Draft Environmental Impact Report

Fresno Costco Commercial Center Project

State Clearinghouse No. 2021100443

Prepared for:

City of FRESNO

Planning and Development Department

July 2023

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°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AAQS	ambient air quality standard
AB	Assembly Bill
ADT	average daily traffic
af	acre-feet
AFV	alternative fuel vehicles
AIRFA	American Indian Religious Freedom Act of 1978
ATP	Active Transportation Plan
BAU	business-as-usual
BMP	best management plans
CAA	Clean Air Act
CAFE	corporate average fuel economy
CAFE	Corporate Average Fuel Economy Standards
CAL FIRE	California Department of Forestry and Fire Protection
Cal/OSHA	California Occupational Safety and Health Administration
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAP	climate action plans
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CC	Community Commercial
CC/EA/UGM/cz	Community Commercial/Expressway Overlay/Urban Growth Management/conditions of zoning
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
Central Valley RWQCB	Central Valley Regional Water Quality Control Board
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CEUS	California Commercial End Use Survey
CFR	Code of Federal Regulations
CG/UGM/cz	General Commercial/Urban Growth Management/conditions of zoning
City	City of Fresno
CMP	Congestion Management Process
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNRA	California Natural Resources Agency's

CO	carbon monoxide
CO_2	carbon dioxide
COG	Council of Governments
Costco	Costco Wholesale Corporation
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CUPA	Certified Unified Program Agency
CVP	Central Valley Project
CWA	Clean Water Act
dB	decibels
diesel PM	exhaust from diesel engines
DOC	California Department of Conservation
DOT	U.S. Department of Transportation
Draft EIR	draft environmental impact report
DTSC	California Department of Toxic Substances'
DWR	California Department of Water Resources
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 1992
ESA	Endangered Species Act
FAX	Fresno Area Express
FEMA	Federal Emergency Management Agency
FHSZ	fire hazard severity zones
FHWA	Federal Highway Administration
FICAN	Federal Interagency Committee on Aviation Noise
FID	Fresno Irrigation District
FIRM	Flood Insurance Rate Map
FMFCD	Fresno Metropolitan Flood Control District
FMMP	Farmland Mapping and Monitoring Program
Fresno COG	Fresno County Council of Governments
FTA	Federal Transit Administration
GAMAQI	*Guidance for Assessing and Mitigating Air Quality Impacts*
GBV	Ground-Borne Vibration
GC	General Commercial
General Plan	City of Fresno's General Plan
GHG	greenhouse gas
GHGRP	Greenhouse Gas Reduction Program
GIS	Geographic Information System
GPA	General Plan amendment
GSA	groundwater sustainability agencies
GSP	groundwater sustainability plan
HAP	hazardous air pollutants

HMBEP	Hazardous Materials Business Emergency/Contingency Plan
Hz	hertz
IEPR	Integrate Energy Policy Report
in/sec	inches per second
kBtu/year	kilo British Thermal Unit per year
km	kilometers
kV	kilovolt
kWh/year	kilowatt hours per year
lb/day	pounds per day
LCFS	Low Carbon Fuel Standard
L_{dn}	Day-Night Level
LEED™	Leadership in Energy Efficient Design
L_{eq}	Equivalent Continuous Sound Level
L_{max}	Maximum Sound Level
LOS	level of service
MBTA	Migratory Bird Treaty Act
MDO	market delivery operation
MEI	Maximally Exposed Individual
mgd	million gallons per day
mgy	million gallons per year
$MMTCO_2e$	million metric tons of carbon dioxide equivalent
mPa	micro-Pascals
mph	miles per hour
MPO	metropolitan planning organizations
MS4	municipal separate storm sewer system
$MTCO_2e$	metric tons of carbon dioxide equivalent
MW	megawatts
MY	Model Year
NAAQS	national ambient air quality standards
NAHC	Native American Heritage Commission
NCCP	natural community conservation plan
NFIP	National Flood Insurance Program
NFWRF	North Fresno Wastewater Reclamation Facility
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NKGSA	North King Groundwater Sustainability Agency
NO_2	nitrogen dioxide
NOP	notice of preparation
North Kings GSA	North Kings Groundwater Sustainability Agency
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act

NRHP	National Register of Historic Places
OCP	organochlorine pesticides
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Office of Planning and Research
OSHA	Occupational Safety and Health Administration
PG&E	Pacific Gas & Electric
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter with aerodynamic diameter of 2.5 or less
Porter-Cologne Act	Porter-Cologne Water Quality Control Act of 1970
ppb	parts per billion
ppm	parts per million
PPV	peak particle velocity
PRC	Public Resources Code
project	Costco Commercial Center Project
RCRA	Resource Conservation and Recovery Act
Reclamation	U.S. Bureau of Reclamation
RMS	root-mean-square
ROG	reactive organic gases
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
RWQCB	regional water quality control board
RWRF	Regional Wastewater Reclamation Facility
SAFE Rule	Safer Affordable Fuel-Efficient Vehicles Rule
SB	Senate Bill
SENL	single-event noise levels
SESWTF	Southeast Surface Water Treatment Facility
SGMA	Sustainable Groundwater Management Act
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	sulfur dioxide
SO_X	oxides of sulfur
SPCC	Spill Prevention, Control, and Countermeasure
SPL	sound pressure level
SR	State Route
SSJVIC	Southern San Joaquin Valley Information Center
State CEQA Guidelines	California Environmental Quality Act Guidelines
SWE	snow water equivalent
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
SWQDV	Stormwater Quality Design Volume
SWTF	Surface water treatment facilities

TAC	toxic air contaminants
TCP	Traffic Control Plan
TIA	Transportation Impact Analysis
TPY	tons per year
USC	U.S. Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tanks
UWMP	Urban Water Management Plan
UWMPA	Urban Water Management Planning Act
UV	ultraviolet
VdB	vibration decibels
VMT	vehicle miles traveled
WSA	water supply assessment
WQO	Water Quality Objective
ZEV	zero emissions vehicle

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1 INTRODUCTION

This draft environmental impact report (Draft EIR) evaluates the environmental impacts of the proposed Fresno Costco Commercial Center Project (project or proposed project). This Draft EIR has been prepared under the direction of City of Fresno (City), the lead agency under the California Environmental Quality Act (CEQA), in accordance with the requirements of CEQA (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines. The Costco Wholesale Corporation (Costco) is the project applicant. This chapter of the Draft EIR provides a synopsis of the project under analysis; information on the type, purpose, intended uses, and scope of the Draft EIR; the public review process; and the organization of this document.

1.1 PROJECT REQUIRING ENVIRONMENTAL ANALYSIS

Costco proposes to construct a membership-only Costco Commercial Center, including a new warehouse with an attached tire center and home delivery services, and a detached gas station and drive-through car wash. The proposed project site is a vacant 22.4-acre parcel located at the northeast corner of the intersection of West Herndon Avenue and North Riverside Drive in the city of Fresno. The project site is a single parcel, bordered by West Spruce Avenue to the north, the right-of-way of (currently unbuilt) North Arthur Avenue to the east, West Herndon Avenue to the south, and North Riverside Drive to the east.

The existing Costco facility on West Shaw Avenue would be relocated to the project site, and the new facility would be sized to accommodate the membership base in northwest Fresno. For further information on the proposed project, see Chapter 2, "Project Description."

1.2 PURPOSE AND INTENDED USES OF THIS DRAFT EIR

According to CEQA, preparation of an EIR is required whenever it can be fairly argued, based on substantial evidence, that a proposed project may result in a significant environmental impact. An EIR is a document used to inform public agency decision makers and the general public of the significant environmental impacts of a project, identify possible ways to minimize the significant impacts, and describe reasonable alternatives to the project that could feasibly attain most of the basic objectives of the project while substantially lessening or avoiding any of the significant environmental impacts. Public agencies are required to consider the information presented in the EIR when determining whether to approve a project.

This Draft EIR has been prepared to meet the requirements of a project EIR as defined by Section 15161 of the State CEQA Guidelines. A project EIR focuses on the changes in the physical environment that would result from the implementation of a project, including its planning, construction, and operation. The City's intention in preparing a project EIR is that no further environmental analysis would be required for additional regulatory approvals following approval of the project, absent conditions requiring a subsequent EIR, a supplement to the EIR, or an addendum. (See State CEQA Guidelines Sections 15162–15164.)

1.3 MANDATORY FINDINGS OF SIGNIFICANCE

Within Article 5 of the State CEQA Guidelines, Section 15065 provides guidelines for the preliminary review of projects and conduct of an initial study. This section establishes that a lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared for the project where there is substantial evidence, in light of the whole record, that any of the following conditions may occur:

> (1) The project has the potential to: substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of

an endangered, rare or threatened species; or eliminate important examples of the major periods of California history or prehistory.

(2) The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.

(3) The project has possible environmental effects that are individually limited but cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.

(4) The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

Based on evidence in the record at the time application for the proposed project was submitted, the City determined that an EIR should be prepared to evaluate the potential effects of project implementation.

Following the decision to prepare an EIR, Section 15065(c) of the State CEQA Guidelines establishes that if a lead agency determines that any of the conditions specified above will occur, such a determination shall apply to:

(1) the identification of effects to be analyzed in depth in the environmental impact report or the functional equivalent thereof,

(2) the requirement to make detailed findings on the feasibility of alternatives or mitigation measures to substantially lessen or avoid the significant effects on the environment,

(3) when found to be feasible, the making of changes in the project to substantially lessen or avoid the significant effects on the environment, and

(4) where necessary, the requirement to adopt a statement of overriding considerations.

1.4 SCOPE OF THIS DRAFT EIR

This Draft EIR includes a detailed evaluation of the following environmental issue areas:

- Aesthetics;
- Agricultural and Forestry Resources;
- Air Quality;
- Archaeological, Historical, and Tribal Cultural Resources;
- Biological Resources;
- Energy;
- Greenhouse Gas Emissions and Climate Change;
- Hazards and Hazardous Materials;
- Hydrology and Water Quality;
- Land Use;
- Noise and Vibration;
- Public Services and Recreation;
- Transportation and Circulation; and
- Utilities.

Under the CEQA statutes and the State CEQA Guidelines, a lead agency may limit an EIR's discussion of environmental effects when such effects are not considered potentially significant (PRC Section 21002.1[e]; State CEQA Guidelines Sections 15128, 15143). (See Section 1.3.2, "Effects Found Not to Be Significant.") Information used to determine which impacts would be potentially significant was derived from review of the project; review of applicable planning documents and CEQA documentation; field work; feedback from public and agency consultation; and comments received during the scoping period (see Appendix A of this Draft EIR).

1.4.1 Comments Received on the Notice of Preparation

The City released a notice of preparation (NOP) for this EIR on October 22, 2021. The purpose of the NOP was to provide notification that an EIR was being prepared and to solicit input on the scope and content of the document. A virtual public meeting was held on November 2, 2021, at 6:00 p.m. The scoping period for the project ended on November 22, 2021. The NOP and comments received in response to the NOP are included in Appendix A of this Draft EIR.

Comments were received regarding traffic congestion, safety, and access; air quality and the proximity of the gas station to nearby sensitive receptors; access to existing recreational trails; and lighting. The effects of the project on visual resources, including substantial new sources of light that would adversely affect views in the area are evaluated in Section 3.1, "Aesthetics." Emissions of pollutants during project operation are evaluated in Section 3.3, "Air Quality," and Section 3.7, "Greenhouse Gas Emissions and Climate Change." Transportation, including safety hazards due to design or incompatible use and consistency with planned pedestrian facilities, is evaluated in Section 3.13, "Transportation and Circulation." Additional information about trails can be found in Section 3.12, "Public Services and Recreation."

1.4.2 Effects Found Not to Be Significant

CEQA Guidelines Section 15128 requires that an EIR contain a brief discussion stating the reasons why various possible significant effects of a project were determined not to be significant and are, therefore, not discussed in detail in the EIR. The following topics are not evaluated in detail in this Draft EIR because effects would not be significant: geology and soils, mineral resources, population and housing, and wildfire.

GEOLOGY AND SOILS

Directly or Indirectly Cause Adverse Effects Related to Rupture of a Known Earthquake Fault, Strong Seismic Shaking, Seismic Related Ground Failure, or Landslides

Earthquakes occur when fractures or boundaries between tectonic plates, which comprise the Earth's crust, or lithosphere, move relative to one-another. The project site is located in a region traditionally characterized by low seismic activity. It is not located within the California Geologic Survey designated Alquist-Priolo Earthquake Fault Zone, and no mapped active fault traces are known to project towards or transverse the site. Because there are no mapped active or potentially active faults in the general vicinity of the site, the potential for fault-related ground surface rupture at the site is considered low. The primary sources of seismic shaking are anticipated to be the Great Valley Fault and San Andreas Fault, which are located at distances of about 42 miles and 65 miles from the site, respectively (Appendix B). All buildings would be constructed in compliance with California Building Code Title 24, which identifies specific design requirements to reduce damage resulting from strong seismic ground shaking, ground failure, and landslide. For this reason, development of the project is not anticipated to directly or indirectly cause potential substantial adverse effects involving rupture of a known earthquake fault.

Substantial Soil Erosion or the Loss of Topsoil

Based on soil borings and test pits excavated on the site, soils are comprised primarily of alluvial fan deposits overlain by topsoil. The alluvial deposits are generally composed of interbedded layers of stiff to very stiff silts and clays with variable amounts of sand and medium dense to dense poorly graded sands, and silty sand (Kleinfelder 2021). Following construction, all disturbed areas would be either landscaped consistent with the City code or would be paved to reduce the potential for erosion.

Location on a Geologic Unit or Soul that is Unstable or that would Become Unstable as a Result of the Project, Potentially Resulting in On- or Off-Site Landslide, Lateral Spreading, Subsidence, Liquefaction, or Collapse

The project would not be located on a geologic unit or soil that is unstable. The project site and surrounding area are relatively flat; therefore, landslides or other forms of natural slope instability are unlikely to occur. Liquefaction and associated adverse effects are not anticipated on the project site due to the lack of near-surface groundwater (Kleinfelder 2021). Therefore, there would be no impacts related to exacerbation of these potential hazards.

Location on Expansive Soil, Creating Substantial Direct and Indirect Risks to Life and Property

Based on laboratory test results, the surficial soils exhibit a low expansion potential (Kleinfelder 2021). All buildings would be constructed in compliance with California Building Code Title 24, which identifies specific design requirements to reduce damage resulting from expansive soils.

Soils Incapable of Supporting use of Septic Tanks or Alternative Waste Water Disposal Systems Where Sewers are Not Available for the Disposal of Waste Water

The project would connect to the City's sewer system. Septic tanks and alternative disposal systems would not be constructed.

Conclusion

Based on site conditions and existing regulatory requirements, no significant impacts or a cumulatively considerable incremental effect related to geology and soils would occur, and no further analysis is required by CEQA. Potential impacts on paleontological resources are discussed in Section 3.4, "Archaeological, Historical, and Tribal Cultural Resources."

MINERAL RESOURCES

Loss of Availability of a Known Mineral Resource that would be of Value to the Region and Residents of the State

Impacts to mineral resources can occur if the project would result in the loss of availability of a known mineral resource. In the city of Fresno, mineral resources primarily consist of aggregate, which are located in the San Joaquin River Corridor (City of Fresno 2014:8-1). The project site is not within a mineral resource zone identified by the California Department of Conservation Mineral Resource Zone Map and there are no mining activities within or near the project site (Fresno County 2000).

Loss of Availability of a Locally-Important Mineral Resource Recovery Site Delineated on a Local General Plan, Specific Plan, or Other Land Use Plan

The site is not delineated in any local land use plans as an important mineral resources recovery site.

Conclusion

Therefore, the project would not have any significant impacts or a cumulatively considerable incremental effect related to mineral resources, and no further analysis is required by CEQA.

POPULATION AND HOUSING

Inducement of Substantial Unplanned Population Growth in an Area, either Directly or Indirectly

The project site is currently designated as Community Commercial and would be redesignated to General Commercial to accommodate the relocated commercial facility. The project does not include residential uses, nor does it include elements that would directly or indirectly affect population or housing (e.g., expand service infrastructure). Therefore, the project would not result in direct population growth or any substantial indirect

population growth. Construction would be short-term and would not result in construction employees relocating to the project vicinity due to this short duration and small scale.

As discussed further in Chapter 5, "Other Considerations," the project would not induce growth by creating new employment positions; a maximum of 300 employees would work at the proposed Costco facility, which is the same maximum number of employees at the existing Costco on West Shaw Avenue (which would close once the project is operational). It is assumed that the employees at the existing Costco facility would relocate to the new facility.

The *Fresno County General Plan Background Report* (City of Fresno 2014:5.12-3) reports that the number of employees residing in Fresno County exceeded the number of jobs available after the year 2000. Therefore, demand for local jobs is high and some employees who live in Fresno County travel outside the county to their place of employment. Because most of the jobs would be filled by existing employees, the project would not substantially increase the city's population or result in notable demand for additional housing or services. Any new employees would most likely be derived from the existing labor pool that resides locally (within the city or county). For these reasons, the project would not directly or indirectly induce unplanned population growth,

Displacement of Substantial Numbers of Existing People of Housing, Necessitating the Construction of Replacement Housing Elsewhere

The project would not remove any existing housing and would not displace any people or housing.

Conclusion

Potential impacts would be less than significant and less than cumulatively considerable, and no further analysis is required by CEQA.

WILDFIRE

Location on or near State Responsibility Areas or Lands Classified as Very High Fire Hazard Severity Zones

The project site is not in or near the State Responsibility Area designated by California Department of Forestry and Fire Protection. In addition, the city of Fresno does not contain any land classified as a "Very High Fire Hazard Severity Zone." Therefore, wildfire issues associated with lands under these designations are not discussed further in this EIR. The potential for the project to expose people or structures to a significant risk of loss, injury, or death involving wildland fires is discussed in Section 3.8, "Hazards and Hazardous Materials."

Conclusion

Potential impacts would be less than significant and less than cumulatively considerable, and no further analysis is required by CEQA.

1.5 PUBLIC REVIEW PROCESS

This Draft EIR is being circulated for public review and comment for a period of 45 days. During this period, comments may be submitted to the lead agency. Upon completion of the public review and comment period, a Final EIR will be prepared that will include both written and oral comments on the Draft EIR received during the public review period, responses to those comments, any revisions to the Draft EIR made in response to public comments, and any other information added by the lead agency. The Draft EIR and Final EIR will comprise the EIR for the project.

Before adopting the project, the lead agency is required to certify that the EIR has been completed in compliance with CEQA, that the decision-making body reviewed and considered the information in the EIR, and that the EIR reflects the independent judgment of the lead agency.

1.6 DRAFT EIR ORGANIZATION

This Draft EIR is organized into chapters, as identified and briefly described below. Chapters are further divided into sections (e.g., Chapter 3, "Environmental Impacts and Mitigation Measures," and Section 3.6, "Energy"):

The **"Executive Summary"** introduces the project; provides a summary of the environmental review process; and lists impacts evaluated, significance determinations, and mitigation measures.

Chapter 1, "Introduction," provides a description of the lead and responsible agencies, the legal authority and purpose for the document, and the public review process.

Chapter 2, "Project Description," describes the location, background, and goals and objectives for the project, and describes the project elements in detail.

Chapter 3, "Environmental Impacts and Mitigation Measures," provides an evaluation of the anticipated changes to existing conditions after development of the project. For any significant or potentially significant impact that would result from project implementation, mitigation measures are presented and the level of impact significance after mitigation is identified.

Chapter 4, "Cumulative Impacts," presents an analysis of the project's impacts considered together with other past, present, and probable future projects producing related impacts, as required by Section 15130 of the State CEQA Guidelines.

Chapter 5, "Other Considerations," evaluates growth-inducing impacts and irreversible and irretrievable commitment of resources.

Chapter 6, "Alternatives," presents a reasonable range of alternatives and evaluates the environmental effects of those alternatives relative to the proposed project, as required by Section 15126.6 of the State CEQA Guidelines. The environmentally superior alternative is identified.

Chapter 7, "Report Preparers," identifies the preparers of the document.

Chapter 8, "References," provides the full references associated with the parenthetical references found throughout this EIR, organized by chapter and section.

2 PROJECT DESCRIPTION

Costco proposes to construct a membership-only Costco Commercial Center, including a new Costco facility with an attached tire center and home delivery services, as well as a detached gas station and drive-through car wash in the city of Fresno. The existing Costco warehouse facility on West Shaw Avenue would close following construction of the proposed project, and the new facility would be sized to accommodate the membership base in northwest Fresno (Figure 2-1). The Costco warehouse building is consistent with established zoning for the parcel; however, an amendment to the City of Fresno's General Plan (General Plan) and rezoning of the site would be required to permit the proposed car wash. The project also includes a proposed General Plan amendment and rezoning to reclassify West Herndon Avenue from North Riverside Drive to North Hayes Avenue as a superarterial. The following discussion provides information about the project background, existing conditions, elements of the proposed project, buildout and operation assumptions used in the analysis, project objectives, and required approvals for the project.

2.1 PROJECT LOCATION

The proposed project site is a 22.4-acre parcel located at the northeast corner of the intersection of West Herndon Avenue and North Riverside Drive in the city of Fresno. The project site is a single parcel, bordered by West Spruce Avenue to the north, the right-of-way of (currently unbuilt) North Arthur Avenue to the east, West Herndon Avenue to the south, and North Riverside Drive to the east. The project site's address is 7120 North Riverside Drive and the assessor's parcel number (APN) is 50302012 (Figure 2-2). Local access to the site is provided by West Herndon Avenue, West Spruce Avenue, and North Riverside Drive. Regional access is provided by State Route (SR) 99, via the West Herndon Avenue interchange approximately 0.5 mile to the southwest.

2.1.1 Existing Conditions

The project site was used as an orchard from approximately 1937 through 1998. Based on historical photographs, the orchard was removed sometime between 1998 and 2002 (NIC 2022). The site has been vacant since the orchard was removed. The undeveloped project site is roughly rectangular and sparsely vegetated with grasses. An electrical transmission line extends diagonally across the northern portion of the project site from a tower in the northwest corner to the eastern side of the site. Surrounding land uses include a residential neighborhood to the west, a public golf course to the north (Riverside Golf Course), a vacant lot and self-storage facility to the east, a gas station and vacant lot to the south, Rio Vista Middle School and River Bluff Elementary School to the southeast, and a large-scale retail development (Marketplace at El Paseo Shopping Center) to the southwest.

CITY OF FRESNO GENERAL PLAN DESIGNATIONS AND ZONING

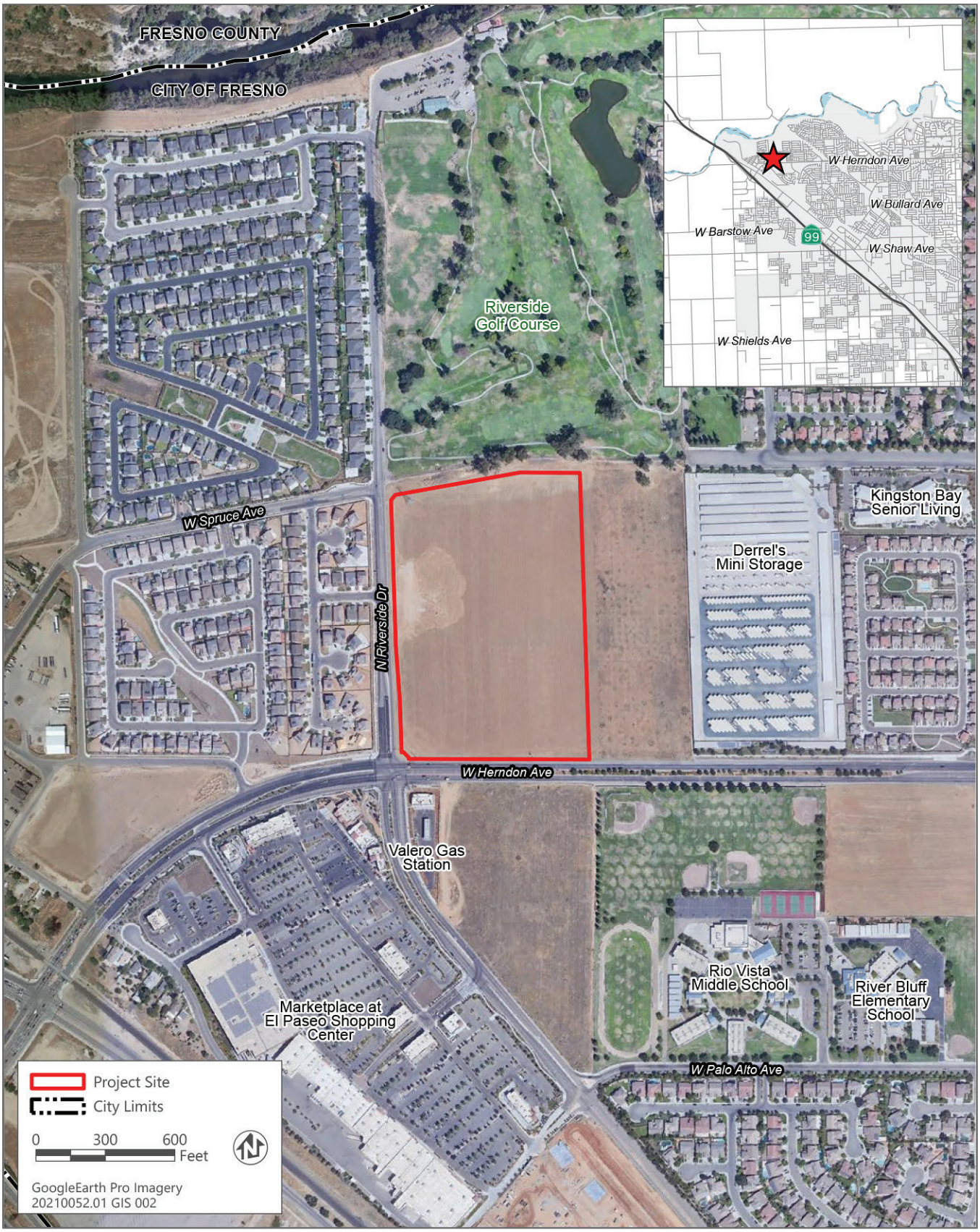
The general plan assigns the project site the land use designation of Community Commercial (Figure 2-3). As shown in Figure 2-4, the zoning designation for the project site is CC (Commercial – Community). The existing Community Commercial designation and CC district are intended for commercial development that primarily serves local needs such as convenience shopping and offices. Specific uses allowed include medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores, and supporting uses.

2.2 PROPOSED PROJECT

The project would develop a new commercial warehouse facility with local and regional access for both residents and visitors of Fresno. The project site is in an area that has recently experienced substantial retail growth. The project would be required to comply with applicable standards for commercial development prescribed in the Citywide Development Code.

Source: Adapted by Ascent Environmental in 2021.

Figure 2-1 Regional Location of Project Site and Existing Costco Facility

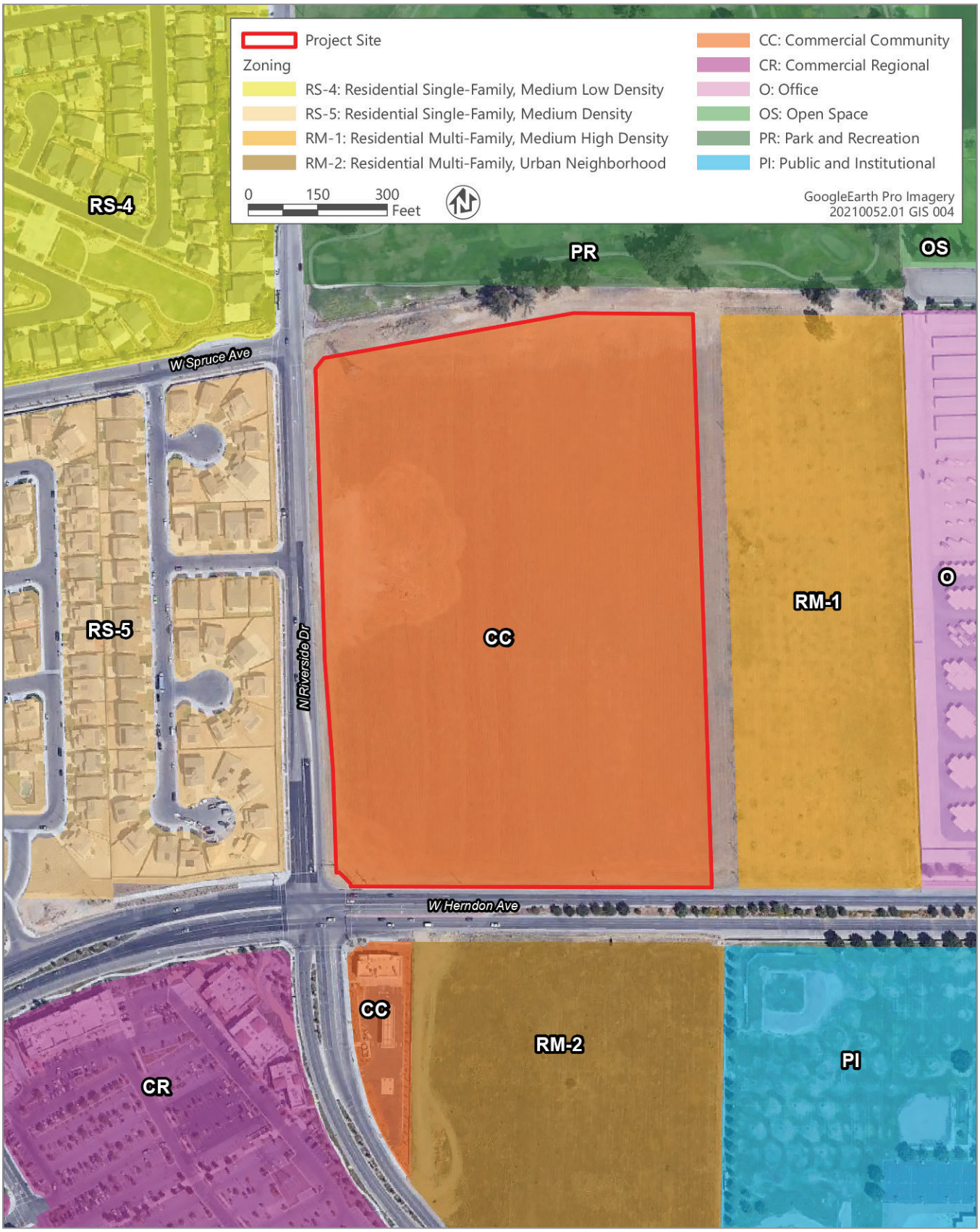


Source: Adapted by Ascent Environmental in 2021.

Figure 2-2 Project Location

Source: Data downloaded from the City of Fresno in 2021; adapted by Ascent Environmental in 2021.

Figure 2-3 Existing Land Use Designation



Source: Data downloaded from the City of Fresno in 2021; adapted by Ascent Environmental in 2021.

Figure 2-4 Existing Zoning Designation

GENERAL PLAN AMENDMENTS AND REZONING

As described above, the project would require a general plan amendment to change the land use designation of the project site from Community Commercial to General Commercial. The General Commercial designation proposed for the site is described in Urban Form, Land Use, and Design Element of the general plan as appropriate for retail and service uses that may generate high volumes of vehicle traffic. The proposed land use designation is shown in Figure 2-5.

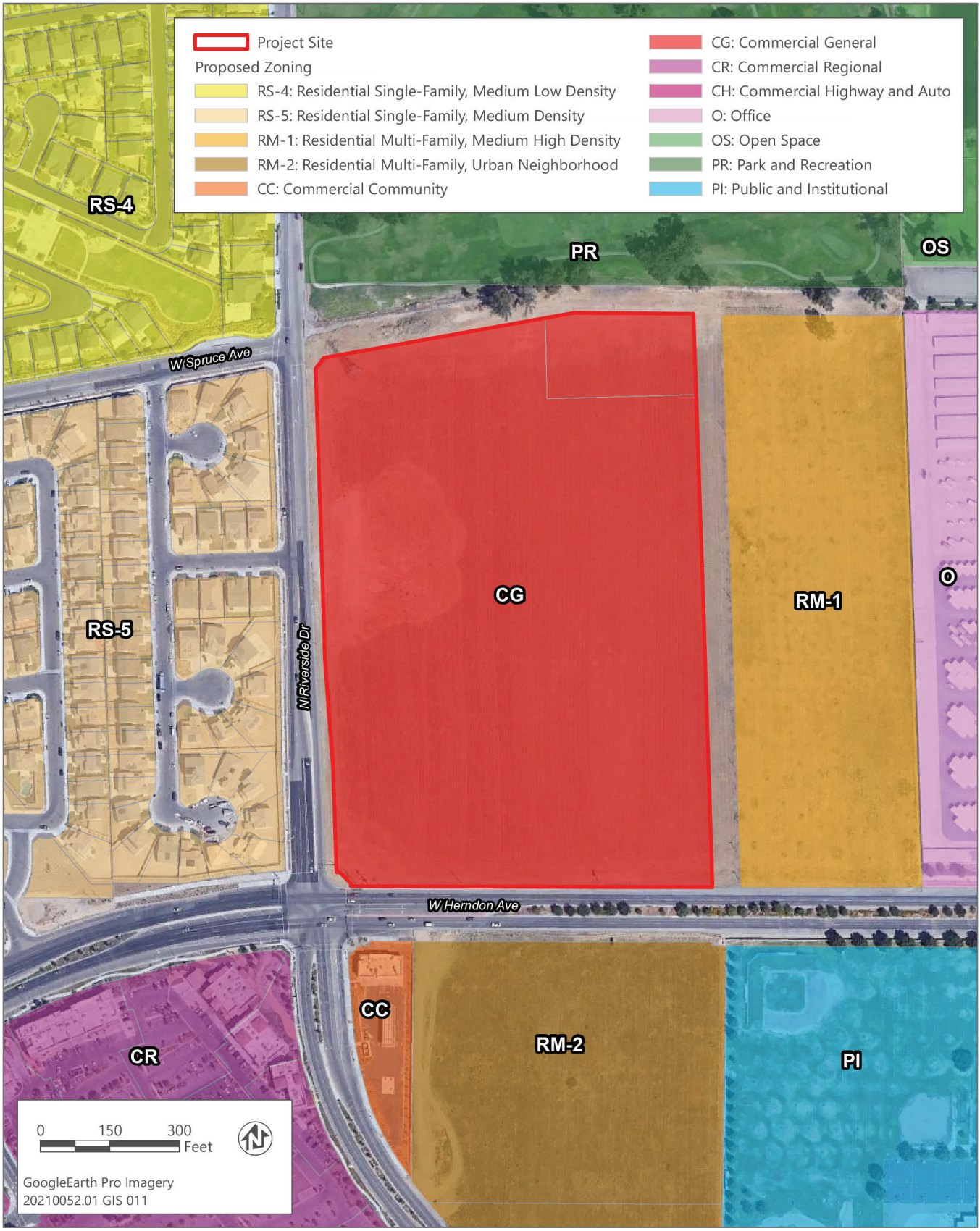
Similarly, the project site would be rezoned from CC to CG, as shown in Figure 2-6. Large-format retail and fuel sales, which are the primary uses at the site, are allowed (after review and approval of a conditional use permit) within the existing CC zoning (see Section 15-1201 of the Fresno Municipal Code). The proposed rezone is necessary to permit the development of the car wash, which is not allowed under the current zoning. Development standards for the CG district are focused on ensuring that structures fit into the surrounding development pattern and architectural or traffic conflicts are minimized.

