROG, and NO_X emissions.

Expanded facility operations at the Vierra Dairy would result in increases of vehicular traffic on local roads, and, therefore, in localized exhaust emissions. The primary source of CO emissions in California is on-road motor vehicles; this source is significant only for areas with large traffic volumes and congested intersections and roadways. Milk from the proposed project would continue to be collected from the dairy by tanker truck. Feed and commodity deliveries would result in additional truck trips to the dairy site. New employees associated with the proposed expansion would result in an increase in light vehicle use. As estimated by the project sponsor, average daily trips (ADT) by all vehicle classes are approximately 77.8 ADT, and would increase to approximately 109.1 ADT with the proposed expansion. Emissions of CO from vehicular traffic is estimated to be 0.43 tons annually (see Appendix F-1 of this EIR). With low traffic volumes and generally high levels of service of rural roadways serving the site (and resulting low background concentrations of CO), the effect of CO emissions related to traffic from dairy operations at the Vierra Dairy Expansion is expected to be minimal.

Because of the low volumes of traffic associated with the project, and the fact that the Air Basin is in attainment for state and federal CO standards, and emissions from the Vierra Dairy Expansion project would not exceed SJVAPCD significance criteria, the CO emissions associated with the traffic related to the proposed levels of operations at the project would be considered to be less than significant.

Significance of Impact: Less than significant.

Mitigation Measure AQ-2: None required.

Impact AQ-3: Ozone precursor emissions from dairy operations, farm equipment, and increased traffic (Criteria III.b)

The proposed dairy expansion would result in emissions of ozone precursors (volatile organic Compounds (VOC)/Reactive Organic Gases (ROG) and Nitrogen Oxides (NO_X)) from dairy operations, farm equipment, and increased traffic from the Vierra Dairy Expansion project, which could result in human health effects. However, because the increase in emissions would not exceed SJVAPCD significance thresholds, this would be considered a less-than-significant impact.

Setting information is discussed previously in this Chapter regarding ROG/VOC and NO_X, precursors of ozone, including the major sources of the pollutants; their potential for adverse environmental effects; the role of animal confinement facilities in the emissions; and potential human health effects.

New dairies that exceed the threshold of five tons/year of VOCs or modifications to existing sources that are subject to the SJVAPCD permit requirements must obtain an ATC and PTO from the SJVAPCD, as well as undergo New Source Review (Rule 2201) requirements to determine if new emission sources trigger BACT. Farming equipment exhaust, increased vehicle exhaust, and manure management and feed are sources of ozone precursor emissions. These sources are discussed by pollutant type (NO_X or VOC) below.

Farming Equipment and Increased Traffic: Operational sources of VOC and NO_X emissions associated with animal confinement facilities include farming equipment exhaust[7], truck exhaust, and employee vehicle exhaust. Vehicular traffic from the Vierra Dairy Expansion would generate approximately 31.3 additional ADTs from truck trips and employee travel. Farming equipment such as tractors, milk trucks, back-up generators[8], and pumps are typically used as part of dairy or other animal confinement operations, and the increased use of this equipment would contribute to an increase in exhaust emissions. Farming equipment used for crop cultivation and harvesting would also result in exhaust emissions; there would be a small increase in use and emissions since there would be an overall increase in cropping activity with the proposed dairy project (number of cropped acres would increase but farming cropping patterns would change and number of harvests per field would decrease).

NO_X Emissions - The increment of increase of NOx emissions from traffic, on-site mobile sources, and off-road equipment were calculated using CalEEMod Version 2020.4.0 (see Appendix F). The increment of increase with the proposed expansion of NO_X emissions from truck trips, employee travel, and on-site mobile movement such the feed loader would be 0.293 tons per year. The change in NO_X emissions from farm equipment was estimated using a Merced County-specific emissions factor and applying it to harvested acres (including multiple harvests per year). There would be an increase of 0.007 tons per year of NOx emissions from farm equipment. There would be an overall increase of 0.30 tons/year of NOx emissions from vehicle trips, on-site dairy equipment, and farm equipment as a result of the proposed expansion.

VOC Emissions - Increased VOC emissions from traffic, on-site mobile sources, and off-road equipment were calculated using CalEEMod Version 2020.4.0 (see Appendix F). The estimated increase of VOC/ROG emissions from these sources at the dairy would be 0.035 tons/year. The change in VOC emissions from farm equipment was estimated using a Merced County-specific emissions factor and applying it to harvested acres (including multiple harvests per year). There would be an increase of 0.001 tons/year of VOC emissions from farm equipment. The overall increment of increase of VOC emissions from vehicle trips, on-site dairy equipment, and farm equipment as a result of the proposed dairy expansion would be 0.036 tons/year.

Manure Management and Feed: VOCs are an ozone precursor and are emitted directly from dairy cows, from the fermentation and decomposition of cattle feed, and from the decomposition of cattle manure. There are several management practices used at the Vierra Dairy that control emissions. For example, all animals are fed in accordance with National Research Council (NRC) guidelines to minimize undigested protein and other undigested nutrients in the manure with the result that the overall emissions NH_3 and VOCs emission with manure decomposition are reduced. As proposed by the SJVAPCD, emission reduction measures for feed handling and storage include

[7] The CARB In-Use Off-Road Diesel Vehicle Regulation aims to reduce diesel PM and NO_X emissions from existing off-road heavy-duty diesel vehicles in California. However, vehicles used solely for agriculture are exempt from the Off-Road regulation.

[8] The District's permitting process typically ensures that emissions of criteria pollutants from permitted equipment and activities at stationary sources are reduced or mitigated to below the District's thresholds of significance. Because there is no new permitted equipment proposed for the dairy herd expansion, there would be no change in emissions from permitted sources.

best management practices, such as minimizing the surface area of the silage face exposed to the atmosphere and cleaning up residual feed to avoid decomposition and increased emissions.

Most nitrogen loss from manure management occurs in the form of N_2O emissions from nitrification and denitrification of the nitrogen contained in the manure. Indirect emissions result from volatile nitrogen losses, primarily in the form of ammonia and NO_X. There are large uncertainties associated with using default emission factors of direct N_2O emissions from manure management, and similarly with NO_X emissions, since NO_X emissions from manure decomposition are highly dependent on the management system and duration of waste management (Eckard 2007; IPCC 2006).

NO_X emissions from soil -Nitrous oxide emissions from cropland are a result of natural processes occurring in the soil. Many factors influence the emission of N_2O such as soil moisture, temperature, microbial activity, aeration and organic matter content. Previous findings suggest that soils are a dominant source of NO_X emissions in California; however, a statewide assessment of the impacts of soil NO_X emission on air quality is still lacking. Studies have indicated that an increase of soil N_2O emissions is primarily attributable to the increase of agricultural inputs from fertilizer and manure (Almaraz, et. al. 2018). Several existing farming practices could be used to reduce soil NO_X emissions from fertilized croplands, such as application of fertilizers at agronomic rates, using cover crops to absorb excess nitrogen, and efficient application methods. Many of these methods are promoted through the California Department of Food and Agriculture's Fertilizer Research and Education Program.

For the Vierra Dairy, wastewater would continue to be applied to cropland as fertilizer with the proposed dairy expansion. While the overall acreage associated with dairy operations would increase from 582 acres to 770 acres, it is assumed that animal wastes used as fertilizer would replace all or a portion of existing synthetic fertilizers used on acquired cropland. There are no currently adopted emission factors for NO_X emissions from the soil due to the wide number of variables and lack of extensive assessment; however, to provide an estimate on the potential change in NO_X emissions from the soil as a result of the dairy expansion, this analysis uses NO_X emissions from Michigan State University's US Cropland Greenhouse Gas Calculator, which accounts for different cropping systems (see Appendix F). Based on the increased crop acreage, it is estimated there would be an increase of 0.21 tons/year of N_2O emissions with the proposed project.

VOC Emissions - Calculations of total VOC emissions from cows at the Vierra Dairy Expansion are set forth in Appendix F. Silage pile and Total Mixed Ration (TMR) VOC emissions flux are calculated based on the area of exposure on the silage piles and feed lanes[9]. Estimated VOC emissions from feed at the Vierra Dairy Expansion project are set forth in Appendix F. The dairy would continue to maintain the same number of covered silage piles with an open end. TMR was calculated based estimated area of feed per cow. VOC emissions from the feed and manure management would total 55.16 tons/year with the proposed project, with the expansion contributing 8.68 more tons/year over existing conditions. VOC emissions from all animal confinement facilities in the San Joaquin Valley are discussed in Section 12.1, *Cumulative Impacts*.

[9] For the purposes of this analysis, it is assumed that there would only be one open silage face for each silage type at a given time. TMR was calculated based on SJVAPCD estimated area of feed per cow.

The VOC Emission Factors used in this analysis are from the dairy emissions calculator spreadsheet provided by the SJVAPCD (dated January 2020)[10]. Aggregated VOC emissions for all activities associated with the Vierra Dairy Expansion are presented in Table 5-7.

Table 5-7 Aggregated VOC/ROG Emissions from the Vierra Dairy Expansion

Emission Source	Existing VOC/ROG Emissions	Proposed VOC/ROG Emissions	Increment of Increase with Proposed Expansion
Traffic, On-site Mobile Source, Off-road Equipment			0.035 tons/year
Farm Equipment	0.914 tons/year	0.915 tons/year	0.001 tons/year
Feed and Manure Management	46.48 tons/year	55.16 tons/year	8.68 tons/year
Total Increment of Increase			**8.71 tons/year**
SJVAPCD Significance Criterion			**10 tons/year**
Criterion Exceeded?			**NO**

Source: Planning Partners, 2023. See Appendix F of this EIR.

Summarily, NO_X emissions from expanded project operations for traffic, off-road equipment, farm equipment, and soils would result in an estimated net increase of 0.508 tons/year of NO_X emissions from existing conditions. The increment of increase in VOC emissions associated with the proposed expansion would be 8.71 tons/year over existing operations. The proposed dairy expansion would trigger New Source Review and application of BACT, and an ATC/PTO would be required prior to the initiation of construction. As part of the PTO, the dairy operator would be required to submit an ATC/PTO application detailing an emission mitigation plan listing all chosen BACT/BARCT mitigation measures. The SJVAPCD would then consider implementation of the selected mitigation measures as conditions of the ATC permit required by District Rule 2201. The menu of potential mitigation measures that could apply to the proposed dairy expansion is included in Appendix D of this EIR. Chapter 18.64.050 U of the ACO (see Appendix C of this DEIR) applies to this impact, which includes compliance with requirements of the SJVAPCD and required reduction of air emissions, including PM_{10} and ROG.

Human Health Effects

As described in the Environmental Setting of this chapter, exposure to criteria pollutant emissions can cause human health effects. Potential health effects vary depending primarily on the pollutant type, the concentration of pollutants during exposure, and the duration of exposure. Air pollution does not affect every individual in the population in the same way, and some groups are more sensitive than others to adverse health effects. However, using the SJVAPCD emissions threshold is not amenable to determining project level assessments of human health effects. Air districts have focused on reducing regional emissions from all sectors to meet the health-based concentration standards, thereby reducing the pollutant specific health impacts for the entire population. As set forth above, the SJVAPCD has prepared plans to attain and maintain the ozone and particulate matter ambient air quality standards. These attainment plans include emissions inventories, air

[10] The Vierra Dairy is currently required to comply with all applicable mitigation measure requirements of SJVAPCD Rule 4570, which are expected to result in VOC emissions reductions. These mitigation measures as identified by the SJVAPCD, and the expected control measure for each, are included in calculations for existing and proposed operations.

monitoring data, control measures, modeling, future pollutant-level estimates, and general health information. Attainment planning models rely on regional inputs to determine ozone and particulate matter formation and concentrations in a regional context, not a project specific context. For an analysis of the potential for localized health impacts, see Impacts AQ-5 and AQ-6 regarding hazardous air pollutants and health risk.

As described in the introduction to this chapter, ROG/VOC and NO_X are precursors to ozone, increased concentrations of which can cause health effects generally associated with reduced lung function. The contribution of VOCs and NO_X to a region's ambient ozone concentrations is the result of complex photochemistry. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In other words, because of the complexity of ozone formation, the pounds or tons of emissions from a proposed project in a specific geographical location does not equate to a specific concentration of ozone formation in a given area, because in addition to emission levels, ozone formation is affected by atmospheric chemistry, geography, and weather. Because air district attainment plans and supporting air model tools are regional in nature, they do not allow for analysis of the health impacts of specific projects on any given geographic location.

In contrast to attainment models, CalEEMod, one of the models used for this CEQA air quality analysis, is designed to calculate and disclose the mass emissions expected from the construction and operation of the proposed dairy expansion project (tons/year). The estimated emissions are then compared to SJVAPCD significance thresholds, which are in turn keyed to reducing emissions to levels that will not interfere with the region's ability to attain the Federal and State ambient air quality standards. This protects public health in the overall region, but there is currently no methodology to determine the impact of emissions on concentration levels in specific geographic areas in the San Joaquin Valley. The SJVAPCD currently does not have a methodology that would provide Lead Agencies and CEQA practitioners with a consistent, reliable, and meaningful analysis to correlate specific health impacts that may result from a proposed project's mass emissions (SJVAPCD 2023). Therefore, given existing constraints, the analysis of direct health impacts due to criteria air pollutant emissions from the proposed dairy expansion is not yet feasible and will remain a qualitative discussion.

Summary
The proposed dairy expansion project would result in an increase of VOC emissions that would not exceed the SJVAPCD significance thresholds. While the Air Basin is in nonattainment for both federal and state ozone standards, and VOCs and NO_X are ozone precursors, the expanded operations of the proposed dairy are not predicted to exceed SJVAPCD significance thresholds, and this would be considered a less-than-significant impact.

Significance of Impact: Less than significant.

Mitigation Measure AQ-3: None required.

Impact AQ-4: PM_{10} and $PM_{2.5}$ emissions from fugitive dust during project operations (Criteria III.b)

Operations at the Vierra Dairy Expansion would result in fugitive dust (PM_{10} and $PM_{2.5}$) emissions from wind erosion, farming operations, animal movement in unpaved corrals, vehicle use along unpaved driveways and access roads, and equipment operation. Because pollutant concentrations would not exceed SJVAPCD emissions thresholds, this would be a less-than-significant impact.

Setting information regarding particulate matter, including the major sources of the pollutant; its potential for adverse environmental effects; the role of animal confinement facilities in the emissions; and potential human health effects, is presented in the Setting above. For an evaluation of the project potential to impact ambient air quality through a violation of any air quality standard or a substantial contribution to an existing or projected air quality standard, see Impact AQ-6.

As discussed in detail in the following paragraphs, several sources of particulate matter emissions are associated with animal confinement facilities: wind erosion, farming operations, farming equipment exhaust, traffic on unpaved roadways, and animal movement. Calculation spreadsheets are included in Appendix F. Various management practices are currently used at this dairy to control PM emissions. The dairy uses a flush system with recycled water to clean the milk barn, which minimizes PM emissions. Bi-weekly scraping of the corrals minimizes loose dirt and manure in the pens. Concrete lanes in the barns reduce PM emissions since the cows are on a paved surface instead of loose dirt, and flushing of the concrete lanes to remove manure also minimizes PM emissions.

Ammonia emissions from dairies are considered to be precursors to $PM_{2.5}$ formation. In reactions in the atmosphere, gaseous ammonia combines with SOx and NOx to form ammonium nitrate and ammonium sulfate $PM_{2.5}$ particles. Formation of $PM_{2.5}$ requires both ammonia and SOx or NO_X. ammonium nitrate is estimated to comprise about 40 percent of the Valley's annual average $PM_{2.5}$ concentrations, but it is generally regarded as having relatively low toxicity as compared to other types of $PM_{2.5}$ species (SJVAPCD 2015). Dairies are a source of ammonia, but do not necessarily produce $PM_{2.5}$ unless the SOx or NO_X concentration is sufficiently high. In most rural settings, SOx/NOx concentrations limit the formation of $PM_{2.5}$. According to a report completed by the SJVAPCD in 2019, the SJVAPCD modeling results demonstrated that ammonia (NH_3) is not a significant precursor to $PM_{2.5}$ concentrations in the Valley; the data indicated that ammonium nitrate formation in the Valley is limited by the amount of NO_X present in the air (SJVAPCD 2019). Further, the CARB has an extensive suite of measures in place to reduce NOx emissions from mobile sources that reduce ammonium nitrate. For these reasons, the CARB has excluded ammonia from control requirements in the SIP. As described in Impact AQ-3, NO_X emissions are not anticipated to exceed SJVAPCD significance criteria. Though ammonia is not designated as a pre-cursor pollutant under the CAA, the SJVAPCD Rule 4570 includes ammonia emission controls for dairies, which may be an effective $PM_{2.5}$ mitigation practice in certain areas and climatic conditions (Hristov 2011). While the proposed dairy expansion project would result in an increase in ammonia emissions (see Appendix F-1), it is not anticipated to substantially contribute to $PM_{2.5}$ formation for the reasons stated above.

Wind Erosion: Wind erosion from land cultivation produces PM_{10} and $PM_{2.5}$ emissions. Research from the CARB has led to emission factor estimates that would be appropriate for application to this project. The Vierra Dairy has approximately 582 acres in farming operations that are currently being exposed to cultivation and occasional wind erosion under existing conditions, and would

increase to 770 acres under proposed conditions. Based on existing and proposed cropping patterns and multiple harvests, the existing project operations would generate 9.45 tons/year of PM_{10} and 1.629 tons/year of $PM_{2.5}$ from wind erosion, and 9.47 tons/year of PM_{10} and 1.631 tons/year of $PM_{2.5}$ with proposed project operations (see Appendix F for calculations and assumptions).

Farming Operations: Land preparation and harvesting produces PM_{10} emissions. Research from the CARB has led to emission factor estimates that would be appropriate for application to this project. There are different emission factors for land preparation and for harvesting according to crop type as shown in Appendix F. By applying these crop-specific emission factors to the existing cropped acreage for the Vierra Dairy operation, estimated emissions from land preparation and harvesting for existing operations are 5.57 tons/year of PM_{10} and 0.46 tons/year of $PM_{2.5}$. Estimated emissions from land preparation and harvesting for proposed operations would be 5.17 tons/year of PM_{10} and 0.50 tons/year of $PM_{2.5}$ (see Appendix F).

Farming Equipment and Increased Traffic: On-site mobile sources of exhaust emissions include a feed loading tractor, a feed delivery tractor, milk tankers, solids manure removal trucks, and commodity delivery trucks. Other diesel-fueled sources that would not have an increase in usage as a result of the project are bedding delivery tractor, manure scraping tractor, and manure loading tractor. Emissions could also occur from vehicle travel on paved and unpaved roads. Based on mobile source calculations in CalEEMod (see Appendix F), the proposed dairy expansion traffic operations would result in an increment of increase of 0.06 tons/year of PM_{10} and 0.01 tons/year of $PM_{2.5}$.

Animal Movement: Emissions attributed to animal movement were estimated using PM_{10} emission factors currently used by the SJVAPCD (see Appendix F of this EIR). To generate $PM_{2.5}$ emissions, the PM_{10} emission results were multiplied by the $PM_{2.5}$ fraction from the livestock fugitive dust profile in the California Emission Inventory Data and Reporting System developed by the California Air Resources Board. Based on these emissions factors, the proposed Vierra Dairy Expansion would result in an overall decrease of -1.51 tons/year of PM_{10} and -0.17 tons/year of $PM_{2.5}$. The project would result in a reduction in PM emissions based on the changes in animal housing, by moving some milk cows out of corrals and into paved freestalls and providing shaded corrals, which reduces dust.

Dry Manure Application: Additionally, spreading dry manure on cropped fields creates PM_{10} emissions. According to the existing and proposed conditions NMPs, dry manure is not currently applied on any onsite dairy cropland, and would not be applied to onsite dairy cropland under proposed conditions. Impacts from the application of dry manure from the proposed dairy herd expansion at off-site locations are discussed in Section 12.1, *Cumulative Impacts,* of this EIR.

Aggregated PM_{10} emissions for all activities associated with the Vierra Dairy Expansion are presented in Table 5-8.

Table 5-8 Aggregated PM_{10} and $PM_{2.5}$ Emissions for Project-Specific Activities for the Proposed Dairy Expansion

Emission Source	Project Increase of PM_{10} Emissions (tons/year)	Project Increase of $PM_{2.5}$ Emissions (tons/year)
Wind Erosion	0.012	0.002
Farming Operations	-0.40	0.04
Traffic, On-site Mobile Source	0.06	0.01
Animal Movement	-1.51	-0.17
Dry Manure Application	0	0
Total	**-1.84**	**-0.12**
SJVAPCD Significance Criterion	15 tons/year	15 tons/year
Criterion Exceeded?	**NO**	**NO**

Source: Planning Partners, 2023.

As shown above, there would be an overall decrease in particulate matter emissions with implementation of the proposed dairy improvements, and emissions would not exceed SJVAPCD significance criteria for PM_{10} or $PM_{2.5}$.

SJVAPCD Rule 4550 includes dairies, other animal confinement facilities, and other on-field farming operations. As mentioned above, Rule 4550 requires the preparation of CMP plans to reduce PM_{10} emissions. This rule applies to agricultural operators with more than 100 contiguous acres, including the Vierra Dairy. Unpaved roads with traffic volumes greater than 75 vehicles per day (but not internal farm roads or roads with average daily traffic volumes fewer than 75 vehicles) are subject to SJVAPCD regulation.

Chapters 18.64.050 U and HH of the ACO (see Appendix C) apply to this impact, which includes compliance with requirements of the SJVAPCD, dust control measures for unpaved roadways, and required reduction of air emissions, including PM_{10} and ROG. The dairy BACT/BARCT mitigation requirements presented in Appendix D would apply to the proposed project for required measures, and could be made conditions of the SJVAPCD's permit approval of the dairy for feasible measures.

As described above, the proposed project would result in an overall reduction in PM emissions due to changes in animal housing and cropping patterns. While the Merced County portion of the San Joaquin Valley Air Basin has been classified as non-attainment for PM_{10} under the established CAAQS, the expanded operations of the proposed dairy are not predicted to exceed SJVAPCD significance thresholds, and this would be considered a less-than-significant impact. For a discussion of bioaerosols, see Impact AQ-8 below.

Significance of Impact: Less than significant.

Mitigation Measure AQ-4: None required.

Impact AQ-5: Expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants (including ammonia and hydrogen sulfide) from project construction and operations (Criterion III.c)

The proposed dairy expansion project would be a potential source of hazardous air pollutants from construction activities, animal movement, manure management, land application of wastewater, and on-site mobile sources. Without the application of SJVAPCD-approved control measures, this project would exceed health risk thresholds. This would be a significant impact.

Ammonia and hydrogen sulfide are produced during the anaerobic decomposition of manure. They are of concern as both "air toxics," and as criteria pollutants or precursors to $PM_{2.5}$. Both of these pollutants are listed in the State Air Toxics "Hot Spots" Information and Assessment Act (AB 2588). AB 2588 is intended to provide a cumulative inventory of toxic air pollutants, to require risk assessments, and to require control measures. If a facility is subject to AB 2588, as dairies are if they have the potential to emit greater than 10 tons/year of PM_{10} (as a surrogate for ammonia and hydrogen sulfide), then several steps are required. First, a detailed inventory is compared to values of concern to determine if further action is required. If so, a HRA is conducted to further evaluate the concern. Finally, in cases of high risk, control measures are required.

Proposed modifications to the Vierra dairy would result in emissions of hazardous air pollutants and would be located near existing residences; therefore, an assessment of the potential risk to the population attributable to emissions of hazardous air pollutants from the proposed dairy expansion is required. The HRA prepared for the Vierra Dairy Expansion project assesses the potential risk to the adjacent residents and workers attributable to emissions of hazardous air pollutants from construction and operation of the proposed dairy (see Appendix G[11] of this EIR).

Pursuant to guidance provided by the SJVAPCD, emissions based on the current configuration of the dairy are considered to be existing emissions. Based on this guidance, the facility's existing emissions are not considered as part of the evaluation of the proposed dairy expansion. Emissions from the dairy expansion have been restricted to incremental emissions from construction activities, animal movement, manure management, and land application of wastewater based on the proposed increase in the number of cattle and the additional on-site mobile sources required for the expansion.

The HRA addresses emissions from: ammonia; hydrogen sulfide; particulate matter (PM_{10} and $PM_{2.5}$) and its toxics components (e.g., aluminum, lead, manganese, nickel, etc.); and xylenes, formaldehydes, carbon tetrachloride, and other components from VOCs (see Appendix H for the list of toxic substances emitted from project activities and classification of these substances as to their potential for producing carcinogenic and non-cancer acute or chronic health impacts). The toxic air pollutants of greatest concern are those that cause serious health problems or affect many people. Health problems can include cancer, respiratory irritation, nervous system problems, and birth defects. Toxic Air Contaminants (TAC) emissions of concern from construction activities would include the diesel particulate matter (DPM) emissions from on-site construction equipment exhaust.

Construction equipment sources include diesel-fueled dozers, loaders, backhoes, excavators, graders, cranes, forklifts, generator sets, concrete/industrial saws, and welders. CalEEMod default equipment listing for general heavy industrial usages were used. Operational mobile sources include a diesel-fueled feed loading tractor, a feed delivery tractor, milk tankers, solids manure removal trucks, and

[11] Calculations for this Appendix were completed in April 2023.

commodity delivery trucks. Other diesel-fueled sources that would not have an increase in usage as a result of the project are bedding delivery tractor, manure scraping tractor, and manure loading tractor. There would also be emissions from the housing barns, milk barn, lagoons, solid manure storage and land application areas associated with increased herd size.

Emissions of hazardous air pollutants attributable to proposed construction activities, animal movement, manure management and on-site mobile sources were calculated using generally accepted emission factors and the California Emissions Estimator Model version 2020.4.0. Ambient air concentrations were predicted with dispersion modeling (using the most recent version of the EPA's AMS/EPA Regulatory Model – AERMOD) to arrive at a conservative estimate of increased individual carcinogenic risk that might occur as a result of continuous exposure over a 70-year lifetime. Similarly, concentrations of compounds with non-cancer adverse health effects were used to calculate hazard indices (HI), which are the ratio of expected exposure to acceptable exposure. Appendix G includes complete details on pre-project and post-project cattle and housing locations. SJVAPCD-approved control measures that were determined feasible by the project applicant were applied to PM_{10} emission factors for having at least bi-weekly scraping of corrals or pens; no exercise pens for freestall barns 3, 4, and 5; and shaded corrals. Appendix G includes complete details on post-project cattle and housing locations.

A total of 153 off-site receptors[12] of residences and workers and 2 on-site receptors were assessed during the preparation of the HRA (see Table 4-3 of Appendix G, *Health Risk Assessment and Ambient Air Quality Analysis*, for coordinates of residences included as maximum impact receptors in the model). There are currently five on-site residences; however, currently only two have children residing in the house.

The SJVAPCD has set the level of significance for carcinogenic risk to twenty in one million (20 x 10^{-6}), which is understood as the possibility of causing twenty additional cancer cases in a population of one million people. The level of significance for acute and chronic non-cancer risk is a hazard index of 1.0. Initial modeling results showed a potential to cause a cancer risk to Receptor 1 (on-site residence 13) when construction and operational risks are combined. Cancer risks are primarily attributable to emissions of DBCP[13] through the inhalation pathway. Acute risks are primarily attributable to emissions of ammonia, which affects the respiratory system and eyes. Acute non-cancer hazard risks are primarily attributable to emissions of ammonia, which affects the respiratory system and eyes. Chronic non-cancer hazard risks are primarily attributable to emissions of arsenic and affect the cardiovascular, central nervous, reproductive, respiratory and skin systems.

Preliminary modeling with the on-site employee residences indicated that one residence would exceed the SJVAPCD's cancer risk and non-cancer chronic hazard thresholds. In order to reduce emissions to acceptable levels, and to ensure the implementation of SJVAPCD-approved control

[12] For the purpose of this document, **receptors** are defined as people – children, adults, and seniors – occupying or residing in: Residential dwellings; Schools; Daycares; Hospitals; and Senior-care facilities. **Sensitive receptors** are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and designated residential areas are examples of sensitive receptors.

[13] Dibromochloropropane, 1,2-Dibromo-3-chloropropane (DBCP), was used in the past as a pesticide on crops. Despite the ban on the use of DBCP, this pesticide remains persistent in soil and continues to be detected as a groundwater contaminant in areas of past high use.

measures, the following mitigation would be required. Compliance with SJVAPCD Rule 4570 during the permitting process would further reduce ammonia concentrations.

Significance of Impact: Significant.

Mitigation Measure AQ-5a:
To minimize the exposure of sensitive persons to hazardous air pollutants and reduce potential cancer risk to acceptable levels, the dairy operator shall implement one of the following measures:

1. Receptor 1 (residence 13 on Figure 3-6 in Chapter 3, *Project Description* of this EIR) shall not be occupied by children during construction periods. The applicant has agreed to either temporarily relocate the employee family to an offsite location or other on-site residence that has a less than significant impact during construction activity, or permanently replace the employee family with a family that has no children.

OR

2. Prior to issuance of a building permit for the proposed expansion, the project applicant shall modify operations to minimize toxic air contaminant emissions and have a Health Risk Assessment prepared that demonstrates that the proposed expansion emissions would not exceed the SJVAPCD's cancer risk threshold for the on-site residence. Modifications to operations may include measures such as the replacement of existing tractors with lower emission equipment.

Mitigation Measure AQ-5b:
The project applicant shall apply SJVAPCD-approved control measures to reduce PM_{10} emissions below SJVAPCD health risk thresholds. As applied in the HRA prepared for the project, these control measures would include having at least bi-weekly scraping of corrals or pens; no exercise pens for freestall barns 3, 4, and 5; and shaded corrals. If necessary, control measures for PM_{10} emissions may be modified by the SJVAPCD during their permitting process. All control measure requirements shall be included in the SJVAPCD permit documents.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project area. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Implementation of the foregoing measures would reduce the magnitude of this potential effect by restricting use of the residence during construction. Compliance with SJVAPCD control measure requirements would further minimize emissions and reduce the associated cancer risk. In accordance with the SJVAPCD GAMAQI (SJVAPCD 2002), the potential health risk attributable to the proposed project is determined to be less than significant with mitigation based on the following conclusions:

- Potential chronic carcinogenic risk from the proposed facility would be *below* the significance level of ten in one million at each of the modeled residential receptors;
- The hazard index for the potential chronic non-cancer risk from the proposed facility would be *below* the significance level of 1.0 at each of the modeled residential receptors; and,
- The hazard index for the potential acute non-cancer risk from the proposed facility would be *below* the significance level of 1.0 at each of the modeled residential receptors.

Therefore, with implementation of the above mitigation measure, the potential impact from hazardous pollutant emissions would be reduced to less than significant.

Implementation/Monitoring: Implementation of the mitigation measure would be the responsibility of the project applicant. The Merced County Division of Environmental Health and the SJVAPCD shall monitor for compliance. Mitigation Measure AQ-5a shall be implemented prior to and during construction, and AQ-5b shall be implemented prior to initiation of new operations and throughout ongoing operations.

Impact AQ-6: Expose nearby residents to substantial pollutant concentrations from emissions of criteria air pollutants (Criterion III.c)

Operations at the Vierra Dairy Farm Expansion would result in emissions of criteria air pollutants that could impact ambient air quality through a violation of air quality standards. However, the project would not exceed screening level thresholds for construction and operational activities that would affect ambient air quality standards in areas adjacent to the dairy. This would be a less-than-significant impact.

As described above, the SJVAPCD has developed screening levels for requiring an AAQA. The SJVAPCD recommends that an AAQA be performed for all criteria pollutants when emissions of any criteria pollutant resulting from project construction or operational activities exceed the 100 pounds per day screening level, after compliance with Rule 9510 requirements and implementation of all enforceable mitigation measures.

Emissions of criteria pollutants attributable to proposed construction activities, animal movement, manure management and on-site mobile sources were calculated using generally accepted emission factors. Average daily emissions for construction and operational activities associated with this project would not exceed 100 pounds per day for any criteria pollutant that has an ambient air quality standard (see EIR Appendix H Table 3-1). Therefore, an AAQA is not required, and the proposed dairy expansion is considered to be less than significant for ambient air quality impacts.

Significance of Impact: Less than significant.

Mitigation Measure AQ-6: None required.

Impact AQ-7: Adverse odor from project operations (Criterion III.d)

Operations and manure management at the Vierra Dairy Expansion in Merced County may emit odors that may be bothersome to nearby sensitive persons and uses, including rural residences. Because of the proximity of residences to existing and proposed active animal confinement facilities, there is an increased potential for nuisance conditions, and this would be a significant impact.

Adverse levels of odor could potentially affect several classes of land uses. These include:

- Urban areas;
- Land uses where the residents/occupants have no choice about the location of the use and cannot move to another location (schools, hospitals, jails, etc.);

- Areas where past actions of the County have provided reasonable expectations of urban levels of land use compatibility (residentially zoned or designated districts in otherwise rural areas, and/or groups of residences in rural areas developed at urban densities);
- Isolated rural residences constructed in Agricultural zones;
- Parks, other public and private designated or permitted recreation facilities; and,
- Wildlife refuges.

As discussed in Chapter 3, *Project Description*, there are several off-site residences located within the windshed of the dairy (defined as an area of 1,320 feet upwind to 2,640 feet downwind of the periphery of the animal facility) (see Figure 3-5 in Chapter 3, *Project Description*). There are six off-site residences are located within 1,000 feet of active areas of the dairy (see Figure 3-8 in Chapter 3, *Project Description*). The community of Hilmar is located approximately 2.5 miles to the east-northeast of the existing active dairy facilities. There are no protected habitat areas, such as wildlife refuges or wildlife management areas, within one-half mile of the project site.

Odors associated with dairy and other animal confinement operations are primarily generated from manure and silage. The odor characteristics that contribute to nuisance conditions include the intensity, concentration, or strength of the odor, the odor frequency, the duration that the odor remains detectable, and the perceived offensiveness and character or quality of the odor. The four basic approaches to control odor and odorants are diet manipulation, manure treatment, capture and treatment of emitted gases, and enhanced dispersion.

Unlike the other air pollutants evaluated in this section, odor does not have generally accepted methods of measurement or allowable concentration, and its offensiveness differs among individuals. For these reasons, Merced County has sought to prevent nuisances by the use of setbacks between potential sources of offensive odors and adjoining sensitive land uses, rather than regulating the concentration of odor-producing compounds. Under existing regulations, Merced County enforces a setback of 0.5-mile from animal confinement facilities to specified urban uses, parks, and wildlife refuges, and a minimum of 1,000 feet between animal confinement facilities (ponds, corrals, barns) and rural residences.

The County has maintained and reinforced land use policies to protect agricultural production in designated agricultural areas. Since the late 1960s, the County Zoning Code has regulated land uses in the County to maintain areas zoned for Agricultural uses in agricultural production. The County's 1978 General Plan introduced the Specific Urban Development Plan designation (now called Urban Community) whereby the County directed urban growth to occur in urban areas, with rural areas reserved for agricultural production. The 1984 Agricultural Element of the General Plan further refined the County's Urban Centered Concept for managing urban and rural uses. This land use concept, which has been the land use policy in Merced County since the 1978 General Plan, directs anticipated urban growth to cities, unincorporated communities, or established population centers. In the 2030 General Plan, such centers are designated as City Planning Area, Rural Residential Center, Rural Center, Urban Community, Highway Interchange Center, and Isolated Urban Areas. A primary purpose of the Urban Centered Concept is to reduce conversion of productive agricultural land, including animal confinement facilities, to urban uses.

As discussed in Chapter 11, *Land Use Compatibility*, there are six off-site residences located within 1,000 feet of the existing dairy facility. According to Merced County Code Chapter 18.48.040 (B)(2), the modification or expansion of an existing facility must not decrease the existing separation

distance from off-site residences to less than 1,000 feet unless the off-site property owner provides written permission. Construction of the proposed facilities would not reduce the existing separation distances to five off-site residences within 1,000 feet. Further, construction of the proposed facilities would not reduce the distance to residences currently greater than 1,000 feet from active dairy facilities to a separation distance less than 1,000 feet. However, the distance of active animal facilities to the residence located along Williams Avenue would be reduced from 900 feet to 750 feet with the proposed dairy expansion. A Merced County Setback Waiver[14] has been signed by the owner of the off-site residence to allow a reduced setback distance, which would meet the requirements of the ACO.

The ACO (Merced County Code Chapter 18.64.040 (B)(1)(a)) prohibits new dairies within one-half mile of urban areas or sensitive uses such as schools, hospitals, jails, public or private recreational areas, parks, or all wildlife refuges. For an existing facility, modification or expansion of the dairy facility must not decrease the existing separation distance if it is less than one-half mile (Merced County Code Chapter 18.64.040 (B)(2)). For the Vierra Dairy, these uses are greater than one-half mile from active dairy facilities, and the proposed dairy expansion would not decrease these distances to less than one-half mile. Further, no odor complaints have been reported at the Vierra Dairy and submitted to DEH or the SJVAPCD within the last five years (Merced County DEH April 2023; SJVAPCD 2023).

Chapters 18.64.050 (H), 18.64.060 (C)(8)(a), and 18.64.040 (B)(1) of the ACO (see Appendix C of the EIR) address potential odor impacts, and require preparation of an odor management plan, which has been completed by the dairy applicant. Additionally, the nuisance requirements and protocols set forth in the Merced County Code regarding odor nuisances would apply. Summarily, if an odor nuisance condition were reported, as required by the ACO, DEH would implement the following procedures:

A. If nuisance conditions are reported to the DEH, the Division shall take the following actions:

   Within 72 hours of receiving a complaint, the DEH shall determine whether an odor exists during an inspection of the location of the complaint, and identify potential sources of odor in the vicinity. If a confined animal facility is identified as a potential source of the odor nuisance, the County will evaluate the affected facility and identify sources of the odor. In the event of odor causing a nuisance, the County will impose additional control measures on a site-specific basis. Measures that may be required by DEH include the operational measures set forth above. (ACO Chapters 18.64.050 (H), 18.64.060 (C)(8)(a), and 18.64.040 (B)(1)).

B. If odor nuisance conditions are confirmed, and are attributable to operations at a confined animal facility, the DEH shall require the owner/operator to remedy the nuisance condition within a specified period of time. The Division shall notify the parties reporting the nuisance of its findings, and shall provide follow-up inspections to ensure that the nuisance condition is cured. Should the condition persist, the Division shall initiate an enforcement action against the offending operator.

[14] A copy of this waiver is on file with the Planning Division/Community & Economic Development Department.

The project applicant has completed an Odor Control Plan for the dairy facility as part of the proposed dairy expansion project application. The following best management practices would be implemented as part of that Plan to control odors:

- Liquid manure utilized for irrigation purposes will be managed so that it does not stand in the application field for more than 24 hours.
- Odor control measures will be implemented, including:

    1. Ration/diet manipulation

        This approach involves the alteration of feed in order to reduce the volume of substrate available for anaerobic activity. The activity includes reducing the nitrogen content of feed ration, phase feeding, repartitioning agents, improved animal genetics, and various feed additives.

    2. Manure management

        Use best management practices for manure management, including minimizing the time between animal excretion and application.

    Additionally, the following additional best management practices will be implemented:

    Manure Collection Areas

    - Clean out manure generated at the freestall barns by flushing lanes 3x/day and clean corrals at least twice a year, or more frequently as necessary to minimize odors;
    - Keep cattle as dry and clean as possible at all times;
    - Scrape manure from the corrals and bedding from the freestall barns at a frequency that would reduce or minimize odors.

    Manure Treatment and Application

    - Minimize moisture content of stockpiled manure/retained solids to a level that will reduce the potential for release of odorous compounds during storage;
    - Minimally agitate stockpiled manure during loading for off-site transport;
    - Mix process water with irrigation water prior to irrigation (dilution rate will be adequate to minimize odor levels and maintain appropriate nutrient content in effluent);
    - Clean up manure spills upon occurrence;
    - Maintain and operate wastewater storage ponds to minimize odor levels.

    General

    - Implement dust suppression measures to prevent the release of odorous compound-carrying fugitive dust.

Operational measures to control flies included in the Vector Control Plan described in Impact HAZ-1 in Chapter 9, *Nuisance Conditions from Insects*, will also reduce odors at the Vierra Dairy facility.

As set forth in the Odor Control Plan, the dairy operator will provide a point of contact to residents within the windshed of the dairy should nuisance odors occur. The dairy operator/owner will respond to neighbors who are adversely affected by odors generated at the project site and take prompt corrective action. These actions will include confirmation that all measures described above

have been implemented effectively. If necessary and feasible, the Vierra Dairy operators will implement the following additional measures:

1. Manure treatment
   Manure treatment methods include maintaining aerobic conditions during storage, and biochemical treatment.
2. Capture and treatment of emitted gases
   This approach includes timely incorporation of applied liquid or solid manure.
3. Enhanced air dispersion
   Odor and other air contaminants are diluted to below threshold levels by atmospheric turbulence that increases with wind velocity, solar radiation, and roughness elements such as buildings, trees, or barriers. Additional dispersal barriers between the source of odors and the odor receptor could be necessary.
4. Enhanced land spreading procedures
   Procedures may be modified to minimize impacts by avoiding spreading when the wind is blowing towards populated areas, employing technologies to incorporate manure into soil during or directly after application (i.e. injection, plowing, disking), or spreading manure in thin layers during warm weather.

If odor nuisances cannot be resolved between dairy operator and the neighbor, the neighbor can report nuisance conditions to the Merced DEH.

Because of the proximity of residences to existing and proposed active animal confinement facilities, there is an increased potential for nuisance conditions, and the following mitigation would be required.

Significance of Impact: Significant.

Mitigation Measure AQ-7a:
The applicant has prepared an Odor Control Plan, which has been submitted to the Merced County Division of Environmental Health. The project applicant shall revise the Odor Control Plan to include all neighbors within the windshed and sensitive area setbacks to be provided with a point of contact for nuisance complaints at the dairy facility. The applicant shall inform all neighbors within the windshed and sensitive area setbacks of the facility of methods to contact this individual in the event of nuisance conditions, both in English and in Spanish. The applicant shall continue to implement all measures within the approved Odor Control Plan throughout the active life of the dairy.

Mitigation Measure AQ-7b:
The applicant shall implement the nuisance control measures set forth in the Vector Control Plan in Mitigation Measure HAZ-1. The nuisance control measures include best management practices and manure management measures that would also act to control odors.

Potential Environmental Effects of Measures: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project site. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Implementation of the foregoing measures would reduce the magnitude of this potential effect by requiring implementation of additional housekeeping and management measures. While there may be an increased potential for nuisance conditions with the dairy expansion, the project applicant has provided increased measures to control odors, including a point of contact in the event of odors in order to immediately remedy the situation. Further, the proposed expansion would not reduce the setback distances specified by the ACO, and with implementation of the above mitigation measures, the potential impact from odors would be reduced to less than significant.

Implementation/Monitoring: Implementation of these measures would be the responsibility of the project applicant. The Merced County Division of Environmental Health shall monitor for compliance. Mitigation Measure AQ-7a and AQ-7b shall be implemented throughout ongoing operations.

Impact AQ-8: Health impacts due to Valley Fever (Criterion III.d)

Soil disturbing construction activities associated with the Vierra Dairy Expansion project could expose workers to spores known to cause Valley fever. Because existing regulations would minimize health effects to construction workers, this would be a less-than-significant impact.

Construction workers and others who work outdoors are at risk for Valley fever, especially if they dig or disturb soil, operate heavy machinery, or work under windy conditions. Merced County has a relatively high Valley fever rate, with greater than 28 cases reported per 100,000 people per year in 2021 (CDPH 2022a). Populations with more than 20 cases annually of Valley Fever per 100,000 people are considered highly endemic. California law AB203 (2019) requires construction employers who work in counties with high rates of Valley fever to train their employees on minimizing the risk of Valley fever annually. This training is required for employees working in 11 counties where work activities disturb the soil. These counties have the highest rates of Valley fever: Fresno, Kern, Kings, Madera, Merced, Monterey, San Joaquin, San Luis Obispo, Santa Barbara, Tulare, and Ventura (CDPH 2022). In addition, during construction of the proposed Vierra Dairy, the applicant would be required to comply with SJVAPCD Regulation VIII and implement dust control measures. Compliance with SJVAPCD Regulation VIII and AB203 would reduce construction dust emissions and the associated risk of contracting Valley fever during construction.

To ensure project compliance with applicable SJVAPCD Rules and Regulations and state law requiring construction employee training, the following measure would be recommended.

Significance of Impact: Less than significant.

Recommended Measure AQ-8a:
Implement Recommended Measure AQ-1, which requires that prior to the release of the first-issued building permit, the applicant shall provide to the County a receipt of a SJVAPCD approved ATC permit, in addition to a Dust Control Plan or Construction Notification form in compliance with Regulation VIII – Fugitive Dust PM_{10} Prohibitions, in addition to implementation of the SJVAPCD measures.

Recommended Measure AQ-8b:
To minimize exposure to dust potentially containing spores that cause Valley fever, the Dust Control Plan shall include controls and work practices that reduce workers' exposure, which may include:

- Minimize the area of soil disturbed.
- Use water, appropriate soil stabilizers, and/or re-vegetation to reduce airborne dust.
- Stabilize all spoils piles by tarping or other methods.
- Provide enclosed air-conditioned cabs for vehicles that generate dust and make sure workers keep windows and outside air vents closed.
- Suspend work during heavy winds.
- Keep workers upwind of digging and other dust-producing activities, such as grading, driving, dumping soil, drilling, or blasting.
- Use vacuums equipped with HEPA filters, water, wet towels, or other wet methods to clean soiled equipment, tools, and surfaces. Do not use compressed air, dry sweeping, or other methods that create dust when cleaning.
- Keep break areas, eating areas, and sleeping quarters, if provided, clean and protected from sources of dust.
- When exposure to dust is unavoidable, provide NIOSH-approved respiratory protection with particulate filters rated as N95, N99, N100, P100, or HEPA. Employers must develop and implement a respiratory protection program in accordance with Cal/OSHA's Respiratory Protection standard (8 CCR 5144). Face coverings and masks do not protect against Valley Fever.
- Take measures to reduce transporting spores offsite, such as:
    - Clean tools, equipment, and vehicles safely before transporting offsite.
    - At dusty worksites, provide coveralls and change rooms, and showers where possible. Ensure workers change into clean clothes and shoes before leaving the worksite. (CDPH 2022)

Recommended Measure AQ-8c:
In accordance with AB203 (2019), the project's construction contractors shall provide training and personal protective respiratory equipment to construction workers and provide information to all construction personnel and visitors to the construction site about Valley fever. Project construction contractors shall be required to provide the training and protective gear, and permit periodic inspection of the construction site by Merced County staff to confirm compliance. Construction contractors have a legal responsibility to immediately report to Cal/OSHA any Valley fever cases among employees.

Potential Environmental Effects of Measures: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project area. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Project implementation of SJVAPCD Regulation VIII to be included in the SJVAPCD permit process would reduce construction dust and associated potential risk of Valley fever. Compliance with state law and the recommended measures would ensure that future construction workers and site visitors associated with the Project are provided training/education regarding Valley Fever, and would ensure that all construction workers are

provided with protective respiratory equipment for use during ground-disturbing activities that could generate particulate matter. This impact would continue to be considered less than significant following implementation of the recommended measures.

Implementation/Monitoring: Implementation of the measures would be the responsibility of the project applicant. The Merced County Division of Environmental Health and the SJVAPCD shall monitor for compliance. Implementation of Recommended Measure AQ-8 shall be implemented prior to the release of the first-issued building permit and during construction.

Impact AQ-9: Health effects as a result of exposure to bioaerosols during dairy operations (Criterion III.d)

Operations at the Vierra Dairy Expansion project may result in the production of and exposure to bioaerosols, which can cause health effects to workers. Because the proposed dairy modifications would result in an overall reduction in dust emissions, and therefore also control bioaerosols, this would be considered a less-than significant impact.

Bioaerosols, such as mold spores, bacteria, pollen, and endotoxins, carry health risks for sensitive individuals. As discussed above in the environmental setting of this chapter, the major sources of bioaerosols on a dairy are animals, animal wastes, feed, and bedding materials. Given their proximity to dairy operations, onsite workers have the greatest potential for exposure to bioaerosols, in addition to individuals in nearby residences.

Potential harmful effects on workers or nearby residents from bioaerosols can be minimized by reducing particulate matter emissions, or dust, during dairy operations. As described in Impact AQ-4, various management practices are currently used at the Vierra Dairy to control PM emissions, including: a flush system with recycled water to clean the milk barn; bi-weekly scraping of the corrals to minimize loose dirt and manure in the pens; concrete lanes in the barns (cows are on a paved surface instead of dirt); and flushing of the concrete lanes to remove manure. Additional SJVAPCD-approved control measures that were determined feasible by the project applicant were applied to PM_{10} emission factors for having at least bi-weekly scraping of corrals or pens; no exercise pens for freestall barns 3, 4, and 5; and shaded corrals (see Impact AQ-5). Compliance with additional SJVAPCD rules and regulations discussed in Impact AQ-4 would further reduce dust emissions. According to the dairy operator, on dusty days, Personal Protective Equipment (PPE) is made available to workers, and protective face covering is commonly used by workers on windy days. In addition, equipment with enclosed cabs is used for potentially dusty jobs like feeding and composting.

As described in Impact AQ-4, the proposed project would result in an overall reduction in PM emissions due to changes in animal housing and cropping patterns, which would also be anticipated to reduce bioaerosols. This combined with implementation of SJVAPCD rules and regulations would reduce exposure to bioaerosols and associated public health impacts for onsite workers and nearby residents, and a less-than-significant impact would occur.

Significance of Impact: Less than significant.

Mitigation Measure AQ-9: None required.

Impact AQ-10: Conflict with or obstruct implementation of the applicable air quality plan (Criterion III.a)

Implementation of the Vierra Dairy Expansion project would not conflict with or obstruct implementation of the SJVAPCD air quality attainment plan. For this reason, the impact would be less than significant.

As stated above in the regulatory environment, for nonattainment criteria pollutants, the SJVAPCD has attainment plans in place that identify strategies to bring regional emissions into compliance with federal and state air quality standards. Projects and uses that are consistent with the assumptions used to develop the plans, and implement strategies to implement the plans, would not jeopardize attainment of the air quality levels identified in the plans.

Local General Plan land use designations and population projections form the basis of SJVAPCD attainment planning. The proposed Vierra Dairy Expansion is a use consistent with the 2030 Merced County General Plan land use designation of the project site and area used to generate air emission projections incorporated into the SJVAPCD attainment plans. Thus, implementation of the project would not conflict with the assumptions and emissions estimates contained within the plans as approved by the CARB and the EPA. The SJVAPCD regulates air emissions at the Vierra Dairy through its ATC/PTO permit process, and has required operational mitigation measures to reduce air emissions at the dairy.

While the proposed project would contribute to regional emissions, because the proposed uses are consistent with Merced County's land use designation for the site, and the project would comply with applicable rules and regulations of the SJVAPCD as described above, the proposed project would not conflict with or obstruct implementation of any SJVAB attainment plan or the SIP.

Significance of Impact: Less than significant.

Mitigation Measure AQ-10: None required.

6 BIOLOGICAL RESOURCES

This chapter provides an evaluation of biological resource impacts associated with the proposed Vierra Dairy Expansion project. As established in the Initial Study (IS) for the proposed project (see Appendix A, *Notice of Preparation and Initial Study*), construction and operation of the Vierra Dairy Expansion project could result in significant impacts to biological resources. For a discussion of potential water and soil contamination effects at off-site agricultural fields from manure pathogens as a result of project operations, see Chapter 10, *Hydrology and Water Quality*.

The evaluation implements, and is consistent with, mitigation measures and study protocols adopted by Merced County in its certification of the 2030 Merced County General Plan EIR in addition to the EIR for Revisions to the Animal Confinement Ordinance (ACO) and its approval of the ACO. This analysis is based on and summarizes the *Biological Resources Reconnaissance Survey and CEQA Analysis, Vierra Dairy Expansion Project*, prepared by Padre Associates, Inc. (February 2022), included as Appendix G of this EIR.

6.1 REGULATORY FRAMEWORK

6.1.1 SPECIAL STATUS PLANT AND WILDLIFE SPECIES

In accordance with Section 15380 of the State CEQA Guidelines, rare or endangered species include species listed as such by the California Fish and Wildlife Commission or the United States Fish and Wildlife Service (USFWS) because they meet the following criteria:

- *Endangered*: a species whose survival and reproduction in the wild is in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploration, predation, competition, disease, or other factors.
- *Rare*: a species that, although not presently threatened with extinction, is existing in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or a species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered "threatened" as that term is used in the federal Endangered Species Act.

A special-status species is a plant or animal that is:

- Listed endangered, threatened, or a candidate species under the federal Endangered Species Act (FESA);
- Listed endangered, threatened, or a candidate species under the California Endangered Species Act (CESA);
- Listed as a species of special concern by the California Department of Fish and Wildlife (CDFW) or the Department of Forestry;
- A plant species that is on the California Native Plant Society's (CNPS) List 1 or 2; and/or
- Considered rare, threatened, or endangered under CEQA Guidelines 15380(d) as the species survival is in jeopardy due to loss or change in habitat.

In addition, species protected by specific federal or state acts or local ordinances are considered special-status species. Project-related adverse impacts on special-status species[1] are considered significant for CEQA purposes.

FEDERAL AUTHORITY

Federal Endangered Species Act. FESA, administered by the USFWS and the National Marine Fisheries Service (NMFS), was passed to protect species threatened with extinction. It provides measures to prevent and alleviate the loss of species and their habitats. FESA provides protection to species listed as Threatened (FT) or Endangered (FE). Federal Species of Concern (FSC) comprise those species that should be given consideration during planning for projects.

Projects that would result in the "take" of a federally listed or proposed species are required to consult the USFWS or NMFS. *Take* is defined as "...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct". The objective of consultation is to determine whether the project would jeopardize the continued existence of a listed or proposed species, and to determine what mitigation measures would be required to avoid jeopardy. Consultations are conducted under Sections 7 or 10 of FESA, depending on the involvement by the federal government.

Migratory Bird Treaty Act and Bald Eagle and Golden Eagle Protection Act. The USFWS also administers the federal Migratory Bird Treaty Act of 1918 (16 USC 703-711) (MBTA) and the Bald Eagle and Golden Eagle Protection Act (16 USC 668-688). The focus of the MBTA is to protect migratory birds, including their eggs and nests. The MBTA prevents the removal of trees, shrubs, and other structures containing active nests of migratory bird species that may result in the loss of eggs or nestlings. Adherence to construction windows either before the initiation of breeding activities or after young birds have fledged is an active step to protect migratory birds and comply with the MBTA. All birds expected to nest in the project area are considered migratory birds, with the exception of European starlings and house sparrows. The Bald Eagle and Golden Eagle Protection Act prohibits the taking or possession of bald and golden eagles, their eggs, or their nests without a permit from the USFWS.

Food Security Act of 1985. The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) is responsible for delineation of wetlands on agricultural lands. The wetland conservation provisions of the 1985 Food Security Act removed incentives for production of agricultural commodities on converted wetlands making farmers ineligible for program benefits for agricultural commodities produced on wetlands converted after December 23, 1985, unless the functions of the converted wetlands were for mitigation or unless an exemption applies. The NRCS is responsible for wetland certifications made to determine eligibility for USDA program benefits. An NRCS certification may result in determination of "prior converted croplands" or "farmed wetlands" depending on the date of conversion to agricultural croplands and other factors.

Clean Water Act Section 404. The U.S. Army Corps of Engineers (Corps) and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredge and fill material into jurisdictional waters of the United States (waters) pursuant to Section 404 of the Clean Water Act

[1] For the purposes of this EIR, the term "special-status species" includes species that have state or federal status as threatened, endangered, or candidate species; federal and state species of concern; California fully protected; and plant species identified as rare in California or on specific California Native Plant Society lists.

(33 USC 1344). The term "waters" includes wetlands and non-wetland bodies of water that meet specific criteria as defined in the Code of Federal Regulations (CFR).

Section 10 of the Rivers and Harbors Act of 1899. The ACOE regulates activities affecting "navigable waters of the United States" under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403). Navigable waters are defined as "…*those waters of the United States that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible to use to transport interstate or foreign commerce*." Structures or work under or over a navigable WoUS is considered to have an impact on the navigable capacity of the waterbody.

Feed Supplementation. Supplementation of feed for livestock is authorized by the U.S. Food and Drug Administration. The legally approved maximum supplementation level of three milligrams per head per day for selenium is also considered the minimum selenium content required to support health and optimal performance of food-producing animals (USFDA 2020). Feed produced in Merced County lacks natural selenium and, therefore, requires supplementation (Merced County 2002).

STATE AUTHORITY

The CDFW administers a number of laws and programs designed to protect fish, wildlife, and plant species and resources.

California Endangered Species Act. The California Endangered Species Act of 1984 (CESA - Fish and Wildlife Code Section 2050) regulates the listing and "take" of state endangered and threatened species. CDFW also designates Species of Special Concern, which are species of limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. These species do not have the same legal protection as listed species, but may be added to official lists in the future.

Unlawful Destruction of Nest or Eggs, Fish and Game Code Section 3503. This section of the California Fish and Game Code prohibits the take, possession, or needless destruction of nests or eggs of birds.

Fully Protected Species, Fish and Game Code Sections 3511, 4700, 5050, and 5515. This section of the California Fish and Game Code provides particular and special state protection to a list of 37 wildlife species, and prohibits take or possession "at any time" with few exceptions. The CDFW cannot authorize incidental take of fully protected species.

Migratory Bird Treaty Act, Fish and Game Code Section 3513. This section of the California Fish and Game Code complies with and strengthens state support for the MBTA. The section makes it unlawful to take or possess any nongame migratory bird, or part of any such migratory nongame bird except under the special provisions in the federal MBTA.

Section 1600 Lake/Streambed Alteration Agreement (LSAA). The CDFW also regulates activities that may impact streambeds or other wetland areas. Completion of a Section 1601-03 LSAA with the CDFW is required before any work begins that will affect jurisdictional wetland areas.

Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act mandates that waters of the State of California shall be protected. Current policy in California is that activities that may affect waters of the State shall be regulated to attain the highest quality. Waters of the State include any surface water or groundwater, including saline waters, and any aquatic features that meet the state definition of a wetland, within the boundaries of the state. The Porter-Cologne Act establishes that the state assumes responsibility for implementing portions of the federal Clean Water Act, rather than operating separate state and Federal water pollution control programs in California. Consequently, the state is involved in activities such as setting water quality standards, issuing discharge permits, and operating grant programs. Pursuant to Section 401 of the Clean Water Act, the ACOE cannot issue a federal permit until the State of California first issues a water quality certification to ensure that a project will comply with state water quality standards. The Regional Water Quality Control Board issues water quality certifications.

LOCAL POLICIES

Merced County Animal Confinement Ordinance (ACO). In order to identify potential special-status species and/or habitat, the Merced County Community and Economic Development Department requires a "preliminary biological assessment" for each Conditional Use Permit application subject to the revised ACO. The revised ACO does not specifically address protection of special status species. Animal confinement facility owners are required to work with CDFW and USFWS biologists during the CEQA review of individual projects to address potential impacts to plant and wildlife resources. In addition, the EIR prepared for the revised ACO contains mitigation measures to be implemented during environmental review of animal confinement facility projects such as the Vierra Dairy Expansion project (Merced County 2002). Mitigation measures adopted in the EIR for the revised ACO include measures to minimize the following potential impacts:

- Loss and/or degradation of riparian habitat
- Loss of special-status species
- Loss and/or modification to wetlands
- Interference with the activities of night-active wildlife
- Potential interference with animal movement/migration patterns.
- Potential selenium and heavy metals effects to biological resources.

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

Locational criteria in the ACO regarding setbacks for new animal confinement facilities include the following statements in regard to wildlife and habitat areas:

> The new facility shall be located more than one-half mile from the nearest boundary of the following: specific urban development plan, rural residential center, highway interchange center, or agricultural services center; residentially designated property in the general plan or residentially zoned property; sensitive uses such as schools, hospitals, jails, public or private recreational areas, parks, or all wildlife refuges; or concentrations of five or more offsite residences, provided that to qualify as a "concentration," residences must be legally established, occupied, located within a contiguous area and must equal or exceed a density of one dwelling unit per acre… (Merced County Zoning Code Section 18.64.040 (B)(1)(a))

The ACO goes on to clarify that for existing facilities, if the separation distances are less for the uses or boundaries described in Merced County Zoning Code Section 18.64.040 (B)(1) above, modification or expansion of the facility must not decrease the existing separation distance (Merced County Zoning Code Section 18.64.040 (B)(2)). For further analysis of the proposed dairy expansion project's compliance with ACO setback requirements and compatibility with sensitive wildlife areas, see Table 11-3 in Chapter 11, *Land Use Compatibility.*

Merced County General Plan. Goal #1 of the Natural Resources Element of the *2030 Merced County General Plan* states: "Preserve and protect, through coordination with the public and private sectors, the biological resources of the County." There are several policies in the Natural Resources Element that address protection, preservation, and enhancement of biological resources of the County, and additional policies in the General Plan that also seek to protect natural resources. The policies that are relevant to the proposed project include:

> **Policy NR-1.7: Agricultural Practices**
> Encourage agricultural, commercial, and industrial uses and other related activities to consult with environmental groups in order to minimize adverse effects to important or sensitive biological resources.
>
> **Policy NR-1.17: Agency Consultation**
> Consult with private, local, State, and Federal agencies to assist in the protection of biological resources and prevention of degradation, encroachment, or loss of resources managed by these agencies.
>
> **Policy LU-1.13: Wetland Habitat Area Separation**
> Do not allow rural commercial and industrial uses, secondary residences, and ancillary agricultural uses within a half mile of either State or Federal wildlife refuges, or managed wetlands within the Grasslands Ecological Area when it is determined by the County that there could be an unmitigated impact to natural resources or habitat.
>
> **Policy LU-4.7: Wildlife Refuge Separation**
> Do not allow rural commercial and industrial uses, secondary residences, and ancillary agricultural uses within a half mile of either State or Federal wildlife refuges, or managed wetlands within the Grasslands Ecological Area when it is determined by the County that there could be an unmitigated impact to natural resources or habitat.
>
> **Policy LU-10.14: Consultation with Grassland Resources Regional Working Group**
> Consult with the Grasslands Resources Regional Working Group during project review and conservation planning efforts for projects within the boundaries of the Grasslands Focus Area.

These goals and policies were considered in the evaluation of the proposed project and the formulation of appropriate mitigation measures below. A more detailed discussion of the relevance of these goals and policies to the proposed project is located in Table 11-1 of Chapter 11, *Land Use Compatibility,* of this EIR.