West Herndon Avenue is designated, depending on the specific segment, as either an expressway or superarterial, the two highest roadway classifications in the General Plan, throughout the project site's vicinity and is designated as a superarterial between the project site and SR 99 (Figure 2-7). The project includes a general plan amendment to reclassify the portion of West Herndon Avenue between North Riverside Drive and North Hayes Avenue from expressway to superarterial to allow the construction of an intersection where West Herndon Avenue meets the private North Arthur Avenue right-of-way. The current classification of expressway would not permit the construction of this intersection. The proposed intersection where West Herndon Avenue meets the North Arthur Avenue right-of-way would allow access to the project site via two north-south streets, rather than solely from North Riverside Drive. This may result in easier travel for southbound drivers along North Riverside Drive, including nearby residents and visitors to the Riverside Golf Course.

Customers traveling to the store from neighborhoods to the south of the project site would have access along North Riverside Drive, which is classified as an arterial south of the site, and Veterans Boulevard, a superarterial.

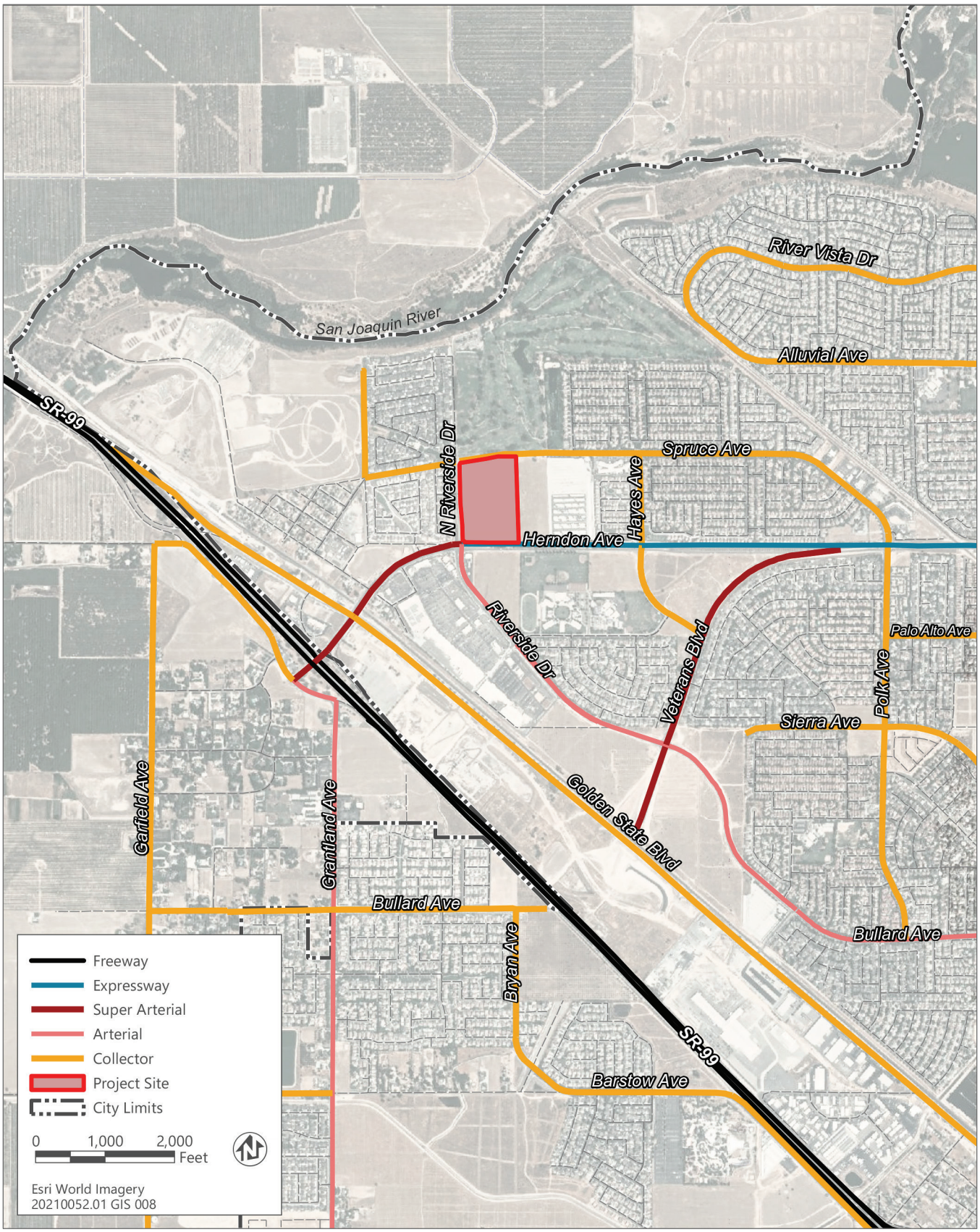
Source: Adapted by Ascent Environmental in 2021.

Figure 2-5 Proposed Land Use Designation



Source: Adapted by Ascent Environmental in 2021.

Figure 2-6 Proposed Zoning Designation



Source: Adapted by Ascent Environmental in 2021.

Figure 2-7 Existing General Plan Roadway Classifications

PLANNED DEVELOPMENT PERMIT

Article 59 of Chapter 15 of the Fresno Municipal Code establishes regulations and procedures for Planned Development Permits (PD Permits), which are permits for "development on large areas of land and infill sites to allow for projects that desire greater flexibility than already provided for in this Code." The PD Permit process allows developments to request deviations from development standards to respond to site conditions in more customized and tailored manner than allowed by the standards specified in the Municipal Code.

The project applicant has applied for a PD Permit to request deviations from Section 15-2015 of the Municipal Code, which specifies that lighting fixtures in commercial districts have a maximum height of 25 feet. Costco aims to achieve 2.5 foot-candles of light throughout the parking area to maximize safety within the parking lot. This level of lighting is intended to provide security and safety for drivers and pedestrians navigating the parking lot at night. The project would include light fixtures with a maximum height of approximately 36.5 feet instead of the allowed 25-foot-tall fixtures to reduce the number of lights needed to achieve the desired light levels within the parking field. The proposed 36.5-foot-tall light poles also allow a more diffuse distribution of light, reducing the difference in light levels in the areas between poles. The taller lighting also ensures that the area beneath the PG&E easement that runs directly through the parking field has adequate lighting. (No structures, including light poles, are allowed within this overhead easement.) Off-site glare and light spillover from parking lot light fixtures would be minimized by using less powerful lights on fixtures at the edge of the property.

2.2.1 Project Purpose and Need

Costco has occupied the commercial building at 4500 West Shaw Avenue in the city of Fresno since 1985. Costco's customer base has outgrown the capacity of the current facility, which could lead to future traffic and parking concerns. For this reason, the existing Costco warehouse would close, and the new facility would serve the same customers as the existing facility plus additional growth in the area.

The project would allow Costco to expand services in the area to include an additional gas station and a car wash, as well as a loading area to facilitate delivery of purchases directly to homes in the Fresno area.

ECONOMIC CHARACTERISTICS

The project would contribute to the availability of integrated retail sales of goods and services in the northwest area of Fresno in response to recent growth. The project would continue and increase Costco's contribution to the City's tax base through store sale tax revenues received by the City.

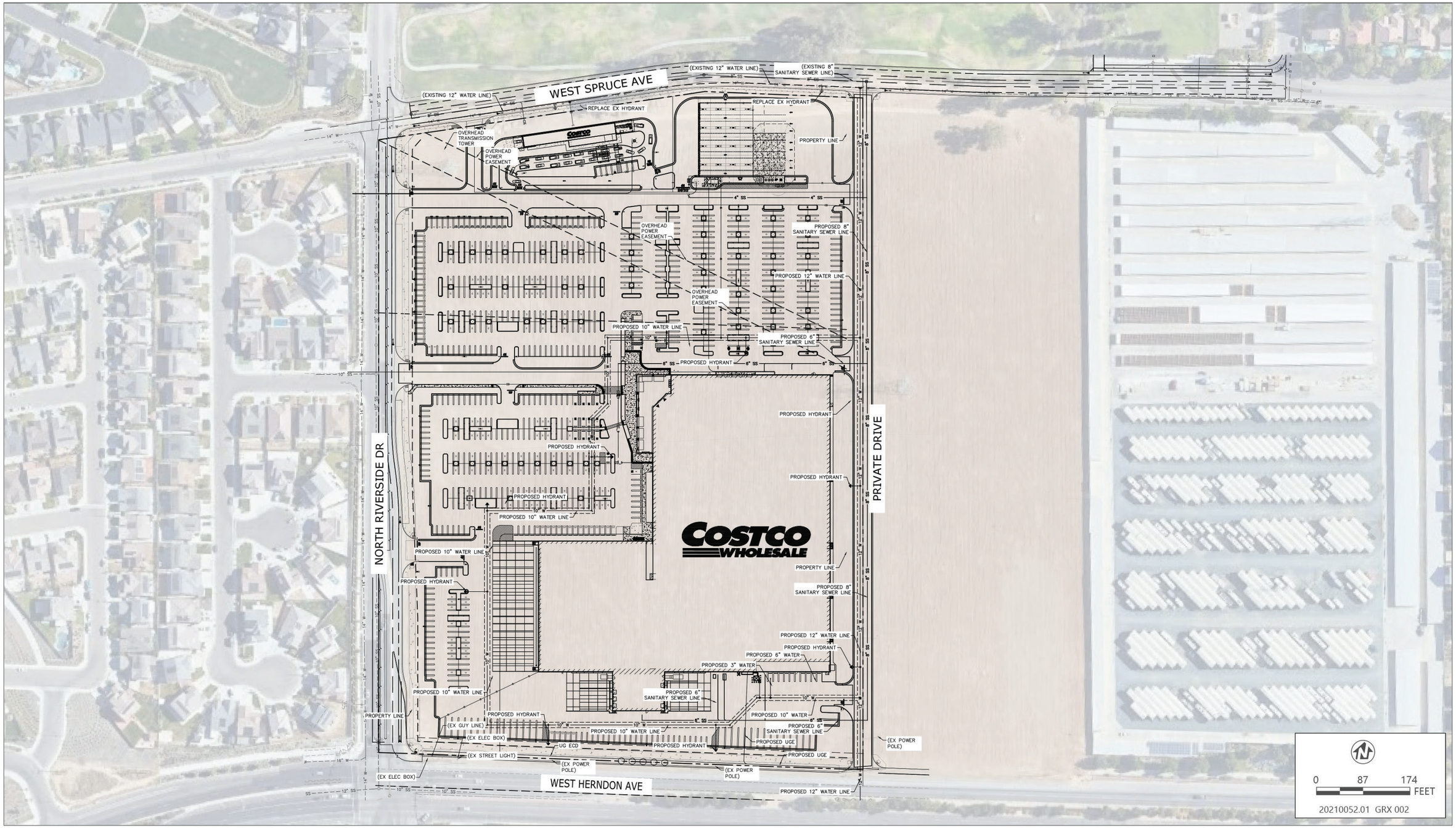
2.2.2 Project Elements

Each of the proposed project elements is described in detail below. A site plan for the proposed facilities is provided in Figure 2-8. Table 2-1 summarizes the different elements of the project and the square footage of each.

Table 2-1 Project Elements

Structure	Area (square feet)
Warehouse Retail Building Footprint	**241,342**
Warehouse/Retail	162,264
Loading/Back of house/Storage/Receiving	23,881
Market delivery operation	46,834
Open canopy space	5,126
Building envelope	2,9555
Fuel canopy	**12,885**
Car wash	**4,800**

Source: Data provided by Urban Planning Partners in 2022.



Source: Image produced and provided by Kimley Horn & Associates in 2021.

Figure 2-8 Site Plan

COSTCO WAREHOUSE BUILDING

The proposed warehouse would occupy 241,342 square feet of which approximately 24,000 square feet would be reserved for storage and receiving. The structure would be set in the southeastern corner of the project site, with parking provided primarily to the north and west of the building. The entrance and exit doorways would be located in the northwest corner of the building. The sales floor area would include a tire center, optical exams and optical sales, hearing aid testing and sales, pharmacy, food service preparation and sales, meat preparation and sales, bakery and sales of baked goods, and alcohol sales. Temporary outdoor sales may occur within the parking field adjacent to the warehouse for seasonal sales, such as Christmas trees from late November through December.

In addition to the general sales floor, the southwest portion of the warehouse would contain an area for receiving, storing, and loading items big and bulky items for Costco's home delivery program. This approximately 47,000-square-foot relocated market delivery operation (MDO) is a last-mile facility for delivery of large and bulky items and is not open to visitation by Costco members. At MDO facilities, large goods are dropped off, organized, and loaded for daily deliveries to Costco members' homes. Services would be the same scale as the existing program but would be consolidated into the proposed warehouse facility. The existing facility averages approximately 20 MDO trips per day and an average trip length of approximately 160 miles. In each trip, the box trucks typically make roughly 14 deliveries. It is anticipated that these trip characteristics would apply to the proposed MDO site.

COSTCO GAS STATION

The project would include a Costco members-only gas station on the northern portion of the project site adjacent to West Spruce Avenue. The facility would include an approximately 13,000 square-foot canopy and a 125 square-foot controller enclosure. There would be four covered fueling islands, each with four two-sided fuel dispensers to provide for the fueling of eight cars at each island, for a total of 32 fueling positions. The gas station would also have eight stacking lanes, allowing approximately 40 cars to wait for pumps at any given time in addition to the 32 cars at the dispensers. The dispensers would be fully automated and self-service. An attendant would be present at all times of operation to oversee operations and assist members. Four underground fuel tanks would also be installed at the southern edge of the gas station. Lights would be recessed into the canopy to provide both lighting during operating hours and a lower level of security lighting after hours.

COSTCO CAR WASH

A Costco members-only automated carwash would be located at the northwest corner of the project site, adjacent to the gas station. The car wash structure would be approximately 4,800 square feet. The car wash facility would include only the automated car wash within the structure. Wash water would be recycled. No self-service car vacuum stations would be provided.

EXISTING FACILITIES

Costco would close the existing Costco warehouse (see Figure 2-1). The City anticipates that the existing Costco building may be purchased or leased by another large-format retailer; however, no specific use, including the potential for redevelopment, is known at this time. The fueling station would remain.

SITE ACCESS AND CIRCULATION

The proposed development would provide multiple points of access to the project site. The primary entrance to the warehouse would be located along North Riverside Drive, with a full-service driveway aligned with West Fir Drive. This proposal includes the installation of traffic control devices at the intersection of West Fir Drive, North Riverside Drive, and the Costco main driveway. Two additional right-in/right-out driveways along North Riverside Drive would provide secondary vehicle access to the project site. The existing right-of-way along the eastern edge of the site is a private

driveway, North Arthur Avenue. The North Arthur Avenue roadway would provide a north-south connection between West Spruce Drive and West Herndon Avenue, providing West Herndon Avenue with right-in and left-in access from West Herndon Avenue and right-out access from North Arthur Avenue. At the eastern edge of the project site, two additional right-in/right-out driveways are proposed along North Arthur Avenue for customer access. A third driveway is proposed along North Arthur Avenue near the southern boundary of the project site that would provide delivery, service, and emergency vehicle access. The primary truck access route would be the southernmost driveway along North Arthur Avenue, with a secondary truck route using the southernmost driveway along North Riverside Drive.

North Arthur Avenue

A portion of this project involves vacating an existing public street right-of-way for North Arthur Avenue, between West Spruce Avenue and West Herndon Avenue. North Arthur Avenue was originally dedicated on a May 26, 1920, map for the J.C. Forkner Fig Garden Subdivision. North Arthur Avenue was never developed or constructed as a public street. There are no current or future plans to develop or construct North Arthur Avenue as a public street. The purpose of this proposed street vacation is to dispose of excess public street right-of-way to accommodate the development of this project in accordance with the Streets and Highways Code.

West Spruce Avenue

The applicant would extend West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue. The connection would be consistent with the City of Fresno Active Transportation Plan. The asphalt roadway would include curb, gutter, sidewalk, Class II bicycle facilities, and streetlights.

Loading

The truck loading dock would be located on the southern facade of the building. This dual-sided loading dock would allow trucks convenient access to loading positions with minimal maneuvering. The bay doors would be equipped with sealed gaskets to limit noise. A smaller on-grade door would also be located on the south side of the building. This door would be used to receive bread delivery and Federal Express-type trucks. A transformer and two trash compactors would also be located along the southern edge of the building. As discussed below, dense landscape material would provide visual screening for these service areas when viewed from North Riverside Drive and West Herndon Avenue.

In addition to the full-size truck loading dock on the southern side of the building, the southwestern portion of the building would accommodate the loading of small box trucks for Costco's online order and delivery service. Goods ordered online by Costco members would be delivered to the warehouse along with normal warehouse stock in full-size trucks. The southwestern portion of the warehouse would have space for receiving, sorting, and storing goods ordered online. When ready for delivery, these items would be loaded onto box trucks at one of the loading spaces on the western façade. The bay doors for this loading area would also be equipped with sealed gaskets to limit noise.

Parking

The project includes 889 total parking stalls, which meets the City of Fresno's minimum parking requirements for the project. These parking stalls would include a total of 21 accessible spaces and 53 electric vehicle-ready parking stalls. The design would be in compliance with City and Americans with Disabilities Act (ADA) requirements. The project also would provide bicycle parking in accordance with the City's Citywide Development Code.

Pedestrian Trails and Bike Paths

The project would include construction of 12-foot-wide pedestrian and bicycle paths along the project site's frontage with West Herndon Avenue and North Riverside Drive. These facilities would be consistent with the City's Active Transportation Plan.

2.2.3 Project Design

BUILDING DESIGN

The warehouse design is proposed to be contemporary and would include a variety of design elements that add depth and dimension. Costco intends to create scale and architectural interest with the use of design techniques such as the location of building materials, landscaping, and the incorporation of varying parapet cap heights that break the long elevations both horizontally and vertically. The technique of breaking a long elevation into smaller elements with varied materials and colors is used to create a more pedestrian-friendly scale in the proposed design. The proposed colors are natural earth tones, which will relate to the proposed surrounding development by utilizing similar building materials and architectural detailing. Figures 2-9a through 2-9c provide representative visual simulations of the proposed warehouse building.

The warehouse design is consistent with the requirements of Leadership in Energy and Environmental Design (LEED), an internationally accepted benchmark for green building design and construction. The buildings would use recycled metal in construction, and restroom fixtures would be high efficiency to reduce water use. In addition, mechanical heat from refrigeration systems would be captured to preheat hot water tanks.

Source: Image produced and provided by MG2 Corporation in 2021.

Figure 2-9a Visual Simulation: Entry Canopy Perspective

Source: Image produced and provided by MG2 Corporation in 2021.

Figure 2-9b Visual Simulation: Northeast Perspective

Source: Image produced and provided by MG2 Corporation in 2021.

Figure 2-9c Visual Simulation: Southeast Perspective

LANDSCAPING

The landscape plan includes a mix of climate-adapted shrubs and grasses, and a variety of shade trees. The landscape design has incorporated a perimeter buffer which includes evergreen and deciduous trees and shrubs to enhance the streetscape. The proposed trees and landscaping would meet the City's shading requirement; the provided landscaping would shade at least 51 percent of the parking lot in 15 years. Additionally, the proposed landscaping represents 13 percent of the total project site and provides 354 trees, which meets the City's requirements of 10 percent of total project site and 121 trees, respectively.

INFRASTRUCTURE

Costco would construct utility improvements within the project site to service the proposed uses and connect to available utilities adjacent to the site. Additional water and/or sewer infrastructure improvements would be constructed adjacent to the site, in the fronting streets. Water and sewer service would be provided by the City of Fresno Department of Public Utilities via existing facilities located in the North Riverside Drive right-of-way. Stormwater from the site would be directed to existing Fresno Metropolitan Flood Control District drainage facilities in North Riverside Drive, West Spruce Avenue, and West Herndon Avenue.

The project would participate in PG&E's Solar Choice program, which provides 100 percent renewable energy to customers enrolled in the program. The project would also implement a solid waste diversion program that is consistent with the measures of the City's Greenhouse Gas Reduction Plan (LSA 2021). Specifically, the project would implement techniques of solid waste segregation, disposal, and reduction (such as recycling, composting, and waste separation), to reduce the volume of solid wastes that must be sent to landfill facilities consistent with Policies PU-9-a and RC-11-a. During construction, the project would recycle construction and demolition waste consistent with Policy RC-11-a.

Infrastructure Improvements

As discussed above, the project would include construction of off-site improvements to improve circulation and provide utilities to the site. Specific improvements include the following and are depicted in Figure 2-10:

1. Installation of a traffic signal at the intersection of West Fir Avenue, North Riverside Drive, and the main Costco driveway.
2. The construction of a private 36-foot asphalt right-of-way (currently named North Arthur Avenue) running along the eastern boundary of the project site.
3. Construction of the intersection of West Herndon Avenue and North Arthur Avenue to allow right-in/right-out and left-in turning, which would require a median cut on West Herndon Avenue.
4. The construction of West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue. The asphalt roadway would include curb, gutter, sidewalk, and streetlights, as well as the installation of sewer and water mains underneath this portion of West Spruce Avenue. Existing turf and mature trees within the right-of-way would be removed. In addition, the existing irrigation system at the golf course and path for the golf carts would be relocated. A new fence and nets to prevent errant balls from striking vehicles and pedestrians would be installed along the northern boundary of the roadway.
5. Improvements to the intersection of West Herndon Avenue and North Riverside Drive.
6. Improvements to North Riverside Drive, including moving the concrete median approximately 5 feet to the west, construction of a second southbound left-turn lane, construction of a second northbound lane, and construction of a 12-foot-wide multiuse trail and a 3-foot-tall landscaped berm between trail and parking lot.
7. The construction of pedestrian and bicycle facilities, including a trail as identified by the City's Active Transportation Plan along the project site's frontage with West Herndon Avenue.

Source: Adapted by Ascent Environmental in 2021.

Figure 2-10 Off-Site Infrastructure Improvements

2.2.4 Construction

Construction would occur Monday through Saturday for a duration of approximately 170 days. The City of Fresno Municipal Code exempts from noise standards site preparation, grading, and construction work accomplished pursuant to a construction permit issued by the City or other governmental agency that takes place between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday. Peak construction workforce numbers would be 80 to 100 people in the last four weeks of construction. Construction would typically occur within daytime hours; however, some activities, such as pouring concrete slabs, could require work to start early (2:00 a.m.). Costco uses pre-manufactured building elements wherever possible to streamline the construction process and reduce the duration and intensity of these impacts at the site.

Table 2-2 lists equipment anticipated to be used during construction. In addition, approximately 325 loads of aggregate base would be imported onto the project site and approximately 3,000 cubic yards of utility and foundation spoils would be off hauled. Grading of the project site would be otherwise balanced and would not require additional import or export of soils. All staging would occur on the project site. Trucks would enter the project site from North Riverside Drive and exit the site via North Arthur Avenue.

Table 2-2 Construction Equipment List

Activity	Quantity	Equipment Type
Earthwork (Site Preparation and Grading)	2	Skip Loader
	2	Scrapers
	2	Motor Grader
	2	Soil Compactor
	1	Vibratory Roller
	4	Loaders/Tractor/Backhoes
	1	Paver
	1	AC Roller
Utilities	3	Excavators
	3	Loaders
	3	Backhoe Loaders
	2	Gradall Forklift
Landscaping	2	Mini Excavators
	2	Skidsteer Front Loader
Building Construction, Paving, and Architectural Coating	2	Excavators
	3	Rubber Tired Dozers
	3	Loaders/Tractors/Backhoes
	2	Gradall Forklift

Source: Data provided by Urban Planning Partners in 2021.

2.2.5 Operation

Costco facilities are operated on a membership-only basis. The warehouse and car wash hours are anticipated to be Monday through Friday from 9:00 a.m. to 8:30 p.m., and Saturday and Sunday from 9:00 a.m. to 7:00 p.m. The gas station would operate from 5:00 a.m. to 10:00 p.m. daily. It is anticipated that the proposed facilities would employ approximately 300 individuals, which would transfer from the existing Costco facility on West Shaw Avenue. A maximum of 165 to 175 employees would be on-site at any given time. In total, the project is estimated to generate 10,616 net new weekday trips and 14,266 weekend daily net new trip ends.

Costco anticipates an average of about 10 to 13 trucks delivering goods on a typical weekday. The trucks range in size from 26-foot-long single-axle trailers to 70-foot-long double-axle trailers. Receiving time would be from 2:00 a.m. to 1:00 p.m., averaging two to three trucks per hour, with most of the deliveries completed before the 10:00 a.m. opening time. Deliveries to the warehouse would be made primarily in Costco trucks from its freight consolidation facility in Tracy, California, coming to the project site from SR 99 and West Herndon Avenue. Costco anticipates one daily delivery of large goods to the MDO facility. Typical receiving time is before 6:00 a.m., made primarily in Costco trucks from its freight consolidation facility (depot) in Tracy, California.

It is estimated that fuel would be delivered to the facility in two to three trucks per day. The largest fuel trucks would be approximately 70 feet long. While delivering the fuel, the trucks would be parked over the underground tanks. The trucks would not block access to any of the fueling positions or occupy any queuing space or parking spaces. The facility has been located and specifically designed to avoid traffic and queuing conflicts with the warehouse.

The tire center would typically receive shipments of tires one to two times per week in single- or double-trailer trucks of up to 70 feet in length, and the same delivery truck would pick up old tires for recycling. Deliveries to, and pickups from, the tire center would be scheduled for pre-opening hours, typically about 6:00 a.m.

2.3 PROJECT OBJECTIVES

The State CEQA Guidelines require that an EIR include a statement of objectives for the project and that the objectives include the underlying purpose of the project. These objectives help the lead agency determine the alternatives to evaluate in the EIR (see CEQA Guidelines Section 15124[b]) and gauge whether alternatives or mitigation measures are feasible. The following is a list of project objectives:

- Construct and operate a new membership-only Costco Commercial Center in northwest Fresno that serves the local community with a wide variety of goods and services from both nationally known businesses and regional and local businesses.
- Locate the new membership-only Costco Commercial Center in a location that is convenient for its members, the community, and employees to travel to for shopping and working.
- Locate the new membership-only Costco Commercial Center in an area serviced by adequate existing infrastructure, including roadways and utilities.
- Establish a facility of sufficient size to provide a state-of-the-art facility that integrates several services, including home and/or business delivery service, under one roof.
- Meet demand for automobile services, including gasoline, car wash, and tire center.
- Create a commercial use with architecture designed to facilitate integration with the overall design context for an area, including the surrounding community.
- Reduce energy consumption by incorporating sustainable design features and systems with enhanced energy efficiencies meeting State and federal requirements.
- Continue and increase big-box retail store sales tax revenues received by the City.
- Improve availability of integrated retail sales of goods and services in the northwest area of Fresno.
- Minimize circulation conflicts between automobiles and pedestrians for retail stores and gas stations.

2.4 AGENCY ROLES AND RESPONSIBILITIES

2.4.1 Lead Agency

The City is the lead agency responsible for approving and carrying out the project and for ensuring that the requirements of CEQA have been met. After the EIR public review process is complete, the City Council will determine whether to certify the EIR (see State CEQA Guidelines Section 15090) and approve the project.

2.4.2 Trustee and Responsible Agencies

A trustee agency is a State agency that has jurisdiction by law over natural resources that are held in trust for the people of the State of California. The only trustee agency that has jurisdiction over resources potentially affected by the project is the California Department of Fish and Wildlife (CDFW).

Responsible agencies are public agencies, other than the lead agency, that have discretionary-approval responsibility for reviewing, carrying out, or approving elements of a project. Discretionary approval power may include such actions as issuance of a permit, authorization, or easement needed to complete some aspect of the proposed project. Responsible agencies may include, but are not limited to, the following:

- State Water Resource Control Board (SWRCB);
- Central Valley Regional Water Quality Control Board (Central Valley RWQCB);
- San Joaquin Valley Air Pollution Control District (SJVAPCD); and
- Fresno Metropolitan Flood Control District (FMFCD).

2.4.3 Required Permits and Approvals

The purpose of an EIR is to analyze the proposed development or activity described in the EIR, and this EIR is intended to apply to the listed project approvals, as well as to any other approvals that may be necessary or desirable to implement the project. A list of discretionary approvals, permits, and entitlements anticipated for the proposed project includes the approvals noted below. However, this EIR may be utilized by the City and any other governmental entities, such as responsible and trustee agencies, for approvals needed in connection with the proposed project, whether or not such agencies or specific approvals are expressly listed below. The following list identifies permits and other approval actions likely to be required from responsible agencies before implementation of the proposed project.

- SWRCB: Coverage under the State General Stormwater Permit.
- Central Valley RWQCB: National Pollutant Discharge Elimination System Permit and Wastewater Discharge Permit.
- SJVAPCD: Permit to construct and permit to operate.
- FMFCD: Plan and drainage report review.

The proposed project would also require the following entitlements from the City of Fresno:

- Amend the 2035 Fresno General Plan to change the planned land use designations for the project site from the Community Commercial to the General Commercial planned land use designation and reclassify a portion of West Herndon Avenue between North Riverside Drive and North Hayes Avenue from Expressway to Superarterial.
- Amend the Official Zoning Map of the City of Fresno to reclassify the project site from the CC/EA/UGM/cz (Community Commercial/Expressway Area Overlay/Urban Growth Management/conditions of zoning) zone district to the CG/UGM/cz (General Commercial/Urban Growth Management/conditions of zoning) zone district.

- Approve a Conditional Use Permit to construct a ±241,342 square-foot, warehouse retail building with a ±4,800 square-foot car wash; and an ±13,000 square-foot, 32-station fuel canopy.
- Approve an Alcoholic Beverage Control Conditional Use Permit to establish a Type 21 alcohol license that would allow the sale of beer, wine, and distilled spirits for consumption off the premises where sold.
- Approve a Planned Development Permit to modify parking lot development standards to allow for 36.5-foot-tall light fixtures rather than 25-foot light fixtures.
- Approve a Parcel Map for the subdivision of the existing parcel into two resultant parcels.
- Approve vacation of an existing public street right-of -way for North Arthur Avenue, between West Spruce Avenue and West Herndon Avenue.
- Approve a permit for construction noise.

3 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

APPROACH TO THE ENVIRONMENTAL ANALYSIS

This Draft EIR evaluates and discloses the environmental impacts associated with the project, in accordance with CEQA (Public Resources Code [PRC] Section 21000 et seq.) and the State CEQA Guidelines (California Code of Regulation, Title 14, Chapter 3, Section 15000 et seq.). Sections 3.1 through 3.14 of this Draft EIR present a discussion of regulatory background, existing conditions, environmental impacts associated with construction and operation of the project, mitigation measures to reduce the level of impact, and residual level of significance (i.e., after application of mitigation, including impacts that would remain significant and unavoidable after application of all feasible mitigation measures). Issues evaluated in these sections consist of the environmental topics identified for review in the Notice of Preparation (NOP) prepared for the project (see Appendix A of this Draft EIR).

Sections 3.1 through 3.14 of this Draft EIR each include the following components:

Regulatory Background: This subsection presents information on the laws, regulations, plans, and policies that relate to the issue area being discussed. Regulations originating from the federal, state, and local levels are each discussed as appropriate.

Environmental Setting: This subsection presents the existing environmental conditions on the project site and in the surrounding area as appropriate, in accordance with State CEQA Guidelines Section 15125. The discussions of the environmental setting focus on information relevant to the issue under evaluation.

Environmental Impacts and Mitigation Measures: This subsection presents thresholds of significance and discusses potentially significant effects of the project on the existing environment, including the environment beyond the project boundaries, in accordance with State CEQA Guidelines Section 15126.2. The methodology for impact analysis is described, including technical studies upon which the analyses rely. The thresholds of significance are defined, and thresholds for which the project would have no impact are disclosed and dismissed from further evaluation. Project impacts and mitigation measures are numbered sequentially in each subsection (Impact 3.2-1, Impact 3.2-2, Impact 3.2-3, etc.). A summary impact statement precedes a more detailed discussion of the environmental impact. The discussion includes the analysis, rationale, and substantial evidence upon which conclusions are drawn. The determination of level of significance of the impact is defined in bold text. A "less-than-significant" impact is one that would not result in a substantial adverse change in the physical environment. A "significant" impact is one that would result in a substantial adverse change in the physical environment. These impacts are also described as "potentially significant" when the potential for substantial adverse change is less certain; however, both significant and potentially significant impacts are treated the same under CEQA in terms of procedural requirements and the need to identify feasible mitigation. Mitigation measures are identified, as feasible, to avoid, minimize, rectify, reduce, or compensate for significant or potentially significant impacts, in accordance with the State CEQA Guidelines Section 15126.4. Any required mitigation measures are numbered to correspond to the impact numbering; therefore, the mitigation measure for Impact 3.2-2 would be Mitigation Measure 3.2-2. Unless otherwise noted, the mitigation measures presented are recommended in the EIR for consideration by the City to adopt as conditions of approval.

Where an existing law, regulation, or permit specifies mandatory and prescriptive actions about how to fulfill the regulatory requirement as part of the project definition, leaving little discretion in its implementation, and would avoid an impact or maintain it at a less-than-significant level, the environmental protection afforded by the regulation is considered before determining impact significance. Where existing laws or regulations specify a mandatory permit process for future projects, performance standards without prescriptive actions to accomplish them, or other requirements that allow substantial discretion in how they are accomplished, or have a substantial compensatory component, the level of significance is determined before applying the influence of the regulatory requirements. In this circumstance, the impact would be potentially significant or significant, and the regulatory requirements would be included as a mitigation measure.

This subsection also describes whether mitigation measures would reduce project impacts to less-than-significant levels. Significant-and-unavoidable impacts are identified as appropriate in accordance with State CEQA Guidelines Section 15126.2(b). Significant-and-unavoidable impacts are also summarized in Chapter 5, "Other Considerations."

3.1 AESTHETICS

This section provides a description of existing visual conditions, meaning the physical features that make up the visible landscape near the project site and an assessment of changes to those conditions that would occur from project implementation. The effects of the project on the visual environment are generally defined in terms of the project's physical characteristics and potential visibility, the extent to which the project's presence would change the perceived visual character and quality of the environment, and the expected level of sensitivity that the viewing public may have where the project would alter existing views.

Comments pertaining to aesthetic resources were received in response to the notice of preparation (see Appendix A) and included concern about lighting, loss of greenspace, and impacts to the adjacent golf course. These impacts are analyzed in this section.

3.1.1 Regulatory Setting

FEDERAL

No federal plans, policies, regulations, or laws related to aesthetics, light, and glare are applicable to the project.

STATE

California Scenic Highway Program

California Scenic Highway Program California's Scenic Highway Program was created by the California Legislature in 1963 and is managed by the California Department of Transportation. The goal of this program is to preserve and protect scenic highway corridors from changes that would affect the aesthetic value of the land adjacent to highways. A highway may be designated "scenic" depending on how much of the natural landscape travelers can see, the scenic quality of the landscape, and the extent to which development intrudes on travelers' enjoyment of the view. The nearest officially designated scenic highway is a portion of Route 180 located approximately 25 miles southeast of the project site.

LOCAL

City of Fresno General Plan

The City of Fresno's General Plan (City of Fresno 2014) includes the following policies that pertain to aesthetic resources:

- Policy LU-6-a: Design of Commercial Development. Foster high quality design, diversity, and a mix of amenities in new development with uses through the consideration of guidelines, regulations and design review procedures.
- Policy LU-6-d: Neighborhood and Community Commercial Center Design. Plan for neighborhood mixed use and community commercial uses to implement the Urban Form concepts of this Plan, promote the stability and identity of neighborhoods and community shopping areas, and allow efficient access without compromising the operational effectiveness of the street system.
- Policy C-19-e. Working with utility companies the city will continue to pursue the undergrounding of overhead utilities as feasible.
- Policy MT-3-a: Scenic Corridors. Implement measures to preserve and enhance scenic qualities along scenic corridors or boulevards, including:
  - Van Ness Boulevard – Weldon to Shaw Avenues
  - Van Ness Extension – Shaw Avenue to the San Joaquin River Bluff

- Kearny Boulevard – Fresno Street to Polk Avenue
- Van Ness/Fulton couplet – Weldon Avenue to Divisadero
- Butler Avenue – Peach to Fowler Avenues
- Minnewawa Avenue – Belmont Avenue to Central Canal
- Huntington Boulevard – First Street to Cedar Avenue
- Sheperd Avenue – Friant Road to Willow Avenue
- Audubon Drive – Blackstone Avenue to West Herndon Avenue
- Fiant Road – Audubon to Millerton Roads
- Tulare Avenue – Sunnyside to Armstrong Avenues
- Ashland Avenue – Palm to Maroa Avenues

Bullard Community Plan

The Bullard Community Plan includes the following policies that pertain to aesthetic resources in commercial areas:

> 7g. Within an area 100 feet wide abutting property zoned or planned for residential use, exterior area lighting for parking areas, carports, garages, access drives and loading areas for commercial uses and office uses shall be shielded, to prevent line of sight visibility of the light source from abutting property zoned or planned for residential use.

Fresno Municipal Code

Chapter 15, "City Wide Development Code," of the City's code contains specific design and development standards applicable to development within different land use districts and zoning overlay districts. The project site is within the City's Community Commercial (CC)/Expressway Overlay/Urban Growth Management/conditions of zoning district.

Section 15-1201 through Section 15-1205

Section 15-1201 through Section 12-1205 of the Fresno Municipal Code establish design standards including height limits, setback, screening, and lighting height requirements, and reference to the landscaping standards that apply to development in commercial districts, including the CC and General Commercial (GC) districts.

Section 15-2015: Outdoor Lighting and Illumination

This section of the Fresno Municipal Code establishes additional standards to prevent spillover illumination or glare onto adjoining properties and prohibit interference with normal operation of adjacent property. Pursuant to this section, all outdoor lighting is required to be shielded. Light fixtures in commercial districts have a maximum height of 25 feet.

Sections 15-2420 and 15-2421: Parking Area Lighting, and Parking Lot Landscaping and Shading

These sections of the Fresno Municipal Code establish additional standards to prevent spillover illumination or glare onto adjoining properties and prohibit interference with normal operation of adjacent property. All outdoor lighting is required to be shielded, and should not exceed a height of 20 feet within 100 feet of any street frontage or Residential District. Parking areas must have a minimum lighting level of 0.5-foot candle in parking areas. Section 15-2420 establishes standards for tree cover, landscaping cover, and screening requirements for parking lots in Multi-Family, Mixed-Use, Office, Business Park, Regional Business Park, and Commercial developments: 10 percent of parking lots are to be landscaped.

Section 15-2508: Lighting and Glare

This section of the Fresno Municipal Code requires lighting design to deflect glare away from adjacent properties and prohibits or requires mitigation for direct heat or glare that may cause disruption to traffic or adjoining properties. Light casting onto residential properties should not exceed 0.5 foot-candle.

3.1.2 Environmental Setting

VISUAL CHARACTER AND QUALITY OF THE PROJECT SITE

As described in Chapter 2, "Project Description," the project site is 22.4 acres, flat, and undeveloped. The property was previously used as an orchard and has been disturbed and graded. The site currently supports minimal vegetation such as grasses and weeds. There are no trees on the project site, except for several large blue gum (*Eucalyptus globulus*) trees adjacent to the project site to the north and northeast, including a windrow along the southern boundary of the Riverside Golf Course. These trees are located within the right-of-way for the Spruce Avenue extension. As shown in Figure 3.1-1, the site is maintained to manage vegetation. Electric transmission lines bisect the project site, and overhead utility lines are located along its southern boundary. The project site is bounded by roadways to the south and west. From adjacent roadways, the seasonal grassland offers relatively open views, although isolated between existing urban uses. The visual character of the site is vacant land.

Visual quality is the overall visual impression or attractiveness of an area in relation to its visual character as determined by the particular landscape characteristics, including natural features such as landforms, rock forms, water features, and vegetation patterns; or features of the built environment such as historic or aesthetically valuable structures, vegetation, or scenic roadways. The project site does not contain notable natural features such as landforms, rock forms, water features, vegetation patterns, and does not support any historic or aesthetically valuable built environment features. The project site is not within, visible from, or in proximity to, state scenic roadways or scenic corridors identified in General Plan Policy MT-3-a. The visual quality of the project site is low.

Source: Photograph taken by Ascent Environmental in 2021.

Figure 3.1-1 Project Site Existing Conditions – Facing Southwest

VISUAL CHARACTER OF THE SURROUNDING AREA

On the east side of the project site is a vacant parcel with similar visual characteristics that is zoned for multi-family housing. A commercial self-storage facility is located east of this parcel. A golf course (Riverside Golf Course) is located north of the West Spruce Avenue right of way and project site. Single family residential developments are located to the northwest, west, and northeast of the project site. Low to medium density commercial development is located southwest of the project site, at the southwest corner of the intersection of North Riverside Drive and West Herndon Avenue (refer to Figure 2-3 in Chapter 2, "Project Description"). The existing commercial areas and residential communities are generally auto oriented in design, of low to medium density, and contain structures of similar height (i.e., one or two stories). Colors are predominately neutral tones. The limited height, density, and types of land uses comprising the areas surrounding the project site have a suburban visual character. The occurrence of interspersed vacant parcels in the vicinity of the project site results in an overall visual character that indicates transition from a rural community to a developed suburban environment.

Except for the Riverside Golf Course, development surrounding the project site does not contain natural features such as landforms, rock forms, water features, and vegetation patterns; or features of the built environment such as historic or aesthetically valuable structures, vegetation, or scenic roadways. The Riverside Golf Course supports gently sloping green hills, along with deliberately placed landscaping such as shrubs and trees. The range (or distance) of views of and within the golf course are short to medium. Landscaping on the golf course prevents direct line of site. In addition, fencing and netting to block errant golf balls create visual separation along North Riverside Drive north of the project site. Figure 3.1-2 shows existing views of the golf course in the area north of the project site.

Source: Photograph taken by Ascent Environmental in 2022.

Figure 3.1-2 Riverside Golf Course Existing Conditions - Facing Northeast

VIEWS OF THE PROJECT SITE AND SURROUNDING AREA

The project site is visible from adjacent roadways including West Spruce Avenue to the northeast, West Herndon Avenue to the south, and North Riverside Drive to the west, and from adjacent land uses including the golf course to the north, and the middle school located south of West Herndon Avenue. Primary viewers of the project site include occupants of the residential community approximately 80 feet to the west of the project site; individuals recreating at the golf course to the north; and drivers, bicyclists, and pedestrians using adjacent roadways. Views from the middle school are limited due to vegetation that screens the school from West Herndon Avenue. The project site is also visible from commercial areas located approximately 260 feet southwest of the site, but views from this location are limited by interfering roadway traffic, distance, and vegetation.

LIGHT AND GLARE CONDITIONS

The project site is undeveloped and is, therefore, void of light and glare sources. However, the adjacent residential areas, roadways, and commercial areas located in proximity to the site include interior and exterior lighting around buildings, facilities, and surface parking lots, which introduce lighting onto the parcel and the surrounding areas.

3.1.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

First, the predominant built and natural features contributing to the project site's appearance were identified (including built, natural, or cultural features) to describe the site's visual character. The quality of the visual environment (e.g., low, moderate, high) was determined relative to the visual character of the project site and surrounding areas. Publicly accessible areas from which the site is visible were identified, and the level of viewer exposure was determined. These existing conditions were compared to the plans for the proposed project to characterize the change in the aesthetic quality of the site.

The assessment of aesthetic impacts involves qualitative analysis that is inherently subjective in nature. Different viewers react to viewsheds and aesthetic conditions differently. Because the project site is in a rapidly urbanizing part of the city that some viewers may not characterize as fully urbanized, the following evaluation discusses degradation of views of the site as well as potential for conflict with applicable regulations.

THRESHOLDS OF SIGNIFICANCE

An impact on aesthetics, light, and glare would be significant if implementation of the project would:

- have a substantial adverse effect on a scenic vista;
- substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage point), and in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality; or
- create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

TOPICS NOT DISCUSSED FURTHER

Substantial Adverse Effects on Scenic Vistas

A scenic vista is considered a view of an area that has remarkable scenery or a natural or cultural resource that is indigenous to the area. The project site is currently vacant and is located in a semi-developed, suburban setting. The site and surrounding areas do not contain remarkable scenery or views of natural areas that would be considered a scenic vista. There would be a less-than-significant impact. Therefore, no further analysis is required by CEQA.

Substantial Damage to Scenic Resources

The project site is not visible from a state scenic highway or locally designated scenic roadway. No scenic resources such as trees, rock outcroppings, and historic buildings, are located within or in proximity to the site. There would be no impact. Therefore, no further analysis is required by CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.1-1: Substantially Degrade the Existing Visual Character or Quality of Public Views of the Site and Its Surroundings or Conflict with Zoning and Other Regulations Governing Scenic Quality

Implementation of the project would alter views by adding built-environment elements on a vacant parcel. However, the existing visual quality of the parcel is low. The project elements proposed would not change the suburban visual character of the general area, as elements of the project's design (such as building height, color, massing, architectural detailing, screening vegetation and landscaping, and setback requirements) would be consistent with the visual character of the surrounding environment. This impact would be **less than significant.**

The project would construct an approximately 241,342-square-foot single story, contemporary-style retail building in the southeast corner of the project site, and a car wash and fueling stations along the northern portions of the site. Supporting site improvements would include a parking lot, landscaping, and on-site utility connections. Landscaping would include shrubs, and evergreen and deciduous trees. As depicted in Figure 3.1-3, the project would place trees along most of perimeter of the project site to partially screen project elements from surrounding land uses. The building colors would be primarily neutral earth tones and would use exterior materials and architectural detailing consistent with surrounding development (see Figure 2-9a in Chapter 2, "Project Description"). The project would also include construction of 12-foot-wide pedestrian and bicycle paths along the project's frontage with West Herndon Avenue and North Riverside Drive. These facilities would be consistent with the City's Active Transportation Plan.

The City of Fresno General Plan establishes policies related to land use and planning, as detailed above in Section 3.1.1, "Regulatory Setting." Policy LU-6-a requires that the City foster high quality design, diversity, and a mix of amenities through compliance with guidelines, regulations, and design review procedures. The proposed facility would comply with applicable design review procedures. Policy LU-6-d requires the City to plan for commercial development to implement the Urban Form concepts, promote the stability and identity of neighborhoods and community shopping areas, and allow efficient access without compromising the operational effectiveness of the street system. The project would be developed on a currently vacant lot and would not remove existing elements that could reduce the stability and identity of the surrounding neighborhoods. Additionally, as detailed in Section 3.13, "Transportation and Circulation," roadway design changes are proposed to ensure efficient access to the project site without compromising the operational effectiveness of the existing street system.

As described the in Chapter 2, "Project Description," the project site currently has a land use designation of Community Commercial per the City's official zoning map and is within the City's CC/Expressway Area Overlay/Urban Growth Management/conditions of zoning district. Implementation of the project would result in a change from the CC land use designation to the GC land use designation.

Source: Landscape site plan provided by David Babcock and Associates in 2021 and adapted by Ascent Environmental in 2022.

Figure 3.1-3 Preliminary Landscape Plan

As described in the "Regulatory Setting" section, above, the Fresno Municipal Ordinance contains design standards and regulations pertaining to aesthetics that apply to each land use designation and zoning district. Section 15-1203 "Intensity and massing development standards" describes development standards applicable to different commercial uses. The maximum height for buildings in both GC and CC districts is 35 feet per Section 15-1203 of the Fresno Municipal Code. Additional aesthetics-related requirements (Sections 15-1201 through 15-1205) for these districts include landscaping standards, as well as building façade and setback requirements. For example, Section 15-1205 requires all street-facing façades to include one projection or recess at least 2 feet in depth for every 25 feet of wall. Section 15-2420 establishes standards for tree cover, landscaping cover, and screening requirements for parking lots. The project design would comply with height, setback, façade, landscaping and tree cover requirements, and other aesthetics requirements contained in the Fresno Municipal Ordinance that are applicable to commercial zoning districts.

Currently, south-facing views from the Riverside Golf Course are minimally screened with vegetation, but also include views of the vacant project site and transmission lines in the foreground, and longer-distance views of surrounding commercial development. From this vantage point, views of the commercial development at the intersection of West Herndon Avenue and North Riverside Drive include buildings that are predominantly earth tones and similar in height amongst each other. Views from the golf course would be altered to include a net, parking, landscaping elements, the fueling station, and carwash in the foreground; and the retail warehouse building, and additional landscaping features in the mid-range views. The net and fencing that would be installed along the extension of West Spruce Avenue would have an appearance similar to the existing fence and net along North Riverside Drive (see Figure 3.1-2). Landscaping and trees proposed along the perimeter of the project site would provide partial screening. The existing visual quality of the site is low, and the project would introduce visual features that are consistent with local ordinances. Therefore, although the project would reduce the vacant land visible from this vantage point, it would not substantially degrade the existing visual quality and would be consistent with the visual character of the existing development in the vicinity.

East-facing views of the project site from the residential community are partially screened by vegetation and neutral fencing made of natural materials at the pedestrian level, but include vacant land associated with the site, views of the energy infrastructure on the site and views of street lighting in the foreground. Mid-range views from this vantage point include fencing and structures associated with the self-storage facility, and views of additional transmission lines, residences, and tree canopy in the long range. The project would introduce automobile traffic, parking and landscaping, and views of structures associated with the golf course nets, carwash, fueling facility, and warehouse structure in the short- to mid-range views of the site. The project would also increase viewers from this vantage point by placing additional pedestrian and bicyclist viewers along the proposed bike path planned along North Riverside Drive. The project would reduce the vacant land visible from this vantage point but would not substantially degrade the existing visual quality, which is relatively low, and would be consistent with the visual character of surrounding development.

North facing views of the project site from West Herndon Avenue are primarily short to mid-range. Viewers along this road include motorists, pedestrians, and bicyclists, and visitors of the commercial development at the corner of West Herndon Avenue and North Riverside Drive. Elements visible from the extent of West Herndon Avenue include views of the project site in the foreground (vacant land, utility infrastructure), and mid-range views of vegetation associated with the southern boundary of the golf course. Existing views would be altered by eliminating the vacant land, and introducing parking, landscaping, and the warehouse structure in the short range. For motorists on West Herndon Avenue, the project would appear consistent with the character and scale of existing development along the roadway. The project would reduce the vacant land visible from this vantage point but would not substantially degrade the existing visual character because existing views are low quality and the project would be consistent with the visual character of surrounding development.

Implementation of the project would alter views by adding built-environment elements on a vacant parcel, but would not substantially degrade existing views of the project site or the surrounding areas. Elements of the project's design (such as building height, color, massing, architectural detailing, landscaping, and setback requirements) would be consistent in visual character with the surrounding development, and consistent with applicable regulations pertaining to aesthetics. These established standards would result in a development that would not detract from or degrade the existing visual character or quality of public views of the site and its surroundings. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.1-2: Create a New Source of Substantial Light or Glare Which Would Adversely Affect Nighttime Views in the Area

The project would introduce new sources of light onto the existing, vacant project site. Light spillover onto adjacent land uses would be reduced by using less powerful lights on fixtures at the edge of a property. Reflective, glare causing materials would not be used. All fixtures would be downcast and would not exceed the 0.5-foot-candle standard for light spillover onto residential areas. Therefore, this impact would be **less than significant**.

The project site is currently vacant and is devoid of existing light and glare sources. However, the adjacent residential areas, roadways, and commercial areas located in proximity to the site include interior and exterior lighting around buildings, facilities, and surface parking lots, which introduce lighting onto the parcel and the surrounding areas. The project applicant has applied for a Planned Development Permit to request deviations from Section 15-2015 of the Municipal Code, which specifies that lighting fixtures in commercial districts have a maximum height of 25 feet, and proposes 36.5-foot-tall fixtures. This would reduce the number of light fixtures needed to achieve a lighting level of 2.5 foot-candles within the parking lot. Taller lighting is intended to allow a more diffuse distribution of light, reducing the difference in light levels in the areas between poles. The taller lighting also ensures that the area beneath the Pacific Gas and Electric Company easement that runs directly through the parking field has adequate lighting. (No structures, including light poles, are allowed within this overhead easement.) Light spillover onto adjacent land uses would be reduced by using less powerful lights on fixtures at the edge of a property. Reflective, glare causing materials would not be used in the building design. The applicant would be required to demonstrate that all fixtures would be downcast and would not exceed the 0.5-foot-candle standard established in Section 15-2420 of the Fresno Municipal Code and the Bullard Community Plan for light spillover onto adjacent residential areas. Shielding requirements in Section 15-2015 of the Fresno Municipal Code would also prohibit light pollution associated with upcast light and reduce effects on dark skies and day or nighttime views in the area.

The project would introduce new sources of light and proposes to erect lighting that is higher than existing City standards for parking lot lighting fixtures. All fixtures would be downcast and would not exceed the 0.5-foot-candle standard for light spillover onto residential areas that are adjacent. Therefore, the project impact of the new lighting would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

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3.2 AGRICULTURAL AND FORESTRY RESOURCES

This section evaluates the potential impacts of the proposed project on agricultural and forestry resources. The existing forest and agricultural resource characteristics are described and the relationship between the proposed project and existing plans and policies is addressed. No comments regarding agricultural or forestry resources were received in response to the notice of preparation prepared for this project, which may be found in Appendix A.

3.2.1 Regulatory Setting

FEDERAL

Farmland Protection Policy Act

The Natural Resources Conservation Service, a federal agency within the U.S. Department of Agriculture, is the agency primarily responsible for the implementation of the Farmland Protection Policy Act. The purpose of the Farmland Protection Policy Act is to minimize federal programs' contribution to the conversion of farmland to nonagricultural uses by ensuring that federal programs are administered in a manner that is compatible with state, local, and private programs designed to protect farmland. The Natural Resources Conservation Service provides technical assistance to federal agencies, state, and local governments; tribes or non-profit organizations that desire to develop farmland protection programs and policies.

STATE

California Public Resources Code

Public Resources Code Section 21060.1 defines "agricultural land" as:

> prime farmland, farmland of statewide importance or unique farmland, as defined by the United States Department of Agriculture land inventory and monitoring criteria, as modified for California.

This EIR uses these definitions for evaluating impacts associated with the loss of agricultural lands resulting from implementing the project.

California Department of Conservation

The California Department of Conservation (DOC) administers and supports several programs, including the Williamson Act, the California Farmland Conservancy Program, the Williamson Act Easement Exchange Program and the Farmland Mapping and Monitoring Program. These programs are designed to preserve agricultural land and provide data on conversion of agricultural land to urban use. Key DOC tools available for land conservation planning are conservation easement grants, tax incentives to keep land in agriculture or open space, and farmland mapping and monitoring.

Farmland Mapping and Monitoring

The Farmland Mapping and Monitoring Program (FMMP) develops mapping tools and statistical data that tracks and assesses changes to farmland land use. The FMMP designates portions of the state landscape as "prime farmland," "unique farmland," "farmland of statewide importance," "farmland of local importance," "grazing land," urban and built-up land," or "other land" as described in Table 3.2-1, below.

Table 3.2-1 FMMP Mapping Categories

Category	Considered Important Farmland under CEQA[1]	Definition
Prime Farmland	Yes	Farmland with the best combination of physical and chemical features able to sustain long-term agricultural production. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.
Farmland of Statewide Importance	Yes	Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for irrigated agricultural production at some time during the 4 years before the mapping date.
Unique Farmland	Yes	Farmland of lesser quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include non-irrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years before the mapping date.
Farmland of Local Importance	No	Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
Grazing Land	No	Land on which the existing vegetation is suited to the grazing of livestock.
Urban and Built-Up Land	No	Land occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. This land is used for residential, industrial, commercial, construction, institutional, public administration, railroad and other transportation yards, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, water control structures, and other developed purposes.
Other Land	No	Land not included in any other mapping category. Common examples include low density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than 40 acres. Vacant and non-agricultural land surrounded on all sides by urban development and greater than 40 acres is mapped as Other Land.
Water	No	Perennial water bodies with an extent of at least 40 acres.

[1] Important farmland is defined by CEQA under Public Resources Code Section 21060.01 and CEQA Guidelines Appendix G.

Source: Compiled by Ascent Environmental in 2021.

Williamson Act

The California Land Conservation Act, also known as the Williamson Act, was adopted in 1965 to encourage the preservation of the state's agricultural lands and to prevent their premature conversion to urban uses. Landowners receive reduced property tax assessments in return for enrollment under Williamson Act contract. Property tax assessments of Williamson Act contracted land are based upon generated income as opposed to potential market value of the property. In return, the landowners guarantee that these properties remain under agricultural production for a 10-year period. The contract is renewed automatically unless the owner files a notice of non-renewal.

LOCAL

City of Fresno General Plan

Policies in the City of Fresno General Plan emphasize preservation of farmland by incentivizing new development within and adjacent to already-urbanized land, only extending public utilities to new development that adheres to the plan, and not expanding the City's sphere of influence. The Resource Conservation and Reliance Element also addresses the broader planning issues of farmland preservation (City of Fresno 2014). As described in Chapter 2, "Project Description," the land use designation of the project site is Community Commercial, and the site is within an urbanized area of the incorporated city with established utility service. General plan policies intended to preserve agricultural land outside of the area planned for urbanization under the general plan would not apply to the project.

3.2.2 Environmental Setting

The project site was used as an orchard from approximately 1937 through 1998. The orchard was removed sometime between 1998 and 2002, and the site has been vacant since then. Currently, the site is undeveloped and is sparsely vegetated with grasses. No agricultural uses occur on or adjacent to the project site. Surrounding land uses include a residential neighborhood to the west, a public golf course to the north (Riverside Golf Course), a vacant lot and self-storage facility to the east, a gas station and vacant lot to the south, Rio Vista Middle School and River Bluff Elementary School to the southeast, and a large-scale retail development (Marketplace at El Paseo Shopping Center) to the southwest. The project site and surrounding areas to the east, south, and west are classified as farmland of local importance (DOC 2018) (Figure 3.2-1).

As shown in Figure 2-3 in Chapter 2, "Project Description," no agricultural uses occur adjacent to the project site and adjacent parcels are designated for residential and commercial uses in the general plan (City of Fresno 2022). No timberland, Timber Production Zones, or forest land are identified within or adjacent to the project site.

3.2.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

State and local mapping of farmland and forest land was used to identify the potential for resources on and adjacent to the project site. Evaluation of potential impacts of the project was based on review of documents pertaining to the project area, including the general plan, associated policies and zoning information, and FMMP Important Farmlands data.

THRESHOLDS OF SIGNIFICANCE

An impact on agricultural and forestry resources would be significant if implementation of the project would:

- convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the FMMP of the California Resources Agency, to non-agricultural use;
- conflict with existing zoning for agricultural use or a Williamson Act contract;
- conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g));
- result in the loss of forest land or conversion of forest land to non-forest use; and/or
- involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use.

Source: 2018 data downloaded from DOC in 2021

Figure 3.2-1 Farmland Mapping and Monitoring Program Designation

TOPICS NOT DISCUSSED FURTHER

Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to Non-Agricultural Use or Conflict with Existing Zoning for Agricultural Use or a Williamson Act Williamson Act Contract

There are no lands under Williamson Act contract within or adjacent to the project site. No agricultural land use or zoning is present within or adjacent to the site. There would be no impact. Therefore, no further analysis is required by CEQA.

Conflict with Existing Zoning For, Or Cause Rezoning of, Forest Land, Timberland, or Timberland Zoned Timberland Production; Result in the Loss of Forest Land or Conversion of Forest Land to Non-Forest use; and/or Involve Other Changes in the Existing Environment, Which, Due to Their Location or Nature, Could Result in Conversion of Forest Land to Non-Forest Use

There are no forestland and timberland production zones within, or in proximity to, the project site. There would be no impact. Therefore, no further analysis is required by CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.2-1: Involve Other Changes in the Existing Environment, Which, Due to Their Location or Nature, Could Result in Conversion of Farmland to Non-Agricultural Use

The project would result in the development of a parcel that was formerly used for agriculture and is recognized by DOC as Farmland of Local Importance. The project site is no longer used for agriculture and is designated for commercial land use per the City of Fresno General Plan. Similarly, surrounding parcels are designated, and in some cases developed as, residential and commercial uses. The project would not involve changes to the existing environment that could result in conversion of farmland to non-agricultural use. This impact would be **less than significant**.

Farmlands of concern under CEQA (Prime Farmland, Unique Farmland, and Farmland of Statewide Importance) would not be directly or indirectly affected by the development of the project. The 22.4-acre project site is classified as locally important farmland (DOC 2018) and has historically supported agricultural uses. As described above, the DOC's farmland of local importance designation is intended to identify land of importance to the local agricultural economy, as determined at the local level. The site has been vacant since 2002 and is designated for commercial uses under the general plan. No agricultural land uses are identified on or adjacent to the project site.

As described further in Section 3.10, "Land Use and Planning," the project site and surrounding uses are designated for non-agricultural uses in the general plan. Land within the City's sphere of influence is no longer identified for agricultural uses or anticipated to contribute to the local agricultural economy. Through the general plan and Development Code, the City has designated all land within the city for use other than farmland. The project supports the City's intent to concentrate urban development within the City's sphere of influence while supporting preservation of agricultural land in the unincorporated area. Therefore, while implementation of the project would result in the conversion of fallow land formerly used for agriculture, this conversion would not result in the loss of Farmland as defined in Public Resources Code Section 21060.1 and Appendix G of the State CEQA Guidelines and the project would not involve changes to the existing environment that could result in conversion of farmland to non-agricultural use. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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3.3 AIR QUALITY

This section includes a discussion of existing air quality conditions, a summary of applicable regulations, and an analysis of potential construction and operational air quality impacts caused by proposed development of the project. Mitigation is developed as necessary to reduce significant air quality impacts to the extent feasible.

Public comments received in response to the notice of preparation articulated concerns related to pollution caused by operation of the project, specifically the proposed gas station. The effect of project operation on air quality is discussed below.

3.3.1 Regulatory Setting

Air quality in the project area is regulated through the efforts of various federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, planning, policy making, education, and a variety of programs. The agencies responsible for improving air quality within the San Joaquin Valley Air Basin (SJVAB) are discussed below.

REGULATORY

Federal Plans, Regulations, and Laws

The U.S. Environmental Protection Agency (EPA) has been charged with implementing national air quality programs. EPA's air quality mandates draw primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments were made by Congress in 1990. EPA's air quality efforts address both criteria air pollutants and hazardous air pollutants (HAPs).

Criteria Air Pollutants

The CAA required EPA to establish national ambient air quality standards (NAAQS) for six common air pollutants found all over the U.S., referred to as criteria air pollutants. EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter with aerodynamic diameter of 10 micrometers or less (PM_{10}) and fine particulate matter with aerodynamic diameter of 2.5 micrometers or less ($PM_{2.5}$), and lead. Criteria air pollutants are compounds that, at certain concentrations, can cause harm to human and animal health and the environment. Extensive scientific and economic research has been conducted to evaluate the specific concentrations where these pollutants may cause harm to health and environment and are reflected in EPA's NAAQS, which are shown in Table 3.3-1. The primary standards protect public health and the secondary standards protect public welfare. The CAA also required each state to prepare a State Implementation Plan (SIP) for attaining and maintaining the NAAQS. The federal Clean Air Act Amendments of 1990 added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. EPA is responsible for reviewing all SIPs to determine whether they conform to the mandates of the CAA and its amendments, and whether implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, EPA may prepare a federal implementation plan that imposes additional control measures. If an approvable SIP is not submitted or implemented within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basin.

California's SIP is updated periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. The current SIP is a compilation of plans and regulations that govern how the region and state will comply with the CAA requirements to attain and maintain the NAAQS for ozone and $PM_{2.5}$.

Table 3.3-1 National and California Ambient Air Quality Standards

Pollutant	Averaging Time	California (CAAQS)[a,b]	National (NAAQS)[c]	
			Primary[b,d]	Secondary[b,e]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	–[e]	Same as primary standard
	8-hour	0.070 ppm (137 µg/m^3)	0.070 ppm (147 µg/m^3)	
Carbon monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	Same as primary standard
	8-hour	9 ppm[f] (10 mg/m^3)	9 ppm (10 mg/m^3)	
Nitrogen dioxide (NO_2)	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	53 ppb (100 µg/m^3)	Same as primary standard
	1-hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	—
Sulfur dioxide (SO_2)	24-hour	0.04 ppm (105 µg/m^3)	—	—
	3-hour	—	—	0.5 ppm (1300 µg/m^3)
	1-hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	—
Respirable particulate matter (PM_{10})	Annual arithmetic mean	20 µg/m^3	—	Same as primary standard
	24-hour	50 µg/m^3	150 µg/m^3	
Fine particulate matter ($PM_{2.5}$)	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3	15.0 µg/m^3
	24-hour	—	35 µg/m^3	Same as primary standard
Lead [f]	Calendar quarter	—	1.5 µg/m^3	Same as primary standard
	30-Day average	1.5 µg/m^3	—	—
	Rolling 3-Month Average	–	0.15 µg/m^3	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm (42 µg/m^3)	No national standards	
Sulfates	24-hour	25 µg/m^3		
Vinyl chloride [f]	24-hour	0.01 ppm (26 µg/m^3)		
Visibility-reducing particulate matter	8-hour	Extinction of 0.23 per km		

Notes: µg/m^3 = micrograms per cubic meter; km = kilometers; ppb = parts per billion; ppm = parts per million.

a California standards for ozone, carbon monoxide, SO_2 (1- and 24-hour), NO_2, particulate matter, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25 degrees Celsius (°C) and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

c National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic means) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. The $PM_{2.5}$ 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the U.S. Environmental Protection Agency for further clarification and current federal policies.

d National primary standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

e National secondary standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

f The California Air Resources Board has identified lead and vinyl chloride as toxic air contaminants with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

Source: CARB 2016.

The federal Corporate Average Fuel Economy (CAFE) standards determine the fuel efficiency of certain vehicle classes in the U.S. The National Highway Traffic Safety Administration (NHTSA) sets CAFE standards for passenger cars and for light trucks (collectively, light-duty vehicles), and separately sets fuel consumption standards for medium- and heavy-duty trucks and engines. With improved gas mileage, fewer gallons of transportation fuel would be combusted to travel the same distance, thereby reducing nationwide GHG emissions associated with vehicle travel. The most recent standards require an industry-wide fleet average of approximately 49 miles per gallon for passenger cars and light trucks in model year 2026, by increasing fuel efficiency by 8 percent annually for model years 2024 and 2025, and 10 percent annually for model year 2026.

EPA has established a number of emission standards for on- and off-road heavy-duty diesel engines used in trucks and other equipment. This was done in part because diesel engines are a significant source of oxides of nitrogen (NO_X), PM_{10}, and $PM_{2.5}$, and because the EPA has identified diesel particulate matter as a probable carcinogen. Implementation of the heavy-duty diesel on-road vehicle standards and the non-road diesel engine standards are estimated to reduce particulate matter and NO_X emissions from diesel engines up to 95 percent in 2030 when the heavy-duty vehicle fleet is completely replaced with newer heavy-duty vehicles that comply with these emission standards.

In concert with the diesel engine emission standards, EPA regulations have also substantially reduced the amount of sulfur allowed in diesel fuels. The sulfur contained in diesel fuel is a significant contributor to the formation of particulate matter in diesel-fueled engine exhaust. The new standards reduced the amount of sulfur allowed by 97 percent for highway diesel fuel (from 500 parts per million by weight [ppmw] to 15 ppmw), and by 99 percent for off-highway diesel fuel (from about 3,000 ppmw to 15 ppmw). The low sulfur highway fuel (15 ppmw sulfur), also called ultra-low sulfur diesel is currently required for use by all vehicles in the U.S. All the aforementioned federal diesel engine and diesel fuel requirements have been adopted by California, in some cases with modifications making the requirements more stringent or the implementation dates sooner.

Hazardous Air Pollutants and Toxic Air Contaminants

TACs, or in federal parlance, HAPs, are a defined set of airborne pollutants that may pose a present or potential hazard to human health. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

A wide range of sources, from industrial plants to motor vehicles, emit TACs. The health effects associated with TACs are quite diverse and generally are assessed locally, rather than regionally. TACs can cause long-term health effects such as cancer, birth defects, neurological damage, asthma, bronchitis, or genetic damage; or short-term acute effects such as eye watering, respiratory irritation (a cough), running nose, throat pain, and headaches.

For evaluation purposes, TACs are separated into carcinogens and non-carcinogens based on the nature of the physiological effects associated with exposure to the pollutant. Carcinogens are assumed to have no safe threshold below which health impacts would not occur. This contrasts with criteria air pollutants for which acceptable levels of exposure can be determined and for which the ambient standards have been established (Table 3.3-1). Cancer risk from TACs is expressed as excess cancer cases per one million exposed individuals, typically over a lifetime of exposure.

EPA regulates HAPs through its National Emission Standards for Hazardous Air Pollutants. The standards for a particular source category require the maximum degree of emission reduction that the EPA determines to be achievable, which is known as the Maximum Achievable Control Technology—MACT standards. These standards are authorized by Section 112 of the 1970 CAA and the regulations are published in 40 CFR Parts 61 and 63.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Air Resources Board

The California Air Resources Board (CARB) is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required CARB to establish CAAQS (see Table 3.3-1).

Criteria Air Pollutants

CARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned federally regulated criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard-setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to attain and maintain the CAAQS by the earliest date practical. The CCAA specifies that local air districts should focus particular attention on reducing the emissions from transportation and area-wide emission sources. The CCCA also provides air districts with the authority to regulate indirect sources, such as vehicle movement and residential, commercial, and industrial development.

Toxic Air Contaminants

TACs in California are regulated primarily through the Tanner Air Toxics Act (Assembly Bill [AB] 1807, Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act of 1987 (AB 2588, Chapter 1252, Statutes of 1987). AB 1807 sets forth a formal procedure for CARB to designate substances as TACs. Research, public participation, and scientific peer review are required before CARB can designate a substance as a TAC. To date, CARB has identified more than 21 TACs and adopted EPA's list of HAPs as TACs. Most recently, in 1998, particulate matter exhaust from diesel engines (diesel PM) was added to CARB's list of TACs.

After a TAC is identified, CARB then adopts an airborne toxics control measure for sources that emit that particular TAC. If a safe threshold exists for a substance at which there is no toxic effect, the control measure must reduce exposure below that threshold. If no safe threshold exists, the measure must incorporate best available control technology for toxics to minimize emissions.

The Hot Spots Act requires that existing facilities that emit toxic substances above a specified level prepare an inventory of toxic emissions, prepare a risk assessment if emissions are significant, notify the public of significant risk levels, and prepare and implement risk reduction measures.