The *Merced County 2030 General Plan* also contains an Open Space Action Plan (OSAP). The OSAP includes implementation programs to ensure that areas designated as sensitive or significant resources in the Open Space and Conservation Chapter of the General Plan are protected, managed, or preserved in a manner compatible with the resources of the specified area. One of the primary implementing tools of the County's OSAP is the Open Space Development Review System. The

system provides a process for assessing the appropriateness of proposed developments, including their compatibility with surrounding environmental constraints and resources. For further analysis of the proposed dairy expansion project's compliance with the Open Space Development Review System, see Table 11-2 in Chapter 11, *Land Use Compatibility*.

6.2 ENVIRONMENTAL SETTING

6.2.1 METHODOLOGY

IDENTIFICATION OF SPECIAL STATUS SPECIES ON THE PROJECT AREA

Sensitive biological resources present or potentially present on the project site and within the project area[2] were identified first through a query of the CDFW Natural Diversity Database (CNDDB) for the U.S. Geological Survey (USGS) topographic quadrangle including the project area (Hatch) and for the surrounding eight USGS topographic quads (Brush Lake, Ceres, Denair, Crows Landing, Turlock, Newman, Gustine, and Stevinson). The CNDDB record search reports list sensitive species and habitat locations, and provide specific information (e.g., state and federal protection status; global and state rank; CDFW listing status; rare plant status; specific location data; existence status; dates last observed; habitat preferences; and other notes) for each recorded occurrence of a biologically sensitive species or habitat. (CDFW 2022)

A query of the CNPS inventory was also conducted for the same quadrangles to provide information on additional plant species of concern that may occur in the project area and surrounding vicinity (CNPS 2022). In addition, a species list was obtained from the USFWS for the Hatch quadrangle on species of concern that have the potential to occur in the vicinity of the proposed project. Finally, a query of the USFWS National Wetland Inventory (NWI) Map for the Sandy Mush quadrangle was conducted for information regarding known wetlands in the project area. (USFWS 2022a)

The results of these database searches and the location analysis were used to determine if any sensitive resources had been previously reported within or in the immediate local vicinity of the Vierra Dairy Expansion project area, and which sensitive biological resources should be specifically searched for during the biological reconnaissance survey. Only those species with the potential to occur on the project area are given consideration in this EIR.

A reconnaissance-level biological survey of the project site was conducted on January 27, 2022 to assess existing biological conditions. The purpose of the survey was to characterize general biological resources supported by the project site and evaluate the potential for sensitive biological resources to occur on the site and be affected by implementation of the proposed project. The surveys included evaluating primary vegetation cover types, assessing habitat suitability for special-status species, recording observed plant and animal species, and surveys for regulated habitats and potentially jurisdictional aquatic resources. The survey was conducted during the day between 9:00 am and 12:00 p.m. The weather was mostly sunny with a light breeze and a high of approximately 60°F. The reconnaissance survey involved surveying the entire project site, including on-foot and

[2] Definition of the Project Site – For the purposes of this EIR, the "project site" refers to the area of active and proposed dairy facilities. Throughout this document, "project area" refers to all parcels that are part of the project, including the active dairy facilities and associated cropland.

windshield evaluations of the site, including surveys of the crop lands outside of the development footprint that will be utilized for application of manure process water. Berms along roadsides and ditches were surveyed for signs of use by burrowing owl, American badger, and/or San Joaquin kit fox. Agricultural fields onsite and in surrounding areas that were not fallowed were surveyed for recent signs of nesting activity, though surveys were conducted outside of the nesting season. Trees were limited onsite, but large trees in the surrounding area were surveyed for evidence of previous years raptor nests and evaluated for nesting habitat suitability. Dominant flora and fauna were noted (when present) and identified. Additional survey conditions and limitations are included in the reconnaissance report (see Appendix G).

6.2.2 PROJECT SETTING

The existing Vierra Dairy and the site of the proposed expansion are located on a 72-acre portion of an existing farm totaling approximately 695 acres in unincorporated Merced County. The project cropland application area consists of 582± acres located on portions of 12 additional parcels associated with the project.

The proposed project would modify and expand the existing dairy facilities so that the modified dairy would house 4,170 milk cows, 550 dry cows, and 2,397 support stock. The proposed expansion would represent an increase of 1,520 animals from existing numbers. Approximately 15 acres of cropland would be converted to active dairy facilities with completion of the project. With the recent purchase of surrounding farmland over nine additional parcels, there would be a total of 770± acres of cropland available for wastewater and manure application with the proposed dairy expansion.

VEGETATION TYPES PRESENT

The proposed expansion site is surrounded by existing dairy facilities or other agricultural lands in crop production (see Figure 3-2). Vegetation was sparse around the dairy facility and the sites of the proposed expansion. The field along Williams Avenue, the proposed site of the new utility shop, was actively supporting crop production. There were no drainage ditches along the southern side of the field where the utility shop is proposed and the area did not support any vegetation except for the grain crop currently in production.

On the eastern edge of the field along Williams Avenue, the proposed site of the new utility shop, there was an earthen berm that separated the field from fallow land adjacent to the dairy. Along this berm there was sparse vegetation including dwarf nettle and common sunflower.

WILDLIFE PRESENT

Wildlife species observed within or adjacent to the project site included predominantly migratory bird species or birds that are well adapted to human disturbance. Species observed included Brewer's blackbird, house sparrow, rock pigeon, and Eurasian collared-dove, among others (see Appendix G, Table 2 for a complete listing of wildlife species recorded in the project vicinity). Minimal mammal activity was observed aside from various small mammal burrows located in isolated areas outside of the main development of the dairy. Species observed included California ground squirrel and California vole.

There was one large burrow present, presumably a California ground squirrel (*Spermophilus beecheyi*), that would be suitable for use by burrowing owls (*Athene cunicularia*). However, there were no signs of active ground squirrel or burrowing owl inhabitance observed. At many locations surrounding the dairy, including along the eastern edge of the existing corals in the northwest corner of the dairy, there are large eucalyptus trees that could support nests of various raptor species including red-tailed hawk and Swainson's hawk. Many raptor species are known to use agricultural fields as foraging grounds for their prey which commonly includes California ground squirrels and brush rabbits. One large raptor nest was observed in the eucalyptus trees in the northwest corner of the dairy.

SPECIAL STATUS SPECIES

To identify special-status species that have been reported from the project area, the CNDDB was queried spatially for the Hatch USGS topographic quadrangle and the eight quads surrounding the project site (nine quadrangle search). Species recorded in the nine-quadrangle search for which suitable habitat may occur on site, or in surrounding areas, were included in the analyses. The species identified from these data sources were further assessed for their potential to occur within the project site based upon previously documented occurrences, their habitat requirements, and the quality and extent of any available habitat within the site.

The CNDDB and CNPS lists for the nine-quadrangle area, and the USFWS Species List for the Hatch quadrangle (USFWS 2022), identified 5 sensitive natural communities, 19 special-status plant species, and 37 special-status wildlife species. Appendix G includes a complete list of special status wildlife species recorded in the region of the project, and a preliminary analysis of their potential to occur on the project site or area.

Special Status Plant Species

There are 19 special-status plant species that have been recorded in the nine-quad vicinity of the project, but neither special-status plants, nor habitat that would support special-status plants, occur on the project site. The entire project location is composed of managed dairy facilities and structures, residences, and cropland. No special-status plant species were observed on or in the immediate vicinity of the project site during the field survey. For a complete list of sensitive plant species recorded in the region of the project area and a preliminary analysis of their potential to occur at the project location, see Table 3 of Appendix G.

Special Status Wildlife Species

Thirty-seven (37) special-status wildlife species have been recorded in the nine-quad vicinity of the project area. Some of them may occur on the project site or area from time to time, including tricolored blackbird, American Badger, and Swainson's hawk.

Swainson's hawk and tricolored blackbird have been reported within less than five miles of the project site and could forage on the project site. A raptor nest was observed in a eucalyptus tree in the northeast corner of the project area although at the time of the survey it was unclear if the nest was occupied. San Joaquin kit fox have been reported within 3-6 miles from project properties at the San Luis National Wildlife Refuge. No sign of San Joaquin kit fox was observed, but they may occur on site as transient foragers. The project site supports some small mammals that could provide prey for San Joaquin kit fox and American badger. Agricultural access roads, open or fallow fields, and irrigation ditches and canals provide potential movement corridors for these mammals. A brief

description of each special-status wildlife species that has potential to occur within the project location is provided below.

Tricolored blackbird (*Agelaius tricolor*) is state listed as threatened. It is common locally throughout the Central Valley. Based on a statewide survey, the Tricolored blackbird (TCBB) population has declined by 63 percent from 2008 to 2014 (Meese 2014). However, the most recent results of the 2017 TCBB Statewide Survey suggest that the rapid decline in abundance observed since at least 2008 has been arrested and that there has been an increase in abundance since 2014 of about 32,000 birds (Meese 2017). It breeds in shrubs or trees near fresh water, or in marshes, and forages for its prey in open environments, often on lake or river shores. TCBB have two specific peaks in breeding activity, one in the first week of June and one in the first two weeks of July. Total nesting duration is approximately 45 days. Although this species was not observed during field survey, the croplands on site or in surrounding areas could provide suitable nesting habitat. The nearest tricolored blackbird occurrence is located approximately 2.8 miles west of the project site.

American badger (*Taxidea taxus*) is a state species of concern that is most abundant in drier, open stages of most shrub, forest, and herbaceous habitats, with friable soils. Badgers need sufficient food, friable soils, and open, uncultivated ground. This species or its sign (burrows, tracks, and scat) were not observed during the field survey, and there were no suitable burrows onsite. The nearest known occurrence is a historic occurrence approximately 4.8 miles southeast of the site. This species may occur occasionally as a transient, but is not expected to den on site.

Swainson's hawk (*Buteo swainsoni*), a state threatened raptor (the nesting season of the species is the season of concern), is found in riparian areas with suitable nest trees adjacent to prime foraging habitat (large, open grasslands, or croplands). Nesting trees are often oaks, cottonwoods, walnuts, and willows in the Central Valley. Suitable foraging grounds include native grasslands, lightly grazed pastures, and certain grain and row croplands. Some croplands in which prey is scarce or difficult to get at because of the density of vegetative cover are unsuitable hunting grounds for the Swainson's hawk. This species was not observed during surveys; the closest nesting occurrence was in 1988, located approximately 1.8 miles south of the project site. There are 26 recorded occurrences of Swainson's hawk within 10 miles of the project site. One raptor nest was observed within 200 feet of proposed expansion facilities. At the time of surveys it was unclear if the nest was active, or what species uses it. There are additional suitable nest trees for Swainson's hawk within 0.5-mile of the site.

Other Sensitive Wildlife Species

The project area may provide occasional foraging opportunities for additional sensitive wildlife species, including various species of raptors and migratory birds that are protected by the Migratory Bird Treaty Act.

For a complete list of special status species recorded in the region of the project site, and a preliminary analysis of their potential to occur on site, see Table 3 of Appendix G.

Sensitive Natural Communities

Sensitive natural communities are those that are considered rare within the region, support sensitive plant and/or wildlife species, or function as corridors for wildlife movement. The five sensitive natural communities recorded in the area (Cismontane Alkali Marsh, Coastal and Valley Freshwater

Marsh, Sycamore Alluvial Woodland, Valley Sacaton Grassland, and Valley Sink Scrub) do not occur on the project site or adjacent to the project site. Neither special-status plants nor habitat that would support special-status plants occur on the project site or in the adjacent croplands due to the disturbed nature of the dairy facility and agricultural lands.

POTENTIALLY JURISDICTIONAL WATERS/WETLANDS

The NWI map does not depict any wetlands on the project site designated for dairy expansion (USFWS 2022). The NWI does show an excavated riverine wetland feature to the south of Williams Avenue along the fields to the south. There were no agricultural ditches observed along the field on the north side of Williams Avenue or at any other location designated for dairy expansion. Additionally, NWI identified an agricultural canal located less than 700 feet north of the proposed expansion facilities. This canal would not be affected by the new dairy facilities. No potentially jurisdictional waters or wetlands were observed within area proposed for development during the January field survey.

FEED SUPPLEMENTATION

As evaluated in the EIR for the Merced County ACO (Merced County 2002), approximately 90 to 95 percent of dairies in Merced County use feed additives for selenium (and other trace metals) because feed grown in much of Merced County is lacking in selenium. The form of selenium added to the feed is sodium selenate, at concentrations of up to 0.3 parts per million (as a daily dose not to exceed, the maximum allowed by the U.S. Food and Drug Administration). Confined animal waste (i.e., manure and urine) is stored on site and then may be used as fertilizer. Selenium present in dairy waste may enter the environment through the following routes (exposure pathways): direct application to soil, storage in ponds/retention basins, leaching from soil and/or pond sediment to groundwater and subsequent transport to surface water, dust generation, and limited surface water runoff (surface water is required to be contained on-site, but may run off during extreme storm events). Leaching from soil and/or pond sediment to groundwater and subsequent transport to surface water, direct discharge of tailwater, and discharges from tile drains to surface water would also be complete exposure pathways. For additional discussion of selenium, see the ACO RDEIR, pages 5-141 through 5-145. For information on how to access the ACO RDEIR, see Chapter 1, *Introduction*, of this EIR.

6.3 ENVIRONMENTAL EFFECTS

6.3.1 SIGNIFICANCE CRITERIA

The project was evaluated in terms of findings of significance defined in State CEQA Guidelines Section 15065, and Appendix G of the State CEQA Guidelines Section IV, Biological Resources. A project would normally result in a significant impact if the proposed project would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies or regulations, or by CDFW or USFWS. *(IV.a)*
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS. *(IV.b)*

- Have a substantial effect on state or federally protected wetlands (including, but not limited to marsh, vernal pool, coastal, etc.) through direct filling, hydrological interruption, or other means. *(IV.c)*
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. *(IV.d)*
- Conflict with any local policies or ordinances protecting biological resources such as a tree preservation policy or ordinance. *(IV.e)*
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approval local regional or state habitat conservation plans. *(IV.f)*

As established in the regulatory setting, the project area is not subject to a Habitat Conservation Plan. Further, the project area is not covered by a Natural Community Conservation Plan, nor any other approved local, regional, or state habitat conservation plan. Therefore, there would no conflicts with the provisions of such plans, and this impact will not be evaluated further in this chapter.

6.3.2 ENVIRONMENTAL IMPACTS

The proposed Vierra Dairy Expansion project would result in the expansion of the existing herd and the construction of new active dairy facilities. The proposed project would convert approximately 15 acres of cropland to developed dairy facilities. With the recent purchase of surrounding farmland, approximately 770± acres of the dairy operation would remain as cropland, and would continue to be cropped with dairy feed crops.

Impact BIO-1: Nest Disturbance and loss of foraging habitat for Swainson's hawk (Criterion IV.a)

Implementation of the proposed Vierra Dairy Expansion project would result in the loss of approximately 15 acres of potential foraging habitat for Swainson's hawk. The state-threatened Swainson's hawk is known to nest and forage in the project vicinity. Although a raptor nest was observed during the field survey (conducted outside of the nesting season), it was not possible to confirm the identity of the raptor species using the nest. There are also additional suitable raptor nesting trees within one mile of the dairy expansion site. Due to the proximity of suitable nesting habitat within one mile of the site, direct impacts to Swainson's hawk nests could occur. There are 26 recorded nesting occurrences within ten miles of the project site. Swainson's hawks generally forage within 10 miles of their nest tree, and more commonly within five miles of their nest tree (CDFW 2022).

According to the CDFW Staff Report regarding Mitigation for Impacts to Swainson's Hawks (CDFW 1994), the following vegetation types are considered small mammal and insect foraging habitat for Swainson's hawks: alfalfa; fallow fields; beet, tomato, and other low-growing row or field crops; dry-land and irrigated pasture; rice land (when not flooded); and cereal grain crops (including corn after harvest). The project area cropland provides foraging habitat for small ground dwelling mammals, which are prey species for raptors. With conversion of approximately 15 acres of cultivated farmland to dairy facilities, the proposed project would contribute to the loss of foraging habitat for the Swainson's hawk.

As stated above, approximately 15 acres of appropriate foraging habitat for Swainson's hawk, a state-listed special status species, would be removed with project implementation. Further, due to the proximity of suitable nesting habitat, noise and motion associated with construction activities in the vicinity of Swainson's hawk nesting areas could disrupt breeding activities. Therefore, project impacts to Swainson's hawk foraging and breeding activities would be considered significant.

Significance of Impact: Significant.

Mitigation Measure BIO-1a:
Protocol Surveys: For work that begins between March 1 and August 30, a qualified biologist with expertise in Swainson's hawk shall conduct protocol surveys of potential nesting habitat within 0.5 mile of any earth-moving activities prior to initiation of such activities.

The project applicant shall conduct a protocol-level survey in conformance with the "Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley," Swainson's Hawk Technical Advisory Committee (https://www.wildlife.ca.gov/conservation/survey-protocols#377281284-birds) (May 31, 2000) hereby incorporated by reference. This protocol prescribes minimum standards for survey equipment, mode of survey, angle and distance to tree, speed, visual and audible clues, distractions, notes and observations, and timing of surveys. If construction work begins after August 30 and ends before March 1 (outside of the breeding season), impacts to the Swainson's hawk would be avoided. Surveys would not be required for work conducted during this part of the year.

A written report with the pre-construction survey results must be provided to the Merced County Community and Economic Development Department and CDFW within 30 days prior to commencement of construction-related activities. The report shall include: the date of the report, authors and affiliations, contact information, introduction, methods, study location, including map, results, discussion, and literature cited.

Mitigation Measure BIO-1b:
Nest Avoidance: If the required protocol surveys show there are no active nests within 0.5 mile of construction activities, then no additional mitigation for nest disturbance will be required. If nesting Swainson's hawks are observed within 0.5-mile of the project site, the project applicant must implement CDFW pre-approved mitigation measures to avoid nest impacts during construction. These measures include:

1. All project-related activities with the potential to cause nest abandonment or forced fledging of young shall be avoided until the young have fledged.
2. If disturbances, habitat conversions, or other project-related activities, that may cause nest abandonment or forced fledging, are necessary, within the nest protection buffer zone (0.5-mile), monitoring of the nest site by a qualified raptor biologist, funded by the project applicant, shall be required, to determine if the nest is abandoned. If the nest is abandoned, but the nestlings are still alive, the project proponent is required to fund the recovery and the controlled release of captive reared young.
3. The project applicant shall be required to coordinate with CDFW to determine if project activities with the potential to cause disturbance to nesting Swainson's hawks within the 0.5-mile buffer may proceed with a reduced nest buffer and an approved biological monitor. CDFW may

authorize a reduced nest buffer with the presence of a monitoring biologist during construction activities to ensure that the nest is not disturbed.

4. Routine disturbances such as agricultural activities, commuter traffic, and routine maintenance activities within one-quarter-mile of an active nest are not prohibited.

Mitigation Measure BIO-1c:
Foraging Impacts: Generally, CDFW requires mitigation for loss of foraging habitat based on the presence of active nests within 10 miles of the project. If an active nest site is identified within ten miles of the project site, the project proponent will be required by CDFW to provide off-site foraging habitat management lands at a specified Mitigation Ratio that is based on proximity of the nest to the project site, as follows:

Distance from Project Boundary	Mitigation Acreage Ratio*
Within 1 mile	1.00:1**
Between 1 and 5 miles	0.75:1
Between 5 and 10 miles	0.50:1

*Ratio means [acres of mitigation land] to [acres of foraging habitat impacted].
**This ratio shall be 0.5:1 if the acquired lands can be actively managed for prey production.

CDFW provides options for off-site habitat management by fee title acquisition or conservation easement acquisition with CDFW-approved management plan, and by the acquisition of comparable habitat. Mitigation credits may be pursued though a CDFW-approved mitigation bank for Swainson's hawk impacts in Merced County. Go to: https://wildlife.ca.gov/Conservation/Planning/Banking/Approved-Banks.

The CDFW pre-approved CEQA mitigation measures are found at: "DFG Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California," CDFW (http://nrm.dfg.ca.gov) (November 8, 1994).

The Merced County Community and Economic Development Department may negotiate Management Conditions that differ from the foregoing CDFW pre-approved mitigation measures if such conditions are consistent with California Fish and Wildlife Commission and the state legislative policy, and such conditions are approved by CDFW prior to reaching agreement with the project applicant.

Potential Environmental Effects of Measure: Implementation of these measures could require the creation of a conservation easement over agricultural land elsewhere in the project vicinity, or the purchase of credits through a mitigation bank. The creation of the easement would ensure continued use as agricultural cropland. Because the measure would result in the protection of existing, cultivated agricultural lands to benefit wildlife, no adverse effects would occur, and no additional mitigation would be necessary.

Significance after Mitigation: Mitigation Measure BIO-1 relies on the CDFW permit process and mitigation requirements to avoid "take" of special status species. Although the mitigation measure is within the jurisdiction of an agency other than Merced County, the required measures must be completed prior to commencement of any activities that would result in these impacts, and

compliance with the CDFW permit requirements would fully mitigate impacts to Swainson's hawk nesting and foraging habitat to reduce this impact to less than significant.

Implementation/Monitoring: Implementation of the mitigation measure would be the responsibility of the project applicant. The Merced County Community and Economic Development Department and CDFW shall monitor for compliance. Implementation of Mitigation Measure BIO-1 shall occur prior to issuance of a building permit, and prior to and during construction.

Impact BIO-2: Loss of foraging and nesting habitat for sensitive and migratory bird species (Criteria IV.a/d)

The proposed Vierra Dairy Expansion project would be constructed on land that has previously been cultivated in grain crops, and has provided foraging and nesting habitat for a variety of special-status and migratory bird species. Because 15 acres of cropland that provides potential foraging and nesting habitat for these birds would be converted to active dairy facilities with the proposed project, this would be a significant impact.

The agricultural fields found on and around the project area may provide suitable breeding habitat for ground nesting and migratory birds. Suitable habitat for ground nesting birds such as western meadowlark, killdeer, and California horned lark is limited, and expected only along edges of agricultural fields.

Construction of the proposed dairy expansion would result in the conversion of approximately 15 acres of cropland to dairy facilities, and a loss of potential nesting and foraging habitat for sensitive and migratory bird species. Because potential nesting and foraging habitat for special-status and migratory bird species would be converted to active dairy facilities with the proposed project, this would be a significant impact, and the following mitigation would be required.

Significance of Impact: Significant.

Mitigation Measure BIO-2a:
Implement Mitigation Measures BIO-1a through BIO-1c, if necessary, which include measures to minimize potential impacts to Swainson's hawk, and which would benefit other species as well.

Mitigation Measure BIO-2b:

1. Ground clearing and initiation of construction should occur from September 15 to February 15, outside the breeding season, if feasible.
2. If ground clearing outside of nesting season is not feasible, a preconstruction survey shall be conducted to determine the presence of nesting birds for any ground clearing or construction activities that will be initiated during the breeding season (February 15 through September 15). The project site and potential nesting areas within 100 feet of the site for MBTA protected birds and 500 feet for raptors shall be surveyed within seven days prior to the initiation of construction. Surveys will be performed by a qualified biologist or ornithologist to verify the presence or absence of nesting birds.

3. Construction shall not occur within a 500-foot buffer surrounding nests of raptors (including burrowing owls) or a 100-foot buffer surrounding nests of migratory birds (including killdeer, house finch, mourning dove, etc.).
4. If construction within these buffer areas is required or if nests must be removed to allow continuation of construction, prior approval must be obtained from the CDFW.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by these measures would be located within the project area. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Preconstruction surveys and avoidance measures would reduce this impact to less than significant. Further, while approximately 15 acres of cropland would be converted to a dairy operation, with the recent purchase of surrounding farmland, approximately 770± acres of the dairy operation would remain as cropland, and would continue to provide foraging and nesting habitat.

Implementation/Monitoring: Implementation of the mitigation measure would be the responsibility of the project applicant. The Merced County Community and Economic Development Department and CDFW shall monitor for compliance. Implementation of BIO-2a shall occur prior to issuance of a building permit, and prior to and during construction. Implementation of BIO-2b shall occur prior to and during construction.

Impact BIO-3: Loss of nesting habitat for tricolored blackbird (Criteria IV.a/d)

The Vierra Dairy Farm provides potential nesting habitat for tricolored blackbird, a threatened species under CESA. Because 15 acres of cropland that provides potential nesting habitat for these birds would be converted to active dairy facilities with the proposed project, this would be a significant impact.

Tricolored blackbird (TCBB) is a California threatened species under CESA. Based on the 2014 TCBB Statewide Survey, the TCBB population has declined by 63 percent since 2008 (Meese 2014). However, the most recent results of the TCBB Statewide Survey conducted in 2017 suggest that the rapid decline in abundance observed since at least 2008 has been arrested, and that there has been an increase in abundance since 2014 of about 32,000 birds (Meese 2017). More recent TCBB Statewide Survey data is not available as efforts were postponed due to the pandemic. TCBB is a highly colonial species that nests in large flocks near open water with a protected substrate and nearby foraging area. TCBB have two specific peaks in breeding activity, one in the first week of June and one in the first two weeks of July. Total nesting duration is approximately 45 days. Historically, TCBB nested within emergent wetland in the Central Valley; however, currently 38 percent of TCBB nests occur on triticale, a wheat-rye hybrid grown for forage on dairies (Meese 2014). The timing of triticale harvest conflicts with TCBB nesting, putting entire colonies at risk from harvesting activities that occur before fledging (Meese 2009). TCBB foraging typically occurs within three to five miles of the nesting colony. Lightly grazed fields, irrigated pastures, annual grasslands, and grain fields that provide habitat for a supply of large insects such grasshoppers, dragonflies, and damselflies offer the best foraging habitat. However, dairy and silage edge as well as feed lots maybe

used for foraging. Surface water is typically present within a half mile of the nesting colony, a habitat criterion that would not be met at the proposed dairy development site. Although TCBB was not observed during the site survey, and the crops currently in production (sudangrass, corn, and oats) are not used as nesting substrate by breeding tricolored blackbirds (Meese 2009), the croplands on site and in the surrounding area could provide suitable nesting habitat for TCBB if they were in production of triticale silage.

Currently, there are no specific mitigation requirements for the loss of TCBB nesting or foraging habitat. Both nesting and foraging mitigation options are currently being developed by CDFW and the Tricolored Blackbird Working Group (TBWG). If there is a permanent loss of TCBB breeding habitat, this impact may require compensatory mitigation. Loss of TCBB habitat may be compensated through a combination of: 1) creation of replacement habitat; 2) habitat preservation through Conservation Easement; 3) acquisition of credits at an approved mitigation bank; 4) in-lieu contribution to a regional habitat restoration fund; and/or 5) other compensatory measures that are deemed acceptable by the CDFW. According to Samantha Arthur of the TBWG, a disturbance buffer of 100 feet has been given to nesting TCBB at dairy operations in the Central Valley (Airola, et al. 2016). Although not currently required, mitigation for foraging habitat will likely be required in the future. Mitigation for the loss of foraging habitat could have a similar approach to what is currently being required for the Swainson's hawk, where compensatory mitigation is required for the conversion of foraging habitat within a specific buffer from a nesting colony (Airola, et al. 2016).

Construction of the proposed dairy expansion would result in the conversion of approximately 15 acres of cropland to dairy facilities. Although the cropland planned for conversion is not currently planted in crops that are known to be preferred TCBB habitat, grainfields are considered potentially suitable TCBB habitat, particularly if preferred grain crop (e.g., triticale) is planted. The following mitigation would be required.

Significance of Impact: Significant.

Mitigation Measure BIO-3a:
Implement Mitigation Measures BIO-1a through BIO-1c, if necessary, which includes measures to minimize potential impacts to Swainson's hawk, and which would benefit other species as well.

Mitigation Measure BIO-3b:
Implement Mitigation Measure BIO-2b, which includes a preconstruction survey to determine presence / absence of TCBB or MBTA protected nesting birds if ground clearing or construction activities will be initiated during the breeding season (February 15 through September 15).

Mitigation Measure BIO-3c:
If a TCBB nesting colony is discovered during preconstruction surveys, CDFW will be consulted prior to ground disturbing activities to determine the appropriate actions or required mitigation. Avoidance and minimization measures are likely to include the delayed harvest of silage until the TCBB young have fledged. If there is a permanent loss of TCBB breeding habitat, compensatory mitigation may be required. Loss of TCBB habitat may be compensated through a combination of: (1) creation of replacement habitat; (2) habitat preservation through Conservation Easement; (3) acquisition of credits at an approved mitigation bank; (4) in-lieu contribution to a regional habitat restoration fund; and/or (5) other compensatory measures that are deemed acceptable by the CDFW.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by these measures would be located within the project area. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Dedication of mitigation lands for sensitive bird species foraging habitat (if required), and preconstruction surveys and avoidance measures would reduce this impact to less than significant. Further, surrounding cropland would continue to provide foraging and nesting habitat.

Implementation/Monitoring: Implementation of the mitigation measure would be the responsibility of the project applicant. The Merced County Community and Economic Development Department and CDFW shall monitor for compliance. Implementation of BIO-3a shall occur prior to issuance of a building permit, and prior to and during construction. Implementation of BIO-3b and BIO-3c shall occur prior to and during construction.

Impact BIO-4: Impacts to the San Joaquin kit fox and/or American badger (Criteria IV.a/d)

Implementation of the proposed dairy expansion project could impact San Joaquin Kit fox or American badger that may occur on site as transient foragers or dispersing individuals. This would be a significant impact.

The San Joaquin kit fox is listed as federally listed endangered and State listed threatened, and the American badger is included on the list of California species of concern. No potential denning habitat is present for San Joaquin kit fox within the project site. Nevertheless, there are records from the CNDDB of occurrences of San Joaquin kit fox within the San Luis National Wildlife Refuge, approximately 5.6 miles south of the project site. Signs of the American badger were not observed during field surveys, but the closest occurrences of the species are from approximately 4.8 miles southeast of the site. These species may occur occasionally as transient foragers or dispersing individuals but are not expected to den onsite.

San Joaquin kit fox and American badger may occasionally pass through the project area while foraging or dispersing, but based on habitat characteristics, these species would not be expected to den on the site. No potential denning habitat is present where construction of expanded dairy facilities is proposed. Transient animals could be injured during the construction period. Therefore, while the conversion of approximately 15 acres of cropland to active dairy facilities would not directly impact den habitat, construction vehicles and lighting could adversely impact potential transient animals.

Although there is a low likelihood of occurrence of San Joaquin kit fox and American badger, because there is the potential for occurrence as transient foragers or dispersing individuals, the *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* (USFWS 2011) shall be followed. The measures that are listed below have been excerpted from those guidelines and will protect San Joaquin kit fox and American badgers.

Significance of Impact: Significant.

Mitigation Measure BIO-4:

1. Project-related vehicles should observe a daytime speed limit of 20-mph throughout the site in all project areas, except on county roads and state and federal highways; this is particularly important at night when kit foxes are most active. Night-time operations should be minimized to the extent possible. However, if it does occur, then the speed limit should be reduced to 10-mph. Off-road traffic outside of designated project areas should be prohibited.
2. To prevent inadvertent entrapment of San Joaquin kit foxes or other animals, all excavated, steep-walled holes or trenches more than two feet deep should be covered at the close of each working day by plywood or similar materials. If the trenches cannot be closed, one or more escape ramps constructed of earthen-fill or wooden planks shall be installed. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured San Joaquin kit fox is discovered, USFWS and CDFW shall be contacted as noted under Measure 13 referenced below.
3. San Joaquin kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All pipes, culverts, or similar structures with a diameter of four-inches or greater that are stored at the site for one or more overnight periods should be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a San Joaquin kit fox is discovered inside a pipe, that section of pipe should not be moved until the USFWS has been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.
4. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in securely closed containers and removed at least once a week from the project site.
5. No firearms shall be allowed on the project site.
6. If any San Joaquin kit fox or American badger, or their sign, are detected on site, dogs and cats shall be kept off the project site to prevent harassment, mortality of San Joaquin kit foxes or American badgers, and/or destruction of their dens.
7. Use of rodenticides and herbicides in project areas should be restricted. This is necessary to prevent primary or secondary poisoning of San Joaquin kit foxes and the depletion of prey populations on which they depend. All uses of such compounds should observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation, as well as additional project-related restrictions deemed necessary by the USFWS. If rodent control must be conducted, zinc phosphide should be used because of a proven lower risk to kit fox.
8. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a San Joaquin kit fox or who finds a dead, injured or entrapped San Joaquin kit fox. The representative will be identified during the employee education program and their name and telephone number shall be provided to the Service.
9. An employee education program should be conducted for any project that has anticipated impacts to kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in kit fox biology and legislative protection to explain endangered species concerns to contractors, their employees, and military and/or agency personnel involved in the project. The program should include the following: A description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Act; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared

for distribution to the previously referenced people and anyone else who may enter the project site.

10. Upon completion of the project, all areas subject to temporary ground disturbance, including storage and staging areas, temporary roads, pipeline corridors, etc. should be recontoured if necessary, and revegetated to promote restoration of the area to pre-project conditions.
11. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the USFWS should be contacted for guidance.
12. Any contractor, employee, or military or agency personnel who are responsible for inadvertently killing or injuring a San Joaquin kit fox shall immediately report the incident to their representative. This representative shall contact the CDFW immediately in the case of a dead, injured or entrapped kit fox. The CDFW contact for immediate assistance is State Dispatch at (916) 445-0045. They will contact the local warden or Mr. Paul Hoffman, the wildlife biologist at (530) 934-9309. The USFWS should be contacted at the numbers below.
13. The Sacramento Fish and Wildlife Office and CDFW shall be notified in writing within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact is Mr. Paul Hoffman at 1701 Nimbus Road, Suite A, Rancho Cordova, California 95670, (530) 934-9309.
14. New sightings of San Joaquin kit fox shall be reported to the CNDDB. A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed should also be provided to the USFWS at the address below.
15. Any project-related information required by the USFWS or questions concerning the above conditions or their implementation may be directed in writing to the U.S. Fish and Wildlife Service at: Endangered Species Division, 2800 Cottage Way, Suite W2605, Sacramento, California, 95825-1846, (916) 414-6620 or (916) 414-6600.

Potential Environmental Effects of Measure: No physical improvements or activities that could result in changes to the physical environment would be required by this measure.

Significance after Mitigation: Implementation of the recommendations provided in the *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance* would reduce the potential impacts to both San Joaquin Kit fox and American badger by requiring preconstruction surveys for the kit fox and badger, preventative measures to avoid potential impacts to these species, and compulsory action should any animal be encountered.

Implementation/Monitoring: Implementation of this measure would be the responsibility of the project applicant. The Merced County Community and Economic Development Department shall monitor for compliance. Mitigation Measure BIO-4 shall be implemented prior to any construction activity and during construction for the expanded dairy operations.

Impact BIO-5: Loss and/or degradation of special-status plant species (Criteria IV.a)

Implementation of the proposed Vierra Dairy Expansion project would not result in the loss of special-status plant species since the project site does not provide suitable habitat for these species. This would be a less-than-significant impact.

There are 19 special-status plant species that have been recorded in the nine-quad vicinity of the project area. Because of lack of habitat due to recent, past, and current active dairy operations and the cultivation of forage crops, the likelihood of a special-status plant species occurring on the project area is considered to be extremely low. Further, no special-status plant species were observed during the field survey. Conversion of 15 acres of cropland to dairy facilities is not expected to affect special-status plants.

Because of the lack of habitat for special-status plant species, there would be no impacts to these species with implementation of the proposed dairy expansion project.

Significance of Impact: Less than significant.

Mitigation Measure BIO-5: None required.

Impact BIO-6: Loss and/or degradation of riparian and vernal pool habitat or sensitive natural communities; loss or modification of wetlands (Criteria IV.b/c)

Implementation of the proposed Vierra Dairy Expansion project would not result in the loss of riparian or vernal pool habitat; loss of any sensitive natural community; or loss or modification of wetlands, since no such resources are located within the area that would be disturbed by construction of the proposed dairy expansion. This would be a less-than-significant impact.

No riparian habitats or other sensitive natural communities have been mapped or observed on the site. The National Wetland Inventory map does not identify waters or wetlands within the project site, and no agricultural ditches, waters, or wetlands were observed within the project impact areas during surveys. Consequently, the Vierra Dairy Expansion project would not have a substantial adverse effect on state or federally protected Waters of the U.S. or wetlands.

Because construction associated with the project is located in active cropland, and no sensitive natural communities, riparian and vernal pool habitat, or wetlands occur on site, there would be no impacts to riparian and vernal pool habitat, other sensitive habitat types or sensitive natural communities, or wetlands and jurisdictional waters of the U.S. with implementation of the proposed dairy expansion project.

Significance of Impact: Less than significant.

Mitigation Measure BIO-6: None required.

Impact BIO-7: Interference with on-site wildlife movement corridors or wildlife nursery sites (Criterion IV.d)

Implementation of the proposed Vierra Dairy Expansion project would not interfere with a wildlife movement corridor, migratory patterns, or wildlife within a nursery site, since there are none onsite. This would be a less-than-significant impact.

There are no creeks, valleys, or other wildlife movement corridors on the site. The project is not located within the Grasslands Ecological Area or Grasslands Focus Area boundaries. The intensively cultivated fields and dairy facilities are not suitable corridors or nursery sites and the dairy expansion project would not interfere substantially with wildlife movement or impede the use of wildlife nursery sites.

Due to the distance to nearby wildlife areas, development of the dairy expansion project would not interfere with wildlife movement or impede the use of wildlife nursery sites. This would be a less-than-significant impact.

Significance of Impact: Less than significant.

Mitigation Measure BIO-7: None required.

Impact BIO-8: Potential selenium and heavy metals effects to on-site biological resources (Criteria IV.a/b)

The use of supplemented feeds at the proposed Vierra Dairy Expansion could result in the introduction of heavy metals into the environment by the application of dairy waste to on-site agricultural fields and retention ponds. If concentrations of metals in terrestrial or aquatic media are significantly higher than naturally occurring background levels, adverse effects to terrestrial or aquatic biota within the project area could occur. Compliance with Merced County ACO regulations would reduce this impact to less-than-significant levels.

Based on studies summarized by the Council for Agricultural Science and Technology and others, concentrations of selenium, the heavy metal of most concern in supplemented feeds, are unlikely to be elevated in terrestrial media following application of dairy waste to fields, even under repeated application (Merced County 2002). Therefore, no impacts to wildlife from direct exposure to terrestrial media within the project area are expected. Ullrey (1992) showed that supplementation of feeds with 0.3 parts per million (ppm) selenium (the amount approved by FDA in 1997) would result in less than 0.5 percent of the total input of selenium to the environment from other sources. Additionally, corn grown with and without the use of selenium-supplemented dairy waste as fertilizer showed no significant increase in selenium content.

Selenium could, however, leach from on-site soil and/or retention pond bottom sediments to groundwater. Depending on the amount and form of selenium present in soil or sediment within the project area, selenium could enter groundwater and be transported to surface water. Tailwater or water from tile drains could be directly discharged to surface water. It is assumed that this could result in the introduction of selenium into aquatic ecosystems. For the Vierra Dairy, all cropped fields receiving wastewater have tailwater return systems, and excess irrigation water is either retained by berms, or returned to the top of adjacent fields.

The Merced County ACO, together with the Merced County Well Ordinance, recognize the importance of protecting water quality from the release of animal pathogens and agricultural chemicals or compounds. (The potential effects of contamination due to the export of manure pathogens to off-site agricultural fields as a result of project operations are evaluated in Chapter 10, *Hydrology and Water Quality*.) As described in the regulatory setting in Chapter 10, *Hydrology and Water Quality*, of this EIR, ACO Chapter 18.64.050, Sections E, K, O, T, LL, MM, and NN include requirements to protect water quality. Sections 18.64.060 D, E, F, and G contain provisions requiring testing of selenium in manure, soils, groundwater, and plant tissue. Section 18.64.050 T requires that operators of confined animal facilities prevent further degradation if elevated levels of selenium are detected, and requires remediation of existing contamination. Sections 18.64.050 LL and MM require that potential sources of selenium contamination be treated in the facility waste management system or monitored if discharged to surface waters, including irrigation district facilities. Section 18.64.050 MM requires that any discharges to surface waters, including irrigation district facilities, meet the discharge and receiving water standards of the appropriate irrigation district and/or the CVRWQCB. Currently, the total selenium water quality objective for the San Joaquin River is 0.005 mg/l four-day average (CVRWQCB 2018). In summary, these measures include: management practices to prevent degradation; requirements for manure, soils, and groundwater testing; and in the event of contamination, remediation to meet receiving water standards by the RWQCB as set forth in the Basin Plan.

In addition, the CVRWQCB requires that all process water that comes into contact with wastewater be collected and stored in on-site settling basins and retention ponds with low permeability liners, reducing the potential release of pathogens and agricultural compounds in the project area to water supplies. (The text of these ACO provisions can be found in Appendix C.) Additional regulatory requirements for the Vierra Dairy Expansion may be included in the Individual WDRs issued by the CVRWQCB.

The regulatory requirements of the CVRWQCB and the ACO would minimize selenium exposure pathways within the project area and require the implementation of an on-site system for the monitoring and remediation of selenium in the environment. To ensure project compliance with ACO regulations for waste, soil, and groundwater monitoring and remediation, the following mitigation would be required. Implementation of Mitigation Measures HYD-3 and HYD-8 as set forth in Chapter 10, *Hydrology and Water Quality*, would further minimize this impact.

Significance of Impact: Less than significant.

Mitigation Measure BIO-8: None required.

Impact BIO-9: Conflict with local policies or ordinances protecting biological resources (Criterion IV.e)

Implementation of the proposed Vierra Dairy Expansion project would not conflict with local policies or ordinances that protect biological resources because it would be consistent with the Merced County 2030 General Plan, the Open Space Action Plan, and the Animal Confinement Ordinance. This would be a less-than-significant impact.

The Merced County 2030 General Plan contains a goal and several policies in its Natural Resources Element to protect the biological resources of the county. Because there were no wetland habitats or known rare or endangered species observed within the project area during the field reconnaissance survey that would be affected by the proposed dairy expansion, and the proposed project would comply with applicable regulations and implement mitigation measures designed to protect biological resources, the proposed project would not conflict with local policies. Merced County implements an Open Space Action Plan to ensure that areas designated as sensitive or significant resources are protected.

The proposed dairy expansion area is not designated as a sensitive resource. Further, the proposed project would comply with the requirements of the Merced County ACO. Merced County 2030 General Plan Policy LU-1.13 restricts development within a half mile of all wildlife refuges such as the Merced National Wildlife Refuge, should the County determine that there are unmitigated impacts to natural resources or habitat. No protected habitat areas are located within one-half mile of the project site. A biological reconnaissance of the project area was conducted to determine whether potential special-status species or sensitive habitat were located within the proposed project area. The assessment found that no such resources were located within the proposed project expansion area, and mitigation measures would minimize potential impacts to any nearby species. Consistency with local policies and ordinances were also considered in the evaluation of the proposed project and the formulation of appropriate mitigation measures listed above. As set forth in Chapter 11, *Land Use Compatibility*, of this EIR, the project would be consistent with adopted County policies to protect biological resources.

For the foregoing reasons, the proposed Vierra Dairy Expansion project would not conflict with local policies or ordinances that protect biological resources.

Significance of Impact: Less than significant.

Mitigation Measure BIO-9: None required.

This page intentionally
left blank.

7 CULTURAL RESOURCES AND TRIBAL CULTURAL RESOURCES

This chapter provides an evaluation of potential effects on cultural resources and tribal cultural resources associated with the proposed Vierra Dairy Expansion project. As established in the Initial Study (IS) for the proposed project (see Appendix A, *Notice of Preparation and Initial Study*), construction and operation of the Vierra Dairy Expansion project could result in significant impacts to cultural resources, tribal cultural resources, and human remains that may exist in the subsurface portions of the project site during construction. The following evaluation implements, and is consistent with, mitigation measures and study protocols adopted by Merced County in its certification of the 2030 Merced County General Plan Environmental Impact Report (EIR) in addition to the EIR for Revisions to the Animal Confinement Ordinance (ACO) and its approval of the ACO.

INTRODUCTION

Cultural resources are the remains and sites associated with human activities, and include prehistoric and ethnohistoric[1] Native American archaeological sites, historic archaeological sites, historical buildings, and elements or areas of the natural landscape that have traditional cultural significance. They consist of both surface and subsurface artifacts, structures, or features. When cultural resources are considered in the context of their natural surroundings or the rock strata (layers) in which they are found, they may contribute valuable information to the archaeological or historic record. Cultural resources are a nonrenewable resource that, if properly managed, can increase the knowledge and understanding of past cultures and events.

Native American cultural resources may also have sacred values that can only be identified through coordination and input from local Native Americans. Under Public Resources Code (PRC) Section 5097.9 *et seq*., any public agency is prohibited from interfering with the free expression or exercise of Native American religion or causing severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property. Under PRC Section 5097.94, lead agencies are required to consider the effects of projects on tribal cultural resources, and to conduct consultation with federally and non-federally recognized Native American Tribes who are traditionally and culturally affiliated with the geographic area of the proposed project, and who have requested such consultation in writing.

METHODOLOGY

Padre Associates, Inc. conducted a supplemental Phase I archaeological survey in support of the expansion of the Vierra Dairy. Dr. L. Kyle Napton, Consulting Archaeologist, had conducted athe initial Phase I archaeological survey in 2012 (Napton 2012). The area of potential effect consists of three acres, which includes cropland that would be removed from production and converted to active dairy facilities with implementation of the proposed project. The supplemental Phase I archaeological survey was conducted on January 31, 2022. The results of the assessment are detailed in the *Supplemental Phase I Archaeological Study Report, Vierra Dairy Expansion, Merced County, California* (Padre 2022).

[1] Ethnohistory is the study of cultures and indigenous peoples' customs by examining historical records as well as other sources of information on their lives and history.

The cultural resources assessment consists of four components: (1) pre-field sensitivity and background research, including an examination of existing literature and historical databases for the proposed project area; (2) a record search of the California Historical Resources Information Systems (CHRIS) of the State Office of Historic Preservation on cultural resources for the proposed project area; (3) consultation with the Native American Heritage Commission, and (4) a pedestrian survey of the proposed project site.

7.1 REGULATORY FRAMEWORK

FEDERAL REGULATIONS

National Historic Preservation Act of 1966 (16 U.S.C. 470 et seq.). The National Historic Preservation Act (NHPA) is a federal law created to avoid unnecessary harm to historic properties. The NHPA includes regulations that apply specifically to federal land-holding agencies, but also includes regulations (Section 106) that pertain to all projects funded, permitted, or approved by any federal agency that have the potential to affect historical and cultural resources. The proposed project is privately funded and would not require any federal permits; since no federal actions are associated with the proposed project, the NHPA in addition to the National Environmental Policy Act of 1969 (NEPA) (16 U.S.C. 4321, and 4331-4335) are not expected to apply to this project.

American Indian Religious Freedom Act of 1978 (42 U.S.C. 1996 and 1996a). The American Indian Religious Freedom Act and the Native American Graves and Repatriation Act of 1990 (25 U.S.C. 3001 et seq.) establish that traditional religious practices and beliefs, sacred sites, and the use of sacred objects shall be protected and preserved.

STATE REGULATIONS

California Environmental Quality Act (Public Resources Code Section 21000 et seq.). The California Environmental Quality Act (CEQA provides direction on determining the significance of impacts to archaeological and historical resources. PRC Section 21083.2 and Section 15064.5 of the State CEQA Guidelines require that lead agencies determine whether projects may have a significant effect on archaeological and historical resources. This determination applies to those resources that meet significance criteria qualifying them as "unique" or "important," on the California Register of Historic Resources (CRHR), or determined eligible for listing on the CRHR. Potential eligibility is also based on the integrity of the resource. Integrity is defined as the retention of the resources' physical condition that existed during its period of significance. It is determined through careful consideration of a resource's design, workmanship, materials, location, feeling, and association to important events in history.

California Register of Historical Resources. The CRHR is restricted to properties that are to be protected from substantial adverse change (PRC Section 5024.1). The CRHR lists properties that have been formally determined to be eligible for listing in the National Register of Historic Places, State Historical Landmarks, and listed as eligible as Points of Historical Interest. All other resources require nomination in order to be included on the Register.

California Public Resources Code Section 5097. Part of the Native American Historic Resource Protection Act, PRC Section 5097 specifies the archaeological, paleontological, and historical and sacred site procedures that must occur both prior to and during construction of any major public

works project on state or public lands. It describes the procedures in the event there is a discovery of human remains.

California Public Resources Code Section 5097.94. Assembly Bill (AB) 52 was approved in September 2014, amending PRC Section 5097.94, and adding to sections of the code relating to Native Americans. AB 52 requires lead agencies to consider the effects of projects on tribal cultural resources, and to conduct consultation with federally and non-federally recognized Native American Tribes early in the environmental planning process. AB 52 states that the lead agency must consult with California Native American Tribes who are traditionally and culturally affiliated with the geographic area of the proposed project, and who have requested such consultation in writing.

California Health and Safety Code Sections 7050.5 - 7055. Division 7 of the Health and Safety Code governing dead bodies states that the disturbance of Native American cemeteries is a felony. It requires that construction or excavation must be stopped in the vicinity of discovery of human remains until the County Coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the California Native American Heritage Commission.

Executive Order B-64-80. Executive Order B-64-80 directs state agencies to identify, inventory, preserve, and maintain cultural resources under their jurisdiction.

LOCAL POLICIES

Merced County General Plan. The Merced County 2030 General Plan contains the following and policies related to cultural resources:

> **Policy RCR-2.5: Human Remains Discovery**
> Require that, in the event of the discovery of human remains on any project construction site, all work in the vicinity of the find will cease and the County Coroner and Native American Heritage Commission will be notified.
>
> **Policy RCR-2.10: Tribal Consultation**
> Consult with Native American tribes regarding proposed development projects and land use policy changes consistent with Planning and Zoning Law at Government Code Section 65351, and the OPR Tribal Consultation Guidelines (2005).

These policies, and their relevance to the proposed project, are further discussed in Section 7.3, *Environmental Effects*, below, in addition to Table 11-1 in Chapter 11, *Land Use Compatibility*.

Merced County Animal Confinement Ordinance. The revised ACO does not address the protection of cultural resources. However, Merced County requires that all new animal confinement facilities obtain an Administrative Permit or a Conditional Use Permit. Both of these permits are discretionary and require that the County comply with the requirements of CEQA in an environmental review process. To address potential impacts to cultural resources, the EIR prepared for the revised ACO contains mitigation measures to be implemented during environmental review of animal confinement facility projects such as the Vierra Dairy Expansion project. Mitigation measures adopted as policy in the EIR for the ACO include:

- Consultation with listed Native Americans regarding the identification and locations of known and unknown cultural resources and traditional cultural properties;

- Assessment of identified cultural resources by a qualified archaeologist;
- Evaluation of the resource according to CEQA significance criteria and preparation of a mitigation plan in accordance with appropriate guidelines and consultation with listed Native Americans;
- Suspension of work if archaeological resources are encountered at any site of an animal confinement facility during construction until the County complies with above listed measures.

These policies, in addition to Merced County's Standard Conditions for Private Projects (see Chapter 4, *Introduction to the Environmental Analysis*), were considered in the evaluation of the proposed project and the formulation of appropriate mitigation measures below.

7.2 ENVIRONMENTAL SETTING

7.2.1 PROJECT SETTING

HISTORIC AND EXISTING USE

The existing Vierra Dairy Farm and the site of the proposed expansion of the dairy facility are located on approximately 72 acres of a farm totaling approximately 695 acres on 17 parcels in an unincorporated area of Merced County. The project site is located on the northwest corner of Williams Avenue and Washington Road near the community of Hilmar within California's Great Central Valley (see Chapter 3, *Project Description*, for additional details of the project). The project site is located approximately one mile north of the Merced River and over three miles east of the San Joaquin River.

In the past, the entire project area was covered by sparse, salt-adapted savannah grass and brush lands, and seasonal runoff channels transected the project site from the northeast to the southwest (Napton 2012). The region to the west of the project site consisted of mostly swamp or extensive alkaline or semi-alkaline wetlands. Part of the project site may have reflected conditions currently observable in the Great Valley Grasslands State Park, located nearby on the San Joaquin River. During past decades, however, the project area, like much of the terrain in the surrounding region, was extensively altered, primarily by draining the seasonal wetlands and grading and cultivating the land (Napton 2012). At the time when the cultural resources assessment was conducted (January 2022), most of the areas surveyed consisted of compacted, frequently graded soils with imported gravel base. Ground disturbances were attributed to ongoing operations including frequent tilling, grading, and the installation of subsurface pipelines (Padre 2022). Based on review of General Land Office plats and early surveys conducted in 1853, the entire project area was leveled to agricultural grade years ago.

PALEONTOLOGICAL SETTING AND GEOLOGICAL FEATURES

Paleontological resources are the trace remains of plants and animals. These resources include actual bones, shells, or other organic remains; impressions, casts, or molds, mineral replacement of organisms (fossils), or evidence of the previous existence of creatures, such as trackways, trails, or burrows.

Generally, the area within Merced County is covered by an extensive layer of marine and continental eroded materials that has buried fossil-bearing formations over the course of many centuries. However, the extensive river outwash deposits along the Merced and San Joaquin rivers are areas where remains of Pleistocene and Tertiary plants and animals might be found. The project area is not known to have produced significant paleontological resources, although fossils have been found along the San Joaquin River and its tributaries, including the Chowchilla River. According to the University of California Museum of Paleontology BerkeleyMapper website, there have been no paleontological resources identified within a 15 mile radius of the project site (UCMP 2022).

ARCHAEOLOGICAL SETTING

Archaeological resources include material remains of human life and culture in the past, such as graves, buildings, tools, and pottery. Archaeological investigations in the Central Valley commenced in the Delta area of San Joaquin County, where from 1880 to 1906 numerous mound or burial sites were excavated. The vast majority of the early investigations focused on the study of single sites and few reports describe broad-based regional areas. Archaeological investigations specific to the Central Valley that included sites in Merced County were conducted as early as 1941. Countywide investigations were conducted beginning in the early 1980s. Collectively, these archeological investigations led to the identification of three major prehistoric cultural phases in the Central Valley: the Windmiller, Consumnes, and the Hotchkiss (Napton 2012).

The major local archaeological sequence applicable to the vicinity of the project area has been identified by excavation at sites impacted by construction of San Luis Dam and Los Banos Grandes Reservoir, which are located to the southwest of the proposed project area. Data from five excavated archaeological sites located west of Los Banos provided a detailed visualization of the prehistoric past for the region. The five excavated sites lead to the identification of four local archaeological complexes. From the earliest to the latest, the four complexes include the Positas Complex, the Pacheco Complex, the Gonzaga Complex, and the Panoche Complex. Inventoried materials at these complexes include projectile points, small bones, ground and shell beads, shell ornaments, milling stones, cobble pestles, stone tools, small bowl mortars, slab milling stones, hand stones, and burial sites. Some complexes also contained structures, including an assembly house, heating pits, and a built-up interior mud rings and fire pits. Subsequent investigations in the area (near Pacheco Pass) include surveys that discovered occupation sites, bedrock mortars, cupule features, flake scatters, quarries, petroglyphs, and rock shelters.

In general, the archaeology of central and western Merced County is poorly known. While numerous investigations occurred at the San Luis Dam and Los Banos Grandes Reservoir, these investigations were not near the proposed project site. No formal archaeological investigations have been conducted on or near the project area, but prehistoric archaeological resources exhibiting Native American inhumations have been identified near the San Joaquin River within the general vicinity of the project area.

ETHNOGRAPHIC SETTING

The project area is located within the former territory of the Penutian- speaking Yokuts, a tribe that at the time of contact occupied an area extending east from the crest of the Coast (Diablo) Range well into the foothills of the Sierra Nevada, north to the American River, and south to the upper San Joaquin River. The Yokuts spread from the Sierra Nevada foothills into the Central Valley about 500

years ago. The Northern Valley Yokuts formerly occupied the territory in which the proposed project is located. The principal area occupied by the Yokuts is west of the confluence of the Merced and San Joaquin Rivers - the lower reaches of the Merced. This area is also indicated as within the territory of the *Coconoon* group of the Northern Valley Yokuts. While cultural studies mention Yokuts along the Merced River, there is no information regarding Native American occupation of specific locations, such as the proposed project area. Most information on the "west side" of the San Joaquin Valley and for central Merced County is nonexistent (Napton 2012). Given the ethnographic literature pertaining to the project region and its surrounding area, including early ethnographic documentation, imperishable features and artifacts may be found during cultural resource reconnaissance of the areas in Merced County (Napton 2012).

HISTORICAL SETTING

Historic cultural resources cover a wide range of artifacts, buildings, roads, settlements, and other features of the built environment. Regionally, the historical setting dates to when the Spanish entered California in the 1700s and rapidly spread northward along the coast. The Spanish presence in the Central Valley, however, was limited to occasional forays in search of fugitive missionized Native Americans. American exploration of the Central Valley began with the arrival of explorers and traders, including Jedediah Smith, Ewing Young, and J. R. Walker. In 1844, John Frémont and his party, heading south, crossed present-day Merced County. Following John Marshall's discovery of gold in the tailrace of Sutter's Mill in January of 1848, miners flocked to California. News of the find brought thousands to the Valley en route to the adjacent Sierra Nevada "Mother Lode" region. One of the indirect consequences of the Gold Rush was the presence in the Central Valley of ferry operators, storekeepers, innkeepers, and others who supplied miners with goods and services.

During the 1850s, the more productive parts of the Central Valley were settled. The first Legislature created the structure of the new state. Mariposa County was the largest county, covering one fifth of the state's area. In 1855, a reapportionment of Mariposa County resulted in the creation of Merced County. In 1872, the City of Merced was selected as the county seat, and the Central Pacific Railroad entered the county. The railroad connected the San Joaquin Valley with markets in the north and south, and importantly, the east. By 1874, much of Merced County was under cultivation. Controlled irrigation and the impoundment of floodwaters developed in the Central Valley, so by 1888, most of the Valley floor was broken up into numerous small farms. The Valley began to take on its present densely settled, highly productive form. U.S. Route 99 was paved through the county in about 1913, later resulting in an expanded network of paved roads, which represent the on-going trend toward increased urbanization, urban centers, and reductions in the amount of agricultural land.

The dairy industry was introduced to the county in the late 1850s. By the 1970s, there were more than 2,500 commercial dairies, 17 milk product plants, and milk cows that produced dairy products valued at $39,564,000. Today, Merced County continues to be an important contributor to the livestock and farming industries in California. In 2019, Merced County's dairy industry products remain the leading agricultural commodity in the county, with an overall gross value of $1,050,940,000 (Merced Agricultural Commissioner 2020).

RECORDS SEARCH

Records of the known cultural resources found in Merced County are included in the files of the Office of Historic Preservation, California Historical Resources Information System. The Central California Information Center (CCIC), housed at California State University, Stanislaus, locally administers these records. A records search request was filed with the CCIC on December 16, 2021 for all recorded historic-era and prehistoric archaeological sites within ¼ mile radius of the project site to determine its historic and cultural sensitivity (Padre 2021).

The results of CCIC Records Search indicated that no previously recorded cultural resources were recorded within the project site or search radius. Other than the above-mentioned study by Napton in 2012, no other studies have been completed on the project area.

NATIVE AMERICAN CONSULTATION

The Native American Heritage Commission (NAHC), in Sacramento, was contacted on December 16, 2021 to request an examination of their Sacred Lands Files to determine whether the project is located on sacred land, and to request a current list of Native American tribal representatives who may have concerns regarding the proposed project.

Results of the records search by the NAHC did not indicate the presence of Native American tribal cultural resources within or adjacent to the project site (Padre 2022). AB 52 requires that the lead agency must consult with California Native American Tribes who are traditionally and culturally affiliated with the geographic area of the proposed project, and who have requested such consultation in writing. At the time of preparation of this EIR, no tribes have requested such consultation, nor have any tribes requested to be informed of projects in the area of the proposed project (Ho *pers comm* 2023).

FIELD SURVEY RESULTS

Field inspection for the proposed project was completed on January 31, 2022 by an archaeologist to ascertain whether the site contains cultural resources. The project site was examined with parallel transects spaced at 10-meter intervals where not constrained by existing structures, manure, or dense vegetation. During the field investigation, no indications of the presence or former presence of historic or prehistoric cultural resources were observed within the proposed project site.

The location of the two proposed freestall barns currently contains calf hutches and equipment storage. The surrounding ground surface has been graded and is very compact. The location of the proposed hospital milking barn and septic system is also located on heavily graded soils. The location of the proposed commodity barn additions consists of a concrete slab and compacted gravel. The proposed optional shade barn will cover an existing corral with a bisecting feed lane. The location of the proposed concrete nutrient drying area is currently used as an earthen nutrient drying area and has been frequently graded. The location of the proposed earthen nutrient drying area consists of cropped land and graded soils. The location of the proposed utility shop is currently used as cropped land.

7.3 ENVIRONMENTAL EFFECTS

7.3.1 SIGNIFICANCE CRITERIA

The project was evaluated in terms of findings of significance defined in State CEQA Guidelines Section 15065, and Appendix G of the State CEQA Guidelines Section V, *Cultural Resources*, Section VII, *Geology and Soils*, and Section XVIII, *Tribal Cultural Resources*. A project would normally result in a significant impact if the proposed project would:

- Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5. *(V.a)*
- Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5. *(V.b)*
- Disturb any human remains, including those interred outside of formal cemeteries. *(V.c)*
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. *(VII.f)*

For Tribal Cultural Resources, a project would normally result in a significant impact if the proposed project would cause a substantial adverse change in the significance of a tribal cultural resource as defined in PRC Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native America tribe, and that is:

- Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 2010.1(k), or *(XVIII.a)*
- A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. *(XVIII.b)*

Pursuant to Section 15064.5 of the CEQA Guidelines, a historical resource is presumed significant if it is listed on the CRHR, or has been determined to be eligible for listing by the State Historical Resources Commission. A historical resource may also be considered significant if the lead agency determines, based on substantial evidence, that the resource meets the criteria for inclusion in the CRHR.

Section 15064.5(b) of the CEQA Guidelines further provides standards for determining what constitutes a "substantial adverse change" that must be considered a significant impact on a historic resource. A "substantial adverse change" means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired." Material impairment means demolishing or altering "in an adverse manner those characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the California Register of Historical Resources."

The section further states that archaeological resources not otherwise determined to be historical resources may be significant if they are unique. Pursuant to PRC Section 21083.2, a unique archaeological resource is defined as an archaeological artifact, object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets one of the following criteria:

- Contains information needed to answer important scientific questions and there is a demonstrable public interest in that information;
- Has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

According to Section 15064.5 of the CEQA Guidelines, all human remains are significant.

A non-unique archaeological resource means an archaeological artifact, object, or site that does not meet the above criteria. A non-unique archaeological resource need be given no further consideration under CEQA.

7.3.2 ENVIRONMENTAL IMPACTS

This impact analysis is based on:

- a review of published information and reports regarding cultural resources within the boundaries of the Vierra Dairy Expansion project area;
- consultation with the Native American Heritage Commission;
- analysis of federal, state, and local regulations pertaining to cultural resources; and
- changes that could occur to cultural resources as a result of the proposed Vierra Dairy Expansion project.

Impact CUL-1: ***Cause a substantial adverse change in the significance of a historical, archaeological, or paleontological resource, or a unique geological feature (Criteria V.a/b, VII.f)***

Construction of the proposed dairy facilities could result in substantial adverse changes to the significance of historical, archaeological, or paleontological resources within the project area. Because ground-disturbing activities could affect unidentified remains of subsurface historic, archaeological, or paleontological resources, this would be a significant impact.

The cultural resources assessment completed by the Central California Information Center determined that no previously recorded prehistoric sites, historic archaeological resources, or historic buildings occur within the proposed project area, or within the immediate vicinity of the project area. A 2012 study by Napton was the only previous investigation completed within the project area that has been reported to the CCIC.

An assessment of cultural resources in the project area known to be protected or sacred by the Native American Indian community was completed through consultation with the NAHC, Sacramento. The assessment completed by the NAHC determined that no sacred lands were identified in the area of the proposed project. As of the time of preparation of the EIR (May 2023),

no correspondence has been received from Native American tribal representatives requesting information or consultation on the proposed project.

The proposed project includes the construction of new supporting buildings and structures at the existing dairy. While a majority of the modification of the proposed facilities would occur within the existing footprint of the dairy, there would be change in cropped acreage associated with the farm, with 15 acres of cropland to be converted to active dairy facilities. Many areas that have been plowed for years may nevertheless contain intact archaeological remains or paleontological resources beneath the plow zone, a situation demonstrated at several Central Valley localities.

The entire project area has been highly modified by agriculture, reducing the probability of finding paleontological sites, and is not within an area where paleontological resources would likely be exposed. The project area also lacks any unique geologic features, since the project area consists of flat and graded agricultural fields. The results of the literature search and the general pattern of historical occupation of the Central Valley suggest that the proposed project is located in a sensitive area regarding the possible presence of cultural resources, including prehistoric and historic archaeological sites.

All aspects of the cultural resources assessment of the proposed Vierra Dairy Expansion project site indicate that no known cultural or paleontological resources are present within the project area. Therefore, the project would have no adverse effects on known historic, cultural, or paleontological resources. Also, because the project area lacks any unique geologic features, the proposed project would not adversely affect these resources. However, previously unidentified historic, archaeological, or paleontological resources may remain buried below the plow zone, which could be disturbed by project construction activities. This impact would be significant.

Significance of Impact: Significant.

Mitigation Measure CUL-1:
The project applicant and construction contractor shall implement measures to address discovery of unanticipated buried cultural or paleontological resources. If buried cultural resources such as chipped or ground stone, midden deposits, historic debris, building foundations, or paleontological resources are inadvertently discovered during ground-disturbing activities, work shall stop in that area and within 100 feet of the find until a qualified archaeologist or paleontologist can assess the significance of the find and, if necessary, develop responsible treatment measures in consultation with Merced County and other appropriate agencies. Measures must result in the avoidance, preservation, or recordation of the resource.

Environmental Effects of Measure: If any cultural resources are discovered during construction of the Vierra Dairy Expansion project, implementation of Mitigation Measure CUL-1 would protect these archaeological, historic, and paleontological resources, and would trigger additional mitigation for effects to such resources. All physical improvements or activities that could result in changes to the physical environment required by these measures would be located within the project site, and no additional impacts beyond those identified for such development in Chapters 5 through 11 of this Draft EIR would occur.

Significance after Mitigation: Implementation of Mitigation Measure CUL-1 would provide protection of archaeological, historic, and paleontological resources, and would ensure that these features are protected, preserved, and/or documented by requiring the project applicant and

construction contractor to implement measures that address the discovery of unanticipated buried cultural or paleontological resources. Therefore, this impact would be less than significant after implementation of Mitigation Measure CUL-1.

Implementation/Monitoring: Implementation of this mitigation measure would be the responsibility of the project applicant/construction contractor and Merced County Community and Economic Development Department, and that department shall monitor for compliance. Implementation of Mitigation Measure CUL-1 would occur prior to and during project construction.

Impact CUL-2: Result in the accidental discovery and disturbance of human remains (Criterion V.c)

Construction activities associated with the Vierra Dairy Expansion project could result in the accidental discovery of human remains. This would be a significant impact.

No human remains have previously been identified within the project area. Even though no remains have been discovered during previous disturbance of the project site, currently unknown remains could be disrupted by construction operations that involve the excavation or disturbance of subsurface layers. As a result, the potential for the accidental discovery and disturbance of human remains would result in a significant impact.

Significance of Impact: Significant.

Mitigation Measure CUL-2a:
Implement Mitigation Measure CUL-1.

Mitigation Measure CUL-2b:
The project applicant and construction contractor shall implement a plan to address discovery of human remains. If remains of Native American origin are discovered during proposed project construction, it shall be necessary to comply with state laws concerning the disposition of Native American burials, which fall within the jurisdiction of the Native American Heritage Commission (NAHC). If any human remains are discovered or recognized in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until:

- The County coroner has been informed and has determined that no investigation of the cause of death is required; and
- If the remains are of Native American origin:
  - √ The most likely descendants of the deceased Native Americans (identified by the NAHC) has made a recommendation to the landowner or person responsible for the excavation work for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC 5097.98; or
  - √ The NAHC has been unable to identify a descendant, or the descendant failed to make a recommendation within 24 hours after being notified.

According to the California Health and Safety Code, six or more human burials at one location constitute a cemetery (Section 8100), and disturbance of Native American cemeteries is a felony

(Section 7052). Section 7050.5 requires that construction or excavation be stopped in the vicinity of discovered human remains until the coroner can determine whether the remains are those of a Native American. If the remains are determined to be Native American, the coroner must contact the NAHC.

Environmental Effects of Measure: If any human remains are discovered during construction of the proposed Vierra Dairy Expansion project, implementation of Mitigation Measure CUL-2 would protect these remains, and would trigger additional mitigation for effects to such resources. All physical improvements or activities that could result in changes to the physical environment required by these measures would be located within the project site, and no additional impacts beyond those identified for such development in Chapters 5 through 11 of this Draft EIR would occur.

Significance after Mitigation: Implementation of Mitigation Measure CUL-2 would provide protection of human remains, and would ensure that any remains are protected, handled according to state law, and treated with appropriate respect. Therefore, this impact would be less than significant after implementation of Mitigation Measure CUL-2.

Implementation/Monitoring: Implementation of this mitigation measure would be the responsibility of the project applicant/construction contractor and Merced County Community and Economic Development Department, and that department shall monitor for compliance. Implementation of CUL-2 would occur prior to and during project construction.

Impact CUL-3: Cause a substantial adverse change in the significance of a tribal cultural resource (Criteria XVIII.a/b)

Ground-disturbing construction activities associated with the Vierra Dairy Expansion project would not result in a substantial adverse change in the significance of a tribal cultural resource since no tribal cultural resources were identified on the project site, and no Native American tribes requested consultation. This would be a less-than-significant impact.

The Native American Heritage Commission was contacted to conduct a record search of the Sacred Lands File. The records search produced negative results. As of preparation of the EIR (May 2023), no Native American tribes in the area of the proposed project have requested in writing that Merced County consult with them early in the environmental planning process in accordance with AB 52 (Ho *pers. comm.* 2023).

Because the Sacred Lands File produced negative results, and no requests have been received by the County from Native American representatives to consult on projects proposed for their geographic area, the County's obligations under AB 52 and the implementing requirements of the Public Resources Code have been satisfied. As a result, this potential impact would be less than significant.

Significance of Impact: Less than significant.

Mitigation Measure CUL-3: None required.

8 GREENHOUSE GAS EMISSIONS AND ENERGY USE

This chapter provides an evaluation of greenhouse gas (GHG) emissions generated by the proposed Vierra Dairy Expansion project, in addition to an evaluation of potential energy impacts from the dairy expansion. As established in the Initial Study (IS) for the proposed project (see Appendix A, *Notice of Preparation and Initial Study*), the construction and operation of the Vierra Dairy Expansion project would result in greenhouse gas emissions from both direct and indirect sources.

Global climate change refers to the long-term fluctuations in temperature, wind patterns, precipitation, and other aspects of the climate systems of the earth. It is widely recognized that GHG emissions associated with human activities are contributing to global climate change, which is a public health and environmental concern broadly accepted around the world. As global concentrations of atmospheric greenhouse gases increase, global temperatures increase, as do weather extremes and air pollution concentrations. GHG emissions are produced from: electricity generation, road transportation, and other energy sources; industrial processes; agriculture, forestry, and other land use; solid waste disposal; and wastewater treatment and discharge. Carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) are the principal GHGs from dairy operations.

8.1 REGULATORY FRAMEWORK

This section includes a discussion of laws, ordinances, regulations, and standards applicable to greenhouse gas emissions and energy efficiency.

8.1.1 FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The United States Environmental Protection Agency (EPA) is the federal agency responsible for implementing the federal Clean Air Act (CAA). The U.S. Supreme Court ruled on April 2, 2007 that carbon dioxide is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs[1]. However, there are no federal regulations or policies regarding GHG emissions thresholds applicable to the proposed project at the time of preparation of this Environmental Impact Report (EIR).

Greenhouse Gas Reporting Program. Under the Final Mandatory Reporting of Greenhouse Gas Rule, suppliers of fossil fuels or industrial GHGs including carbon dioxide, methane, nitrous oxide, and fluorinated gases; manufacturers of vehicles or engines; and facilities that emit more than 25,000 metric tons or more per year of GHGs are required to submit annual reports to EPA. This comprehensive, nationwide emissions data will provide a better understanding of the sources of GHGs, and will guide development of the policies and programs to reduce emissions. Large agricultural operations with manure management systems may be affected by the EPA rule. The minimum average annual animal population for dairies to emit 25,000 tons per year (t/yr) or more of GHG is 3,200 dairy cows. Operators of facilities with less than 3,200 dairy cows will likely not need to report under this rule. Congressional action, however, has blocked the rule's application to livestock manure management. The EPA will not be implementing subpart JJ, Manure Management of Part 98 due to a Congressional restriction prohibiting the expenditure of funds for this purpose (EPA 2023).

[1] On June 30, 2022, the U.S. Supreme Court case ruling on *West Virginia v. Environmental Protection Agency* restricted the EPA's power to regulate GHGs. In response, when Congress passed the Inflation Reduction Act of 2022, it amended the Clean Air Act and reinforced that carbon dioxide emitted from fossil fuels is an air pollutant and that the EPA has the authority, and responsibility, to regulate it.

Climate Adaptation Plan. The Climate Adaptation Action Plan was developed by the EPA to address reduction of greenhouse gases in the United States. The plan consists of more than 50 voluntary programs, including the Ruminant Livestock Efficiency Program (RLEP) and the AgStar Program. The RLEP, developed in coordination with the United States Department of Agriculture (USDA), provides a series of improved livestock production practices that could readily be implemented to reduce methane emissions from ruminant animals. Developed in conjunction with the USDA, this program established livestock production practices (modification of feed), which if implemented, could reduce methane emissions. The AgStar Program, developed by the EPA, USDA, and U.S. Department of Energy, encourages the use of methane recovery technologies to reduce methane emissions at concentrated animal feeding operations that manage manure as liquids or slurries.

Inflation Reduction Act of 2022. The bill provides hundreds of billions of dollars in tax incentives and grants to reduce the cost of meeting standards for power companies, car companies, and their customers. It allocates $40 billion for the USDA to expand climate-focused programs, particularly in regard to conservation. Farmers will be offered more incentives to plant cover crops or adopt other conservation practices. The bill includes $9.7 billion in grants and loans to rural electric cooperatives to buy renewable energy, renewable energy systems, carbon capture and storage systems, and make energy efficiency improvements on generation and transmission systems.

Kyoto Protocol and the Paris Agreement. The Kyoto Protocol is an international treaty that extends the 1992 United Nations' Framework Convention on Climate Change (UNFCCC) that commits parties to reduce greenhouse emissions. During the first commitment period, 37 industrialized countries and economies in transition and the European Community committed to reduce GHG emissions to an average of five percent against 1990 levels. During the second commitment period (under the Doha Amendment), parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020; however, the composition of Parties in the second commitment period is different from the first. While not a part of the Kyoto Protocol but within the framework of the UNFCCC, the Paris Agreement was adopted in December 2015 with the aim of governing greenhouse gas emissions after 2020, where all major emitting countries committed to cut climate pollution and strengthen those commitments over time. The United States withdrew from the agreement in 2020, but rejoined in 2021.

8.1.2 STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The California Air Resources Board (CARB) is the agency responsible for the coordination and oversight of state and local air pollution control programs in California, and for implementing the California Clean Air Act (CCAA). Various statewide and local initiatives to reduce the state's contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is under way, and there is a real potential for severe adverse environmental, social, and economic effects in the long term. Because every nation emits GHGs and therefore makes an incremental cumulative contribution to global climate change, cooperation on a global scale will be required to reduce the rate of GHG emissions to a level that can help to slow or stop the human-caused increase in average global temperatures, and the associated changes in climatic conditions.

Listed below is a summary of major climate legislation and executive orders, focusing on legislation that reflects the more current climate goals of the state.

California's Mandatory Greenhouse Gas Reporting Rule

The California Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (California Mandatory Reporting Rule) (17 CCR, Section 95100-95157), approved in 2007, is similar to the U.S. EPA Mandatory Reporting Rule in that it requires certain large emitters and suppliers to report their GHG data on an annual basis; however, the California emissions threshold is lower at only 10,000 metric tons of CO_2e per year. The California Mandatory Reporting Rule excludes GHG emissions related to livestock manure management systems and agricultural irrigation pumps.

Assembly Bill 32, the California Climate Solutions Act of 2006

In September 2006, then-Governor Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 established regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 required that statewide GHG emissions be reduced to 1990 levels by 2020. California exceeded the initial target of reducing greenhouse gas emissions to 1990 levels by 2020, and reached that goal by 2016. More recent legislation described below extended the GHG reduction goals of AB 32.

In 2011, the CARB adopted the cap-and-trade regulation. The Cap-and-Trade Program covers major sources of GHG emissions in the State such as refineries, power plants, industrial facilities, and transportation fuels. The Cap-and-Trade Program includes an enforceable emissions cap that will decline over time. The State will distribute allowances, which are tradable permits, equal to the emissions allowed under the cap.

Cap-and-trade is a market based regulation that is designed to reduce greenhouse gases (GHGs) from multiple sources. Cap-and-trade sets a firm limit or cap on GHGs and minimizes the compliance costs of achieving AB 32 goals. The cap will decline approximately 3 percent each year beginning in 2013. Trading creates incentives to reduce GHGs below allowable levels through investments in clean technologies. With a carbon market, a price on carbon is established for GHGs. Market forces spur technological innovation and investments in clean energy. Cap-and-trade is an environmentally effective and economically efficient response to climate change. (ARB 2017a)

The initial main strategies and roadmap for meeting the 1990 emission level reductions were outlined in a Scoping Plan approved in December 2008 and updated every five years (the Scoping Plan was updated in 2014, 2017, and 2022). The 2022 Scoping Plan for Achieving Carbon Neutrality lays out a path to achieve targets for carbon neutrality and reduce anthropogenic greenhouse gas emissions by 85 percent below 1990 levels no later than 2045, as directed by Assembly Bill 1279. The plan outlines how carbon neutrality can be achieved by taking bold steps to reduce GHGs to meet the anthropogenic emissions target and by expanding actions to capture and store carbon through the state's natural and working lands and using a variety of mechanical approaches. (CARB 2022)

The Scoping Plan recognizes that some sectors (e.g. agriculture) are currently not suitable for inclusion in the Cap-and-Trade Program and, as a result, instead recommends separate complementary voluntary strategies for those sectors. The Compliance Offset Protocol for Livestock Projects is one of four protocols for voluntary activities that have been approved by the CARB under the Cap-and-Trade Program. This protocol provides the procedures necessary for quantifying and reporting GHG emission reductions associated with the installation of a biogas control system, such as a digester, for manure management on dairy cattle and swine farms. These

quantified emission reductions can be sold in the market as emission offset credits[2]. See Alternatives 2 and 3 in Chapter 13, *Alternatives Analysis*, of this EIR, for discussion of the feasibility of installing dairy digesters.

Senate Bill 605 and Senate Bill 1383

Senate Bill 605 (Lara, Chapter 523, Statutes of 2014) requires CARB, in coordination with other State agencies and local air districts, to develop a strategy to further reduce short-lived climate pollutant emissions in California. Short-lived climate pollutants are powerful climate forcers that remain in the atmosphere for a much shorter period of time than major climate pollutants such as carbon dioxide. Their relative potency in terms of how they heat the atmosphere can be tens to thousands of times greater than CO_2. Short-lived climate pollutants include methane, black carbon, and fluorinated gases. Reducing these emissions can have an immediate beneficial impact on climate change.

SB 1383 (Lara, Chapter 395, Statutes of 2016), establishes methane emissions targets, including a reduction in statewide methane emissions of 40 percent below 2013 levels by 2030 and an equivalent methane emissions reduction target for the dairy and livestock sector (2030 target). Pursuant to SB 605 and SB 1383, the CARB issued the **Short-Lived Climate Pollutant Reduction Strategy** (SLCP Strategy) in March 2017, which lays out a range of options to accelerate SLCP emission reductions in California, including regulations, incentives, and other market-supporting activities. State law mandates a 40 percent reduction in methane and HFC emissions by 2030 and a 50 percent reduction in anthropogenic emissions of black carbon by 2030. Additional legislation (AB 1613 and SB 859) included a spending plan for Cap-and-Trade revenues that specifically target SLCP emission reductions. These included $5 million for black carbon wood smoke reductions, $40 million for waste reduction and management, $7.5 million for Healthy Soils, and $50 million for methane emission reductions from dairy and livestock operations (CARB 2017).

As stated in the Strategy, California can cut methane emissions by 40 percent below current levels in 2030 by capturing or altogether avoiding methane from manure at dairies, meeting national industry targets for reducing methane emissions from enteric fermentation, effectively eliminating disposal of organics in landfills, and reducing fugitive methane emissions by 40-45 percent from all sources. California will aim to reduce methane emissions from dairy manure management by at least 20 percent in 2020, 50 percent in 2025, and 75 percent in 2030. To accomplish this, the State will encourage and support near-term actions by dairies to reduce emissions through market support and financial incentives. As set forth in the 2017 Scoping Plan, no state regulatory requirements are to go into effect prior to 2024 requiring dairy sector methane reductions to meet the state's GHG reduction goals (CARB 2017). The reduction of methane emissions from dairy operations will continue to be voluntary, though one of the 2022 Scoping Plan strategies includes consideration of regulation development for methane mitigation strategies beyond complimentary incentives for dairy and livestock operations in order to meet 2030 GHG emission targets. However, CARB is only authorized to implement these regulations provided that they are determined technologically and economically feasible, cost-effective, include provisions to minimize and mitigate potential leakage (CARB 2022).

[2] Since the original adoption of the Cap-and-Trade Program, it has been amended eight times through a robust public process. The AB 398 Cap-and-Trade Program came into effect on January 1, 2021, which included lower offset limits. The offset usage limit was cut from 8 percent to 4 percent, and half of offsets must provide direct benefits to California.

In recognition of the need for public funding sources to subsidize voluntary dairy methane emissions reduction projects, funds from the Cap-and-Trade Program are allocated to the Greenhouse Gas Reduction Fund to be administered by CDFA to support such projects. CDFA receives funding from California Climate Investments to support projects that reduce methane emissions from dairy and livestock operations, such as dairy digesters and manure management systems, totaling $80 million for 2021-2023, primarily through the Dairy Digester Research and Development Program (DDRDP) and the Alternative Manure Management Program (AMMP). Additional programs within the agricultural sector that aim to reduce emissions and sequester carbon include the Healthy Soils Program, and the State Water Efficiency and Enhancement Program.

AMMP projects could include installation of mechanical manure solids separation on dairies with flush systems, or conversion to dry manure management practices, such as scrape or vacuum systems, combined with composting or solar drying of manure. Current DDRDP projects are expected to reduce greenhouse gas emissions by an estimated 21.02 million metric tons of CO_2e over ten years, or approximately 2.10 million metric tons of CO_2e annually. The 116 AMMP projects awarded so far are expected to reduce greenhouse gas emissions by an estimated 2.22 million metric tons of CO_2e over 10 years. Combined, the DDRDP and AMMP funded projects would contribute approximately 22 percent of the reductions necessary to achieve the 2030 goal. A combination of dairy digesters, alternative manure management, enteric strategies, and dairy herd size population decreases will be needed to meet the 2030 target (CDFA 2023; CARB 2022a)

SB 1383 also requires CARB to conduct an analysis on progress the sector has made in achieving the 2030 target. In response to that requirement, the *Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target* describes progress toward the 2030 target as well as progress made in overcoming technical and market barriers to dairy and livestock methane emissions reduction projects. CARB estimated that if the remaining reductions needed to achieve the 2030 target are met through a mix of half dairy digesters and half AMMP projects, then at least 420 additional projects may be necessary. This approach would cost an amount between $0.8 and $3.7 billion, which could be supported by local, State, and federal funding, or other financial mechanisms, such as the pilot financial mechanism outlined in SB 1383. If, going forward, only digester projects were developed to achieve the target, approximately 230 additional digesters may be needed, at a cost between $0.7 and $3.9 billion depending on the types of technologies selected. Regardless of the project and technology mix used, the most important factors for achieving the 2030 target are ongoing capital funding for new methane emissions reduction projects, continued revenue streams that incentivize dairy biogas capture and beneficial use, and an available and accepted means of reducing enteric methane emissions. (CARB 2022a).

Senate Bill 32, the California Climate Solutions Act of 2006: Emissions Limit

As the sequel to AB 32, Senate Bill (SB) 32 (September 2016) requires the state board to ensure that statewide greenhouse gas emissions are reduced to 40 percent below the 1990 level by 2030, a goal set forth in Executive Order B-30-15.

Assembly Bill 1279, The California Climate Crisis Act

AB 1279 (Muratsuchi, Chapter 337, Statutes of 2022) establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85 percent below 1990 levels. The bill requires CARB to ensure that Scoping Plan

updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO_2 removal solutions and carbon capture, utilization, and storage technologies.

Executive Order N-79-20
Executive Order N-79-20 (2020) directs the state to require that, by 2035, all new cars and passenger trucks sold in California be zero-emission vehicles – a target which would achieve more than a 35 percent reduction in greenhouse gas emissions and an 80 percent improvement in oxides of nitrogen emissions from cars statewide. The executive order will not prevent Californians from owning gasoline-powered cars or selling them on the used car market.

Advanced Clean Trucks Regulation. The Advanced Clean Trucks regulation was approved on June 25, 2020 and has two main components, a manufacturers zero emissions vehicle (ZEV) sales requirement and a one-time reporting requirement for large entities and fleets. The purpose of this regulation is to accelerate the market for on-road zero-emission vehicles and to reduce emissions of oxides of nitrogen (NO_X), fine particulate matter (PM), other criteria pollutants, toxic air contaminants, and greenhouse gases from medium-and heavy-duty on-road vehicles. Any manufacturer that certifies on-road vehicles over 8,500 lbs. gross vehicle weight rating for sale in California is subject to this rule. Essentially, manufacturers who certify these vehicles would be required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035.

California Renewables Portfolio Standard (RPS). The California Renewables Portfolio Standard was established in 2002 under Senate Bill 1078. The California RPS program requires all utilities in the state to source half of their electricity sales from clean, renewable sources such as wind, solar, geothermal, and biopower, by 2030. In 2018, SB 100 (de León, 2018) was signed into law, which increases the RPS to 60 percent by 2030 and requires all the state's electricity to come from carbon-free resources by 2045. Dairy digesters producing electricity are an RPS eligible technology. In addition, dairy digesters can produce biogas and send it to a natural gas-fired energy generation facility, which can produce RPS eligible electricity.

Title 24. Title 24 of the California Code of Regulations, The Energy Efficiency Standards for Residential and Nonresidential Buildings, contains the energy efficiency standards related to residential and nonresidential buildings. These standards conserve electricity and natural gas and prevent the state from having to build more power plants. The *California Green Building Standards Code* (CALGreen Code)(California Code of Regulations, Title 24, Part 11) is a part of the California Building Standards Code that comprehensively regulates the planning, design, operation, and construction of newly constructed buildings throughout the state. Both mandatory and voluntary measures are included in the CALGreen Code. Mandatory measures for non-residential structures include standards for light pollution reduction, energy efficiency, and water conservation, among others.

8.1.3 MERCED COUNTY

Merced County Greenhouse Gas Reduction Plans. Merced County does not yet have a Climate Action Plan (CAP) or energy plan. The County is in the process of preparing a Climate Action Plan. While completion of the CAP was previously anticipated some time in 2021, the process has been delayed with no projected completion date.

Merced County Animal Confinement Ordinance. No provisions of the Animal Confinement Ordinance (ACO) directly address methane emissions, but Chapter 18.64.050 U of the Merced County Code (see Appendix C of the EIR) requires compliance with requirements of the San Joaquin Valley Air Pollution Control District (SJVAPCD) and the reduction of air emissions in general. Because the decomposition of manure is one source of methane emissions, measures to comply with reactive organic gas (ROG/VOC) limitations required by Chapter 18.64.050 OO would also reduce methane emissions.

Merced County General Plan. There are several policies in the General Plan that also seek to reduce GHG emissions, including promoting carbon efficient agricultural practices, and encouraging methane digesters for agricultural operations, among others. The policies that are relevant to the proposed project include:

> **Policy NR-2.9: Energy Conservation**
> Encourage and maximize energy conservation and identification of alternative energy sources (e.g., wind or solar).
>
> **Policy AQ-1.3: Agricultural Operations Emission Reduction Strategies**
> Promote greenhouse gas emission reductions by encouraging agricultural operators to use carbon efficient farming methods (e.g., no-till farming, crop rotation, cover cropping); install renewable energy technologies; protect grasslands, open space, oak woodlands, riparian forest and farmlands from conversion to other uses; and develop energy-efficient structures.
>
> **Policy AQ-2.2: Development Review Process**
> Use the development review process to achieve measurable reductions in criteria pollutants, toxic air contaminants, and greenhouse gas emissions.

These goals and policies were considered in the evaluation of the proposed project and the formulation of appropriate mitigation measures below. A more detailed discussion of the relevance of these goals and policies to the proposed project is located in Table 11-1 of Chapter 11, *Land Use Compatibility*, of this EIR.

8.2 ENVIRONMENTAL SETTING

8.2.1 GREENHOUSE GASES AND CLIMATE CHANGE

Global Warming is a public health and environmental concern around the world. As global concentrations of atmospheric greenhouse gases increase, global temperatures increase, weather extremes increase, and increases in air pollutant concentrations. Global warming and climate change have been observed to contribute to poor air quality, rising sea levels, melting glaciers, stronger storms, more intense and longer droughts, more frequent heat waves, increases in the number of wildfires and their intensity, and other threats to human health and safety (IPCC 2013). The years 2014–2022 all rank among the warmest years in the 1880–2022 record (143-year record). The global annual temperature has increased at an average rate of 0.08°C (0.14°F) per decade since 1880 and over twice that rate (+0.18°C / +0.32°F) since 1981 (NOAA 2023). Hotter days facilitate the formation of ozone, increases in smog emissions, and increases in impacts to public health and well-being (e.g., heat-related illness, heart and respiratory conditions, increased food-, water-, and vector-borne disease, mental health consequences) (EPA 2022). Because oceans tend to warm and cool more slowly than land areas, continents have warmed the most. If greenhouse gas emissions continue to increase, climate models predict that the average temperature at the Earth's surface is

likely to increase by up to 8.3 degrees Fahrenheit above 2011 to 2020 levels by the end of this century, depending on future emissions and the responsiveness of the climate system (IPCC 2022).

THE GREENHOUSE EFFECT (NATURAL AND ANTHROPOGENIC)

The Earth naturally absorbs and reflects incoming solar radiation and emits longer wavelength terrestrial (thermal) radiation back into space. On average, the absorbed solar radiation is balanced by the outgoing terrestrial radiation emitted to space. A portion of this terrestrial radiation, though, is itself absorbed by gases in the atmosphere. The energy from this absorbed terrestrial radiation warms the Earth's surface and atmosphere, creating what is known as the "natural greenhouse effect." Without the natural heat-trapping properties of these atmospheric gases, the average surface temperature of the Earth would be below the freezing point of water (IPCC 2007). Although the Earth's atmosphere consists mainly of oxygen and nitrogen, neither plays a significant role in this greenhouse effect because both are essentially transparent to terrestrial radiation.

The greenhouse effect is primarily a function of the concentration of water vapor, carbon dioxide, methane, nitrous oxide, ozone, and other trace gases in the atmosphere that absorb the terrestrial radiation leaving the surface of the Earth (IPCC 2022). Changes in the atmospheric concentrations of these greenhouse gases can alter the balance of energy transfers between the atmosphere, space, land, and the oceans. Increases in greenhouse gas concentrations in the atmosphere produces a warming effect, and will likely contribute to an increase in global average temperature and related climate changes (IPCC 2022).

SCIENTIFIC CONSENSUS REGARDING CLIMATE CHANGE

In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined with other countries around the world in signing the UNFCCC agreement; the goal of the agreement was to control greenhouse gas emissions, including methane.

The UNFCCC definition of climate change is "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." Given that definition, in its assessment of the science of climate change, the IPCC stated that:

> Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased (IPCC 2013).

IPCC concluded in its most recent scientific assessment report that it is "unequivocal that human influence has warmed the atmosphere, ocean and land" (IPCC 2022). The IPCC report states that numerous long-term changes in climate have been observed at continental, regional, and ocean basin scales, including changes in arctic temperatures and ice, widespread changes in precipitation amounts, ocean salinity, wind patterns, and aspects of extreme weather including droughts, heavy precipitation, heat waves, and the intensity of tropical cyclones. Continued greenhouse gas emissions at or above current rates would cause further warming and induce many changes in the global climate system (IPCC 2013; IPCC 2022).

GREENHOUSE GASES, THEIR MAJOR SOURCES, AND ATMOSPHERIC CONCENTRATIONS

Naturally occurring greenhouse gases include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also greenhouse gases, but they are, for the most part, emitted solely by human activities. There are also several gases that, although they do not have a direct radiative forcing effect, do influence the formation and destruction of ozone, which does have such a terrestrial radiation absorbing effect. These gases, referred to here as ozone precursors, include carbon monoxide (CO), oxides of nitrogen (NO_X), and non-methane volatile organic compounds (NMVOC). Aerosols (extremely small particles or liquid droplets emitted directly or produced as a result of atmospheric reactions) can also affect the absorptive characteristics of the atmosphere.

Carbon is stored in nature within the atmosphere, soil organic matter, oceans, marine sediments and sedimentary rocks, terrestrial plants, and fossil fuel deposits. Carbon is constantly changing form on the planet through a number of processes referred to as the carbon cycle, which includes but is not limited to degradation and burning, photosynthesis and respiration, decay, and dissolution[3]. When the carbon cycle transfers more carbon to the atmosphere this can lead to global warming. Since 1970, carbon dioxide emissions have increased by about 90 percent, with emissions from fossil fuel combustion and industrial processes contributing about 78 percent from 1970 to 2011. Deforestation and the conversion of natural ecosystems to agricultural use are the second-largest contributors (EPA 2023a). Carbon stored in plants and rocks is referred to as being sequestered. Within the United States, forest sequestration of carbon offset approximately 9 percent of the GHG emissions in 2016, and from 10 to 20 percent of U.S. emissions each year (USDA 2018).

In 2021 in the United States, energy and transportation related activities accounted for the majority of human-generated greenhouse gas emissions, mostly in the form of carbon dioxide emissions from burning fossil fuels. The major sources of GHG emissions in the U.S. include electricity production (25 percent), transportation (28.5 percent), industrial processes (such as the production of cement, steel, and aluminum) (23.5 percent), commercial (6.9 percent), residential (5.8 percent), agriculture (9.4 percent), and the U.S. Territories (0.4 percent). From 1990 to 2021, net emissions decreased 2.3 percent, down from a high of 15.8 percent above 1990 levels in 2007. There was a sharp decline in emissions by 10.6 percent from 2019 to 2020, largely due to the impacts of the COVID-19 pandemic on travel and economic activity (EPA 2023b[4]).

In the U.S, agriculture contributed approximately 9.4 percent of total greenhouse gas emissions in 2021, and emissions from livestock (including emissions from enteric fermentation and manure management) made up approximately 43.6 percent of that total (EPA 2023b). The largest contributor to GHG emissions from agricultural activities is agricultural soil management (approximately 49.2 percent of total GHG emissions from agriculture). From 1990 to 2021, emissions from enteric fermentation have increased by 6.5 percent. While emissions generally follow trends in cattle populations, over the long term there are exceptions as population decreases have been coupled with production increases or minor decreases. The data indicates that while emission factors per head are increasing, emission factors per unit of product are decreasing, mostly related to

[3] Dissolution is the process whereby carbon dioxide from the atmosphere dissolves in water.

[4] As of May 2023, the 1990 to 2021 greenhouse gas emissions inventory is the most recent approved source of data available for the United States.

the increased digestibility of feed. Emissions from dairy cattle in 2021 accounted for approximately 25 percent of methane emissions from enteric fermentation (EPA 2023b).

Specific to the U.S. dairy industry, it is estimated that dairy cattle contribute approximately 1.3 percent of total U.S. emissions (Rotz, A. 2018). The major sources of GHG emissions on dairy farms include: an estimated 30-60 percent from enteric fermentation, 10-30 percent from manure management, 10-25 percent from the production of resources used on the farm, and smaller sources include emissions from cropland (1–10 percent), the combustion of fossil fuels and decomposition of lime (4-6 percent), and indirect emissions occurring beyond the farm from ammonia and nitrates leaving the farm (0.5-12 percent) (Rotz, C.A., Thoma, G. 2017).

A brief description of each greenhouse gas, its sources, and its role in the atmosphere is given below. This chapter focuses on the major greenhouse gases emitted by confined animals or agricultural activities, including carbon dioxide, methane, and nitrous oxide.

Carbon Dioxide (CO_2). In nature, carbon is cycled between various atmospheric, oceanic, land biotic, marine biotic, and mineral reservoirs. The largest fluxes occur between the atmosphere and terrestrial biota, and between the atmosphere and surface water of the oceans. In the atmosphere, carbon predominantly exists in its oxidized form as CO_2. Atmospheric carbon dioxide is part of this global carbon cycle, and therefore its fate is a complex function of geochemical and biological processes. Carbon dioxide concentrations in the atmosphere increased from approximately 280 parts per million (ppm) in pre-industrial[5] times to 416 ppm in 2021, a 48 percent increase. The predominant source of anthropogenic CO_2 emissions is the combustion of fossil fuels (IPCC 2022).

Management of agricultural soils can lead to carbon dioxide emissions. Carbon dioxide is emitted by farm equipment moving across the farm's fields during tilling, planting, the application of pesticides and fertilizers and harvest. Activities at animal confinement facilities in general are being developed on existing cultivated land, and would have little direct effect on CO_2 since the greenhouse gas emissions are already directly estimated on existing tilled land. Merced County, however, does not have a grading or other ordinance to guide existing tillage practices or the liming of soils to minimize effects of current practices. Indirectly, the expansion of a dairy operation would lead to more fuel consumption through electricity consumption, farming operations for food and manure disposal, and deliveries and general maintenance. The potential greenhouse gas effects of these activities will be estimated in terms of their equivalent CO_2 impacts.

Methane (CH_4). Methane, an odorless gas, is produced through the anaerobic decomposition of organic matter; it is emitted from a variety of both human-related (anthropogenic) and natural sources. Agricultural processes such as wetland rice cultivation, enteric fermentation in animals, and the decomposition of animal wastes emit methane, as does the decomposition of municipal solid wastes. Methane is also emitted during the production and distribution of natural gas and petroleum, and is released as a by-product of coal mining and incomplete fossil fuel combustion. Natural sources of methane include wetlands, termites, oceans, sediments, volcanoes, and wildfires (EPA 2023b).

[5] The pre-industrial period is defined as the time preceding the year 1750 (IPCC 2007).

While Methane has a Global Warming Potential (100-Year Time Horizon) [6] of 28 and is a potent climate pollutant, it has a short lifespan of approximately 12 years before it is broken down via oxidation and removed from the atmosphere, while carbon dioxide has a longer-lasting effect (EPA 2023a; Saunois et al. 2020).

In 2021, methane accounted for about 12 percent of all U.S. greenhouse gas emissions from human activities (EPA 2023a). Methane emissions in the United States decreased by 16 percent between 1990 and 2021. During this time period, emissions increased from sources associated with agricultural activities, while emissions decreased from other sources including landfills and coal mining and from natural gas and petroleum systems. It is estimated that 50-65 percent of global methane emissions are related to human-related activities (EPA 2023a).

Methane produced as part of the normal digestive processes of animals and manure management represent approximately 35.9 percent of total methane emissions from human-related activities in the United States in 2021 (EPA 2023b). Of the domestic animal types, emissions from dairy cattle in the United States accounted for approximately 25 percent of the total ruminant livestock methane generated (EPA 2023b). The relative proportion of methane sources may not be strictly applicable to Merced County, but the data provide some perspective. Sources of methane emissions associated with animal confinement facilities are further discussed below.

Animals. Methane is a natural by-product of animal digestion. During digestion, methane is produced through a process referred to as enteric fermentation, in which microbes that reside in animal digestive systems break down feed consumed by the animal. This methane is exhaled or belched by the animal, and accounts for the majority of emissions from ruminants. Ruminants, which include cattle, buffalo, sheep, goats, and camels, have higher methane emissions than other types of animals because of their unique digestive system. Ruminants possess a rumen, or large "fore-stomach," in which a significant amount of methane-producing fermentation occurs. Non-ruminant domestic animals, such as pigs and horses, have much lower methane emissions than ruminants because much less methane-producing fermentation takes place in their digestive systems. Approximately 200 species and strains of microorganisms are present in the digestive system of ruminant animals, although only a small portion, about 10 to 20 species, are believed to play an important role in ruminant digestion. The microbial fermentation that occurs in the rumen enables ruminant animals to digest coarse plant material that monogastric animals[7] cannot digest.

The amount of methane produced by domesticated animals depends primarily on the type of animal (i.e., ruminant or non-ruminant), the age and weight of the animal, and the quantity and quality of the feed consumed. The quality of the feed depends on the physical and chemical characteristics of the feed, and whether feed additives have been added to promote production efficiency. Other factors that influence methane emissions are the feeding schedule, and the activity level and health of the animal.

[6] Gases in the atmosphere can contribute to the greenhouse effect both directly and indirectly. The IPCC developed the Global Warming Potential (GWP) concept to compare the ability of each greenhouse gas to trap heat in the atmosphere relative to another gas. Carbon dioxide is used as a reference gas for GWP, with a value of 1.

[7] Monogastric animals have a mouth, esophagus, stomach, small intestines, large intestines, pancreas, and liver. Examples of monogastric animals include swine, dogs, monkeys, and humans.

Manure Decomposition. Manure decomposition is a process in which microorganisms derive energy and material for cellular growth by metabolizing organic material in manure. When decomposition occurs without oxygen (i.e., anaerobic decomposition), methane is an end product of the process (EPA 2023a).

In general, livestock manure is highly conducive to methane generation due to its high organic content and large bacterial populations. In addition, the specific methane-producing capacity of livestock manure depends on the specific composition of the manure, which in turn depends on the composition and digestibility of the animal diet. The greater the energy content and digestibility of the feed, the greater the methane-producing capacity of the resulting manure. For example, feedlot cattle eating a high-energy grain diet produce highly biodegradable manure with a high methane-producing capacity. Range cattle eating a low energy forage diet produce a less biodegradable manure with only half the methane-producing capacity of feedlot cattle manure (EPA 2023b). While a higher quality feed results in lower methane emissions from enteric fermentation and higher methane emissions from manure decomposition, enteric fermentation is a larger source of greenhouse gas emissions, and increasing the quality of feed generally results in a net reduction in greenhouse gas emissions on a dairy (EPA 2023b).

The principal factor affecting the methane actually produced from manure decomposition is manure management and climate. Methane production will only occur under anaerobic conditions, such as anaerobic lagoons. Manure that is managed in liquid form under warm conditions for an extended period of time promotes increased methane formation. Manure managed as dry material (aerobic conditions) in a cold climate does not readily produce methane.

From 1990-2021, methane emissions from manure management have increased by 69 percent in the United States. Swine and dairy cow manure account for the majority of this increase with an increasing trend of using liquid systems for manure management, which tends to produce greater methane emissions. The increase in liquid systems is the combined result of a shift to larger facilities, all of which tend to use liquid systems. Also, new regulations limiting the application of manure nutrients have shifted manure management practices at smaller dairies from daily spread to manure managed and stored on site (EPA 2023b).

Nitrous Oxide (N_2O). Anthropogenic sources of N_2O emissions include agricultural soils, especially the use of synthetic and manure fertilizers; fossil fuel combustion, especially from mobile sources; adipic (nylon) and nitric acid production; wastewater treatment and waste combustion; and biomass burning. The atmospheric concentration of N_2O in 2021 was about 334 ppb, which represents an increase of 24 percent since 1750 (EPA 2023b). The majority of this increase has occurred after the pre-industrial period and is most likely due to human activities. Nitrous oxide is removed from the atmosphere primarily by the photolytic action of sunlight in the stratosphere. N_2O has an atmospheric lifetime of more than 100 years, and over a 100-year period, each molecule of N_2O has a direct global warming potential of about 265 times that of a single molecule of CO_2 (EPA 2023b).

Sources of N_2O emissions associated with animal confinement facilities are discussed below.

Manure Decomposition. Manure decomposition is a process in which microorganisms derive energy and material for cellular growth by metabolizing organic material in manure. When decomposition occurs without oxygen (i.e., anaerobic decomposition), methane is an end product of the process (EPA 2023b). N_2O is also produced during the manure decomposition process. Production of N_2O during the storage and treatment of animal wastes occurs by combined nitrification - denitrification[8] of nitrogen contained in ammonia (NH_3) that is present in the wastes. The quantity of N_2O produced during manure decomposition depends on the manure and urine composition, the type of bacteria involved in the decomposition process, and the amount of oxygen and liquid present in the manure management system. The amount of N_2O ultimately released depends on the management system and the duration of waste management. Indirect N_2O emissions are produced when N is lost from the system through volatilization (as NH_3 or NO_X) or through runoff and leaching (EPA 2023b).

Agricultural Soil Management. The management of agricultural soils produces the majority of N_2O emissions in the United States. A number of agricultural activities add nitrogen to soils, thereby increasing the amount of nitrogen available for nitrification and denitrification, and ultimately the amount of N_2O emitted. These activities may add nitrogen to soils either directly or indirectly. Direct additions occur through various cropping practices (i.e., application of synthetic and organic fertilizers, daily spread of animal wastes, production of nitrogen-fixing crops, and incorporation of crop residues), and through animal grazing (i.e., direct deposition of animal wastes on pastures, range, and paddocks by grazing animals). Indirect additions occur through two mechanisms: (1) volatilization of applied nitrogen (i.e., fertilizer and animal waste) and subsequent indirect emissions of that nitrogen as NH_3 and NO_x; and (2) surface runoff and leaching of applied nitrogen into surface water and groundwater (EPA 2023b).

A number of conditions can affect nitrification rates in soils, including water content, which regulates oxygen supply; temperature, which controls rates of microbial activity; nitrate or ammonium concentrations, which regulate reaction rates; available organic carbon, which is required for microbial activity; and soil pH, which is a controller of both nitrification and denitrification rates and the ratio of N_2O / N_2 from denitrification. These conditions vary greatly by soil type, climate, cropping system, and soil management regime. (EPA 2023b)

Activities at animal confinement facilities would have little effect on N_2O emissions from agricultural fields since all new and expanding facilities are assumed to be developed on existing cultivated land, animal wastes used as fertilizer would replace all or a portion of existing synthetic fertilizers used, and no feature of general best practices in the San Joaquin Valley would require the application of greater amounts of fertilizer than those currently used.

Black Carbon. Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Diesel particulate matter emissions are a major source of black carbon, primarily from developing countries.

[8] Denitrification is the process by which nitrates or nitrites are reduced by bacteria, which results in the release of nitrogen into the air. Nitrification is the process by which bacteria and other microorganisms oxidize ammonium salts to nitrites, and further oxidize nitrites to nitrates.

Carbon Sequestration

Carbon storage (sequestration) occurs in forests and soils primarily through the natural process of photosynthesis. Atmospheric carbon dioxide is taken up through leaves and becomes carbon in the woody biomass of trees and other vegetation. Approximately half of vegetation mass (biomass) is carbon. When vegetation dies and decays, some of this carbon makes its way into soils; however, carbon (in the form of carbon dioxide) can return to the atmosphere when agricultural tillage practices stir up soils or when biomass decays and/or burns. Forests and agricultural soils can both sequester and release carbon dioxide, and the net effect is dependent upon site-specific circumstances.

The term "sinks" is used to refer to forests, croplands, and grazing lands, and their ability to sequester carbon. Agriculture and forestry activities can release CO_2 to the atmosphere. Therefore, a carbon sink occurs when carbon sequestration is greater than carbon releases over some time period. Carbon sequestration rates vary by tree species, soil type, regional climate, topography, and management practice.

Carbon can be sequestered in forests/woodlands over decades or even centuries, until mature ecosystems reach a stage of carbon saturation; however, as natural decay or other events such as fire or harvesting occur, carbon is released back to the atmosphere as carbon dioxide. Carbon from forests can be stored in wood products like furniture and housing lumber for up to several decades. However, ultimately much of the carbon in wood products eventually decays and can be released back to the atmosphere as carbon dioxide (EPA 2023b). And if carbon sequestration practices in agriculture, such as reduced tillage, are abandoned or interrupted, most or all of the accumulated carbon can be quickly released. When the carbon cycle transfers more carbon to the atmosphere this can lead to global warming. In the United States, forest sequestration of carbon offsets approximately 13 percent of GHG emissions (EPA 2023b).

CALIFORNIA GREENHOUSE GAS EMISSIONS

California carbon dioxide equivalent (CO_2e) emissions were approximately 369.2 million metric tons in 2020[9], 35.3 million metric tons CO_2e lower than 2019 levels and 61.8 million metric tons CO_2e below the 2020 GHG Limit of 431 million metric tons CO_2e[10]. Since the peak level in 2004, California's GHG emissions have generally followed a decreasing trend. In 2014, statewide GHG emissions dropped below the 2020 GHG Limit and have remained below the Limit since that time.

Of 2020 GHG emissions in California, approximately 36.8 percent is from transportation, 19.9 percent is from industry, 16.1 percent from electric power generation, 10.5 percent residential and commercial uses, 5.8 percent High GWP (refrigerants), and 2.4 percent recycling and waste[11]. Agriculture, including fuel use by agricultural support activities, comprises 8.6 percent of the state's GHG emissions. Approximately 71 percent of agricultural sector GHGs are emitted from livestock. Crop production accounted for 21 percent of agriculture emissions in 2020. (CARB 2022b)

Agricultural activities are the dominant source of GHG emissions within Merced County (69 percent of total 2010 emissions in unincorporated Merced County, and 42 percent of total 2010

[9] As of May 2023, the 2000-2020 greenhouse gas emissions inventory is the most recent one available for California.
[10] The 2019 to 2020 decrease in emissions is likely due in large part to the impacts of the COVID-19 pandemic.
[11] 2020 GHG Emissions by Scoping Plan Category.

countywide emissions, including the incorporated cities). Transportation activities are the second leading source of GHG emissions (23 percent in unincorporated Merced County and 39 percent in total Merced County during 2010) (Merced County 2013).

AGRICULTURE AND ADAPTATION

With climate change and the increased potential for more frequent and severe droughts, less water stored in the Sierra snowpack, increased pests and invasive species, heat waves, and other impacts, California agriculture is vulnerable to increasing risks. Agencies, industry leaders, and farmers are exploring adaptation strategies to address the changing climate. In addition, there are opportunities in agriculture for reducing greenhouse gas emissions, including research efforts on N_2O emissions, coordinated regulatory response to siting of dairy digesters, and the development of offset protocols. As discussed in the regulatory setting of this Chapter, mitigation and adaptation plans are being developed to protect agriculture and the food supply. For the purposes of this project-level dairy EIR, project impacts will focus on GHG emissions from existing and proposed farm and dairy operations.

8.2.2 ELECTRICITY AND ENERGY USE IN CALIFORNIA DAIRIES

There are several major electric energy use categories generally found on California dairies (Southern California Edison 2004), not including feed production. These categories and the approximate distribution of electric energy use on a representative dairy farm in California include:

- Milk Harvest (12%)
- Lighting (13%)
- Waste Handling (24%)
- Compressed Air Systems (4%)
- Milk Cooling (27%)
- Air circulation and Ventilation (10%)
- Water Systems (8%)

Milk cooling and waste handling consume the most energy of all use categories. Washing and water heating is not included in the distribution because fossil fuel is primarily used to heat water (Southern California Edison 2004).

The Energy Utilization Index (EUI) refers to the amount of energy used to accomplish a particular activity or process. EUIs can help to determine overall dairy farm energy efficiency and identify process or equipment changes that would result in a reduction of energy consumption. A typical dairy's EUI can vary greatly depending on the size of the farm, housing and milk harvest methods, use of energy-conserving technology, and the use of electric technologies for lighting, ventilation/air circulation, waste, and material handling. EUIs have been found to range from as low as 300-400 kWh per cow-year to over 1,500 kWh per cow-year. Studies of electricity use on dairies in the San Joaquin Valley show average electrical energy use is about 504 kWh per cow-year (Merced County 2013). Lower EUI values are typically found on large freestall, milking parlor dairies that use: (1) high-efficiency milk cooling systems, (2) variable speed drive vacuum and milk pumps, (3) heat recovery, as this affects milk cooling, (4) high-efficiency lighting, (5) limited application of air circulation equipment, (6) less complicated waste handling systems, (7) efficient water heating (for electric water heating), (8) efficient farmstead layouts, and (9) effective cost control methods. Farms with high EUIs generally indicate: (1) smaller production units, (2) lower production efficiencies, and (3) older, less efficient equipment (Southern California Edison 2004). Incorporation of more energy-efficient systems can be used to effectively manage energy costs and increase profitability.

8.3 ENVIRONMENTAL EFFECTS

8.3.1 SIGNIFICANCE CRITERIA

As set forth in Appendix G to the State CEQA Guidelines, Section VIII, Greenhouse Gas Emissions, and Section VI, Energy, this analysis considers impacts to be significant if implementation of a proposed action would:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. (*VIII.a*)
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. (*VIII.b*)
- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. (*VI.a*)
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency. (*VI.b*)

SIGNIFICANCE THRESHOLDS

In determining the significance of a project's impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, or with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction of greenhouse gas emissions, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is consistent with those plans, goals, or strategies (CEQA Guidelines Section 15064.4 (b)(3).) The legislative or regulatory programs establish standards that are independent of the impact analysis described in the CEQA Guidelines (see provisions beginning with Section 15126). The 2022 Scoping Plan Update is the State program for GHG emission reductions. While the 2022 Scoping Plan identifies various actions and concepts that would lead to an increase in climate-smart agricultural management actions, at this stage it does not include regulatory requirements that would reduce greenhouse gas emissions. At this time, there is no regional or Merced County greenhouse gas reduction plan or climate action plan. Therefore, there is no local, regional, or statewide plan regulating global warming by which the proposed project can be measured.

In an effort to capture both large increases in GHG emissions and large emitters of GHGs, for the purposes of this EIR, the project's contribution to GHG emissions would be considered significant if either of the following apply:

- The increment of increase of the project's GHG emissions would be greater than 10,000 t/yr of CO_2e.
- The increment of increase of the project's GHG emissions would be less than 10,000 t/yr of CO_2e, but the total project facility's GHG emissions (existing plus project increment) would be greater than 25,000 t/yr of CO_2e (or greater than a 3,200-mature-cow dairy herd as based on the EPA's Final Mandatory GHG Reporting Rule).

These numeric thresholds would only be applicable to dairies, and would not apply to industrial, commercial, residential, or other development types for projects permitted by Merced County (see Appendix F-4 of this EIR for a detailed discussion of GHG emissions thresholds for the project). However, if the dairy implements a voluntary Scoping Plan methane mitigation strategy for dairy and livestock operations, such as dairy digesters and manure management systems, then the project's contribution to GHG emissions would be considered less than significant.

State CEQA Guidelines Section 15126.2(b) requires that if analysis of a project's energy use shows that that the project may result in significant environmental effects due to wasteful, inefficient, or unnecessary consumption use of energy, or wasteful use of energy resources, then mitigation measures must be included to reduce that impact. CEQA Guidelines Appendix F describes the types of information and analyses related to energy conservation to be included in an EIR. Energy conservation is described in terms of decreased per capita energy consumption, decreased reliance on natural gas and oil, and increased reliance on renewable energy sources. To assure that energy implications are considered in project decisions, EIRs must include a discussion of the potentially significant energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

8.3.2 ENVIRONMENTAL IMPACTS

All project-related construction and operational activities as described in Chapter 3, *Project Description*, would generate some level of greenhouse gas emissions and/or energy use, and thus are being assessed as part of this EIR. Naturally occurring greenhouse gases include water vapor, carbon dioxide, methane, nitrous oxide, and ozone. There are also several gases that, although they do not have a direct radiative forcing effect, do influence the formation and destruction of ozone, which does have such a terrestrial radiation absorbing effect. These gases, referred to as ozone precursors, include reactive organic gases (ROG/VOC) and oxides of nitrogen. These latter two gases are evaluated in Impact AQ-3, found in Chapter 5, *Air Quality and Odors*, of this EIR.

Impact GHG-1: Greenhouse gas emissions from project construction and operation (Criterion VIII.a)

Construction and operation of the Vierra Dairy Expansion project would result in greenhouse gas emissions from direct and indirect sources. Because the proposed project would exceed established significance thresholds for GHG emissions, this would be a significant impact.

Construction activities associated with the Vierra Dairy Expansion project would result in short-term CO_2 emissions, a greenhouse gas. Construction-related emissions were calculated using CalEEMod Version 2020.4.0 (see Appendix G, *Health Risk Assessment and Ambient Air Quality Analysis* for construction modeling results). GHG emissions from site preparation and facilities construction for the proposed project would result in maximum annual emissions of approximately 307 metric tons of CO_2e over two years (see Table 8-1).

Table 8-1 Construction Related Greenhouse Gas Emissions

Construction Year	Greenhouse Gas Emissions (metric tons/year of CO_2e)
2022 Emissions (1)	307
2023 Emissions	224
Maximum Annual Emissions	**307**

Notes: Calculations completed in May 2022. CO_2e = carbon dioxide equivalents.

1 See CalEEMod calculation assumptions in Appendix A of the Health Risk Assessment and Ambient Air Quality Analysis included as Appendix G of this EIR. Construction would include 481,360 square feet of new structures.

Source: Trinity Consultants 2023, Planning Partners 2023.

Greenhouse gases associated with operations of confined animal and agricultural activities include methane, nitrous oxide, ozone, and carbon dioxide. Several sources of these greenhouse gases are associated with animal confinement facilities: animal metabolic activity and animal housing; manure decomposition in waste deposits, treatment and storage areas, and field applied manure; on-field cultivation; fuel consumption; electricity use; and feed cultivation and transport.

Milk production is the commercial dairy operation's single largest source of GHG emissions, at approximately 59 percent of total emissions. On the dairy farm, the most significant source of greenhouse gas emissions is the dairy cow: estimates of 35-80 percent (mean 50 percent) of GHG emissions are due to methane from enteric fermentation. Growing feed, both on dairies and crop farms, is milk's second most GHG-intensive process (Wightman 2008). The primary sources of these emissions include the production of commercial fertilizer, fuel use in machinery, and on-field production of nitrous oxide due to nitrification and denitrification of nitrogen (both chemical and organic) (Innovation Center 2008). Approximately 9-53 percent (mean 30 percent) of GHG emissions are from nitrous oxide emissions (manure management and nitrous fertilizers), and 16 percent of GHG emissions are from carbon dioxide coming from tractors, trucks, and electricity production (IDF 2009).

The digestibility of feed has a strong effect on the GHG emissions per pound of milk product; a 10 percent increase in feed digestibility in an intensively managed[12] system can reduce GHG emissions by approximately 10 percent (FAO 2010). In practice, however, the quality of the feed is interrelated with milk production and growth, so looking at the combined effect of changes in feed quality, milk production, and growth is more realistic. If an increase in milk production by 10 percent is assumed, parallel to the increased digestibility, the GHG emissions are reduced by 15.4 percent. In the situation where the growth rate is also increased, the GHG emissions are further reduced (FAO 2010). Today, many producers already reduce enteric methane emissions by maximizing feed efficiency and increasing production per cow. Despite the considerable methane emissions mitigation potential of enteric strategies like feed additives, little progress has been made, as few products with proven mitigation potential have become commercially available (CARB 2022).

The use of dairy manure digesters is often discussed as a method of reducing methane emissions from manure because it has been recognized as the most effective means of reducing animal-related emissions, which represent the most significant source of dairy-related GHG emissions. CDFA has awarded a total of $195 million for 117 dairy digester projects from 2015 through 2021. There are

12 Intensive dairy systems typically involve large numbers of animals raised on limited lands.

approximately 417 anaerobic digester systems in operation or under construction at commercial dairy farms in the United States, with 137 located in California (database updated August 24, 2022) (EPA 2022a). As set forth in Chapter 13, *Alternatives Analysis*, of this EIR, Alternatives 2 and 3 evaluate the environmental effects of the proposed project as modified to include a digester.

For an evaluation of electricity use and energy efficiency on the proposed Vierra Dairy Expansion project, please refer to Impact GHG-2.

Studies have shown that the use of best management practices, rather than the size or location of the dairy farm, makes the biggest difference in reducing GHG emissions (Paustian et. al. 2006). No provisions of the ACO or SJVAPCD regulations directly address methane or CO_2 emissions, but Chapter 18.64.050 U of the ACO applies to air emissions in general (see Appendix C). Because the decomposition of manure is one source of methane emissions, measures to comply with ROG limitations required by Chapter 18.64.050 U of the Merced County Code and a SJVAPCD Permit to Operate would also reduce methane emissions.

For a calculation of emissions from the dairy farm, this analysis considers emissions from on-site operations, including animal and manure management, vehicle sources, emissions from cropping activities, and secondary emissions from energy use on the farm. GHG emissions were estimated using available emission factors and basic calculator models. Based on the SJVAPCD dairy calculator (dated January 2020), GHG emissions from the herd would increase from 24,794 to 34,189 metric tons of CO_2 equivalents per year (see Appendix F-3). Additional GHG emissions resulting from increased on-site operations including mobile source emissions from truck trips and dairy operational equipment (such as the feed loader) is estimated at 123 metric tons CO_2e (see CalEEMod data in Appendix F). While there would be no direct emissions of GHG from energy use, increased electricity use for operations would result in secondary GHG emissions. Based on monthly energy use provided by the project applicant and emission factors provided by the EPA, secondary GHG emissions from electricity use would results in an increase of approximately 163 metric tons CO_2e per year over existing operations (see Appendix F-3 for GHG emission calculations from electricity use). GHG emissions from agricultural activities on project site cropland is estimated to result in an increase of 58 metric tons CO_2e annually. See Table 8-2 for a summary of increased GHG emissions as a result of the dairy expansion project.

Table 8-2 Greenhouse Gas Emissions from the Vierra Dairy Expansion – Increased Emissions from Animals and Manure Management, Vehicle Trips, Electricity Use, and Cropland

Increased Herd GHG Emissions (metric tons CO_2e/yr)	Increased On-Site Operations GHG Emissions (metric tons CO_2e/yr)	Increased Electricity Use GHG Emissions (metric tons CO_2e/yr)	Increased Farming GHG Emissions (metric tons CO_2e/yr)	Total Increment of Increased GHG Emissions (metric tons CO_2e/yr)
9,395	123	163	58	**9,739**

Notes: See Appendix F-3 of this EIR for calculations.
(1) GHG emissions from the expanded herd were estimated using the SJVAPCD dairy emissions calculator dated January 2020.
(2) GHG emissions from increased vehicle trips and on-site operations were estimated using CalEEMod Version 2020.4.0.
(3) Electricity use was based on information provided by the project applicant and extrapolated for the expanded herd, and converted to GHG emissions using eGRID emission rates for California (https://www.epa.gov/egrid).
(4) GHG emissions from agricultural activities was estimated using Michigan State University's US Cropland Greenhouse Gas Calculator.

Source: Planning Partners 2023.

Based on the estimates included in Table 8-2, the dairy expansion would result in an overall increase of 9,739 metric tons CO_2e per year from existing operations, which is less than the 10,000 t/y CO_2e significance threshold. However, the estimated net emissions of 34,189 metric tons CO_2e per year for the herd would qualify as a major source of greenhouse gas emissions as established by the EIR significance threshold of 25,000 t/y CO_2e. The proposed expansion would house a total of 4,720 mature dairy cows, which is greater than the minimum average annual animal population of 3,200 mature dairy cows (not including calves and heifers) identified by the EPA greenhouse gas mandatory reporting regulation[13][14]. Since both the existing and proposed dairy herd would meet or exceed 3,200 mature cows as identified by the EPA as a major source threshold, this would be a significant impact.

Many water quality and soil health Best Management Practices (BMP) commonly used on a dairy farm are also good GHG emission reduction practices. The existing Vierra Dairy operations include the following GHG emission mitigation strategies to reduce GHG emissions from enteric methane, manure, and energy sources as identified by the CARB and other resource papers:

Enteric Methane	Manure	Energy
· Diet management	· Renewable fertilizers	· LED lighting
· Herd management	· Nutrient and water recovery	· Milk pre-cooling technology
· Cow comfort and well-being	· Solid separation	· Variable speed pumps

At this time, there is no adopted methodology specifically for mitigating GHG emissions for a dairy operation either locally or through the SJVAPCD. Further, as described in the regulatory setting above, the Legislature has determined that GHG emissions reductions from dairies statewide will remain voluntary through 2023. As set forth by CARB the recent *Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target* (March 2022), while the dairy and livestock sector has made significant progress, it must still achieve considerable methane emissions reductions to meet the 2030 target of 40 percent below 2013 levels. The report identifies two primary methods for reducing manure methane emissions, including installation of an anaerobic digester and alternative manure management practices. However, "the cost to procure biomethane can be about 10 times more expensive than fossil natural gas", and therefore incentives are needed for California's dairy sector to adopt these methane reduction strategies (CARB 2022a). Alternative manure management practices have also been difficult to move forward, since resultant emissions reductions are inconsistent across the same project types and difficult to quantify. Feed additives are an additional methodology for reducing enteric reductions that have made limited progress in overcoming both technical or market barriers; no feed additives with demonstrated long-term methane mitigation potential have been approved by the U.S. Food and Drug Administration and are commercially available (CARB 2022a). Should Best Management Practices for the reduction of GHGs from dairy operations be adopted, the Vierra Dairy Expansion would likely be required to meet those standards, as adopted by the State, SJVAPCD, or County.