CARB has adopted diesel exhaust control measures and more stringent emissions standards for various transportation-related mobile sources of emissions, including transit buses, and off-road diesel equipment (e.g., tractors, generators). Over time, the replacement of older vehicles will result in a vehicle fleet that produces substantially lower levels of TACs than under current conditions. Mobile-source emissions of TACs (e.g., benzene, 1-3-butadiene, diesel PM) have been reduced significantly over the last decade and will be reduced further in California through a progression of regulatory measures (e.g., Low Emission Vehicle/Clean Fuels and Phase II reformulated gasoline regulations) and control technologies. With implementation of CARB's Risk Reduction Plan and other regulatory programs, it is estimated that emissions of diesel PM will be less than half of those in 2010 by 2035. Adopted regulations are also expected to continue to reduce formaldehyde emissions emitted by cars and light-duty trucks. As emissions are reduced, it is expected that risks associated with exposure to the emissions will also be reduced.

LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

San Joaquin Valley Air Pollution Control District

Criteria Air Pollutants

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the primary agency responsible for meeting the NAAQS and CAAQS in the SJVAB. The SJVAB has been designated as nonattainment with respect to the NAAQS and CAAQS for ozone and $PM_{2.5}$ (Table 3.3-3) (CARB 2020, EPA 2022). SJVAPCD works with CARB and EPA to maintain the region's portion of the SIP for ozone and $PM_{2.5}$.

SJVAPCD also enforces air quality regulations, educates the public about air quality, and implements a number of programs to provide incentives for the replacement or retrofit of older diesel engines. SJVAPCD's air quality guidance also influences land use development in the SJVAB by providing decision makers with suggested goals, policies, and science pertaining to siting receptors to known or planned locations of stationary and/or mobile sources of air pollution.

SJVAPCD adopted its 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ NAAQS Standards ($PM_{2.5}$ Plan) on November 15, 2018. The $PM_{2.5}$ Plan utilizes extensive science and research, state of the art air quality modeling, and best available information to develop a strategy to attain the federal health-based 1997, 2006, and 2012 NAAQS (SJVAPCD 2018). Additionally, SJVAPCD adopted its 2016 Ozone Plan for 8-Hour Ozone NAAQS Standard (2016 Ozone Plan) in June 2016. The 2016 Ozone Plan provides a comprehensive strategy to reduce NO_X emissions, which combine with reactive organic gases (ROG) to form ground-level ozone, by 60 percent between 2012 and 2031 to assist SJVAPCD in attaining the 2008 8-hour ozone NAAQS (SJVAPCD 2016).

All projects are subject to adopted SJVAPCD rules and regulations in effect at the time of construction. Specific rules applicable to the project may include but are not limited to the following:

- **Regulation VIII—Fugitive Dust PM_{10} Prohibitions:** Rules 8011–8081 are designed to reduce PM_{10} emissions (predominantly dust and dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, and landfill operations. Compliance with Regulation VIII is mandatory and enforced through civil penalties, so compliance by the project proponent is assumed in this analysis. SJVAPCD is made aware of actions that violate their regulations and rules, such as Regulation VIII, and may investigate claims that, if found to be accurate, may incur financial penalties.
- **Rule 1177—Gasoline Dispensing Facility Tester Certification:** The purpose of this rule is to specify the requirements for persons electing to obtain certification as a Gasoline Dispensing Facility (GDF) Tester. The GDF Tester Certification Program has been established to provide GDF operators with a qualified pool of testers to properly conduct the gasoline vapor recovery performance tests required by District rules and/or Air Resources Board (ARB) executive orders.
- **Rule 2010—Permits Required:** This rule applies to anyone who plans to or does operate, construct, alter, or replace any source operation that may emit air contaminants or may reduce the emission of air contaminants. The proposed project would be subject to SJVAPCD permitting requirements for stationary sources such as boilers or back-up generators.
- **Rule 3180—Administration Fees for Indirect Source Review:** This rule serves to recover SJVAPCD's costs for administering the requirements of Rule 9510, Indirect Source Review (summarized below).
- **Rule 3135—Dust Control Plan Fee:** This rule requires applicants to submit a fee in addition to a dust control plan. The purpose of this fee is to recover SJVAPCD's cost for reviewing such plans and conducting compliance inspections.
- **Rule 4002—National Emissions Standards for Hazardous Air Pollutants**: This rule applies to all stationary sources of HAPs and requires them to comply with the standards, criteria, and requirements set forth therein.
- **Rule 4101—Visible Emissions:** This rule prohibits emissions of visible air contaminants to the atmosphere and applies to any source operation that emits or may emit air contaminants.
- **Rule 4102—Nuisance:** This rule applies to any source operation that emits or may emit air contaminants or other materials. If such emissions create a public nuisance, the owner/operator could be in violation and be subject to enforcement action by SJVAPCD.
- **Rule 4601—Architectural Coatings:** This rule limits ROG from architectural coatings by specifying storage, cleanup, and labeling requirements for architectural coatings. This rule also establishes ROG limits for various architectural coating types.
- **Rule 4622—Gasoline Transfer Into Motor Vehicle Fuel Tanks:** The purpose of this rule is to limit emissions of gasoline vapors from the transfer of gasoline into motor vehicle fuel tanks. This rule applies to any gasoline storage and dispensing operation or mobile fueler from which gasoline is transferred into motor vehicle fuel tanks.
- **Rule 4641—Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations:** This rule applies to the manufacture and use of certain asphalt types for paving and maintenance operations.

- **Rule 9510—Indirect Source Review:** Also known as the Indirect Source Rule (ISR), this rule is intended to reduce or mitigate emissions of NO_X and PM_{10} from the construction- and operation-related emissions of new land use development in the SJVAPCD. This rule requires specific percentage reductions in estimated on-site construction and operation emissions, and/or payment of a prescribed off-site mitigation fee for required reductions that cannot be met on the project site. Construction emissions of NO_X and PM_{10} exhaust must be reduced by 20 percent and 45 percent, respectively. Operational emissions of NO_X and PM_{10} must be reduced by 33.3 percent and 50 percent, respectively. The rule applies to residential developments of 50 units or more, and commercial development projects of 2,000 square feet and larger, so the proposed development would be subject to the ISR. The provisions of Rule 9510 are described in more detail in the analysis of environmental impacts and mitigation measures.

SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts* (GAMAQI) is an advisory document that provides lead agencies, consultants, and project applicants with analysis guidance and uniform procedures for addressing air quality in environmental documents. The GAMAQI describes the criteria that the SJVAPCD uses when reviewing and commenting on the adequacy of environmental documents. It recommends thresholds for determining whether projects would have significant adverse environmental impacts, identifies methods for predicting project emissions and impacts, and identifies measures that can be used to avoid or reduce air quality impacts. If modeled construction- or operation-related emissions for a project exceed SJVAPCD's mass emission thresholds for criteria air pollutants and precursors, then SJVAPCD recommends implementing mitigation to reduce these emissions. SJVAPCD's mass emission thresholds are presented in Section 3.3.3, "Environmental Impacts and Mitigation Measures."

SJVAPCD states in its GAMAQI that "[d]esign elements, mitigation measures, and compliance with District rules and regulations may not be sufficient to reduce project-related impacts on air quality to a less than significant level. In such situations, project proponents may enter into a Voluntary Emission Reduction Agreement (VERA) with the District to reduce the project related impact on air quality to a less than significant level" (SJVAPCD 2015a: 116). SJVAPCD directs project applicants to reduce project-level emissions to the best extent, then allows project applicants to engage in regional programs or a VERA to further reduce emissions to a less-than-significant level.

Typically, air districts develop thresholds of significance for CEQA evaluation (summarized below) in consideration of maintaining or achieving attainment under the NAAQS and CAAQS for the geographical area they oversee (long-term regional air quality planning). These thresholds are often tied to the SIP of an air district in nonattainment for criteria air pollutants within a cumulative context. The associated air quality plans are submitted to CARB and contain an inventory of existing ambient air pollutant concentrations and, if applicable, a suite of measures to reduce air pollution along with a projected date of achieving attainment under the NAAQS and CAAQS. Air quality plans identify a budget that accounts for new, future sources of pollution from land use development and stationary sources. These budgets inform the development of CEQA thresholds of significance; "projects with emissions below the thresholds of significance for criteria pollutants would be determined to 'not conflict or obstruct implementation of [SJVAPCD's] air quality plan'" (SJVAPCD 2015a: 65).

As discussed previously, the NAAQS and CAAQS represent concentrations of criteria air pollutants protective of human health and are substantiated by extensive scientific evidence. CARB states that ambient air quality standards "are established to protect even the most sensitive individuals in our communities. An air quality standard defines the maximum amount of a pollutant that can be present in outdoor air without harm to the public's health" (CARB 2022a). As stated previously, SJVAPCD, like other air districts in California and within the U.S., are tasked with producing local air quality plans to attain the NAAQS and CAAQS by an eventual date. These plans include mass emissions inventories coupled with control measures that achieve necessary reductions in certain criteria pollutants and precursors to meet the concentration-based NAAQS and CAAQS. In developing CEQA thresholds of significance, SJVAPCD has developed quantitative, project-level thresholds based on anticipated levels of growth in the SJVAB in consideration of existing sources of air pollution and a future attainment date. These thresholds of significance are intended to optimize emission elimination of proposed projects while requiring a level of mitigation that is realistic and achievable. Thus, projects that demonstrate levels of construction and/or operational emissions below these thresholds would be consistent with long-term regional planning efforts in the SJVAB to attain the NAAQS and CAAQS and, therefore, avoid subjecting residents of the region to harmful concentrations of criteria air pollutants. Consequently, such projects would not result in emissions that would conflict with an area achieving future attainment status under the NAAQS and CAAQS as outlined by an applicable air quality plan.

Similarly, projects that demonstrate emissions levels in exceedance of an applicable threshold could contribute to the continued nonattainment designation of a region or potentially degrade a region from attainment to nonattainment, resulting in acute or chronic respiratory and cardiovascular illness associated with exposure to concentrations of criteria air pollutants above what EPA and CARB consider safe. Symptoms can include coughing, difficulty breathing, chest pain, eye and throat irritation and, in extreme cases, death caused by exacerbation of existing respiratory and cardiovascular disease, cancer, and impaired immune and lung function. However, the exact location and magnitude of specific health impacts that could occur as a result of an individual project's construction or operational emissions of primary and secondary pollutants are difficult to model with any degree of reliability for several reasons. Below includes a discussion of the types of modeling that may be used to estimate dispersion of pollutants, their inputs and scientific limitations, and use in estimating health impacts.

The most common approach to determining the fate and transport of directly emitted criteria air pollutants is through dispersion modeling.

Dispersion modeling is best suited for primary criteria air pollutants, such a CO, PM_{10} and $PM_{2.5}$, which are directly emitted into the atmosphere and, at certain concentrations, cause adverse health and environmental impacts. Other pollutants of concern are identified as secondary pollutants, which are emitted as one compound, which then combines with other pollutants, to form criteria air pollution. To follow these secondary pollutants into the ambient atmosphere, use of a photochemical model is required.

The secondary pollutants of concern for this analysis are ROG, NO_X, and oxides of sulfur (SO_X), which combine in the atmosphere to form ground-level ozone and secondary PM. Photochemical modeling of these secondary pollutants is a more difficult exercise than the modeling of primary pollutants for the following reasons. With respect to the formation of ground-level ozone from the oxidation (i.e., combination) of ROG and NO_X in the presence of sunlight, rates of ozone formation are a function of a variety of complex physical factors, including topography, building influences on air flow (e.g., downwash), ROG and NO_X concentration ratios, multiple meteorological conditions, and sunlight exposure (Seinfeld and Pandis 1996:298). For example, rates of ozone formation are highest in elevated temperatures and when the ratio of ROG to NO_X is 5.5:1. When temperatures are lower and this ratio shifts, rates of ozone formation are stunted (Seinfeld and Pandis 1996:299–300). In addition, ROG emissions are composed of many compounds that have different levels of reactivity leading to ozone formation. Methane, for instance, is the most common ROG compound, yet it has one of the lowest reactivity potentials (Seinfeld and Pandis 1996:309, 312).

Moreover, as confirmed by epidemiological studies reviewed and confirmed by EPA and CARB, some groups may develop more severe health impacts than others. For instance, infants, children, the elderly, and individuals with preexisting medical conditions are more susceptible to developing illnesses from exposure to air pollutants. Additionally, environmental conditions (e.g., exposure to secondhand smoke), lifestyle choices (e.g., diet, exercise, use of drugs or tobacco products), and presence of a health condition (e.g., cancer, chronic illness) that may affect an individual's existing health is privileged information unknown to an air quality expert, regulator, lead agency, or any other person using photochemical models. Air dispersion and photochemical modeling cannot account for the locations of these individuals on a regional basis, and, therefore, the degree to which an individual may respond to certain concentrations of criteria air pollutants (e.g., the development of lifelong chronic conditions such as asthma or the exacerbation of an existing respiratory or cardiovascular condition) cannot be meaningful predicted. As explained in greater detail in Section 3.3.3, "Environmental Impacts and Mitigation Measures," the best modeling tools available use regional and national health data to quantify potential health effects; however, these results are not specific to any one location and cannot account for nuances in health data that are unknown.

A recent court decision, known as the Friant Ranch Decision, shaped the way in which air quality impacts are analyzed in EIRs (*Sierra Club v. County of Fresno)*. During the litigation process that led to the Friant Ranch Decision, SJVAPCD submitted an amicus curiae brief in support of Fresno County and Friant Ranch LP (the parties that ultimately did not prevail in the Friant Ranch Decision). In that brief, SJVAPCD provided scientific context and expert opinion regarding the feasibility of performing regional dispersion and photochemical modeling for ozone from one specific project. SJVAPCD described the challenges of trying to correlate pollutants in the atmosphere and cited several variables as to how and where pollutants would ultimately settle and the connection to actual health effects that would be realized in any one specific location from the generation of such pollutants. Such modeling, that could reasonably link secondary

pollution formation to specific health effects in a meaningful context from one project *alone* was not readily available (in 2009) for use by lead agencies. Notably, given improvements in scientific methodologies and modeling techniques, such modeling could be performed now using regional modeling tools such as EPA's Comprehensive Air Quality Model with Extensions and BenMap-CE; however, the degree of accuracy in applying models designed to trace the secondary formation of criteria air pollutants on a regional scale to project-level analysis is highly questionable given that compounding variables (e.g., temperature, sunlight, cumulative sources of air pollution, meteorological conditions) affect the accuracy of tracking the transport of these pollutants. This concern led SJVAPCD to state that "CEQA does not require an EIR to correlate a project's air quality emissions to specific health impacts, because such an analysis is not reasonably feasible." As SJVAPCD explains (SJVAPCD 2015b [footnotes omitted]):

> Attainment of a particular NAAQS occurs when the concentration of the relevant pollutant remains below a set threshold on a consistent basis throughout a particular region. For example, the San Joaquin Valley attained the 1-hour ozone NAAQS when ozone concentrations remained at or below 0.124 parts per million Valley-wide on 3 or fewer days over a 3-year period. Because the NAAQS are focused on achieving a particular concentration of pollution region-wide, the Air District's tools and plans for attaining the NAAQS are regional in nature.
>
> For instance, the computer models used to simulate and predict an attainment date for the ozone or particulate matter NAAQS in the San Joaquin Valley are based on regional inputs, such as regional inventories of precursor pollutants (NO_X, SO_X and [ROG]) and the atmospheric chemistry and meteorology of the Valley. At a very basic level, the models simulate future ozone or PM levels based on predicted changes in precursor emissions Valley wide. Because the NAAQS are set levels necessary to protect human health, the closer a region is to attaining a particular NAAQS, the lower the human health impact is from that pollutant.
>
> The goal of these modeling exercises is not to determine whether the emissions generated by a particular factory or development project will affect the date that the Valley attains the NAAQS. Rather, the Air District's modeling and planning strategy is regional in nature and based on the extent to which all of the emission-generating sources in the Valley (current and future) must be controlled in order to reach attainment.
>
> Accordingly, the Air District has based its thresholds of significance for CEQA purposes on the levels that scientific and factual data demonstrate that the [SJVAB] can accommodate without affecting the attainment date for the NAAQS. The Air District has tied its CEQA significance thresholds to the level at which stationary pollution sources must "offset" their emissions…. Thus the CEQA air quality analysis for criteria air pollutants is not really a localized, project-level impact analysis but one of regional cumulative impacts.

The brief explains that these CEQA thresholds of significance are not intended to be applied such that any localized human health impact associated with a project's emissions could be identified. Rather, CEQA thresholds of significance are used to determine whether a project's emissions would obstruct a region's capability of attaining the NAAQS and CAAQS according to the emissions inventory prepared in a SIP, which is then submitted and reviewed by CARB and EPA. This sentiment is corroborated in an additional brief submitted to the California Supreme Court by the South Coast Air Quality Management District (SCAQMD 2015).

Note that this section aligns with the sentiments of these *amicus curiae* briefs and does not perform dispersion or photochemical modeling to numerically correlate the project's emissions to potential human health impacts. Rather, the following analysis follows SJVAPCD's guidance in evaluating the project's emissions against SJVAPCD's thresholds of significance and provides a qualitative correlation between the project's emissions and resulting health impact. SJVAPCD has not developed its own model(s) for project-level evaluation of resulting concentrations of ozone precursors within the SJVAB that link emissions of an individual project to changes in health of individuals.

Toxic Air Contaminants

At the local level, air districts may adopt and enforce CARB control measures. Under SJVAPCD Rule 2010 ("Permits Required") and Rule 2201 ("New and Modified Stationary Source Review"), all sources that possess the potential to emit TACs are required to obtain permits from SJVAPCD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including New Source Review standards and air

toxics control measures (e.g., CARB's Hots Spots Program). SJVAPCD limits emissions and public exposure to TACs through multiple programs. SJVAPCD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors. Sensitive receptors are people or facilities that generally house people (e.g., residences, schools, hospitals), that may experience adverse effects from unhealthful concentrations of air pollutants. SJVAPCD's *District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document*, *Framework for Performing Health Risk Assessments*, and *Draft Guidance for Air Dispersion Modeling* are tools that may be utilized by experts to assess potential health effects at locations of sensitive receptors from the construction and operation of projects emitting TACs (SJVAPCD 2015c and 2018).

City of Fresno General Plan

The following existing City of Fresno General Plan Policies have been adopted to protect air quality:

- **Policy RC-4-a: Support Regional Efforts.** Support and lead, where appropriate, regional, State and federal programs and actions for the improvement of air quality, especially the SJVAPCD's efforts to monitor and control air pollutants from both stationary and mobile sources and implement Reasonably Available Control Measures in the Ozone Attainment Plan.
- **Policy RC-4-b: Conditions of Approval.** Develop and incorporate air quality maintenance requirements, compatible with Air Quality Attainment and Maintenance Plans, as conditions of approval for General Plan amendments, community plans, Specific Plans, neighborhood plans, Concept Plans, and development proposals.
- **Policy RC-4-c: Evaluate Impacts with Models.** Continue to require the use of computer models used by SJVAPCD to evaluate the air quality impacts of plans and projects that require such environmental review by the City.
- **Policy RC-4-d: Forward Information.** Forward information regarding proposed General Plan amendments, community plans, Specific Plans, neighborhood plans, Concept Plans, and development proposals that require air quality evaluation, and amendments to development regulations to the SJVAPCD for their review of potential air quality and health impacts.
- **Policy RC-4-k: Electric Vehicle Charging.** Develop standards to facilitate electric vehicle charging infrastructure in both new and existing public and private buildings, in order to accommodate these vehicles as the technology becomes more widespread.

3.3.2 Environmental Setting

METEROLOGY/TOPOGRAPHY/CLIMATE

The project site is within the city of Fresno and the SJVAB. Ambient concentrations of air pollutants are determined by the levels of emissions released by pollutant sources and the ability of the atmosphere to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight.

The SJVAB is the southern half of California's Central Valley and is approximately 250 miles long and averages 35 miles wide. The SJVAB is bordered by the Sierra Nevada in the east, the Coast Ranges in the west, and the Tehachapi mountains in the south. There is a slight downward elevation gradient from Bakersfield in the southeast end (elevation 408 feet) to sea level at the northwest end where the valley opens to the San Francisco Bay at the Carquinez Straits. The bowl-shaped topography inhibits movement of pollutants out of the SJVAB.

The SJVAB is in a Mediterranean Climate Zone and is influenced by a subtropical high-pressure cell most of the year generated by the Pacific Ocean that influences the amount of rain that is deposited, the characteristics of temperature, and the deposition/collection of air pollution in the SJVAB. Rainfall is sparse and occurs mainly in winter. Summers are hot and dry. Summertime maximum temperatures often exceed 100 degrees Fahrenheit (°F).

The subtropical high-pressure cell is strongest during spring, summer and fall and produces subsiding air, which can result in temperature inversions, or a reversal of the normal behavior of temperature in the troposphere that results in a layer of cool air at the surface is overlaid by a layer of warmer air, in the SJVAB. A temperature inversion can act like a lid, inhibiting vertical mixing of the air mass at the surface. Any emissions of pollutants can be trapped below the inversion. Most of the surrounding mountains are above the normal height of summer inversions (1,500–3,000 feet). These mountains can function as a physical barrier to trap emissions of regional pollutants in the SJVAB leading to degraded, stagnant air quality.

Winter-time high pressure events can often last many weeks with surface temperatures often lowering to 30–40°F. During these events, fog can be present, and inversions are extremely strong. These wintertime inversions can inhibit vertical mixing of pollutants to a few hundred feet.

Solar radiation and temperature are particularly important in the chemistry of photochemical smog (ozone) formation. The SJVAB averages over 260 sunny days per year. Photochemical air pollution (primarily ozone) is produced by the atmospheric reaction of organic substances (such as ROG and NO_X) under the influence of sunlight (SJVAPCD 2015a).

The local meteorology of the project site and surrounding area is represented by measurements recorded at the Western Regional Climate Center Friant Government CP Station. The average annual precipitation from a 1912 to 2016 period is approximately 14.3 inches. Average January temperatures range from a normal minimum of 36.7°F to a normal maximum of 55.4°F. July temperatures range from a normal minimum of 61.0°F to a normal maximum of 100.3°F (WRCC 2016). The prevailing wind direction is from the northwest (WRCC 2002).

EXISTING AMBIENT AIR QUALITY

Criteria Air Pollutants

Concentrations of criteria air pollutants are used to indicate the quality of the ambient air. A description of key criteria air pollutants in the SJVAB and their potential impacts on human health is provided below. Emission source types and health effects are summarized in Table 3.3-2. Fresno County's attainment status for the CAAQS and the NAAQS are shown in Table 3.3-3.

Table 3.3-2 Sources and Health Effects of Criteria Air Pollutants

Pollutant	Sources	Acute[1] Health Effects	Chronic[2] Health Effects
Ozone	Secondary pollutant resulting from reaction of ROG and NO_X in presence of sunlight. ROG emissions result from incomplete combustion and evaporation of chemical solvents and fuels; NO_X results from the combustion of fuels	increased respiration and pulmonary resistance; cough, pain, shortness of breath, lung inflammation	permeability of respiratory epithelia, possibility of permanent lung impairment
Carbon monoxide (CO)	Incomplete combustion of fuels; motor vehicle exhaust	headache, dizziness, fatigue, nausea, vomiting, death	permanent heart and brain damage
Nitrogen dioxide (NO_2)	combustion devices; e.g., boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines	coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis or pulmonary edema; breathing abnormalities, cough, cyanosis, chest pain, rapid heartbeat, death	chronic bronchitis, decreased lung function
Sulfur dioxide (SO_2)	coal and oil combustion, steel mills, refineries, and pulp and paper mills	Irritation of upper respiratory tract, increased asthma symptoms	Insufficient evidence linking SO_2 exposure to chronic health impacts
Respirable particulate matter (PM_{10}), Fine particulate matter ($PM_{2.5}$)	fugitive dust, soot, smoke, mobile and stationary sources, construction, fires and natural windblown dust, and formation in the atmosphere by condensation and/or transformation of SO_2 and ROG	breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, premature death	alterations to the immune system, carcinogenesis
Lead	metal processing	reproductive/ developmental effects (fetuses and children)	numerous effects including neurological, endocrine, and cardiovascular effects

Notes: NO_X = oxides of nitrogen; ROG = reactive organic gases.

[1] Acute health effects refer to immediate illnesses caused by short-term exposures to criteria air pollutants at fairly high concentrations. An example of an acute health effect includes fatality resulting from short-term exposure to carbon monoxide levels in excess of 1,200 parts per million.

[2] Chronic health effects refer to cumulative effects of long-term exposures to criteria air pollutants, usually at lower, ambient concentrations. An example of a chronic health effect includes the development of cancer from prolonged exposure to particulate matter at concentrations above the national ambient air quality standards.

Source: CARB 2022a.

Table 3.3-3 Attainment Status Designations for Fresno County

Pollutant	National Ambient Air Quality Standard	California Ambient Air Quality Standard
Ozone	—	Nonattainment (1-hour) Classification-Serious[1]
	Nonattainment (8-hour)[2] Classification=Extreme	Nonattainment (8-hour)
Respirable particulate matter (PM_{10})	Attainment (24-hour)	Nonattainment (24-hour)
	—	Nonattainment (Annual)
Fine particulate matter ($PM_{2.5}$)	Nonattainment (24-hour)	—
	Nonattainment (Annual)	Nonattainment (Annual)
Carbon monoxide (CO)	Unclassified/Attainment (1-hour)	Attainment (1-hour)
	Unclassified/Attainment (8-hour)	Attainment (8-hour)
Nitrogen dioxide (NO_2)	Unclassified/Attainment (1-hour)	Attainment (1-hour)
	Unclassified/Attainment (Annual)	Attainment (Annual)
Sulfur dioxide (SO_2)[5]	Unclassified/Attainment (1-Hour)	Attainment (1-hour)
		Attainment (24-hour)
Lead (Particulate)	Attainment (3-month rolling avg.)	Attainment (30-day average)
Hydrogen Sulfide	No Federal Standard	Unclassified (1-hour)
Sulfates		Attainment (24-hour)
Visibly Reducing Particles		Unclassified (8-hour)
Vinyl Chloride		Unclassified (24-hour)

[1] Per Health and Safety Code (HSC) § 40921.5(c), the classification is based on 1989 – 1991 data, and therefore does not change.

[2] 2015 Standard.

Sources: CARB 2020, EPA 2022.

Ozone

Ozone is a photochemical oxidant (a substance whose oxygen combines chemically with another substance in the presence of sunlight) and the primary component of smog. Ozone is not directly emitted into the air but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that result from the combustion of fuels. As discussed in greater detail above under the heading, "San Joaquin Valley Air Pollution Control District," in Section 3.3.1, "Regulatory Setting," the formation of ozone from the oxidation of ROG and NO_X is a complex interaction and is reliant on various functions and conditions.

Acute health effects of ozone exposure include increased respiratory and pulmonary resistance, cough, pain, shortness of breath, and lung inflammation. Chronic health effects include restriction of lung function and possibility of permanent lung impairment (EPA 2018). Emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. Emissions of ROG and NO_X decreased from 2000 to 2010 and are projected to continue decreasing from 2010 to 2035 (CARB 2013).

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide, which reacts through oxidation in the atmosphere to form NO_2. The term NO_X is used to represent the combined emissions of seven compounds. The combined emissions are reported as equivalent NO_2, which are regulated by EPA and CARB through the CAA and CCAA. Because NO_2 is formed and

depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local sources of NO_X emissions (EPA 2012).

Acute health effects of exposure to NO_X includes coughing, difficulty breathing, vomiting, headache, eye irritation, chemical pneumonitis, or pulmonary edema, breathing abnormalities, cyanosis, chest pain, rapid heartbeat, and death. Chronic health effects include chronic bronchitis and decreased lung function (CARB 2022a).

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by reaction of gaseous precursors (CARB 2013). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less. PM_{10} emissions in the SJVAB are dominated by emissions from area sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, farming operations, construction and demolition, and particles from residential fuel combustion. Direct emissions of PM_{10} are projected to remain relatively constant through 2035. Emissions of $PM_{2.5}$ in the SJVAB are dominated by the same sources as emissions of PM_{10} (CARB 2013). Additionally, emissions of ambient $PM_{2.5}$ are heavily influenced from secondary source emissions such as nitrates, sulfates, and organic compounds from combustion processes including biomass burning, soil and road dust, livestock operations, and use of aerosols (Behera and Sharma 2010). While primary $PM_{2.5}$ is from direct emissions, secondary $PM_{2.5}$ is formed in the atmosphere through photochemical reactions, condensation, and other atmospheric processes.

A number of adverse health impacts have been associated with exposure to both $PM_{2.5}$ and PM_{10} (CARB 2022a). Short-term exposures to PM_{10} have been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits. For $PM_{2.5}$, short-term exposures (up to 24 hours in duration) have been associated with premature mortality, increased hospital admissions for heart or lung cases, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days. These adverse health effects have been reported primarily in infants, children, and older adults with preexisting heart or lung diseases. In addition, of all the common air pollutants, $PM_{2.5}$ is associated with the greatest proportion of adverse health effects related to air pollution, both in the U.S. and worldwide. Long-term (months to years) exposure to $PM_{2.5}$ has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children.

Carbon Monoxide

CO is an odorless, colorless gas formed by the incomplete combustion of fuels. CO is a product of motor vehicle exhaust, which comprises the majority of ambient CO concentrations. High concentrations of CO generally occur in areas with heavy traffic congestion. Other sources of CO emissions include industrial processes such as carbon black manufacturing, non-transportation related fuel combustion, and natural sources such as wildfires. CO can cause harmful health effects by reducing oxygen delivery to the body's organs (including the heart and brain) and tissues. For people with heart disease, short-term exposure to CO can further affect their body's capacity to respond to the increased oxygen demands of exercise or exertion. CO can also be deadly in indoor environments and closed spaces.

Sulfur Dioxide

Sulfur Dioxide (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits placed on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

Lead

Lead (Pb) in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline, the manufacturing of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead. Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95 percent. With the phase-out of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emission sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth.

Monitoring Station Data and Attainment Designations

Criteria air pollutant concentrations are measured at several monitoring stations in the SJVAB. The Table Mountain station is the station closest to and most representative of the project area with recent data for ozone. Because no PM_{10} and $PM_{2.5}$ concentrations are collected at the Table Mountain station, measured concentrations from the next closest station, the Clovis-N Villa Avenue station, was used. Table 3.3-4 summarizes the air quality data from a recent 3-year period (2018–2020).

Both CARB and EPA use this type of monitoring data to designate areas according to their attainment status for criteria air pollutants (attainment designations are summarized above in Table 3.3-2). As shown in Table 3.3-4, measured emissions of PM_{10} and $PM_{2.5}$ in 2020 were elevated due to wildfire activity in southern and central California.

Table 3.3-4 Summary of Annual Data on Ambient Air Quality (2018-2020)[1]

	2018	2019	2020
Ozone			
Maximum concentration (1-hour/8-hr avg, 0.09 ppm/0.070 ppm)[2]	*	*	0.096/0.085
Number of days state/national standard exceeded (8-hr avg, 0.070 ppm)	*	*	5
Number of days national standard exceeded (1-hr, 0.09 ppm)	*	*	2
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (24-hour 12 µg/m^3)	82.3	39.1	193.7
Number of days national standard exceeded (24-hour measured 12 µg/m^3)[2]	25	1	40
Respirable Particulate Matter (PM_{10})			
Maximum concentration (24-hour 50 µg/m^3)	118.6	155.7	296.0
Number of days state standard exceeded (24-hour 50 µg/m^3)	14	11	114
Number of days national standard exceeded (24-hour 150 µg/m^3)	0	0	1

Notes: µg/m^3 = micrograms per cubic meter; ppm = parts per million.

[1] Measurements from the Table Mountain station for ozone. Measurement for respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) were taken from the Clovis-N Villa Avenue station.

[2] The 2015 8-hour ozone NAAQS matches the 8-hour ozone CAAQS.

Source: CARB 2022b.

Toxic Air Contaminants

According to the *California Almanac of Emissions and Air Quality* (CARB 2013), the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being diesel PM. Diesel PM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emissions control

system is being used. Unlike the other TACs, no ambient monitoring data are available for diesel PM because no routine measurement method currently exists. However, CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. These estimates can be used as a surrogate for diesel PM where information specific to diesel PM is limited due to its highly dispersive character. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

Diesel PM poses the greatest health risk among these 10 TACs mentioned. Overall, levels of most TACs, except para-dichlorobenzene and formaldehyde, have decreased since 1990 (CARB 2013).

Existing sources of TACs in the project area include gasoline vapors such as benzene, toluene, and methyl tertiary-butyl ether from operation of the Valero gas station to the south of the project site. Also, diesel PM emissions are produced from vehicle trips on West Herndon Avenue and North Riverside Drive.

Sensitive Receptors

Sensitive receptors include those land uses where exposure to pollutants could result in health-related risks to sensitive individuals, such as children or the elderly. Residential dwellings, schools, hospitals, playgrounds, and similar facilities are of primary concern because of the presence of people particularly sensitive to pollutants and/or the potential for increased and prolonged exposure to pollutants. The project site is in a mixed-use area with commercial development to the south, the Riverside Golf Course to the north, residences to the east and west of the project site, and the Rio Vista Middle School and River Bluff Elementary School to the southeast.

The nearest sensitive receptors include a neighborhood of single-family residences located west of the project site, the closest of which is approximately 90 feet from the project site boundary on the opposite side of North Riverside Drive. Rio Vista Middle School and River Bluff Elementary School are located approximately 850 feet and 1,230 feet south of the project site boundary, respectively.

Odors

Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

With respect to odors, the human nose is the sole sensing device. The ability to detect odors varies considerably among the population and overall is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity but may have sensitivities to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person may be perfectly acceptable to another (e.g., fast food restaurant). It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition only occurs with an alteration in the intensity. Odor sources of concern include wastewater treatment plants, sanitary landfills, composting facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting operations, rendering plants, and food packaging plants. None of these odorous land uses are within proximity to the project site.

3.3.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

The following resources were used for this analysis:

- the California Emissions Estimator Model (CalEEMod) 2020.4.0 Computer Program (CAPCOA 2021),
- SJVAPCD's GAMAQI (SJVAPCD 2015a), and
- the 2022 Air Quality Technical Report (Ramboll 2022) (included as Appendix C to this EIR).

Criteria Air Pollutants

SJVAPCD has established thresholds for determining environmental significance of air pollutant emissions. These thresholds distinguish between a project's short-term emissions from its long-term emissions. The short-term emissions are related to the construction phase of a project, which are recognized to be short in duration. The long-term emissions are related to the activities that will occur on an ongoing basis as a result of project operations.

Impacts are evaluated both on the basis of CEQA Guidelines Appendix G questions and SJVAPCD significance criteria. The impacts evaluated are those involving construction, operational emissions of criteria pollutants [i.e., ROG and NO_X, CO, SO_2, PM_{10}, and $PM_{2.5}$], and cumulative air quality impacts. Because the area is nonattainment for ozone, PM_{10}, and $PM_{2.5}$, a major criterion for review is whether the project would result in a net increase of pollutants impacting ozone precursor pollutants, PM_{10}, and $PM_{2.5}$.

Modeling was based on project-specific information (e.g., size, area to be graded, area to be paved) where available; reasonable assumptions based on typical construction activities; and default values in CalEEMod that are based on the project's location and land use types. Based on scheduling information provided by the project applicant, this analysis assumes that construction would commence in May 2023 and end in November 2023. Construction equipment mix assumptions were based on project-specific data. The CalEEMod mitigation module was used to account for Rule 8011 of Regulation VIII to reduce fugitive dust emissions. The modeling prepared for the project also assumes that all construction equipment over 50 horsepower would be held to EPA's Tier 3 engine standards.

Operational emissions were estimated for sources permitted by the air district (e.g., stationary sources like the project's gas station) and those that the air district does not directly regulate (e.g., mobile sources), which are referred to as "non-permitted" sources.

The project's emissions from the permitted gas station were based on anticipated throughput. Emissions from area sources were estimated using CalEEMod defaults. Energy-related emissions were estimated assuming that the project would be constructed to meet the 2022 California Energy Code requirements. Mobile-source emissions were calculated using project-specific VMT data and anticipated use of transportation refrigeration units accessing the project's loading dock. Mobile source emissions were estimated using project-specific VMT information from the TIA prepared for the project and accounts for: the movement of existing member VMT from the existing Costco warehouse at 4500 West Shaw Avenue to the project site, the increase in VMT from the project associated with expanded operations as compared to the existing Costco, and the assumed reuse of the Shaw Avenue facility with a new retail use.

In addition, a portion of warehouse delivery trucks will be equipped with transportation refrigeration units (TRUs), which result in emissions when the warehouse delivery truck is docked at the site. Emissions associated with these TRUs were calculated as mobile source emissions using the trip rates and trip length information.

See Appendix C for more details regarding modeling assumptions.

Toxic Air Contaminants

An HRA was prepared to quantify and evaluate TAC impacts from construction and operational activities. Construction activities accounted for the volume of diesel particulate matter (diesel PM) generated during the project's construction period. Operational impacts were estimated from project-generated traffic, operation of diesel generators, gasoline and diesel transfer and dispensing, and delivery trucks. The HRA was completed by referencing the SJVAPCD *Update to*

District's Risk Management Policy to Address OEHHA's Revised Risk Assessment Guidance Document, the SJVAPCD *Framework for Performing Health Risk Assessments*, the SJVAPCD *Draft Guidance for Air Dispersion Modeling,* and the Office of Environmental Health Hazard Assessment *Risk Assessment Guidelines* (SJVAPCD 2015c, SJVAPCD 2018, and OEHHA 2015). Specific model assumptions and inputs for these calculations can be found in Appendix C.

Carbon Monoxide

CO impacts are evaluated using SJVAPCD's preliminary screening tool. Based on the CO Protocol Analysis developed by the California Department of Transportation (Caltrans), and due to the fact that increased CO concentrations are usually associated with roadways that are congested and with heavy traffic volume, the SJVAPCD has established that preliminary screening can be used to determine with fair certainty that the effect a project has on any given intersection would not result in a CO hotspot. Therefore, SJVAPCD has established that if neither of the following criteria are met at all intersections affected by the developmental project, the project will result in no potential to create a violation of the CO standard:

- A traffic study for the project indicates that the Level of Service (LOS) on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F; or
- A traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at more or more intersections in the project vicinity.

If either of the above criteria can be associated with any intersection affected by the project, the applicant/consultant would need to conduct a CO analysis to determine a project's significance.

Additionally, concentrations of CO were evaluated using the City of Fresno's General Plan and Development Code Update which determines that a CO hotspot would not occur for roadway intersections that support less than 36,000 peak hour trips. This value was determined by a sensitivity analysis conducted for the General Plan using the CALINE4 CO Hotspot model, which found that intersections that supported this level of trips would result in hourly concentrations of 7.5 ppm and an 8-hour concentration of 6.0, which is well below the NAAQS and CAAQS for CO.

THRESHOLDS OF SIGNIFICANCE

In its March 2015 GAMAQI, SJVAPCD provides evidence to support the development and applicability of its thresholds of significance for project-generated emissions of criteria air pollutants and precursors, which may be used at the discretion of a lead agency overseeing the environmental review of projects located within the SJVAB. As stated in the GAMAQI, "a Lead Agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the Lead Agency to adopt such thresholds is supported by substantial evidence" (SJVAPCD 2015a: 63-64). CEQA-related air quality thresholds of significance are tied to long-term air quality planning, which focuses on achieving or maintaining attainment designations with respect to the NAAQS and CAAQS for criteria air pollutants, which are scientifically substantiated, numerical concentrations considered to be protective of human health.

These numerical thresholds for construction- and operation-related emissions of criteria air pollutants and precursors would determine whether a project's discrete emissions would result in a regional contribution (i.e., significant) to the baseline nonattainment status of SJVAPCD. In developing thresholds of significance for individual project emissions, SJVAPCD analyzed emissions values against the SJVAPCD's offset thresholds to ozone precursors, which, when applied, prevent further deterioration of ambient air quality in the SJVAB. Thresholds for PM_{10} and $PM_{2.5}$ were adopted from the SJVAPCD's PM_{10} New Source Review (NSR) offset thresholds for stationary sources, which represent the greatest component of SJVACPD's long-term regional air quality planning (SJVAPCD 2015a: 82). Using these parameters, SJVAPCD developed quantitative thresholds of significance for project-level CEQA evaluation that may be used to determine the extent to which a project's emissions of criteria air pollutants and precursors would contribute to the regional degradation of ambient air quality within the SJVAB. According to SJVACPD, projects with emissions below these thresholds of significance would demonstrate consistency with SJVAPCD's air quality plans. Notably, annual mass emissions thresholds of significance are not designed to determine whether a project's contribution of emissions would directly result in a violation of the NAAQS or CAAQS, which are hourly, concentration-based standards.

SJVACPD has also developed daily mass emissions screening criteria for ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ to determine whether project emissions would result in a violation of an ambient air quality standard (AAQS). Unlike SJVACPD's annual mass emissions thresholds, which are used to evaluate a project's consistency with long-term regional air quality planning, these daily mass emissions screening criteria serve to determine the location where an exceedance of an AAQS, and resulting adverse health impacts, could occur. Because the NAAQS and CAAQS are concentration-based standards presented hourly, daily mass emissions are a more suitable estimate to determine whether a project would contribute to a violation of an AAQS. Projects that emit emissions below these daily screening criteria would likely not generate emissions in levels that would result in a violation of an AAQS, and air dispersion modeling would not be required. Consequently, projects that emit emissions above these criteria are recommended to perform an ambient air quality analysis to evaluate whether an exceedance, and resulting health impact, would occur.

Using federal and state guidance pertaining to TACs, in addition to the findings of several scientific studies, SJVAPCD developed cancer risk and non-cancer health hazard thresholds for TAC exposure. Unlike criteria air pollutants, there is no known safe concentration of TACs for cancer risk. Moreover, TAC emissions contribute to the deterioration of localized air quality. Due to the dispersion characteristics of TACs, emissions generally do not cause regional-scale air quality impacts. SJVAPCD's thresholds are designed to ensure that a source of TACs does not contribute to a localized, significant impact to existing or new receptors.

Appendix G of the State CEQA Guidelines includes the following criteria for assessing an air quality impact:

a) conflict with or obstruct implementation of the applicable air quality plan?

b) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

SJVAPCD also has recommended mass emissions thresholds for use in CEQA documents. Using the aforementioned criteria of Appendix G and SJVAPCD's GAMAQI, air quality impacts from project implementation would be found to be significant if the project would:

- generate emissions during project construction that exceed SJVAPCD's mass emissions threshold of 10 tons per year (TPY) for ROG and NO_X, 15 TPY for PM_{10} and $PM_{2.5}$, and 27 TPY for SO_X. Additional air dispersion modeling would be required if construction emissions would exceed SJVACPD's mass emissions screening criteria of 100 pounds per day (lb/day) for ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$;
- generate emissions during project operation that exceed 10 TPY, PM_{10} and $PM_{2.5}$ that exceed 15 TPY, and SO_X that exceed 27 TPY. Additional air dispersion modeling would be required if operational emissions would exceed SJVACPD's mass emissions screening criteria of 100 pounds per day (lb/day) for ROG, NO_X, CO, SO_X, PM_{10}, and PM $_{2.5}$;
- generate levels of TACs so that the probability of contracting cancer for the Maximally Exposed Individual (MEI) exceeds 20 in 1 million or an acute or chronic Hazard Index that equals or exceeds 1 for the MEI for non-carcinogens;
- contribute CO emissions leading to a CO concentration that exceeds the CAAQS of 9.0 ppm for 8 hours or 20 ppm for 1 hour; and/or
- generate emissions that expose members of the public to objectionable odors.

TOPICS NOT DISCUSSED FURTHER

All topics related to air quality are evaluated in this section.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.3-1: Generate Short-Term Construction-Related Emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$

Considering SJVAPCD's guidance, annual and daily construction-generated emissions were quantified for the project. The project would not generate construction emissions of criteria air pollutants and ozone precursors exceeding SJVAPCD's annual mass emissions thresholds of significance or daily screening criteria. These thresholds are inherently tied to long-term regional air quality planning (i.e., SJVAPCD's AQMPs) which demonstrates that the project would not conflict with the applicable air quality plans. Because construction-generated emissions would not exceed SJVAPCD's annual mass emissions thresholds of significance or daily screening criteria, construction-generated emissions of criteria air pollutants and ozone precursors would be **less than significant**.

Although the impacts from construction related air pollutant emissions are temporary in duration, such emissions can become a significant air quality impact. Construction activities such as grading, excavation, building construction, and paving can generate substantial amounts of air pollution. Emissions from construction equipment engines also contribute to elevated concentrations of ROG, NO_X, PM_{10}, $PM_{2.5}$, CO, and SO_X.

Several pieces of diesel-powered heavy equipment would operate during the construction of the proposed project. Site preparation activity emissions have been estimated based on the maximum fleet recommended by SJVAPCD. Exhaust and fugitive dust emissions would be generated by excavation and grading, construction vehicle traffic, wind blowing over exposed earth, construction workers traveling to and from the construction sites, heavy-duty construction equipment operation, and application of architectural coatings.

Dust from construction activities can cause impacts both locally and regionally. The dry climate of the area during the summer months, combined with regional fine, silty soils, create a high potential for dust generation. Increased dustfall and locally elevated PM_{10} levels near the construction activity are expected. Depending on the weather, soil conditions, the amount of activity taking place at any one time, and the nature of dust control efforts, these impacts could affect existing land uses near the project site. See the discussion in the "Methodology" section and Appendix C for additional modeling information.

Construction emissions estimates for the proposed project were calculated using CalEEMod (refer to Appendix C). Based on the outputs of CalEEMod, the project would produce the emissions shown in Table 3.3-5, estimated as annual and daily values and compared to applicable SJVAPCD thresholds of significance.

Table 3.3-5 Maximum Emissions of Criteria Pollutants and Precursors Associated with Construction of the Project

	ROG[1]	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Annual Emissions						
Maximum (TPY)	2.1	3.9	4.6	<1	0.6	0.2
SJVAPCD CEQA Significance Threshold	10	10	100	27	15	15
Exceeds Threshold?	No	No	No	No	No	No
Daily Emissions						
Maximum (lb/day)	11	21	25	<1	3	1
SJVAPCD Screening Criteria	100	100	100	100	100	100
Exceeds Screening Criteria?	No	No	No	No	No	No

Notes: TPY = tons per year, lb/day = pounds per day, ROG = reactive organic gases, NO_X = oxides of nitrogen, CO = carbon monoxide, SO_X = sulfur oxides, PM_{10} = respirable particulate matter, $PM_{2.5}$ = fine particulate matter, SJVAPCD = San Joaquin Valley Air Pollution Control District.

[1] Appendix C expresses ROG emissions as VOCs, which are interchangeable terms that describe the same group of pollutants. SJVAPCD's thresholds are established for ROG emissions; therefore, ROG is the term used in this analysis.

Source: Modeling performed by Ramboll Environ in 2023.

As shown in Table 3.3-5, annual and daily emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ would not exceed SJVAPCD's annual mass emissions threshold of significance or screening criteria. This level of emissions indicates that the project would not conflict with long-term regional air quality planning in the SJVAB, would not result in a cumulative contribution to air pollution and would not conflict with SJVAPCD's relevant air quality plans. Additionally, as long-term regional air quality planning is directly tied to attainment of the NAAQS and CAAQS, the project would not directly result in an adverse health outcome. This impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

Impact 3.3-2: Generate Long-Term Operational Emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$

Considering SJVAPCD's guidance, annual and daily operation-generated emissions were quantified for the project for permitted and non-permitted operations. The project would not generate operational emissions of criteria air pollutants and ozone precursors exceeding SJVAPCD's annual mass emissions thresholds of significance or daily screening criteria for permitted and non-permitted sources following compliance with SJVACPD's Rule 9510 (ISR) for this land use type. Because operational emissions of criteria air pollutants and ozone precursors would be less than SJVAPCD's annual and daily mass emissions threshold, impacts would be **less than significant.**

Implementation of the project would result in additional development and urbanization in the city of Fresno, which would in turn increase criteria air pollutants and ozone precursors in an area that is currently designated as an extreme nonattainment area with respect to the NAAQS.

Operational emissions estimates for the proposed project were calculated using CalEEMod (Appendix C). Table 3.3-6 summarizes the total modeled operational emissions associated with the project for the assumed first full year of operation (i.e., 2023) for the permitted (i.e., gas station) and non-permitted (i.e., mobile, energy, area) sources of pollution. Emissions are presented for the entire project including permitted and non-permitted emissions associated with project operation.

Table 3.3-6 Maximum Annual Emissions of Criteria Pollutants and Precursors Associated with Operation of the Project

	ROG[1]	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Permitted (Annual Emissions)						
Total (TPY)	9.9[2]	–	–	–	–	–
SJVAPCD CEQA Significance Threshold	10	10	100	27	15	15
Exceeds Threshold?	No	No	No	No	No	No
Permitted (Daily Emissions)						
Maximum (lb/day)	54[2]	–	–	–	–	–
SJVAPCD Screening Criteria	100	100	100	100	100	100
Exceeds Screening Criteria?	No	No	No	No	No	No
Non-Permitted (Annual Emissions)[3]						
Total (TPY)	9.5	11.9	81.4	0.2	18.1	4.6
SJVAPCD CEQA Significance Threshold	10	10	100	27	15	15
Exceeds Threshold?	No	Yes	No	No	Yes	No
Emissions Reductions from Compliance with Rule 9510	–	-3.0	–	–	-9.1	–
Total (TPY)	9.5	8.9	81.4	0.3	9	6.5
Exceeds Threshold?	No	No	No	No	No	No

	ROG[1]	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Non-Permitted (Daily Emissions)						
Maximum (lb/day)	17	10	98	<1	<1	<1
SJVAPCD Screening Criteria	100	100	100	100	100	100
Exceeds Screening Criteria?	No	No	No	No	No	No

Notes: TPY = tons per year, lb/day = pounds per day, ROG = reactive organic gases, NO_X = oxides of nitrogen, CO = carbon monoxide, SO_X = sulfur oxides, PM_{10} = respirable particulate matter, $PM_{2.5}$ = fine particulate matter, SJVAPCD = San Joaquin Valley Air Pollution Control District.

[1] Appendix C expresses ROG emissions as VOCs, which are interchangeable terms that describe the same group of pollutants. SJVAPCD's thresholds are established for ROG emissions; therefore, ROG is the term used in this analysis.

[2] The permitted activity of the gas station would be limited to emissions of ROG, thus emissions of NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ are not presented in the table. While the gas station would be a source of non-permitted emissions (e.g., on-road vehicle trips), the permitted actions of the gas station are limited to gasoline and diesel fuel distribution.

[3] Non-permitted sources include landscaping activity, natural gas combustion, and on-road vehicle trips.

Source: Modeling performed by Ramboll Environ in 2023.

As shown in Table 3.3-6, permitted emissions of ROG would not exceed SJVAPCD's annual CEQA thresholds or daily mass emissions screening criteria; therefore, additional air dispersion modeling is not required.

Non-permitted emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ would similarly not exceed SJVAPCD's daily mass emissions thresholds. However, non-permitted sources of NO_X and PM_{10} would exceed SJVAPCD's annual mass emissions prior to compliance with SJVAPCD's Rule 9510. Following compliance with Rule 9510 (discussed in Section 3.1.1, "Regulatory Setting"), emissions of NO_X and PM_{10} would be reduced by 3 and 9.1 tons per year, respectively, thus reducing emissions to below SJVAPCD's annual mass emissions thresholds of significance. Therefore, the project would not conflict with long-term regional air quality planning in the SJVAB and SJVAPCD's air quality plans. Additionally, as long-term regional air quality planning is directly tied to attainment of the NAAQS and CAAQS, the project would not directly result in an adverse health outcome.

Moreover, the project would include several project design features which would benefit regional air quality within the SJVAB. For instance, as discussed in Chapter 2, "Project Description," the project is committed to procuring 100 percent of its electricity from PG&E's Solar Choice program, which provides 100 percent renewable energy to customers enrolled in the program. While this would not reduce on-site emissions from the project, it would reduce emissions expelled elsewhere at energy generation facilities, which would assist the SJVAB in attaining the NAAQS and CAAQS for those pollutants for which it is in nonattainment.

Additionally, as noted in Section 3.13, "Transportation and Circulation," the project would construct Class I bike paths along the proposed project's western and southern frontages, construct Class II bike lanes on the proposed project's northern frontage, and include bike parking as required in the City's Municipal Code. The use of these bike paths would serve to reduce VMT generated from the project, and would reduce exhaust emissions from on-road mobile sources. Inclusion of these on-site project design elements align with the direction provided by SJVAPCD to prioritize mitigating emissions from on-site sources.

Because the project would incorporate these project design features and would have emissions below SJVAPCD's annual mass emissions thresholds following compliance with the ISR requirements of Rule 9510, this impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

Impact 3.3-3: Expose Receptors to TAC Concentrations Adversely Affecting a Substantial Number of People

Based on the HRA prepared for the project, construction and operation of the project would not produce significant diesel PM or other TACs such that SJVAPCD's thresholds for TAC cancer risk exposure of 20 in 1 million or an acute or chronic Hazard Index of 1 for the MEI for non-carcinogens would be exceeded. Using these numerical thresholds established by SJVAPCD, the project would not generate substantial emissions of TACs causing an adverse health impact from TAC expose. This impact would be **less than significant**.

SJVAPCD has developed quantitative threshold of significance for carcinogenic risk exposure (i.e., 20 in 1 million) and non-carcinogenic risk exposure (i.e., acute or chronic Hazard Index of 1 for the MEI) in consideration of dosage, risk exposure, background risk levels, and guidance established by AB 2588, the Air Toxics "Hot Spots" Information and Assessment Act. SJVAPCD's threshold for carcinogenic risk was updated in 2016 from 10 in 1 million to 20 in 1 million in consideration of improved ambient air quality due to efficacy of various programs such as CARB's Diesel Risk Reduction Plan (SJVAPCD 2016). A 2015 study demonstrated dramatic declines in cancer risk from exposure to air toxics from CARB-implementation regulations and policies (Propper et al. 2015).

Also, AB 2588 directs each air district to establish a prioritization score threshold for stationary sources of TACs. In order to assist the districts with this requirement, the California Air Pollution Control Officers Association (CAPCOA) Toxics Committee, in cooperation with the Office of Environmental Health Hazard Assessment (OEHHA) and CARB, developed the Air Toxics "Hot Spots" Program, Facility Prioritization Guidelines (July 1990). The purpose of the guideline is to provide districts with suggested procedures for prioritizing facilities. However, districts may develop and use prioritization methods which differ from the CAPCOA guidelines. In 2015, CAPCOA updated these guidelines to incorporate the changes made to the OEHHA risk assessment methodology.

Construction

Construction-related activities would result in temporary, short-term project-generated emissions of diesel PM from the exhaust of off-road, heavy-duty diesel equipment for site preparation (e.g., demolition, clearing, grading); paving; application of architectural coatings; and other miscellaneous activities. Particulate exhaust emissions from diesel PM were identified as a TAC by CARB in 1998. Construction activity is anticipated to take place over a 6-month timeframe for the project and would not result in intensive construction activities for any one extended period of time during project construction. Nevertheless, a construction HRA was prepared to evaluated potential TAC exposure from project construction.

Based on the findings of the HRA, the lifetime cancer risk for the MEI (identified as a residential receptor type approximately 900 feet from the project site) was estimated to be 1.3 in one million, which is below SJVAPCD's significance threshold of 20 in one million. Additionally, estimated chronic and acute hazard risk at the MEI was found to be 0 which is below SJVAPCD's threshold of one. Because construction-emissions of diesel PM would be below SJVAPCD's thresholds of significance for TAC impacts, construction related TAC emissions would be less than significant.

Operation

The project would generate TACs from new gasoline and diesel-powered vehicle trips, operation of a new gas station, and transportation refrigeration units accessing the project site. Cancer risks and non-cancer chronic and acute hazards from these sources for the first year of operation (i.e., 2023) were evaluated in the HRA.

Based on the findings of the HRA, the lifetime cancer risk for the MEI (identified as a residential receptor type approximately 2,000 feet from the project site) was estimated to be 5.1 in one million, which is below SJVAPCD's significance threshold of 20 in one million. Additionally, estimated chronic and acute hazard risk at the MEI was found to be 0.01 and 0.14, respectively, which are below SJVAPCD's threshold of one.

Conclusion

Table 3.3-7 summarizes the total health risk from project construction and operation combined.

Table 3.3-7 Health Risk Assessment Results

Receptor Type	Maximum Estimated Cancer Risk (in one Million)	Maximum Estimated Chronic Hazard Index	Maximum Estimated Acute Hazard Index
Project Construction			
Residential	1.3	0	0
Sensitive	0.2	0	0
Worker	0	0	0
Project Operation			
Residential	5.1	0.01	0.14
Sensitive	0.8	0	0.02
Worker	3.4	0.07	0.52
Total Health Risk			
Residential	**6.4**	**0.01**	**0.14**
Sensitive	**1**	**0**	**0.02**
Worker	**3.4**	**0.07**	**0.52**
SJVACPD Threshold	**20**	**1**	**1**
Exceeds Threshold?	**No**	**No**	**No**

Note: SJVAPCD = San Joaquin Valley Air Pollution Control District.

Source: Modeling performed by Ramboll Environ in 2023.

Construction and operation of the project would not expose receptors to a cancer risk exceeding 20 in one million or a noncancer chronic and acute hazard index greater than one. For these reasons, TAC emissions would result in a **less-than-significant impact**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.3-4: Expose Receptors to Substantial CO Concentrations

Buildout of the project would not contribute to localized concentrations of mobile-source CO that would exceed an applicable ambient air quality standard. This impact would be **less than significant**.

Local mobile-source CO emissions near roadway intersections are a direct function of traffic volume, vehicle speed, and traffic delay. A CO hotspot is an area of localized CO pollution that is caused by severe vehicle congestion on major roadways, typically near intersections. Transport of CO is extremely limited because it disperses rapidly with distance from the source under normal meteorological conditions. However, under stable meteorological conditions, CO concentrations near roadways and/or intersections may reach unhealthy levels, adversely affecting nearby sensitive land uses, such as residential units, hospitals, schools, and childcare facilities. CO is a pollutant of localized concern and, therefore, is analyzed at the local level. Construction activities are rarely a cause of localized CO impacts because they do not typically result in substantial traffic increases at any one location. This impact focuses on operational increases in mobile sources of CO.

The Transportation Impact Analysis (see Appendix D) prepared for this project evaluated the LOS impacts at six existing intersections and three proposed intersections resulting from new roadways for site access. The traffic study evaluated impacts for the following scenarios:

- Scenario 1: Existing Conditions (2021),
- Scenario 2: Existing Plus Project Conditions (2021),

- Scenario 3: Existing Plus Project Conditions with Off-Site Improvements (2021),
- Scenario 4: Future Conditions (2042),
- Scenario 5: Future Plus Project Conditions (2042),
- Scenario 6: Future Plus Project with Reclassification Conditions with Off-Site Improvements (2042)
- Scenario 7: Future Plus Project Conditions without Reclassification of West Herndon Avenue (2042), and
- Scenario 8: Future Plus Project Conditions without Reclassification of West Herndon Avenue with Off-Site Improvements (2042).

Scenarios 3, 6, and 8 would not result in a reduction of LOS on one or more streets or at one or more intersections in the project vicinity to LOS E or F.

Based on the analysis performed in the Traffic Study, the LOS impacts show that the following intersections have the potential to reduce to LOS E or F with the project:

- Scenario 2: Existing Plus Project Conditions (2021)
  - Intersection No. 2 (North Riverside Drive/West Fir Avenue): PM and Saturday peak hours
  - Intersection No. 3 (North Riverside Drive/West Herndon Avenue): AM, PM, and Saturday peak hours
  - Intersection No. 4 (North Golden State Boulevard/West Herndon Avenue): PM and Saturday peak hours
- Scenario 5: Future Plus Project Conditions (2042):
  - Intersection No. 2 (North Riverside Drive/West Fir Avenue): PM and Saturday peak hours
  - Intersection No. 3 (North Riverside Drive/West Herndon Avenue): AM, PM, and Saturday peak hours
  - Intersection No. 4 (North Golden State Boulevard/West Herndon Avenue): PM and Saturday peak hours
- Scenario 7: Future Plus Project Conditions without Reclassification of West Herndon Avenue (2042)
  - Intersection No. 2 (North Riverside Drive/West Fir Avenue): PM and Saturday peak hours
  - Intersection No. 3 (North Riverside Drive/West Herndon Avenue): AM, PM, and Saturday peak hour
  - Intersection No. 4 (North Golden State Boulevard/West Herndon Avenue): PM and Saturday peak hours

For these intersections listed above, the total traffic volumes would be less than 36,000 vehicles per hour. Based on the City of Fresno's General Plan and Development Code Update intersections that support less than 36,000 peak hour trips would not create a CO hotspot. SJVAPCD provides two criteria for determining whether a CO impact would occur: (1) a traffic study for the project indicates that the LOS on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F, or (2) a traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at more or more intersections in the project vicinity. Either threshold may be used to determine the significance of a CO impact. Because the project satisfies the SJVAPCD screening criterion that no existing LOS F on any of the studied intersections would be substantially worsened, the project would not result in the potential to create a violation of the CO standard. Additionally, mobile-source CO emissions have historically decreased since the advent of catalytic converters, which decrease mobile-source exhaust emissions. There have also been improvements in fuel economy since 2015, when the GAMAQI was developed, through regulatory compliance implemented by EPA and CARB (e.g., the CAFE standards and Advanced Clean Cars program) that also result in reduced vehicular CO emissions. This impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

Impact 3.3-5: Generate Other Emissions (Such as Those Leading to Odors) Adversely Affecting a Substantial Number of People

Buildout of the project would not introduce an odor source identified by SJVAPCD that could result in an adverse odor impact. This impact would be **less than significant.**

According to SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts*, each project that would generate odors should be evaluated to determine the likelihood that it would result in nuisance odors. SJVAPCD recognizes the subjective nature of odor impacts and recommends that each project should be assessed on a "case-by-case" basis, taking into consideration all available pertinent information to qualitatively determine if a significant impact is likely to occur, such as information regarding the characteristics of the buffer zone between the sensitive receptor(s) and the odor source(s), local meteorological conditions, and the nature of the odor source. To facilitate the evaluation of odors, SJVAPCD has produced a list of common types of facilities, along with the distance from the source within which odors could possibly be significant. The list provides a qualitative assessment of a project's potential to adversely affect off-site receptors. Table 3.3-8, below, presents the list of common facilities and the minimum distance from the source below which the odor impacts may be significant. The project does not include any uses identified by the SJVAPCD as being associated with odors, and thus the project would not result in odors adversely affecting a substantial number of people.

Table 3.3-8 San Joaquin Valley Air Pollution Control District Screening Levels for Potential Odors Sources

Type of Facility	Distance
Wastewater Treatment Facility	2 miles
Sanitary Landfill	1 mile
Transfer Station	1 mile
Composting Facility	1 mile
Petroleum Refinery	2 miles
Asphalt Batch Plant	1 mile
Chemical Manufacturing	1 mile
Fiberglass Manufacturing	1 mile
Painting/Coating Operations	1 mile
Food Processing Facility	1 mile
Feed Lot/Dairy	1 mile
Rending Plant	1 mile

Source: SJVAPCD 2015a.

Although there is a gas station proposed as a component of the project, odors from gasoline and diesel fuel transfer would be concentrated on the site and are not considered significant sources of odor to nearby receptors due to the high dissipation rates of benzene, the chemical component of gasoline associated with its notable odor. Additionally, SJVAPCD's Rule 4622 would limit emissions of gasoline vapors from the transfer of gasoline into motor vehicle tanks, which would also serve to reduce odors from gasoline dispensing. Because the project would not site a new source of odor listed above in Table 3.3-8, highly dispersive characteristics of benzene, and the efficacy of Rule 4622, this impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

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3.4 ARCHAEOLOGICAL, HISTORICAL, AND TRIBAL CULTURAL RESOURCES

This section analyzes and evaluates the potential impacts of the project on known and unknown cultural resources, addressing the CEQA Guidelines Appendix G categories of "Cultural Resources" and "Tribal Cultural Resources." It also addresses paleontological resources, listed in Subsection (f) in the "Geology and Soils" Appendix G category.[1] Cultural resources include districts, sites, buildings, structures, or objects generally older than 50 years and considered to be important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. They include pre-historic resources, historic-period resources, and "tribal cultural resources" (the latter as defined by Assembly Bill (AB) 52, Statutes of 2014, in Public Resources Code [PRC] Section 21074).

Archaeological resources are locations where human activity has measurably altered the earth or left deposits of prehistoric or historic-period physical remains (e.g., stone tools, bottles, former roads, house foundations). Historical (or built environment) resources include standing buildings (e.g., houses, barns, outbuildings, cabins) and intact structures (e.g., dams, bridges, roads, districts), or landscapes. A cultural landscape is defined as a geographic area (including both cultural and natural resources and the wildlife therein), associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values. Tribal cultural resources are sites, features, places, cultural landscapes, sacred places and objects, with cultural value to a tribe.

One comment letter regarding tribal cultural resources was received in response to the AB 52 notification letters (see Appendix A). The comment letter received in response to the notification expressed a general tribal interest in the project area, as well as a request for copies of the record search and cultural resources documentation. This issue is addressed in this section.

3.4.1 Regulatory Setting

FEDERAL

National Register of Historic Places

The National Register of Historic Places (NRHP) is the nation's master inventory of known historic properties. It is administered by the National Park Service and includes listings of buildings, structures, sites, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, or local level.

The formal criteria (36 CFR 60.4) for determining NRHP eligibility are as follows:

1. The property is at least 50 years old (however, properties under 50 years of age that are of exceptional importance or are contributors to a district can also be included in the NRHP);
2. It retains integrity of location, design, setting, materials, workmanship, feeling, and associations; and
3. It possesses at least one of the following characteristics:

   Criterion A Is associated with events that have made a significant contribution to the broad patterns of history (events).

   Criterion B Is associated with the lives of persons significant in the past (persons).

   Criterion C Embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant, distinguishable entity whose components may lack individual distinction (architecture).

   Criterion D Has yielded, or may be likely to yield, information important in prehistory or history (information potential).

[1] The remaining Appendix G subcategories of "Geology and Soils" are addressed in Section 1.2.1, "Effects Found Not to Be Significant."

For a property to retain and convey historic integrity it must possess most of the seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association. Location is the place where the historic property was constructed or the place where a historic event occurred. Integrity of location refers to whether the property has been moved since its construction. Design is the combination of elements that create the form, plan, space, structure, and style of a property. Setting is the physical environment of a historic property that illustrates the character of the place. Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. This is an intangible quality evoked by physical features that reflect a sense of a past time and place. Association is the direct link between the important historic event or person and a historic property. Continuation of historic use and occupation help maintain integrity of association.

Listing in the NRHP does not entail specific protection or assistance for a property but it does guarantee consideration in planning for federal or federally assisted projects, eligibility for federal tax benefits, and qualification for federal historic preservation assistance. Additionally, project effects on properties listed in the NRHP must be evaluated under CEQA.

The National Register Bulletin series was developed to assist evaluators in the application of NRHP criteria. For example, National Register Bulletin #36 provides guidance in the evaluation of archaeological site significance. If a property cannot be placed within a particular theme or time period, and thereby lacks "focus," it will be unlikely to possess characteristics which would make it eligible for listing in the NRHP. Evaluation standards for linear features (such as roads, trails, fence lines, railroads, ditches, and flumes) are considered in terms of four related criteria that account for specific elements that define engineering and construction methods of linear features: (1) size and length, (2) presence of distinctive engineering features and associated properties, (3) structural integrity, and (4) setting. The highest probability for NRHP eligibility exists in the intact, longer segments, where multiple criteria coincide.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act of 1978 (AIRFA) (42 U.S. Code Section 1996) pledges to protect and preserve the traditional religious rights of American Indians, Aleuts, Eskimos, and Native Hawaiians. It establishes a national policy that traditional Native American practices and beliefs, sites (and right of access to those sites), and the use of sacred objects shall be protected and preserved. If a place of religious importance to American Indians could be affected by a federal undertaking, AIRFA promotes consultation with Indian religious practitioners, which could be coordinated with Section 106 consultation. Amendments to Section 106 of the National Historic Preservation Act (NHPA) in 1992 strengthened the interface between AIRFA and the NHPA by clarifying that (1) properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization could be determined to be eligible for inclusion in the NRHP and (2) in carrying out its responsibilities under Section 106, a federal agency shall consult with any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to properties described under (1).

Native American Graves Protection and Repatriation Act of 1990

The intent of the Native American Graves Protection and Repatriation Act of 1990 (25 U.S. Code Section 3001) is to identify Native American affiliation or lineal descent and ensure the rightful disposition, or repatriation, of Native American human remains, funerary objects, sacred objects, and items of cultural patrimony that are in federal possession or control. The regulations implementing the requirements of Native American Graves Protection and Repatriation Act relating to the inadvertent discovery of human remains and objects of cultural patrimony of Native American origin on federal or tribal lands are described in 43 CFR Section 10.4.

STATE

California Register of Historical Resources

All properties in California that are listed in or formally determined eligible for listing in the NRHP are also listed in the California Register of Historical Resources (CRHR). The CRHR is a listing of State of California resources that are significant in the context of California's history. It is a Statewide program with a scope and with criteria for inclusion similar to those used for the NRHP. In addition, properties designated under municipal or county ordinances are also eligible for listing in the CRHR.

A historical resource must be significant at the local, state, or national level under one or more of the criteria defined in the California Code of Regulations Title 15, Chapter 11.5, Section 4850 to be included in the CRHR. The CRHR criteria are tied to CEQA because any resource that meets the criteria below is considered a significant historical resource under CEQA. As noted above, all resources listed in or formally determined eligible for listing in the NRHP are automatically listed in the CRHR.

The CRHR uses four evaluation criteria:

Criterion 1. Is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States.

Criterion 2. Is associated with the lives of persons important to local, California, or national history.

Criterion 3. Embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of a master; or possesses high artistic values.

Criterion 4. Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation.

Similar to the NRHP, a historical resource must meet one of the above criteria and retain integrity to be listed in the CRHR. The CRHR uses the same seven aspects of integrity used by the NRHP.

California Environmental Quality Act

CEQA requires public agencies to consider the effects of their actions on "historical resources," "unique archaeological resources," and "tribal cultural resources." Pursuant to PRC Section 21084.1, a "project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment." Section 21083.2 requires agencies to determine whether projects would have effects on unique archaeological resources. PRC Section 21084.2 establishes that "[a] project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment."

Historical Resources

"Historical resource" is a term with a defined statutory meaning (PRC Section 21084.1; State CEQA Guidelines Sections 15064.5[a] and [b]). Under State CEQA Guidelines Section 15064.5(a), historical resources include the following:

1) A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR (PRC Section 5024.1).