[13] The Rule applies to livestock facilities with manure management systems, but does not require reporting of emissions of methane via enteric fermentation or land application of manure, which are included in proposed project calculations. However, the project cropland acts as a carbon sink and results in a reduction in net emissions.

[14] While the EPA is currently not implementing subpart JJ, Manure Management of the Mandatory GHG Reporting Rule, and dairies that appear to fall under this rule do not currently need to report, it is recommended that these dairy operators maintain records on their manure management systems in accordance with the Rule should they be requested for data in the future.

Because the proposed project would exceed 3,200-mature cows and established significance thresholds for GHG emissions even after the continued implantation of best management practices, this would be a significant impact.

Significance of Impact: Significant.

Mitigation Measure GHG-1a:
Implement Mitigation Measure AQ-3a, which requires implementation of all air quality provisions of the ACO and compliance with SJVAPCD Rules, several of which would also act to reduce methane emissions.

Mitigation Measure GHG-1b:
The installation of manure digesters to reduce methane emissions is included as a voluntary strategy for the agricultural sector in the CARB Scoping Plan. Because project emissions have been evaluated to exceed GHG significance thresholds of 25,000 t/y CO_2e, prior to the issuance of a building permit, the project sponsor shall complete a good faith effort to obtain funding in order to install a manure digester on the project site as set forth in Alternative 3, in Chapter 13, *Alternatives Analysis*, of this EIR. The project sponsor shall provide documentation of application to obtain financial assistance for the dairy digester to Merced County prior to issuance of a building permit.

Should adequate funding assistance be provided, and the digester is installed as set forth in Alternative 3, the applicant shall use the digester and the captured methane for energy use to displace fossil fuel use and reduce GHG emissions from the dairy. Implementation of this measure is contingent upon adequate state or other government funding and technological and economic feasibility in accordance with SB 1383.

Potential Environmental Effects of Measures: On-site facilities necessary to comply with the above measures would be constructed within the overall facility footprint of the Vierra Dairy Expansion site as assessed in Chapters 5-11 of this EIR. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR, and as discussed under Alternative 3, in Chapter 13, *Alternatives Analysis*.

Significance after Mitigation: Significant and Unavoidable.

Even after imposition of the identified mitigation measures, this would be a significant and unavoidable impact for the following reasons: the measures required by the above Mitigation Measure GHG-1a would not be sufficient to reduce project GHG emissions below the threshold of significance; the dairy digester cited in Mitigation Measure GHG-1b may be considered financially infeasible without financial assistance, and even if the project applicant applied for funding assistance, funds may not be awarded. Further, installation of the dairy digester still may not reduce project GHG emissions below the threshold of significance. The ultimate success of implementing Mitigation Measure GHG-1b is contingent on a favorable award of financial incentives to construct the digester; however, Merced County is unable to control the outcome of the financial award and construction of the digester, and hence the effectiveness, of the measure.

CEQA Guidelines Section 15130(c) states that with some projects, the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis. Global climate change is considered a cumulative impact, since the causes and effects are not just regional or statewide, but also

worldwide. While this analysis uses a numeric threshold to assist in determining significance pursuant to CEQA, given the uncertainties in quantifying the impact of any single project on global warming and climate change, and also the uncertainties in quantifying GHG reduction from project design and BMPs, any further feasible emissions reductions would be accomplished through CARB regulations adopted pursuant to AB 32.

Implementation and Monitoring: Implementation of these measures would be the responsibility of the project applicant. The Merced County Community and Economic Development Department shall monitor for compliance. Mitigation Measure GHG-1a shall be implemented prior to final inspection or prior to initiation of new operations and throughout ongoing operations. Mitigation Measure GHG-1b shall be implemented prior to issuance of a building permit and throughout ongoing operations.

Impact GHG-2: Wasteful or inefficient consumption of energy (Criterion VI.a)

Construction and operation of the Vierra Dairy Expansion project would result in the use of electricity, natural gas, and other fossil fuels. Because the operations at the Vierra Dairy Expansion would be considered energy efficient, and energy efficiency measures would be incorporated into project operations, this would be a less-than-significant impact.

Proposed dairy and agricultural operations at the Vierra Dairy Expansion project site require the use of electricity, natural gas, and other fossil fuels associated with agricultural production. Development of the proposed dairy project would entail energy consumption that includes both direct and indirect expenditures of energy. Indirect energy would be consumed by the use of construction materials for the project (e.g., energy resource exploration, power generation, and mining and refining of raw materials into construction materials used, including placement). Direct energy impacts would result from the total fuel consumed in vehicle propulsion (e.g., construction vehicles, and increased use of heavy equipment and other vehicles using the facility). No unusual materials, or those in short supply, are required in the construction of the project.

Dairy operators continue to seek ways to become more efficient, since electricity costs can determine whether the dairy farm can remain competitive. Electric companies may provide rebates on a range of energy efficient equipment, including irrigation, mechanical controls, ventilation, and lighting. There are several options for dairy farms to improve energy efficiency, depending on the farm operations and overall needs. In the milking process, energy efficiency can be improved for refrigeration and vacuum pumps. Plate coolers, which capture heat from milk and transfer it to cold water, can reduce cooling time by as much as 15 to 30 minutes. The warmed water can be used to preheat water for other uses, such as wash down of cattle and milking parlors. Also, a refrigeration heat exchanger transfers the excess heat from the milk cooler to preheat water for use in the barn. A variable frequency pump/drive adjusts energy use to meet the milking need and can result in energy savings of 50-80 percent. Variable frequency drives can be used for varying loads such as milk pumps, vacuum pumps, and ventilation fans (UMass Extension 2011).

Lighting on the dairy farm is another opportunity for energy and cost savings. Increased lighting can increase milk production and maintain reproductive performance: dairy cows given 16 hours of light continuously each day will increase milk production from 5 to 16 percent, and increase feed intake by about 6 percent compared to cows receiving 13.5 hours or less of light. Changing electric lighting

from incandescent lights to fluorescent, high pressure sodium lamps, or Light Emitting Diodes (LED) can provide all the lighting that the animals need, at a reduced cost of operation, and with a large increase in energy conservation. Switching from incandescent to more energy efficient lights can save energy needed for lighting by 75 percent. (USDA 2006)

To reduce electricity use and increase efficiency, conducting energy audits on a dairy and acting on those recommendations have generated significant cost savings and reduced GHG emissions from energy use. The energy efficiency savings identified in a farm energy audit vary greatly, and are not correlated with farm size. However, it is estimated that, as a rough average, farms across the U.S. may be able to achieve 10 percent to 15 percent energy savings through a farm energy audit (Innovation Center 2008).

At the Vierra Dairy, several energy efficiency upgrades have been incorporated into existing operations at the active dairy facilities. The milking system operates with a vacuum pump with a variable speed drive motor, there is a plate cooler system for milk cooling, and the dairy uses a compressor heat recovery unit. During the day, only natural lighting is necessary. Night lighting at the facility includes LED lighting on freestall barns and the milking parlor. These features of the Vierra Dairy operations and proposed improvements would be considered relatively energy efficient (EnSave 2012).

Based on monthly energy use provided by the project applicant, energy use at the dairy, including farming operations, was estimated to be 2,748,010 kWh annually, which calculates to 491 kWh per cow-year for existing operations. This energy use is considered low, but within the range of normal for this size of operation with equipment upgrades in the San Joaquin Valley. As discussed in Section 8.2.2, the average electricity use on dairies in Merced County is about 504 kWh per cow-year, which is rather efficient compared to the high range of 1,500 kWh per cow-year found on other California dairies. Because the dairy uses less energy per cow-year than the average for the region and the State, the Vierra Dairy operations would be considered energy efficient.

Considering the equipment upgrades, the energy requirements of the dairy farm would be considered efficient. Also, while the proposed dairy expansion would result in an increase in energy use, there could be a small increase in energy efficiency since larger farms generally use machines more efficiently, providing some reduction in the machinery required per unit produced (USDA 2016).

Agricultural operations at the dairy farm provide additional opportunity for energy efficiency, though modifications would not be required since the existing operations would be considered energy efficient. The irrigation/tailwater pumps are 6-8 years old and do not have variable speed motors. Regular testing of the irrigation pumps for pumping efficiency is a good way to help determine if it is time for a pump upgrade. Based on the model year of the existing tractor fleet, at least two of the five loaders and tractors have Tier 3 or Tier 4 engines. Newer tractors and trucks with Tier 3 or Tier 4 engines drastically reduce smoke and smog (particulate matter (PM) and Nitrogen Oxides (NO_X)). Even with older equipment, regular maintenance and other practices will help tractors perform more efficiently and reduce fuel use. These practices include: replacing air and fuel filters regularly; checking tire pressures frequently, and replacing worn tires; using proper ballast for each operation; not idling diesel engines over 10 minutes; cleaning dirty fuel injectors; keeping ground-engaging tools sharp; using the right tractor for the job (match the horsepower to the load); combining trips whenever possible, and by modifying equipment if necessary (Cornell 2012; EnSave 2012).

Because the operations at the Vierra Dairy Expansion would be considered energy efficient, and energy efficiency measures would be incorporated into project operations, the dairy operations at the Vierra Dairy Expansion would be considered energy efficient. This would be a less-than-significant impact.

Significance of Impact: Less than significant.

Mitigation Measure GHG-2: None required.

Impact GHG-3: Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency (Criteria VIII.b and VI.b)

Implementation of the Vierra Dairy Expansion project would not be inconsistent with the California Air Resources Board's Climate Change Scoping Plan since standards and required actions for the reduction of greenhouse gas emissions and energy efficiency in the agricultural sector have not currently been adopted. Therefore, the proposed dairy would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions or promoting renewable energy or energy efficiency, and this would be a less-than-significant impact.

The CARB's Climate Change Scoping Plan represents the primary plan to reduce GHG emissions and promote alternative energy use throughout California. This Plan is designed to reduce anthropogenic greenhouse gas emissions by 85 percent below 1990 levels no later than 2045. Due to limited research, and the wide variety of farm sizes, animals, and crops produced, there are few emission reduction or carbon sequestration strategies that can be generally applied to the agricultural sector. The 2022 Scoping Plan includes discussion for the first time of the Natural and Working Lands sectors as both sources of emissions and carbon sinks. The key recommended actions in the Scoping Plan for croplands include increasing climate smart agricultural practices and increasing organic agriculture. While 2022 Scoping Plan identifies various actions and concepts that would lead to an increase in climate-smart agricultural management actions, at this stage it does not include regulatory requirements; the authority to reduce GHG emissions via measures relating to natural and working lands largely lies with state, regional, and local agencies, along with the Legislature and its budgeting choices. (CARB 2022)

Reasonably foreseeable compliance responses associated with the agriculture sector recommendations consist of nitrogen management, manure management, soil management practices, water and fuel technologies, and land use planning to enhance, protect, and conserve lands in California. Senate Bill 1383: Short-lived Climate Pollutants (2016) includes regulations to reduce methane emissions from livestock manure and dairy manure management operations by up to 40 percent below the dairy sector's and livestock sector's 2013 levels by 2030, including establishing energy infrastructure development and procurement policies needed to encourage dairy biomethane projects. The regulations will remain voluntary at least until January 1, 2024 (CARB 2017, 2022).

The GHG gas reduction plans and supporting regulations cited above and in the regulatory setting of this chapter contain strategies that would result in increased energy efficiency or support renewable energy on dairy farms. For example, SB 1383 requires the establishment of energy infrastructure development and procurement policies needed to encourage dairy biomethane

projects to reduce methane emissions from livestock and dairy manure management operations by up to 40 percent below the sector's 2013 levels by 2030. The Scoping Plan, SB 1383, and other GHG emissions reduction, renewable energy, and energy efficiency plans and regulatory measures do not include regulatory requirements immediately applicable to the agricultural sector; rather, as a result of these plans, agencies may establish rules in the future that could apply to the proposed dairy project. Any future dairy project would have to go through the local permitting process, and would have to adhere with the rules in place at that time.

Mandatory implementation of digesters as a mitigation measure is considered economically infeasible without financial incentives to offset the significant costs, and would be inconsistent with the Scoping Plan's designation of digesters as a voluntary approach. There is no requirement that the proposed project emissions be reduced by the same percentage as the statewide percentage in order for the state to achieve these targets. Therefore, the proposed project's GHG emissions increases do not conflict with the Scoping Plan's provisions to meet the statewide targets.

Currently, there are no state, regional, or local policies or requirements in place that are specifically applicable to the project that would result in the reduction of greenhouse gas emissions or the promotion of renewable energy or energy efficiency. Because standards for the reduction of greenhouse gas emissions or increases in energy efficiency in the agricultural sector are not currently in place, the proposed project would not conflict with any plans or regulations adopted for the purpose of reducing the emissions of greenhouse gases or promoting renewable energy or energy efficiency.

Significance of Impact: Less than significant.

Mitigation Measure GHG-3: None required.

This page intentionally
left blank.

9 NUISANCE CONDITIONS FROM INSECTS

This chapter provides an evaluation of the generation and dispersal of nuisance insects at the proposed Vierra Dairy Expansion project. As established in the Initial Study for the proposed project (see Appendix A, *Notice of Preparation and Initial Study*), operation of the Vierra Dairy Expansion project may result in the potential for nuisance conditions related to insects. Additional potential health hazard assessment criteria have been previously evaluated in the Initial Study/Notice of Preparation (IS/NOP) and will not be evaluated further in this chapter (these less-than-significant impacts are briefly summarized in Section 9.3.1 below).

The following evaluation implements, and is consistent with, mitigation measures and study protocols adopted by Merced County in its certification of the 2030 Merced County General Plan EIR in addition to the EIR for Revisions to the Animal Confinement Ordinance (ACO) and its approval of the ACO.

9.1 REGULATORY FRAMEWORK

9.1.1 MERCED COUNTY MOSQUITO ABATEMENT DISTRICT

The Merced County Mosquito Abatement District is responsible for implementing and enforcing mosquito control measures countywide. Mosquito Abatement Districts are established in accordance with the provisions of California Health and Safety Code Section 2000 et seq. The mission of the Mosquito Abatement District is to provide area-wide mosquito control, prevent mosquito-borne disease, and reduce economic loss and discomfort from mosquitoes.

The Merced County Mosquito Abatement District provides the following guidelines for the construction and management of dairy wastewater systems to prevent significant mosquito production (Bakken, *pers. comm*. 2021):

- Wastewater holding ponds should not exceed 100 feet in width;
- All dairy wastewater holding and solids separator ponds should be surrounded by an access road at least 14 feet in width. The road must be accessible at all times to provide for the use of vehicle-mounted mosquito control equipment;
- All fencing around wastewater and solids ponds should be placed on the outside of the 14-foot lanes with gates to provide easy access.
- All four interior banks of holding and separation ponds should be graded 1:1 or steeper for the first ten feet, soil type permitting, but no greater than 2:1.
- Two or more separator ponds should be used. These ponds should not be more than 60 feet in width.
- No drainage lines should by-pass the separator ponds, except those that provide for normal corral run-off. All such drain inlets must be sufficiently grated to prevent the accumulation of solids in the holding ponds.
- Floatage of any solid substance that could provide harborage for immature mosquito stages should be kept out of all wastewater holding ponds. Mechanical agitators may be very helpful in this regard.

- Prevent vegetative growth from all areas of the wastewater and solids separation ponds. This includes access lanes, interior pond embankments, and any weed growth that might become established on pond surfaces.
- Dairy wastewater discharged for irrigation purposes shall be managed so that it does not stand for more than three days. Discharges that stand for more than three days could cause severe mosquito emergence.

9.1.2 MERCED COUNTY

The Merced County Division of Environmental Health (DEH) is responsible for implementing and enforcing fly abatement measures countywide. The County's primary fly abatement tool for animal confinement facilities is the ACO.

MERCED COUNTY ANIMAL CONFINEMENT ORDINANCE

The ACO includes regulation of potential health hazards, including numerous requirements for vector control management. These provisions include design and management guidelines for the construction of retention ponds and settling basins to prevent excessive fly or mosquito breeding, and to reduce the potential impact of insects to adjacent residents. In addition, the EIR prepared for the ACO contains mitigation measures to address potential impacts from nuisance flies to be implemented during environmental review of animal confinement facility projects such as the Oliveira Dairy Expansion project. Mitigation measures adopted in the EIR for the ACO include:

- Measures to be applied on a site-specific basis by the DEH, including Best Management Practices and sanitation practices;
- Measures to control fly populations if nuisance conditions are reported to the DEH, including biological and chemical pest control; and,
- Measures to ensure the remedy of nuisance conditions within a specified period of time.

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

9.2 ENVIRONMENTAL SETTING

9.2.1 PROJECT SETTING

The existing Vierra Dairy is located on the northwest corner of Williams Avenue and Washington Road in the Hilmar area of the County (for additional project area information, see Chapter 3, *Project Description*). There are five residences located at the Vierra Dairy facility. There are off-site single-family residences located within the windshed of the dairy (defined as an area of 1,320 feet upwind to 2,640 feet downwind of the periphery of the animal facility) (see Figure 3-5). There are six off-site residences are located within 1,000 feet of active areas of the dairy (see Figure 3-8 in Chapter 3, *Project Description*). The community of Hilmar lies approximately 2.5 miles to the east-northeast of the existing active dairy facilities. There are additional dairy facilities in the vicinity of the project site, including one facility located approximately 0.1 miles to the north and another 0.25 miles to the east of the project site).

NUISANCE FLIES

Nuisance flies are commonly associated with confined animal agriculture facilities such as dairies because they breed in the manure, animal feed, and other organic materials found on these facilities. Nuisance flies are known to cause significant economic losses in the form of reduced milk yields, increased hide damage, and higher production costs due to the nuisance and discomfort they cause to both animals and facility employees. Furthermore, nuisance flies have been shown to carry a large number of disease-causing pathogens such as *Salmonella* bacteria and *Trachoma* virus (bovine pink eye), and may be responsible for infecting animals or people with these pathogens (Gerry 2008).

Some nuisance flies are blood feeders and can inflict a painful bite while feeding on animals or humans. Blood feeding (or biting) flies include the stable fly and horn fly. Other flies do not bite (non-biting flies), but instead feed on body secretions or liquefied organic matter. Non-biting flies include the housefly, face fly, and garbage fly. Common nuisance flies and their characteristics are listed in Table 9-1.

Table 9-1 Common Nuisance Flies

Species	Primary Breeding Location(s)	Larval Habitat	Primary Season
Housefly (*Musca domestica*)	Animal confinement facility, residential	Garbage, fresh manure, dry manure, silage	Warm seasons
Face Fly (*Musca autumnalis*)	Animal confinement facility	Fresh, undisturbed manure	Spring/fall; tend to invade homes in fall
Little Housefly (*Fannia canicularis*)	Poultry operations	Fresh poultry manure	Spring/fall
Stablefly (*Stomxys calcitrans*)	Stables	Wet manure with vegetation (e.g., horse manure)	Mid to late spring
Garbage Flies (*Phaenicia, Calliphora, Phormia, and Ophyra spp.*)	Residential	Garbage	Warm seasons

Source: Merced County, Revised DEIR for the Animal Confinement Ordinance, 2002.

Different species of nuisance flies are most predominant during different seasons of the year. The length of time required to complete the development from egg to adult is temperature-dependent, and may be as short as seven days during the summer months. Nuisance flies have a life cycle comprised of the following stages: egg, three larval, pupal, and adult. Eggs are laid on wet substrates, especially dung pats and manure or wet/rotting feed, hay, and bedding straw, where the larvae can feed on food particles found on the substrate. A single female can lay hundreds of eggs during her life.

It is important to note that fly larvae are not capable of developing in truly aqueous habitats – they need wet but not overly wet substrates. The third and final (largest) larval stage is called the "wandering stage." During the wandering stage, fly larvae will leave the wet developmental substrate to find a dry area where they can pupate (develop into the pupal stage). The pupal case will vary in color from light brown to red to black depending upon the age of the pupa, and superficially will look like a rodent dropping except that it is segmented and well-rounded on both ends. Within the confines of the pupal case, the developing fly will undergo further changes to become a winged adult fly that will eventually emerge from the pupal case and disperse from the site.

Adult flies are generally active during daylight hours and inactive at night. During the day, flies may be noted resting on vertical surfaces such as walls and support structures. Flies will preferentially rest

on white (or light colored) surfaces that are in direct sunlight on cold days or in shade on hot days. Most nuisance flies are known to disperse from their development sites into surrounding areas. However, the distance and direction of dispersal are not well understood and are likely determined by many environmental and geographical conditions. Non-biting nuisance fly species are likely to disperse further from the dairy site than those fly species that require animal blood meals. The habitat surrounding a dairy site will likely also play a role in the distance of nuisance fly dispersal. Nuisance flies will likely disperse further in open habitats typical of rangeland and low agricultural crops than they will in urban or forested areas that contain substantially more vertical structure on which flies may rest (Gerry 2008).

At an animal confinement facility, proper design and manure management can significantly decrease fly populations. Because all nuisance flies require wet manure or organic matter (feed, straw, etc.) for development, the number of flies that successfully develop into adults can be reduced by ensuring that these substrates remain dry, or dry very quickly. Fly control at animal confinement facilities includes both housekeeping and pest control measures. Housekeeping measures include manure management, and management of feed and commodity areas. Such management often includes cleanup of spilled feeds and manure at corral edges. Biological controls can include predators of eggs and instars, parasites, and competitors. Operators should avoid the application of pesticides directly to manure because beneficial insects are probably more susceptible than flies, and their loss could result in a fly population explosion. Chemical control can be part of an Integrated Pest Management Program, but should be supplemental to sanitation practices and be used only to control fly outbreaks (Gerry 2008). Several strategies for dairy facility management to decrease breeding success of nuisance flies are contained in Appendix E, *Management of Nuisance Flies: Dairy Design and Operational Considerations.*

MOSQUITOES

Mosquitoes may be associated with animal confinement facilities, especially those that flush manure into wastewater storage lagoons. In addition to transmitting various severe diseases, mosquitoes cause great annoyance and economic loss. Nuisance mosquitoes affect human comfort and efficiency, cause weight loss and death of domestic animals, and reduce milk production (Lawler, S. P. and Lanzaro, G.C 2005).

Mosquitoes are best known for the biting habit of females, which must have a blood meal for egg production. The beak of the male mosquito is dull and unable to penetrate the skin of humans or animals. Their main diet consists of fruit and plant juices.

The three dominant genera of mosquitoes in California are *Aedes, Anopheles,* and *Culex*. The *Aedes* and *Ochlerotatus* mosquitoes are also called the "floodwater mosquitoes," since they usually occur in areas that are subject to intermittent flooding. These areas include irrigated pastures and orchards, riverbanks, dry lakes, and containers with fluctuating water levels. The most common genus in the project area is *Culex*. Their larvae occur in almost any water source but prefer foul water, including septic tanks, dairy ponds, industrial wastes, catch basins, street gutters, artificial containers, stagnant pools, and even flower pots (CDPH 2023).

Mosquitoes are insects that have a complete metamorphosis and therefore go through four basic stages to develop to an adult. These stages are: egg; larval; pupal; and adult. The larvae and pupae are

the aquatic forms of the mosquitoes. They do not need a lot of water to develop, but cannot breed in areas that are merely damp.

The type of egg varies according to the mosquito genera. *Aedes* is a so-called floodwater mosquito that occur in areas that have a dry and wet period, such as irrigated pastures. They lay their eggs on damp ground that will be flooded later. Therefore, those eggs have to withstand the dry period. The other three genera lay their eggs on the surface of stagnant water, where they hatch within 1-2 days. *Culex* mosquitoes lay them in clumps of about 100-200 eggs, the so-called egg rafts, which float on the water. *Anopheles* on the other hand, lay single eggs, which have individual floating devices on the sides of each egg.

The larvae develop in four stages, which are called "instars." They are active free-swimming forms, which feed on tiny pieces of organic matter. All species except *Anopheles* have breathing tubes to breathe air at the water surface. *Anopheles* mosquitoes have to lay parallel to the water surface to breathe. They usually complete this cycle within 2-5 days, but some species (like *Culiseta* spec.) can overwinter in this stage.

The pupae are also known as "tumblers." Some people mistake them for tadpoles, since they have a big round head and a tail. As in most insects, the pupae don't feed at all. They have two air tubes at the top of their head to breathe. The adult mosquito develops inside the pupal case.

After one to two days, the adult mosquito is ready to exit the pupal case. It breaks through the top of the pupae by pumping air into its body and stretching out. Then it sits on the water surface until it's dry and flies off. Usually, the male mosquitoes are the first ones to hatch. After mating, the female mosquito is ready to take her first blood meal in order to obtain protein for her eggs' development. The males die shortly after mating, but the females can reproduce several times and live four to eight weeks. Some species overwinter as pregnant females and are able to live for several months at reduced metabolism.

Although some mosquitoes need only five to seven days in hot summer months to complete their life cycle, they are seldom a problem around deep, well-managed wastewater lagoons. To eliminate places where mosquitoes and flies can lay eggs, a holding pond should have weed-free sides and minimal floating solids (CDPH 2023).

Mosquito-borne Diseases

Mosquitoes are very important vectors of serious diseases. Global efforts to reduce the numbers of mosquitoes usually are due to the deadly diseases they can transmit, and not because of the nuisance. Mosquito-borne diseases under surveillance in California include Yellow fever and the endemic arboviral[1] diseases caused by West Nile virus, St. Louis encephalitis virus, and western equine encephalitis virus, as well as travel-associated diseases caused by *Plasmodium* spp. (malaria), dengue, chikungunya, and Zika viruses. The California Department of Public Health, Vector-Borne Disease Section monitors and consults with local agencies regarding invasive mosquito species including *Aedes aegypti* (yellow fever mosquito) and *Aedes albopictus* (Asian tiger mosquito). (CDPH 2023)

[1] "Endemic Arboviral disease" is a term used to describe infections regularly found among particular people or in a certain area caused by a group of viruses spread to people by the bite of infected insects (arthropods) such as mosquitoes and ticks.

The virus that causes St. Louis encephalitis is normally contained in birds, but horses and humans can become "accidental hosts" if they get bitten by an infected mosquito. Encephalitis is an inflammation of the brain, which results in high fever, irritability, and disorientation, with the most serious cases terminated by coma and death. Most people that are bitten by an infected mosquito never show any symptoms of the disease. In 2022, St. Louis encephalitis virus was detected in mosquitoes in 11 California counties. In 2021, there were 4 human cases statewide (CDC 2023a).

The first mosquito carrying West Nile Virus in Merced County was identified in June 2006, with the first human diagnosed with the disease reported in August 2006. Most humans infected with this disease have mild or no obvious symptoms, but 20 percent develop fever and muscular weakness. Less than one percent develops the very serious neuron-invasive form, which causes long term or permanent damage. This disease causes a high mortality among horses and over 225 species of wild birds, and is considered an endemic disease for humans, domestic animals, and wildlife in California (DPH 2012). In 2022, West Nile virus was detected in mosquitoes in 22 California counties; the virus was detected in humans in 18 of those counties. (CDC 2023a)

Two genera of mosquitoes are probable transmitters of the West Nile Virus. They are the *Culex* and *Aedes* mosquitoes. One of the *Culex* species, *C. quinquefasciatus*, prefers to breed in waste lagoons such as those commonly found on dairies. For this reason, mosquito control around dairy lagoons is necessary.

Malaria is a widespread disease that still kills hundreds of thousands of people per year – in 2020, an estimated 627,000 people died from malaria, most of them children in Africa. The *Anopheles* mosquito, the vector for malaria, occurs almost everywhere; the reason that there are very few outbreaks of malaria in California is that the Plasmodium parasite is generally not present in the state. In most malaria cases, mosquitoes here transmit the disease by biting someone who was infected by malaria elsewhere in the world. (CDC 2023)

Other forms of mosquito-borne encephalitis that infect birds, livestock, and humans also occur infrequently within the Central Valley region of California.

Two invasive (non-native) mosquito species have been found in several California cities and counties, and there is a potential for them to spread into other areas of California. They are *Aedes aegypti* (the yellow fever mosquito) and *Aedes albopictus* (the Asian tiger mosquito). The *Aedes aegypti* has been found in Merced County. Unlike most native mosquito species, *Aedes aegypti* and *Aedes albopictus* bite during the day. Both species are small black mosquitoes with white stripes on their back and on their legs. They can lay eggs in any small artificial or natural container that holds water. (CDPH 2023)

Aedes aegypti and *Aedes albopictus* have the potential to transmit several viruses, including Zika, dengue, chikungunya, and yellow fever. None of these viruses are currently known to be transmitted within California, but thousands of people are infected with these viruses in other parts of the world. In 2022, four travel-associated Zika virus infections in the United States. (CDPH 2023a)

9.3 ENVIRONMENTAL EFFECTS

9.3.1 SIGNIFICANCE CRITERIA

This analysis evaluates the potential generation and dispersal of nuisance insects at the proposed Vierra Dairy Expansion project site. The following significance criterion established by the ACO and its EIR was used to evaluate these impacts:

- Would the project create significant nuisance conditions to the public or the environment through the generation of insects due to project operations?

As set forth in Appendix G to the State CEQA Guidelines, Section IX, *Hazards and Hazardous Materials*, the additional health hazard assessment criteria previously evaluated in the project IS/NOP include whether the project would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. *(IX.a)*
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. *(IX.b)*
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or wastes within one-quarter mile of an existing or proposed school. *(IX.c)*
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment. *(IX.d)*
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area. *(IX.e)*
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. *(IX.f)*
- Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires. *(IX.g)*

These impacts were found to be less than significant in the IS/NOP (see Appendix A). In addition, potential impacts from the release of hazardous substances into the environment during on-site project operations related to routine transport and use of hazardous materials, including pesticides, diesel fuels, supplements in cattle feed, genetically modified crops, Recombinant Bovine Growth Hormone, and antibiotics were evaluated in the IS/NOP and found to be less than significant. Therefore, these impacts will not be evaluated further in this chapter. For a discussion of impacts to water quality as a result of increased export of dry manure and associated pathogens and residual contaminants, see Chapter 10, *Hydrology and Water Quality*.

9.3.2 ENVIRONMENTAL IMPACTS

Impact HAZ-1: Increased fly production and related nuisance effects (ACO)

Implementation of the proposed Vierra Dairy Expansion project could result in the generation of flies that can adversely affect animal and human health, and become a nuisance for other adjacent land uses. While there have been no nuisance fly complaints for the existing dairy facility, because there are off-site residences located less than 1,000 feet from existing and proposed active animal confinement facilities, there is an increased potential for nuisance conditions, and this would be a significant impact.

Merced County has sought to prevent agricultural nuisances by the use of setbacks between potential sources of nuisance insects and adjoining sensitive land uses. Under existing regulations, Merced County enforces a setback of 1,000 feet between animal confinement facilities (such as ponds, corrals, barns) and rural residences. According to Merced County Code Chapter 18.64.040 (B)(2), the modification or expansion of an existing facility must not decrease the existing separation distance from off-site residences that are less than 1,000 feet unless the off-site property owner provides written permission. At the Vierra Dairy, there are six off-site residences within 1,000 feet of existing dairy facilities. Construction of the proposed facilities would not reduce the existing separation distances to five of the off-site residences within 1,000 feet. However, the distance of active animal facilities to the residence located along Williams Avenue would be reduced from 900 feet to 750 feet with the proposed dairy expansion. A Merced County Setback Waiver[2] has been signed by the owner of the off-site residence to allow a reduced setback distance, which would meet the requirements of the ACO. Also, the proposed expansion would not reduce the distance to less than 1,000 feet for any off-site residence currently greater than 1,000 feet from existing active dairy facilities (see Figure 3-8 in Chapter 3, *Project Description*).

The ACO prohibits new dairies within one-half mile of urban areas or sensitive uses such as schools, hospitals, jails, public or private recreational areas, parks, or all wildlife refuges (Merced County Code Chapter 18.64.040 (B)(1)(a)). According to Merced County Code Chapter 18.64.040 (B)(2), if the dairy facility is located within the minimum setback distance, the modification or expansion of an existing facility must not decrease the existing separation distance from these areas. There are no residentially zoned areas or concentrations of rural residences within the 0.5-mile setback distance (Merced County 2023). The community of Hilmar is located approximately 2.5 miles to the east-northeast of existing active dairy facilities, well outside of the half-mile setback.

Where trees, tall crops, or man-made structures (e.g., homes) surround an animal facility, the dispersal distance will be short. When low-growing crops or native vegetation surround an animal facility, dispersal distance is typically longer as flies fail to find nearby vertical resting structures or feeding sites to halt the dispersal behavior. The dairy site is predominantly surrounded by low-growing forage crops, other animal confinement facilities immediately north and east of the project site, and additional facilities located north, south, east, and west of the project area. Trees are limited onsite. The presence of a tall corn crop during summer would mitigate movement of nuisance flies from the dairy.

[2] A copy of this waiver is on file with the Planning Division/Community & Economic Development Department.

The DEH has responsibility for the maintenance of public health in the county. As required by the DEH, the methods for insect control must be described in a Vector Control Plan as outlined in Chapter 18.64.060 C.8.c of the ACO (see Appendix C of the EIR). A Vector Control Plan has been prepared for the proposed Vierra Dairy operations and provided to the County. The Vector Control Plan includes Best Management Practices for Vector Control, specific to field application areas and the dairy production area. The Vierra Dairy currently hires a weekly pest control service to minimize the fly population on the dairy site; all structures are sprayed for basic insect control. The dairy operator also periodically sprays for flies. These practices would continue with implementation of the proposed expansion project. The dairy operator would continue to implement the following Best Management Practices to address potential fly problems:

a. Daily inspection of manure flush systems to ensure that manure is being effectively removed from flush areas, with particular attention paid to corners and isolated areas.
b. Daily inspections of water supply and circulation systems to ensure that any leaks are promptly repaired. These inspections shall include all watering troughs to ensure that mechanisms for controlling water level are operating effectively and are protected from damage.
c. Regular blading of feeding lanes in freestall barns and corrals to ensure that spilled feed is promptly removed and disposed.
d. Daily removal of manure and spilled feed from stalls in freestall barns.
e. Scraping of corrals and removal of manure at least twice a year.
f. Daily inspection of silage storage areas to ensure proper covering, drainage, and removal of any spoiled silage.
g. Weekly inspection of fence lines of corrals and other "edge" areas, and removal of any accumulated manure.

The following sanitation practices would also continue to be implemented to control fly populations:

a. Dead animals will be stored in a secured area at the dairy facility, and off-site rendering plant operators will be notified for pickup of carcasses. Carcasses will be removed within 24 hours.
b. Residual feed will be removed from infrequently used feeding areas.
c. All garbage will be disposed of in closed dumpsters that are regularly emptied by a contracted waste management service for off-site disposal.
d. Grass and other landscape clippings will be removed from the site for off-site disposal or reuse (as feed or soil amendment).

Design features of the Vierra Dairy that reduce fly development include freestall barns with flush lanes and appropriate grades for pens. The use of manure separators at this facility also results in lower fly numbers as the resulting manure solids are removed and stockpiled in windrows within a few days.

DEH enforces the operational measures of each Vector Control Plan through periodic random inspections, and by requiring the annual submittal of compliance reports. The DEH also responds to complaints from neighbors of such facilities as described above. No current or active fly complaints have been reported and submitted to DEH at the Vierra Dairy (Merced County 2023);

however, a comment submitted on the Notice of Preparation for the project indicated a concern for increased nuisance insects at dairies in Merced County, there were no issues specific to the project identified by any nearby neighbors or reported to DEH.

As required by the ACO, DEH must implement the following procedures if nuisance insect conditions are reported at, or adjacent to, the animal confinement facility:

A. If fly nuisance conditions are reported to the Environmental Health Division, the Division shall take the following actions:

   Within 72 hours of receiving a complaint, the Environmental Health Division shall determine the species and population density of a fly population during an inspection of the location of the complaint, and identify potential sources of flies in the vicinity. At the location of the nuisance complaint, the County will seek to identify access points, identify attractants, and locate breeding sites. If an animal confinement facility is identified as a potential source of the fly nuisance, the County will evaluate the affected herd, identify sources of the fly population, and evaluate weather conditions. In general, an infestation would be indicated by insect pests found on over 25 percent of the animals sampled during monitoring, or by the presence of substantial breeding areas. In the event of infestation causing a nuisance, the County will impose additional control measures on a site-specific basis. Measures that may be required by DEH include both biological and/or chemical pest control methods.

B. If fly nuisance conditions are confirmed, and are attributable to operations at an animal confinement facility, the Environmental Health Division shall require the owner/operator to remedy the nuisance condition within a specified period of time. The Division shall notify the parties reporting the nuisance of its findings, and shall provide follow-up inspections to ensure that the nuisance condition is cured. Should the condition persist, the Division shall initiate an enforcement action against the offending operator.

While there is no recent history of nuisance fly complaints at the existing dairy, because there are off-site residences located less than 1,000 feet from existing and proposed active dairy facilities, and the proposed expansion could result in an increase in flies, there is an increased potential for nuisance conditions, and the following mitigation would be required.

Significance of Impact: Significant.

Mitigation Measure HAZ-1:
The applicant has prepared a Vector Control Plan to meet the requirements of the Animal Confinement Ordinance Chapter 18.64.060(C)(8), which has been submitted to the Merced County Division of Environmental Health. The applicant shall continue to implement all measures within the approved Vector Control Plan throughout the active life of the dairy.

Potential Environmental Effects of Measures: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project area. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Implementation of the foregoing measures would reduce the magnitude of this potential effect by requiring the continued implementation of housekeeping and

management measures. Because the proposed project would not reduce the setback distances specified by the ACO, with implementation of the above mitigation measures, the potential impact from nuisance flies would be reduced to less than significant.

Implementation/Monitoring: Implementation of these measures would be the responsibility of the project applicant. The Merced County Community and Economic Development Department and Environmental Health Division shall monitor for compliance. Mitigation Measure HAZ-1 shall be implemented prior to issuance of a building permit and throughout ongoing operations.

Impact HAZ-2: Create significant nuisance conditions due to increased mosquito production (ACO)

Implementation of the proposed Vierra Dairy Expansion project would not create significant nuisance conditions related to increased mosquito production since the proposed dairy expansion would not modify existing active dairy facilities that provide potential mosquito habitat. This would be a less-than-significant impact.

Potential habitat for mosquitoes at the Vierra Dairy Expansion project includes the on-site waste management system, which currently includes a wastewater storage pond and four solid settling ponds. Undesirable numbers of mosquitoes could occur if the facilities are improperly constructed or managed so that weeds build up along the sides of ponds, mats of solids float within lagoons, or if water levels of "beach areas" of lagoons are not fluctuated to alternately flood or dry out areas where insects lay eggs. Lagoons that become mosquito breeding grounds are those with less than two feet of free bank space (freeboard) from surface to top of levee, that have "dead" corners where little wind action can occur, or where floating solids are not mechanically corralled to one end of the lagoon and removed.

In addition to the Vector Control Plan, which has been completed by the project applicant, Sections 18.64.050 B, H, and X and Sections 18.64.070 B, C, J, K, and S of the ACO contain provisions related to mosquitoes (see Appendix C of the EIR). The Merced County Mosquito Abatement District provides guidelines for the construction and management of dairy wastewater systems to prevent significant mosquito production (outlined in Regulatory Framework, above). The proposed project facilities are in compliance with all but one of the provisions of the Mosquito Abatement District and the ACO related to site design to control mosquitoes. The existing settling basins and the existing wastewater storage pond exceed the dimensions outlined in the ACO (Chapter 18.64.070 J) and those recommended by the Mosquito Abatement District. These guidelines state that wastewater holding ponds should not exceed 100 feet in width and settling basins should not exceed 60 feet in width. The oversized settling basin and storage ponds may incur increased treatment costs for the District.

Substantial compliance with the guidelines of the Merced County Mosquito Abatement District and correct management of the dairy wastewater containment systems are required to comply with the Merced County ACO, and would prevent significant mosquito production. The project Vector Control Plan as required by the ACO contains operational measures for the wastewater ponds and settling basin to further reduce mosquitoes. There have been no recorded complaints regarding mosquitoes from the Vierra Dairy. Based on these reasons, the proposed dairy expansion would not increase the potential for mosquito nuisance intensity or frequency. This would be a less-than-significant impact.

Significance of Impact: Less than significant.

Mitigation Measure HAZ-2: None required.

10 HYDROLOGY AND WATER QUALITY

This chapter evaluates the potential hydrology and water quality impacts associated with the proposed dairy expansion project, and includes a discussion of the mitigation measures necessary to reduce these impacts to a less-than-significant level, where possible. As established in the Initial Study (IS) for the proposed project (see Appendix A, *Notice of Preparation and Initial Study*), the construction and operation of the Vierra Dairy Expansion project may result in degradation of groundwater resources, potential adverse effects to surface water quality, impacts to groundwater levels, water quality impacts due to flooding, alteration of drainage patterns on the site, or conflict with a sustainable groundwater management plan.

This water resources evaluation implements, and is consistent with, mitigation measures and study protocols adopted by Merced County in its certification of the 2030 Merced County General Plan EIR in addition to the EIR for Revisions to the Animal Confinement Ordinance (ACO) and its approval of the ACO.

INTRODUCTION AND METHODOLOGY

Dairies pose a number of potential risks to water quality, primarily related to the amount of manure and wastewater that they generate. Manure and wastewater from animal confinement facilities can contribute pollutants such as nutrients (nitrogen), ammonia, phosphorus, organic matter, sediments, pathogens, hormones, antibiotics, and total dissolved solids (salts). These pollutants, if uncontrolled, can cause several types of water quality impacts, including contamination of drinking water, interference with irrigation systems, and impairment of surface water and groundwater quality.

A hydrogeologic technical evaluation was conducted by NV5, engineering and hydrogeological consultants, for the Vierra Dairy project. To determine background characteristics of the groundwater at the project site, information was reviewed from the Turlock Subbasin Groundwater Sustainability Plan (GSP) (TSGSP 2023), the California Department of Water Resources (DWR) Sustainable Groundwater Management Act (SGMA) Portal (DWR 2023) and water quality data from on-site supply well samples collected as required by the Central Valley Regional Water Quality Regional Water Quality Control Board (CVRWQCB) General Order for Existing Milk Cow Dairies (Order No. R5-2013-0122). This hydrogeologic technical evaluation provides an assessment of existing surface water and groundwater conditions, and the potential future impacts associated with operation of the proposed dairy expansion (included in Appendix I of this EIR, bound separately).

10.1 REGULATORY FRAMEWORK

10.1.1 FEDERAL LAWS AND REGULATIONS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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[1] **and** the operator discharges, or proposes to discharge, pollutants to the waters of the Unites States.

FEDERAL EMERGENCY MANAGEMENT AGENCY

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

10.1.2 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.

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 Title 27 of the California Code of Regulations[2] and the Porter Cologne Water Quality Control Act. The Basin Plan for the Sacramento-San Joaquin Valley (Basin Plan) developed by the CVRWQCB generally regulates agriculture practices.

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 Title 27 of the California Code of Regulations[3] 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

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

2 Article 1, Subchapter 2, Chapter 7, Division 2, Title 27 of the California Code of Regulations.

3 Subsection 20090 of Article 1, Subchapter 2, Chapter 7, Division 2, Title 27 of the California Code of Regulations.

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 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 for which a Report of Waste Discharge (ROWD) was filed with the CVRWQCB. 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 are 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 an NMP. In compliance with the requirements of the CVRWQCB, the proponents of the Vierra Dairy have completed the required components of the WMP and NMP of the General Order.

In accordance with Provision 29 of the General Order, all dairies must be in compliance with CCR 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 that can provide greater groundwater protection. Because Section 13360 of the California Water Code 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 General Order requires compliance with the Monitoring and Reporting Program (MRP) R5-2013-0122. Under the MRP, and 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 2013 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 an RMP. Dairies that do not notify the CVRWQCB or do not intend to join a RMP will be held to individual monitoring requirements set forth in the regulations. The Vierra Dairy is a member of the Central Valley Dairy Representative Monitoring Program (CVDRMP); however, in the future, they could be treated as an individual discharger required to have an individual WDR and a separate groundwater monitoring system.

The RMP establishes a regional monitoring network for the member dairies of the CVDRMP. 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 are then extrapolated to other member dairies of the RMP, theoretically precluding the need to install monitoring well networks on an individual basis.

There are over 1,100 dairy members of the CVDRMP. Monitoring data are being collected at 42 representative dairies, using 443 monitoring wells. The findings from 2012 through 2021[4] confirm that first encountered groundwater has been affected by historic and current dairy farming practices, and indicate that crop fields are the primary source of nutrient emissions to groundwater[5], though nitrate concentrations beneath lagoons and animal housing also show water quality impacts. (CVDRMP 2019)

[4] Program updates accessed on May 19, 2023, available at: http://www.waterboards.ca.gov/centralvalley/water_issues/confined_animal_facilities/groundwater_monitoring/index.shtml

[5] The RMP examines conditions in first encountered groundwater (i.e., groundwater near the water table directly beneath dairy facilities). Therefore, the design of the dedicated monitoring wells is fundamentally different from that of drinking water wells, and data from the monitoring wells are not indicative of actual impacts to drinking water sources. The RMP was not designed for, and does not address, monitoring and assessment of drinking water sources.

Based on current knowledge collected to date, the RMP findings indicate that most dairies will not be able to meet CVRWQCB standards for being protective of groundwater. The CVDRMP recommends several specific changes to the Dairy General Order, including replacing the current annual reporting method with a more consistent approach focused on achieving whole-farm balance. CVDRMP also recommends new methods for sampling liquid and solid manure and harvested crops, use of flowmeters for measuring applications of liquid manure, use of enhanced Irrigation and Nitrogen Management Plans (INMP), new lagoon liner standards and a requirement for dairy operator education in the area of improving nitrogen use efficiency (NUE). CVDRMP also recommends continued groundwater monitoring to watch trends over time, but at reduced frequency. (CVDRMP 2019)

The Vierra Dairy is operating in accordance with the requirements of 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 was 1,573 milk and dry cows combined[6], with regulatory review required for expansions of greater than 15 percent above this value. Following the 2012 expansion of the Vierra Dairy, the ROWD submitted to the CVRWQCB established a herd size of 3,200 milk and dry cows combined. Individual WDRs were never issued by the CVRWQCB for the 2012 Vierra Dairy Expansion. Since the current proposed expansion would increase the mature cow number by greater than 15 percent, the CVRWQCB should issue Individual WDRs for the Vierra Dairy Expansion.

Significant operational and reporting requirements will be required as part of the individual WDR process, including the following nutrient management practices:

- 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.

Planning documents related to these requirements include a Nutrient Management Plan and Waste Management Plan (see Appendix J, *Dairy Facility Nutrient Management Plan Report and Waste Management Plan Report for the Vierra Dairy*).

However, the State Water Resources Control Board (State Water Board) is currently conducting a review of the Dairy General Order and has signaled that its review is likely to result in an order that will direct the CVRWQCB to reconsider significant aspects of its confined animal facilities program. The CVRWQCB has stated that pursuant to the CVDRMP's summary conclusions, the existing management practices under the NMP, WMP, and the Dairy General Order are not, nor have they been adequate to prevent groundwater pollution underlying the dairy facilities and under lands receiving dairy wastes. The CVRWQCB is deferring the issuance of individual WDRs, and reviewing significant aspects of its Dairy General Order. State water quality permit coverage for dairy expansion projects, such as that assessed in this EIR, is likely to be significantly delayed. Should the

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

Dairy General Order be remanded during the course of this project, the Merced County ACO regulations to protect water quality would continue to apply to the Vierra Dairy operations.

Nutrient Management Plan and Waste Management Plan

The NMP/WMP planning process is used to implement BMPs 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, an NMP/WMP in place of a Comprehensive Nutrient Management Plan (CNMP)[7] for the Vierra Dairy Expansion facility has been prepared pursuant to the requirements of the CVRWQCB (see Appendix J). The NMP and WMP for the proposed dairy expansion, both dated August 2020, have been used for the evaluation in this DEIR. To establish a baseline, the NMP and WMP (dated August and November 2017, respectively) were used to represent existing conditions.

CALIFORNIA STATEWIDE GROUNDWATER ELEVATION MONITORING PROGRAM AND SUSTAINABLE GROUNDWATER MANAGEMENT ACT

Since 2009, the California Statewide Groundwater Elevation Monitoring Program (CASGEM) has tracked seasonal and long-term groundwater elevation trends in groundwater basins statewide. The CASGEM is a voluntary program run by DWR wherein local monitoring entities collect groundwater elevation data and provide it to DWR. In June 2014, the DWR announced its CASGEM Basin Prioritization results. The Basin Prioritization determined groundwater use, groundwater supply, groundwater overdraft, and other factors for each basin to assign 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.

The Sustainable Groundwater Management Act (SGMA) of 2014 (as amended) allows customized GSPs to be prepared by groundwater sustainability agencies (GSA) to manage groundwater resources while being sensitive to local economic and environmental needs. SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, the target year will be 2040. For the remaining high and medium priority basins, 2042 is the deadline. The GSAs are responsible for submitting an annual report summarizing

[7] Since adoption of the ACO, the CVRWQCB has required the preparation of a NMP and WMP, which serve in place of the CNMP as allowed by Merced County Code Chapter 18.64.060 K.

groundwater elevation data, groundwater extraction, groundwater recharge (from surface water supply used or available for use), total water use, and change in groundwater storage.

The Turlock Subbasin (the area of the Vierra Dairy) has been identified as a high priority groundwater basin. While not in a condition of critical overdraft, the subbasin is experiencing declining groundwater levels over the long term. Water management and land management agencies serving the Turlock Subbasin have formed two GSAs: the West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and the East Turlock Groundwater Sustainability Agency (ETSGSA). The Vierra Dairy location is included in the southcentral part of the western subbasin, under the jurisdiction of the WTSGSA. These GSAs worked to develop a joint Turlock Subbasin Groundwater Sustainability Plan, which was adopted and submitted to the California Department of Water Resources in January 2022. As of the date of this EIR, the GSP is currently under review by DWR. An annual report to DWR is required by each April 1 to provide information on groundwater conditions and an update on implementation efforts for the prior year. After adoption of the GSP, an annual report to DWR is required by each April 1 to provide information on groundwater conditions and an update on implementation efforts for the prior year.

After implementation of the GSPs, the SWRCB will be authorized to intervene if local agencies prove unable or unwilling to correct groundwater management concerns. The goal of implementing the GSPs is to 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.

A total of 23 GSP Projects and Management Actions have been developed by the GSAs in order to achieve the sustainability goal for the Turlock Subbasin by 2042, and to avoid undesirable results over the remainder of a 50-year planning horizon. These projects categorized into three groups: Group 1 projects are already being constructed and will continue to be implemented, Group 2 projects are planned and will be implemented, and Group 3 projects have been identified and may be implemented in the future, as needed. GSP plans include primarily groundwater recharge projects. The GSP Annual reports provide a summary of the results from projects and management actions using the following elements: A) Groundwater Extraction, B) Groundwater Extraction Methods, C) Surface Water Supply, D) Total Water Use, E) Change in Storage and F) Monitoring Network Modules. A Group 2 TID project includes an On-Farm Recharge Project in the WTSGSA. For this project, TID will work with growers within its irrigation service area to identify parcels that would be willing to participate in the On-Farm Recharge Project and have suitable conditions to support recharge.

IRRIGATED LANDS REGULATORY PROGRAM

A range of pollutants such as pesticides, fertilizers, salts, pathogens, and sediment can be found in runoff from irrigated lands. The Irrigated Lands Regulatory Program (ILRP) of the CVRWQCB regulates discharges from irrigated agricultural lands throughout the Central Valley. 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 Long-term Irrigated Lands Regulatory Program General Orders adopted by the RWQCB protect both surface water and groundwater throughout the Central Valley. (CVRWQCB 2023)

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 by preparing regional plans to address water quality problems. All Central Valley growers must comply with the ILRP. 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. Because onsite application of nutrient rich wastewater at a dairy is regulated by the CVRWQCB through the Dairy General Order, the Vierra 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, or if project area cropland is not included in the dairy's NMP) and a regulatory assessment warrants action under the ILRP, the Vierra 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.

CENTRAL VALLEY SALINITY ALTERNATIVES FOR LONG TERM SUSTAINABILITY AND NITRATE CONTROL PROGRAM

In 2018, the CVRWQCB adopted Basin Plan amendments (Resolution R5-2018-0034) that established valley-wide Salt and Nitrate Control Programs. Central Valley Salinity Alternatives for Long Term Sustainability (CV-SALTS) is a collaborative stakeholder driven and management effort to develop sustainable salinity and nitrate management planning. The long-term solutions for managing salt in the Central Valley will be developed and implemented through a phased Salt Control Program. The three phases of the Salt Control Program include: (1) Complete a comprehensive study and analysis to define long-term salt management actions, beginning in 2021 over 10 to 15 years; (2) Complete design and permitting of projects identified in Phase 1; and (3) Construct projects to manage salts. In 2020 and 2021, initiatives were made through the IRLP coalitions, the CVDRMP, and private WDR holders to fund the 20-year salinity study. The CVDRMP is paying the fee for participation in the CV-SALTS Salt Control Program on behalf of its members.

Nitrate Control Plan (NCP) collaboratives were developed in Merced County within the 2020 Priority 1 subbasins (Turlock and Chowchilla). The collaboratives were charged with developing and implementing action plans to provide safe drinking water, reducing nitrate impacts, and restoring groundwater quality. This program will require facilities that discharge nitrates at levels that are causing exceedances of drinking water standards (including most dairies) to upgrade their facilities and/or waste management practices over a timeframe that may extend as long as 35 years. While upgrades are being developed and implemented, facilities responsible for adverse nitrate impacts are required to supply impacted communities with replacement drinking water. Facilities such as dairies may comply with the Nitrate Control Program individually or may elect to participate in

Management Zones, which are collectives of permitees that collaborate on enhancing water quality management practices while providing affected communities replacement drinking water. Regulatory requirements under the Nitrate Control Program are triggered by the issuance of a Notice to Comply. For the purposes of compliance with the Nitrate Control Program, the project is in Priority Area 1. The Vierra Dairy is located in the Turlock Management Zone, which is included in the Valley Water Collaborative (VWC), a non-profit organization established to organize and operate the proposed Modesto and Turlock Management Zones. The VWC is responsible for the implementation of the Early Action Plan within the Turlock Subbasin.

STATE WATER RESOURCES CONTROL BOARD PUBLIC DRINKING WATER SYSTEMS

The State maintains regulatory authority over public water systems within the State. A public water system is defined as a system that provides water for human consumption to 15 or more connections or regularly serves 25 or more people daily for at least 60 days out of the year. A public water system is not necessarily a public entity, and most public water systems are privately owned. Being a public water system means providing affordable, safe drinking water to employees and customers 24 hours a day, 7 days a week, 365 day a year. This includes the associated legal, fiscal, and operational responsibilities, and future planning.

The first step of the process to obtain a permit for a new public water system is to complete a preliminary technical report. The report involves contacting other existing public water systems to see if the service area of the proposed system could, instead, be served by an existing system. It also evaluates the long-term costs of creating a new public water system. The preliminary technical report must be submitted at least 6-months prior to any water related construction.

Because the project would exceed the threshold of 25 or more persons on 60 or more days of the year at the project site, the property owner must obtain a public water system permit from the State of California State Water Resources Control Board, Division of Drinking Water. The facility shall then maintain compliance with that permit as long as 25 or more persons are present at the facility on 60 or more days of the year.

TOTAL MAXIMUM DAILY LOAD PROGRAM – IMPAIRED WATERWAYS

Under Section 303(d) of the federal 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[8] for all listed water contaminants that do not meet water quality standards. States are required to establish a TMDL for these identified 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.

[8] A Total Maximum Daily Load, or TMDL, is a calculation of the maximum amount of a pollutant that a waterbody can receive and still safely meet water quality standards.

The CVRWQCB maintains and periodically updates the impaired water bodies list for Central Valley. The Merced and San Joaquin Rivers are located approximately 2 and 4 miles to the south and west of the project site, respectively. Both the rivers and the nearby laterals are listed as impaired under Section 303(d). As listed under the 2020-2022 California Section 303(d) List of Water Quality Limited Segments of the San Joaquin River, the segment is impaired for the pollutants/stressors of boron, chlorpyrifos, DDE, DDT, electrical conductance (E.C.), Group A Pesticides, mercury, temperature, unknown toxicity, and alpha BHC. The likely source of pollutants is agriculture. The Merced River is adjacent to the southern application fields. The Merced River is listed as impaired under Section 303(d). As listed under the 2020-2022 California Section 303(d) List of Water Quality Limited Segments, the segment is impaired for the pollutants/stressors of chlorpyrifos, diazinon, E. coli, Group A Pesticides, mercury, temperature, and unknown toxicity. The likely source of pollutants is agriculture or resource extraction.

The CVRWQCB adopted Amendments To The Water Quality Control Plan For The Sacramento River and San Joaquin River Basins in February 2019. Discharges off site would have to comply with discharge limits outlined in the Basin Plan and the 2020 Revised Salt and Nitrate Program Resolution. As described in the NMP and WMP, land application field discharges are closely monitored to address potential impacts.

FLOODPLAIN 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.

CONSTRUCTION GENERAL PERMIT

Construction activities disturbing one or more acres are required by the State Water Resources Control Board (SWRCB) to obtain a Construction General Permit (Order 2009-0009-DWQ). This Construction General Permit provides a risk-based approach to managing storm water discharge. The Construction General Permit has three risk level categories based on sedimentation risk and receiving water risk. Each risk category has specific BMPs 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.

The Construction General Permit requires a Storm Water Pollution Prevention Plan (SWPPP) and a Rain Event Action Plan (REAP) to be developed by the discharger, who must implement these plans – and also comply with specific requirements of the Construction General Permit. The SWPPP must list any BMPs that the discharger will use to protect storm water runoff, and define the placement of identified 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.

10.1.3 MERCED COUNTY

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. A more detailed discussion of the relevance of these goals and policies to the proposed project is located in Table 11-1 of Chapter 11, *Land Use Compatibility*.

ANIMAL CONFINEMENT ORDINANCE

The Merced County Animal Confinement Ordinance regulates the design, construction, and operation of animal confinement facilities within the county. Because the ACO is regulatory rather than permissive, all existing and proposed animal confinement facilities within the county are required to comply with the terms of the ACO, including the proposed Vierra Dairy Expansion project. 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 18.64.060 K.

The Merced County ACO contains additional provisions to protect water quality. For example, Chapters 18.64.050 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 18.64.050 J requires that off-site property owners accepting wastewater (liquid manure) complete written agreements to accept responsibility for proper land application. Chapter 18.64.050 G requires notification of Merced County Division of Environmental Health (DEH) for any off-site discharge of wastewater. Chapter 18.64.050 BB requires application of manure at agronomic rates. For the permanent closure of an animal confinement facility, Chapter 18.64.050 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 18.64.070 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 18.64.050 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; 18.64.060 A, B, C, D, E, F, H, K; and 18.64.070 A, D, E, G, H, I, K, L, M, P, Q, S, and T (see Appendix C for the full text of the ACO). To ensure compliance with the provisions of the ACO, the Ordinance requires routine inspections of animal confinement facilities by Merced County DEH.

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 EIR and serve as the basis for mitigation measures identified in this document.

FLOOD ORDINANCE

Merced County is responsible for implementing FEMA floodplain management regulations. Zoning Code Section 18.26.050, *Provisions for Flood Hazard Reduction* (Flood Ordinance) contains specific requirements limiting and discouraging development in various flood zones, as designated on Flood Insurance Rate Maps. 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 Flood Ordinance requirements 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 the elevation of proposed structures and pads.

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 a well and contaminate groundwater. The standards include well setback distances from potential sources of contamination and pollution, and standards for construction as set forth in Appendix I of this EIR.

MERCED COUNTY GROUNDWATER ORDINANCE

With the adoption of the Sustainable Groundwater Management Act of 2014, Merced County adopted groundwater ordinance No. 1930 (adding Chapter 9.27 to the Merced County Code), that prohibited the unsustainable extraction of groundwater or conveyance of groundwater outside of a subbasin. This ordinance was intended as a transition regulation until documents required by the SGMA are published and implemented. On February 8, 2022, the Board of Supervisors adopted amendments to the Groundwater Ordinance that would transition the determination of sustainability of proposed groundwater wells from the County to the GSAs. Under the revised Ordinance, the following criteria must be met for any proposed wells to be approved:

(1) The proposed well must be located in an area covered by an adopted and implemented GSP;
(2) The proposed well is not located in a probationary basin as designated by the State Resources Water Control Board;
(3) The proposed construction and use of the proposed well are consistent with the applicable GSP;
(4) The GSA provides documentation of its determination that all of the above conditions are met to the Merced County DEH.

The GSP consistency determination must be provided with the well application to the County, and provided all conditions are met, a well construction permit could be issued ministerially. Domestic wells serving a single parcel delivering two acre-feet of groundwater per year or less are generally exempt from the prohibition of well construction.

ONSITE WASTEWATER TREATMENT SYSTEMS

In June 2012, the SWRCB adopted a Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems (OWTS). The policy establishes a set of comprehensive regulations for all aspects of siting, construction, and operating OWTS. The Merced County Division of Environmental Health enforces design standards for the operation and maintenance of on-site sewage disposal systems to minimize potential pollution of groundwater and surface water features (Merced County Code Chapter 9.54, *Regulation of Onsite Wastewater Treatment Systems*). DEH requires that every occupied structure in the county that cannot be connected to a public wastewater treatment system must construct an OWTS under permit from DEH, consisting of an OWTS with effluent discharging into an approved subsurface disposal field. All systems must meet the minimum design standards of DEH, including location, system dimensions and capacity, soil capability, minimum depth to groundwater, and minimum separation distances between septic systems and wells, streams, and other water bodies. In order to obtain a permit, an applicant must provide DEH with a site plan indicating the dimensions and placement of the disposal field. DEH expects that their existing design standards for operation and maintenance of OWTS will usually meet the requirements of the Water Quality Control Policy for Siting, Design, Operation, and Maintenance of Onsite Wastewater Treatment Systems.

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 and audit of the Vierra Dairy on February 25, 2021. The dairy inspection evaluated the facility for compliance with the Merced County Animal Confinement Ordinance (ACO) (Merced County Code Chapter 18.64). The DEH found the facility in compliance with the ACO as referenced in their letter of March 2, 2021.

MERCED COUNTY REGULATION OF STORM WATER DISCHARGE DURING CONSTRUCTION

Merced County Code regulates storm water discharges related to construction activities through Chapter 9.53 of the County Code. As defined by the Code, construction means "Any construction or demolition activity, including, but not limited to, clearing, grading, grubbing, or excavation, or any other activity that results in a land disturbance of equal to or greater than one acre." Standards required by the County include:

> Prior to disturbing any soil, operators of a construction activity project shall prepare and submit a Sediment Control Plan (SCP) to the Department of Public Works for review and approval. The SCP shall be incorporated as separate sheets of the Civil portion of the plans prepared for the project and shall indicate BMPs to be used during project construction and post construction. The SCP shall be prepared by a certified Qualified Storm Water Pollution Prevention Plan (SWPPP) Developer.
>
> The operator of a construction activity project shall submit evidence that all applicable permits (i.e., State Water Board's Construction General Permit, State Water Board 401 Water Quality Certification, U.S. Army Corps 404 permit, and the California Department of Fish & Wildlife 1600 Agreement) directly associated with the soil disturbing activities have been obtained.
>
> If a SWPPP is required to be developed for the construction activity project pursuant to the State Water Board's Construction General Permit, the SWPPP may substitute for the required SCP. In this case, the operator of the construction activity project shall submit a copy of the SWPPP to the County for review and approval.