2) A resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g), will be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

3) Any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be a historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a

resource will be considered by the lead agency to be historically significant if the resource meets the criteria for listing in the CRHR (PRC Section 5024.1).

4) The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to PRC Section 5020.1[k]), or identified in a historical resources survey (meeting the criteria in PRC Section 5024.1[g]) does not preclude a lead agency from determining that the resource may be a historical resource as defined in PRC Sections 5020.1(j) or 5024.1.

Unique Archaeological Resources

CEQA also requires lead agencies to consider whether projects will affect unique archaeological resources. PRC Section 21083.2(g) states that "unique archaeological resource" means 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 or more of the following criteria:

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

Tribal Cultural Resources

CEQA also requires lead agencies to consider whether projects will affect tribal cultural resources. PRC Section 21074 states:

a) "Tribal cultural resources" are either of the following:
    1) Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
        A) Included or determined to be eligible for inclusion in the California Register of Historical Resources.
        B) Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1.
    2) 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 Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

b) A cultural landscape that meets the criteria of subdivision (a) is a tribal cultural resource to the extent that the landscape is geographically defined in terms of the size and scope of the landscape.

c) A historical resource described in Section 21084.1, a unique archaeological resource as defined in subdivision (g) of Section 21083.2, or a "nonunique archaeological resource" as defined in subdivision (h) of Section 21083.2 may also be a tribal cultural resource if it conforms with the criteria of subdivision (a).

Public Resources Code Section 21080.3

AB 52, signed by the California Governor in September of 2014, established a new class of resources under CEQA: "tribal cultural resources," defined in PRC Section 21074. Pursuant to PRC Sections 21080.3.1, 21080.3.2, and 21082.3, lead agencies undertaking CEQA review must, upon written request of a California Native American Tribe, begin consultation before the release of an EIR, negative declaration, or mitigated negative declaration.

PRC Section 21080.3.2 states:

> Within 14 days of determining that a project application is complete, or to undertake a project, the lead agency must provide formal notification, in writing, to the tribes that have requested notification of proposed projects in the lead agency's jurisdiction. If it wishes to engage in consultation on the project, the tribe must respond to the lead agency within 30 days of receipt of the formal notification. The lead agency must begin the consultation process with the tribes that have requested consultation within 30 days of receiving the request for consultation.

Consultation concludes when either: 1) the parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource, or 2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached.

California Native American Historical, Cultural, and Sacred Sites Act

The California Native American Historical, Cultural, and Sacred Sites Act (PRC Section 5097.9) applies to both State and private lands. The act requires, upon discovery of human remains, that construction or excavation activity cease and that the county coroner be notified. If the remains are those of a Native American, the coroner must notify the Native American Heritage Commission (NAHC), which notifies and has the authority to designate the most likely descendant of the deceased. The act stipulates the procedures the descendants may follow for treating or disposing of the remains and associated grave goods.

Health and Safety Code Section 7050.5

Section 7050.5 of the Health and Safety Code 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 they are determined to be those of a Native American, the coroner must contact NAHC.

Public Resources Code Section 5097

PRC Section 5097 specifies the procedures to be followed if human remains are unexpectedly discovered on nonfederal land. The disposition of Native American burials falls within the jurisdiction of NAHC. Section 5097.5 of the code states:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure, or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

LOCAL

City of Fresno General Plan

The Historic and Cultural Resource Element (Chapter 8) of the City of Fresno's General Plan (City of Fresno 2014) contains the following objectives and policies regarding historic and cultural resources, including archaeological sites and places of significance to local Native American tribes:

- **Policy HCR-1-c: Historic Preservation Ordinance**. Maintain the provisions of the City's Historic Preservation Ordinance, as may be amended, and enforce the provisions as appropriate.
- **Policy HCR-2-c: Project Development.** Prior to project approval, continue to require a project site and its Area of Potential Effects (APE), without benefit of a prior historic survey, to be evaluated and reviewed for the potential for historic and/or cultural resources by a professional who meets the Secretary of Interior's Qualifications. Survey costs shall be the responsibility of the project developer. Council may, but is not required, to adopt an ordinance to implement this policy.
- **Policy HCR-2-d: Native American Sites.** Work with local Native American tribes to protect recorded and unrecorded cultural and sacred sites, as required by State law, and educate developers and the community-at-large about the connections between Native American history and the environmental features that characterize the local landscape.
- **Policy HCR-2-f: Archaeological Resources.** Consider State Office of Historic Preservation guidelines when establishing CEQA mitigation measures for archaeological resources.

City of Fresno Municipal Code

Historic Preservation Ordinance. The City of Fresno has also established a Historic Preservation Commission and a Local Register of Historic Resources per Fresno Municipal Code, Chapter 12, Article 16. The Ordinance is used to provide local levels of control over the historical aesthetics of cultural resources within the city, and to ensure that the potential impact to locally significant historical resources that may be the subject of redevelopment are given reasonable consideration. The purpose of the Ordinance is to:

> […] continue to preserve, promote and improve the historic resources and districts of the City of Fresno for educational, cultural, economic and general welfare of the public; to continue to protect and review changes to these resources and districts which have a distinctive character or a special historic, architectural, aesthetic or cultural value to this city, state and nation; to continue to safeguard the heritage of this city by preserving and regulating its historic buildings, structures, objects, sites and districts which reflect elements of the city's historic, cultural, social, economic, political and architectural history; to continue to preserve and enhance the environmental quality and safety of these landmarks and districts; to continue to establish, stabilize and improve property values and to foster economic development. (Article 16 Section 12-1602(a).)

3.4.2 Environmental Setting

REGIONAL PREHISTORY

The project site is located in the city of Fresno in California's Central Valley. The Central Valley region of California was one of the most densely populated areas in North America during prehistoric times. Early work conducted by Sacramento Junior College and the University of California, Berkeley in the first 40 years of the 20th Century within the region resulted in the development of the Central California Taxonomic System and a tripartite classification scheme (Early, Middle, and Late Periods). In 2007, this classification system was updated based the findings of studies since the 1940s and results based on new technologies such as Carbon 14 dating and obsidian hydration (NIC 2021:8). The resulting new classification system is briefly described below.

Paleo-Indian and Lower Archaic Period (11,500–5550 cal B.C.E.) sites are not well represented in the Central Valley. This is likely due to the fact that large segments of the Late Pleistocene landscape throughout the valley have been buried or removed by periodic episodes of deposition and erosion, in particular the formation of the Sacramento–San Joaquin Delta about 6,000 years ago. The archaeological evidence that is available for this early period is primarily defined by basally thinned, fluted projectile points found in sites located in and around Fresno and in Kern County on the ancient shoreline of Buena Vista Lake. These points are morphologically similar to well-dated Clovis points found elsewhere in North America.

Middle Archaic Period/Windmiller Pattern (5550–550 cal B.C.E.) sites are characterized by extended burials orientated to the west, specialized grave goods, baked clay balls, charmstones, and exotic lithic materials. Year-round settlements with seasonal forays into the foothills resulted in the acquisition of a varied subsistence resource base that was dominated by fish and acorn acquisition. However, archaeological evidence shows heavy exploitation of elk, deer, antelope, rabbits, waterfowl, and numerous additional floral and faunal species.

Upper Archaic Period/Berkeley Pattern (550 cal B.C.E. – 1100 cal. C.E.) artifact assemblages show a dramatic increase in the use of mortar and pestle groundstone technology, possibly related to an expanded reliance on acorns as a staple food resource. Flexed burials with various orientations are common, as well as specialized bone tools, numerous distinctive shell beads and ornaments, and stone tools unique to the period frequently occur on sites dated to this time.

Emergent Period/Augustine Pattern (1100 cal. C.E. – Historic Contact) cultural manifestations are distinguished by the presence of shaped mortars and pestles, the use of bow and arrow technology and the introduction of the harpoon, particularly during early phases of this period. Bone awls are common. There is an increased usage of shell for decorative items and as money for exchange. Ground stone technologies included mundane items such as handstones and pestles as well as more exotic times such as tubular pipes and charmstones. Mortuary practices can be highly variable; pre-interment pit burning, cremations, and flex burials are all associated with this period.

ETHNOGRAPHY

The project site is within the ethnographic territory of the Northern Valley Yokuts. The Northern Valley Yokuts primarily occupied the lands along the San Joaquin River, starting in the north at the Calaveras River and extending southward to the upper San Joaquin River, and from the crest of the Coast (Diablo) Range in the east to the Sierra Nevada foothills in the west.

The Northern Valley Yokuts diet was comprised of seasonally available resources obtained by hunting, fishing, and gathering. A wide variety of tools and implements were used by the Northern Valley Yokuts to collect, process, and cook their food. Fishing and hunting tools included harpoons, hooks, nets, bows and arrows, traps, and blinds, as well as tule rafts for navigating waterways. Sharpened digging sticks and woven tools such as seed beaters, burden baskets, and carrying nets were used to collect plant resources. Stone mortars and pestles, bedrock and portable mortars, possibly wooden mortars, stone knives, and scrapers. Various bone tools were used to process resources, including hides for clothing, bedding, and other related household items. Clay was used for cooking, waterproofing basketry, and net weights. Additional items, such as marine shell beads, basketry materials, chalk, and obsidian were obtained through trade. Northern Valley Yokuts constructed many types of shelters and storage facilities, including conical huts, shade structures, sweat house pits, and acorn granaries. The primary building materials used were willow and tule.

Today, the descendants of these first peoples live throughout the Fresno area, including on the Tule River Reservation near Porterville, Picayune Rancheria at Coarsegold in Madera County, Santa Rosa Rancheria in Kings County, and Table Mountain Rancheria near Friant in Fresno County (NIC 2021:12).

HISTORIC SETTING

Regional History

The Yokuts were the first residents of the area that would become the city of Fresno, followed by the Mexicans and the Americans. There were no missions in the San Joaquin Valley but there were small Mexican era settlements such as Pueblo de las Junta, located at the confluence of the San Joaquin River and the Fresno Slough. The Spanish and Mexican influence is indicated through place names such as "Fresno," which means "ash tree" and which was first applied to the Fresno River (City of Fresno 2014:8-4). Following the Gold Rush of 1849, miners were drawn to the southern gold fields, and cattle ranchers and dryland farmers moved into the area.

In 1870, the Central Pacific Railroad began its diagonal push down the San Joaquin Valley, reaching what is now Fresno in late April 1872. In that same year, the Contract and Finance Company, a subsidiary of the railroad, laid out the town of Fresno in a rigid "gridiron" plan. Fresno continued to grow slowly until extensive irrigation efforts, such as the 28-mile Enterprise Canal and Miller and Lux's 67-mile San Joaquin and Kings River Canal were established. Soon after, people from around the United States and from Europe came by rail to settle in the region, establishing agricultural colonies and livestock operations, as well as numerous individual family farms serviced by a lacework of canals, laterals, and irrigation ditches. As a result of this population boom, Fresno was incorporated as a city in 1885, and by 1890, had a population of over 10,000. By 1900, Fresno was the market center of what is now the richest farming region in the United States (City of Fresno 2014:8-5).

Fresno continued to grow following World War I, and in 1930, the city had a population of 52,513. While the Great Depression brought hardship to the city, it also resulted in the construction of a series of major civic buildings in the city, such as the complex of buildings at Fresno's Chandler Airfield/Fresno Municipal Airport built by the Works Progress Administration between 1936 and 1937 (City of Fresno 2014:8-5).

During and after World War II, a surge of returning servicemen and homeless transients arrived in the city, looking for agricultural work, creating a severe housing shortage. This led to the development of a series of suburban housing tracts and associated infrastructure outside of the city, including the Herndon–Kearney 230 kilovolt (kV) Transmission Line between 1943 and 1964 which brought power to agricultural, commercial, and residential to developments in the northwestern portion of the city (NIC 2021:18-19). The first major post-war subdivision completed was Mayfair, which included the first suburban shopping center. Manchester Center followed in 1955, with Fig Garden Village in 1956. Six

blocks of the Downtown were converted to a pedestrian mall in 1964, with a design by landscape architect Garrett Eckbo (City of Fresno 2014:8-6). However, like so many other cities across the country, the suburban flight of the 1960s eventually lead to the decline of the downtown area.

Today, Fresno is home to a diverse population, which includes descendants from the city's earliest pioneers and recently arrived immigrants. Although farming and ranching remain at the economic forefront, its place in the center of California has allowed it to also become a hub for industrial complexes and distribution centers, continuing the city's legacy as a major center of commerce in California.

Project Site and West Spruce Avenue History

The project site is located on the northwestern outskirts of Fresno, approximately 11 miles from downtown and one and a half miles south of the San Joaquin River just east of the former community of Herndon. Herndon started as a ferry crossing on the San Joaquin River called Sycamore Point, then became a steamship stop, and a railroad stop called Sycamore Station in 1872. Growth of the community slowed after that and today, Herndon is considered to be an unincorporated community of Fresno County (Hoover et al. 2002).

Located in in proximity to the San Joaquin River, the project site was subject to little development other than agricultural use and river access over the last 150 years. No development of the site is shown until 1946, when USGS 7.5-minute Herndon topographic map shows that the project site is under cultivation. By 1964, the topographic maps show that the Herndon–Kearney 230-kV Transmission Line bisects the northern portion of the project site and that the property is still in use agriculturally. No further development of the project site is shown on later topographic maps.

Aerial photographs do not start until 1962, but they indicate that the entire project site was in use as an orchard from at least 1962. The electrical transmission line is in place by that time as well. The orchard remained in place until sometime between 1998 and 2002, when it appears to have been removed (NIC 2021:12). Since 2002, the project site has continued to be regularly plowed for vegetation maintenance. No other development of the site is seen on later aerial photographs.

West Spruce Avenue was constructed between 1942 and 1947 to provide access onto and around the Fresno Municipal Golf Course, which is in place to its north. The road appears to be unpaved at that time. The golf course was established by three members of the Sunnyside Country Club in 1925 as the semi-private nine-hole Riverside Golf Club along the San Joaquin River. In 1938, the City of Fresno purchased the course, club house, and 40 additional acres for roughly $12,000. The City expanded the course to 18 holes. The improved course opened in 1939 as the Fresno Municipal Golf Course, and in 1963, its original Riverside name was returned (NIC 2022:14).

Project Site Geoarchaeology

Recent geoarchaeological research for California Department of Transportation District 6, which includes Fresno County, finds that the project area has low sensitivity for the presence of buried archaeological remains (NIC 2021:5). The project site is underlain by Middle-to-Late Pleistocene-aged (450 to 130 thousand years ago) alluvium of the Riverbank Formation (Qr^2) with soils of the Exeter Series found at the surface. Because this material formed long before the first human occupation of the area, it is very unlikely to contain or to have buried archaeological resources. The overlying soils of the Exeter Series are younger, dating to the Late Holocene (2,000 to 150 years ago) and so are generally more sensitive for buried cultural remains.

Site-specific variables, including age of the underlying landform, lack of archaeological sites within the general vicinity, minimal historical development, extent of past disturbance from agricultural activities, and negative survey results indicate low potential for the discovery of intact archaeological deposits, including buried archaeological deposits, materials, or features (NIC 2021:19).

PALEONTOLOGICAL RESOURCES

Paleontological resources are the remains or traces of prehistoric plant and animal life, exclusive of human remains or artifacts, and the geologic units that house them. Paleontological resources are useful in education in that they promote the understanding of the history of life and the diversity of the Earth's biota. Paleontological resources occur in geologic units (e.g., formations or members). The probability of finding significant fossils at a given location can be estimated based on previous records of fossils recovered from the geologic units present in and/or adjacent to it. The geological setting and the number of known fossil localities help to estimate a location's paleontological sensitivity as defined by CEQA.

The Riverbank Formation is well represented by important paleontological remains elsewhere in California, though only one fossil locality is on record for the formation in Fresno County. The locality is near the Laguna Seca Ranch approximately 50 miles west of the project area, and produced a single tibia from an extinct Rancholabrean-aged horse (*Equus* sp.). However, it should also be kept in mind that unlike archaeological sites, which are narrowly defined, paleontological sites are defined by the entire areal and stratigraphic extent of their respective geologic unit or formation. This means that once a significant fossil locality is identified, no matter how small, the entire geologic unit containing it is treated as a paleontological site, even if that unit extends over multiple counties or states. The paleontological sensitivity of a geologic unit is thus described and analyzed in the broadest possible terms. A more reliable estimation of the actual paleontological resource potential of any given location is often gained from records of significant fossil discoveries made in close proximity to it and from direct field inspection of the location concerned.

None of the fossil localities on record for Fresno County, including the Laguna Seca Ranch locality, have been mapped within the project area. As no unique geologic features, fossil-bearing strata, or paleontological sites have been recorded within or near the project area, the paleontological resource sensitivity of the project area is estimated to be low (NIC 2021).

RECORDS SEARCHES, SURVEYS, AND CONSULTATION

Two record searches by the Southern San Joaquin Valley Information Center (SSJVIC) of the California Historical Resources Information System were conducted to determine whether historic built environment resources or archaeological sites have been previously recorded within project site. The record searches also provided information concerning the extent to which each location has been previously surveyed, and the number and type of cultural resources within a 0.25-mile radius of the project site. The results of the SSJVIC search were returned on September 13, 2021, and December 20, 2021, respectively. The portion of West Spruce Avenue to be extended was covered in the September 13, 2021, results. The SSJVIC searches included a search of available archaeological and historical records as well as the following sources:

- National Register of Historic Places: listed properties,
- CRHR: listed resources,
- Historic Property Data File for Fresno County,
- Archaeological Determinations of Eligibility,
- Built Environment Resources Directory,
- California Inventory of Historical Resources,
- California Historical Landmarks,
- California Points of Historical Interest,
- Historical GLO land plat maps, and
- Historical USGS topographic maps and aerial imagery.

The SSJVIC records search results for the project site, which includes the location of the extension for West Spruce Avenue, indicated that no prior cultural resource studies have been completed at these locations, though eight

studies have been completed within the 0.25-mile records search radius. The results also indicated that no built environment features or archaeological sites have been previously recorded within the project site, and that three built environment features have been recorded within the 0.25-mile search radius. The previously recorded built environment features within the 0.25-mile records search radius included two transmission lines and a ditch. No archaeological sites have been previously recorded within the project site or within a 0.25-mile radius.

An intensive pedestrian survey of the entire project site was conducted on September 24, 2021, and of the location for the extension of West Spruce Avenue on June 20, 2022. All portions of each property were surveyed intensively using transects spaced no greater than 15 meters apart. Ground visibility within the project site was excellent at 75-100 percent due to recent plowing and vegetation maintenance. The slope was nearly level. Ground disturbances (e.g., animal burrows, drainages, dirt roads) and geologic outcrops were visually inspected. An unrecorded segment of a previously recorded linear resource, electrical transmission line P-10-006130, was identified and recorded during the field survey in September of 2021. In June 2022, a segment of West Spruce Avenue (NIC-2022-Costco 01) was identified, recorded, and evaluated. No additional historic resources 50 years or older were identified within the project site, and no archaeological sites were identified. No paleontological resources or unique geologic units were noted.

Historic Features

P-10-006130

P-10-006130 is the Herndon-Kearney 230-kV Transmission Line. It carries electricity between the Herndon and Kearney Substations, providing power to agricultural, commercial, and residential developments in northwestern Fresno. The transmission line was constructed between 1943 and 1969. A previously unrecorded 907-foot-long segment of this approximately 11-mile-long line was recorded within the project site as a result of the cultural resources investigation for the project. P-10-006130 as a whole was determined not eligible for listing in the NRHP by the State Historic Preservation Officer in 2011. Research conducted for the project also finds that P-10-006130 also does not represent a historical resource for the purposes of CEQA.

While the transmission line is potentially under Criterion 1 for its association with the development of electrical infrastructure in Fresno, it does not retain sufficient integrity to convey that significance. The resource has lost its integrity of design, workmanship, and materials following extensive past upgrades and alterations, as well as its integrity of setting and feeling due to the dramatic transformation of the surrounding area from a mostly agricultural to a residential and commercial environment (NIC 2021:18-19). P-10-006130 also does not have any direct associations with any individuals significant to history (Criterion 2); has been significantly altered as noted above and is without noteworthy architectural qualities (Criterion 3); and is not likely to yield any additional important information about our history (Criterion 4).

NIC-2022-Costco-01, West Spruce Avenue Segment

This resource is a 1,580-foot segment of West Spruce Avenue between North Riverside Drive and North Sandrini Avenue. Historical sources indicate that the portion of the road extending eastward from its intersection with North Riverside Drive to its intersection with Strother Avenue was first constructed between 1942 and 1947. It provided access onto and around the Riverside Golf Course (then the Fresno Municipal Golf Course), though the alignment appears to have been slightly different. By 1964 it follows its current path. The portion between Strother Avenue and North Sandrini Avenue was completed between 2007 and 2009. West of Strother Avenue the road is roughly 10 feet wide, and to its east is 70 feet wide. Asphalt is severely decayed along the western portion.

The segment of West Spruce Avenue within the project area is part historic and part modern. It does not appear to be directly associated with any events (Criterion 1) or people (Criterion 2) significant in local, regional, or national history. While the western portion was constructed in the mid-20th century to facilitate travel around the Riverside Golf Course, it was one of dozens of roads in place in the area by that time and has since been largely abandoned. The eastern portion was constructed in the 21st century and so is not historic. The road segment does not appear to have had primary importance in either historic or modern times. In addition, the road is of a type that is ubiquitous in construction, materials, and engineering throughout the region, and so does not appear to be eligible for CRHR listing under Criterion 3. Its information value is captured in existing documentation, including historical aerial

photographs, maps, and plans, as well as in the formal recordation of the resource completed as part of this assessment for the project. For these reasons, the resource does not appear to be significant under any CRHR criteria and is recommended as not eligible for listing in the CRHR. As such, NIC-2022-Costco-01 neither constitutes an historical resource as defined under CEQA Section 15064.5, nor a unique archaeological resource as defined under CEQA Section 21083.2(g).

Tribal Cultural Resources

NAHC Search

A search of the NAHC Scared Lands File was conducted on October 7, 2021. The results were negative for Native American cultural resources in the proposed project site or its immediate vicinity, including the portion of West Spruce Avenue to be expanded.

Native American Consultation

Pursuant to AB 52, the following tribes have requested project notification by the City:

- Roger Ledger, Chairperson, Dumna Wo Wah Tribal Government;
- John Ledger, Dumna Wo Wah Tribal Government;
- Eric S. Smith, Dumna Wo Wah Tribal Government; and
- Bob Pennell, Cultural Resources Director, Table Mountain Rancheria of California.

The City mailed notification letters concerning development of the project site to these tribal representatives on October 11, 2021. A response from Robert Pennell of the Table Mountain Rancheria of California was received on October 19, 2021, indicating that the project site lies within an area of tribal interest. Mr. Pennell then requested copies of the result of any cultural records and technical studies prepared for the project, which were provided.

No other tribes have formally responded to either notification, and none have requested consultation under AB 52.

3.4.3 Impacts and Mitigation Measures

METHODOLOGY

The impact analysis for archaeological and historical resources is based on the findings and recommendations of the *Cultural and Paleontological Resources Assessment for the Costco Commercial Center Development Project in the City of Fresno, Fresno County, California* (NIC 2021 and 2022). The analysis is also informed by the provisions and requirements of federal, state, and local laws and regulations that apply to cultural resources.

PRC Section 21083.2(g) defines a "unique archaeological resource" 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 or more of the following CRHR-related criteria: (1) that it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information; (2) that it as a special and particular quality, such as being the oldest of its type or the best available example of its type; or (3) that it is directly associated with a scientifically recognized important prehistoric or historic event or person. An impact on a resource that is not unique is not a significant environmental impact under CEQA (State CEQA Guidelines Section 15064.5[c][4]). If an archaeological resource qualifies as a resource under CRHR criteria, then the resource is treated as a unique archaeological resource for the purposes of CEQA.

PRC Section 21074 defines "tribal cultural resources" as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" that are listed or determined eligible for listing in the CRHR, listed in a local register of historical resources, or otherwise determined by the lead agency to be a tribal cultural resource.

For the purposes of the impact discussion, "historical resource" is used to describe built-environment historic-period resources. Archaeological resources (both prehistoric and historic-period sites), which may qualify as "historical resources" pursuant to CEQA, are analyzed separately as unique archaeological resources as defined by PRC 21083.2(g).

THRESHOLDS OF SIGNIFICANCE

An impact on cultural resources would be significant if implementation of the project would:

- cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the State CEQA Guidelines;
- cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines;
- cause a substantial adverse change in the significance of a tribal cultural resource, 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 American tribe that is also:
  - listed or eligible for listing in the CRHR or in the local register of historical resources as defined in PRC Section 5020.1(k), or
  - a resource determined by the lead agency in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in PRC 5024.1(c). In applying the criteria set forth in PRC 5024.1(c), the lead agency shall consider the significance of the resource to ta Native American tribe;
- disturb any human remains, including those interred outside of formal cemeteries; or
- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

TOPICS NOT DISCUSSED FURTHER

Significance of Historical Resources pursuant to Section 15064.5 of the State CEQA Guidelines

As described above, two historic features were identified on the project site. This feature, P-10-006310 was previously determined not eligible for listing in the NRHP by the State Historic Preservation Officer and the results of the study for the project find that it is also not eligible for listing in the CRHR (NIC 2021:18-19). Investigation conducted for the project determined that NIC-2022-Costco-1 was not eligible for listing in the CRHR. As a result, neither are considered historical resources for the purposes of CEQA. Therefore, project construction and operation would have no impact on historical resources per Section 15064.5 of the State CEQA Guidelines and no further analysis is required by CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.4-1: Cause a Substantial Adverse Change in the Significance of Archaeological Resources

Although no known archaeological resources have been identified on the project site, project-related ground-disturbing activities may result in the discovery of or damage to yet undiscovered archaeological resources as defined in State CEQA Guidelines Section 15064.5. This impact would be reduced to a **less-than-significant level with implementation of mitigation measures**. Specifically, Mitigation Measures 3.4-1a and 3.4-1b would minimize impacts by requiring that a worker environmental awareness program be prepared and provided to all construction personnel and supervisors who would have the potential to encounter and alter archaeological resources. These measures would also require construction to halt if potential archaeological resources are discovered, coordination with Native American groups (if applicable), implementation of preservation options (including data recovery, mapping, capping, or avoidance), and proper curation if significant artifacts are recovered.

As indicated through the results of the SSJVIC records search and pedestrian survey, no known prehistoric or historic-era archaeological sites are present on the project site or within a 0.25-mile radius.

Geological analysis finds that the project site is underlain by Middle-to-Late Pleistocene-aged (450 to 130 thousand years ago) alluvium of the Riverbank Formation (Qr^2) with soils of the Exeter Series found at the surface. Given several site-specific variables—including age of the underlying landform, lack of archaeological sites within the general vicinity, minimal historical development, extent of past disturbance from agricultural activities, and negative survey results—the potential for the discovery of intact archaeological deposits, including buried archaeological deposits, materials, or features at the project site, is estimated to be low (NIC 2021:19).

Regardless, implementation of the project as described in Chapter 2, "Project Description," would involve preconstruction (such as utility discovery 'potholing' and vegetation clearing)- and construction-related ground-disturbing activities, including grading, that may result in the discovery of and/or damage or destruction of unrecorded archaeological sites and materials at the project site. Such actions would result in a substantial adverse change to the significance of the resource. This impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.4-1a: Develop and Implement a Worker Environmental Awareness Program

The applicant shall retain a qualified professional archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for archaeologists to prepare a worker environmental awareness program. The program shall be provided to all construction personnel and supervisors who will have the potential to encounter and alter archaeological resources. A copy of the worker environmental awareness program shall be provided to the City's Planning Division before construction activities begin. The topics to be addressed in the worker environmental awareness program will include, at a minimum:

- types of cultural resources expected on the project site;
- types of evidence that indicates cultural resources might be present (e.g., glass shards, lithic scatters);
- what to do if a worker encounters a possible resource;
- what to do if a worker encounters animal bones or possible human bones; and
- repercussions for removing or intentionally disturbing archaeological resources.

Mitigation Measure 3.4-1b: Retain an Archaeological Monitor and Native American Monitor, and Halt Ground-Disturbing Activity upon Discovery of Subsurface Archaeological Features or Tribal Cultural Resources

In the event that any historic-era subsurface archaeological features or deposits (e.g., glass, metal, and/or ceramic refuse scatters), or prehistoric subsurface archaeological features or deposits (e.g., locally darkened soil ("midden"), stone tool chipping debris, bones, shell beads, or concentrated charcoal layers), are discovered during construction, all ground-disturbing activity within 50 feet of the resources shall be halted and the City shall be notified. The applicant will then retain the services of a qualified professional archaeologist to assess the significance of the find. Specifically, the archaeologist shall determine whether the find qualifies as an historical resource, a unique archaeological resource, or tribal artifacts. If the find does fall within one of these three categories, the qualified archaeologist shall then make recommendations to the City regarding appropriate procedures that should be used to protect the integrity of the resource and to ensure that no additional resources are affected. Procedures could include preservation in place, archival research, subsurface testing, and/or data recovery, with preservation in place being the preferred option if feasible. If the find is a tribal artifact, the City shall provide a reasonable opportunity for input from a Native American tribal representative affiliated with the location of the discovery; affiliation shall be determined by the City, in consultation with the qualified archaeologist, based on the City's AB 52 list or the contact list provided by the NAHC. If responsive, the tribal representative will then determine whether the artifact is considered a tribal cultural resource, as defined by PRC Section 21074. The applicant, in consultation with the City and Tribe, shall implement the recommended preservation options (which may include preservation in place, data

recovery, mapping, capping, or avoidance), and proper curation of significant artifacts, if it determines that the measures are feasible in light of project design, logistics, and cost considerations.

Significance after Mitigation

Implementation of Mitigation Measures 3.4-1a and 3.4-1b would reduce this impact to a level that would be **less than significant with implementation of mitigation measures** by requiring that a worker environmental awareness program be prepared and provided to all construction personnel and supervisors who will have the potential to encounter and alter archaeological resources. The mitigation would also require construction to halt if potential archaeological resources are discovered, coordination with Native American groups (if applicable), implementation of preservation options (including data recovery, mapping, capping, or avoidance), and proper curation if significant artifacts are recovered. This mitigation would also be consistent with Objective HCR-1, Policy HCR-1-c, Objective HCR-2, Policy HCR-2-b, Policy HCR-2-c, and HCR-2-d of the City of Fresno General Plan and the Historic Preservation Ordinance.

Impact 3.4-2: Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource

Tribal consultation has not resulted in the identification of tribal cultural resources on the project site. Despite this, excavation activities associated with project construction may disturb or destroy previously undiscovered significant subsurface tribal cultural resources. Impacts related to tribal cultural resources would be reduced to **less than significant with implementation of mitigation measures** by requiring that a worker environmental awareness program be prepared and provided to all construction personnel and supervisors who will have the potential to encounter and alter cultural resources; and requiring construction to halt if potential archaeological resources are discovered, coordination with Native American groups (if applicable), implementation of preservation options (including preservation in place, data recovery, mapping, capping, or avoidance), and proper curation if significant artifacts are recovered.

Implementation of the project would involve construction and excavation activities associated with relocation of the Costco facility. As discussed above in Section 3.4.2, "Environmental Setting," tribal consultation did not result in the identification of tribal cultural resources on the project site. Tribal consultation was initiated on October 11, 2021. Only one response was received from Robert Pennell of the Table Mountain Rancheria of California. Mr. Pennell only requested additional information; he did not identify the presence of any Tribal Cultural Resources. No further responses have been received to date and no tribal cultural resources have been identified on the project site as a result of the tribal consultation. Despite this, excavation activities associated with project construction may disturb or destroy previously undiscovered significant subsurface tribal cultural resources. This impact is **potentially significant**.

Mitigation Measures

Implement Mitigation Measures 3.4-1a and 3.4-1b.

Significance after Mitigation

Impacts related to unknown tribal cultural resources would be reduced to **less than significant with implementation of mitigation measures** by requiring that a worker environmental awareness program be prepared and provided to all construction personnel and supervisors who will have the potential to encounter and alter archaeological resources; The mitigation would also require construction to halt if potential archaeological resources are discovered, coordination with Native American groups (if applicable), implementation of preservation options (including preservation in place, data recovery, mapping, capping, or avoidance), and proper curation if significant artifacts are recovered.

Impact 3.4-3: Disturb Human Remains

Based on documentary research, no evidence suggests that any prehistoric or historic-period marked or un-marked human interments are present within or in the immediate vicinity of the project site. However, ground-disturbing preconstruction and construction activities could uncover previously unknown human remains. Compliance with California Health and Safety Code Section 7050.5 and PRC Section 5097 would make this impact **less than significant**.

Based on documentary research, no evidence suggests that any prehistoric or historic-period marked or un-marked human interments are present within or in the immediate vicinity of the project site. However, the grave sites and Native American remains can occur outside of identified cemeteries or burial sites. Therefore, there is a possibility that unmarked, previously unknown Native American or other graves could be present within the project site and could be uncovered by project-related construction activities.

California law recognizes the need to protect Native American human burials, skeletal remains, and items associated with Native American burials from vandalism and inadvertent destruction. The procedures for the treatment of Native American human remains are contained in California Health and Safety Code Section 7050.5 and PRC Section 5097. These statutes require that, if human remains are discovered, potentially damaging ground-disturbing activities in the area of the remains and a 50-foot radius shall be halted immediately, and the appropriate County Coroner shall be notified immediately. If the remains are determined by the coroner to be Native American, NAHC shall be notified within 24 hours and the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains. Following the coroner's findings, the NAHC-designated Most Likely Descendant, and the landowner shall determine the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments, if present, are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in PRC Section 5097.94.

Compliance with California Health and Safety Code Section 7050.5 and PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.4-4: Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature

Although no known paleontological resources have been identified on the project site, project-related ground-disturbing activities may result in the discovery of or damage to yet undiscovered resources. This impact would be reduced to a **less-than-significant level with implementation of mitigation measures**. Specifically, Mitigation Measure 3.4-4 would minimize impacts by requiring the project applicant to immediately halt operations if paleontological resources are discovered during earthmoving activities.

Recent geologic maps indicate that the project area is underlain by Middle-to-Late Pleistocene (450 to 130 thousand years ago) alluvium of the Riverbank Formation (Qr^2). The Riverbank Formation is well represented by important paleontological remains elsewhere in California, though only one fossil locality is on record for the formation in Fresno County. The locality is near the Laguna Seca Ranch approximately 50 miles west of the project area and produced a single tibia from an extinct Rancholabrean-aged horse (NIC 2021).

None of the fossil localities on record for Fresno County, including the Laguna Seca Ranch locality, have been mapped within the project area. As no unique geologic features, fossil-bearing strata, or paleontological sites have been recorded within or near the project area, the paleontological resource sensitivity of the project area is estimated to be low. Nevertheless, given the general sensitivity of the Riverbank Formation for vertebrate fossils, a field survey was completed that included inspection for geologic outcrops that may contain paleontological resources (NIC 2021).

As no unique geologic features, fossil-bearing strata, or paleontological sites have been recorded within or near the project area, and no paleontological resources of any kind were observed within the project area during the field survey undertaken as part of this assessment, the paleontological resource sensitivity of the project area is estimated to be low (NIC 2021). Nonetheless, there is a low potential that ground-disturbing activities could result in discovery of paleontological resources, which could lead to destruction of the resource. This impact would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.4-4: Halt Ground-Disturbing Activity upon Discovery of Subsurface Paleontological Resources

If paleontological resources are discovered during earthmoving activities, the project applicant shall immediately halt operations within 30 feet of the find and notify the City. If the find is determined to be significant, it shall be salvaged by a qualified paleontologist retained by the project applicant following the standards of the SVP (2010) and curated at a certified repository such as the University of California Museum of Paleontology.