10.2 ENVIRONMENTAL SETTING

10.2.1 PROJECT SETTING AND PHYSIOGRAPHY (PHYSICAL GEOGRAPHY)

The project site is located in the San Joaquin Valley in an active agricultural district of Merced County. The topography of the site is nearly flat with surface elevations ranging from 67 to 78 feet above mean sea level (MSL). There are no natural water features on the site. As noted on USGS topographic maps, Lateral No. 7 passes through the northwestern application fields. The San Joaquin River is located approximately 3.5 miles to the west, and the Merced River is located approximately 1.5 miles south of active dairy facilities, and immediately adjacent to several application area fields. The Dahlquist, Brynteson, and Hilmar Drains run adjacent to or pass through the application fields, and several laterals exist within one mile of the application fields. The community of Hilmar is located approximately 2.5 miles to the east-northeast of the existing active dairy facilities.

Irrigation water for the project farming operations is obtained from Turlock Irrigation District (TID) canal water and one on-site irrigation well. The TID also acts as a local improvement district to maintain drainage facilities. An existing private ditch system operated by the project applicant is 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. Receiving fields have been graded and developed with tailwater return systems to circulate irrigation water across the project site and individual application fields. For a depiction of the dairy facility with existing and proposed structures and the application area irrigation wells, see Figures 3-4, 3-6, 3-7a, and 3-7b, in Chapter 3, *Project Description*, of this EIR.

TID maintains a tile drain system in the Vierra Dairy land application area to reduce groundwater levels below the root zone of agricultural crops. The project site tile drains do not convey wastewater. Tile drains are common in this area of the Central Valley. The tile drain system was installed by the private landowner in 1999 to control sub-surface water levels. The tile drains are composed of corrugated 6- to 12-inch pipes surrounded by a gravel envelope. The number and depth of these lines vary based on soil drainage capacity and field slope. The depths range from 6 to 12 feet, and typically one to three pipes are installed per field using a deep rip backhoe. These pipe systems control shallow groundwater levels with a groundwater control pump; when groundwater reaches the tile drain elevation, the pump is activated to draw groundwater levels down. During periods of drought and lowered groundwater levels, the tile drain pump system is not activated. Groundwater pumped from the tile drain system is discharged to the TID irrigation lateral system in the area, which is then circulated to other customers for irrigation.

10.2.2 GEOLOGY

REGIONAL GEOLOGY

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[9] 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 Vierra Dairy Expansion project) consist of high amounts of silica-rich intermixed clay, silt, sand and gravel deposits derived from the granitic Sierra Nevada Mountains.

SITE SPECIFIC SOILS AND GEOLOGY

Predominant soils underlying the existing and proposed Vierra Dairy Expansion facilities as classified by the Natural Resources Conservation Service (NRCS) consist of Hilmar loamy sand, 0 to 3 percent slopes (HgA), and Delhi loamy sand, silty substratum, 0 to 3 percent slopes. Soils present at the application fields include Hilmar sand, poor drained, 0 to 1 percent slopes; Dinuba sandy loam, 0 to 1 percent slopes; Grangeville loam, slightly saline-alkali, 0 to 1 percent slopes; Pachappa fine sandy loam, 0 to 1 percent slopes; and Pachappa sandy loam, deep over hardpan, 0 to 1 percent slopes. Numerous "saline spots[10]" are identified by NRCS within and around the application fields nearest the Merced River. Two "saline spots" were located within the northwestern application field. Near surface geology at the project site consists of Modesto Formation Alluvium underlain by Tulare Formation clay deposits. Quaternary Alluvium is present along the banks of the Merced River and Dos Palos Alluvium is present along the San Joaquin River.

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

[10] Defined as soils influenced by salt, which may interfere with crop growth.

The well logs on site and the GSP cross section (see Figures 2, 3, and 4 of Appendix I) indicate that interbedded clay, sandy clay, and sand deposits dominate the near surface geology in proximity to the facility. Gravel was not identified within the selected driller's logs. Somewhat continuous sand and clay deposits approximately 5 to 15 feet in thickness are found from near surface depths to 100 feet below ground surface (bgs). Sediments are considerably more clay dominant below 100 feet bgs, and are considered to be part of the Corcoran Clay.

10.2.3 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 project site lies within the Turlock Subbasin, bounded by the Tuolumne River on the north, the Merced River on the south, and the San Joaquin River on the west. The eastern boundary approximates the contact between Subbasin sediments and the crystalline basement rocks of the Sierra Nevada foothills. 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. Differentiation between the unconfined, semi-confined, and confined aquifers is due to existence of Corcoran Clay within the Tulare Formation. Groundwater is unconfined or perched above the Corcoran Clay and semi-confined to confined below the Corcoran Clay.

According to the GSP, groundwater elevations in the Western Upper Principal Aquifer (the area of the Vierra Dairy) have been relatively stable during the GSP study period, with declines during the recent drought of less than 15 feet, followed by water level recovery (TSGSA 2022).

As stated in the GSP, compressible clay layers within and below the Corcoran Clay have been associated with land subsidence in many areas of the Central Valley. In these areas, water levels have declined, depressurizing or dewatering these clay layers. This has resulted in subsurface compaction of the clays, which allow the overlying ground surface to subside. In the Turlock Subbasin, data from remote sensing and local global positioning system (GPS) stations indicate only small amounts of vertical displacement of the land surface in local areas. No impacts from land subsidence have been identified to date in this Subbasin (TSGSA 2022).

SITE SPECIFIC HYDROGEOLOGY

Groundwater flow in the Turlock Subbasin in the project vicinity is generally to the west across the basin, towards the San Joaquin River. In general, groundwater depths are shallowest near the San Joaquin River, and increase away from the river as surface elevation increases. Data from the GSP indicates regional groundwater flow contours have been influenced because of weak groundwater depressions north of the site and other localized pumping centers.

The hydrogeologic cross-sections depict the extremely variable interbedded nature of the subsurface sediments (see Appendix I Figures 3 and 4). Water supply wells in the area generally have depths of less than 200 feet. As shown on the DWR well log, one on-site well is installed to a depth of 360 feet with perforations from 60 to 300 feet bgs (see Appendix I). Due to the presence of significant, semi-continuous clay layers near surface, limited perched groundwater conditions may exist at near surface depths. The close proximity of both the Merced and San Joaquin Rivers and drainage laterals have influenced groundwater elevations at the Vierra Dairy.

Area knowledge and DWR hydrographs indicate that groundwater may exist within sand units found less than 25 feet bgs. First encountered groundwater is anticipated to be found in unconfined aquifers (Western Upper Principal Aquifer) and within laterally extensive sands units or as isolated perched units. DWR hydrographs for nearby wells show multi-year groundwater elevation changes and depth to groundwater. Seasonal groundwater fluctuations range approximately 5 feet for each well. Large variations in groundwater from measurement to measurement are likely due to pump use during or immediately prior to the measurement.

Of the dairies included in the CVDRMP representative monitoring program, there are two in the general vicinity of the Vierra Dairy: one located approximately two miles to the east and one located approximately two miles to the southwest (see Appendix I of this EIR for more information). As included in the Year 10 (2021) RMP report, the dairy to the east has seven monitoring wells that have been sampled over the 10-year monitoring period. Groundwater levels have remained stable over the monitoring period. The dairy to the southwest has nine monitoring wells that have been sampled over the 10-year monitoring period. Due to the close proximity to the river, groundwater levels have had some variability during the monitoring period. While not necessarily representative of the Vierra Dairy conditions, the data from these dairy monitoring wells give some insight as to what may be occurring in the area of the Dairy.

Project area groundwater beneficial use is for domestic and irrigation purposes. The land uses in the surrounding area are primarily irrigated agriculture and confined animal facilities, with numerous dairies in the nearby vicinity. Six domestic wells and two irrigation wells are located in the area of active dairy facilities and associated cropland, with additional domestic wells located on adjacent project site cropland parcels. Similar to existing conditions, the proposed project would use both surface water from the Turlock Irrigation District and groundwater from the existing irrigation wells for irrigation needs.

10.2.4 EXISTING WATER QUALITY

The Turlock Subbasin GSP states that Nitrate as N in the western portion of the subbasin (where the Vierra Dairy is located) has significant variability, with elevated values in the western most portion of the subbasin. As described above, there are two dairies included in the CVDRMP representative monitoring program in the general vicinity of the Vierra Dairy: one located approximately two miles to the east and one located approximately two miles to the southwest (see Appendix I of this EIR for more information). The Year 10 (2021) RMP report found the water quality at the dairy to the east (seven monitoring wells sampled) showed nitrate ranges from 35 to 120 mg/L over the 10-year monitoring period. The dairy to the southwest (nine monitoring wells) showed nitrate ranges from non-detect to 120 mg/L over the 10-year monitoring period. While not necessarily representative of the Vierra Dairy conditions, the data from these dairy monitoring wells gives some insight as to what may be occurring in the area.

Water quality data collected as required by the General Order for Existing Milk Cow Dairies for the existing domestic and irrigation water wells for the project site was available from December 2020. From the 2020 sample, concentration of nitrate as nitrogen ranged from 0.969 to 81.7 mg/L, with three detections reported above the California Title 22 Primary Maximum Contaminant Limit

(MCL) of 10 mg/L. Electrical Conductance (EC)[11] ranged from 0.935 to 1.48 dS/m, with nine detections above the Title 22 Secondary MCL of 0.9 dS/m. For a complete table of all water quality parameters tested, see Table 1 in Appendix I of this EIR.

10.2.5 FLOODING

The Flood Insurance Rate Maps from FEMA show that the dairy site and application fields are located partially within Zone X and partially within Zone A. Areas within the FEMA designation Zone X are defined as an area outside the FEMA designated 100-year and 500-year floodplains. Areas within the FEMA designation Zone A are defined as areas that would be inundated by a 100-year flood event, but for which no base flood elevations (BFE) have been established. A flood protection analysis for the proposed dairy was prepared by Sousa Engineering as part of the WMP (dated November 2020). The estimated flood elevation in the vicinity of the dairy production area increases from approximately 76 feet at the western boundary of the dairy facility to 78.5 feet at the southeastern corner of the facility at the intersection of Williams Avenue and Washington Road. The existing facilities are consistently above the BFE. Where the estimated flood elevation increases at the southeast corner of the facility, a retaining wall has been constructed that allowed the dairy production area to the elevated to elevations between 80 and 83 feet. Based on the estimated BFE, a portion the proposed expanded dairy production area near the southwest corner of the existing facility might be subject to inundation levels of approximately one-foot without any improvements to the site.

10.2.6 PATHOGENS, ANTIBIOTICS, PESTICIDES, AND HORMONES IN MANURE

The potential for pathogens, antibiotics, pesticides, and hormone transport in manure was evaluated in the ACO EIR. The discussion below provides a summary and update of the analysis contained in the ACO EIR.

PATHOGENS

Animal agriculture, such as dairies, results in the production of copious amounts of manure. On a per weight basis, livestock animals produce from 13 to 25 times more manure than humans. This manure is ultimately used as fertilizer for crops, either through the application of dairy wastewater or the incorporation of solid manure onto cropland (either on site or by trucking dry manure off site). Animal wastes contain zoonotic pathogens, which are viruses, bacteria, and parasites of animal origin that can cause disease in humans. Diseases that can be caused by zoonotic pathogens include Salmonellosis, Tuberculosis, Leptospirosis, infantile diarrheal disease, Q-Fever, Trichinosis, Cryptosporidiosis, and Giardiasis. Health effects generally include mild diarrhea, fever, headaches, vomiting, and muscle cramps. In more severe cases, however, these diseases may cause meningitis, hepatitis, reactive arthritis, mental retardation, miscarriages, and even death, particularly in the immunocompromised. (EPA 2005)

Human infection from zoonotic pathogens occurs through various routes, including contaminated air, contact with livestock animals or their waste, swimming in water impacted by animal feces, exposure to potential vectors (such as flies, mosquitoes, water fowl, and rodents), or consumption of food or water contaminated by animal wastes. Regulatory limits on the concentrations of pathogens in

[11] The reason that the conductivity of water is important is because it can tell you how much dissolved substances, chemicals, and minerals are present in the water.

the environment protective of human health have not been established. Based on epidemiological evidence, the fecal indicator bacteria *E. coli* and enterococci provide the basis for local, state, and federal water quality regulations. (EPA 2005; LPE Learning Center 2019)

In general, agricultural soils tend to create relatively effective barriers by filtering pathogens/parasites from percolating water, thereby minimizing groundwater contamination. Important exceptions are sandy or rocky soils, which generally allow for greater infiltration of organisms through the soil profile than heavier soils. Movement of bacteria and viruses increases in saturated soils, and percolating water can provide a mechanism for downward movement. Additionally, plant roots tend to increase the movement of bacteria through soil (USDA 2000). Finally, improper installation of wells can allow for direct contamination of groundwater via the leaching of organisms along the well casing.

The survival of pathogens in manure varies by pathogen, environment, and temperature. It has been reported that Cryptosporidium oocysts[12] can survive up to two weeks in surface water. Other research reports have shown that E. coli can survive 84 days in manure. Generally speaking, microbial survival is lowest during times when the temperatures are high, sunlight is present, and the environment is dry. There may be higher proliferation of pathogens in manure slurry than dry manure (EPA 2005). Further, organisms are known to survive longer in the anaerobic state than in aeration. This is most likely because the generation of heat from bacterial breakdown of organic material in aerated material is sufficient to shorten bacterial life spans. (USDA 2000)

Several options are available for treatment of manure transferred from animal operations to minimize the presence of pathogens. These options include aerobic lagoons, anaerobic lagoons, controlled anaerobic digestion for methane, composting, and constructed wetlands. Pathogens can also be managed by cleaning pens regularly and keeping them dry (Augustin et al 2011). Therefore, good pathogen practice, such as cleaning clothing after working or visiting a dairy facility, tracking visitor activity, and cleaning, adequately drying, and disinfecting manure handling equipment can greatly reduce hazards related to pathogen outbreaks (Augustin et al 2011).

ANTIBIOTICS

Antibiotics are used in animal feeding operations and may appear in animal wastes. The practice of feeding antibiotics to poultry, swine, and cattle evolved from the 1949 discovery that the application of very low levels of antibiotics usually improved animal growth and development. The primary mechanisms of the elimination of antibiotics in animals are in the discharge of urine and bile. Essentially all of an antibiotic administered is eventually excreted, whether unchanged or in metabolite form. Little information is available regarding the concentrations of antibiotics in animal wastes, or on their fate and transport in the environment (EPA 2013; EPA 2018).

The industrialization of livestock production and the widespread use of non-therapeutic antibiotics has intensified the risk for the emergence of new, more virulent, or more resistant microorganisms. These have reduced the effectiveness of several classes of antibiotics for treating infections in both humans and livestock. A report issued by the U.S. Centers for Disease Control and Prevention states that more than 2.8 million antibiotic-resistant infections occur in the U.S. each year, and more than 35,000 people die as a result. Resistant germs can spread between animals and people through food

[12] Cryptosporidium is a protozoan parasite that causes a parasitic disease that affects the intestines. The parasite is transported in an oocyst, an environmentally hardy microbial cyst.

or contact with animals (CDC 2020). However, microbial risk assessment is a complex and evolving discipline.

The Food and Drug Administration (FDA) issued guidance in April 2012 that sought to stop farmers and ranchers from feeding antibiotics to cattle, pigs, chickens and other animals simply to help the animals grow larger. Under a voluntary initiative, farmers and ranchers needed a prescription from a veterinarian before using antibiotics in farm animals. As of January 2017, the use of medically important antibiotics for growth promotion is no longer permitted by the FDA (USFDA 2023).

Dairies administer significantly less antibiotics proportionally per animal than other animal confinement facilities since most antibiotics are prohibited for use with lactating cows (Watanabe, et. al. 2010). Antibiotics are often only used to treat sick animals and are not routinely administrated, though some dairies may administer antibiotics to calves, heifers, and dry cows. Animals being treated with antibiotics are removed from the milking herd and isolated until treatment is completed. Waste milk from animals treated with antibiotics is commonly fed to calves. Additionally, waste from animals being treated with antibiotics is typically managed within the normal waste stream of a dairy. Therefore, environmental pathways that may allow antibiotics to be transported into groundwater include leakage from wastewater lagoons, leaching of manure applied to fields, and leaching from animal housing areas (Watanabe, et. al. 2010; Pollard and Morra 2017).

A study completed by University of California, Davis researchers investigated the use and occurrence of antibiotics in dairy confined animal feeding operations and their potential transport into first-encountered groundwater. The July 2010 study found that antibiotics were detected ubiquitously at the surface and in the waste stream of the dairy, but generally degraded in the top layers of soils. Even after decades of use, the study indicated that antibiotics are not generally transported in groundwater beyond the boundaries of the farms. Overall, the detection of several antibiotics in soil samples indicates that different antibiotic types move differently through the subsurface environment, and therefore all production areas of dairies could be considered a potential source of antibiotics in shallow groundwater. The study also suggested that proper dilution of lagoon water with irrigation water and controlling the loading rate of wastewater to cropped fields could promote degradation and sorption[13], and thereby attenuate the movement of certain types of antibiotics in the environment. The results of the study suggests that intensive sampling campaigns are necessary to properly evaluate animal farms as sources of antibiotics, and further studies would be required to determine specific best management practices for improved antibiotic attenuation. (Watanabe, et. al. 2010; Pollard and Morra 2017)

PESTICIDES AND HORMONES

Pesticides and hormones are compounds that are used in animal feeding operations and can be expected to appear in animal wastes. Both of these types of pollutants have been linked with endocrine (hormonal) disruption in humans and animals. Pesticides are applied to livestock to suppress houseflies and other pests, and are often used in the production of livestock feed. Little information is available regarding the concentrations of these compounds in animal wastes, or their fate/transport behavior and bioavailability in waste-amended soils (EPA 2018).

[13] Sorption is the process by which one substance becomes attached to another.

Specific hormones are used to increase productivity in the beef and dairy industries. Several studies have shown that hormones are present in animal manures in situations where hormones are fed or applied to animals. Most studies to date have evaluated poultry manure, which has been shown to contain both estrogen and testosterone. Runoff from fields with land-applied manure has been reported to contain estrogens, estradiol, progesterone, and testosterone, as well as their synthetic counterparts.

Recombinant Bovine Growth Hormone (rBGH or also known as Bovine Somatotropin or BST) is a genetically engineered copy of a naturally occurring hormone produced by cows. This hormone is used by some milk producers. The purpose of rBGH is to enable cows to produce more milk than they naturally produce. The hormone is destroyed in the cow's gut. The hormone is approved by the Federal Food and Drug Administration. This hormone is not used at the Vierra Dairy operations, nor would it be used with implementation of the dairy expansion project.

TRACE MINERALS

Trace mineral supplements are generally provided in the daily feed for the dairy herd and are essential for common biological processes. As evaluated in the EIR for the Merced County Animal Confinement Ordinance (Merced County 2002), approximately 90 to 95 percent of dairies in Merced County use feed additives for selenium (and other trace metals) because feed grown in much of Merced County is lacking in selenium. Trace minerals can improve herd health and efficiency, as research has shown that minerals can improve fertility, decrease infections, prevent lameness, and increase milk production. In most cases, trace elements are only partially absorbed by the cow, and some of the elements are excreted in the manure or urine. Through the application of wastewater and dry manure to cropland, trace minerals can accumulate in the soil.

Water contamination and plant toxicity are common detriments associated with a high concentration of metals. Most environmental concerns are focused on the over-application of nitrogen and phosphorous. However, other elements, currently not regulated in dairy manure, are routinely overfed, or have low absorption efficiency and may be excreted in large quantities in animal manure (Brock et. al. 2006; Indraratne et. al. 2021). Several studies have identified copper and zinc as a concern since they are frequent minerals used on the dairy herd and could accumulate in manure-amended fields. A reduced yield has been documented for various types of grasses and corn after application of copper to the soil (Flis et. al. 2006).

Possible strategies for minimizing excess minerals in the manure would be reducing the total amount of minerals in the ration or improving the efficiency of animal mineral use (using more bioavailable supplements). The National Research Council (NRC) requirements for dietary minerals have been found to be adequate for dairy cattle health, and any additional increase beyond NRC requirements in the diet is unnecessary (Brock et. al. 2006). The results from several studies suggest that reduction in the concentration of dietary minerals is potentially the most efficient way of reducing overall excretions and whole-farm surpluses of these minerals. Further, minerals in the water may affect excretion of them from the cows, and at some dairies, controlling water contributions when formulating animal diets could reduce the amount of minerals in manure and overall land application (Castillo et. al. 2007).

10.3 ENVIRONMENTAL EFFECTS

10.3.1 SIGNIFICANCE CRITERIA

As set forth in Appendix G to the State CEQA Guidelines, Section X, *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 or otherwise substantially degrade surface or ground water quality. (*X.a*)
- Substantially decrease groundwater supplies or interfere with groundwater recharge such that the project may impede sustainable groundwater management of the basin. (*X.b*)
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - → result in substantial erosion or siltation on- or off-site; (*X.c.i)*
  - → substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; (*X.c.ii)*
  - → create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; (*X.c.iii)*
  - → or impede or redirect flood flows. (*X.c.iv*)
- In flood hazard zones, risk release of pollutants due to project inundation. (*X.d*)
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. (*X.e*)

An additional hydrology and water quality assessment criterion previously evaluated in the project IS/NOP include whether the project would:

- In tsunami or seiche zones, risk release of pollutants due to project inundation. (*X.d*)

Because the project site is located distant from the sea or any large reservoir, this impact was found to be less than significant in the IS/NOP and will not be evaluated further in this chapter.

An additional geology and soils assessment criterion previously evaluated in the project IS/NOP was whether the project would:

- Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water. (*VII.e*)

Because compliance with State and Merced County performance standards and permit conditions would minimize potential impacts, this impact was found to be less than significant in the IS/NOP and will not be evaluated further in this chapter.

10.3.2 ENVIRONMENTAL IMPACTS

PROPOSED PROJECT OPERATIONS AND NMP AND WMP SUMMARY

The project applicant has prepared a proposed NMP/WMP, both dated August 2020, 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, dated August and November 2017, respectively, were used to establish a baseline of existing conditions.

The existing facility consists of freestall barns and open corrals, rotary milk barn, commodity barns, feed storage areas, and solid manure area (see Chapter 3, *Project Description*, of this EIR for additional information). Animal wastes from freestall and other concrete-surfaced areas are flushed to an on-site waste management system that consists of four settling basins and wastewater storage pond. All ponds are earthen-lined. The area of active dairy facilities has been graded to direct corral runoff to the existing waste management system. Stormwater runoff from impervious surfaces and roofed areas is routed to the wastewater pond, except for stormwater from a shade barn and heifer shade, which is routed to fields. Recycled water is used to clean the milk parlor floor and is the source of sprinkler pen water.

Dry manure is scraped from corrals once per year. Manure solids are separated from liquids in a separation system combined with four separation basins. The mechanical separators on the facility are generating material daily. This material is moved from the separator pad several times a week and transferred into the manure drying area where it is placed in windrows. Once in windrows, the dairy has a windrow turner that dries and conditions the material. Once the drying process is completed (typically several weeks depending upon the weather), the material can then either be used for freestall bedding (consisting of dry manure and almond shells), applied on the project site, or sold to brokers and hauled off-site to fields in the project vicinity. As reflected in the NMP, approximately 30,000 tons of solid manure and separated solids (or approximately 485,000 pounds of nitrogen) (approximately 25-30 percent of the dry manure generated at the dairy) is exported and applied to off-site fields not owned by the dairy operator.

The dairy facility uses both surface water and groundwater resources for farm operations. Domestic water to the site and dairy barns is provided by three on-site water wells (there are four additional domestic wells associated with the project). Irrigation water is supplied by surface water sources from TID canals and two irrigation wells. Wastewater is mixed with irrigation water supplied by TID canal surface water or on-site wells and applied to cropland. Receiving fields are graded to guide excess applied irrigation water to an existing tailwater return and/or retention system. Collected tailwater is recycled and returned to the nearest field pipe access for reapplication. Field application of wastewater would include surface irrigation via pipeline.

As shown in Table 3-3 of Chapter 3, *Project Description*, existing herd numbers at the Vierra Dairy include 5,597 cows, which would increase to 7,117 cows with the proposed expansion. The proposed project would include construction of two freestall barns, a hospital milking barn, commodity barn addition, heifer barn, and utility shop. Construction of the proposed facilities would result in the conversion of approximately 15 acres of existing cropland to active dairy facilities. With the recent purchase of surrounding farmland over nine additional parcels, there

would be approximately 770± acres of cropland available for wastewater and manure application with the proposed dairy expansion.

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

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

Solid manure that accumulates within corrals would continue to be scraped. With the proposed dairy expansion, dry manure would continue to be composted on-site and removed once a month. Dry manure and almond shells would continue to be used for bedding; additional manure would be sold and hauled off-site for use as fertilizer and soil amendments.

As reported in the NMP, exported solid manure applied to off-site agricultural fields not owned by the project applicant would increase from 30,000 tons of solid manure from the dairy facility to 34,000 tons of solid manure with the proposed expansion (increasing from approximately 25-30 percent under existing conditions to 35-40 percent of previously separated solids under proposed conditions). While the exact location of these off-site cropland parcels may vary throughout operations, the disposal of manure at off-site locations and the acreage necessary to properly dispose of manure liquids and solids are accounted for in the project NMP.

According to the General Order, nitrogen application rates shall not result in total nitrogen applied to the land application areas exceeding 1.4 times the nitrogen that will be removed from the field in the harvested portion of the crop, unless plant tissue sampling identifies a need to increase fertilizer application of a specific crop. The whole farm nitrogen balance is a ratio that reflects the total nitrogen generated by the operation minus losses and exports, divided by the nitrogen removed by crops. The General Order requires that if the whole farm nitrogen 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 (applied to removed) =
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 NMPs, total annual gross nitrogen generated by facility is estimated at 1,201,899.2 pounds/year. Nitrogen exports currently total 485,000.0 pounds/year. After ammonia losses, existing operations reflect a whole farm nitrogen balance ratio of 1.4.

With implementation of the proposed expansion as reported by the June 4, 2020 proposed conditions NMP, total annual gross nitrogen generated by the expanded facility would increase to 1,659,351.8 pounds/year. A total of 712,760.0 pounds/year of nitrogen would be removed through nitrogen exports as solid manure. After ammonia losses, the whole farm balance ratio would be 1.39.

Overall management of nitrogen on the farm, including increasing nitrogen exported, would result in a reduction in the whole farm nitrogen value.

Total process wastewater generated by the existing dairy operations includes 181,123 gallons per day (approximately 66 million gallons per year) sent to the pond (which includes process water from the milkbarn and manure and bedding, rainfall runoff into ponds, and direct rainfall onto ponds). The proposed expanded dairy operations would generate approximately 216,506 gallons per day (approximately 79 million gallons per year) of process wastewater. There would be a 13 million gallons per year increase in process wastewater generated with the proposed dairy expansion and sent to the pond. This increase in water use is related to an increase in plate cooler water and other reusable water. Process wastewater from the pond would continue to be mixed with irrigation water and applied to crops.

The irrigation water demand of the existing farming operations is estimated by multiplying the croppable acres by the estimated average irrigation demand per acre. The existing NMP estimates an irrigation average demand of over 6 feet of water for cropped acres. As summarized in the IS/NOP, there are approximately 582 acres (208 acres currently double cropped with oats and corn silage and 374 triple-cropped with oats/corn/Sudangrass), for a total irrigation demand of approximately 3,076 acre-ft/year or 1.0023 billion gallons of water annually. The estimated wastewater component of the total irrigation demand for existing operations is estimated at 6.6 percent[14] of total water volume, not accounting for pond evaporation and evapotranspiration.

For the proposed expansion, total land application area would be increase from 582 acres to 770 acres with the recent purchase of nearby cropland. As reported in the proposed conditions NMP, there are approximately 770 acres proposed to be double cropped with a combination of oat soft dough and corn silage, for a total irrigation demand of approximately 3,080 acre-ft/year, or 1.0036 billion gallons of water annually. The estimated wastewater component of the total irrigation demand for proposed operations is estimated to be 7.9 percent[15] of total water volume, not accounting for pond evaporation and evapotranspiration.

In summary, the proposed NMP/WMP establishes the following required facility improvements for the herd and potential areas of sensitivity under the proposed expansion[16]:

- 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-removed ratio for nitrogen under existing conditions is 1.34, and would increase to 1.35 for proposed conditions. The whole farm nitrogen balance under existing conditions is 1.40, and would decrease to 1.39 under proposed conditions.
- The recommended amount of salt applied to cropland will be provided in the future versions of the approved NMP for the dairy.

[14] The estimated wastewater component for existing operations was determined by calculating the percentage of total irrigation water demand, 1.0023 billion gallons, provided by the wastewater generated per year, in this case 66 million gallons per year.

[15] The estimated wastewater component for proposed operations was determined by calculating the percentage of total irrigation water demand, 1.0036 billion gallons, provided by the wastewater generated per year, in this case 79 million gallons/year.

[16] 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-9 in Section 10.3.2 of this chapter.

- The 27,370,660 gallons of storage capacity for the four solids settling and one wastewater pond would be sufficient to permit storage of wastewater generated by the facility for a 120-day cycle during normal precipitation periods and 1.5 factor normal precipitation periods. Pond freeboard capacity is used to address 100-year storm events. All ponds are earthen-lined.
- A tailwater return and/or retention system is used to prevent the movement of water offsite. Collected tailwater is recycled and returned to the top of field, returned to the tailwater pond for reuse, or drained through the adjacent field to the tailwater pond.
- Stormwater runoff from impervious surfaces and roofed areas would continue to be routed to the wastewater pond, except for rainwater from several barns, which would be routed to nearby fields and yards.
- The site is in the Federal Emergency Management Agency (FEMA 2008) Zone X, and as discussed in Section 2.8. Zone X is not subject to inundation by the 100 and 500-year storm events. The site is in the Federal Emergency Management Agency (FEMA 2008) Zone A. Zone A is defined as an area subject to inundation by the 1 percent annual chance flood event. A Base Flood Elevation was determined to be between 76 and 78.5 feet. Based on the estimated BFE, a portion of the proposed dairy production area may be subject to inundation levels of approximately one-foot without any improvements to the site.
- 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 could receive solid manure and wastewater as a purchased soil amendment.

The NMP demonstrates that the proposed dairy facility would, after off-site disposal of solid wastes, comply with the nitrogen loading groundwater protection requirements of the CVRWQCB and the Merced County ACO. The NMP shows the whole farm balance would be reduced from 1.4 at the existing dairy facility, to 1.39 with the proposed expansion, and that the whole farm balance ratio would remain below the regulatory limit of 1.65.

Impact HYD-1: Degradation of water quality due to stormwater runoff during project construction (Criteria X.c.i, VII.b)

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. Because compliance with the SWRCB's Construction General Permit would reduce potential effects from stormwater runoff, this would be a less-than-significant impact.

The proposed facilities would be constructed either within the existing facility footprint or within 15 acres of existing cropland adjacent to existing facilities. 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 (Order 2009-0009-DWQ). This Construction General Permit provides 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.

The Construction General Permit requires a Storm Water Pollution Prevention Plan (SWPPP) and a Rain Event Action Plan (REAP) to be developed by the discharger, who must implement these plans – and also comply with specific requirements of the Construction General Permit. The SWPPP must list any BMPs that the discharger will use to protect storm water runoff, and define the placement of identified 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.[17]

Compliance with the SWRCB's Construction General Permit and its requirement that a SWPPP be prepared and implemented would reduce potential effects from stormwater runoff. To ensure implementation of stormwater 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 recommended.

Significance of Impact: Less than significant.

Recommended 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. 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, including any revisions, shall be included in construction documents and must be available on site for the duration of the project. Proof of registration shall be submitted to the Merced County Building and Safety Division prior to the initiation of construction.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project site. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Project compliance with State Water Resources Control Board and Merced County regulations to avoid siltation effects would reduce construction effects from stormwater runoff this impact to less than significant and the proposed project construction effects would continue to be considered less than significant following implementation of the recommended measure.

[17] Adherence to the requirements of the State's Construction General Permit would satisfy Merced County storm water management regulations set forth in Chapter 9.53 of the Merced County Code.

Implementation/Monitoring: Implementation of the mitigation measure would be the responsibility of the project applicant. The Merced County Building and Safety Division and the SWRCB shall monitor for compliance. Implementation of HYD-1 shall occur prior to and during construction.

Impact HYD-2: Degradation of surface water quality from operation of the Vierra Dairy Expansion (Criterion X.a)

The project would not result in the degradation of surface water quality during project operations. Crop fields associated with the existing and proposed expansion operations of the dairy are developed with an existing tailwater collection system, which would prevent discharge offsite. Wastewater is applied, and would continue to be applied, in accordance with ACO and CVRWQCB requirements. However, occasional discharge of tile drainage may provide a conduit for contamination of surface water. This would be a significant impact.

There are no natural water features on the site. As noted on USGS topographic maps, several canals pass through or adjacent to the site and application fields. The San Joaquin River is located approximately 3.5 miles to the west, and the Merced River is located approximately 1.5 miles south of active dairy facilities, and immediately adjacent to several application area fields.

There is an existing irrigation system that consists of a surface flood system coupled with a tailwater return and/or retention system. Collected tailwater is recycled and returned to the nearest field pipe access for reapplication. The tailwater return system 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 has been used to minimize irrigation water use and subsequently minimize the potential for runoff.

As required by the Dairy General Order WDRs, the dairy operator must document compliance with provisions to prevent backflow or direct discharge of wastewater to 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. According to the project engineer, the potential for backflow has been evaluated and this survey has determined that there are no cross-connections on the site that would allow for direct discharge of wastewater into groundwater via backflow through water supply or irrigation supply wells.

With regular inspection and water testing requirements, ongoing maintenance would occur for the wastewater application system and tailwater retention system to ensure the systems are working properly. 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.

The tile drain system installed in the Vierra Dairy land application area pumps groundwater from underneath the project area to the TID canal system. The project site tile drains do not convey wastewater from dairy operations. The tile drain system could result in the eventual contact between project area groundwater and natural receiving waters via discharge from the end of TID's irrigation network. TID does not currently test water quality at the pump outfall at the intersection of Faith

Home Road and Lateral 7, though based on past monitoring of tile drain outfall waster in the area, it is not unusual for water quality exceedances to be encountered in tile drain waters (Niemi, Mike, *pers. comm.* 2023). While the Vierra Dairy tile drains may continue to contribute to surface water discharge from the end of TID's irrigation network, there would be no anticipated increase in wastewater nutrients applied to the project area fields with implementation of the proposed dairy expansion (see Impact HYD-3 below). However, ACO Sections 18.64.050 LL and MM require that tile drainage water be monitored for water quality constituents and meet the discharge and receiving water standards of the appropriate irrigation or drainage district and/or the Regional Water Quality Control Board.

Due to the extensive tailwater retention system, the BMPs for liquid and solid manure application, and backflow prevention compliant with Dairy General Order requirements, limited surface water discharge from these manured areas is anticipated, and no increased adverse impacts to surface water would occur as a result of the proposed dairy expansion. However, occasional discharge of tile drainage may continue to contribute to surface water discharge from the end of TID's irrigation network and provide a conduit for contamination of surface water. This would be a significant impact.

Significance of Impact: Significant.

Mitigation Measure HYD-2a:
Prior to the commencement of operations, the applicant shall provide a written agreement with the Turlock Irrigation District to complete annual water quality testing of the Vierra Subsurface Drain at Lateral 7 and Faith Home Road. The applicant shall complete water testing at the tile drain outfall for the same parameters required for the project site domestic and irrigation wells under the Dairy General Order. The applicant shall submit testing results to TID and to the RWQCB as part of the Annual Report required in accordance with the Dairy General Order.

Mitigation Measure HYD-2b:
Implement Mitigation Measure HY-3j, which states that the CVRWQCB should develop a revised Dairy General Order with updated standards.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure will be located within the project site. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Significant and Unavoidable.

With implementation of Mitigation Measure HYD-2a, the project would comply with ACO testing requirements for tile drainage. However, because of the demonstrated history of shallow groundwater contamination in the project area, a project tile drainage system that may result in the eventual contact between project area groundwater and natural receiving waters via discharge from the end of TID's irrigation network, and the fact that above-stated Mitigation Measure HYD-2b is within the responsibility and jurisdiction of other public agencies and not the County of Merced, potential impacts to surface quality would be significant and unavoidable.

Implementation/Monitoring: Implementation of this measure would be the responsibility of the project applicant. The Merced County Division of Environmental Health shall monitor for compliance. Implementation of HYD-2a and HYD-2b shall occur prior to herd expansion.

Impact HYD-3: Groundwater contamination from expanded dairy project operations (Criterion X.a)

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

The proposed dairy has the potential to impact the underlying groundwater quality with the continued application of nutrients, salts, and other compounds. Based on the existing water quality data from project site domestic and irrigation wells, water quality impacts were noted as elevated for several samples for the indicator parameter Nitrate. EC was reported above the secondary MCL (see Table 1 of Appendix I for water quality data). Overall, the project site wells demonstrated adequate water quality with some elevated levels of nitrate. However, as stated by the CVRWQCB, data from existing wells may not be sufficient to adequately characterize existing conditions. Area groundwater quality reported by the Groundwater Ambient Monitoring and Assessment Program and GSP Annual Reports shows very limited data for interpretation.

The Vierra Dairy is part of the Central Valley Dairy Representative Monitoring Program, developed in accordance with Dairy General Order requirements and with review by the CVRWQCB. As stated above, the CVDRMP has found that shallow groundwater has been affected across the Central Valley due to historic or current animal confinement operations, especially underlying cropland. 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 Vierra Dairy Expansion project would concentrate animals and their wastes within the feeding areas, and to a lesser degree, within open corrals. Waste from the concrete lined feed lanes would be flushed to the on-site wastewater management system for treatment and storage in ponds as referenced in the existing WMP.

Wastewater Storage and Treatment Ponds. The existing treatment and storage ponds receive wastewater as described in the project NMP/WMP. Pond construction information was not available for review. According to the project applicant, the ponds are earthen embankment structures constructed to the standards in place at that time. Following solids removal from the four settling basins, the wastewater with dissolved constituents is stored in the wastewater storage pond for later application in irrigation water to crops. All basin structures would continue to be subject to regular maintenance.

The existing dairy wastewater ponds have the potential to impact groundwater because they contain elevated concentrations of inorganic and organic constituents, and because hydraulic pressure and gravity force liquids downward through soils to groundwater. The flux of liquid through the base of the existing pond has been estimated based on the soil permeability at the base of the ponds (estimated as 10^{-6} centimeters per second or 1 foot per year). Based on the existing pond size of

approximately square 414,000 feet, the total leakage through the base of the pond is estimated at 3 million gallons per year. As described above, there would be an increased volume of process wastewater sent to the pond under proposed conditions. However, since no changes to the existing pond construction or operation are proposed with the dairy modification, the hydraulic pressure within the existing ponds and overall rate of pond leakage would stay the same. Therefore, there would be no anticipated increase to groundwater quality impacts from the ponds with implementation of the proposed project.

Corrals and Freestall Barns. The dairy expansion would continue to use open-air, concrete-lined feed lanes which are roofed, where animals are fed and watered, and waste is collected. Outside of the feed lanes and covered loafing areas, cows are allowed to roam in uncovered areas where manure is collected once per year, which meets Dairy General Order standards and minimizes the potential impact. Liquid discharge from corrals would continue to be minimal.

Crop Fields. Dry and/or liquid manure are used to fertilize dairy cropland. A tailwater collection system is used to prevent the movement of water off site and allow the recycling of applied wastewater. The land application area available would increase from 582± under existing conditions to 770± acres with the proposed expansion. The applied-to-removed ratio for nitrogen under existing conditions is 1.34, and would increase to 1.35 for proposed conditions. While there would be a minor increase in nutrients applied, the proposed nutrient application rates meet required agronomic rates of 1.4 or less for best management farming practice mandated by the CVRWQCB. There would be no significant increase in potential for groundwater contamination from crop fields.

Farming cropping patterns, fresh water mix, and exportation of manure offsite would result in a reduced whole farm nitrogen balance. The whole farm nitrogen balance ratio would be reduced from 1.4 at the existing dairy facility to 1.39 for the proposed operation.

Potential Impacts from Wastewater Constituents

Field application of phosphorus, potassium, and salts are calculated and managed under the Dairy 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. The California CV-SALTS control efforts will be used to assess impacts related to Nitrate, EC, and other salt indicators in the future.

Despite attempts to apply dairy wastewater at agronomic rates, groundwater quality beneath crop fields may be impacted with continued land application of nutrients, salts, and other constituents. As discussed above, the CVDRMP monitoring has found that 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. Additionally, imprecision and inefficiencies in wastewater application and variations in weather both can influence plant growth, and, thus, the uptake of

nitrogen. For these reasons, 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, determine if further degradation occurs, and identify if application modifications would be necessary.

Chapters 18.64.050 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; 18.64.060 A, B, C.8.d, D, E, F; and 18.64.070 A, D, E, G, H, I, K, L, M, P, Q, S, and T of the ACO apply to this potential effect (see Appendix C). For a discussion of potential secondary impacts of off-site disposal of solid manure from the project, see Impact HYD-8 below.

Needed Revisions to the Dairy General Order

The CVRWQCB has stated the existing management practices under the NMP, WMP, and the Dairy General Order are not, nor have they been adequate to prevent groundwater pollution underlying the dairy facilities and under lands receiving dairy wastes. The CVDRMP recommends several specific changes to the Dairy General Order, including replacing the current annual reporting method with a more consistent approach focused on achieving whole-farm balance. CVDRMP also recommends new methods for sampling liquid and solid manure and harvested crops, use of flowmeters for measuring applications of liquid manure, use of enhanced Irrigation and Nitrogen Management Plans (INMP), and new lagoon liner standards. CVDRMP recommends additional voluntary education for dairy operators in the area of improving nitrogen use efficiency (NUE), which could cover subjects such as training on how to properly use flowmeters, proper manure and harvest sampling techniques, how to use new reporting methods, strategies for increasing irrigation efficiency and distribution uniformity, introduction to innovative irrigation systems, manure management alternative strategies, available grant funding and more. CVDRMP also recommends continued groundwater monitoring to watch trends over time, but at reduced frequency. (CVDRMP 2019)

The CVDRMP determined that exporting excess manure nitrogen to non-dairy cropland is hampered by several factors, including demand for raw manure being limited because of concerns about pathogens, which compromise food safety, and weed seeds. Composting can address these concerns by destroying weed seeds and pathogens, but leads to additional costs, air emissions of volatile organic compounds (VOC) and ammonia that contribute to regional air pollution, regulatory barriers (e.g., air permitting) and uncertain markets and pricing. There is potential to produce other value-added manure-based products, such as fertilizer pellets, but technologies to do so are still being developed and there is significant uncertainty related to potential markets, economic and technical feasibility and potential regulatory barriers. (CVDRMP 2019)

New technologies are developing that could more easily extract nitrogen from liquid manure to facilitate export, but their economic and technical feasibility remains untested in California. Some technologies and practices exist, such as vermiculture (cultivating worms in a bed of organic material to which diluted liquid manure is added) that could denitrify manure on the dairy, converting reactive nitrogen compounds into harmless, inert nitrogen gas. However, vermiculture comes with high costs and its ability to generate offsetting revenue streams has not yet been demonstrated, especially in California. (CVDRMP 2019)

The CVDRMP states that a central goal of the new system is to develop clear manure nitrogen export targets for dairies, while allowing time for them to learn about their options and progress toward achieving a whole-farm balance. CVDRMP proposes that reporting of actual nitrogen exports be phased in over time with known future milestones, so that dairy operators can immediately understand the need to act, while allowing them time to consider options. Thus, time schedules for achieving whole farm N balance are a necessary component of the recommendation. (CVDRMP 2019)

Should the Dairy General Order be remanded during the course of this project, the Merced County ACO regulations to protect water quality would continue to apply to the Vierra Dairy operations. The Merced County DEH would continue to complete routine inspections of animal confinement facilities to ensure compliance with the ACO.

Conclusion

The proposed project as planned would be required to use BMPs, and engineering, and design measures consistent with existing local and state regulations. The proposed dairy expansion is not anticipated to significantly increase the potential for impacts to groundwater quality. However, because of the elevated nitrate levels from agricultural operations in general in the Central Valley, the following mitigation measures would be required to ensure implementation of regulatory measures. The CVRWQCB should incorporate the following mitigation measures into the individual WDR permit requirements for the Vierra Dairy Expansion project.

Significance of Impact: Significant.

Mitigation Measure HYD-3a:
The following Best Management Practices shall be implemented as applicable:

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 for the proposed dairy 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 dairy expansion to be issued by the CVRWQCB.

Mitigation Measure HYD-3d:
The applicant shall comply with the permit requirements to protect surface waters and groundwater from salts in wastewater, to be issued by the CVRWQCB as set forth in Board Resolution R5-2018-0034. Since the dairy is a member of the Central Valley Dairy Representative Monitoring Program, and the CVDRMP has committed to participate in the Salt Control Program on behalf of its members, the applicant is not required to take further action to comply with the Salt Control Program.

Mitigation Measure HYD-3e:
Because the Vierra Dairy is a member of a Groundwater Monitoring Coalition, no site-specific shallow groundwater monitoring system has been implemented at the Vierra Dairy. As a condition of the individual WDR issued for the facility, the CVRWQCB may require shallow groundwater monitoring wells to be installed and monitored or require the facility to contribute to a regional representative groundwater monitoring system to confirm water table gradients and water quality variations. Monitoring well requirements and a monitoring schedule shall be included in the WDR issued for the facility. The resulting groundwater monitoring objectives for either the regional program or individual site shall be used 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 shall be completed by the dairy operator. Potential future groundwater monitoring wells may be sampled as required by the Individual WDR, or depending on the success of the regional representative monitoring program. 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. A well monitoring schedule shall be incorporated into the Individual 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 dairy expansion. A new Report of Waste Discharge (ROWD) may be required by the CVRWQCB. The ROWD shall clearly demonstrate that the herd size will not constitute a threat to groundwater quality. If necessary, the CVRWQCB shall 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.

Mitigation Measure HYD-3i:
During construction, all soils that contain manure or process water residue shall be maintained on the project site.

Mitigation Measure HYD-3j:
Based on the results of the CVDRMP study, the CVRWQCB should develop a revised Dairy General Order with updated standards that apply to all confined animal facilities within the Central Valley. The revised Dairy General Order should re-examine seepage rates from all areas, including but not limited to corrals, treatment ponds, and application fields; maximum permeability rates for areas that require lining to prevent groundwater degradation; and implementation of an antidegradation policy for groundwater.

Potential Environmental Effects of Measure: Most physical improvements or activities that could result in changes to the physical environment required by this measure will be located within the project site, though some components of Mitigation Measure HYD-3g may have components that would be located outside the project site. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR, or construction of surface water protection, such as berms, or installation of well backflow protection at additional cropland locations would result in less-than-significant environmental effects.

Significance after Mitigation: Significant and Unavoidable.

As stated above, the proposed dairy facility expansion would not increase the potential for impacts to groundwater quality. Mitigation Measures HYD-2a-j reinforce ACO and General Order requirements to quantify and evaluate water quality and determine necessary measures to remediate water quality conditions as required to meet water quality standards. It includes monitoring of the effectiveness of implemented measures, and modification or addition of measures if water quality problems persist. Compliance with applicable requirements would reduce project impacts to groundwater quality. However, because of the demonstrated history of groundwater contamination as a result of animal confinement facilities, and the above-stated mitigation measures are within the responsibility and jurisdiction of other public agencies and not the County of Merced, potential impacts to groundwater quality would be significant and unavoidable.

Implementation/Monitoring: Implementation of these measures would be the responsibility of the project applicant. The Merced County Division of Environmental Health, Department of Community and Economic Development, and the CVRWQCB shall monitor for compliance. Implementation of HYD-3a and HYD-3b shall occur prior to herd expansion and throughout ongoing operations. Implementation of HYD-3c, HYD-3e, HYD-3f, and HYD-3g shall occur throughout ongoing operations. Implementation of HYD-3d shall occur prior to final inspection or initiation of new operations, and throughout ongoing operations. Implementation of HYD-3h shall occur prior to final inspection or initiation of new operations. Implementation of HYD-3i shall occur during construction. Implementation of HYD-3j shall occur prior to herd expansion.

Impact HYD-4: Decrease groundwater supplies (Criterion X.b)

Implementation of the proposed project may result in the decrease of groundwater supplies since there would be a small increase in groundwater use with the proposed dairy expansion. However, because the majority of the water would be used for irrigation and would contribute to groundwater recharge, this would be a less-than-significant impact.

According to the GSP, groundwater elevations in the Western Upper Principal Aquifer (the area of the Vierra Dairy) have been relatively stable during the GSP study period, with declines during the recent drought of less than 15 feet, followed by water level recovery (TSGSA 2022).

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 18 to 40 gallons of drinking water per day, depending on the type of feed, as higher levels of water intake would be required for an all-hay ration. Severe water restriction can have a marked impact on productivity and feeding behavior of the herd. For the Vierra Dairy, drinking water for the dairy herd would continue to be derived from groundwater. Based on the proposed increase in 1,520 milk cows, there would be an estimated associated increase of 27,360 gallons/day of drinking water required over existing conditions, or approximately 10 million gallons annually (Kononoff, J. and J. Clark 2017).

There is a significant amount of water used in the milking cycle. Water use in the milk parlor generally includes washing cow udders before milking, using sprinklers to keep cows cool in order to enhance milk production, cleaning holding pens and parlor areas, and washing milk lines and equipment. These actions are repeated with each milking cycle. There are several options for dairy farms to improve water use efficiency and conservation, depending on the farm operations and overall needs. By maintaining clean stalls and alleys and practicing good bedding management, the animals are cleaner and the need for udder rinsing is reduced. Additional best management practices in the milk parlor can include regular inspections of water hoses, scraping manure from the parlor floors before spraying, and using recycled water from the plate coolers or from the pipeline wash in the milk house (Castillo and Burrow 2008; Holmes and Struss 2009).

Currently, the process wastewater generated from daily water use from the milkhouse equipment and floor wash at the Vierra Dairy is 19.9 million gallons annually. With the proposed expansion, process wastewater generated would increase to 23.1 million gallons annually due to an increase in plate cooler water and other reusable water. This water is sourced from the domestic dairy groundwater well at the milk barn. While there would be an increase of approximately 3.2 million gallons annually in process wastewater generated and overall groundwater use at the milkbarn, the increased volume of diluted process wastewater would be used for continued irrigation of dairy cropland.

While there would be an increase in wastewater generated, this wastewater would be used to irrigate the existing cropland[18]. Therefore, the increase in water use at the dairy production area would result in a minor offset in irrigation deliveries at the cropland. In other words, the total irrigation demand provided from wastewater would increase from 6.6 percent to 7.9 percent of total water volume to with the proposed dairy expansion.

[18] As noted above, the proposed nutrient application rates meet required agronomic rates of 1.4 or less for best management farming practice mandated by the CVRWQCB.

The Vierra Dairy Expansion would continue to rely on surface water (from TID canals), groundwater, and wastewater recycling for irrigation. No new irrigation wells are proposed as part of the dairy expansion project. For the proposed dairy expansion, the applicant purchased additional cropland to be used for wastewater and manure application. With implementation of the proposed dairy expansion, the overall acreage for the land application area would increase from 582 acres to 770 acres. With the proposed changes in cropping patterns as detailed above, the estimated crop water demand would increase from 1.0023 to 1.0036 billion gallons of water annually, or an increase of approximately 1.3 million gallons annually.

Considering the increased groundwater use for drinking water (10 million gallons per year) and at the milkbarn (increase of 3.2 million gallons per year), there would be an overall increase in groundwater extraction of 13.2 million gallons per year at the milkbarn. While the proposed project would result in an increase in water required for irrigating cropland (increase of 1.3 million gallons per year), there would be an increase in process wastewater[19] generated with the proposed dairy expansion and sent to the pond (13 million gallons per year) as outlined above, and then mixed with irrigation water and applied to cropland. Therefore, while the proposed dairy expansion would result in an overall increase in groundwater extraction of 13.2 million gallons per year, the 13 million gallons of increased process wastewater available would be used for continued irrigation of dairy cropland[20] and would contribute to groundwater recharge via irrigation percolation.

The Turlock Subbasin is identified by the California Department of Water Resources as a high priority groundwater basin. While not in a condition of critical overdraft, the subbasin is experiencing declining groundwater levels over the long term. The Sustainable Groundwater Management Act (SGMA) of 2014 (as amended) 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. The goal of SGMA is to have sustainably managed groundwater within 20 years of the initial GSP submittal and maintain sustainability for a 50-year planning and implementation horizon.

The Turlock Subbasin Groundwater Sustainability Plan was adopted in January 2022 and submitted to the California DWR. The proposed project would be subject to the requirements of the GSP as adopted and revised in the future. The GSP identifies 23 projects and management actions to achieve its sustainability goal. The GSP plans include primarily groundwater recharge projects.

While the proposed dairy expansion would result in an increase in overall water use predominantly from drinking water for the cows, the increased process wastewater generated at the dairy would be used for irrigation, which could result in groundwater recharge via irrigation percolation, and it is not anticipated that the dairy expansion project would affect the broader groundwater basin levels or overdraft conditions. In addition, the proposed dairy expansion would be subject to the requirements of the GSP for the region, as adopted and revised in the future, which would further minimize impacts to groundwater supplies. Therefore, impacts from groundwater depletion from this operation would be considered less than significant.

[19] This includes process water from the milkbarn and manure and bedding, rainfall runoff into ponds, and direct rainfall onto ponds.

[20] As noted above, the proposed nutrient application rates meet required agronomic rates of 1.4 or less for best management farming practice mandated by the CVRWQCB.

Significance of Impact: Less than significant.

Mitigation Measure HYD-4: None required.

Impact HYD-5: Modification of surface water drainage patterns and an increase in runoff (Criteria X.c.ii and X.c.iii)

Implementation of the proposed dairy project would modify surface water drainage patterns, which could cause localized off-site migration of runoff, erosion, and/or flooding. However, because all stormwater 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 expansion project and would result in the conversion of 15 acres of cropland to dairy facility footprint. The facility includes an existing irrigation and tailwater retention 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 rainwater from several existing and proposed barns, which would be routed to nearby fields and yards. 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.

A portion of the project site and project area is located in a potential 100-year flood hazard zone identified by FEMA as Zone A. While a portion of the proposed dairy expansion facilities would be constructed within Flood Zone A, the dairy facility is not a high-density land use that would impede or redirect flood flows. Therefore, implementation of the proposed dairy expansion project would not impede or redirect flood flows.

Chapters 18.64.050 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 18.64.050 G requires notification of Merced County Division of Environmental Health for any off-site discharge of wastewater. Chapter 18.64.050 BB requires application of manure at agronomic rates. Additionally, Chapter 18.64.050 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. Chapter 18.64.070 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 Vierra Dairy is in substantial compliance with ACO requirements.

Under State regulations and according to the WMP, the Vierra 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 a 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.

Significance of Impact: Less than significant.

Mitigation Measure HYD-5: None required.

Impact HYD-6: Risk release of pollutants due to project inundation in flood zones (Criteria X.a, X.c.iv, and X.d)

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, causing impacts to surface water quality. This would be a significant impact.

Dairies located within flood hazard zones could be damaged by floodwaters, or could 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 site is located in a potential 100-year flood hazard zone identified by FEMA as Zone A. Within Merced County, no base flood elevations have been determined in areas designated as Zone A.

The Merced County floodplain management ordinance (Zoning Code Section 18.26) meets the minimum federal standard for participation in the National Flood Insurance Program. This ordinance requires that the base flood elevation on a project site be established, 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 18.64.050 Q of the Animal Confinement Ordinance requires that all new facilities be protected against the 100-year flood hazards. The General Order also requires in the WMP an evaluation of the dairy's design, construction, operation, and maintenance for flood protection. Compliance with Merced County and General Order regulations regarding floodplain management would provide protection of active dairy facilities from flood inundation.

For non-residential structures, an elevation certificate or a flood proofing certificate is required in accordance with Section 18.26.050 of the Merced County Code. A Flood Protection Analysis was completed for the Vierra Dairy and included as part of the proposed WMP (see Appendix J). The Flood Protection Analysis shows a portion of the dairy footprint within the Zone A designation, and established a base flood elevation of between 76 and 78.5 feet MSL. Based on the estimated BFE,

portions of the proposed dairy production area might be subject to inundation levels of approximately one-foot without any improvements to the site.

In accordance with Merced County flood requirements, all future buildings on the Vierra Dairy with three or more walls would need to have the finished floor at or above the base flood elevation, or buildings can be flood proofed up to BFE and provided with adequate venting (one square inch of vent per square foot of building). Any remodeled or improved buildings where the value of the improvement is more than 50 percent of the pre-construction value of said building would also be required to meet the BFE requirement. The Flood Protection Analysis prepared for the Vierra Dairy includes a Conceptual Grading and Flood Protection Plan that demonstrates how flood protection can be provided for the entire site by raising the access roads or berms for the proposed barns and manure drying area to elevations above the estimated base flood elevation. By constructing the finish grade elevation above the BFE, the study confirmed that the Vierra Dairy facility would have adequate protection from the 100-year flood event. Additional assessment and certification of the flood protection plan may be required in accordance with Merced County Code Section 18.26.050. Raising the finish grade in these areas would not impede or redirect flood flows since it would not affect overall flood flows or block drainage in the project area.

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 and NMP/WMP require operational practices that keep flood waters from coming into contact with recently applied manure or process water (Merced County Code 18.64.050 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 are expected to occur in the fields prior to contact with any flood waters;
- Neither the flood water nor the receiving waters will be used as a drinking water source without prior treatment, and therefore any pollutants contained in the flood water will 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 to 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).

Because the proposed dairy facilities could be subject to flood inundation in the event of a 100-year storm without constructing the finish grade above the base flood elevation, the following measures would be required to comply with the General Order and Merced County requirements for flood protection. For potential effects groundwater impacts due to pathogens at off-site locations, see Impact HYD-9.

Significance of Impact: Significant.

Mitigation Measure HYD-6:

- As recommended by the Flood Protection Analysis report (Sousa 2020), the following measures shall be implemented to meet General Order requirements for flood protection: Construction of the access road around the south end of the proposed barns shall be to finished elevations of 79 feet or greater. Construction of the access road or berm around the south and west boundary of the proposed manure drying area shall be to finished elevations of 77 – 78 feet.
- Following construction of the proposed facilities and prior to commencement of dairy operations, the project applicant shall obtain a flood proofing certificate in accordance with Section 18.26.050 of the Merced County Code from the Merced County Building and Safety Division. 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.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project site. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: This impact would be reduced to less-than-significant levels by ensuring that proposed facilities would be protected from to inundation. Issuance of a flood proofing certificate would demonstrate that needed measures have been installed, or that such measures would be installed during construction of the proposed dairy.

Implementation/Monitoring: Implementation of the mitigation measure would be the responsibility of the project applicant and Merced County Building and Safety Division. The Merced County Building and Safety Division shall monitor for compliance. Implementation of HYD-6 shall occur prior to issuance of a building permit, during construction, and prior to final inspection.

Impact HYD-7: Water supply pathways for pollutant migration (Criterion X.a)

Existing water supply wells on site and adjacent to the proposed dairy may represent preferred pathways for pollutant migration to groundwater. The project applicant has documented compliance with setback requirements or adequate well protection for on-site wells. This would be a less-than-significant impact.

Existing irrigation and water supply wells (either active or abandoned) in the site proximity that do not meet current well 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.

There are three on-site domestic wells, four additional domestic wells associated with the project area, and two irrigation wells serving the Vierra Dairy. The Merced County ACO, together with the Merced County Well Ordinance, recognizes the importance of protecting water quality from the release of animal pathogens. Chapter 18.64.050 of the County Code 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 well is provided. As noted in the DEH inspection, the Vierra Dairy is in substantial compliance with ACO requirements. In addition, the facility includes backflow prevention for existing irrigation wells and water supply wells and has adequate protection of groundwater.

The ACO requires that all wastewater be maintained on-site and discharged into the manure management system, and that wastewater does not create a nuisance or pollution condition (Chapter 18.64.050 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 18.64.050 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.

Since all existing wells at the project site meet current Merced County standards for well protection as set forth above, and the Vierra Dairy would continue to be subject to ACO and Well Ordinance requirements, there would be no potential conduits for groundwater contamination associated with existing water wells. This would be a less-than-significant impact.

Significance of Impact: Less-than-significant impact.

Mitigation Measure HYD-7: None required.

Impact HYD-8: Impacts to water quality at off-site locations as a result of project operations (Criterion X.a)

Implementation of the proposed Vierra Dairy Expansion project would result in the increased export of dry manure, associated pathogens, and residual contaminants to off-site locations, potentially causing impacts to water quality at off-site locations. This would be a significant impact.

The proposed dairy facility expansion would increase the number of cows from 5,597 to 7,117. The herd expansion would result in an overall increase in manure and associated pathogens produced at the project site. The manure could also contain residual amounts of contaminants such as hormones, antibiotics, or pesticides. Therefore, manure process water applied to fields may contain these pathogens and contaminants. For the potential impacts from pathogen transport and contamination of groundwater and water supply wells at the project site, see Impacts HYD-3 and HYD-7.

While implementation of the ACO, the General Order, and the Merced County Well Ordinance would minimize potential impacts from pathogen contamination on site, the proposed dairy facility expansion includes the increased export of manure generated from the facility. As reported in the NMP, approximately 30,000 tons of solid manure from the dairy facility is exported and applied to off-site agricultural operations. The total export of manure would increase to 34,000 tons with the proposed dairy expansion.

The Long-term Irrigated Lands Regulatory Program General Orders adopted by the RWQCB (see Regulatory Setting of this section) provide general WDRs to protect ground and/or surface waters

for owners and operators of irrigated lands throughout the Central Valley who join an approved third-party group or coalition. The Individual Discharger General Order (Order R5-2013-0100) regulates waste discharges from irrigated lands for individuals that are not enrolled under WDRs administered by a third-party, or who are not covered by the Dairy General Order WDRs. All growers are required to submit farm information to either their coalition or the RWQCB. These include both a farm evaluation and a nitrogen management plan. The Farm Evaluation helps determine what farm practices are currently being implemented and whether any improvements can be made to protect water quality. A significant amount of adsorption[21] of nutrients to soil particles and inactivation of pathogenic organisms would be expected to occur in the fields, and potential impacts to water quality at off-site fields receiving exported liquid and dry manure would be reduced. The growers are required to implement BMPs to protect surface water in areas where monitoring has identified problems.

As defined by the adopted Irrigated Lands Program General Orders (described above) and animal confinement facility WDRs, required surface and groundwater water monitoring and corrective actions conducted by water quality coalitions and individuals would reduce this potential impact to water quality at off-site fields. However, because elevated nitrate levels have been observed from agricultural operations in general in the Central Valley, the following mitigation measures would be required to ensure compliance with regulatory requirements.

Significance of Impact: Significant.

Mitigation Measure HYD-8:

Over the course of operations, the project sponsor shall obtain written agreement from the recipients of manure exported off site to require demonstrated compliance with the following:

- The recipient belongs to an approved third-party group or coalition compliant with the Long-term Irrigated Lands Regulatory Program General Orders adopted by the RWQCB, is covered by an Individual Discharger General Order, or is otherwise covered by Confined Animal Facility WDRs as adopted by the RWQCB.
- All manure shall be applied to cropland at rates and times that are reasonable for the crop, soil, climate, special local situations, and management system. Manure applications shall be timed and managed to minimize nitrogen movement below the root zone and to minimize percolation of waste constituents to groundwater.
- All stormwater that is or has been in contact with manure shall be maintained on site. No storm drainage that has been in contact with manure shall be allowed to flow or seep onto adjacent properties or public roads, or into any waterway.
- Where the commingling of water containing manure can take place with irrigation wells and irrigation and/or drainage district facilities, these facilities must be protected from pollution by a backflow device or method that is approved by the Division of Environmental Health and/or the appropriate irrigation/drainage district. It is the obligation of the property owner to install and maintain or cause to be installed and maintained the backflow device or method.

[21] Not to be confused with absorption, adsorption is the adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to a surface. Absorption is the process in which a fluid permeates or is dissolved by a liquid or solid.

- Manure shall not be applied within 100 feet of any domestic well, irrigation well, or surface water body. Surface water bodies include creeks, streams, lakes and reservoirs, but do not include canals constructed above grade. Adequate protection of surface water bodies or irrigation wells shall prevent discharge or infiltration of manure constituents to the water body or well.
- The project sponsor shall provide the most recent analysis of the liquid or dry manure, in writing, to the manure recipient. The signed agreement between the project sponsor and the recipient of manure exported off site shall be submitted to the Merced County Division of Environmental Health for review.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located outside the project site. The construction of surface water protection, such as berms, or installation of well backflow protection at off-site locations would result in less-than-significant environmental effects.

Significance after Mitigation: Significant and Unavoidable.

Implementation of these measures would reduce the magnitude of this potential effect by requiring compliance with RWQCB requirements to minimize impacts to surface and ground water quality from manure applied to cropland offsite. However, as discussed above, the CVDRMP monitoring has found that shallow groundwater has been affected across the Central Valley due to historic or current dairy operations, especially beneath cropland. Because the proposed operations would result in increased solid manure exported for off-site application to cropland, and the County can't control where the manure is sold and how it is applied to cropland, potential impacts to groundwater quality from the off-site export of manure would be significant and unavoidable.

Implementation/Monitoring: Implementation of these measures would be the responsibility of the project applicant. The Merced County Community and Economic Development Department and Division of Environmental Health shall monitor for compliance. Mitigation Measure HYD-7 shall be implemented throughout ongoing operations.

Impact HYD-9: Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan (Criterion X.e)

Implementation of the Vierra Dairy Expansion project could conflict with or obstruct implementation of the General Order for Existing Milk Cow Dairies WDRs or the Turlock Subbasin Groundwater Sustainability Plan. This impact would be considered potentially significant.

The Vierra Dairy is located in the Turlock Subbasin. The current Basin Plan for the Sacramento River and San Joaquin River Basins was updated as of February 2019. Agriculture and animal confinement facilities are designated as beneficial uses of water resources in the Basin Plan.

The CVRWQCB Existing Milk Cow Dairies General Order implements the State laws and regulations relevant to confined animal facilities. Under the General Order, animal confinement facility operations are prohibited from discharging waste into surface water, or into groundwater that is directly connected to surface water. In compliance with the requirements of the CVRWQCB, the proponents of the Vierra Dairy have completed the required components of the General Order for

the existing dairy, and would be required to obtain coverage under Individual WDRs for the proposed dairy expansion. However, the State Water Resources Control Board (State Water Board) is currently conducting a review of the Dairy General Order and has signaled that its review is likely to result in an order that will direct the CVRWQCB to reconsider significant aspects of its confined animal facilities program. The CVRWQCB has stated that pursuant to the CVDRMP's summary conclusions, the existing management practices under the NMP, WMP, and the Dairy General Order are not, nor have they been, adequate to prevent groundwater pollution underlying the dairy facilities and under lands receiving dairy wastes. Therefore, the proposed project may include waste discharges that could conflict with the Basin Plan.

As described above, the Turlock Subbasin Groundwater Sustainability Plan for the Turlock Subbasin was developed in order to implement the SGMA requirements and achieve the sustainability goals outlined in SGMA. While the Vierra Dairy Expansion would result in an increase in groundwater use, the majority of the water would be used for irrigation and would contribute to groundwater recharge, and the Vierra Dairy Expansion would be expected to follow the guidelines within the GSP, as applicable, to manage groundwater depletion.

Therefore, the project may conflict with or obstruct the water quality control plan or a sustainable groundwater management plan, and the potential impacts would be significant. The following mitigation would be required.

Significance of Impact: Significant.

Mitigation Measure HYD-9a:
Implement Mitigation Measure HYD-3, which requires compliance with Merced County and RWQCB regulations to minimize impacts to surface and groundwater quality.

Mitigation Measure HYD-9b:
Implement Mitigation Measure HYD-8, which requires compliance with Merced County and RWQCB regulations to minimize impacts to surface and groundwater quality from manure applied to cropland off site.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project site. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5-11 of this EIR.

Significance after Mitigation: Significant and Unavoidable.

Implementation of these measures would reduce the magnitude of this potential effect by requiring compliance with RWQCB requirements to minimize impacts to surface and groundwater quality. However, as discussed above, the CVDRMP monitoring has found that shallow groundwater has been affected across the Central Valley due to historic or current dairy operations, especially beneath cropland. Because of the demonstrated history of groundwater contamination as a result of animal confinement facilities, and the above-stated mitigation measures are within the responsibility and jurisdiction of other public agencies and not the County of Merced, potential impacts to groundwater quality would be significant and unavoidable.

Implementation/Monitoring: Implementation of the above measure would be the responsibility of the project applicant. The Merced County Division of Environmental Health and Department of Community and Economic Development shall monitor for compliance. Implementation of HYD-9a shall occur as listed under HYD-3, and implementation of HYD-9b shall occur as listed under HYD-8.

11 LAND USE COMPATIBILITY

This land use chapter provides an evaluation of land use compatibility for the proposed Vierra Dairy Expansion project. As established in the Initial Study (IS) for the proposed project (see Appendix A, *Notice of Preparation and Initial Study*), due to the proximity of off-site residences to the project facilities, the proposed dairy expansion could be incompatible with existing land uses in the project vicinity. Additional potential land use effects have been previously evaluated in the project IS and will not be evaluated further in this chapter. (This less-than-significant impact is briefly summarized in Section 11.3 below.)

The following assessment provides a discussion of the relationship of the proposed project to the policies and procedures of the Merced County General Plan, the Merced County Animal Confinement Ordinance (ACO) (a chapter of the Merced County Zoning Code), and other provisions of the Merced County Zoning Code.

11.1 REGULATORY FRAMEWORK

11.1.1 LAND USE REGULATION

Merced County has implemented extensive regulation of land use for areas within its jurisdiction, including the area of the proposed Vierra Dairy Expansion project. This regulation generally occurs through the County's General Plan and Zoning Ordinance.

MERCED COUNTY GENERAL PLAN AND ZONING ORDINANCE

The 2030 General Plan (Merced County 2013)[1] is a long-range, generalized planning policy document to guide development of the county over a 20-year period. The General Plan consists of a policy document and a series of land use and circulation maps and diagrams. The narrative policy document sets forth the adopted policies of the County regarding issues of public interest and regulation. Merced County's five guiding principles - agriculture, economic development, environmental quality, public facilities and services, and transportation - reflect a general community consensus about the key considerations of the General Plan. Topics addressed in the General Plan include goals, policies, and programs regarding: land use and community character; agriculture; transportation and circulation; housing; public facilities and services; natural resources; recreation and cultural resources; health and safety; air quality; and water resources.

The project site and the areas surrounding the site are designated Agricultural on the Merced County General Plan Land Use Diagram. As set forth in the 2030 Merced County General Plan, the Agricultural land use designation:

> … provides for cultivated agricultural practices which rely on good soil quality, adequate water availability, and minimal slopes. This is the largest County land use designation by area in the County and is typically applied to areas on the valley floor. (Merced County 2013)

[1] The 2030 Merced County General Plan was adopted on December 10, 2013. The document is available at the Merced County Community and Economic Development Department or at: <https://www.co.merced.ca.us/2018/Adopted-General-Plan>

The project site and the area surrounding the site are located within an area designated for A-1 (General Agricultural) uses by the Merced County Zoning Code. The purpose of the General Agriculture zone is to provide for areas of intensive farming operations dependent on higher quality soils, water availability, and relatively flat topography; and to host agricultural and/or industrial uses dependent on proximity to agricultural production or requiring a location in sparsely populated areas.

Animal confinement facilities such as dairies may be permitted in all agricultural zones within Merced County subject to approval of an Administrative Permit or Conditional Use Permit (CUP) as determined by the number of off-site dwellings within the windshed, and whether animal confinement facility criteria are met. Animal confinement facilities face greater regulatory scrutiny if greater than five off-site residential dwellings are located within the windshed, defined as an area of 1,320 feet upwind to 2,640 feet downwind of the periphery of the animal facility, or if the animal confinement facility does not meet other locational criteria as defined by County Code Section 18.64.040 (B). For the Vierra Dairy Expansion project, there are several residences located within the windshed of the dairy (see Figure 3-5 in Chapter 3, *Project Description*). Because of the number of residences located in the windshed, Merced County is considering the dairy project under its Conditional Use Permit process.

Within Merced County, Conditional Use Permits are discretionary permits that require special review and control to ensure that a use of land is compatible with the neighborhood and surrounding residences. Land uses subject to a CUP are considered more likely to have greater impacts than uses permitted by right, or uses permitted under Administrative Permits (Merced County Code Section 18.116.010 (B)). The proponents of the proposed Vierra Dairy Expansion project have made application to the County of Merced for a Conditional Use Permit (CUP20-009) to construct and operate the proposed dairy expansion.

Open Space Action Plan

The 2030 Merced County General Plan contains an Open Space Action Plan (OSAP). The Open Space Development Review System (OSDRS) is one of the primary implementing tools of the County's Open Space Action Plan. Through such a review system, daily planning and permit approval decisions should reflect and implement the adopted policies and development standards of the 2030 General Plan. The system is intended for utilization by developers in the design and building of projects, and by planners and decision makers in their review of projects for conformance with County policy. The system is fundamentally a process for assessing the appropriateness of proposed developments, including their compatibility with surrounding environmental constraints and resources. This system of review is required of all projects for which a building permit or other entitlement is necessary, such as a land division or use permit, as well as during policy and ordinance amendment. For project consistency with the OSDRS, see Table 11-2 in Section 11.3 of this chapter. Potential impacts to biological resources were evaluated in Chapter 6, *Biological Resources,* of this EIR.

Merced County Code and Animal Confinement Ordinance

Merced County's ACO acts to provide a comprehensive set of environmental compliance regulations affecting animal confinement facilities in Merced County. These regulations include several locational criteria to minimize land use conflicts with urban and sensitive land uses, and adjacent rural residences. To address these potential land use impacts, the EIR prepared for the ACO contains mitigation measures that require implementation of applicable chapters of the Merced County Code during environmental review of animal confinement facility projects such as the Vierra Dairy Expansion project.

Chapter 18.64.040 (B)(1)(b) of the Merced County Code requires a setback of at least 1,000 feet between new animal confinement facilities and any off-site residences. For an existing facility such as the Vierra Dairy, if the separation distances are less for the uses or boundaries described in Chapter 18.64.040 (B)(1), modification or expansion of the facility may not decrease the existing separation distance unless the off-site property owner provides written permission (Merced County Code Chapter 18.64.040 (B)(2)). The setback distance is measured from the nearest point of active areas of the animal confinement facility to the nearest point of the residence. For the Vierra Dairy, there are six off-site residences within 1,000 feet of existing dairy facilities.

The ACO prohibits new dairies within one-half mile of urban areas, areas zoned for residential uses, or concentrations of rural residences (Merced County Code Chapter 18.64.040 (B)(1)(a)). The ACO also protects sensitive uses such as schools, hospitals, jails, public parks, or any wildlife refuges from the nuisance effects of dairies by establishing a one-half mile setback from new dairies[2]. For an existing facility, modification or expansion of the dairy facility must not decrease the existing separation distance if it is less than one-half mile. The urban community of Hilmar is situated approximately 2.5 miles east-northeast of the existing active dairy facilities. There are no protected habitat areas, such as wildlife refuges or wildlife management areas, within or adjacent to the project area; the project site is located approximately four miles northeast of the Kesterson Unit of the San Luis National Wildlife Refuge – well beyond the minimum one-half mile setback.

Table 11-3 in Section 11.3 of this chapter lists locational criteria contained in the ACO, and project compliance with these regulations. (For a complete listing of Merced County Regulations Pertaining to Dairies and Other Animal Confinement Facilities, see Appendix C.)

[2] 2030 Merced County General Plan Policies LU-4.7 and LU-1.13 prohibit rural commercial and industrial uses, secondary residences, and ancillary agricultural uses within a half-mile of either federal or State wildlife refuges, or managed wetlands within the Grasslands Ecological Area when it is determined by the County that there could be an unmitigated impact to natural resources or habitat. See Table 11-1 for a discussion of project consistency with these policies.

11.2 ENVIRONMENTAL SETTING

11.2.1 PROJECT LOCATION AND SETTING

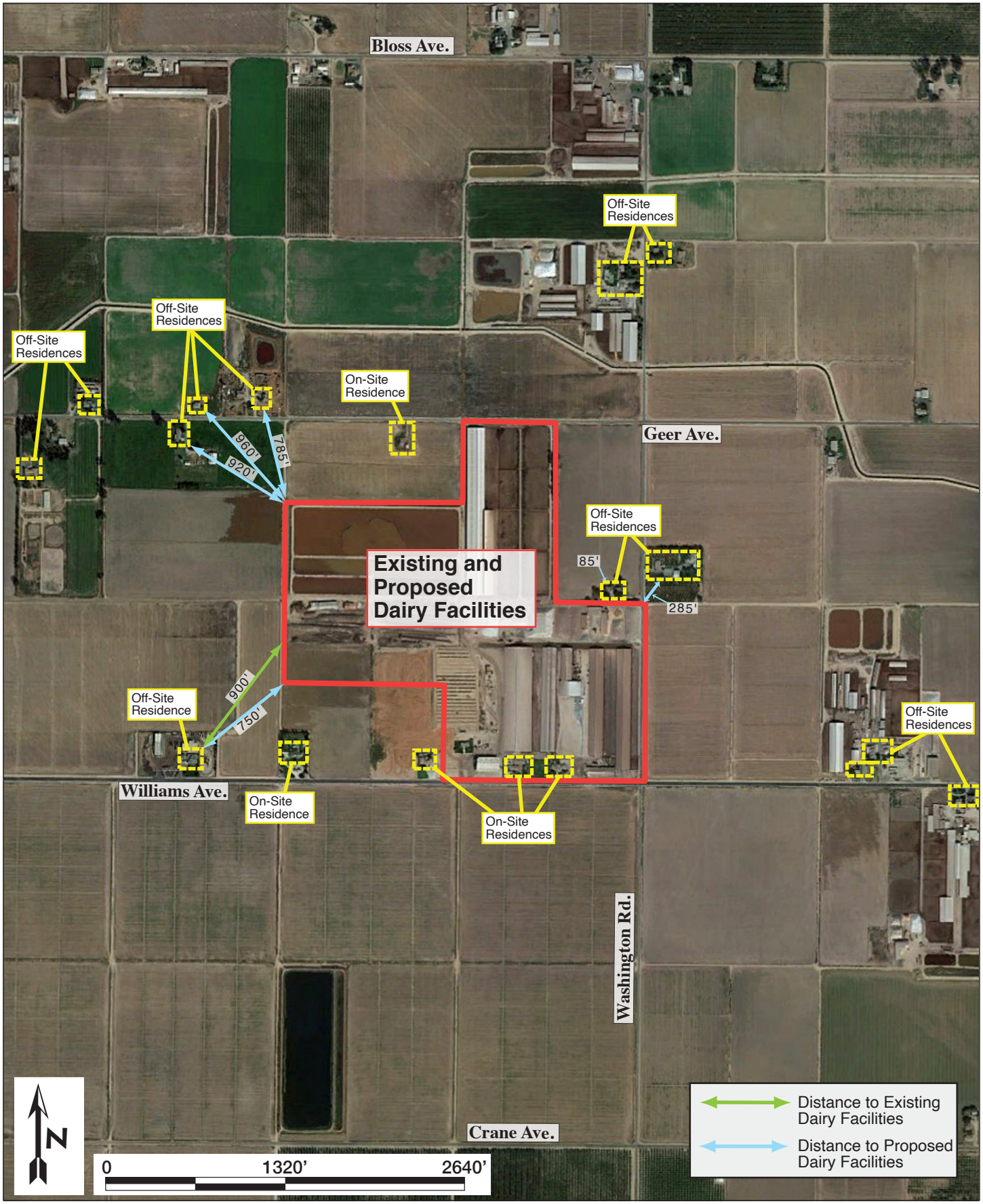
The existing Vierra Dairy is located in unincorporated Merced County, on the northwest corner of Williams Avenue and Washington Road in the Hilmar area (for additional project area information, see Chapter 3, *Project Description*). Adjacent existing land uses include several off-site single-family residences associated with other agricultural operations (see Figure 3-2 and Table 3-2). There are several off-site residences located within the windshed of the dairy (defined as an area of 1,320 feet upwind to 2,640 feet downwind of the periphery of the animal facility) (see Figure 3-5). There are six residences located within 1,000 feet of active dairy facilities: two located along Washington Road approximately 85 feet and 285 feet north and east of active animal facilities; three located along Geer Avenue approximately 785 feet, 960 feet, and 920 feet north of active animal facilities; and one located along Williams Avenue approximately 900 feet south of existing active animal facilities (see Figure 11-1 and the text box above). The distance of active animal facilities to the residence located along Williams Avenue would be reduced from 900 feet to 750 feet with the proposed dairy expansion. The distances to the other five residences within 1,000 feet would not be reduced. There are additional dairy facilities in the vicinity of the project site, including one facility located approximately 0.1 miles to the north and another 0.25 miles to the east of the project site.

Off-Site Residences within 1,000 Feet of Active Dairy Facilities

Washington Rd Residence A	85 feet
Washington Rd Residence B	285 feet
Geer Ave Residence A	785 feet
Geer Ave Residence B	960 feet
Geer Ave Residence C	920 feet
Williams Ave Residence A	900 feet

11.2.2 MERCED COUNTY PERMITTING HISTORY

Merced County records indicate there are several old permits on file for the project site, including permits for additional dwellings, Williamson Act Contracts, and the original dairy and dairy lagoon. There is an existing CUP12-005 on file for the dairy, which allowed for a dairy expansion in 2012 to 5,600 total animals. The NMP indicates that the facility has been in operation since 1967. To allow for the expansion of the dairy, the project sponsor has submitted an application for issuance of a new Conditional Use Permit (CUP20-009) from the County.



SOURCE: Planning Partners 2023

Vierra Dairy Expansion Project CUP20-009

Figure 11-1

Off-Site Residences Within 1,000 Feet of Existing or Proposed Active Dairy Facilities

11.3 ENVIRONMENTAL EFFECTS

11.3.1 SIGNIFICANCE CRITERIA

As set forth in Appendix G to the State CEQA Guidelines, Section XI, *Land Use and Planning*, 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:

- Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. (*XI.b)*

An additional land use assessment criterion previously evaluated in the project IS/NOP was whether the project would:

- Physically divide an established community. (*XI.a)*

Because there is no established urban community within or adjacent to the project area, this impact was found to be less than significant and will not be evaluated further in this chapter.

PROJECT CONSISTENCY WITH ADOPTED MERCED COUNTY PLANS AND POLICIES

The following discussion evaluates the consistency of the proposed Vierra Dairy Expansion project with Merced County policies. The policies of the 2030 Merced County General Plan, the consistency of the proposed dairy expansion project with those policies, and the reasoning for the conclusions are set forth in Table 11-1.

Because compliance or noncompliance with adopted plans and policies does not in itself result in a physical impact to the environment, no environmental impacts are identified in this analysis; rather, the evaluation concentrates on the proposed project's compliance with adopted Merced County policy. Where a policy regulates or sets standards for an aspect of the environment, for instance in setting flood proofing standards for areas subject to 100-year frequency floods, the impact is identified and evaluated in the appropriate topical section of this EIR, so that agency policies as environmental standards are used in evaluating specific environmental impacts.

Policy compliance is often a matter of interpretation. Unless their decision is appealed to the Board of Supervisors, the Merced County Planning Commission is the ultimate arbiter of public policy for this project, and their judgment regarding the project and a specific policy may be different from that set forth in this report. Thus, the following policy evaluation should be viewed as preliminary, with the ultimate decision to be made by the appropriate appointed and elected officials.

Table 11-1 Consistency of the Proposed Vierra Dairy Expansion Project with the 2030 Merced County General Plan Policies

Objective or Policy	Consistency	Discussion
Land Use Element		
Policy LU-1.13: Wetland Habitat Area Separation Do not allow rural commercial and industrial uses, secondary residences, and ancillary agricultural uses within a half mile of either State or Federal wildlife refuges, or managed wetlands within the Grasslands Ecological Area when it is determined by the County that there could be an unmitigated impact to natural resources or habitat.	Yes	There are no protected habitat areas, such as wildlife refuges or wildlife management areas, near the project site. The project site is well beyond the minimum one-half mile setback for these uses. Further, the proposed project consists of an expansion of existing dairy facilities and does not include ancillary uses such as additional farm worker housing as described in Policy LU-2.4 below.
Policy LU-2.3: Land Use Activity Limitations Limit allowed land use within Agricultural and Foothill Pasture areas to agricultural crop production, farm support operations, and grazing and open space uses.	Yes	The existing and proposed dairy facility is an allowed use in the agricultural land use designation subject to approval of an Administrative Permit or Conditional Use Permit.
Policy LU-2.4: Secondary Uses in Agricultural Areas Except as otherwise provided by law, limit ancillary uses in Agricultural and Foothill Pasture areas to include secondary single-family residences, farm worker housing, agricultural tourism related uses, and agricultural support services, provided that such uses do not interfere with historic agricultural practices or result in adverse health risks, or conflict with sensitive habitats or other biological resources.	Yes	The existing uses at the project area include a dairy facility, associated cropland, and secondary single-family residences. The proposed project includes an expansion of the existing dairy facilities.
Policy LU-2.7: Rural Energy Production Allow the development of ethanol production, co-generation, solar, and wind facilities in Agricultural and Foothill Pasture areas that produce renewable energy, support agricultural-related industries, and/or use agricultural waste, provided that such uses do not interfere with agricultural practices or conflict with sensitive habitats or other biological resources.	n/a	There is no renewable energy production included with the proposed dairy expansion.
Policy LU-4.7: Wetland Habitat Area Separation Do not allow rural commercial and industrial uses, secondary residences, and ancillary agricultural uses within a half mile of either State or federal wildlife refuges, or managed wetlands within the Grasslands Ecological Area when it is determined by the County that there could be an unmitigated impact to natural resources or habitat.	Yes	See Policy LU-1.13 above.

Table 11-1 Consistency of the Proposed Vierra Dairy Expansion Project with the 2030 Merced County General Plan Policies

Objective or Policy	Consistency	Discussion
Policy LU-10.12: Consultation with State and Federal Agencies, as follows: Continue to consult with applicable State and Federal regulatory agencies during project review and permitting activities.	Yes	The Notice of Preparation of an EIR for the Vierra Dairy Expansion project was filed with the Office of Planning and Research (OPR) on October 1, 2021. The NOP and Initial Study were circulated to the public, local and state agencies, and other interested parties to solicit comments on the proposed project. This Draft EIR similarly will be circulated for public review and comment.
Policy LU-10.14: Consultation with Grassland Resources Regional Working Group Consult with the Grasslands Resources Regional Working Group during project review and conservation planning efforts for projects within the boundaries of the Grasslands Focus Area.	n/a	Consultation as required by this policy is not necessary since the project site is located outside of the Grasslands Focus Area and the Grasslands Ecological Area boundaries.
Agricultural Element		
Policy AG-3.1: Right-to-Farm Ordinance Continue to implement the Right-to-Farm Ordinance to define and limit instances where agricultural operations may be considered a nuisance to surrounding rural residential, residential or urban development.	Yes	The existing dairy is consistent with agricultural uses in the surrounding area. Mitigation measures have been included in this chapter to ensure land use compatibility of the expanded dairy with existing off-site residential uses.
Policy AG-3.9: New Confined Animal Facility Location Requirements Require new or expanded confined animal facilities to be located, at a minimum: a) One-half mile from any Rural Center or Urban Community boundary; residentially-designated or zoned property; sensitive uses such as schools, hospitals, jails, Federal wildlife areas, State wildlife areas, and public parks; or concentrations of five or more off-site residences. This does not include areas for municipal uses such as wastewater treatment facilities, airports, or solid waste recycling or disposal facilities located outside urban areas; and b) One thousand feet from any off-site residence, unless there is written permission from the off-site property owner.	Yes	The proposed project would be compliant with setback provisions for the protection of the specified uses. There are no residentially zoned areas or concentrations of rural residences within the 0.5-mile setback distance. There are no wildlife areas within the 0.5-mile setback distance. There are six off-site residences located within 1,000 feet of the existing dairy facility. However, distances to these residences would not be reduced (see Impact LU-1 and LU-2).

Table 11-1 Consistency of the Proposed Vierra Dairy Expansion Project with the 2030 Merced County General Plan Policies

Objective or Policy	Consistency	Discussion
Transportation and Circulation Element		
Policy CIR-1.8: Private Roadway Improvements Require private roads and related improvements to be designed and installed to County standards as contained in the Improvement Standards and Specifications Manual (Title 16 of County Code) and Subdivision Code (Title 17), unless it can be demonstrated to the satisfaction of the approval authority that alternative improvements will be provided sufficient to fulfill the goals and objectives of this Chapter and the respective Codes.	n/a	No new private roads are proposed as part of the Vierra Dairy Expansion project. No modifications to any existing roadway are proposed either during project construction or operation.
Policy CIR-1.14: Required Structural Improvements Require developers of mining, large commercial, agricultural commercial, and industrial projects to either make appropriate roadway improvements and/or provide a funding mechanism for maintenance of the structural sections of County roadways when such projects could result in appreciable increases to commercial truck traffic and/or compromise the integrity of existing road sections.	Yes	The proposed dairy expansion would result in an increase from approximately 77.8 to 109.1 average daily trips, with an increase of 31.3 daily trips, including 4.3 heavy truck trips per day. The Merced County Department of Public Works, Roads Division, has required as a condition of approval that a Roadway Impact Agreement between the applicant and the County be prepared and executed to determine impact fees for the proposed project.
Policy CIR-1.15: Right-of-Way and Roadway Improvement Requirements Require right-of-way dedication and roadway improvements to offset project-related traffic and roadway impacts on all discretionary land use entitlement approvals.	Yes	See above.
Policy CIR-1.18: Right-of-Way Work Require encroachment permits for work within a right-of-way.	n/a	At this time, the proposed project would not require an Encroachment Permit since there is no work proposed within any public right-of-way.
Public Facilities and Services Element		
Policy PFS-7.10: Adequate Fire Flows for Agricultural Facilities Require all agricultural commercial facilities to have adequate water supply and fire flows to meet the Uniform Fire Code and other State and local ordinances.	Yes	As described in the IS/NOP, the Merced County Fire Department generally imposes requirements for on-site water storage for fire protection. Compliance with measures as set forth by the Fire Department would be required as conditions of approval and would reduce fire risk and hazard to levels found acceptable by the Merced County Fire Department.

Table 11-1 Consistency of the Proposed Vierra Dairy Expansion Project with the 2030 Merced County General Plan Policies

Objective or Policy	Consistency	Discussion
Natural Resources Element		
Policy NR-1.7: Agricultural Practices Encourage agricultural, commercial, and industrial uses and other related activities to consult with environmental groups in order to minimize adverse effects to important or sensitive biological resources.	Yes	See response to Policy LU-10.12 above.
Policy NR-1.17: Agency Consultation Consult with private, local, State, and Federal agencies to assist in the protection of biological resources and prevention of degradation, encroachment, or loss of resources managed by these agencies.	Yes	See response to Policy LU-10.12 above.
Policy NR-2.9: Energy Conservation Encourage and maximize energy conservation and identification of alternative energy sources (e.g., wind or solar).	Yes	Operations at the Vierra Dairy would be considered energy efficient. Impact GHG-2 describes several energy efficiency upgrades that have been incorporated into existing operations.
Policy NR-3.1: Soil Protection Protect soil resources from erosion, contamination, and other effects that substantially reduce their value or lead to the creation of hazards.	Yes	Merced County's environmental procedures and standard conditions of approval include erosion control measures for both public and private development projects within the county. Additionally, the project will be required to comply with the State requirements of the General Permit for Discharges of Storm Water Associated with Construction Activity.
Policy NR-3.2: Soil Erosion and Contamination Require minimal disturbance of vegetation during construction to improve soil stability, reduce erosion, and improve stormwater quality.	Yes	See above.
Recreation and Cultural Resources Element		
Policy RCR-1.7: Agricultural Land Use Compatibility Consider agriculture as a compatible land use and appropriate buffer for public and private recreation areas.	n/a	There are no public or private recreation uses immediately adjacent to the project site or area.
Policy RCR-2.5: Human Remains Discovery Require that, in the event of the discovery of human remains on any project construction site, all work in the vicinity of the find will cease and the County Coroner and Native American Heritage Commission will be notified.	Yes	Chapter 7, *Cultural Resources and Tribal Cultural Resources* of this EIR includes mitigation that would require stopping work in the event of human remains discovery until the County coroner and Native American Heritage Commission (NAHC) are notified and appropriate action is taken.

Table 11-1 Consistency of the Proposed Vierra Dairy Expansion Project with the 2030 Merced County General Plan Policies

Objective or Policy	Consistency	Discussion
Policy RCR-2.10: Tribal Consultation Consult with Native American tribes regarding proposed development projects and land use policy changes consistent with Planning and Zoning Law at Government Code Section 65351, and the OPR Tribal Consultation Guidelines (2005).	Yes	Chapter 7, *Cultural Resources and Tribal Cultural Resources* of this EIR, written notification and consultation with Native Americans was conducted during the Draft Program EIR preparation process for the 2030 General Plan Update. There were no responses received, and no sacred lands sites were identified as areas of concern with implementation of the 2030 General Plan. Lead agencies, such as Merced County, must consult with California Native American Tribes who are traditionally and culturally affiliated with the geographic area of the proposed project, and who have requested such notification or consultation in writing. As of the date of this Draft EIR (*Ho, pers. comm.* 2023), no tribes have requested notification or consultation with Merced County for the project area.
Health and Safety Element		
Policy HS-5.1: Compliance with Safety Standards Require that hazardous materials are used, stored, transported, and disposed of in a safe manner, in compliance with local, State, and Federal safety standards.	Yes	The on-site storage of any hazardous material over threshold quantities (55 gallons; 200 cu. ft.; or 500 pounds) would require that a revised Hazardous Materials Business Plan (HMBP) to be filed with the Merced County DEH. The existing HMBP for the Vierra Dairy Expansion will be updated with the DEH.
Air Quality Element		
Policy AQ-1.3: Agricultural Operations Emission Reduction Strategies Promote greenhouse gas emission reductions by encouraging agricultural operators to use carbon efficient farming methods (e.g., no-till farming, crop rotation, cover cropping); install renewable energy technologies; protect grasslands, open space, oak woodlands, riparian forest and farmlands from conversion to other uses; and develop energy-efficient structures.	Yes	The proposed dairy expansion includes maintaining the cultivation of cropland for the production of feed for the cows on site. As evaluated in Chapter 8, *Greenhouse Gas Emissions and Energy Use*, of this EIR, the dairy operations include several GHG emission reduction strategies (see Impact GHG-1). Operations at the Vierra Dairy would be considered energy efficient, and several energy efficiency features are used in agricultural operations (see Impact GHG-2).
Policy AQ-2.2: Development Review Process Use the development review process to achieve measurable reductions in criteria pollutant, toxic air contaminants, and greenhouse gas emissions.	Yes	As part of the development review process, this EIR evaluates air quality and greenhouse gas emission impacts of the proposed Vierra Dairy Expansion project (see Chapter 5, *Air Quality and Odors,* and Chapter 8, *Greenhouse Gas Emissions and Energy Use*, of this EIR) and includes mitigation measures to minimize impacts.
Policy AQ-2.3: Cumulative Impacts Encourage the reduction of cumulative air quality impacts produced by projects that are not significant by themselves, but result in cumulatively significant impacts in combination with other development.	n/a	Potential project impacts due to both project specific and cumulative air quality effects have been determined to be significant and unavoidable. Air quality impacts of the proposed Vierra Dairy Expansion project are evaluated in Chapter 5, *Air Quality and Odors,* of this EIR, and mitigation measures are included to minimize impacts.

Table 11-1 Consistency of the Proposed Vierra Dairy Expansion Project with the 2030 Merced County General Plan Policies

Objective or Policy	Consistency	Discussion
Policy AQ-2.4: Mitigation Require that local and regional air quality impacts identified during CEQA review for projects reviewed and approved by the County are consistently and fairly mitigated.	Yes	See above.
Policy AQ-2.5: Innovative Mitigation Measures Encourage innovative mitigation measures and project redesign to reduce air quality impacts by coordinating with the San Joaquin Valley Air Pollution Control District, project applicants, and other interested parties.	Yes	See above.
Policy AQ-2.7: Air District Best Performance Standards Require the County to use the Best Performance Standards adopted by SJVAPCD during the development review and decision-making process to ensure new projects meet the targets set by the district.	Yes	As part of the development review process, this EIR evaluates air quality of the proposed Vierra Dairy Expansion project and requires implementation of SJVAPCD Best Performance Standards, including compliance with Regulation VIII, the ATC/PTO permit process, and implementation of Best Available Control Technology to be developed during permit review (see Chapter 5, *Air Quality and Odors,* of this EIR).
Policy AQ-6.1: Particulate Emissions from Construction Support the San Joaquin Valley Air Pollution Control District's efforts to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible and consistent with State and Federal regulations.	Yes	As discussed in Chapter 5, *Air Quality and Odors,* of this EIR, the project applicant would be required to comply with applicable SJVAPCD Rules and Regulations, including Regulation VIII, which specifies control measures for PM_{10} emissions from construction related activities, including demolition.
Policy AQ-6.8: Voluntary Emissions Reduction Agreement Require all project applicants, where project emissions have been evaluated to exceed SJVAPCD significance thresholds, to consult with the SJVAPCD regarding the establishment of a Voluntary Emissions Reduction Agreement between the applicant and the SJVAPCD. Support the SJVAPCD in its efforts to fund the Emission Reduction Incentive Program.	Yes	Chapter 5, *Air Quality and Odors,* of this EIR includes mitigation requiring the project applicant to consult with the SJVAPCD regarding a Voluntary Emissions Reduction Agreement (see Mitigation Measure AQ-3).

Table 11-1 Consistency of the Proposed Vierra Dairy Expansion Project with the 2030 Merced County General Plan Policies

Objective or Policy	Consistency	Discussion
Water Element		
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.	Yes	As discussed in Chapter 10, *Hydrology and Water Quality*, the existing dairy is subject to the requirements of the Central Valley Regional Water Quality Control Board General Order for Existing Milk Cow Dairies. The proposed expansion would require obtaining coverage under Individual Waste Discharge Requirements, or new requirements to be issued by the CVRWQCB, which will include additional measures to minimize these effects.
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.	Yes	As discussed in the IS/NOP, the proposed dairy expansion would include the construction of a new septic system near the proposed hospital milking barn. The installation of the septic system would require compliance with Merced County performance standards and approval by the DEH.
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.	Yes	As discussed in Impact HYD-7 in Chapter 10, *Hydrology and Water Quality*, existing wells at the project site meet current Merced County standards for well protection, and no mitigation would be required.
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.	Yes	Tailwater return used on land application fields are discussed in Chapter 10, *Hydrology and Water Quality*. Recycled water is used to clean the milk parlor floor and is the source of sprinkler pen water, which ultimately is used as process wastewater to irrigate crops.

Source: Merced County, 2013; Planning Partners, 2023.

Table 11-2 includes an evaluation of project consistency with the Open Space Development Review System as set forth in the County's General Plan Open Space Action Plan.

Table 11-2 Consistency of the Proposed Vierra Dairy Expansion Project with the Merced County General Plan Open Space Development Review System

Question	Response	Discussion
1. Basic Land Use Category, Zone Code Consistency and Community Service Availability Determination	Yes	The proposed project is consistent with the Merced County Agricultural land use designation. The project is consistent with the General Agricultural zoning designation. As evaluated in the IS/NOP, the Vierra Dairy Expansion project impact to County services and facilities has been found to be less than significant. Based on the number of people on the site, the applicant must obtain a permit to operate a public water system. The facility shall then maintain compliance with that permit as long as 25 or more persons work at the facility on 60 or more days of the year.
2. Open Space Inventory Map and Data Base Review	Yes	Agriculture is considered an open space use. The proposed dairy expansion project would be a continuation of existing agricultural uses.
3. Demonstration by the permit applicant of consultation with the California Department of Fish and Wildlife, the Central Valley Regional Water Quality Control Board, the State Water Resources Control Board, the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and/or the Army Corps of Engineers, and any water purveyor serving the project area, as appropriate, to evaluate resources that could be affected by the proposed action; and proof of issuance of permits by these agencies, as required	Yes	Through development of the EIR and the CEQA process, consultation with applicable agencies has been conducted on behalf of the project applicant. Where mitigation measures have been suggested by resource agencies, they have been included in the EIR.
4. Environmental Determination	Yes	With issuance of the NOP, an environmental determination was made that the proposed project may have a significant effect on the environment, and an EIR is required. This Draft EIR represents the record of expanding upon the determination.
5. Land Use and Sensitive Resource Compatibility Determination	To be determined by the Planning Commission	The proposed project is located in an agricultural district in Merced County. Adjacent land uses include similar agricultural uses, dairy farms, and crop production areas. The project would be consistent with the requirements of the Merced County Zoning Ordinance with implementation of mitigation measures. Impact LU-2 of this chapter evaluates compatibility with nearby sensitive resources. This impact was found to be less than significant, or less-than-significant following mitigation. The Merced County Planning Commission will make the ultimate compatibility finding.

Source: Merced County, 2013; Planning Partners, 2023.

Table 11-3 below lists locational criteria contained in the ACO, and project compliance with these regulations. (For a complete listing of Merced County Regulations Pertaining to Dairies and Other Animal Confinement Facilities, see Appendix C of this EIR.)

Table 11-3 Consistency of the Proposed Vierra Dairy Expansion Project with the Locational Requirements of the Merced County Code

Requirement	Consistency	Discussion
Chapter 18.64.040 Locational Criteria		
B. Other Locational Criteria 1. New Facilities a. The new facility shall be located more than one-half mile from the nearest boundary of the following: specific urban development plan, rural residential center, highway interchange center, or agricultural services center; residentially designated property in the general plan or residentially zoned property; sensitive uses such as schools, hospitals, jails, public or private recreational areas, parks, or all wildlife refuges; or concentrations of five or more off-site residences, provided that to qualify as a "concentration," residences must be legally established, occupied, located within a contiguous area, and must equal or exceed a density of one dwelling unit per acre. Any of the previously mentioned urban boundaries shall not include areas for municipal uses such as wastewater treatment facilities, airports, or solid waste recycling or disposal facilities located outside urban areas.	n/a	The Vierra Dairy Expansion project involves the expansion of an existing dairy facility and not a new facility. See the consistency evaluation under Section 18.64.040 (B)(2) below.
b. The new facility shall be located at least 1,000 feet from any Federal wildlife area, State wildlife area, or off-site residence, except that any new facility may locate closer than 1,000 feet from an off-site residence with written permission from the off-site property owner(s). New goat facilities shall be located at least 500 feet from any off-site residences or Federal or State wildlife areas.	n/a	See above.
c. An application for a new facility or modification of an existing facility which has submitted a complete land use permit application to planning and community development shall be exempt from the setbacks in subparagraph (B)(1)(b) of this section from off-site residences, provided the new off-site single-family residence obtained the building permit after the facility submitted a complete application for a land use permit.	n/a	See above. All adjacent off-site residences are existing and previously permitted residences.
2. **Existing Facilities**. For an existing facility, if the separation distances are less for the uses or boundaries described in paragraph (B)(1) of this section, modification or expansion of the facility must not decrease the existing separation distance, except that expansion or modification of existing facilities may occur if the separation distance is less than 1,000 feet from an off-site residence and if the off-site property owner(s) provides written permission.	Yes	The proposed project would be compliant with setback provisions for the protection of the specified uses. There are six off-site residences within 1,000 feet of existing dairy facilities. However, distances to these residences would not be reduced (see Impact LU-1 and LU-2).

Table 11-3 Consistency of the Proposed Vierra Dairy Expansion Project with the Locational Requirements of the Merced County Code

Requirement	Consistency	Discussion
3. **Offsite Residences**. New single-family residences not a part of an existing animal confinement facility are prohibited within 1,000 feet of an existing facility with any of the following exceptions. a. The animal facility owner gives written permission for locating the off-site residence closer than 1,000 feet; b. The existing residence is being remodeled; or c. The existing residence is replaced with another dwelling no closer than the existing separation distance.	n/a	There are no new single-family off-site residences included in the proposed project.

Source: Merced County, 2013; Planning Partners, 2023.

11.3.2 ENVIRONMENTAL IMPACTS

The following discussion examines the potential impact of the proposed project based on the impact threshold criterion described above.

Impact LU-1: Consistency with Merced County Land Use Plans and policies adopted to protect the environment, including setback standards (Criterion XI.b)

As proposed, the Vierra Dairy Expansion project would be consistent with Merced County land use policies, including setback standards for animal confinement facilities. Because the proposed project would comply with land use regulations established by Merced County under the 2030 General Plan, ACO, and Zoning Code provisions, this would be considered a less-than-significant impact.

As indicated in Tables 11-1 and 11-2, the proposed Vierra Dairy Expansion project would be consistent with the policies and requirements of the Merced County General Plan and the Open Space Action Plan. Table 11-3 indicates that the proposed project would be consistent with the locational requirements of the Merced County Code (Chapter 18). These locational requirements are described in detail below.

The ACO (Merced County Code Chapter 18.64.040 (B)(1)(a)) and Merced County General Plan Policy AG-3.9 prohibit new dairies within one-half mile of urban areas, areas zoned for residential uses, or concentrations of rural residences. According to Merced County Code Chapter 18.64.040 (B)(2), if the animal confinement facility is located within the minimum setback distance, the modification or expansion of an existing facility must not decrease the existing separation distance from these areas. The proposed dairy project is not located within one-half mile of any of these uses. The community of Hilmar is located approximately 2.5 miles to the east-northeast of the existing active dairy facilities. Also, there are no residentially zoned areas or concentrations of rural residences within the one-half mile setback distance (Merced County GIS 2023).

The ACO also protects sensitive uses such as schools, hospitals, jails, public or private recreational areas, parks, or all wildlife refuges from the nuisance effects of dairies by establishing a one-half mile

setback from new dairies[3]. For an existing facility, modification or expansion of the dairy facility must not decrease the existing separation distance if it is less than one-half mile. There are no protected habitat areas, such as wildlife refuges or wildlife management areas, within one-half mile of the project site.

Chapter 18.64.040 of the Merced County Code and Merced County General Plan Policy AG-3.9 require at least a 1,000-foot setback between animal confinement facilities such as the Vierra Dairy and off-site residences. The setback distance is measured from the nearest point of active areas of the animal confinement facility to the nearest point of the residence. For the Vierra Dairy, there are six off-site residences within 1,000 feet of existing dairy facilities; two located along Washington Road approximately 85 feet and 285 feet north and east of active animal facilities; three located along Geer Avenue approximately 785 feet, 960 feet, and 920 feet north of active animal facilities; and one located along Williams Avenue approximately 900 feet south of active animal facilities (see Figure 11-1). According to Merced County Code Chapter 18.48.040 B(2), modification or expansion of the facility may not decrease the existing separation distance unless the off-site property owner provides written permission. Construction of the proposed facilities would not reduce the existing separation distances to five of the off-site residences within 1,000 feet. However, the distance of active animal facilities to the residence located along Williams Avenue would be reduced from 900 feet to 750 feet with the proposed dairy expansion. A Merced County Setback Waiver[4] has been signed by the owner of the off-site residence to allow a reduced setback distance, which would meet the requirements of the ACO. The proposed expansion would not reduce the distance to less than 1,000 feet for any off-site residence currently greater than 1,000 feet from existing active dairy facilities.

Because the proposed dairy expansion would meet Merced County ACO setback requirements, this would be a less-than-significant impact.

Significance of Impact: Less than significant.

Mitigation Measure LU-1: None required.

Impact LU-2: Land use compatibility with existing off-site residential uses adjacent to the project area (ACO)

Implementation of the proposed Vierra Dairy Expansion project could introduce an additional source of odors, dust, flies, or other insects in the area of nearby residences; the proposed project could be considered incompatible with existing off-site residences due to the siting of active dairy facilities in proximity to these uses. While there have been no nuisance complaints for the dairy, because of the proximity of the adjacent off-site residences, there is an increased potential for land use conflicts, and this would be a significant impact.

---

[3] 2030 Merced County General Plan Policies LU-4.7 and LU-1.13 prohibit rural commercial and industrial uses, secondary residences, and ancillary agricultural uses within a half-mile of either federal or State wildlife refuges, or managed wetlands within the Grasslands Ecological Area when it is determined by the County that there could be an unmitigated impact to natural resources or habitat. See Table 11-1 for a discussion of project consistency with these policies.

[4] A copy of this waiver is on file with the Planning Division/Community & Economic Development Department.

The major land uses adjacent to the dairy project are agricultural and open space land uses. For the Vierra Dairy, the closest off-site residences to existing active dairy facilities are located approximately 85 feet and 285 feet north of active animal facilities along Washington Road near the eastern corner of the project site (see Figure 3-8). Four other off-site residences are located within 1,000 feet of active areas of the dairy. While the existing agricultural character of the vicinity would tend to minimize incompatibility to existing uses in the project vicinity, implementation of the dairy expansion project could introduce an additional source of odors, dust, flies, and other insects in the area of these residences. (These potential nuisance effects are evaluated in Chapter 5, *Air Quality and Odors* and Chapter 9, *Nuisance Conditions from Insects* of this EIR.) The combination of these nuisance effects contributes on a cumulative level to determine land use compatibility with existing residents in the area.

Merced County regulates land use through the 2030 General Plan and Zoning Code. The EIR prepared for the Merced County ACO assessed potential land use conflicts with rural residences for new and expanding animal confinement facilities in Merced County. In efforts to minimize these conflicts and protect agricultural uses, the ACO requires a minimum setback between new or expanded animal confinement facilities and individual off-site rural residents to 1,000 feet, and generally prohibits the construction of new off-site dwellings within 1,000 feet of an existing animal confinement facility, with some exceptions. According to Merced County Code Chapter 18.64.040 (B)(2), the modification or expansion of an existing facility must not decrease the existing separation distance from off-site residences to less than 1,000 feet unless the off-site property owner provides written permission. For the proposed Vierra Dairy Expansion, there are six off-site residences located within 1,000 feet of existing dairy facilities (see Figure 11-1). Construction of the proposed facilities would not reduce the existing separation distances to five off-site residences within 1,000 feet. However, the distance of active animal facilities to the residence located along Williams Avenue would be reduced from 900 feet to 750 feet with the proposed dairy expansion. A Merced County Setback Waiver has been signed by the owner of the off-site residence to allow a reduced setback distance, which would meet the requirements of the ACO.

In the past five years, no official nuisance complaints have been reported at the Vierra Dairy and submitted to DEH (Merced County 2023a). Similarly, no odor complaints regarding the Vierra Dairy have been received by the SJVAPCD (SJVAPCD 2023). While a comment submitted on the Notice of Preparation for the project indicated general concerns regarding odors, nuisance insects, and quality of life impacts from dairies in Merced County, there were no issues specific to the project identified by any nearby neighbors or reported to DEH.

The project applicant has completed an Odor and Vector Control Plan for the dairy facility as part of the proposed dairy expansion project application to minimize the potential for generation of odors and nuisance insects from proposed operations. These plans include housekeeping and management measures to further reduce flies, and implementation of best management practices to control odors. As described above, the existing dairy is consistent with surrounding agricultural uses and meets Merced County setback conditions for expanding dairies. Occasional odors at a dairy facility and associated farmland would be considered normal as recognized by the County's Right-to-Farm Ordinance, even with implementation of best management practices.

While no official nuisance complaints have been reported at the Vierra Dairy, because the active dairy facilities are located less than 1,000 feet from several off-site residences, there would be the potential for nuisance conditions at these residences with implementation of the proposed dairy expansion, and the following mitigation would be required.

Significance of Impact: Significant.

Mitigation Measure LU-2a:
Implement the odor and dust control measures set forth in Mitigation Measures AQ-7a.

Mitigation Measure LU-2b:
Implement the nuisance control measures set forth in Mitigation Measure HAZ-1.

Potential Environmental Effects of Measure: All physical improvements or activities that could result in changes to the physical environment required by this measure would be located within the project area. The impacts of implementing such measures, if any, would be similar to those identified for the project in Chapters 5 to 11 of this EIR.

Significance after Mitigation: Implementation of the foregoing measures would reduce the magnitude of this potential effect by requiring housekeeping and management measures to minimize nuisance insect and odor conditions. While there may be a potential for nuisance conditions with the dairy expansion, the proposed expansion would not reduce the setback distances specified by the ACO, and with implementation of the above mitigation measures, the potential impacts related to land use incompatibility with existing off-site residences would be reduced to less than significant.

Implementation/Monitoring: The Merced County Community and Economic Development Department and Division of Environmental Health shall monitor for compliance. Mitigation Measure LU-1a (MM AQ-7a) and Mitigation LU-1b (MM HAZ-1) shall be implemented prior to issuance of a building permit and throughout ongoing operations.

This page intentionally
left blank.

12 REQUIRED CEQA ANALYSES

12.1 CUMULATIVE IMPACTS

The California Environmental Quality Act (CEQA) Guidelines require that all Environmental Impact Reports (EIR) contain an analysis of cumulative impacts to which the project might contribute. An EIR must discuss the "cumulative impact" of a project when its incremental effect would be cumulatively considerable. State CEQA Guidelines Section 15355 defines cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact "consists of an impact which is created as a result of the combination of the project evaluated in the EIR, together with other projects causing related impacts" [CEQA Guidelines Section 15130(a)(1)]. The discussion of cumulative impacts "shall reflect the severity of the impacts and their likelihood of occurrence, but the discussion need not provide as great detail as is provided for the effects attributable to the project alone" [CEQA Guidelines Section 15130(b)]. By requiring an evaluation of cumulative impacts, CEQA attempts to minimize the possibility that an EIR will overlook large-scale environmental impacts by only focusing on the effects of a single project.

Further, the CEQA Guidelines state that "[l]ead agencies should define the geographic scope of the area affected by the cumulative effect and provide a reasonable explanation for the geographic limitation used" [Section 15130(b)(3)]. The cumulative impacts analysis "shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects" [CEQA Guidelines Section 15130(b)(5)]. With some projects, "the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis" [CEQA Guidelines Section 15130(c)].

CEQA Guidelines Section 15130(a)(3) also states that an EIR may determine that a project's contribution to a significant cumulative impact would be rendered less than cumulatively considerable, and thus not significant, if a project is required to implement or fund its fair share of a mitigation measure(s) designed to alleviate the cumulative impact.

CEQA requires that one of two methods of establishing a future baseline be used:

1. A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency, or
2. A summary of projections contained in an adopted General Plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency (CEQA Guidelines, Section 15130 (b)(1)).

The projections used for the cumulative analysis for the Vierra Dairy Expansion project were described and evaluated in the Program Environmental Impact Report for the Merced County Animal Confinement Ordinance Revision (ACO EIR), certified by Merced County on October 22, 2002. The 2030 Merced County General Plan EIR, certified by Merced County on December 10, 2013, updated and expanded the environmental analyses and conclusions presented in the 2002 ACO EIR regarding the cumulative effects for all project types, including proposed and expanding dairy facility projects such as the Vierra Dairy Expansion project. The 2030 General Plan EIR

contained two levels of cumulative analysis: the countywide evaluation of the potential effects of implementing the General Plan and its policies contained in Chapters 5 through 20 of the General Plan EIR; and a cumulative evaluation of planned development within unincorporated Merced County, cities within Merced County, and adjacent cities and counties set forth in Chapter 22 of the 2030 General Plan EIR. Therefore, the cumulative impact analysis for the Vierra Dairy EIR will incorporate the analyses contained in the 2030 General Plan EIR and the ACO EIR as summarized below, and as modified to reflect current environmental conditions in the county. In general, potential cumulative effects unique to dairies and other types of confined animal agriculture will be based on the potential for the Vierra Dairy Expansion project to make a cumulatively considerable contribution to a cumulative impact identified in the ACO EIR. For cumulative impacts that are common to all types of development projects, such as potential biological impacts, the cumulative analyses will be based on the environmental evaluation contained in the 2030 General Plan EIR.

ACO EIR CUMULATIVE HERD FORECAST

The ACO EIR evaluated cumulative effects for new and expanding animal confinement facilities in Merced County using a list-based approach in addition to a forecast of the future dairy herd based on the size of the then-existing herd and growth factors at the time of analysis (ACO EIR 2002). The ACO EIR cumulative analysis included an estimated herd for the San Joaquin Valley and Merced County in 2001, in addition to an expected dairy herd forecast for 2003, 2005, and 2010. The information below summarizes the cumulative dairy herd forecasted in the ACO EIR both for the San Joaquin Valley and Merced County, and compares it to United States Department of Agriculture (USDA) agricultural census data from counties in the San Joaquin Valley and Merced County for the years 2002, 2007, 2012, and 2017[1].

San Joaquin Valley Herd

Table 12-1 includes the ACO EIR 2001 estimated San Joaquin Valley herd and the dairy herd forecast for 2003, 2005, and 2010.

[1] The 2017 Census of Agriculture is the most recent year available from the USDA. The 2022 Census of Agriculture (due to be released in 2024) will be the next complete count of U.S. farms and ranches, as it is taken only once every five years.

Table 12-1 San Joaquin Valley ACO EIR Cumulative Dairy Herd – Forecasted Number of Head

Year	Total Herd	Milk Cows	Dry Cows	Heifers >2years	Heifers 1-2 years	Calves	Baby Calves
2001[a][b]	3,042,253	1,441,826	216,274	461,384	230,692	576,730	115,346
2003[c]	3,101,445	1,469,879	220,482	470,361	235,181	587,952	117,590
2005[c]	3,392,981	1,608,048	241,207	514,575	257,288	643,219	128,643
2010[c]	4,289,314	2,032,850	304,928	650,512	325,256	813,141	162,628

Sources and Notes:

(a) California Department of Agriculture, Division of Marketing Services, Dairy Marketing Branch, 2001, California Dairy Statistics 2000, Table 4. The CDFA provides milk cow numbers for San Joaquin Valley counties in the cumulative herd.

(b) The total dairy herd is estimated based on the number of mature milking cows. The support stock is extrapolated from mature milking cow numbers.

(c) Cumulative herd numbers for the years 2003, 2005, and 2010 were estimated in the ACO EIR cumulative analysis. Cumulative dairies forecast includes existing, approved, and pending dairies, including estimates for several counties based on foreseeable growth rates at the time.

Table 12-2 includes the estimated dairy herd based on USDA agricultural census data from counties in the San Joaquin Valley for the years 2002, 2007, 2012, and 2017 (USDA 2002, 2007, 2012, 2017).

Table 12-2 CDFA Census of Agriculture: San Joaquin Valley Dairy Herd in 2002, 2007, 2012, and 2017

Year[a]	Total Herd[b]	Milk Cows	Dry Cows	Heifers >2years	Heifers 1-2 years	Calves	Baby Calves
2002	2,645,545	1,253,813	188,072	401,220	200,610	501,525	100,305
2007	3,225,639	1,528,739	229,311	489,196	244,598	611,496	122,299
2012	3,256,298	1,543,269	231,490	493,846	246,923	617,308	123,462
2017	3,210,682	1,521,650	228,248	486,928	243,464	608,660	121,732

Sources and Notes:

(a) United States Department of Agriculture (USDA), National Agricultural Statistics Service, Census Volume 1, Chapter 2: County Level Data: California. Table 11; Years 2002, 2007, 2012, 2017. The CDFA provides milk cow numbers for San Joaquin Valley counties in the cumulative herd.

(b) The total dairy herd is estimated based on the number of mature milking cows. The support stock is extrapolated from mature milking cow numbers.

As shown in Tables 12-1 and 12-2 above, herd growth in the San Joaquin Valley as reported by CDFA has not matched herd numbers projected in the ACO EIR. The 2017 California Department of Food and Agriculture (CDFA) estimated herd count of 3,210,682 cows in the San Joaquin Valley is somewhere between the ACO EIR 2003 and 2005 herd forecasts of 3,101,445 and 3,392,981 cows, respectively. The CDFA estimates show an increase in the herd from 2002 to 2007, almost as projected by the ACO EIR for 2003 to 2005. However, there was little to no overall growth in the number of head between 2007 through 2017 according to CDFA data (see Table 12-2). Due to feed costs increasing and with milk prices at record low levels in 2008 and 2009, many dairy operators found little to no profit margin and the industry growth stagnated.

Merced County Herd

Table 12-3 includes the ACO EIR Merced County 2001 estimated herd and the dairy herd forecast for 2003, 2005, and 2010.

Table 12-3 Merced County ACO EIR Cumulative Dairy Herd – Forecasted Number of Head

Year	Total Herd	Milk Cows	Dry Cows	Heifers >2years	Heifers 1-2 years	Calves	Baby Calves
2001[a][b]	429,695	203,647	30,547	65,167	32,584	81,459	16,292
2003[c]	488,887	231,700	34,755	74,144	37,072	92,680	18,536
2005[c]	534,842	253,480	38,022	81,114	40,557	101,392	20,278
2010[c]	676,133	320,442	48,066	102,542	51,271	128,177	25,635

Sources and Notes:

(a) California Department of Agriculture, Division of Marketing Services, Dairy Marketing Branch, 2001, California Dairy Statistics 2000, Table 4. The CDFA provides milk cow numbers for Merced County in the cumulative herd.

(b) The total dairy herd is estimated based on the number of mature milking cows. The support stock is extrapolated from mature milking cow numbers.

(c) Cumulative herd numbers for the years 2003, 2005, and 2010 were estimated in the ACO EIR cumulative analysis. Cumulative dairies forecast includes existing, approved, and pending dairies, including estimates based on foreseeable growth rates at the time.

Table 12-4 includes the estimated dairy herd based on USDA agricultural census data from Merced County for the years 2002, 2007, 2012, and 2017 (USDA 2002, 2007, 2012, 2017).

Table 12-4 CDFA Census of Agriculture: Merced County Dairy Herd in 2002, 2007, 2012, and 2017

Year[a]	Total Herd[b]	Milk Cows	Dry Cows	Heifers >2years	Heifers 1-2 years	Calves	Baby Calves
2002	471,169	223,303	33,495	71,457	35,728	89,321	17,864
2007	576,541	273,242	40,986	87,437	43,719	109,297	21,859
2012	601,846	285,235	42,785	91,275	45,638	114,094	22,819
2017	575,047	272,534	40,880	87,211	43,605	109,014	21,803

Sources and Notes:

(a) United States Department of Agriculture, National Agricultural Statistics Service, Census Volume 1, Chapter 2: County Level Data: California. Table 11; Years 2002, 2007, 2012, 2017. The CDFA provides milk cow numbers for Merced County.

(b) The total dairy herd is estimated based on the number of mature milking cows. The support stock is extrapolated from mature milking cow numbers.

As shown in Tables 12-3 and 12-4 above, herd growth in Merced County as reported by CDFA has not matched herd numbers projected in the ACO EIR. The 2017 CDFA estimated herd count of 575,047 cows in Merced County is somewhere between the ACO EIR 2005 and 2010 herd forecasts of 534,842 and 676,133 cows, respectively. Compared to the San Joaquin Valley overall, Merced County experienced the same growth rate from 2002 - 2007 (22 percent growth); from 2007-2012, Merced County showed a 4 percent increase in herd compared to the San Joaquin Valley's overall 1 percent increase in herd; both Merced County and the San Joaquin Valley herd saw a decrease from

2012-2017, reverting back to 2007 herd numbers, with a 4 percent loss in Merced County and a 1 percent loss in the San Joaquin Valley overall. While Merced County has seen a greater fluctuation in the herd than the San Joaquin Valley between 2007-2017, the numbers are following the same trends, and are within ACO EIR cumulative dairy herd forecast.

The number of dairy project applications[2] submitted to Merced County has varied over the years. Comparing pending dairy applications in 2002 (at the time of preparation of the ACO EIR) to current pending dairy applications (as of May 2023), there were 14 pending dairy projects in 2002, and there are currently nine pending dairy projects with the County. Table 12-5 includes a summary of dairy applications submitted to Merced County from 2012 to 2022.

Table 12-5 Merced County Dairy Project Applications: Years 2012 - 2022

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
6	2	0	5	2	0	0	2	7	3	0

Note: Only dairy projects that include an increase in herd and requiring environmental review are included.
Source: Planning Partners 2023.

The average number of dairy project applications at Merced County over this time period was approximately 2.5 applications per year, with 2012, 2015, and 2020 showing a greater number of applications than usual, and 2014, 2017, 2018, and 2002 showing no new dairy applications. As of May 2023, there were no new dairy applications with the County.

Conclusion

While the proposed dairy expansion project is obviously well outside of the 2010 herd forecast timeframe in ACO, the most recent estimated herd is well within ACO EIR cumulative herd forecast for both the San Joaquin Valley and Merced County, and the ACO EIR analysis of cumulative effects for new and expanding animal confinement facilities in Merced County is still applicable and relevant.