Significance after Mitigation

The potential for the project to result in the direct or indirect destruction of unique paleontological resources is low; however, the potential cannot be dismissed. With implementation of Mitigation Measure 3.4-4, which sets forth standard treatment measures to limit destruction of unique paleontological resources, the effect of the project on yet undiscovered paleontological resources would be effectively reduced. This impact would be **less than significant with mitigation**.

3.5 BIOLOGICAL RESOURCES

This section addresses biological resources known or with potential to occur on or near the project site and describes potential effects of implementation of the project on those resources.

In response to the notice of preparation for the project EIR, comment letters were received from several members of the public; however, no comments pertaining to biological resources were received. Refer to Appendix A.

3.5.1 Regulatory Setting

FEDERAL

Federal Endangered Species Act

Pursuant to the federal Endangered Species Act (ESA) (16 U.S.C. Section 1531 et seq.), the U.S. Fish and Wildlife Service (USFWS) regulates the taking of species listed in the ESA as threatened or endangered. In general, persons subject to ESA (including private parties) are prohibited from "taking" endangered or threatened fish and wildlife species on private property, and from "taking" endangered or threatened plants in areas under federal jurisdiction or in violation of state law. Under Section 9 of the ESA, the definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." USFWS has also interpreted the definition of "harm" to include significant habitat modification that could result in take.

Section 10 of the ESA applies if a non-federal agency is the lead agency for an action that results in take and no other federal agencies are involved in permitting the action. Section 7 of the ESA applies if a federal discretionary action is required (e.g., a federal agency must issue a permit), in which case the involved federal agency consults with USFWS.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, provides for protection of international migratory birds and authorizes the Secretary of the Interior to regulate the taking of migratory birds. The MBTA provides that it will be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest, or egg of any such bird. Under the MBTA, "take" is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or any attempt to carry out these activities." A take does not include habitat destruction or alteration if there is not a direct taking of birds, nests, eggs, or parts thereof. The current list of species protected by the MBTA can be found in Title 50 of the Code of Federal Regulations (CFR), Section 10.13 (50 CFR 10.13). The list includes nearly all birds native to the United States.

STATE

California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from California Department of Fish and Wildlife (CDFW) is required for projects that could result in the "take" of a plant or animal species that is listed by the state as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species. Authorization for take of state-listed species can be obtained through a California Fish and Game Code Section 2081 incidental take permit.

Native Plant Protection Act

The Native Plant Protection Act (NPPA) (California Fish and Game Code Section 1900 et seq.) allows the California Fish and Game Commission to designate plants as rare or endangered. Sixty-four species, subspecies, and varieties of plants are protected as rare under the NPPA. The act prohibits take of endangered or rare native plants but includes exceptions for agricultural and nursery operations; for emergencies; and, after proper notification of CDFW, for vegetation removal from canals, roads, and other building sites, changes in land use, and other situations.

California Fish and Game Code Sections 3503 and 3503.5—Protection of Bird Nests and Raptors

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 of the California Fish and Game Code states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders *Falconiformes* and *Strigiformes*), including their nests or eggs. Typical violations include destruction of active nests as a result of tree removal or disturbance caused by project construction or other activities that cause the adults to abandon the nest, resulting in loss of eggs and/or young.

Fully Protected Species under the California Fish and Game Code

Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code prohibit take of fully protected birds, mammals, reptiles and amphibians, and fish. Species listed under these statutes may not be taken or possessed at any time and no incidental take permits can be issued for these species except for scientific research purposes, for relocation to protect livestock, or as part of a natural community conservation plan (NCCP).

LOCAL

City of Fresno Municipal Code – Tree Preservation

The City of Fresno Municipal Code includes an ordinance regarding tree preservation (Section 13-305) that requires property owners to obtain a permit to remove or maintain street trees (i.e., any tree planted, or caused to be planted, by the City within the street right-of-way, parkway, or any landscape or public tree easement). Removed trees will be replaced by the applicant through replanting, or by the City through collection of permit fees. Section 15-2308 of the City of Fresno Municipal Code states that removal of eucalyptus trees does not require approval of a tree removal permit.

3.5.2 Environmental Setting

The project site consists of an undeveloped parcel in the northwestern portion of the city of Fresno, approximately 0.35 mile south of the San Joaquin River. The site is surrounded by the Riverside Golf Course to the north; residential development to the west; industrial and residential development to the east; and West Herndon Avenue, commercial development, some undeveloped parcels, and the Rio Vista Middle School to the south. There is a large transmission tower in the northwest corner of the project site. No raptor nests were observed on this tower; however, several owl pellets (likely attributed to a barn owl [*Tyto alba*] or great horned owl [*Bubo virginianus*]) and California ground squirrel (*Otospermophilus beecheyi*) bones were observed under the tower during the reconnaissance-level survey on November 1, 2021, indicating that owls and likely other raptors use the tower as a roost site. California ground squirrel burrows are present throughout the project site and several squirrels were observed during the reconnaissance-level surveys on November 1, 2021, and June 20, 2022. There is a mound of soil directly adjacent to the northern boundary of the project site with many California ground squirrel burrows.

VEGETATION

Habitat within the project site is comprised entirely of regularly disced field with sparse cover of ruderal grassland vegetation. Most of the site does not contain vegetation. Where it occurs, vegetation consists of predominately nonnative grasses as well as native forbs, including Jimsonweed (*Datura wrightii*) and narrow leaf milkweed (*Asclepias fascicularis*). Several large blue gum (*Eucalyptus globulus*) trees are present adjacent to the project site to the north and northeast, including a windrow along the southern boundary of the Riverside Golf Course. These trees are located adjacent to the project site where Spruce Avenue would be extended east of the site. The project site and adjacent rights-of-way do not contain any aquatic habitat (e.g., streams, wetlands), riparian habitat, sensitive natural communities, or other sensitive habitats.

SENSITIVE BIOLOGICAL RESOURCES

Special-Status Species

Special-status species are defined as species that are legally protected or that are otherwise considered sensitive by federal, state, or local resource agencies. Special-status species are species, subspecies, or varieties that fall into one or more of the following categories, regardless of their legal or protection status:

- officially listed by California under CESA or the federal government under ESA as endangered, threatened, or rare;
- a candidate for state or federal listing as endangered or threatened under CESA or ESA;
- taxa (i.e., taxonomic category or group) that meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the State CEQA Guidelines;
- species identified by CDFW as species of special concern;
- species listed as fully protected under the California Fish and Game Code;
- species afforded protection under local planning documents; and
- plant taxa considered by the CDFW to be "rare, threatened, or endangered in California" and assigned a California Rare Plant Rank (CRPR) of 1, or 2. The CDFW system includes rarity and endangerment ranks for categorizing plant species of concern, and ranks 1 and 2 are summarized as follows:
  - CRPR 1A - Plants presumed to be extinct in California;
  - CRPR 1B - Plants that are rare, threatened, or endangered in California and elsewhere;
  - CRPR 2A - Plants presumed to be extinct in California but common elsewhere;
  - CRPR 2B - Plants that are rare, threatened, or endangered in California but more common elsewhere.

All plants with a CRPR are considered "special plants" by CDFW. The term "special plants" is a broad term used by CDFW to refer to all of the plant taxa inventoried in CDFW's California Natural Diversity Database (CNDDB), regardless of their legal or protection status. Plants ranked as CRPR 1A, 1B, 2A, or 2B typically qualify as endangered, rare, or threatened species within the definition of CEQA Guidelines Section 15380. CDFW recommends that potential impacts on CRPR 1 and 2 species be evaluated in CEQA documents. CRPR 3 (review list) and 4 (watch list) species may meet the definition of endangered, rare, or threatened pursuant to CEQA Guidelines Section 15380 and/or Section 15125(c). These species should be evaluated by the lead agency on a case-by-case basis to determine their local rarity.

The term "California species of special concern" is applied by CDFW to animals not listed under ESA or CESA, but that are declining at a rate that could result in listing, or that historically occurred in low numbers and known threats to their persistence currently exist. CDFW's fully protected status was California's first attempt to identify and protect animals that were rare or facing extinction. Most species listed as fully protected were eventually listed as threatened or endangered under CESA; however, some species remain listed as fully protected but do not have simultaneous listing under CESA. Fully protected species may not be taken or possessed at any time and no take permits can be issued for these species except for scientific research purposes, for relocation to protect livestock, or as part of an NCCP.

Of the 21 special-status plant species that are known to occur within the nine U.S. Geological Survey (USGS) 7.5-minute quadrangles including and surrounding the project site, none were determined to have potential to occur on the site and adjacent rights-of-way due to the lack of habitat potentially suitable for the species (CNDDB 2021; CNPS 2021; Table 3.5-1). Of the 28 special-status wildlife species that could occur within the nine USGS quadrangles, three species were determined to have potential to occur on the project site and adjacent rights-of-way based on the presence of habitat potentially suitable for these species (CNDDB 2021, Table 3.5-2). Tables 3.5-1 and 3.5-2 describe the species' regulatory status, habitat, and potential for occurrence on the project site and adjacent rights-of-way.

Table 3.5-1 Special-Status Plant Species Known to Occur in the Vicinity of the Project Site and Their Potential for Occurrence on the Site

Species	Listing Status[1] Federal	Listing Status[1] State	CRPR	Habitat	Potential for Occurrence
Heartscale *Atriplex cordulata* var. *cordulata*	–	–	1B.2	Alkaline flats and scalds in the Central Valley. Sandy soils. 10–900 feet in elevation. Blooms April–October.	Not expected to occur. The project site does not contain alkaline flats or scalds.
Lesser saltscale *Atriplex minuscula*	–	–	1B.1	In alkali sink, shadscale scrub, and grassland in sandy, alkaline soils. 0–740 feet in elevation. Blooms May–October.	Not expected occur. While the project site contains grassland and moderately alkaline soil, this species is typically associated with alkali sink habitat that is seasonally flooded, which is not present on the project site.
Hoover's calycadenia *Calycadenia hooveri*	–	–	1B.3	On exposed, rocky, barren soil. 230–855 feet in elevation. Blooms July–September.	Not expected to occur. The project site does not contain rocky soil.
Succulent owl's-clover *Castilleja campestris* var. *succulenta*	FT	SE	1B.2	Vernal pools, often in acidic soils. 65–2,315 feet in elevation. Blooms April–May.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.
California jewelflower *Caulanthus californicus*	FE	SE	1B.1	Sandy soils. 210–6,100 feet in elevation. Blooms February–May.	Not expected to occur. The project site is outside of the current known range of this species.
Palmate-bracted salty bird's-beak *Chloropyron palmatum*	FE	SE	1B.1	Saline-alkaline soils in seasonally flooded lowland plains and basins. Usually on Pescadero silty clay which is alkaline. Less than 500 feet in elevation. Blooms May–October.	Not expected to occur. The project site does not contain seasonally flooded alkaline-saline soils or Pescadero silty clay soil.
Recurved larkspur *Delphinium recurvatum*	–	–	1B.2	On alkaline soils; often in valley saltbush or valley chenopod scrub. 10–2,595 feet in elevation. Blooms March–June.	Not expected to occur. The project site does not contain saltbush or chenopod scrub habitat.
Dwarf downingia *Downingia pusilla*	–	–	2B.2	Vernal lake and pool margins with a variety of associates. In several types of vernal pools. 3–1610 feet in elevation. Blooms March–May.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.
Spiny-sepaled button-celery *Eryngium spinosepalum*	–	–	1B.2	Some sites on clay soil of granitic origin; vernal pools, within grassland. 260–840 feet in elevation. Blooms April–June.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.
California satintail *Imperata brevifolia*	–	–	2B.1	Mesic sites, alkali seeps, riparian areas. 10–4,905 feet in elevation. Blooms September–May.	Not expected to occur. The project site does not contain mesic sites, seeps, or riparian habitat.
Alkali-sink goldfields *Lasthenia chrysantha*	–	–	1B.1	Vernal pools. Alkaline soils. 0–655 feet in elevation. Blooms February–June.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.
Munz's tidy-tips *Layia munzii*	–	–	1B.2	Hillsides, in white-gray alkaline clay soils, w/grasses and chenopod scrub associates. 490–2,300 feet in elevation. Blooms March–April.	Not expected to occur. The project site does not contain hillsides or chenopod scrub habitat.

Species	Listing Status[1] Federal	Listing Status[1] State	CRPR	Habitat	Potential for Occurrence
Madera leptosiphon *Leptosiphon serrulatus*	–	–	1B.2	Dry slopes; often on decomposed granite in woodland. 985–4,265 feet in elevation. Blooms April–May.	Not expected to occur. The project site does not contain woodland habitat or decomposed granite soils.
Pincushion navarretia *Navarretia myersii* ssp. *myersii*	–	–	1B.1	Vernal pools and wetlands. Clay soils within non-native grassland. 150–330 feet in elevation. Blooms April–May.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.
San Joaquin Valley Orcutt grass *Orcuttia inaequalis*	FT	SE	1B.1	Vernal pools, wetland. 30–2,480 feet in elevation. Blooms April–September.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.
Hairy Orcutt grass *Orcuttia pilosa*	FE	SE	1B.1	Vernal pools, wetland. 145–660 feet in elevation. Blooms May–September.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.
Hartweg's golden sunburst *Pseudobahia bahiifolia*	FE	SE	1B.1	Clay soils, often acidic. Predominantly on the northern slopes of knolls, but also along shady creeks or near vernal pools. 195–560 feet in elevation. Blooms March–April.	Not expected to occur. The project site does not contain acidic soils, or knolls, vernal pool, wetland, or creek habitat.
California alkali grass *Puccinellia simplex*	–	–	1B.2	Alkaline, vernally mesic. Sinks, flats, and lake margins. 3–3,005 feet in elevation. Blooms March–May.	Not expected to occur. The project site does not contain vernally mesic habitat.
Sanford's arrowhead *Sagittaria sanfordii*	–	–	1B.2	In standing or slow-moving freshwater ponds, marshes, and ditches. 0–2,135 feet in elevation. Blooms May–October.	Not expected to occur. The project site does not contain pond, marsh, or ditch habitat.
Caper-fruited tropidocarpum *Tropidocarpum capparideum*	–	–	1B.1	Valley and foothill grassland. Alkaline clay. 0–1,180 feet in elevation. Blooms March–April.	Not expected to occur. The project site is outside of the current known range of this species.
Greene's tuctoria *Tuctoria greenei*	FE	SR	1B.1	Vernal pools in open grasslands. 80–4,350 feet in elevation. Blooms May–July.	Not expected to occur. The project site does not contain vernal pool or wetland habitat.

Notes: CRPR = California Rare Plant Rank; CEQA = California Environmental Quality Act; ESA = Endangered Species Act; NPPA = Native Plant Protection Act

1 Legal Status Definitions

Federal:

FE Federally Listed as Endangered (legally protected by ESA)
FT Federally Listed as Threatened (legally protected by ESA)

State:

SE State Listed as Endangered (legally protected by CESA)

California Rare Plant Ranks (CRPR):

1B Plant species considered rare or endangered in California and elsewhere (protected under CEQA, but not legally protected under ESA or CESA).
2B Plant species considered rare or endangered in California but more common elsewhere (protected under CEQA, but not legally protected under ESA or CESA).

CRPR Threat Ranks:

0.1 Seriously threatened in California (over 80% of occurrences threatened; high degree and immediacy of threat)
0.2 Moderately threatened in California (20-80% occurrences threatened; moderate degree and immediacy of threat)
0.3 Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Sources: CNDDB 2021; CNPS 2021.

Table 3.5-2 Special-Status Wildlife Species Known to Occur in the Vicinity of the Project Site and Their Potential for Occurrence on the Site

Species	Listing Status[1] Federal	Listing Status[1] State	Habitat	Potential for Occurrence
Amphibians and Reptiles				
Blunt-nosed leopard lizard *Gambelia sila*	FE	SE FP	Resident of sparsely vegetated alkali and desert scrub habitats, in areas of low topographic relief. Seeks cover in mammal burrows, under shrubs or structures such as fence posts; they do not excavate their own burrows.	Not expected to occur. The project site is located near the easternmost extent of the current known range of blunt-nosed leopard lizard. The site is disturbed, routinely disked, and does not contain any shrub cover. The project site is also surrounded by extensive residential and commercial development and is not connected to surrounding habitat suitable for blunt-nosed leopard lizard.
California glossy snake *Arizona elegans occidentalis*	–	SSC	Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular ranges south to Baja California. Generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils.	Not expected to occur. The project site is outside of the documented range of this species.
California red-legged frog *Rana draytonii*	FT	SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Not expected to occur. The project site is outside of the current known range of this species and does not contain aquatic or upland habitat suitable for California red-legged frog.
California tiger salamander *Ambystoma californiense*	FT	ST	Need underground refuges, especially ground squirrel burrows, within 1.3 mile of vernal pools or other seasonal water sources for breeding.	Not expected to occur. The project site and surrounding areas do not contain vernal pool or wetland habitat suitable for California tiger salamander.
Coast horned lizard *Phrynosoma blainvillii*	–	SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, and abundant supply of ants and other insects.	Not expected to occur. The project site does not contain scattered shrub habitat suitable for coast horned lizard.
Giant gartersnake *Thamnophis gigas*	FT	ST	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	Not expected to occur. The project site does not contain aquatic habitat suitable for giant garter snake and is located a sufficient distance from nearby aquatic habitat (i.e., San Joaquin River) such that the project site would not be used as upland habitat for the species.
Northern California legless lizard *Anniella pulchra*	–	SSC	Sandy or loose loamy soils under sparse vegetation. Soil moisture is essential. They prefer soils with a high moisture content.	Not expected to occur. While the project site contains loamy soils and sparse vegetation, it is disturbed and routinely disked, which would likely exclude northern California legless lizard from the project site.

Species	Listing Status[1] Federal	Listing Status[1] State	Habitat	Potential for Occurrence
Western pond turtle *Actinemys marmorata*	–	SSC	An aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches, usually with aquatic vegetation, below 6,000 feet elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	Not expected to occur. The project site does not contain aquatic habitat suitable for western pond turtle and is located a sufficient distance from nearby aquatic habitat (i.e., San Joaquin River) such that the project site would not be used as upland habitat for the species.
Western spadefoot *Spea hammondii*	–	SSC	Occurs primarily in vernal pool grassland habitats but can be found in valley-foothill hardwood woodlands with vernal pools. Vernal pools are essential for breeding and egg-laying.	Not expected to occur. The project site does not contain vernal pool or seasonal wetland habitat suitable for western spadefoot.
Birds				
Burrowing owl *Athene cunicularia*	–	SSC	Open, dry annual or perennial grasslands, deserts and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	May occur. The project site contains open ruderal grassland habitat, a healthy population of California ground squirrels, and many ground squirrel burrows. There is a large pile of soil on the northern boundary of the project site with many ground squirrel burrows that may provide additional habitat suitable for burrowing owls. While no evidence of burrowing owl use (e.g., scat, pellets) was observed during the reconnaissance-level surveys on November 1, 2021, or June 20, 2022, burrowing owls could establish on the project site at any time.
Swainson's hawk *Buteo swainsoni*	–	ST	Breeds in grasslands with scattered trees, juniper-sage flats, riparian areas, savannahs, and agricultural or ranch lands with groves or lines of trees. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	May occur. The project site contains nesting habitat (i.e., large trees) potentially suitable for Swainson's hawks within blue gum trees located adjacent to the future extension of Spruce Avenue. Additionally, there are many large, mature trees on the Riverside Golf Course property north of the project site, including several large eucalyptus trees directly adjacent to the northern edge of the project site that may provide nesting habitat suitable for the species. The project site also may provide foraging habitat for Swainson's hawks, albeit low-quality foraging habitat due to disturbance and surrounding development.
Tricolored blackbird *Agelaius tricolor*	–	ST SSC	Highly colonial species, most numerous in Central Valley and vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and foraging area with insect prey within a few kilometers of the colony.	Not expected to occur. The project site does not contain nesting habitat suitable for tricolored blackbirds (e.g., riparian habitat, marsh habitat, blackberry brambles).

Species	Listing Status[1] Federal	Listing Status[1] State	Habitat	Potential for Occurrence
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT	SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	Not expected to occur. The project site does not contain riparian forest habitat suitable for western yellow-billed cuckoo.
White-tailed kite *Elanus leucurus*	–	FP	Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	May occur. The project site contains nesting habitat (i.e., large trees) potentially suitable for white-tailed kites within blue gum trees located adjacent to the future extension of Spruce Avenue. Additionally, there are many large, mature trees on the Riverside Golf Course property north of the project site, including several large eucalyptus trees directly adjacent to the northern edge of the site, that may provide nesting habitat suitable for the species. The project site also may provide foraging habitat for white-tailed kites, albeit low-quality foraging habitat due to disturbance and surrounding development.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	–	SSC	Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds. Nests only where large insects such as Odonata are abundant, nesting timed with maximum emergence of aquatic insects.	Not expected to occur. The project site does not contain nesting habitat suitable for yellow-headed blackbird (e.g., vegetation associated with wetlands, lakes, or ponds).
Fish				
Delta smelt *Hypomesus transpacificus*	FT	SE	Sacramento-San Joaquin Delta. Seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt. Most often at salinities < 2ppt.	Not expected to occur. The project site does not contain aquatic habitat suitable for Delta smelt.
Hardhead *Mylopharodon conocephalus*	–	SSC	Low to mid-elevation streams in the Sacramento-San Joaquin drainage. Also present in the Russian River. Clear, deep pools with sand-gravel-boulder bottoms and slow water velocity. Not found where exotic centrarchids predominate.	Not expected to occur. The project site does not contain aquatic habitat suitable for hardhead.

Species	Listing Status[1] Federal	Listing Status[1] State	Habitat	Potential for Occurrence
Invertebrates				
Crotch bumble bee *Bombus crotchii*	–	–	Coastal California east to the Sierra-Cascade crest and south into Mexico. Food plant genera include *Antirrhinum*, *Phacelia*, *Clarkia*, *Dendromecon*, *Eschscholzia*, and *Eriogonum*. Bumble bees have three basic habitat requirements: suitable nesting sites for the colonies, availability of nectar and pollen from floral resources throughout the duration of the colony period (spring, summer, and fall), and suitable overwintering sites for the queens.	Not expected to occur. There is one historic (1899) documented occurrence of crotch bumble bee within the nine USGS quadrangles including and surrounding the project site (CNDDB 2021). The project site is within the historic range of this species; however, crotch bumble bee has recently undergone a dramatic decline in abundance and distribution and is no longer present across much of its historic range (Xerces Society 2018). While efforts are underway to encourage recovery of crotch bumble bee populations, it is unlikely that the range of this species would expand into the Fresno County region during the life of the project.
Monarch - California overwintering population *Danaus plexippus* pop. 1	FC	–	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress), with nectar and water sources nearby. Milkweed species are the larval host plants.	Not expected to occur. The project site does not contain coastal habitat suitable for overwintering monarch butterflies, so removal of trees would not affect overwintering habitat for this species. Several narrow leaf milkweed plants were observed during the reconnaissance-level survey on November 1, 2021. Milkweed species provide foraging and host plant opportunities for monarch butterflies. However, because the project site is regularly disked, this habitat is not high quality, and the site does not contain adequate nectar sources. Loss of these narrow leaf milkweed plants would not be considered a substantial reduction of monarch larval habitat in the region.
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	–	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus nigra* ssp. *caerulea*). Prefers to lay eggs in elderberry stems 2-8 inches in diameter; some preference shown for "stressed" elderberry shrubs.	Not expected to occur. The project site does not contain blue elderberry shrub habitat suitable for valley elderberry longhorn beetle.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	–	Endemic to the grasslands of the Central Valley, Central Coast mountains, and South Coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	Not expected to occur. The project site does not contain vernal pool or seasonal wetland habitat suitable for vernal pool fairy shrimp.

Species	Listing Status[1] Federal	Listing Status[1] State	Habitat	Potential for Occurrence
Mammals				
American badger *Taxidea taxus*	–	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	Not expected to occur. The project site contains friable soils and a healthy California ground squirrel population. However, the site is regularly disked, which may deter badgers from establishing dens, and is surrounded by dense suburban and commercial development and disconnected from nearby undeveloped habitat suitable for this species.
Fresno kangaroo rat *Dipodomys nitratoides exilis*	FE	SE	The known historical geographic range of the Fresno kangaroo rat encompassed an area of grassland and alkali desert scrub communities on the San Joaquin Valley floor in Merced, Kings, Fresno, and Madera counties. Recently they have been found only in alkali sink communities from 200 to 300 feet in elevation. Known habitat for these animals has been reduced and fragmented primarily by agricultural developments, urbanization, and transportation infrastructures.	Not expected to occur. While the project site is within the historic range of Fresno kangaroo rat, currently, there are no known populations of the species within its historical geographic range in Merced, Madera, and Fresno counties.
Pallid bat *Antrozous pallidus*	–	SSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Not expected to occur. The project site does not contain roosting habitat (e.g., tree cavities, cliffs, crevices, human-made structures) suitable for pallid bats. Human-made structures on the project site (e.g., transmission towers) do not provide roosting habitat suitable for this species.
San Joaquin kit fox *Vulpes macrotis mutica*	FE	ST	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	Not expected occur. San Joaquin kit foxes are unlikely to den within the project site because it is regularly disturbed, surrounded by dense suburban and commercial development, and disconnected from nearby undeveloped habitat suitable for this species. Further, a recent assessment report for the species does not identify any areas east of SR 99 near Fresno as within the current range of San Joaquin kit fox (USFWS 2020).
San Joaquin Pocket Mouse *Perognathus inornatus*	–	–	Occurs in dry, open grasslands or scrub areas on fine-textured soils in the Central and Salinas valleys.	Not expected to occur. The project site is regularly disturbed and does not contain open grassland or scrub habitat or fine-textured soils suitable for San Joaquin pocket mouse.

Species	Listing Status[1] Federal	Listing Status[1] State	Habitat	Potential for Occurrence
Spotted bat *Euderma maculatum*	–	SSC	Occupies a wide variety of habitats from arid deserts and grasslands through mixed conifer forests. Feeds over water and along washes. Feeds almost entirely on moths. Needs rock crevices in cliffs or caves for roosting.	Not expected to occur. The project site does not contain roosting habitat (e.g., rock crevices, cliffs, caves, human-made structures) suitable for spotted bats. Human-made structures on the project site (e.g., transmission towers) do not provide roosting habitat suitable for this species.
Western mastiff bat *Eumops perotis californicus*	–	SSC	Many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces, high buildings, trees, and tunnels.	Not expected to occur. The project site does not contain roosting habitat (e.g., trees cavities, cliffs, crevices, human-made structures) suitable for western mastiff bats. Human-made structures on the project site (e.g., transmission towers) do not provide roosting habitat suitable for this species.

Notes: CNDDB = California Natural Diversity Database; CEQA = California Environmental Quality Act

1 Legal Status Definitions

Federal:

FE Federally Listed as Endangered (legally protected)

FT Federally Listed as Threatened (legally protected)

State:

FP Fully protected (legally protected)

SSC Species of special concern (no formal protection other than CEQA consideration)

SE State Listed as Endangered (legally protected)

ST State Listed as Threatened (legally protected)

Sources: City of Fresno 2014; CNDDB 2021; USFWS 2021.

3.5.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

This impact evaluation is based on data collected during reconnaissance-level field surveys conducted on November 1, 2021, and June 20, 2022, review of aerial photographs, and review of existing databases and environmental reports that address biological resources in the project vicinity.

Data reviewed in preparation of this analysis include:

- results of CNDDB record search of the Madera, Gregg, Lanes Bridge, Biola, Herndon, Fresno North, Fresno South, Kerman, and Kearney Park USGS 7.5-minute quadrangles (CNDDB 2021);
- results of California Native Plant Society, Inventory of Rare Plants search of the Madera, Gregg, Lanes Bridge, Biola, Herndon, Fresno North, Fresno South, Kerman, and Kearney Park USGS 7.5-minue quadrangles (CNPS 2021);
- a list of species and other resources, obtained from USFWS Information for Planning and Consultation, that are known from or expected to be on or near the project location or could be affected by projects in this location (USFWS 2021);
- Master Environmental Impact Report General Plan and Development Code Update City of Fresno, Fresno County, California (City of Fresno 2014); and
- aerial photographs of the project site and region.

THRESHOLDS OF SIGNIFICANCE

An impact on biological resources would be significant if implementation of the 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;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS;
- have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- 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;
- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and/or
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

TOPICS NOT DISCUSSED FURTHER

Effect, Either Directly or Through Habitat Modifications, Special-Status Plants Identified in Local or Regional Plans, Policies, or Regulations or by CDFW or USFWS

No special-status plants have potential to occur on the project site. Therefore, no further analysis is required by CEQA.

Effect Riparian Habitat or Other Sensitive Natural Communities Identified in Local or Regional Plans, Policies, or Regulations or by CDFW or USFWS

The project site does not contain riparian habitat or any sensitive natural communities. Therefore, no further analysis is required by CEQA.

Effect State or Federally Protected Wetlands through Direct Removal, Filling, Hydrological Interruption, or Other Means

The project site does not contain any state or federally protected wetlands or other waters. Therefore, no further analysis is required by CEQA.

Movement of Native Resident or Migratory Fish Species

The project site does not contain aquatic habitat suitable for native resident or migratory fish species. Therefore, no further analysis is required by CEQA.

Movement of Native Resident or Migratory Wildlife Species, Established Native Resident or Migratory Wildlife Corridors or Use of Native Wildlife Nursery Site

According to the California Essential Habitat Connectivity Project, the project site is not located within a Natural Landscape Block or Essential Habitat Connectivity area (Spencer et al. 2010). Project development would not interfere substantially with the movement of any native resident or migratory wildlife species because the project site does not currently provide an important connection between any areas of natural habitat that would otherwise be isolated. While wildlife may use the project site for nesting and roosting or may pass through the site occasionally, it is unlikely that the project site functions as a significant wildlife movement corridor or wildlife nursery site due to the lack of high-quality natural habitat and extensive residential and commercial development surrounding the site. Therefore, no further analysis is required by CEQA.

Consistency with Local Policies or Ordinances Protecting Biological Resources

City of Fresno Municipal Code includes a tree preservation policy, and the City of Fresno General Plan includes policies designed to protect and preserve natural habitats within the city. Project implementation would result in removal of several blue gum trees; however, the City of Fresno Municipal Code exempts Eucalyptus trees (including blue gum) from the tree removal permit requirement. Additionally, the project site does not contain natural habitat, nor does any land surrounding the project site. These policies would, therefore, not apply to the project. Therefore, no further analysis is required by CEQA.

Consistency with Habitat Conservation Plans; Natural Community Conservation Plans; or Other Approved Local, Regional, or State Habitat Conservation Plans

The project site is not within the plan area of any adopted Habitat Conservation Plan; NCCP; or other approved local, regional, or state habitat conservation plan. Therefore, no further analysis is required by CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.5-1: Result in Disturbance to or Loss of Special-Status Wildlife Species and Habitat

Project activities would include ground disturbance, tree removal, and other vegetation removal, which could result in disturbance, injury, or mortality of several special-status wildlife species if present, reduced breeding productivity of these species, and loss of species habitat. This impact would be reduced to a **less-than-significant level with implementation of mitigation measures**. Specifically, Mitigation Measures 3.5-1a and 3.5-1b would minimize impacts by requiring preconstruction surveys for burrowing owl, Swainson's hawk, white-tailed kite, other common raptors, and other native birds, and implementation of protective measures for active nests.

The following three wildlife species may occur on the project site: burrowing owl, Swainson's hawk, and white-tailed kite, as discussed in Table 3.5-2. Common native nesting birds protected under California Fish and Game Code and the federal MBTA may also be present on the project site.

Burrowing Owl

The project site contains ruderal grassland habitat with friable soils and many California ground squirrel burrows. Although no evidence of burrowing owl use (e.g., scat, pellets) was observed during the reconnaissance-level survey on November 1, 2021, burrowing owls could occupy the project site in the future.

Project implementation would include ground disturbance and vegetation clearing, which would require the use of vehicles and heavy machinery. These activities could result in inadvertent disturbance, injury, or mortality of burrowing owl. If present, burrowing owls could be disturbed due to the presence of equipment and personnel and could be inadvertently injured or killed by heavy machinery or vehicles or could abandon active nests resulting mortality of chicks or eggs. Active burrows could be inadvertently crushed and destroyed, if present, potentially resulting in the loss of eggs or chicks. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1a: Conduct Take Avoidance Survey for Burrowing Owl, Implement Avoidance Measures, and Compensate for Loss of Occupied Burrows

- A qualified biologist shall conduct a focused survey for burrowing owls in accessible areas (i.e., not including private property) of habitat suitable for the species on and within 1,640 feet (500 meters) of the project site no less than 14 days before initiating ground disturbance activities using survey methods described in Appendix D of the CDFW 2012 Staff Report (CDFW 2012). Much of the area within this 1,640-foot survey area does not contain habitat suitable for burrowing owl (e.g., residential areas, commercial development, roads) and would not require surveys. Inaccessible areas that contain habitat suitable for burrowing owl (e.g., the Riverside Golf Course property) shall be surveyed using binoculars or a spotting scope.

- If no occupied burrows are found, the qualified biologist shall submit a report documenting the survey methods and results to the City of Fresno, and no further mitigation shall be required.
- If an active burrow is found within 1,640 feet of pending construction activities during the nonbreeding season (September 1 through January 31), the applicant shall establish and maintain a minimum protection buffer of 164 feet (50 meters) around the occupied burrow throughout construction. If an active burrow is found on property outside of the project site (e.g., the Riverside Golf Course), then the protection buffer shall be established on a map, and only the portion of the buffer within the project site shall be marked with fencing, flagging, or other means. The actual buffer size shall be determined by the qualified biologist based on the time of year and level of disturbance in accordance with guidance provided in the CDFW Staff Report on Burrowing Owl Mitigation (CDFW 2012). The protection buffer may be adjusted if, in consultation with CDFW, a qualified biologist determines that an alternative buffer shall not disturb burrowing owl use of the burrow because of particular site features or other buffering measures. If occupied burrows are present that cannot be avoided or adequately protected with a no-disturbance buffer, a burrowing owl exclusion plan shall be developed, as described in Appendix E of the CDFW Staff Report. Burrowing owls shall not be excluded from occupied burrows until the project burrowing owl exclusion plan is approved by CDFW. The exclusion plan shall include a compensatory habitat mitigation plan (see below).
- If an active burrow is found during the breeding season (February 1 through August 31), occupied burrows shall not be disturbed and shall be provided with a protective buffer at a minimum of 164 feet unless a qualified biologist verifies through noninvasive means that either: (1) the birds have not begun egg laying, or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. The size of the buffer may be adjusted depending on the time of year and level of disturbance as outlined in the CDFW 2012 Staff Report. If an active burrow is found on property outside of the project site (e.g., the Riverside Golf Course), then the protection buffer shall be established on a map, and only the portion of the buffer within the site shall be marked with fencing, flagging, or other means. The size of the buffer may be reduced if a broad-scale, long-term, monitoring program acceptable to CDFW is implemented so that burrowing owls are not adversely affected. Once the fledglings are capable of independent survival, the owls can be evicted, and the burrow can be destroyed per the terms of a CDFW-approved burrowing owl exclusion plan developed in accordance with Appendix E of CDFW 2012 Staff Report.
- If burrowing owls are evicted from burrows and the burrows are destroyed by implementation of project activities, the applicant shall mitigate the loss of occupied habitat in accordance with guidance provided in the CDFW 2012 Staff Report, which states that permanent impacts on nesting, occupied, and satellite burrows, and burrowing owl habitat (i.e., grassland habitat with suitable burrows) shall be mitigated such that habitat acreage and number of burrows are replaced through permanent conservation of comparable or better habitat with similar vegetation communities and burrowing mammals (e.g., ground squirrels) present to provide for nesting, foraging, wintering, and dispersal. The applicant shall retain a qualified biologist to develop a burrowing owl mitigation and management plan that incorporates the following goals and standards:
    - Mitigation lands shall be selected based on comparison of the habitat lost to the compensatory habitat, including type and structure of habitat, disturbance levels, potential for conflicts with humans, pets, and other wildlife, density of burrowing owls, and relative importance of the habitat to the species throughout its range.
    - If feasible, mitigation lands shall be provided adjacent or proximate to the project site so that displaced owls can relocate with reduced risk of injury or mortality. Feasibility of providing mitigation adjacent or proximate to the project site depends on availability of sufficient habitat to support displaced owls that may be preserved in perpetuity.
    - If habitat suitable for burrowing owl is not available for conservation adjacent or proximate to the project site, mitigation lands can be secured off-site and shall aim to consolidate and enlarge conservation areas outside of planned development areas and within foraging distance of other conservation lands. Mitigation may be also accomplished through purchase of mitigation credits at a CDFW-approved mitigation bank, if available. Alternative mitigation sites and acreages may also be determined in consultation with CDFW.
    - If burrowing owl habitat mitigation is completed through permittee-responsible conservation lands, the mitigation plan shall include mitigation objectives, site selection factors, site management roles and

responsibilities, vegetation management goals, financial assurances and funding mechanisms, performance standards and success criteria, monitoring and reporting protocols, and adaptive management measures. Success shall be based on the number of adult burrowing owls and pairs using the site and if the numbers are maintained over time. Measures of success, as suggested in the CDFW 2012 Staff Report, shall include site tenacity, number of adult owls present and reproducing, colonization by burrowing owls from elsewhere, changes in distribution, and trends in stressors.