12.1.1 DEFINITION OF GEOGRAPHIC SCOPE OF CUMULATIVE IMPACTS ANALYSIS

Cumulative analyses included in the 2030 General Plan EIR and the ACO EIR are assessed based on an understanding of projected growth or specific projects within a defined geographical area. The extent of the area evaluated varies depending on which environmental issue is being assessed. For example, because hydrologic effects in one watershed would be unrelated to those in another, the cumulative assessment area for surface and groundwater hydrology is defined as the San Joaquin River watershed. In contrast, the area addressed in the air quality evaluation is the San Joaquin Valley Air Basin. The geographic area of each cumulative effect is set forth in the summary of potential cumulative effects in Section 12.1.3 below.

[2] Only dairy projects that include an increase in herd and requiring environmental review are included.

12.1.2 TIERING FROM THE CUMULATIVE IMPACTS ANALYSIS OF THE 2030 GENERAL PLAN EIR AND THE ACO EIR

"Tiering" refers to the relationship between a program-level EIR (where long-range programmatic cumulative impacts are the focus of the environmental analysis) and subsequent environmental analyses such as this subject document, which focus primarily on issues unique to a smaller project within the larger program or plan. Through tiering a subsequent environmental analysis can incorporate, by reference, discussion that summarizes general environmental data found in the program EIR that establishes cumulative impacts and mitigation measures, the planning context, and/or the regulatory background. These broad-based issues need not be reevaluated subsequently, having been previously identified and evaluated at the program stage.

In the case of the Vierra Dairy Expansion project, the cumulative analysis for this EIR is tiered from the 2030 General Plan EIR and the ACO EIR (Merced County 2002) as discussed in Chapter 1, *Introduction*, of this EIR.

12.1.3 SUMMARY OF THE CUMULATIVE IMPACTS ANALYSIS OF THE 2030 GENERAL PLAN EIR AND THE ACO EIR

The ACO EIR presents an assessment of the cumulative impacts associated with the construction and operation of animal confinement facilities in Merced County, including a San Joaquin Valley-wide cumulative herd forecast. Because the number of animals associated with the Vierra Dairy Expansion project would not constitute an exceedance of the forecasted herd numbers contained in the ACO EIR, the potential cumulative impacts identified by the ACO EIR for new and expanding animal confinement facilities would apply.

Additionally, the Merced County 2030 General Plan EIR evaluated the environmental impacts of implementing the General Plan on a comprehensive basis, including discussion of the full range of impacts that would occur because of future development, including new and expanding animal confinement facilities. A full summary of the impact analysis of the 2030 General Plan EIR is included in Chapter 1, *Introduction*, of this EIR. Using the 2030 General Plan EIR and the ACO EIR cumulative analyses as a basis for evaluation, environmental issue areas listed below are assessed for cumulative impacts.

Where applicable, ACO EIR mitigation measures adopted to reduce the magnitude of potential cumulative effects that apply to the Vierra Dairy Expansion project are listed. For the text of the adopted ACO EIR mitigation measures, see Appendix K, *ACO Final EIR - Summary of Impacts and Mitigation Measures*. Adopted 2030 General Plan policies that apply to the project and would reduce the magnitude of potential cumulative effects are set forth in Chapter 11, *Land Use Compatibility*, of this EIR.

Aesthetics: The geography for cumulative effects to aesthetics is Merced County, its cities, and surrounding counties and their adjacent cities. The 2030 General Plan EIR found that the following cumulative significant effect for aesthetics would be considered less than significant with the implementation of mitigation measures identified in the General Plan EIR:

- Generation of substantial light and glare

Merced County adopted Mitigation Measure AES-3, which resulted in a revision to General Plan Policy NR-4.5 for this cumulative impact and has applied the revised General Plan requirements to the Vierra Dairy Expansion project.

The 2030 General Plan EIR found that glow effects in previously dark areas would be a significant cumulative effect. With implementation of the 2030 General Plan goals and policies and mitigation measures identified in the 2030 General Plan EIR, development consistent with Merced County's General Plan would not make a cumulatively considerable contribution to cumulative impacts to aesthetic and visual resources, including glow effects. Therefore, with implementation of General Plan policies and General Plan EIR mitigation measures, Merced County's contribution to the significant cumulative loss of aesthetic quality would be considered less than significant as identified in the 2030 General Plan EIR.

Because the aesthetic effects of the Vierra Dairy Expansion project would be less than significant as determined in the Initial Study/Notice of Preparation (IS/NOP) (see Appendix A, *Notice of Preparation and Initial Study)* for the project, construction and operation of the proposed dairy expansion project would not make a cumulatively considerable contribution to this significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on aesthetics would be less than significant.

Agricultural Resources: The geography for cumulative effects to agricultural resources is Merced County, cities within Merced County, and surrounding counties and adjacent cities. Development under the 2030 General Plan in Merced County, in cities within the county, and in surrounding cities and counties would contribute to cumulative agricultural impacts and the net loss of important farmlands. Although the 2030 General Plan goals and policies would reduce and partially offset Merced County's contribution to these impacts, the contribution from implementation of the 2030 General Plan to the significant cumulative loss of agricultural resources is expected to be cumulatively considerable. Therefore, even with adoption of the General Plan measures, the cumulative impacts to agricultural resources in Merced County would be considered significant as identified in the 2030 General Plan EIR and as modified to reflect current environmental conditions in the county.

Because the agricultural resource effects of the Vierra Dairy Expansion project would be less than significant as identified in the IS/NOP for the project, construction and operation of the proposed dairy expansion project would not make a cumulatively considerable contribution to this significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on agricultural resources would be less than significant.

Air Quality and Greenhouse Gas Emissions: The geography for cumulative effects to air quality is the San Joaquin Valley Air Basin. The ACO EIR found that the following cumulative impacts to air quality and greenhouse gas emissions would be significant and unavoidable within the San Joaquin Valley Air Basin.

- Fugitive dust emissions from construction activities
- Ozone precursor emissions from dairy operations, farm equipment, and increased traffic
- PM_{10} emissions from fugitive dust during project operations
- Ammonia and hydrogen sulfide emissions from animal confinement facility operations
- Greenhouse gas emissions from animal confinement facility operations

- Adverse odor from project operations

The ACO EIR found that the following significant cumulative impact to air quality would be considered less than significant with the implementation of mitigation measures identified in the ACO EIR:

- Exhaust emissions (ROG, NO_x, CO, and PM_{10}) related to construction activities

Merced County adopted Mitigation Measures AQ-1 through AQ-8 for the foregoing cumulative impacts as set forth in the ACO EIR, and has applied the measures to the Vierra Dairy Expansion project, as applicable.

Even with implementation of the 2030 General Plan goals and policies and mitigation measures identified in the 2030 General Plan EIR, the 2030 General Plan EIR found that operational emissions of PM_{10} and $PM_{2.5}$ associated with General Plan buildout would be a significant cumulative effect. Therefore, the cumulative impacts to air quality in the San Joaquin County Air Basin would be considered significant as identified in the ACO EIR, the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county.

The project-level impact of implementing the Vierra Dairy Expansion project from ozone precursors (VOC and NO_X) would not exceed the SJVAPCD significance thresholds. However, because of the magnitude of emissions from the project and pollutant concentrations in the San Joaquin Valley Air Basin, and because the Air Basin is in nonattainment for both federal and state ozone standards, the project's contribution to this effect would be cumulatively considerable. Thus, the cumulative impact of the Vierra Dairy on air quality would be significant and unavoidable.

Cumulative impacts due to GHG emissions are discussed in in this EIR under Impact GHG-1 in Chapter 8, *Greenhouse Gas Emissions and Energy Use*. The proposed project would exceed established significance thresholds for GHG emissions, and cumulative impacts due to GHG emissions were determined to be significant and unavoidable.

Increased health risks at the Vierra Dairy Expansion from the emissions of toxic air contaminants (including ammonia and hydrogen sulfide) were determined to be less-than-significant with implementation of mitigation measures identified in the EIR. However, because no emissions or air quality standards have been promulgated for ammonia, and the volume of ammonia emissions produced by dairies and other confined animal facilities, the proposed project would make a cumulatively considerable contribution to this significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy to this effect would be significant and unavoidable.

Mitigation measures and regulatory requirements identified within the Vierra Dairy Expansion project EIR would reduce potential impacts due to: fugitive dust from construction; fugitive dust during project operations; and adverse odors to a less-than-significant level, and there would be no cumulatively considerable contribution to these significant cumulative effects. Thus, the cumulative impact of the Vierra Dairy to these effects would be less than significant.

Biological Resources: The geography for cumulative effects to biological resources is Merced County, cities within Merced County, and surrounding counties and adjacent cities. The 2030 General Plan EIR found that development under the 2030 General Plan in Merced County, in cities

within the county, and in surrounding cities and counties would contribute to cumulative effects to biological resources would be significant and unavoidable within the San Joaquin Valley:

- Adverse effects to special status species and sensitive habitats
- Adverse effects on wetlands, riparian habitat, and other sensitive natural communities.

Merced County adopted Mitigation Measures BIO-1a to BIO-1r, and BIO-4a to BIO-4d for the foregoing cumulative impacts as set forth in the 2030 General Plan EIR, and has applied the measures to the Vierra Dairy Expansion project, as applicable.

Although 2030 General Plan goals and policies would reduce and partially offset Merced County's contribution to this impact, the potential impacts to habitat and protected species throughout Merced County, cities within Merced County, and surrounding counties and adjacent cities are expected to be cumulatively considerable. The cumulative impacts to habitats and protected species in Merced County, cities within Merced County, and surrounding counties and adjacent cities would be considered significant as identified in the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county.

Because mitigation measures identified within the Vierra Dairy Expansion project EIR would reduce potential impacts to loss of biological resources to a less-than-significant level, and there is no riparian habitat on the project site, impacts to biological resources were determined to be less than significant. However, throughout Merced County, the conversion of cultivated farmland to dairies and other developments is resulting in a cumulative and significant loss of foraging and nesting habitat for some special-status and migratory birds. Conversion of 15 acres of the project site to a dairy facility would contribute to that cumulative loss. This loss of habitat is cumulatively significant, unavoidable, and unmitigable. Thus, the cumulative impact of the Vierra Dairy on biological resources would be significant and unavoidable.

Cultural Resources: The geography for cumulative effects to cultural resources is Merced County. The 2030 General Plan EIR found that the following cumulative significant effect for cultural resources would be considered less than significant with the implementation of mitigation measures identified in the 2030 General Plan EIR:

- Possible disturbance of known and unknown prehistoric and/or historic resources
- Possible adverse changes in archaeological resources, paleontological resources, unique geological features, or disturbances of human remains
- Possible degradation or loss of traditional cultural properties

Merced County adopted Mitigation Measures CUL-1a to CUL-1c, CUL-2, and CUL-3 for this cumulative impact as set forth in the 2030 General Plan EIR, and has applied the measures to the Vierra Dairy Expansion project, as applicable.

With implementation of the 2030 General Plan goals and policies and mitigation measures identified in the 2030 General Plan EIR, implementation of the 2030 General Plan would result in a less-than-significant cumulative effect. Impacts to cultural resources are isolated incidents that are project-specific, and generally do not contribute to a cumulative condition. Therefore, the cumulative impacts to cultural resources in Merced County would be considered less than significant as identified in the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county.

Because mitigation measures identified within the Vierra Dairy EIR would reduce potential impacts from the loss of unknown cultural resources, including tribal cultural resources, to a less-than-significant level, impacts to cultural resources were determined to be less than significant, and construction and operation of the dairy expansion project would not make a cumulatively considerable contribution to this less-than-significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on cultural resources would be less than significant.

Geological and Mineral Resources: The geography for cumulative effects from geologic hazards is Merced County. The 2030 General Plan EIR found that the following cumulative significant effects for geological resources would be considered less than significant with the implementation of mitigation measures identified in the 2030 General Plan EIR:

- Seismic damage
- Substantial soil erosion or loss of mineral resources
- Location of developed uses on unstable or expansive soils or other geohazards
- Location of septic systems on unfit soils

Merced County adopted Mitigation Measures GEO-4a to GEO-4c for these cumulative impacts as set forth in the 2030 General Plan EIR, and has applied the measures to the Vierra Dairy Expansion project, as applicable.

The 2030 General Plan EIR found that no potentially significant adverse effects due to geologic conditions were identified following implementation of 2030 General Plan goals and policies. Geologic conditions are highly localized. Therefore, with adoption of these measures, cumulative impacts to geological resources in Merced County would be considered less than significant as identified in the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county.

Because the geological resource effects of the Vierra Dairy Expansion project would be less than significant as determined in the IS/NOP for the project, construction and operation of the proposed dairy expansion project would not make a cumulatively considerable contribution to this less-than-significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on geological resources would be less than significant.

For an evaluation of cumulative effects due to water quality during construction, see the discussion in Hydrology and Water Quality, below.

Hazards: The geography for cumulative effects from hazards is Merced County. The ACO EIR found that the following cumulative significant effects for hazards would be considered less than significant with the implementation of mitigation measures identified in the ACO EIR:

- Nuisance mosquitoes
- Nuisance flies
- Manure pathogens
- Residual manure at closed facilities

Merced County adopted Mitigation Measures HAZ-1 through HAZ-4 for these cumulative impacts as set forth in the ACO EIR, and has applied the measures to the Vierra Dairy Expansion project, as applicable. The cumulative impacts from hazards in Merced County would be considered less than significant after mitigation as identified in the ACO EIR and as modified to reflect current environmental conditions in the county.

Because mitigation measures identified within the Vierra Dairy EIR would reduce potential impacts due to nuisance insects (hazards) to a less-than-significant level, impacts due to hazards were determined to be less than significant, and there would be no cumulatively considerable contribution to cumulative effects due to hazards. Thus, the cumulative impact of the Vierra Dairy Expansion due to hazards would be less than significant.

For an evaluation of cumulative effects from manure pathogens, see Hydrology and Water Quality below.

Hydrology and Water Quality: The geography for cumulative effects to hydrology is the San Joaquin River Watershed. The ACO EIR found that the following cumulative significant effect for hydrology and water quality would be significant and unavoidable within the San Joaquin River Watershed:

- Development in the zone of high sensitivity to groundwater contamination

The ACO EIR also found that the following significant cumulative impact to hydrology and water quality would be considered less than significant with the implementation of mitigation measures identified in the ACO EIR:

- Modification of surface water drainage patterns
- Increase in runoff
- Exposure to flood risks
- Water supply well pathways for pollutant migration

Merced County adopted Mitigation Measures WQ-1 through WQ-6 for the foregoing cumulative impacts as set forth in the ACO EIR, and has applied the measures to the Vierra Dairy Expansion project, as applicable.

The 2030 General Plan EIR found impacts related to groundwater overdraft would be a significant cumulative effect. Therefore, cumulative effects due to the degradation of groundwater resources and groundwater overdraft in the San Joaquin River Watershed would be considered significant and unavoidable as identified in the ACO EIR, the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county.

While there may be a small increase in groundwater use with the Vierra Dairy Expansion project, the majority of the water would be used for irrigation and would contribute to groundwater recharge, and impacts to groundwater supplies were determined to be less-than-significant. There would be no cumulatively considerable contribution to cumulative groundwater overdraft effects, and the cumulative impact of the Vierra Dairy Expansion due to groundwater overdraft would be less than significant.

With implementation of water quality mitigation measures, project-level groundwater quality effects of the Vierra Dairy were determined to be significant. Similarly, impacts to groundwater quality at

off-site locations due to the export of manure were determined to be significant. Operation of the Vierra Dairy could continue to contribute to the cumulative effects due to the degradation of groundwater resources in the San Joaquin River Watershed, and the proposed project would make a cumulatively considerable contribution to these significant and unavoidable effects. Thus, the cumulative impact of the Vierra Dairy Expansion on groundwater quality would be significant and unavoidable.

Land Use: The geography for cumulative effects to land use is Merced County. The ACO EIR found that the following cumulative impact for land use would be significant and unavoidable within Merced County:

- Land use conflicts with rural residences

The ACO EIR found that the following significant cumulative impacts for land use would be considered less than significant with the implementation of mitigation measures identified in the ACO EIR:

- Conversion of cultivated land to confined animal facilities
- Land use conflicts with urban and sensitive land uses

Merced County adopted Mitigation Measures LU-2 and LU-3 for the foregoing cumulative impacts as set forth in the ACO EIR, and has applied the measures to the Vierra Dairy Expansion project, as applicable. Adverse effects to existing rural residences adjacent to existing animal confinement facilities were identified as significant and unavoidable as identified in the ACO EIR and as modified to reflect current environmental conditions in the county.

Adverse effects to existing rural residences adjacent to the Vierra Dairy Expansion project were determined to be less than significant following implementation of mitigation measures identified in the Vierra Dairy Expansion project EIR. Because the land use effects of the Vierra Dairy Expansion project would be less than significant, construction and operation of the dairy expansion project would not make a cumulatively considerable contribution to this significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project to land use would be less than significant.

Noise: The geography for cumulative effects to the noise environment is Merced County. The 2030 General Plan EIR found that the following cumulative significant effects for noise would be considered to be less than significant within Merced County:

- Creation of noise levels in excess of standards
- Increase in noise levels or the development of sensitive uses in areas subject to noise impacts

The 2030 General Plan EIR found that the following cumulative significant effect for noise would be considered significant within Merced County:

- Exposure to groundborne vibration

Merced County adopted Mitigation Measures NSE-5 to NSE-5f for this cumulative impact as set forth in the 2030 General Plan EIR, and has applied the measure to the Vierra Dairy Expansion project, as applicable.

The 2030 General Plan EIR found that the cumulative significant effect as a result of the creation of excessive noise levels due to increases in vehicle traffic would be considered significant and unavoidable within Merced County even with the adoption of mitigation. Merced County adopted Mitigation Measures NSE-4a and NSE-4b for this cumulative impact as set forth in the 2030 General Plan EIR, and has applied the measure to the Vierra Dairy Expansion project, as applicable.

The 2030 General Plan EIR found that, other than increases in vehicle noise, no potentially significant adverse effects due to noise were identified following implementation of 2030 General Plan goals and policies. The cumulative impacts to the noise environment in Merced County would be considered significant and unavoidable as identified in the 2030 General Plan EIR.

Because the noise effects of the Vierra Dairy Expansion project would be less than significant as determined in the IS/NOP for the project, construction and operation of the proposed dairy expansion project would not make a cumulatively considerable contribution to this significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on noise would be less than significant.

Population and Housing: The geography for cumulative effects to population and housing is Merced County, cities within Merced County, and surrounding counties and adjacent cities. No significant cumulative impacts were identified in the 2030 General Plan EIR; the cumulative impacts to population and housing in Merced County would be considered less than significant as identified in the 2030 General Plan EIR. Because the population and housing effects of the Vierra Dairy Expansion project would be less than significant as identified in the IS/NOP for the project, construction and operation of the dairy expansion project would not make a cumulatively considerable contribution to this less-than-significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on population and housing would be less than significant.

Public Services: The geography for cumulative effects to public services is Merced County. No significant cumulative impacts were identified in the 2030 General Plan EIR; the cumulative impacts to public services in Merced County would be considered less than significant as identified in the 2030 General Plan EIR. Because the public services effects of the Vierra Dairy Expansion project would be less than significant as identified in the IS/NOP for the project, construction and operation of the dairy expansion project would not make a cumulatively considerable contribution to this less-than-significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on public services would be less than significant.

Recreation: The geography for cumulative effects to recreation resources is Merced County. No significant cumulative impacts were identified in the 2030 General Plan EIR; the cumulative impacts to recreation resources in Merced County would be considered less than significant as identified in the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county. Because the recreation resources effects of the Vierra Dairy Expansion project would be less than significant as identified in the IS/NOP for the project, construction and operation of the dairy expansion project would not make a cumulatively considerable contribution to this less-than-significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on recreation resources would be less than significant.

Transportation and Circulation: The geography for cumulative effects to transportation and circulation is the San Joaquin Valley. The ACO EIR found that the following cumulative significant effect for transportation and circulation would be considered less than significant with the implementation of mitigation measures identified in the ACO EIR:

- Addition of traffic on area roadways and high-weight vehicles on rural roads

Merced County adopted Mitigation Measure TRF-1 for this cumulative impact as set forth in the ACO EIR, and has applied the measure to the Vierra Dairy Expansion project, as applicable.

The 2030 General Plan EIR found that even with implementation of General Plan policies and mitigation, Merced County's contribution to regional cumulative impacts related to traffic would be cumulatively significant. Therefore, even with adoption of these measures, the cumulative impacts to traffic and roadways in Merced County would be considered significant as identified in the ACO EIR, the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county.

Because the transportation and circulation effects of the Vierra Dairy Expansion project would be less than significant as determined in the IS/NOP for the project, construction and operation of the dairy expansion project would not make a cumulatively considerable contribution to this significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy on transportation and circulation would be less than significant.

Utilities and Service Systems: The geography for cumulative effects to utilities and service systems is Merced County. The ACO EIR found that the following cumulative significant effects for utilities and service systems would be considered less than significant with the implementation of mitigation measures identified in the ACO EIR:

- Interference with irrigation district facilities

Merced County adopted Mitigation Measure PF-2 for this cumulative impact as set forth in the ACO EIR, and has applied the measure to the Vierra Dairy Expansion project, as applicable.

The 2030 General Plan EIR found impacts related to water supply would be a significant cumulative effect. Therefore, even with implementation of General Plan policies and measures, the cumulative impacts to water supply resources in Merced County would be considered significant as identified in the ACO EIR, the 2030 General Plan EIR, and as modified to reflect current environmental conditions in the county.

Because the utilities and services effects of the Vierra Dairy Expansion project would be less than significant as identified in the IS/NOP for the project, the construction and operation of the dairy expansion project would not make a cumulatively considerable contribution to this significant cumulative effect. Thus, the cumulative impact of the Vierra Dairy Expansion project on utilities and services would be less than significant.

12.2 GROWTH INDUCEMENT AND SECONDARY EFFECTS

CEQA Guidelines Section 15126.2(d) requires that an EIR identify any growth-inducing impacts that may result from a project. The CEQA Guidelines define a growth-inducing impact as:

> …the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth… It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Induced growth as defined in this section of CEQA includes the direct employment, population, or housing growth of a project as well as the secondary or indirect growth accompanying direct growth. New employees from commercial development and new population from residential development represent direct growth, and induce additional economic activity in a given area from the increase in aggregate spending generated as purchases of goods and services. New employment also adds to the demand for local housing, although since all employees employed in a given community will not necessarily live in that community, this housing demand increase will tend to be less than the increase in employment. A project can induce growth by lowering or removing infrastructure barriers to growth, improving transportation access to an area, introducing a new use into an area, or by creating an amenity such as tourist-oriented facilities that attract new population or economic activity.

12.2.1 DIRECT GROWTH

Implementation of the Vierra Dairy Expansion project would not result in any direct growth inducement. With implementation of the proposed project, the number of employees would increase from 32 to approximately 45 workers. No new residences would be constructed on site. The existing workforce within Merced County (118,100 workers, of whom 11.2 percent, or 13,200 people, were unemployed in March 2023) could accommodate additional labor needs for construction or operation of the project without requiring the importation of large numbers of workers (EDD 2023). Similarly, any additional housing demands caused by future project employees could be accommodated by existing and planned housing resources within Merced County.

12.2.2 INFRASTRUCTURE BARRIERS TO GROWTH

A project could be expected to induce growth by removing an infrastructure barrier to growth. Infrastructure barriers can be both physical (e.g., lack of a road for access or sufficient sewage treatment capacity), or they can be institutional (e.g., the lack of some regulatory condition or capacity to allow development to occur).

The proposed Vierra Dairy Expansion project is located in an active agricultural district. Because animal confinement facilities do not require additional public facilities beyond those typically provided in agricultural areas, the animal confinement operations themselves would not be expected to increase the demand for public facilities beyond the levels provided and planned for by public utilities. The Vierra Dairy is currently served by some services and infrastructure, and would not result in the need for any major new systems or substantial alterations to these utility systems (see Appendix A, *Notice of Preparation and Initial Study*). The existing domestic and irrigation wells would

continue to be used to provide water to the dairy site and irrigate surrounding cropland; no new wells are proposed. Based on the number of people on the site, the project applicant is required to obtain a Public Water System Permit from the State of California State Water Resources Control Board, Division of Drinking Water. The facility shall then maintain compliance with that permit as long as 25 or more persons work at the facility on 60 or more days of the year. The permit requires demonstration that sufficient water is available from the water system's sources and distribution storage facilities to provide adequate water service. While there would be the creation of a Public Water System at the dairy, there would be no change or impact to any surrounding community-based water supply systems. The project is not growth inducing from the perspective of adding new infrastructure because no new infrastructure that could induce growth is proposed or required by the proposed project. Thus, implementation of the Vierra Dairy Expansion project would not serve to reduce an infrastructure barrier to growth.

12.2.3 INSTITUTIONAL BARRIERS TO GROWTH

The proposed project could also result in induced growth if it removed a policy or political (institutional) barrier to urban growth. The following discussion qualitatively evaluates this impact.

The proposed dairy expansion project is consistent with Merced County land use plans, and does not include any changes in zoning or land use designations that would directly or indirectly increase the potential for growth. Therefore, the Vierra Dairy Expansion project would not induce growth beyond that which has been anticipated in Merced County planning documents.

12.3 EFFECTS FOUND NOT TO BE SIGNIFICANT

On the basis of the Notice of Preparation (NOP) for the Vierra Dairy Expansion project, in addition to comments received on the NOP, it was determined that the following environmental issues did not need to be evaluated in this EIR:

- Aesthetics;
- Agriculture and Forestry Resources;
- Geology;
- Hazards/Hazardous Materials;
- Mineral Resources;
- Noise;
- Population and Housing;
- Public Services;
- Recreation;
- Transportation/Traffic;
- Utilities and Service Systems;
- Wildfire.

As allowed for by State CEQA Guidelines Section 15128, the reasons for this determination are contained in the Initial Study for the Vierra Dairy Expansion project that is included in Appendix A, *Notice of Preparation and Initial Study,* of this document.

The following potentially significant effects were found not to be significant or less than significant after mitigation as evaluated in this EIR:

- Construction-related air emissions
- Carbon monoxide emissions from operational equipment and increased traffic
- Ozone precursor emissions from dairy operations, farm equipment, and increased traffic
- PM_{10} and $PM_{2.5}$ emissions from fugitive dust during project operations
- Expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants from project construction and operations
- Expose nearby residents to substantial pollutant concentrations from emissions of criteria air pollutants
- Adverse odor from project operations
- Health impacts due to Valley Fever
- Health effects as a result of exposure to bioaerosols during dairy operations
- Conflict with or obstruct implementation of the applicable air quality plan
- Nest disturbance and loss of foraging habitat for Swainson's hawk
- Loss of foraging and nesting habitat for sensitive and migratory bird species
- Loss of nesting habitat for tricolored blackbird
- Impacts to the San Joaquin kit fox and/or American badger
- Loss and/or degradation of special-status plant species
- Loss and/or degradation of riparian and vernal pool habitat or sensitive natural communities; loss or modification of wetlands
- Interference with on-site wildlife movement corridors or wildlife nursery sites
- Potential selenium and heavy metals effects to on-site biological resources
- Conflict with local policies or ordinances protecting biological resources
- Cause a substantial adverse change in the significance of a historical, archaeological, or paleontological resource, or a unique geological feature
- Result in the accidental discovery and disturbance of human remains
- Cause a substantial adverse change in the significance of a tribal cultural resource
- Wasteful or inefficient consumption of energy
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency
- Increased fly production and related nuisance effects
- Create significant nuisance conditions due to increased mosquito production
- Degradation of water quality due to storm water runoff during project construction
- Degradation of surface water quality from operation of the Vierra Dairy
- Decrease groundwater supplies
- Modification of surface water drainage patterns and an increase in runoff
- Risk release of pollutants due to project inundation in flood zones
- Water supply pathways for pollutant migration

- Consistency with Merced County Land Use Plans and policies adopted to protect the environment, including setback standards
- Land use compatibility with existing off-site residential uses adjacent to the project area
- Growth Inducement and Secondary Effects
- Irreversible Commitment of Resources
- Potential Environmental Damage from Accidents

The project's contribution to the following significant cumulative effects was found to be not cumulatively considerable with implementation of mitigation as evaluated in this EIR:

- Cumulative impacts to aesthetics
- Cumulative impacts to agricultural resources
- Cumulative impacts to cultural resources
- Cumulative impacts to geological and mineral resources
- Cumulative impacts to hazards
- Cumulative impacts to land use
- Cumulative noise impacts
- Cumulative impacts to population and housing
- Cumulative impacts to public services
- Cumulative impacts to recreation
- Cumulative transportation and circulation effects
- Cumulative impacts to utilities and service systems

12.4 SIGNIFICANT UNAVOIDABLE ENVIRONMENTAL EFFECTS

The significant unavoidable environmental effects of the proposed project are as follows:

- Groundwater contamination from operation of the Vierra Dairy
- Impacts to water quality at off-site locations as a result of project operations
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan
- Cumulative air quality impacts
- Cumulative impacts to biological resources
- Cumulative impacts due to GHG emissions
- Cumulative hydrology and water quality impacts

Merced County is unable to mitigate any of these potentially significant adverse environmental impacts to a less-than-significant level; all of the adverse impacts of the proposed project identified above would remain significant and unavoidable.

12.5 SIGNIFICANT IRREVERSIBLE CHANGES

CEQA Guidelines Section 15126.2 requires the evaluation of significant irreversible environmental changes, stating that "uses of nonrenewable resources during the initial and continued phases of a proposed project may be irreversible since a large commitment of these resources makes removal or nonuse thereafter unlikely." This section of the EIR evaluates whether the project would result in the irretrievable commitment of resources, or would cause irreversible changes in the environment. Also, this section identifies any irreversible damage that could result from environmental accidents associated with the proposed project.

12.5.1 IRREVERSIBLE COMMITMENT OF RESOURCES

Implementation of the proposed project would result in the expansion of an existing dairy facility; it would also require both direct and indirect expenditures of energy. Indirect energy would be consumed by the use of construction materials for the project (e.g., energy resource exploration, power generation, mining and refining of raw materials into construction materials used, including placement). Direct energy impacts would result from the total fuel consumed in vehicle propulsion (e.g., construction vehicles, heavy equipment, and other vehicles using the facility). Additional energy resource demands would be used for the heating and cooling of buildings, transportation of people and goods, and lighting and other associated energy needs.

Construction and operation of the proposed project would contribute to the incremental depletion of resources, including renewable and non-renewable resources. Resources such as lumber and other forest products are generally considered renewable resources and would be replenished over the lifetime of the project. For example, lumber supplies are increased as seedlings mature into trees. Therefore, the development of the project would not result in the irreversible commitment of renewable resources. Nevertheless, there would be an incremental increase in the demand for these resources over the life of the project.

Non-renewable resources, such as natural gas, petroleum products, asphalt, petrochemical construction materials, steel, copper and other metals, and sand and gravel are considered to be commodities that are available in a finite supply. The processes that created these resources occur over a long period of time. Therefore, the replacement of these resources would not occur over the life of the project. To varying degrees, these materials are all readily available and some materials, such as asphalt or sand and gravel, are abundant. Other commodities, such as metals, natural gas, and petroleum products, are also readily available, but they are finite in supply given the length of time required by natural processes to create them.

The demand for all such resources is expected to increase regardless of whether or not the project is developed. As discussed in the ACO EIR, the number of dairy facilities in the San Joaquin Valley is expected to increase under the cumulative herd forecast. Therefore, if not consumed by this project, these resources would likely be committed to other projects in the region intended to meet this anticipated growth. The investment of additional resources in the project would be typical of the level of investment normally required for dairies of this scale. Mitigation measures have been included in this EIR to reduce and minimize impacts to renewable and non-renewable resources.

12.5.2 IRREVERSIBLE ENVIRONMENTAL CHANGES

Irreversible long-term environmental changes associated with the proposed project are evaluated in Chapters 5 to 11 of this EIR. These irreversible environmental changes would include an increase in operational air emissions and greenhouse gases, among other impacts. Design features have been incorporated into the proposed project and mitigation measures have been included in this EIR to minimize the effects of the environmental changes associated with the development of the project. The project would result in significant and unavoidable impacts to air quality and water quality, as listed above in Section 12.4, *Significant Unavoidable Environmental Effects*.

12.5.3 POTENTIAL ENVIRONMENTAL DAMAGE FROM ACCIDENTS

Potential impacts and irreversible damage that could result from environmental accidents associated with the project have been previously evaluated in Section VII, *Hazards* in the IS/NOP (see Appendix A). The project proposes no uniquely hazardous uses, and its operation would not be expected to cause environmental accidents that would affect other areas.

13 ALTERNATIVES ANALYSIS

13.1 INTRODUCTION

Section 15126.6 of the California Environmental Quality Act (CEQA) Guidelines requires that an Environmental Impact Report (EIR) describe and comparatively evaluate a range of reasonable alternatives to a project, or location of the project, that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the project's significant effects. Thus, the range of alternatives evaluated in the following analysis is dictated by the range of project significant impacts identified in this EIR. Evaluated alternatives are limited to those that would reduce or eliminate identified environmental impacts.

This EIR identified 21 significant impacts that would occur with implementation of the proposed Vierra Dairy project, including:

- expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants;
- adverse odor from project operations;
- nest disturbance and loss of foraging habitat for Swainson's hawk;
- loss of foraging and nesting habitat for sensitive and migratory bird species;
- loss of nesting habitat for tricolored blackbird;
- impacts to the San Joaquin kit fox and/or American badger;
- interference with night-active wildlife;
- substantial adverse change in the significance of historic, archaeological, or paleontological resources;
- accidental discovery and disturbance of human remains;
- GHG emissions from project construction and operation;
- increased fly production and related nuisance effects;
- degradation of surface water quality from operation of the Vierra Dairy;
- groundwater contamination from dairy project operations;
- risk release of pollutants due to project inundation in flood zones;
- impacts to water quality at off-site locations that receive manure;
- conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan;
- land use compatibility with existing off-site residential uses adjacent to the project area;
- cumulative impacts to air quality;
- cumulative impacts to biological resources;
- cumulative impacts to hydrology and water quality;
- cumulative impacts due to greenhouse gas emissions.

The environmental analysis concluded that all significant impacts could be reduced to a less-than-significant level with implementation of mitigation measures outlined in the EIR, except for impacts to surface water quality from dairy expansion operations, groundwater quality from dairy project

operations, impacts to water quality at off-site locations that receive manure, conflicts with a water quality control plan, and a significant contribution to cumulative air quality, biological resources, greenhouse gas emissions[1], and water quality impacts. These impacts would remain significant and unavoidable. Accordingly, two alternatives, in addition to the required No Project alternative, were formulated to illustrate the range of project alternatives that could be implemented as an alternative to the proposed Vierra Dairy project.

This chapter also summarizes the alternatives considered but rejected, and evaluates the environmental impacts of the No Project Alternative, the On-Site Anaerobic Digester Alternative, and the Dairy Digester Cluster Alternative. CEQA does not require the environmental review of alternatives to be at the same level of detail as that for the proposed project [CEQA Guidelines Section 15126.6(d)], and the EIR "need not 'consider in detail each and every conceivable variation of the alternatives stated.'" (Citing *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 406, 407.) The review must be at a sufficient level, however, to allow for a meaningful comparison of the environmental merits of each.

To provide this meaningful comparison, Table 13-4 (shown at the end of this chapter) summarily compares the identified alternatives. The alternatives, as well as their comparative merits, are described below.

13.1.1 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

In accordance with CEQA Guidelines Section 15126.6(f), several alternatives were considered for the Vierra Dairy project, but rejected as infeasible.

ALTERNATIVE SITES OUTSIDE THE SAN JOAQUIN VALLEY

The alternative involving the relocation of dairy facilities to alternative sites outside the San Joaquin Valley was eliminated, despite the fact that siting outside of the San Joaquin Valley Air Basin might speculatively lessen the incremental effect of air emissions and potential air quality cumulative effects. However, because these properties would be outside the jurisdiction of the County; the project applicant does not own, or cannot reasonably acquire an additional dairy site outside of the San Joaquin Valley; and relocation of existing facilities would be costly, this alternative was considered infeasible and rejected from further analysis.

ORGANIC DAIRY FARM MANAGEMENT ALTERNATIVE

Under the Organic Dairy Farm Management Alternative, the existing Vierra Dairy would implement operational improvements and an expanded herd as included in the project description, but would implement an alternative management system by conversion to an organic dairy. The Organic Dairy Farm Management Alternative would reduce impacts from greenhouse gases and minimize potential environmental impacts from pesticides and antibiotics. Organic farms rely heavily on pasture for at least several months every year, and the key environmental benefits of the Organic Dairy Farm Management Alternative are linked to grazing. Greenhouse gas emissions for grazing operations are minimized by: reducing the loss of manure methane during storage, since a portion of the manure

[1] Impacts due to GHG emissions are considered a cumulative impact, since the project would result in a cumulatively considerable contribution to this impact.

would be deposited in pasture; indirectly reducing reliance on corn in feed rations; and soil sequestration of carbon within pastures.

In order to be certified as an organic dairy, the United States Department of Agriculture's (USDA) National Organic Program requires that animals must be able to obtain at least 30 percent of their daily feed intake from pasture during the grazing season, and all animals over six months of age must have daily access to pasture during the grazing season (USDA 2013a). A University of Missouri Extension paper on pasture-based dairies found that the acreage required to adequately pasture cows ranged from 0.3 acres per cow to 3 acres per cow (Horner, J. and R. Milhollin 2012). With the proposed expansion, there would be approximately 9,000 cows over six months of age needing pasture. Therefore, based on the USDA study survey, the proposed dairy under an organic dairy management scenario could require from 2,700 to 27,000 acres of pasture. Since the cows must have daily access to pasture during the grazing season, the pasture needs to be located where the cows are at the dairy site. However, the applicant does not own sufficient acreage of adjacent pasture, and the project vicinity has limited agricultural land availability (Trulia.com 2023). Based on the potentially large amount of acreage required for pasture and the lack of available agricultural real estate in the project vicinity, the project applicant cannot reasonably acquire additional land adjacent to the dairy for pasture.

In addition, current federal farm policies could make organic farming difficult to implement. The USDA's National Organic Program certification of a farming operation can be a complicated process in which the farm must go through a three-year transition period where they manage their farm as if already certified organic. The pasture and cropland providing feed for organic dairies during the three-year transitional phase may not be labeled or marketed as organic, and the farmer would not see a return on the initial investment for several years. Current standards also require the dairy herd to be fed 100 percent organic feed and to be provided organic health care for 12 months before being certified, or purchase a certified organic herd. Grazing is required for all animals over six months of age, with a required amount of feed from pasture of at least a 30 percent dry matter intake for the entire grazing season. As a result, organic operations must often undergo three years of higher costs before the higher organic milk prices are received. In addition, detailed production records must be kept for five years post-certification for a farm to be in compliance with the regulations, and access to these records must be provided to USDA and its certifying agents (USDA 2013a).

According to a study by the USDA, certification paperwork and compliance costs were reported by 40 percent of producers surveyed as the most challenging aspect of organic milk production, followed by finding new organic input sources (dairy replacement and feed), higher costs of production, and maintaining animal health (since antibiotics cannot be routinely administered). The volume of organic inputs needed on large farms in the West may account for the level of concern with sourcing inputs. Access to pasture for dairy feed also had a strong influence on whether a dairy becomes organic (USDA 2009). The study also found that larger organic dairies could reduce production costs due to economies of size; however, the additional costs of complying with pasture requirements and securing organic inputs in large volume may limit the cost advantages of larger organic operations (USDA 2009).

Based on the potentially large amount of acreage required for pasture and the lack of available agricultural real estate in the project vicinity, the project applicant cannot reasonably acquire additional land. In addition, current federal farm policies could make organic farming difficult to

implement. For each and every reason identified above, this alternative was considered infeasible and rejected from further analysis.

SOLID-SCRAPE MANURE MANAGEMENT ALTERNATIVE

Under the Solid-Scrape Manure Management Alternative, the existing dairy would be modified from a flush water lagoon system to a solid-scrape dry manure management system. All other improvements and the herd size increase associated with the proposed dairy expansion project would also occur under the Solid-Scrape Manure Management. This alternative was selected to further reduce greenhouse gas emissions and to consider a strategy that may be adopted in the future as a result of the California Air Resources Board (CARB) Short-Lived Climate Pollutant Strategy (SLCP) (2017) proposed actions for the methane reductions from the dairy sector.

Dairy methane emissions may be significantly reduced by switching from flush water lagoon systems (anaerobic bacterial breakdown) to solid-scrape or dry manure management practices (aerobic bacterial breakdown). The use of manure management systems such as vacuum or scrape would allow for easier transport of manure off site to centralized digester systems, or to localized storage for on-site digesters. Scrape systems are probably best used by dairies that are land constrained, or those that wish to expand their herd without expanding their land footprint, and therefore need to export their manure in order to be in compliance with the General Order (CARB 2017).

In many cases, converting to scrape systems at dairies may not yet be cost-effective. Many California dairies operate flush systems because they tend to have lower labor and operating costs, require less frequent maintenance of floors, and allow for the distribution of nutrients onto fields with lagoon water. For large dairy facilities, flush systems save on manual labor since it is easier to move liquid around to multiple barns by hydraulics rather than manually transporting solid manure to extensive farm areas (Sustainable Conservation 2015).

Using dry or scrape-based manure management systems at existing dairies would reduce methane emissions by keeping manure out of lagoons, but depending on conditions, solid manure management practices could lead to increased emissions of PM_{10}, ammonia, nitrous oxide, and volatile organic compounds (VOC). The feasibility and indirect implications of switching to solid-scrape manure management is being explored by the CARB (CARB 2017). In 2018, the Dairy and Livestock Greenhouse Gas Emissions Working Group developed recommendations to advance methane emissions reductions at California dairy and livestock operations. Among these recommendations, the Working Group proposed additional research into whole-farm emissions changes related to non-digester practices to reduce GHG emissions, such as converting to scrape systems (CARB 2018). These actionable recommendations have been included in the 2022 Scoping Plan as strategies for achieving climate goals.

The CARB's SLCP Strategy lays out a range of options to accelerate SLCP emission reductions in California, including regulations, incentives, and other market-supporting activities. As stated in the Strategy, California can cut methane emissions by 40 percent below current levels in 2030 by capturing or altogether avoiding methane from manure at dairies, meeting national industry targets for reducing methane emissions from enteric fermentation, effectively eliminating disposal of organics in landfills, and reducing fugitive methane emissions by 40-45 percent from all sources. California will aim to reduce methane emissions from dairy manure management by at least 50 percent in 2025 and 75 percent in 2030. To accomplish this, the State will encourage and support

near-term actions by dairies to reduce emissions through market support and financial incentives. At the same time, CARB will initiate a rulemaking process to develop regulations for dairy manure management in California (CARB 2017).

More data is needed regarding the overall emissions impacts of conversion from flush- to scrape-based manure management systems, in addition to water use impacts and economics. Switching from one manure management practice to another could result in both increased and decreased impacts across the environmental spectrum (Sustainable Conservation 2015).

In summary, while dairy methane emissions may be significantly reduced under this alternative, converting to scrape systems at dairies may not yet be cost-effective, and solid manure management practices could lead to increased emissions of PM_{10}, ammonia, nitrous oxide, and VOCs. Further, additional data and supporting regulations are needed before switching to solid-scrape manure management. For each and every reason identified, this alternative was considered infeasible and rejected from further analysis.

13.1.2 EVALUATION OF ALTERNATIVES

ALTERNATIVE 1 - NO PROJECT ALTERNATIVE

CEQA Guidelines require discussion of the "No Project" alternative to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project [CEQA Guidelines Section 15126.6(e)]. Under the No Project Alternative, construction of the Vierra Dairy would not occur. The existing dairy facility and agricultural operations currently developed on the project site would continue under the No Project Alternative. The existing herd size of 5,597 animals at the existing dairy facility would be maintained on the project sites in addition to continued use of the existing wastewater management system. Uses permitted under the General Agriculture zoning designation without discretionary approval by Merced County are limited to crop production, including orchards and vineyards. Thus, the agricultural activities permitted by Merced County zoning designations and the facilities currently developed on the project site would continue under the No Project Alternative.

There are 21 significant impacts that would occur with implementation of the proposed Vierra Dairy project. Of these, seven impacts would remain significant and unavoidable after the implementation of all feasible mitigation measures - one for cumulative air quality, one for cumulative biological resource impacts, one for greenhouse gas emissions, and five for water quality. The No Project Alternative would reduce the magnitude of anticipated environmental impacts associated with the proposed project. The No Project Alternative would avoid the increment of increase for air quality and greenhouse gas emission impacts as a result of the proposed project. The No Project Alternative would not create any construction impacts or provide a source of additional odors. The No Project Alternative would reduce the magnitude of impacts related to air quality; biological and cultural resources; greenhouse gas emissions and energy; nuisance insects; hydrology and soil erosion; and land use compatibility. Based on the foregoing, the No Project Alternative would result in fewer environmental effects than the proposed Vierra Dairy project. Table 13-1 includes an evaluation of the relative impacts of implementing Alternative 1 - No Project Alternative compared to the proposed project.

Table 13-1 Evaluation of Alternative 1 – No Project Alternative		
Impact	**Level of Impact for Project**	**Level of Impact of Alternative 1 Compared to Proposed Project**
Air Quality and Odors		
Construction-related emissions	LS	Reduced magnitude and significance from project since no additional dairy facilities would be constructed on the project site
Carbon monoxide emissions from operational equipment and increased traffic	LS	Reduced magnitude but not significance from project since there would be no increase in traffic
Ozone precursor emissions from dairy operations, farm equipment, and increased traffic	LS	Reduced magnitude but not significance from project since there would be no increment of increase
PM_{10} and $PM_{2.5}$ emissions from fugitive dust during project operations	LS	Reduced magnitude but not significance from project since there would be no increment of increase
Expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants from project construction and operations	PS/LS	Reduced magnitude and significance from project since there would be no increment of increase
Expose nearby residents to substantial pollutant concentrations from emissions of criteria air pollutants	LS	Reduced magnitude but not significance from project since there would be no increment of increase
Adverse odor from project operations	PS/LS	Reduced magnitude and significance from project since there would be no increment of increase
Health impacts due to Valley Fever	LS	Reduced magnitude but not significance from project since there would be no increment of increase
Health effects as a result of exposure to bioaerosols during dairy operations	LS	Reduced magnitude but not significance from project since there would be no increment of increase
Conflict with or obstruct implementation of the applicable air quality plan	LS	No change from project
Biological Resources		
Nest disturbance and loss of foraging habitat for Swainson's hawk	PS/LS	Reduced magnitude and significance from project since there would be no construction or conversion of cropland
Loss of foraging and nesting habitat for sensitive and migratory bird species	PS/LS	Reduced magnitude and significance from project since there would be no construction or conversion of cropland
Loss of nesting habitat for tricolored blackbird	PS/LS	Reduced magnitude and significance from project since there would be no construction or conversion of cropland
Impacts to the San Joaquin kit fox and/or American badger	PS/LS	Reduced magnitude and significance from project since there would be no construction or conversion of cropland
Loss and/or degradation of special-status plant species	LS	No change from project since there is no suitable habitat located within the area that would be disturbed by construction
Loss and/or degradation of riparian and vernal pool habitat or sensitive natural communities or wetlands	LS	No change from project since there are none located within the area that would be disturbed by construction
Interference with on-site wildlife movement corridor or wildlife nursery sites	LS	No change from project since there is a considerable amount of open space in the greater vicinity of the project site that can be used for wildlife movement

Table 13-1 Evaluation of Alternative 1 – No Project Alternative		
Impact	**Level of Impact for Project**	**Level of Impact of Alternative 1 Compared to Proposed Project**
Potential selenium and heavy metals effects to on-site biological resources	LS	Reduced magnitude but not significance from project since there would be no increment of increase in the amount of feed
Conflict with local policies or ordinances protecting biological resources	LS	No change from project
Cultural Resources and Tribal Cultural Resources		
Cause a substantial adverse change in the significance of a historical, archaeological, or paleontological resource, or a unique geological feature	PS/LS	Reduced magnitude but not significance from project since ongoing cropping activities could result in discovery of unknown cultural resources
Result in the accidental discovery and disturbance of human remains	PS/LS	Reduced magnitude but not significance from project since ongoing cropping activities could result in accidental discovery of human remains
Cause a substantial adverse change in the significance of a tribal cultural resource	LS	No change from project since no traditional cultural properties were identified
Greenhouse Gas Emissions and Energy Use		
Greenhouse gas emissions from project construction and operation	SU	Reduced magnitude and significance from project since there would be no increment of increase
Wasteful or inefficient use of energy	LS	Reduced magnitude but not significance from project since there would be no increment of increase in energy use
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LS	No change from project
Nuisance Conditions from Insects		
Increased fly production and related nuisance effects	PS/LS	Reduced magnitude and significance from project since there would be no increment of increase
Create significant nuisance conditions due to increased mosquito production	LS	Reduced magnitude but not significance from project since there would be no increment of increase
Hydrology and Water Quality		
Degradation of water quality due to storm water runoff during project construction	LS	Reduced magnitude but not significance from project since no additional dairy facilities would be constructed on the project site
Degradation of surface water quality from dairy expansion project operations	SU	Reduced magnitude and significance from project since there would be no increment of increase
Groundwater contamination from dairy expansion project operations	SU	Reduced magnitude and significance from project since there would be no increment of increase
Decrease groundwater supplies	LS	Reduced magnitude but not significance from project since there would be no increment of increase in groundwater use
Modification of surface water drainage patterns and an increase in runoff	LS	Reduced magnitude but not significance from project since no additional dairy facilities would be constructed on the project site

Table 13-1 Evaluation of Alternative 1 – No Project Alternative

Impact	Level of Impact for Project	Level of Impact of Alternative 1 Compared to Proposed Project
Risk release of pollutants due to project inundation in flood zones	PS/LS	Reduced magnitude and significance from project since no additional dairy facilities would be constructed on the project site
Water supply pathways for pollutant migration	LS	No change from project since existing wells are not a conduit for contamination
Impacts to water quality at off-site locations as a result of project operations	SU	Reduced magnitude and significance from project since there would be no increment of increase in exported manure
Conflict with or obstruct implementation of the applicable water quality or groundwater management plan	SU	Reduced magnitude and significance from project since there would be no increment of increase
Land Use Compatibility		
Consistency with Merced County Land Use Plans and policies	LS	No impact since no additional dairy facilities would be constructed on the project site
Land use compatibility with existing off-site residential uses adjacent to the project	PS/LS	Reduced magnitude and significance from project since there would be no increment of increase
Cumulative Impacts		
Aesthetics	LS	No change from project
Agricultural Resources	LS	No change from project
Air Quality	SU	Reduced magnitude and significance from project since there would be no cumulatively considerable contribution
Biological Resources	SU	Reduced magnitude and significance from project since there would be no cumulatively considerable contribution
Cultural Resources	LS	No change from project
Geological and Mineral Resources	LS	No change from project
Hazards (Nuisance Insects)	LS	No change from project
Hydrology and Water Quality	SU	Reduced magnitude and significance from project since there would be no cumulatively considerable contribution
Land Use	LS	No change from project
Noise	LS	No change from project
Population and Housing	LS	No change from project
Public Services	LS	No change from project
Recreation	LS	No change from project
Transportation and Circulation	LS	No change from project
Utilities and Service Systems	LS	No change from project
Growth Inducement & Secondary Effects	LS	No change from project
Irreversible Commitment of Resources	LS	Reduced magnitude but not significance from project
Potential Environmental Damage from Accidents	LS	No change from project

LS = Less than significant impact; PS/LS = Less than significant impact with mitigation; SU = Significant and unavoidable impact

Implementation of the No Project Alternative may not fully meet the following goals of the project applicant in proposing the Vierra Dairy project.

- *To maintain a modern, efficient, and competitive dairy operation that operates in full compliance with applicable county, state, and federal laws and regulations*. Under this alternative, no dairy expansion would be developed. Smaller dairy farms in the U.S. are observed to have higher costs per unit of milk produced than larger farms, largely due to farm inefficiencies and economies of size (Tauer and Mishra 2005). Larger farms realize lower production costs for a number of reasons, including fixed capital costs spread over more units of output, access to better technologies, specialization at larger farms, and volume discounts for input items such as feed. The cost advantages of a larger size allow large dairy farms to be more profitable than smaller operations (USDA 2007).
- *To generate dry manure that can be land applied and/or sold as a commodity for use as fertilizer in the region*. Since the dairy expansion would not occur, reduced amounts of dairy process water and manure would be generated and exported off site. Exported solid manure applied to off-site agricultural fields not owned by the project applicant would increase from 30,000 tons to 34,000 tons with the proposed expansion. (DEIR, Chapter 3, *Project Description*, page 3-17)
- *To provide year-round employment opportunities, at competitive wages, for Merced County residents. Unlike other agricultural operations, which provide only seasonal employment, dairies provide year-round employment*. The dairy under existing operations currently employs a staff of approximately 32 workers; with implementation of the proposed expansion, the number of employees would be 45 workers. Since the dairy expansion would not occur under this alternative, no additional employees beyond those existing would be required. (DEIR, Chapter 3, *Project Description*, page 3-17)

ALTERNATIVE 2 – ON-SITE ANAEROBIC DIGESTER ALTERNATIVE

Under the On-Site Anaerobic Digester Alternative, an anaerobic digester would be constructed at the existing dairy, or an existing wastewater pond would be covered and constructed as an anaerobic digester. An on-site combustion engine would be used to convert the biogas to electricity. All other improvements and the herd size increase associated with the proposed dairy expansion project would also occur under the On-Site Anaerobic Digester Alternative. This alternative was selected to further reduce greenhouse gas emissions and to consider a strategy that may be adopted in the future as a result of the CARB's Climate Change Scoping Plan recommended actions for the agriculture sector.

In addition to generating renewable energy, anaerobic digestion leads to reduced odor pollution, fewer pathogens, and reduced greenhouse gas emissions. There is little change in the nutrient value of the manure and organic matter that passes through the process, which can then be used as fertilizer. Methane produced from the collected manure (termed "biogas") can be captured with an estimated effectiveness of 95 percent. It is estimated that combustion of biomethane for energy recovery will convert up to 99 percent of the methane into carbon dioxide. Taking the effect of the CO_2 produced from the combustion of CH_4 into account, an overall reduction of 63.5 percent of fugitive CH_4 emissions can be achieved by the use of properly designed and controlled anaerobic treatment (SJVAPCD 2009).

Under this alternative, the methane from a digester is destroyed through combustion in an engine, flare, or other devices. Burning biogas reduces greenhouse gas emissions in two ways. First, when manure is stored in a conventional liquid handling system without a digester, it typically emits a certain amount of methane-containing biogas. When that methane is collected in a digester and burned, it then will not escape into the atmosphere and cause warming. Second, electricity generated from that digester biogas will typically replace fossil fuel-generated electricity, and there would be a reduction in CO_2 emissions from not burning that fossil fuel (SJVAPCD 2009).

Despite the benefits of anaerobic digestion systems in relation to greenhouse gases and odors, these systems could result in increased nitrogen oxide emissions, and soil and groundwater contamination.[2] The anaerobic treatment process creates intermediates such as ammonia, hydrogen sulfide, orthophosphates, and various salts, all of which must be properly controlled or captured. The ammonium level in the digester effluent is typically higher than raw manure, sometimes as much as two times higher. When digester effluent is field applied, much of the ammonium will be released as a gas (ammonia) unless it is incorporated into the soil. When incorporated, microorganisms can convert the ammonia to nitrite, which is then rapidly converted to nitrate, the nitrogen form most readily taken up by plants (Topper, A. P. et. al, 2023).

Atmospheric releases at locations off-site where biogas is shipped may negate or decrease the benefit of emissions controls on-site. Thus, while devices such as Selective Catalyst Reduction units can reduce NO_X emissions and proper treatment system operation can control intermediates, improper design or operation may lead to violations of federal, state, and local air quality regulations as well as the release of toxic air contaminants. With regard to water quality, it is critical that project developers and managers ensure digester integrity, and fully consider and address post-digestion management of the effluent in order to avoid contamination of local waterways and groundwater resources (de Boer 2008). Catastrophic digester failures, leakage from pipework and tanks, and lack of containment in waste storage areas are all examples of potential problems. Further, application of improperly treated digestate and/or improper application timing or rates of digestate to agricultural land may lead to increased nitrogen oxide emissions, soil contamination, and/or nutrient leaching, thus negating or reducing benefits of the project overall (CCAR 2013).

To facilitate the permitting of dairy digesters in the Central Valley, the Central Valley Regional Water Control Board (CVRWQCB) adopted the Waste Discharge Regulatory Program for Dairy Manure Digester and Co-Digester Facilities, and evaluated the potential environmental impacts of the program in the Dairy Manure Digester and Co-Digester Facilities Draft Program EIR (Dairy Digester Program EIR) (CVRWCB 2010). In order to evaluate potential construction and operational emissions for the On-Site Anaerobic Digester Alternative, this EIR references the air quality analysis included in the Dairy Digester Program EIR. There are numerous uncertainties regarding details of the anaerobic digester that would be appropriate and preferable for the Vierra Dairy Expansion project operation, including but not limited to location, size, engine type, and use of a co-digester[3], making project-specific quantification of air emissions and air toxics speculative and beyond the scope of this alternative. The emission estimates for a single digester included in the

[2] The combustion of biogas could result in increased nitrogen oxide emissions. While devices such as Selective Catalyst Reduction units can reduce NO_X emissions, uncontrolled emissions from combustion of biogas may contain between 200 to 300 ppm of NO_X (de Boer 2008).

[3] A dairy digester pipeline cluster alternative is considered below.

Dairy Digester Program EIR provide adequate information for a meaningful evaluation and comparison with the proposed project, and will be used in this analysis.

As evaluated in Chapter 5, *Air Quality and Greenhouse Gas Emissions*, of the Dairy Digester Program EIR, construction and operation of a dairy digester is not anticipated to exceed San Joaquin Valley Air Pollution Control District (SJVAPCD) thresholds of significance in most cases (CVRWCB 2010). Operational emissions of an individual digester would result in no net increase of ROG/VOC emissions[4], and a net increase in NO_X, PM_{10}, $PM_{2.5}$, SO_2, and CO from vehicle and equipment emissions and biogas combustion emissions. While the digester itself would not result in an increase in criteria air pollutants that would exceed SJVAPCD criteria, the On-Site Anaerobic Digester Alternative would result in an increase in air pollutant emissions compared to the proposed project that could exceed SJVAPCD criteria.

Prior to implementation of this alternative, as required by the RWQCB Dairy Digester Program EIR, an air quality technical report would be prepared to determine if construction and operation related air pollutant emissions would exceed SJVAPCD thresholds, as well as whether any health risks associated with toxic air contaminants would result. The technical report would evaluate all project emissions according to CEQA, and would include mitigation measures designed to reduce emissions below levels of significance, if necessary. Additional permits would also be required for the digester depending on location and resources affected. An Authority to Construct and Permit to Operate would be required from the SJVAPCD.

Another important consideration in this alternative is the feasibility of installing manure digesters at dairies in the San Joaquin Valley. Several studies have examined the financial feasibility of installing different types of manure digester operations and determined that financial feasibility is highly dependent on state and federal government assistance. In one particular study, most of the project scenarios reviewed had high energy production costs or limited revenues and, as a result, were not economically viable without ongoing assistance (USDA 2013). A different study examining the economic feasibility of six operating dairy methane digester systems in California confirmed that there are great cost challenges to overcome for many California dairy digester projects to become feasible without subsidies under the currently available rate structures (CEC 2013). In that study, only one operation out of the six could be considered feasible when excluding grant money. Additionally, a 2011 CVRWQCB study evaluating the economic feasibility of dairy manure digester and co-digester facilities in the Central Valley concluded that for dairy digester projects to become financially viable, they must cost less to build and run, and they must generate larger revenue streams (CVRWQCB 2011). The most recent 2022 CARB *Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target* concluded that financial incentives continue to be needed for California's dairy sector to adopt methane reduction strategies that include installation of anaerobic digesters and alternative manure management practices (CARB 2022). Between 2015 and 2021, the CDFA funded 117 dairy digester projects. For the entire group of 117 projects, the CDFA grant funds covered 33 percent of the total cost (eXtension 2022).

The installation of manure digesters to reduce methane emissions was included as a voluntary strategy for the agricultural sector in the CARB Scoping Plan, and will continue to be voluntary at least through 2023. Funds from the Cap-and-Trade Program are allocated to the Greenhouse Gas

[4] While there would be an increase in VOC emissions as a result of vehicle and equipment emissions and biogas combustion, the digester would reduce VOC emissions from the lagoon.

Reduction Fund to be administered by California Department of Food and Agriculture's (CDFA) to support such projects. CDFA has awarded a total of $195 million for 117 dairy digester projects from 2015 through 2021 through the Dairy Digester Research and Development Program (DDRDP), and over $68.3 million for 116 manure management projects for that time period through the Alternative Manure Management Program (AMMP) (CDFA 2023). Alternative projects could include installation of mechanical manure solids separation on dairies with flush systems, or conversion to dry manure management practices, such as scrape or vacuum systems, combined with composting or solar drying of manure. Current DDRDP projects are expected to reduce greenhouse gas emissions by an estimated 21.02 million metric tons of CO_2e over ten years. Dairy digesters installed with grant funding from CDFA are going to reduce 21 percent of the methane emissions from manure management in California, and 6.6 percent of total GHG emissions from all of California agriculture. The 116 AMMP projects awarded so far are expected to reduce greenhouse gas emissions by an estimated 2.22 million metric tons of CO_2e over 10 years, which equates to 2.2 percent of the methane emissions from manure management in California (CDFA 2023). Combined, the DDRDP and AMMP funded projects would contribute 22 percent of the reductions necessary to achieve the 2030 goal (CDFA 2023; CARB 2022).

Despite the availability of both federal and state funding for digester construction, policies and initiatives to support the installation of digesters, and the existence of the CARB offset protocol for livestock projects, only a small fraction of California's roughly 1,500 dairy farms currently have working digesters (CalCAN 2015; EPA 2022).

There are 21 significant impacts that would occur with implementation of the proposed Vierra Dairy project. Of these, seven impacts would remain significant and unavoidable after the implementation of all feasible mitigation measures - one for cumulative air quality, one for cumulative biological resource impacts, one for greenhouse gas emissions, and five for water quality. The On-Site Anaerobic Digester Alternative would reduce the magnitude of anticipated environmental impacts associated with the proposed project. The On-Site Anaerobic Digester Alternative would reduce, but not avoid, odor impacts. Greenhouse gas emissions would also be reduced. There would be an increase in most criteria air pollutant emissions as described above, including an increase in toxic air emissions that could impact sensitive receptors. While the anaerobic digester would reduce pathogens in the liquid manure stored in the lagoon and applied to cropland off site, because the dry manure exported off site is separated from the waste stream and would not be processed in the manure digester, it would not minimize potential impacts from manure pathogen transport off site. The On-Site Anaerobic Digester Alternative would also reduce the magnitude of impacts related to energy use and water quality. Because the digester equipment could require additional area beyond the existing dairy footprint, this alternative could require conversion of cropland for the digester and potentially increased impacts to biological and cultural resources. Based on the foregoing, the On-Site Anaerobic Digester Alternative would result in fewer environmental effects than the proposed Vierra Dairy project. Table 13-2 includes an evaluation of the relative impacts of implementing Alternative 2 - On-Site Anaerobic Digester Alternative compared to the proposed project.

Table 13-2 Evaluation of Alternative 2 – On-Site Anaerobic Digester Alternative

Impact	Level of Impact for Project	Level of Impact of Alternative 2 Compared to Proposed Project
Air Quality and Odors		
Construction-related emissions	LS	Increased magnitude but not significance from project since construction of the digester would result in additional emissions
Carbon monoxide emissions from operational equipment and increased traffic	LS	Increased magnitude but not significance from project since there would be additional equipment and vehicle trips associated with the digester
Ozone precursor emissions from dairy operations, farm equipment, and increased traffic	LS	Increased magnitude and significance from project, since the manure digester could result in increased ozone precursor emissions that would exceed SJVAPCD thresholds
PM_{10} and $PM_{2.5}$ emissions from fugitive dust during project operations	LS	Increased magnitude but not significance from project, since there would be additional vehicle trips associated with the digester
Expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants from project construction and operations	PS/LS	Potentially increased magnitude but not significance from project, since there would be additional air toxic emissions generated by the combustion of biogas
Expose nearby residents to substantial pollutant concentrations from emissions of criteria air pollutants	LS	Potentially increased magnitude but not significance from project, since there would be additional air pollutant emissions from the digester operations
Adverse odor from project operations	PS/LS	Reduced magnitude but not significance from project
Health impacts due to Valley Fever	LS	Potentially increased magnitude but not significance from project, since there could be additional construction and conversion of cropland for the digester
Health effects as a result of exposure to bioaerosols during dairy operations	LS	Potentially increased magnitude but not significance from project, since there could be additional construction and conversion of cropland for the digester
Conflict with or obstruct implementation of the applicable air quality plan	LS	No change from project
Biological Resources		
Nest disturbance and loss of foraging habitat for Swainson's hawk	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester
Loss of foraging and nesting habitat for sensitive and migratory bird species	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester
Loss of nesting habitat for tricolored blackbird	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester
Impacts to the San Joaquin kit fox and/or American badger	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester
Loss and/or degradation of special-status plant species	LS	No change from project since there are none located within the project area that would be disturbed by construction

Table 13-2 Evaluation of Alternative 2 – On-Site Anaerobic Digester Alternative		
Impact	**Level of Impact for Project**	**Level of Impact of Alternative 2 Compared to Proposed Project**
Loss and/or degradation of riparian and vernal pool habitat or sensitive natural communities or wetlands	LS	No change from project since there are none located within the project area that would be disturbed by construction
Interference with on-site wildlife movement corridor or wildlife nursery sites	LS	No change from project since there is a considerable amount of open space in the greater vicinity of the project site that can be used for wildlife movement
Potential selenium and heavy metals effects to on-site biological resources	LS	No change from project since there would be no change in the amount of feed required
Conflict with local policies or ordinances protecting biological resources	LS	No change from project
Cultural Resources and Tribal Cultural Resources		
Cause a substantial adverse change in the significance of a historical, archaeological, or paleontological resource, or a unique geological feature	PS/LS	Increased magnitude but not significance from project since construction of the digester would result in additional ground disturbance
Result in the accidental discovery and disturbance of human remains	PS/LS	Increased magnitude but not significance from project since construction of the digester would result in additional ground disturbance
Cause a substantial adverse change in the significance of a tribal cultural resource	LS	No change from project since no traditional cultural properties were identified
Greenhouse Gas Emissions and Energy Use		
Greenhouse gas emissions from project construction and operation	SU	Reduced magnitude and significance from project
Wasteful or inefficient use of energy	LS	Reduced magnitude but not significance from project
Increase in GHG emissions that would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions	LS	Reduced magnitude but not significance from project
Nuisance Conditions from Insects		
Increased fly production and related nuisance effects	PS/LS	Reduced magnitude but not significance from project
Create significant nuisance conditions due to increased mosquito production	LS	Reduced magnitude but not significance from project since the wastewater lagoon would be covered
Hydrology and Water Quality		
Degradation of water quality due to storm water runoff during project construction	LS	Increased magnitude but not significance from project
Degradation of surface water quality from dairy expansion project operations	SU	No change from project
Groundwater contamination from dairy expansion project operations	SU	Potential increased magnitude but not significance from project since nitrogen from the manure digester may be more readily available to the crops and could result in over application of nitrogen
Decrease groundwater supplies	LS	No change from project
Modification of surface water drainage patterns and an increase in runoff	LS	No change from project

Table 13-2 Evaluation of Alternative 2 – On-Site Anaerobic Digester Alternative

Impact	Level of Impact for Project	Level of Impact of Alternative 2 Compared to Proposed Project
Risk release of pollutants due to project inundation in flood zones	PS/LS	No change from project
Water supply pathways for pollutant migration	LS	No change from project since existing wells are not a conduit for contamination
Impacts to water quality at off-site locations as a result of project operations	SU	No change from project
Conflict with or obstruct implementation of the applicable water quality or groundwater management plan	SU	No change from project
Land Use Compatibility		
Consistency with Merced County Land Use Plans and policies	LS	No change from project
Land use compatibility with existing off-site residential uses adjacent to the project	PS/LS	Reduced magnitude but not significance from project
Cumulative Impacts		
Aesthetics	LS	No change from project
Agricultural Resources	LS	No change from project
Air Quality	SU	Increased magnitude but not significance from project
Biological Resources	SU	Potential increased magnitude but not significance from project
Cultural Resources	LS	No change from project
Geological and Mineral Resources	LS	No change from project
Hazards (Nuisance Insects)	LS	No change from project
Hydrology and Water Quality	SU	Potential increased magnitude but not significance
Land Use	LS	No change from project
Noise	LS	No change from project
Population and Housing	LS	No change from project
Public Services	LS	No change from project
Recreation	LS	No change from project
Transportation and Circulation	LS	No change from project
Utilities and Service Systems	LS	No change from project
Growth Inducement & Secondary Effects	LS	No change from project
Irreversible Commitment of Resources	LS	No change from project
Potential Environmental Damage from Accidents	LS	No change from project

LS = Less than significant impact; PS/LS = Less than significant impact with mitigation; SU = Significant and unavoidable impact

Implementation of the Anaerobic Digester Alternative may not fully meet the following goals of the project applicant in proposing the Vierra Dairy project.

- *To maintain a modern, efficient, and competitive dairy operation that operates in full compliance with applicable county, state, and federal laws and regulations*. The dairy digester represents a large capital cost and requires proper management and maintenance to realize a financial return. Further, installation of manure digesters to reduce methane emissions is a voluntary strategy in the CARB Scoping Plan.
- *To construct improvements that could be permitted and constructed within a reasonable time frame and would represent commensurate benefit with cost*. This alternative may take additional time to permit with both the SJVAPCD and the CVRWQCB. In addition, studies have found installing dairy digesters are generally not financially feasible without the infusion of grant funds, which are competitive and uncertain.

ALTERNATIVE 3 – DAIRY DIGESTER CLUSTER ALTERNATIVE

The dairy digester cluster concept involves gathering raw dairy biogas from a cluster of existing dairy operations and transferring it to a centralized hub where gas cleaning and conditioning occurs. Under the Dairy Digester Cluster Alternative, an anaerobic digester would be constructed at the existing Vierra Dairy, or the existing wastewater lagoons would be covered and re-constructed as an anaerobic digester. Underground pipeline would be installed to transport the biogas from the dairy to a biogas upgrading facility. The compressed natural gas could be injected into a utility pipeline, or used as a transportation fuel, replacing diesel. All other improvements and the herd size increase associated with the proposed dairy expansion project would also occur under the Dairy Digester Pipeline Cluster Alternative. This alternative was selected to further reduce greenhouse gas emissions and to consider a strategy that may be adopted in the future as a result of the CARB's Climate Change Scoping Plan recommended actions for the agriculture sector.

In addition to generating renewable energy, anaerobic digestion leads to reduced odor pollution, a decrease in manure pathogens, and reduced greenhouse gas emissions. However, this alternative could result in increased impacts to biological resources and/or unknown cultural resources during construction of the proposed pipeline. This alternative would not result in increased operational air criteria emissions associated with the combustion of biogas for energy recovery as described in Alternative 2. Rather, the biogas would be transported to a biogas upgrading facility, where it would be injected into a regional utility pipeline. In the case of the Vierra Dairy, there is an approved dairy digester cluster network in the Hilmar area.

The Central Valley Regional Water Quality Control Board (CVRWQCB) regulates dairy digester facilities in its region under Waste Discharge Requirements (WDR). Existing dairies currently covered under the WDR General Order for Existing Milk Cow Dairies (Dairy General Order) that construct and operate a manure-only digester using only manure generated onsite could retain regulatory coverage under the Dairy General Order, or may be covered under the Dairy Digester General Order. Prior to implementation of this alternative, review and/or approval from the SJVAPCD and CVRWQCB would be required.

Another important consideration in this alternative is the financial feasibility of installing manure digesters at dairies in the San Joaquin Valley (this general topic is explored more fully under Alternative 2 – On-Site Anaerobic Digester Alternative, above). A study looking at the overall viability of dairy digester clusters, including a specific case study in Kern County, concluded that financial feasibility is highly dependent on state and federal government assistance. However, connection to a dairy digester pipeline cluster project may be considered more attractive to a dairy

operator, since the cluster is usually formed by an outside entity that assists in permit and grant applications, and generally takes on maintenance responsibilities. In late 2018, California launched its first dairy digester pipeline cluster in Tulare County, organized by Calgren Renewable Fuels in partnership with Maas Energy Works and approximately one dozen dairy operators. The cluster includes 22 miles of pipeline and 75,000 cows that contribute to the interconnected system. The system is estimated to reduce approximately 1,867,651 metric tons of CO_2 equivalents over 10 years. The digesters and the cluster project were made possible in part by grants in 2017 and 2018 from CDFA's Dairy Digester Research and Development Program totaling approximately $16 million, with an additional $17.5 million in matching funds provided by the dairies and Calgren Renewable Fuels.

The installation of manure digesters to reduce methane emissions was included as a voluntary strategy for the agricultural sector in the CARB Scoping Plan, and will continue to be voluntary at least through 2023. All DDRDP projects funded by CDFA in 2020 were for projects that generate renewable natural gas.

There are 21 significant impacts that would occur with implementation of the proposed Vierra Dairy project. Of these, seven impacts would remain significant and unavoidable after the implementation of all feasible mitigation measures - one for cumulative air quality, one for cumulative biological resource impacts, one for greenhouse gas emissions, and five for water quality. The Dairy Digester Cluster Alternative would reduce the magnitude of anticipated environmental impacts associated with the proposed project. The Dairy Digester Cluster Alternative would reduce, but not avoid, odor impacts. Greenhouse gas emissions would also be reduced, though there would be an increase in greenhouse gas emissions during pipeline construction. While the anaerobic digester would reduce pathogens in the liquid manure stored in the lagoon and applied to cropland off site, because the dry manure exported off site is separated from the waste stream and would not be processed in the manure digester, it would not minimize potential impacts from manure pathogen transport off site. The Dairy Digester Cluster Alternative would also reduce the magnitude of impacts related to energy use and water quality. Because the digester equipment could require additional area beyond the existing dairy footprint, this alternative could require conversion of cropland for the digester and pipeline and potentially increased impacts to biological and cultural resources. Based on the foregoing, the Dairy Digester Cluster Alternative would result in fewer environmental effects than the proposed Vierra Dairy project. Table 13-3 includes an evaluation of the relative impacts of implementing Alternative 3 - Dairy Digester Cluster Alternative compared to the proposed project.

Table 13-3 Evaluation of Alternative 3 – Dairy Digester Cluster Alternative

Impact	Level of Impact for Project	Level of Impact of Alternative 3 Compared to Proposed Project
Air Quality and Odors		
Construction-related emissions	LS	Increased magnitude but not significance from project since construction of the digester and pipeline would result in additional emissions
Carbon monoxide emissions from operational equipment and increased traffic	LS	Increased magnitude but not significance from project since there would be additional equipment and vehicle trips associated with the digester

Table 13-3 Evaluation of Alternative 3 – Dairy Digester Cluster Alternative

Impact	Level of Impact for Project	Level of Impact of Alternative 3 Compared to Proposed Project
Ozone precursor emissions from dairy operations, farm equipment, and increased traffic	LS	Increased magnitude but not significance from project, since there would be additional equipment and vehicle trips associated with the digester
PM_{10} and $PM_{2.5}$ emissions from fugitive dust during project operations	LS	Increased magnitude but not significance from project, since there would be additional vehicle trips associated with the digester
Expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants from project construction and operations	PS/LS	Potentially increased magnitude but not significance from project
Expose nearby residents to substantial pollutant concentrations from emissions of criteria air pollutants	LS	No change from project
Adverse odor from project operations	PS/LS	Reduced magnitude but not significance from project
Health impacts due to Valley Fever	LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester
Health effects as a result of exposure to bioaerosols during dairy operations	LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester
Conflict with or obstruct implementation of the applicable air quality plan	LS	No change from project
Biological Resources		
Nest disturbance and loss of foraging habitat for Swainson's hawk	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester and pipeline
Loss of foraging and nesting habitat for sensitive and migratory bird species	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester and pipeline
Loss of nesting habitat for tricolored blackbird	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester and pipeline
Impacts to the San Joaquin kit fox and/or American badger	PS/LS	Potentially increased magnitude but not significance from project, since there could be additional conversion of cropland for the digester
Loss and/or degradation of special-status plant species	LS	No change from project since there are none located within the area that would be disturbed by construction
Loss and/or degradation of riparian and vernal pool habitat or sensitive natural communities or wetlands	LS	No change from project since there are none located within the area that would be disturbed by construction
Interference with on-site wildlife movement corridor or wildlife nursery sites	LS	No change from project since there is a considerable amount of open space in the greater vicinity of the project site that can be used for wildlife movement
Potential selenium and heavy metals effects to on-site biological resources	LS	No change from project since there would be no change in the amount of feed required

Table 13-3 Evaluation of Alternative 3 – Dairy Digester Cluster Alternative

Impact	Level of Impact for Project	Level of Impact of Alternative 3 Compared to Proposed Project
Conflict with local policies or ordinances protecting biological resources	LS	No change from project
Cultural Resources and Tribal Cultural Resources		
Cause a substantial adverse change in the significance of a historical, archaeological, or paleontological resource, or a unique geological feature	PS/LS	Increased magnitude but not significance from project since construction of the digester and pipeline would result in additional ground disturbance
Result in the accidental discovery and disturbance of human remains	PS/LS	Increased magnitude but not significance from project since construction of the digester and pipeline would result in additional ground disturbance
Cause a substantial adverse change in the significance of a tribal cultural resource	LS	No change from project since no traditional cultural properties were identified
Greenhouse Gas Emissions and Energy Use		
Greenhouse gas emissions from project construction and operation	SU	Reduced magnitude and significance from project
Wasteful or inefficient use of energy	LS	Reduced magnitude but not significance from project
Increase in GHG emissions that would conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions	LS	Reduced magnitude but not significance from project
Nuisance Conditions from Insects		
Increased fly production and related nuisance effects	PS/LS	Reduced magnitude but not significance from project
Create significant nuisance conditions due to increased mosquito production	LS	Reduced magnitude but not significance from project since the wastewater lagoon would be covered
Hydrology and Water Quality		
Degradation of water quality due to storm water runoff during project construction	PS/LS	Increased magnitude but not significance from project
Degradation of surface water quality from dairy expansion project operations	SU	No change from project
Groundwater contamination from dairy expansion project operations	SU	Potential increased magnitude but not significance from project since nitrogen from the manure digester may be more readily available to the crops and could result in over application of nitrogen
Decrease groundwater supplies	LS	No change from project
Modification of surface water drainage patterns and an increase in runoff	LS	No change from project
Risk release of pollutants due to project inundation in flood zones	PS/LS	No change from project
Water supply pathways for pollutant migration	LS	No change from project since existing wells are not a conduit for contamination
Impacts to water quality at off-site locations as a result of project operations	SU	No change from project

Table 13-3 Evaluation of Alternative 3 – Dairy Digester Cluster Alternative

Impact	Level of Impact for Project	Level of Impact of Alternative 3 Compared to Proposed Project
Conflict with or obstruct implementation of the applicable water quality or groundwater management plan	SU	No change from project
Land Use Compatibility		
Consistency with Merced County Land Use Plans and policies	LS	No change from project
Land use compatibility with existing off-site residential uses adjacent to the project	PS/LS	Reduced magnitude but not significance from project
Cumulative Impacts		
Aesthetics	LS	No change from project
Agricultural Resources	LS	No change from project
Air Quality	SU	Increased magnitude but not significance from project
Biological Resources	SU	Potential increased magnitude but not significance from project
Cultural Resources	LS	No change from project
Geological and Mineral Resources	LS	No change from project
Hazards (Nuisance Insects)	LS	No change from project
Hydrology and Water Quality	SU	Potential increased magnitude but not significance
Land Use and Planning	LS	No change from project
Noise	LS	No change from project
Population and Housing	LS	No change from project
Public Services	LS	No change from project
Recreation	LS	No change from project
Transportation and Circulation	LS	No change from project
Utilities and Service Systems	LS	No change from project
Growth Inducement & Secondary Effects	LS	No change from project
Irreversible Commitment of Resources	LS	No change from project
Potential Environmental Damage from Accidents	LS	No change from project

LS = Less than significant impact; PS/LS = Less than significant impact with mitigation; SU = Significant and unavoidable impact

Implementation of the Dairy Digester Cluster Alternative may not fully meet the following goals of the project applicant in proposing the Vierra Dairy project.

- *To maintain a modern, efficient, and competitive dairy operation that operates in full compliance with applicable county, state, and federal laws and regulations*. The dairy digester as part of a dairy digester cluster represents a large capital cost and requires proper management and maintenance to realize a financial return. In addition, construction of the connecting pipeline includes additional construction costs, acquisition of right-of-way or coordination of easements, coordination with utilities, much of which is outside the control of the dairy operator. Further, installation of manure digesters to reduce methane emissions is a voluntary strategy in the CARB Scoping Plan.

- *To construct improvements that can be permitted and constructed within a reasonable time frame and would represent commensurate benefit with cost*. This alternative may take additional time to permit with both the SJVAPCD and the CVRWQCB, and overall to coordinate with and join the nearby dairy digester cluster. In addition, studies have found installing dairy digesters are generally not financially feasible without the infusion of grant funds, which are uncertain.

13.2 COMPARISON OF THE ENVIRONMENTAL MERITS OF EACH ALTERNATIVE

In Table 13-4, the symbol "-5" means that an alternative has a lower magnitude of impact and level of significance than that for the project (e.g., the adverse environmental condition is less than for the project, so that the impact is less than significant rather than significant). The symbol "-1" means that an alternative has a lower magnitude of impact than that for the project (e.g., the adverse environmental condition is somewhat less than for the project, but the significance of the impact is unchanged). The symbol "0" means that the alternative has an environmental effect that is equal in significance and magnitude to the proposed project. The symbol "+1" means that an alternative has a higher magnitude of impact than that for the project (e.g., adverse environmental condition is more than for the project, but the significance of the impact is unchanged). Finally, the symbol "+5" means that an alternative has a more significant impact than the proposed project (i.e., a significant impact rather than less than significant). These numerical values have been assigned to these categories in order to assess each alternative across a large number of impact areas.

Definition	Numerical Value (as explained below and shown in Table 13-4)
Reduced magnitude and significance of impact compared to proposed project	-5
Reduced magnitude of impact, but no change in level of significance	-1
Same magnitude and significance of impact as proposed project	0
Increased magnitude of impact, but no change in level of significance	+1
Increased magnitude and significance of impact compared to proposed project	+5

Because the emphasis of the alternatives analysis is on minimizing or avoiding impacts, those categories associated with avoiding or causing impacts not attributable to the project are assigned a value of -5 or 5 respectively. If an alternative lessens or increases the magnitude of an impact without changing its significance, the category is assigned a value of -1 or 1. The number at the bottom of Table 13-4 indicates, for each alternative, the net number of identified impacts of the project that were avoided or reduced by the alternative.

CEQA requires the selection of an environmentally superior alternative; however, if the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives (CEQA Guidelines Section 15126.6(e)(2)). Therefore, based on this comparative evaluation, Alternative 3 (Dairy Digester Cluster Alternative) would reduce the magnitude of the most impacts as an action alternative. Several of the significant impacts identified for the project would be reduced, but not eliminated, with implementation of Alternative 3. Alternative 3 would be the environmentally superior alternative.

The Merced County Planning Commission will consider the selection of a preferred project upon review of this EIR and other information in the public record. Identification of an environmentally

superior alternative does not require that Merced County choose that alternative. In choosing a preferred project, Merced County is required to make written findings regarding its choice of a project to implement, including the reasons why it chose not to implement an environmentally superior alternative or alternatives, if the selected project is not the environmentally superior alternative. In the findings, Merced County must set forth its reasoning for proceeding with the Vierra Dairy project. Such reasoning could include the social, economic, or other benefits provided by the Vierra Dairy project. This process allows a lead agency to balance any environmental harm with other factors appropriate in judging the merits of a project.

Table 13-4 Relative Comparison of Alternatives

Impact	Level of Impact for Project	Alt. 1 – No Project	Alt. 2 – Anaerobic Digester	Alt. 3 – Dairy Digester Cluster
Air Quality and Odors				
Construction-related emissions	LS	-5	+1	+1
Carbon monoxide emissions from operational equipment and increased traffic	LS	-1	+1	+1
Ozone precursor emissions from dairy operations, farm equipment, and increased traffic	LS	-1	+5	+1
PM_{10} and $PM_{2.5}$ emissions from fugitive dust during project operations	LS	-1	+1	+1
Expose nearby residents to substantial pollutant concentrations from the emissions of toxic air contaminants from project construction and operations	PS/LS	-5	+1	+1
Expose nearby residents to substantial pollutant concentrations from emissions of criteria air pollutants	LS	-1	+1	0
Adverse odor from project operations	PS/LS	-5	-1	-1
Health impacts due to Valley Fever	LS	-1	+1	+1
Health effects as a result of exposure to bioaerosols during dairy operations	LS	-1	+1	+1
Conflict with or obstruct implementation of the applicable air quality plan	LS	0	0	0
Biological Resources				
Nest disturbance and loss of foraging habitat for Swainson's hawk	PS/LS	-5	+1	+1
Loss of foraging and nesting habitat for sensitive and migratory bird species	PS/LS	-5	+1	+1
Loss of nesting habitat for tricolored blackbird	PS/LS	-5	+1	+1
Impacts to the San Joaquin kit fox and/or American badger	PS/LS	-5	+1	+1
Loss and/or degradation of special-status plant species	LS	0	0	0

Table 13-4 Relative Comparison of Alternatives

Impact	Level of Impact for Project	Alt. 1 – No Project	Alt. 2 – Anaerobic Digester	Alt. 3 – Dairy Digester Cluster
Loss and/or degradation of riparian and vernal pool habitat or sensitive natural communities or wetlands	LS	0	0	0
Interference with on-site wildlife movement corridor or wildlife nursery sites	LS	0	0	0
Potential selenium and heavy metals effects to on-site biological resources	LS	-1	0	0
Conflict with local policies or ordinances protecting biological resources	LS	0	0	0
Cultural Resources and Tribal Cultural Resources				
Cause a substantial adverse change in the significance of a historical, archaeological, or paleontological resource, or a unique geological feature	PS/LS	-1	+1	+1
Result in the accidental discovery and disturbance of human remains	PS/LS	-1	+1	+1
Cause a substantial adverse change in the significance of a tribal cultural resource	LS	0	0	0
Greenhouse Gas Emissions and Energy Use				
Greenhouse gas emissions from project construction and operation	SU	-5	-5	-5
Wasteful or inefficient use of energy	LS	-1	-1	-1
Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions, or conflict with or obstruct a state or local plan for renewable energy or energy efficiency	LS	0	-1	-1
Nuisance Conditions from Insects				
Increased fly production and related nuisance effects	PS/LS	-5	-1	-1
Create significant nuisance conditions due to increased mosquito production	LS	-1	-1	-1
Hydrology and Water Quality				
Degradation of water quality due to storm water runoff during project construction	LS	-1	+1	+1
Degradation of surface water quality from dairy expansion project operations	SU	-5	0	0
Groundwater contamination from dairy expansion project operations	SU	-5	+1	+1
Decrease groundwater supplies	LS	-1	0	0
Modification of surface water drainage patterns and an increase in runoff	LS	-1	0	0
Risk release of pollutants due to project inundation in flood zones	PS/LS	-5	0	0

Table 13-4 Relative Comparison of Alternatives

Impact	Level of Impact for Project	Alt. 1 – No Project	Alt. 2 – Anaerobic Digester	Alt. 3 – Dairy Digester Cluster
Water supply pathways for pollutant migration	LS	0	0	0
Impacts to water quality at off-site locations as a result of project operations	SU	-5	0	0
Conflict with or obstruct implementation of the applicable water quality or groundwater management plan	SU	-5	0	0
Land Use Compatibility				
Consistency with Merced County Land Use Plans and policies	LS	0	0	0
Land use compatibility with existing off-site residential uses adjacent to the project	PS/LS	-5	-1	-1
Cumulative Impacts				
Aesthetics	LS	0	0	0
Agricultural Resources	LS	0	0	0
Air Quality	SU	-5	+1	+1
Biological Resources	SU	-5	+1	+1
Cultural Resources	LS	0	0	0
Geological and Mineral Resources	LS	0	0	0
Hazards (Nuisance Insects)	LS	0	0	0
Hydrology and Water Quality	SU	-5	+1	+1
Land Use	LS	0	0	0
Noise	LS	0	0	0
Population and Housing	LS	0	0	0
Public Services	LS	0	0	0
Recreation	LS	0	0	0
Transportation and Circulation	LS	0	0	0
Utilities and Service Systems	LS	0	0	0
Growth Inducement & Secondary Effects	LS	0	0	0
Irreversible Commitment of Resources	LS	-1	0	0
Potential Environmental Damage from Accidents	LS	0	0	0
Impacts Relative to Project		-105	+12	+7

LS = Less than significant impact; PS/LS = Less than significant impact with mitigation; SU = Significant and unavoidable impact

14 LIST OF PREPARERS

14.1 MERCED COUNTY COMMUNITY AND ECONOMIC DEVELOPMENT DEPARTMENT

Mark J. Hendrickson
Director

Brian Guerrero
Development Services Coordinator

Tiffany Ho
Deputy Director of Planning

14.2 ENVIRONMENTAL PLANNING PARTNERS, INC.

Robert Klousner
President, Principal-in-Charge

Raadha M. B. Jacobstein
Professional Planner, Project Manager; Air Quality, Greenhouse Gas Modeling, Alternatives, Required CEQA Analyses

Mary Wilson
Project Coordinator, Planner

Dale Nutley
Graphics

14.3 NV-5

Pat Dunn
Hydrogeologic Assessment

14.4 PADRE ASSOCIATES, INC.

Sarah Powell
Biological Resources

Rachael Letter
Cultural Resources

14.5 TRINITY CONSULTANTS, INC.

Matt Daniel
Modeling for Health Risk Assessment and Ambient Air Quality Analysis

This page intentionally
left blank.

15 REFERENCES/LITERATURE CITED

CEQA. The California Environmental Quality Act, as amended January 1, 2009. CEQA Guidelines, as amended December 31, 2009.

Viera Dairy Farms, 2020. Nutrient Management Plan. Proposed Conditions NMP. Prepared by FR Ag Services. Dated 06/04/2020.

_____, 2020a. Waste Management Plan. Proposed Conditions WMP. Prepared by Sousa Engineering and FR Ag Services. Dated 10/19/2020.

_____, 2017. Nutrient Management Plan. Existing Conditions NMP. Prepared by FR Ag Services. Dated 08/22/2017.

_____, 2017a. Waste Management Plan. Existing Conditions WMP. Prepared by FR Ag Services and Michael Mitchell. Dated 11/09/2017.

Merced, County of. 2020. Planning Commission Resolution 20-001, Revised Standard Conditions of Approval for Major Subdivisions, Administrative Permits, and Conditional Use Permits.

_____. 2013. 2030 Merced County General Plan. Adopted on December 10, 2013.

_____. 2007. An Ordinance Amending the Merced County Code to Modify Chapter 18.48.040 Entitled "Animal Confinement Facilities." February 13, 2007.

_____. 2002. Program Environmental Impact Report for the Merced County Animal Confinement Ordinance Revision. County of Merced, Division of Environmental Health, Merced, California. October 2002.

CHAPTER 5 – AIR QUALITY AND ODORS

Almaraz, et. al. 2018. Agriculture is a major source of NOx pollution in California. M. Almaraz, E. Bai, C. Wang, J. Trousdell, S. Conley, I. Faloona, B. Z. Houlton. Science Advances, 4, eaao3477. 31 January 2018. Accessed on April 26, 2023 at: < https://www.science.org/doi/10.1126/sciadv.aao3477>

CARB, see California, State of, Air Resources Board.

Augustin, et. al. 2017. Biosecure Nutrient Management Practices. Volume NM 1551. By Augustin, Chris. Stoltenow, Charles. Widerholt, Ron. North Dakota State University. Reprinted January 2017. Accessed on April 18, 2023 at <http://www.ag.ndsu.edu/pubs/h2oqual/watnut/nm1551.pdf>

California Air Pollution Control Officers Association (CAPCOA), 2021. Health Effects. Accessed on December 29, 2021 at: <http://www.capcoa.org/health-effects/>

California, State of, Air Resources Board (CARB). 2023. Air Quality Trend Summaries. Accessed on April 18, 2023 at <https://www.arb.ca.gov/adam/>

_____, 2022. Area Designations Maps / State and National. State Designations Last updated November 2022. Federal Designations Last updated November 2022. Accessed on April 6, 2023 at < https://www.arb.ca.gov/desig/adm/adm.htm>

_____, 2016. Ambient Air Quality Standards (CAAQS). Dated 5/4/16. Accessed on April 6, 2023 at <http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>

California, State of, Department of Public Health (CDPH). 2022. Valley Fever. Last Updated August 25, 2022. Accessed on April 19, 2023 at: < https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Coccidioidomycosis.aspx)

_____, 2022a. Epidemiologic Summary of Valley Fever (Coccidioidomycosis) in California, 2020-2021. December 2022. Accessed on April 19, 2023 at: <https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/ValleyFeverDataPublications.aspx>

Centers for Disease Control and Prevention (CDC), Department of Health and Human Services, National Institute for Occupational Safety and Health (NIOSH), 2017. Sampling and characterization of bioaerosols. NIOSH Manual of Analytical Methods, 5th Edition, Chapter BA. March 2017. Accessed on April 20, 2023 at: < https://www.cdc.gov/niosh/nmam/pdf/chapter-ba.pdf>

Eckard, R. 2007. "The Abatement Challenge for Australian Agriculture." The University of Melbourne and Department of Primary Industries, Victoria. Accessed on July 2, 2021 at <http://www.greenhouse.unimelb.edu.au/pdf_files/Garnaut_Eckard.pdf>

EPA. See United States, Environmental Protection Agency.

Henry and Stowell, undated. "Understanding Odor Footprints and the Odor Footprint Tool (FAQs)". University of Nebraska. Prepared by Chris Henry, P.E., and Rick Stowell, Ph.D., P.E. Accessed on April 18, 2023 at < http://water.unl.edu/documents/OFT_FAQ.pdf >

Hristov, A. N., 2011. Technical note: Contribution of ammonia emitted from livestock to atmospheric fine particulate matter (PM2.25) in the United States. Dairy Sci. 94:3130-3136. Accessed on April 12, 2023 at: <https://www.sciencedirect.com/science/article/pii/S0022030211003006

Merced, County of. 2023. Email confirmation from Esther Canal, DEH, in response to Information Request regarding nuisance odor, dust, or nuisance insect complaints on record for the Vierra Dairy. April 2023.

Mitloehner, Frank M. and Marc B. Schenker, 2007. Environmental Exposure and Health Effects from Concentrated Animal Feeding Operations. *Epidemiology*. 2007; 18: 309-311. Accessed on December 29, 2021 at <https://pubmed.ncbi.nlm.nih.gov/17435438/>

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2023. Personal communications with Matthew Crow, Air Quality Specialist, with Raadha Jacobstein regarding analysis methodology for health impacts from criteria air pollutants in light of the Friant Ranch case on April 19, 2023.

_____. 2023. Air Quality Plans. Accessed on April 18, 2023 at < https://ww2.valleyair.org/rules-and-planning/air-quality-plans/ >

_____. 2019. Demonstration of NH3 Precursor Contributions to PM2.5 in the San Joaquin Valley. April 15, 2019. Accessed on April 12, 2023 at: < http://www.valleyair.org/workshops/postings/2019/04-15-19_rules/nh3.pdf>

_____. 2015. "Guidance for Assessing and Mitigating Air Quality Impacts." March 19, 2015. Accessed on December 29, 2021 at <http://www.valleyair.org/transportation/ceqa_guidance_documents.htm>

Trinity Consultants, 2023. Health Risk Assessment and Ambient Air Quality Analysis, Vierra Dairy Facility Expansion. April 2023.

Tyndall, J.C. and J.P. Colletti. 2007. "Mitigating Swine Odor with Strategically Designed Shelterbelt Systems: A Review". Agroforestry Systems. Volume 69:45-65. 2007. Accessed on April 19, 2023 at < https://hero.epa.gov/hero/index.cfm/reference/details/reference_id/529755 >.

United States, Department of Agriculture, 2012. Air Quality: Bioaerosol Sampling in Animal Environments. eXtension: Air Quality in Animal Agriculture. Accessed on April 20, 2023 at: <https://lpelc.org/wp-content/uploads/2019/03/Bioaerosol-SamplingFINAL.pdf>

United States, Department of Agriculture, 2000. Confined Livestock Air Quality Committee (CLAQC) of the USDA Agricultural Air Quality Task Force. Air Quality Research and Technology Transfer White Paper and Recommendations for Concentrated Animal Feeding Operations. July 19, 2000. Accessed on April 19, 2023 at < https://p2infohouse.org/ref/16/15447.htm>

United States, Environmental Protection Agency (EPA). 2023. National Ambient Air Quality Standards (NAAQS) Table. Last updated on March 15, 2023. Accessed on April 6, 2023 at < https://www.epa.gov/criteria-air-pollutants/naaqs-table >

_____. 2023a. Current Nonattainment Counties for All Criteria Pollutants. As of March 31, 2023. Accessed on April 6, 2023 at http://www3.epa.gov/airquality/greenbook/ancl.html

_____. 2023b. Criteria Air Pollutants. Health Effects. Accessed on April 19, 2023 at: <https://www.epa.gov/criteria-air-pollutants>

CHAPTER 6 – BIOLOGICAL RESOURCES

Airola, Dan., Ted Beedy, and Samantha Arthur. 2016. Tricolored Blackbird Biology, Conservation, and Survey Techniques Workshop. Wildlife Society-Sacramento-Shasta Chapter. May 4, 2016. Folsom, CA.

California Department of Fish and Wildlife. 2022. California Natural Diversity Database (CNDDB) RAREFIND Query. California Department of Fish and Game. Sacramento, CA. Data accessed January 2022.

_____. 1994. Department of Fish and Game Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California.

California Native Plant Society. 2022. *Inventory of Rare and Endangered Vascular Plants of California*. California Native Plant Society, Sacramento, CA. Accessed in January 2022 at <http://www.rareplants.cnps.org/>

California, State of. Regional Water Quality Control Board, Central Valley Region (CVRWQCB). 2018. Water Quality Control Plan (Basin Plan) for the Sacramento River Basin and the San Joaquin River Basin, Fifth Edition. Revised May 2018.

Meese, RJ. 2017. Results of the 2017 Tricolored Blackbird Statewide Survey. Report available at the Tricolored Blackbird Portal at http//tricolor.ice.ucdavis.edu/reports.

_____. 2014. Results of the 2014 Tricolored Blackbird Statewide Survey. Report available at the Tricolored Blackbird Portal at http//tricolor.ice.ucdavis.edu/reports.

_____. 2009. Contribution of the Conservation of Silage Colonies of Tricolored Blackbird Conservation from 2005-2009. Report Submitted to the U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, CA. Report available at the Tricolored Blackbird Portal at http//tricolor.ice.ucdavis.edu/reports

Merced, County of. 2013. Merced County 2030 General Plan. Prepared by Mintier Harnish, December 2013.

_____. 2002. Program Environmental Impact Report for the Merced County Animal Confinement Ordinance Revision. County of Merced, Division of Environmental Health, Merced, California. October 2002.

Padre Associates, Inc. 2022. Biological Resources Reconnaissance Survey and CEQA Analysis, Vierra Dairy Expansion Project. February 22, 2022.

Ullrey, D.E. 1992. Basis for regulation of selenium supplements in animal diets. Journal of Animal Science 1992, 70:3922-3927. Accessed on March 4, 2022 at < https://www.ncbi.nlm.nih.gov/pubmed/1474028 >

U. S. Fish and Wildlife Service. 2022. Species list for Vierra Dairy Expansion Project through IPaC Trust Resource Report on January 4, 2022 for use in preparation of Biological Reconnaissance Report. Consultation Code: 08ESMF00-2022-SLI-0726.

_____. 2022a. National Wetlands Inventory website. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands

_____. 2011. *Standardized Recommendations for Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance*. Sacramento Fish and Wildlife Office.

United States Food and Drug Administration (USFDA). 2020. Code of Federal Regulations Title 21 Section 573.920 Selenium. Revised as of April 1, 2020. Accessed on March 4, 2022 at <https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?fr=573.920>

CHAPTER 7 – CULTURAL RESOURCES

Ho, Tiffany; Deputy Director of Planning, Merced County Community & Economic Development Department; 2023. Email from Tiffany Ho to Robert Klousner regarding tribal enrollment pursuant to AB 52 within Merced County.

Merced, County of. Department of Agriculture. 2020. *2020 Report on Agriculture*. Undated. Accessed on February 17, 2022 at <https://www.co.merced.ca.us/Archive.aspx?AMID=36>

Napton, L. Kyle, Ph.D., 2012. Cultural Resources Investigations of the Proposed Vierra Dairy Expansion, Three Acres in Merced County, California.

Padre Associates, Inc., 2022. *Supplemental Phase I Archaeological Study Report, Vierra Dairy Expansion, Merced County, California* (Padre 2022).

University of California Museum of Paleontology (UCMP), 2022. UCMP Locality Search. Locality Search for known paleontological resources in Merced County performed by Mary Wilson on March 23, 2022 at: <https://ucmpdb.berkeley.edu/loc.html>

CHAPTER 8 – GREENHOUSE GAS EMISSIONS AND ENERGY

California, State of, Air Resources Board (CARB), 2022. Scoping Plan for Achieving Carbon Neutrality. November 16, 2022. Accessed on March 24, 2023 at: <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents>

_____, 2022a. Final Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target. March 2022. Accessed on May 2, 2023 at: <https://ww2.arb.ca.gov/resources/documents/dairy-livestock-sb1383-analysis>

_____, 2022b. California Greenhouse Gas Inventory for 2000-2020 (2022 Edition). Accessed on May 3, 2023 at < https://ww2.arb.ca.gov/ghg-inventory-data >

_____, 2017. Short-Lived Climate Pollutant Reduction Strategy. March 2017. Accessed on May 19, 2021 at <http://www.arb.ca.gov/cc/shor20171lived/shortlived.htm>

_____, 2017a. California's 2017 Climate Change Scoping Plan. November 2017. Accessed on May 18, 2021 at < https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm>

California, State of, Department of Food and Agriculture, 2023. Information on the Dairy Digester Research and Development Program and the Alternative Manure Management Program. Accessed on May 2, 2023 at: < https://www.cdfa.ca.gov/oefi/ >

Cornell University Cooperative Extension (Cornell) 2012. Introduction to Farm-Efficient Tractor and Field Operations– April 3, 2019. Accessed on July 12, 2021 at < https://farm-energy.extension.org/introduction-to-farm-equipment-energy-efficiency/ >.

EnSave 2012. Best Practices Guide: Energy Savings Opportunities for Dairy. In cooperation with NRCS and Innovation Center for U.S. Dairy. Accessed on July 12, 2021 at < http://www.energy.wsu.edu/EnergyLibrary/AgricultureMatters/CatalogItemDetail.aspx?id=471 >

EPA. See United States, Environmental Protection Agency.

Food and Agriculture Organization (FAO), 2010. "Greenhouse Gas Emissions from the Dairy Sector, A Life Cycle Assessment." Animal Production and Health Division, Food and Agriculture Organization of the United Nations, 2010. Accessed on May 2, 2023 at < http://www.fao.org/docrep/012/k7930e/k7930e00.pdf >

Innovation Center, 2008. "U.S. Dairy Sustainability Initiative, A Roadmap to Reduce Greenhouse Gas Emissions and Increase Business Value." *U.S. Dairy Sustainability Commitment.* December 2008.

IPCC, 2022. Climate Change 2022. Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press. In Press. Accessed on March 23, 2022 at: < https://www.ipcc.ch/report/ar6/wg2/>

____, 2013. *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp. Accessed on May 19, 2021 at < http://www.ipcc.ch/report/ar5/wg1/>

_____, 2007. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Intergovernmental Panel on Climate Change, Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press, 2007, 996. Accessed on May 19, 2021 at <http://www.ipcc.ch/publications_and_data/ar4/wg1/en/contents.html>

International Dairy Federation (IDF), 2009. Environmental / Ecological Impact of the Dairy Sector: Literature review on dairy products for an inventory of key issues. Bulletin of the International Dairy Federation. 2009.

Merced County, 2013. 2030 Merced County General Plan Background Report. 8 – Natural Resources and 12 – Climate Change. December 2013.

NOAA. See United States, National Oceanic and Atmospheric Administration, National Centers for Environmental Information.

Paustian, Keith, John M. Antle, John Sheehan, and Eldor A. Paul. "Agriculture's Role in Greenhouse Gas Mitigation." Pew Center on Global Climate Change, 2006.

Rotz, C.A., Thoma, G. 2017. Assessing carbon footprints of dairy production systems. In: Beede, D.K., editor. Large Dairy Herd Management. 3rd edition. Champaign, Illinois: American Dairy Society Association. p.19-31.

Rotz, A. 2018. Modeling greenhouse gas emissions from dairy farms. J. Dairy Sci. 101:6675–6690. July 01, 2018. Accessed on May 12, 2022 at: <https://doi.org/10.3168/jds.2017-13272>

Saunois et al. 2020. The Global Methane Budget 2000-2017. Earth Syst. Sci. Data, 12, 1561–1623, 2020. Accessed on April 18, 2022 at: <https://doi.org/10.5194/essd-12-1561-2020>

Southern California Edison, 2004. Dairy Farm Energy Management Guide, California. David C. Ludington, Eric L. Johnson, James A. Kowalski, Anne L. Mage. February 2004. Accessed on May 20, 2021 at <http://www.energy.wsu.edu/EnergyLibrary/AgricultureMatters/CatalogItemDetail.aspx?id=429>

UMass Extension, 2011. Reducing Energy Use on the Dairy Farm. CDLE Pub. 11-55. Accessed on July 12, 2021 at < https://ag.umass.edu/sites/ag.umass.edu/files/fact-sheets/pdf/ReducingEnergyUseontheDairyFarm(11-55).pdf >

United States, Department of Agriculture (USDA), 2018. Forest Service. FIA database. Summarized information accessed at on May 2, 2023 at: <https://cfpub.epa.gov/roe/indicator.cfm?i=86>

_____, 2016. Dairy Gas Emissions Model. Reference Manual. Version 3.3. C. Alan Rotz, Dawn S. Chianese, Felipe Montes, Sasha Hafner, and Henry Bonifacio. Pature Systems and Watershed Management Research Unit, Agricultural Research Service, United States Department of Agriculture. September 2016. Accessed on June 7, 2021, at <http://www.ars.usda.gov/Main/docs.htm?docid=21345#Reference>

_____, 2006. Natural Resources Conservation Service. Conservation Practices that Save: Energy Conservation in Confined Animal Operations. Accessed on July 12, 2021 at <http://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/energy/?cid=nrcs143_023636

United States, Environmental Protection Agency (EPA), 2023. Greenhouse Gas Reporting Program. Subpart JJ – Manure Management. Rule Information. Page last updated on April 21, 2023. Accessed on April 27, 2023 at <https://www.epa.gov/ghgreporting/subpart-jj-manure-management>

_____, 2023a. Overview of Greenhouse Gases. Page updated on April 13, 2023. Accessed on May 2, 2023 at < https://www.epa.gov/ghgemissions/overview-greenhouse-gases>

_____. 2023b. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021. April 13, 2023. Accessed on May 3, 2023 at < https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks >

_____, 2022. Climate Change Indicators: Understanding the Connections Between Climate Change and Human Health. Last updated November 11, 2022. Accessed on May 2, 2023 at: < https://www.epa.gov/climate-indicators/understanding-connections-between-climate-change-and-human-health >

_____. 2022a. *Anaerobic Digester Database*. Last updated August 24, 2022. Accessed on May 4, 2023 at < https://www.epa.gov/agstar/livestock-anaerobic-digester-database >

United States, National Oceanic and Atmospheric Administration (NOAA), 2023. State of the Climate: Global Climate Report for Annual 2022. Published online January 2023. Accessed on May 2, 2023 at: < https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202113 >

Wightman, J., 2008. Production and Mitigation of Greenhouse Gases in Agriculture. Jenifer Wightman In: Climate Change and Agriculture: Promoting Practical and Profitable Responses. Cornell University.

CHAPTER 9 – NUISANCE CONDITIONS FROM INSECTS

Bakken, Jason, pers. comm. 2021. Personal communications between Jason Bakken, Operations Services Supervisor, Merced County Mosquito Abatement District, and Mary Wilson on May 25, 2021, regarding guidelines for construction and management of dairy wastewater systems to minimize mosquitoes.

California, Department of Public Health (CDPH), 2023. Aedes aegypti and Aedes albopictus Mosquitoes. Updated February 26, 2023. Accessed on May 15, 2023 at: < https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/Aedes-aegypti-and-Aedes-albopictus-mosquitoes.aspx >

_____, 2023a. CDPH, Division of Communicable Disease Control, 2022a. CDPH Monthly Update on Number of Zika Virus Infections in California**.** May 1, 2023. Accessed on May 15, 2023 at https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/TravelAssociatedCasesofZikaVirusinCA.pdf

CDC. See United States, Department of Health and Human Services, Centers for Disease Control and Prevention.

DPH. See California, State of. Department of Public Health.

Gerry, Alec, 2008. University of California at Riverside. "Management of Nuisance Flies: Dairy Design and Operational Considerations." April 2008. See Appendix E of this DEIR.

Lawler, Sharon P. and Gregory C. Lanzaro, 2005. *Managing Mosquitoes on the Farm*. Department of Entomology, UC Davis. NR Publication 8158, published in 2005.

Merced, County of. 2023. Email confirmation from Esther Canal, DEH, in response to Information Request regarding nuisance odor, dust, or nuisance insect complaints on record for the Vierra Dairy. April 2023.

_____. 2023. GIS Services and Mapping. Accessed by Raadha Jacobstein and Mary Wilson on various dates between April 2021 and May 2023 at <http://www.co.merced.ca.us/index.aspx?nid=441>

_____, 2002. Program Environmental Impact Report for the Merced County Animal Confinement Ordinance Revision. County of Merced, Division of Environmental Health, Merced, California. October 2002.

United States, Department of Health and Human Services, Centers for Disease Control and Prevention (CDC). 2023. "Malaria." Page last updated April 23, 2023. Accessed on May 15, 2023 at < https://www.cdc.gov/parasites/malaria/index.html

_____, 2023a. Center for Disease Control and Prevention. ArboNET, Arboviral Diseases Branch, 2022. Updated January 10, 2023. Accessed on May 15, 2023 at https://wwwn.cdc.gov/arbonet/Maps/ADB_Diseases_Map/index.html

CHAPTER 10 – HYDROLOGY AND WATER QUALITY

Augustin, et. al. 2011. Biosecure Nutrient Management Practices. Volume NM 1551. By Augustin, Chris. Stoltenow, Charles. Widerholt, Ron. North Dakota State University (NDSU). 2011.

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

Brock, et. al. 2006. Copper and zinc accumulation in poultry and dairy manure-amended fields. By Brock, E. H., Ketterings, Q. M., and McBride, M. Soil Science, 171(5). May 2006:388-399.

California, Department of Water Resources (DWR), 2023. Sustainable Groundwater Management Act (SGMA) Data Viewer, https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#gwlevels

Castillo, et. al. 2007. "Mineral balances, including in drinking water, estimated for Merced County dairy herds", Alejandro R. Castillo Dr., Jose Eduardo P. Santos, and Tom J. Tabone. California Agriculture: Vol. 61: No. 2, Page 90. Accessed on July 26, 2022 at <http://repositories.cdlib.org/anrcs/californiaagriculture/v61/n2/p90>.

Castillo and Burrow 2008. "Waste water storage capacity in dairy farms: the milk parlor water use." Alejandro R. Castillo and Larry Burrow, UC Cooperative Extension, Merced County. May 2008. Accessed on July 26, 2022 at <http://cemerced.ucanr.edu/newsletters/May_2008_Part_223138.pdf>.

CDC. See United States, Department of Health and Human Services, Centers for Disease Control and Prevention.

Central Valley Regional Water Quality Control Board (CVRWQCB), 2023. Irrigated Lands Regulatory Program (ILRP). Web page updated 4/26/23. Accessed on May 22, 2023 at <http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/>

Central Valley Dairy Representative Monitoring Program. 2019. Summary Representative Monitoring Report (Revised). April 19, 2019. Accessed on July 7, 2022 at < https://www.waterboards.ca.gov/centralvalley/water_issues/confined_animal_facilities/groundwater_monitoring/index.html#drmr>

EPA. See United States, Environmental Protection Agency.

Flis, et. al. 2006. The effect of CuSO4 from dairy manure on the growth, and composition of cool season forage grasses and corn. Northern NY Agricultural Development Program 2005-2006 Project Report. By Flis, S. A., Thomas, E. D., Ballard, C. S., Dann, H. M., and Cotanch, K. W.

Holmes and Struss 2009. Milking Center Wastewater Guidelines: A Companion Document to Wisconsin NRCS Standard 629. Brian J. Holmes and Steve Struss. June 2009. Accessed on March 30, 2022 at: < https://www.nrcs.usda.gov/wps/portal/nrcs/detail/wi/home/?cid=nrcs142p2_020924>

Indraratne et. al, 2021. Cattle manure loadings and legacy effects on copper and zinc availability under rainfed and irrigated conditions. Indraratne, Srimathie P., Spengler, Matthew, and Hao, Xiying. Canadian Journal of Soil Science, 101(2) : 305-316. Published on February 3, 2021. Accessed on June 24, 2021 at: < https://doi.org/10.1139/cjss-2020-0124>

Kononoff, J. and J. Clark 2017. Water Quality and Requirements for Dairy Cattle. Paul J. Kononoff and Kim J. Clark. Nebraska Extension. Animal Agriculture, Dairy. Issued September 2017. Accessed on May 21, 2023 at: < https://extensionpublications.unl.edu/assets/html/g2292/build/g2292.htm>

Lifestock and Poultry Environmental (LPE) Learning Center, 2019. Pathogens and Potential Risks Related to Livestock or Poultry Manure. Last Updated March 5, 2019. Accessed on May 22, 2023 at < https://lpelc.org/pathogens-and-potential-risks-related-to-livestock-or-poultry-manure/ >

Nieme, Mike, 2023. Personal communications with Mike Niemi, Turlock Irrigation District, on May 19, 2023 with Raadha Jacobstein regarding TID facilities in the project area.

Pollard and Morra, 2017. Fate of tetracycline antibiotics in dairy manure-amended soils. Environ. Rev. 26: 102–112 (2018) dx.doi.org/10.1139/er-2017-0041. By Anne T. Pollard and Matthew J. Morra. Published on November 8, 2017 at: <www.nrcresearchpress.com/er>

Sousa, 2020. Flood Protection Analysis for Vierra Dairy Farms, Merced County, CA. Sousa Engineering. November 6, 2020.

Turlock Subbasin Groundwater Sustainability Agency, 2022 Turlock Subbasin Groundwater Sustainability Plan, January 2022. Accessed on May 22, 2023 at: < https://turlockgroundwater.org/gsp>

United States, Department of Agriculture (USDA), 2000. "Waterborne Pathogens in Agricultural Watersheds." by Barry H. Rosen. NRCS, Watershed Science Institute School of Natural Resources University of Vermont, Burlington. Issued June 2000.

United States, Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), 2020. Antibiotic Resistance Threats in the United States, 2019. Accessed on July 26, 2022 at < https://www.cdc.gov/drugresistance/biggest-threats.html >

United States, Environmental Protection Agency, 2018. Antibiotics, Pesticides, and Hormones. Page last updated on June 13, 2018. Accessed on May 22, 2023 at < https://p2infohouse.org/ref/02/01269.htm >.

_____. 2013. Literature Review of Contaminants in Livestock and Poultry Manure and Implications for Water Quality. Office of Water. EPA 820-R-13-002. July 2013.

_____. 2005. "Detecting and Mitigating the Environmental Impact of Fecal Pathogens Originating from Confined Animal Feeding Operations: Review." Dr. Shane Rogers. National Risk Management Research Laboratory, Office of Research and Development, United States Environmental Protection Agency, 2005.

United States. Federal Emergency Management Agency, National Flood Insurance Program. 2008. Flood Insurance Rate Map, Merced County, CA and Incorporated Areas.

United States Food and Drug Administration (USFDA), 2023. Veterinary Feed Directive Final Rule and Next Steps. Content current as of: 01/17/2023. Accessed on May 22, 2023 at < https://www.fda.gov/animal-veterinary/development-approval-process/fact-sheet-veterinary-feed-directive-final-rule-and-next-steps >

Viera Dairy Farms, 2020. Nutrient Management Plan. Proposed Conditions NMP. Prepared by FR Ag Services. Dated 06/04/2020.

_____, 2020a. Waste Management Plan. Proposed Conditions WMP. Prepared by Sousa Engineering and FR Ag Services. Dated 10/19/2020.

_____, 2017. Nutrient Management Plan. Existing Conditions NMP. Prepared by FR Ag Services. Dated 08/22/2017.

_____, 2017a. Waste Management Plan. Existing Conditions WMP. Prepared by FR Ag Services and Michael Mitchell. Dated 11/09/2017.

Watanabe, et. al. 2010. Use and Environmental Occurrence of Antibiotics in Freestall Dairy Farms with Manured Forage Fields. N. Watanabe, B. A. Bergamaschi, K. A. Loftin, M. T. Meyer, and T. Harter. Environ. Sci. Technol. 2010, 44 6591-6600. November 17, 2010.

CHAPTER 11 – LAND USE COMPATIBILITY

Ho, Tiffany; Deputy Director of Planning, Merced County Community and Economic Development Department; 2023. Email from Tiffany Ho to Robert Klousner regarding tribal enrollment pursuant to AB 52 within Merced County.

Merced, County of. 2023. GIS Services and Mapping. Accessed by Raadha Jacobstein and Mary Wilson on various dates in May 2021 through May 2023 at < http://geostack-mercedcounty.opendata.arcgis.com/>.

_____, 2023a. Email confirmation from Esther Canal, DEH, in response to Information Request regarding nuisance odor, dust, or nuisance insect complaints on record for the Vierra Dairy. April 2023.

_____, 2013. 2030 Merced County General Plan. Adopted on December 10, 2013.

San Joaquin Valley Air Pollution Control District (SJVAPCD). 2023. Public Records Request. Submitted May 9, 2023.

CHAPTER 12 – REQUIRED CEQA ANALYSES

Employment Development Department (EDD). 2023. Merced County Local Area Profile. Labor Market Information Division. March 2023 data. Accessed on May 12, 2023 at <http://www.labormarketinfo.edd.ca.gov>

Merced, County of. 2002. Program Environmental Impact Report for the Merced County Animal Confinement Ordinance Revision. County of Merced, Division of Environmental Health, Merced, California. October 2002.

United States Department of Agriculture (USDA), National Agricultural Statistics Service, 2017 Census Volume 1, Chapter 2: County Level Data: California. Table 11. Accessed on July 26, 2021 at: < https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_2_County_Level/California/>

CHAPTER 13 – ALTERNATIVES ANALYSIS

ARB. See California, State of, Air Resources Board.

California Climate Action Reserve (CCAR), 2013. U.S. Livestock Project Protocol. Vers. 4.0. January 23, 2013. Accessed on July 23, 2021 at: < https://www.climateactionreserve.org/how/protocols/us-livestock/>

California Climate and Agriculture Network (CalCAN), 2015. Diversified Strategies for Reducing Methane Emissions from Dairy Operations. Accessed on September 9, 2022 at <http://calclimateag.org/wp-content/uploads/2015/11/Diversified-Strategies-for-Methane-in-Dairies-Oct.-2015.pdf>

California Energy Commission, 2013. An Economic Analysis of Six Dairy Digester Systems in California. Volume 2. March 2013. Accessed on July 23, 2021 at < https://archive.epa.gov/region9/organics/web/pdf/cba-session2-econ-feas-dairy-digester-clusters.pdf >

California, State of, Air Resources Board (CARB), 2022. Final Analysis of Progress toward Achieving the 2030 Dairy and Livestock Sector Methane Emissions Target. March 2022. Accessed on April 7, 2022 at: <https://ww2.arb.ca.gov/resources/documents/dairy-livestock-sb1383-analysis>

_____, 2018. Recommendations to the State of California's Dairy and Livestock Greenhouse Gas Reduction Working Group. November 26, 2018. Accessed on July 22, 2021 at <https://ww2.arb.ca.gov/resources/documents/dairy-and-livestock-wg-recs>

_____, 2017. Short-Lived Climate Pollutant Reduction Strategy. March 2017. Accessed on July 22, 2021 at <http://www.arb.ca.gov/cc/shortlived/shortlived.htm>

California, State of, Department of Food and Agriculture, 2023. Information on the Dairy Digester Research and Development Program and the Alternative Manure Management Program. Accessed on May 2, 2023 at: < https://www.cdfa.ca.gov >

CCAR. See California Climate Action Reserve.

CEC. See California Energy Commission.

Central Valley Regional Water Quality Control Board, 2011. Economic Feasibility of Dairy Manure Digester and Co-Digester Facilities in the Central Valley of California. May 2011. Accessed on July 23, 2021 at < http://www.waterboards.ca.gov/rwqcb5/water_issues/confined_animal_facilities/program_regs_requirements/dairy/final_dairy_digstr_econ_rpt.pdf >

_____. 2010. Dairy Manure Digester and Co-Digester Facilities Draft Program EIR. SCH #2010031085. Prepared by ESA. July 2010. Accessed on July 23, 2021 at < https://www.waterboards.ca.gov/centralvalley/water_issues/confined_animal_facilities/program_regs_requirements/dairy/dairy_peir_final_cert.pdf >

CVRWQCB. See Central Valley Regional Water Quality Control Board.

de Boer, H. C. 2008. "Co-digestion of Animal Slurry Can Increase Short-Term Nitrogen Recovery by Crops." *J. Environ. Qual.*, 2008: 1968-1973.

EPA. See United States, Environmental Protection Agency.

eXtension 2022. *Economics of Anaerobic Digesters for Processing Animal Manure.* William F. Lazarus. Updated August 4, 2022. May 23, 2023 at < https://lpelc.org/economics-of-anaerobic-digesters-for-processing-animal-manure/ >

Horner, Joe and Ryan Milhollin 2012. "Dairy Grazing: Keys to Building a Profitable Pasture-Based Dairy." February 2012. University of Missouri Extension. Accessed on May 15, 2023 at < https://extension.missouri.edu/publications/m191 >

San Joaquin Valley Air Pollution Control District 2009. "Final Staff Report -Climate Change Action Plan: Addressing GHG Emissions Impacts under CEQA." *San Joaquin Valley Air Pollution Control District.* December 17, 2009. Accessed on May 15, 2023 at <http://www.valleyair.org/programs/CCAP/CCAP_idx.htm>

SJVAPCD. See San Joaquin Valley Air Pollution Control District.

Sustainable Conservation 2015. Greenhouse Gas Mitigation Strategies for California Dairies. Prepared for Sustainable Conservation by California Environmental Associates. July 2015. Accessed on May 15, 2023 at < http://www.suscon.org/news/pdfs/GHG_Mitigation_for_Dairies_Final_July2015.pdf>

Tauer, Loren W. and Ashok K. Mishra 2005. "Can the small dairy farm remain competitive in US agriculture?" Elsevier, Food Policy 31 (2006) 458-468. Accessed on July 23, 2021 at <http://www.researchgate.net/profile/Loren_Tauer/publication/222429306_Can_the_small_dairy_farm_remain_competitive_in_US_agriculture/links/09e4150c76f8f41a91000000.pdf>

Topper, P. A. et. al, 2023. Fate of Nutrients and Pathogens During Anaerobic Digestion of Dairy Manure. PennState Extension. Patrick A. Topper, Agricultural Research Technologist, Robert E. Graves, Professor of Agricultural Engineering, and Thomas Richard, Associate Professor of Agricultural Engineering. Updated March 9, 2023. Accessed on May 23, 2023 at: < https://extension.psu.edu/fate-of-nutrients-and-pathogens-during-anaerobic-digestion-of-dairy-manure>

Trulia.com 2023. Search for agricultural real estate for sale in the project area. Accessed on May 2, 2023 at <http://www.trulia.com>

USDA. See U.S. Department of Agriculture.

U.S. Department of Agriculture 2013. Economic Feasibility of Dairy Digester Clusters in California: A Case Study. Prepared by California Dairy Campaign for the U.S. Department of Agriculture Rural Development Agency Value Added Producer Grant Program. June 2013.

_____. 2013a. *Organic Livestock Requirements*. USDA Organic. July 2013. Accessed on May 15, 2023 at < https://www.ams.usda.gov/rules-regulations/organic >

_____. 2009. Characteristics, Costs, and Issues for Organic Dairy Farming. William D. McBride and Catherine Greene. USDA Economic Research Report Number 82. November 2009. Accessed on May 15, 2023 at < https://naldc.nal.usda.gov/download/35889/PDF >

_____. 2007. "Profits, Costs, and the Changing Structure of Dairy Farming." Economic Research Report 6704, United States Department of Agriculture. Economic Research Service. MacDonald, James M. & O'Donoghue, Erik J. & McBride, William D. & Nehring, Richard F. & Sandretto, Carmen L. & Mosheim, Roberto. September 2007. Accessed on July 23, 2021 at < https://ideas.repec.org/p/ags/uersrr/6704.html >

United States, Environmental Protection Agency. 2022. *Anaerobic Digester Database.* Last updated August 24, 2022. Accessed on May 4, 2023 at < https://www.epa.gov/agstar/livestock-anaerobic-digester-database >