Significance after Mitigation

Implementation of Mitigation Measure 3.5-1a would reduce potential impacts on burrowing owl to a **less-than-significant** level by requiring a take avoidance survey for burrowing owl, implementation of measures to avoid injury or mortality of burrowing owls and destruction of active burrows if detected, and compensation if burrows cannot be avoided such that the habitat acreage and the number of burrows destroyed are replaced through permanent conservation of comparable or better habitat.

Swainson's Hawk, White-Tailed Kite, Common Raptors, and Other Common Native Birds

Two additional special-status birds have potential to occur on the project site: Swainson's hawk and white-tailed kite. Nesting habitat for Swainson's hawk and white-tailed kite is present within blue gum trees located adjacent to the future extension of Spruce Avenue and large mature trees on the Riverside Golf Course property north of the project site. Other common raptor species could also nest in trees on the project site or on the Riverside Golf Course, as well as on the large transmission tower on the project site, including red-tailed hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), great horned owl, and Cooper's hawk (*Accipiter cooperi*). Common native ground-nesting birds, including killdeer (*Charadrius vociferus*) and western meadowlark (*Sturnella neglecta*) may nest on the project site, and both species were observed on the site during the November 1, 2021, reconnaissance-level survey. While not special-status species, common raptors and other common native birds and their nests are protected under California Fish and Game Code and the federal MBTA.

Project implementation would include ground disturbance, tree removal, and other vegetation clearing which would require the use of equipment, vehicles, and heavy machinery. These activities could result in direct loss of nests or inadvertent disturbance, injury, or mortality of special-status and common native birds. If present, special-status and common native birds could be disturbed due to the presence of equipment and personnel potentially leading to nest abandonment. Active ground nests could be inadvertently removed and destroyed during ground disturbance activities, if present, potentially resulting in the loss of eggs or chicks. This would be a **potentially significant** impact.

Mitigation Measures

Mitigation Measure 3.5-1b: Conduct Focused Surveys for Swainson's Hawk, White-Tailed Kite, Other Nesting Raptors, and Other Native Nesting Birds and Implement Protective Buffers

- To minimize the potential for loss of Swainson's hawk, white-tailed kite, other raptors, and other native birds, project construction activities (e.g., tree removal, vegetation clearing, ground disturbance, staging) shall be conducted during the nonbreeding season (approximately September 1-January 31, as determined by a qualified biologist), if feasible. If project construction activities are conducted during the nonbreeding season, no further mitigation shall be required.
- Within 14 days before the onset of project construction activities during the breeding season (approximately February 1 through August 31, as determined by a qualified biologist), a qualified biologist familiar with birds of California and with experience conducting nesting bird surveys shall conduct focused surveys for Swainson's hawk, white-tailed kite, other nesting raptors, and other native birds. Surveys shall be conducted in accessible areas (i.e., not including private property) within 0.5 mile of the project site for Swainson's hawk and white-tailed kite; within 500 feet of the site for other raptors; and within 50 feet of the site for non-raptor common native bird nests. Inaccessible areas that contain habitat suitable for nesting birds (e.g., the Riverside Golf Course property) shall be surveyed using binoculars or a spotting scope.

- If no nests are found, the qualified biologist shall submit a report documenting the survey methods and results to the City of Fresno, and no further mitigation shall be required.
- Impacts on nesting birds shall be avoided by establishing appropriate buffers around active nest sites identified during focused surveys to prevent disturbance to the nest. Project construction activity, including tree removal, shall not commence within the buffer areas until a qualified biologist has determined that the young have fledged, the nest is no longer active, or reducing the buffer would not likely result in nest abandonment. An avoidance buffer shall be implemented for Swainson's hawk and white-tailed kite in consultation with CDFW. CDFW guidelines recommend implementation of 0.25- or 0.5-mile-wide buffers for Swainson's hawk nests, but the size of the buffer may be decreased if a qualified biologist and the City of Fresno, in consultation with CDFW, determine that such an adjustment would not be likely to adversely affect the nest. For other species, a qualified biologist shall determine the size of the buffer for nests of non-special-status species after a site- and nest-specific analysis. Buffers typically shall be 500 feet for common raptors. Buffer size for non-raptor common bird species generally shall be at least 20 feet. Factors to be considered for determining buffer size shall include presence of natural buffers provided by vegetation or topography, nest height above ground, baseline levels of noise and human activity, species sensitivity, and proposed project construction activities. The size of the buffer may be adjusted if a qualified biologist determines that such an adjustment would not be likely to adversely affect the nest. Any buffer reduction for a listed or fully protected species (i.e., Swainson's hawk, white-tailed kite) shall require consultation with CDFW. If an active nest is found on property outside of the project site (e.g., the Riverside Golf Course), then the protection buffer shall be established on a map, and only the portion of the buffer within the project site shall be marked with fencing, flagging, or other means. Periodic monitoring of the nest by a qualified biologist during project construction activities shall be required if the activity has potential to adversely affect the nest, the buffer has been reduced, or if birds within active nests are showing behavioral signs of agitation (e.g., standing up from a brooding position, flying off the nest) during project construction activities, as determined by the qualified biologist.

Significance after Mitigation

Implementation of Mitigation Measure 3.5-1b would reduce potential impacts on Swainson's hawk, white-tailed kite, other raptors, and other common native nesting birds to a **less-than-significant** level by requiring focused surveys for nesting birds and implementation of measures to avoid disturbance, injury, or mortality of the species if nests are detected.

3.6 ENERGY

This section was prepared pursuant to CEQA Guidelines Section 15126 and Appendix F of the CEQA guidelines, which require that EIRs include a discussion of the potential energy impacts of projects. The analysis considers whether the project would result in inefficient, wasteful, and unnecessary consumption of energy. No comments regarding energy use were received in response to the notice of preparation for this EIR.

3.6.1 Regulatory Setting

Energy conservation is embodied in many federal, state, and local statutes and policies. At the federal level, energy standards apply to numerous products (e.g., the U.S. Environmental Protection Agency's [EPA] EnergyStar™ program) and transportation (e.g., fuel efficiency standards). At the state level, Title 24 of the California Code of Regulations sets forth energy standards for buildings. Further, the State provides rebates/tax credits for installation of renewable energy systems, and offers the Flex Your Power program that promotes conservation in multiple areas. At the local level, individual cities and counties establish policies in their general plans and climate action plans (CAPs) related to the energy efficiency of new development and land use planning and to the use of renewable energy sources.

FEDERAL

Energy Policy and Conservation Act, and CAFE Standards

The Energy Policy and Conservation Act of 1975 established nationwide fuel economy standards to conserve oil. Pursuant to this act, the National Highway Traffic and Safety Administration, part of the U.S. Department of Transportation (DOT), is responsible for revising existing fuel economy standards and establishing new vehicle economy standards.

The Corporate Average Fuel Economy (CAFE) program was established to determine vehicle manufacturer compliance with the government's fuel economy standards. Compliance with the CAFE standards is determined based on each manufacturer's average fuel economy for the portion of their vehicles produced for sale in the country. EPA calculates a CAFE value for each manufacturer based on the city and highway fuel economy test results and vehicle sales. The CAFE values are a weighted harmonic average of the EPA city and highway fuel economy test results. Based on information generated under the CAFE program, DOT is authorized to assess penalties for noncompliance. Under the Energy Independence and Security Act of 2007 (described below), the CAFE standards were revised for the first time in 30 years.

Energy Policy Act of 1992 and 2005

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in EPAct. Federal tax deductions are allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs. The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 is designed to improve vehicle fuel economy and help reduce U.S. dependence on oil. It represents a major step forward in expanding the production of renewable fuels, reducing dependence on oil, and confronting global climate change. The Energy Independence and Security Act increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard requiring fuel producers to use at least 36 billion gallons of biofuel in 2022, which represents a nearly five-fold increase over current levels; and reduces U.S. demand for oil by setting a national fuel economy standard of 35 miles per gallon by 2020—an increase in fuel economy standards of 40 percent.

By addressing renewable fuels and the CAFE standards, the Energy Independence and Security Act of 2007 builds upon progress made by the Energy Policy Act of 2005 in setting out a comprehensive national energy strategy for the 21st century.

STATE

Warren-Alquist Act

The 1975 Warren-Alquist Act established the California Energy Resources Conservation and Development Commission, now known as the California Energy Commission (CEC). The act established state policy to reduce wasteful, uneconomical, and unnecessary uses of energy by employing a range of measures. The California Public Utilities Commission (CPUC) regulates privately-owned utilities in the energy, rail, telecommunications, and water fields.

State of California Energy Action Plan

CEC is responsible for preparing the State Energy Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and the maintenance of a healthy economy. The current plan is the 2003 California Energy Action Plan (2008 update). The plan calls for the State to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero-emission vehicles and addressing their infrastructure needs; and encouragement of urban design that reduces vehicle miles traveled (VMT) and accommodates pedestrian and bicycle access.

Assembly Bill 2076: Reducing Dependence on Petroleum

Pursuant to Assembly Bill (AB) 2076 (Chapter 936, Statutes of 2000), CEC and the California Air Resources Board (CARB) prepared and adopted a joint agency report in 2003, *Reducing California's Petroleum Dependence*. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita VMT (CEC and CARB 2003). Further, in response to the CEC's 2003 and 2005 *Integrated Energy Policy Reports*, Governor Davis directed CEC to take the lead in developing a long-term plan to increase alternative fuel use.

A performance-based goal of AB 2076 was to reduce petroleum demand to 15 percent below 2003 demand by 2030.

Integrated Energy Policy Report

Senate Bill (SB) 1389 (Chapter 568, Statutes of 2002) required CEC to "conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The Energy Commission shall use these assessments and forecasts to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the state's economy, and protect public health and safety" (PRC Section 25301[a]). This work culminated in preparation of the first Integrate Energy Policy Report (IEPR).

CEC adopts an IEPR every 2 years and an update every other year. The multivolume 2021 IEPR, which is the most recent IEPR, was adopted in February 2022. Volume I of the 2021 IEPR addresses actions needed to reduce the greenhouse gases (GHGs) related to the buildings in which Californians live and work, with an emphasis on energy efficiency. It also addresses reducing GHG emissions from the industrial and agricultural sectors. Volume II examines actions needed to increase the reliability and resiliency of California's energy system. Volume III looks at the evolving role of gas in

California's energy system. Volume IV reports on California's energy demand outlook, including a forecast to 2035 and long-term energy demand scenarios to 2050. The analysis addresses the electricity, gas, and transportation sectors. The appendix volume assesses the benefits of California's Clean Transportation Program (CEC 2022a).

Legislation Associated with Electricity Generation

The State has passed multiple pieces of legislation requiring the increasing use of renewable energy to produce electricity for consumers. California's Renewable Portfolio Standard (RPS) Program was established in 2002 (SB 1078) with the initial requirement for electric utility providers to generate 20 percent of their electricity from renewable by 2017, 33 percent of their electricity from renewables by 2020 (SB X1-2 of 2011), 52 percent by 2027 (SB 100 of 2018), 60 percent by 2030 (also SB 100 of 2018), and 100 percent by 2045 (also SB 100 of 2018). More detail about these regulations is provided in Section 3.7, "Greenhouse Gas Emissions and Climate Change."

Senate Bill 350: Clean Energy and Pollution Reduction Act of 2015

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires doubling of the energy efficiency savings in electricity and natural gas for retail customers through energy efficiency and conservation by December 31, 2030.

Assembly Bill 1007: State Alternative Fuels Plan

AB 1007 (Chapter 371, Statutes of 2005) required CEC to prepare a state plan to increase the use of alternative fuels in California. CEC prepared the State Alternative Fuels Plan in partnership with CARB and in consultation with other state, federal, and local agencies. The plan presents strategies and actions California must take to increase the use of nonpetroleum fuels in a manner that minimizes the costs to California and maximizes the economic benefits of in-state production. The plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuel use, reduce GHG emissions, and increase in-state production of biofuels without causing a significant degradation to public health and environmental quality.

California Building Energy Efficiency Standards (Title 24, Part 6)

The energy consumption of new residential and nonresidential buildings in California is regulated by the California Energy Code. The code was established by CEC in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption and provide energy-efficiency standards for residential and nonresidential buildings. CEC updates the California Energy Code every 3 years, typically including more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions.

The 2019 California Energy Code was adopted by CEC on May 9, 2018, and applies to projects constructed after January 1, 2020. CEC estimates that the combination of required energy-efficiency features and mandatory solar panels in the 2019 California Energy Code will result in new residential buildings that use 53 percent less energy than those designed to meet the 2016 California Energy Code. CEC also estimates that the 2019 California Energy Code will result in new commercial buildings that use 30 percent less energy than those designed to meet the 2016 standards, primarily through the transition to high-efficacy lighting (CEC 2018).

California Green Building Standards (Title 24, Part 11)

The California Green Building Standards, also known as CALGreen, is a reach code (i.e., optional standards that exceed the requirements of mandatory codes) developed by CEC that provides green building standards for statewide residential and nonresidential construction. The current version is the 2019 CALGreen Code, which took effect on January 1, 2020. As compared to the 2016 CALGreen Code, the 2019 CALGreen Code strengthened sections pertaining to EV and bicycle parking, water efficiency and conservation, and material conservation and resource efficiency, among other sections of the CALGreen Code. The CALGreen Code sets design requirements equivalent to or more stringent than those of the California Energy Code for energy efficiency, water efficiency, waste diversion, and indoor air quality. These codes are adopted by local agencies that enforce building codes and used as guidelines by state agencies for meeting the requirements of Executive Order B-18-12.

Legislation Associated with Greenhouse Gas Reduction

The State has passed legislation that aims to reduce GHG emissions. The legislation often has an added benefit of reducing energy consumption. SB 32 requires a statewide GHG emission reduction of at least 40 percent below 1990 levels by no later than December 31, 2030. Executive Order S-3-05 sets a long-term target of reducing statewide GHG emissions by 80 percent below 1990 levels by 2050.

SB 375 aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. The Advanced Clean Cars program, approved by CARB, combines the control of GHG emissions and criteria air pollutants and the increase in the number of zero-emission vehicles into a single package of standards. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025.

Implementation of the state's legislation associated with GHG reduction will have the co-benefit of reducing California's dependency on fossil fuel and making land use development and transportation systems more energy efficient.

More details about legislation associated with GHG reduction are provided in the regulatory setting of Section 3.7, "Greenhouse Gas Emissions and Climate Change."

LOCAL

City of Fresno General Plan

The City of Fresno General Plan establishes the following policy related energy that is relevant to the project:

- Policy RC-5-c: GHG Reduction through Design and Operations. Increase efforts to incorporate requirements for GHG emission reductions in land use entitlement decisions, facility design, and operational measures subject to City regulation through the following measures and strategies:
  - Promote the expansion of incentive-based programs that involve certification of projects for energy and water efficiency and resiliency. These certification programs and scoring systems may include public agency "Green" and conservation criteria, Energy Star™ certification, CALGreen Tier 1 or Tier 2, Leadership in Energy Efficient Design (LEED™) certification, etc.
  - Promote appropriate energy and water conservation standards and facilitate mixed-use projects, new incentives for infill development, and the incorporation of mass transit, bicycle and pedestrian amenities into public and private projects.
  - Require energy and water audits and upgrades for water conservation, energy efficiency, and mass transit, pedestrian, and bicycle amenities at the time of renovation, change in use, change in occupancy, and change in ownership for major projects meeting review thresholds specified in an implementing ordinance.
  - Incorporate the City's "Guidelines for Ponding Basin/Pond Construction and Management to Control Mosquito Breeding" as conditions of approval for any project using an on-site stormwater basin to prevent possible increases in vector-borne illnesses associated with global climate change.
  - Periodically evaluate the City's facility maintenance practices to determine whether there are additional opportunities to reduce GHGs through facility cleaning and painting, parks maintenance, road maintenance, and utility system maintenance.
  - Periodically evaluate standards and mitigation strategies for highly vehicle-dependent land uses and facilities, such as drive-through facilities and auto-oriented development.

City of Fresno Climate Action Plan

The City of Fresno first adopted its GHGRP in 2014. The City updated its GHGRP in 2021 to extend its GHG reduction targets beyond 2020 to align with state reduction targets for 2030 (as mandated by SB 32) and 2035 (to align with the horizon year of the general plan). The GHGRP estimates forecasted emissions in the city using a business-as-usual (BAU) model that does not account for various statewide regulations that will reduce emissions in the city.

3.6.2 Environmental Setting

ELECTRICITY AND NATURAL GAS USE

Electric services and natural gas are provided by Pacific Gas and Electric Company (PG&E) for the project. In 2020, PG&E provided its customers enrolled in PG&E's base plan with an energy portfolio composed of 31 percent eligible renewable energy, 10 percent large hydroelectric power, 16 percent natural gas, and 42 percent nuclear power (CEC 2021). PG&E also offers its customers the option to enroll in a 50 or 100 percent renewable energy plan through its Solar Choice Program.

ENERGY USE FOR TRANSPORTATION

In 2020, the transportation sector comprised the largest end-use sector of energy in the state totaling 40.3 percent, followed by the industrial sector totaling 23.1 percent, the commercial sectors at 18.7 percent, and the residential sector of 18.0 percent (EIA 2022). On-road vehicles use about 90 percent of the petroleum consumed in California. The CEC reported retail sales of 156 million gallons of gasoline and diesel in Fresno County in 2020 (the most recent data available) (CEC 2022b). The California Department of Transportation (Caltrans) projects that 522 and 168 million gallons of gasoline and diesel, respectively, will be consumed in Fresno County in 2025 (Caltrans 2008).

ENERGY USE AND CLIMATE CHANGE

Scientists and climatologists have produced substantial evidence that the burning of fossil fuels by vehicles, power plants, industrial facilities, residences, and commercial facilities has led to an increase of the earth's temperature (IPCC 2014 and OPR et al. 2018). For an analysis of GHG production and the project's contribution to climate change, see Section 3.7, "Greenhouse Gas Emissions and Climate Change."

3.6.3 Impacts and Mitigation Measures

METHODOLOGY

Construction of the project requires the use of transportation fuel, including gasoline and diesel use in construction equipment, material transport via hauling trucks, delivery via vendor trucks, and construction worker vehicles. Fuel consumed by construction equipment would be the primary energy resource expended over the course of construction, while VMT associated with the transportation of construction materials and construction worker commutes would also result in fuel consumption. Construction workers would travel to and from the project site throughout the duration of construction; this analysis assumes that construction workers would primarily use gasoline-powered passenger vehicles.

Fuel Use for Heavy-Duty Construction Equipment

Heavy-duty construction equipment of various types would be used during each phase of construction. Heavy-duty construction equipment associated with construction activities would use diesel fuel. The California Emissions Estimator Model (CalEEMod) Version 2020.4.0. was used to estimate construction equipment usage, and results are included in Appendix E. Fuel consumption from construction equipment was estimated by converting the total carbon dioxide (CO_2) emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of diesel. The estimated diesel fuel usage from off-road construction sources over the course of the project construction period is 55,154 gallons.

Fuel Use for Worker, Vendor, and Hauling Trips during Construction

Fuel consumption from worker, vendor, and hauling trips are estimated by converting the total CO_2 emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of gasoline or diesel. Worker vehicles are assumed to include light-duty automobiles and trucks, vendor vehicles are assumed to include an equal mix of medium heavy-duty trucks and heavy heavy-duty trucks, and hauling vehicles are assumed to include heavy heavy-duty trucks. Estimated fuel usage totals 17,539 gallons of gasoline and 29,805 gallons of diesel over the course of the project construction period. Construction of the project is not anticipated to require natural gas fuel. Therefore, natural gas related to construction of the project is not discussed further.

Electricity Use during Project Operation

Operation of the project would result in electricity demand for the car wash, warehouse, gas station, and parking lot. The total electricity use for the project assumes compliance with the 2022 Title 24 standards. The project would require natural gas, mainly for building heating, food preparation, and hot water. Natural gas is estimated using CalEEMod defaults based on averages for the climate zone for the car wash, warehouse, and gas station. Estimates for the project are conservative because they assume the project would be built to existing 2022 Title 24, Part 6 standards, even though it is assumed (based on the 2023 construction year) that a subsequent, more energy efficient iteration of the code will apply.

Fuel Use for Commute Trips during Project Operation

Operational gasoline fuel usage occurs due to customer trips and employee trips when commuting to work at the warehouse, car wash, and gas station and is calculated based on gasoline vehicle net VMT. The development of the member and employee VMT is described in detail in Appendix D. Gasoline fuel consumption for the project is calculated by dividing total net member and employee VMT by average fuel efficiency of gasoline vehicles in Fresno County from the EMFAC2021 database for calendar year 2023.

Fuel Use for Truck Trips during Project Operation

Warehouse truck, fuel delivery truck, and Market Delivery Operations delivery truck fuel consumption is based on total net VMT, which is described in detail in Appendix D. Diesel fuel consumption for the project is calculated by dividing total net diesel truck VMT by the average fuel efficiency of diesel vehicles in Fresno County from the EMFAC2021 database for calendar year 2023.

THRESHOLDS OF SIGNIFICANCE

An impact on energy would be significant if implementation of the project would:

- result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy, or wasteful use of energy resources, during project construction or operation; and/or
- conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

TOPICS NOT DISCUSSED FURTHER

All of the topics identified in Appendix G of the State CEQA Guidelines are examined in this analysis.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.6-1: Result in a Potentially Significant Environmental Impact Due to the Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources, During Project Construction or Operation

The project would not use energy for construction that would be considered wasteful or unnecessary, as that energy expenditure would facilitate operation of the project and achievement of project goals. The project does not include any construction activity beyond what is needed to provide a functional facility. Construction of the project would adhere to best management practices (BMPs) for construction (e.g., restrict idling time to 5 minutes or less). Moreover, the project would utilize Tier 3 construction equipment or construction equipment exceeding 50 horsepower (hp). The project would introduce new electricity and natural gas consumption relative to baseline conditions; however, the project would be enrolled in the PG&E's Solar Choice Program to procure 100 percent of its electricity from solar resources. The project would also be served by existing infrastructure capable of meeting the project's operational energy needs. During operation, energy would not be used in a wasteful or inefficient manner. This impact would be **less than significant.**

Most of the project's construction-related energy consumption would be associated with the use of off-road equipment and the transport of equipment and materials using on-road haul trucks. An estimated 17,539 gallons of gasoline and 84,959 gallons of diesel fuel would be used during construction of the project (see Appendix E for a summary of construction calculations). The energy needs for project construction would occur over a 7-month construction period and are not anticipated to require additional capacity or substantially increase peak or base period demands for electricity and other forms of energy. Gasoline and diesel would also be consumed during worker commute trips. Energy would be required to transport demolition waste and excavated materials. The project would also utilize Tier 3 engines for all construction equipment exceeding 50 hp and would comply with the statewide standard of restricting idling time to no more than 5 minutes. The one-time energy expenditure required to construct the project (spread over the buildout period) would be nonrecoverable. However, there is no atypical construction-related energy demand associated with the project. Nonrenewable energy would not be consumed in a wasteful, inefficient, or unnecessary manner when compared to other construction activity in the region. Additionally, as shown in Appendix E, on-road gasoline and diesel fuel consumption associated with construction activity would go down every year as the vehicle fleet becomes more fuel-efficient over time.

Table 3.6-1 summarizes total construction gasoline and diesel fuel consumption.

Table 3.6-1 Operational Energy Consumption

Construction Activity	Energy Consumption	Units
Diesel Fuel		
Off-Road Heavy Duty Equipment	55,154	gallons
On-Road Mobile Activity	29,805	gallons
Gasoline		
On-Road Mobile Activity	17,539	gallons

Source: Calculations by Ramboll Environ in 2023.

Energy would be consumed from operation of the various land use types proposed for the project site. Table 3.6-2 summarizes the electricity and natural gas consumption from each portion of the project as expressed in kilowatt hours per year (kWh/year) and kilo British Thermal Unit per year (kBtu/year). In total, the project would consume 2,116,460 kWh/year of electricity and 2,753,494 kBtu/year of natural gas. Additionally, vehicle trips related to project implementation would consume 1,088,273 and 59,908 gallons of gasoline and diesel fuel, respectively, in 2023. Notably, the project would obtain its electricity through PG&E Solar Choice Program, which provides 100 percent renewable energy to customers enrolled in the program.

Table 3.6-2 Operational Energy Consumption

Land Use/Energy Type[1]	Energy Consumption	Units
Automobile Care Center		
Electricity	41,328	kWh/year
Natural Gas	99,360	kBtu/year
Discount Club		
Electricity	1,911,410	kWh/year
Natural Gas	2,560,620	kBtu/year
Gasoline/Service Station		
Electricity	38,897	kWh/year
Natural Gas	93,514	kBtu/year
Parking Lot		
Electricity	124,460	kWh/year
Natural Gas	0	kBtu/year
All Land Uses		
Electricity	2,297,337	kWh/year
Natural Gas	2,753,494	kBtu/year

Notes: kWh/year = kilowatt-hours per year; kBtu/year = kilo British thermal units per year.

[1] these designation titles align with the titles used in CALEEMOD.

Source: Calculations by Ramboll Environ in 2023.

For context, the increase in operational electrical demand from the project would represent 0.026 percent of the total electrical demand countywide and 0.001 percent of the total electricity demand statewide. In 2020, total in-state electricity consumption was 279,510 GWh. CEC estimates that state-wide energy demand will increase to 354,209 GWh in 2030. The project's anticipated electricity usage of 2,297,337 kWh/year is approximately 0.0008 percent of the statewide demand in 2020. Given that the state is growing annually, the anticipated state-wide energy demand for the anticipated build-out year for the project of 2023 will likely be greater than that in 2020, and thus the project's relative percentage contribution to the state-wide energy demand would be even less.

With respect to natural gas, the project's incremental contribution of new demand would equate to 0.008 percent of the total natural gas consumed countywide and 0.0002 percent of the total natural gas demand statewide. Similarly, the gasoline and diesel fuel consumption from the project would represent 0.284 and 0.028 percent, respectively, of the county's total consumption. This fuel consumption would equate to 0.007 percent and 0.001 percent, respectively, of the total gasoline and diesel fuel consumed statewide.

Reducing energy consumption by incorporating sustainable design features and systems with enhanced energy efficiencies meeting State and federal requirements is a stated objective of the project. The project would comply with the 2022 California Energy Code, which is intended to increase the energy efficiency of new development projects in the state. Through the permitting process, all development would comply with the State's Title 24 California Building Code. The 2022 California Energy Code (and subsequent updates), which the project is subject to, is designed to move the state closer to its zero-net energy goals. For these same reasons, the project would be consistent with the City's general plan. As also stated in Section 3.6.1, PG&E, as an electricity utility, is required to comply with the future benchmarks of the state's RPS (i.e., 52 percent renewable by 2027, 60 percent by 2030, and 100 percent by 2045). Because electricity utilities in the state are required to increase the percentage of renewable energy sources in the electricity they provide, over time electricity consumed as part of the project will increasingly be provided by renewable sources.

Although the project would result in the generation of VMT associated with shopper trips to the warehouse, purchase of goods in bulk can reduce the overall energy used for the packaging and transport of consumer goods. Further, Mitigation Measure 3.13-2, identified in Section 3.13, "Transportation and Circulation," would establish a mandatory commute reduction program for employees to reduce the energy demand associated with work commutes. Additionally, through regulatory mechanisms in place, such as the Advanced Clean Cars program and Advanced Clean Trucks, gasoline and diesel fuel consumption will continue to decrease as California's on-road transportation sectors electrifies over time.

Therefore, energy would not be used in a wasteful or inefficient manner during operation. As discussed in Section 3.14, "Utilities," the project would be served by existing power and natural gas lines and would not require any new infrastructure to meet the project's energy needs. The project would introduce 2,297,337 kWh/year and 2,753,494 Btu/year of operational energy usage which could be met through existing infrastructure.

The project would not result in wasteful, inefficient, or unnecessary consumption of energy. The project's incremental increase in electricity, natural gas, gasoline, and diesel fuel consumption would represent a small percentage of total consumption within the context of the County of Fresno. The project would serve the community as a retail land use. Locating shopping options near existing residences, where consumers can fulfill multiple shopping needs in one trip, would support efficient use of energy. In addition, the project would procure its electricity from PG&E's Solar Choice Program. This impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

Impact 3.6-2: Conflict with or Obstruct Implementation of Energy Measures of a State or Local Plan for Renewable Energy or Energy Efficiency

The project would be consistent with the relevant energy measures from the City of Fresno's GHGRP that pertain to nonresidential development. Because the project would incorporate relevant measures as project design features, such as a commitment to PG&E's Solar Choice Program, and would incorporate energy-reducing measures from the GHGRP, the project would not conflict with or obstruct implementation of the City of Fresno's GHGRP. This impact would be **less than significant.**

As discussed in Section 3.6.1, "Regulatory Setting," the City of Fresno adopted its most recent update to its GHGRP in 2020. The GHGRP includes GHG emission reduction targets, strategies, and implementation measures developed to help the City reach these targets. Reduction strategies address GHG emissions associated with transportation and land use, water, waste management and recycling, agriculture, open space, and energy. Consistency with State and local plans is demonstrated in the Energy Technical Report provided as Appendix E (Tables B-1 and B-2). The analysis in Section 3.7, "Greenhouse Gas Emissions and Climate Change," which is incorporated by reference, also demonstrates the project's consistency with the targets in the City's GHGRP and establishes a chain of consistency between the GHGRP and the State's targets for GHG reduction. Because the GHGRP is designed to comply with statewide plans, projects consistent with the local plans are inherently consistent with the State's plans for energy efficiency.

As discussed in Chapter 2, "Project Description," the project is committed to enrolling in PG&E Solar Choice Program, which provides options for customers to acquire 50 or 100 percent of its electricity from renewable sources. The project has committed to enrolling in the 100 percent renewable option of PG&E's Solar Choice Program which would align the project with the energy reduction measures of the GHGRP.

Due to the inclusion of energy efficiency and renewable energy measures as part of the project and compliance with state regulations related to energy efficiency and renewable energy, as well as the GHGRP, project implementation would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Therefore, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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3.7 GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

This section presents a summary of regulations applicable to greenhouse gas (GHG) emissions; a summary of climate change science and GHG sources in California; quantification of project-generated GHGs and discussion about their contribution to global climate change; and analysis of the project's resiliency to climate change-related risks. No comments were received in response to the notice of preparation that specifically address GHG emissions or climate change. Effects related to pollution and air quality concerns are addressed in Section 3.3, "Air Quality."

3.7.1 Regulatory Setting

FEDERAL

Greenhouse Gas Emission Standards

In *Massachusetts et al. v. Environmental Protection Agency et al.,* 549 U.S. 497 (2007), the Supreme Court of the United States ruled that CO_2 is an air pollutant as defined under the federal Clean Air Act (CAA) and that the U.S. Environmental Protection Agency (EPA) has the authority to regulate GHG emissions. In 2010, EPA started to address GHG emissions from stationary sources through its New Source Review permitting program, including operating permits for "major sources" issued under Title V of the CAA.

In October 2012, EPA and the National Highway Traffic Safety Administration, on behalf of the U.S. Department of Transportation, issued final rules to further reduce GHG emissions and improve corporate average fuel economy (CAFE) standards for light-duty vehicles for model years 2017 and beyond (77 *Federal Register* 62624). These rules would increase fuel economy to the equivalent of 54.5 miles per gallon, limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025 (77 *Federal Register* 62630).

On April 2, 2018, the EPA administrator announced a final determination that the current standards should be revised. On August 2, 2018, the U.S. Department of Transportation and EPA proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule), which would amend existing CAFE standards for passenger cars and light-duty trucks by increasing the stringency of the standards by 1.5 percent per year from models 2021 through 2026.

The CAA grants California the ability to enact and enforce more strict fuel economy standards through the acquisition of an EPA-issued waiver. Each time California adopts a new vehicle emission standard, the state applies to EPA for a preemption waiver for those standards. However, Part One of the SAFE Rule, which became effective on November 26, 2019, revoked California's existing waiver to implement its own vehicle emission standard. Part Two of the SAFE Rule established a standard to be adopted and enforced nationwide (84 Federal Register [FR] 51310). Pending several legal challenges to Part One of the SAFE Rule and administrative turnover, on December 21, 2021, the NHSTA published its CAFE Preemption Rule, which finalizes the repeal of the SAFE Rule Part 1 allowing California to continue procuring its waiver from EPA through the CAA to enforce more stringent emissions standards. Also, on April 1, 2022, the Secretary of Transportation unveiled new CAFE standards for 2024–2026 model year passenger cars and light-duty trucks. These new standards require new vehicles sold in the US to average at least 40 miles per gallon and apply to all states except those that enforce stricter standards.

STATE

Statewide GHG Emission Targets and Climate Change Scoping Plan

Reducing GHG emissions in California has been the focus of the State government for approximately two decades. GHG emission targets established by the State legislature include reducing statewide GHG emissions to 1990 levels by 2020 (Assembly Bill [AB] 32 of 2006) and reducing them to 40 percent below 1990 levels by 2030 (Senate Bill [SB] 32 of 2016). Executive Order S-3-05 calls for statewide GHG emissions to be reduced to 80 percent below 1990 levels by 2050. This target was superseded by AB 1279, which codifies a goal for carbon neutrality and reduce emissions by 85 percent below 1990 levels by 2045. These targets are in line with the scientifically established levels needed in the U.S.

to limit the rise in global temperature to no more than 2 degrees Celsius, the warming threshold at which major climate disruptions, such as super droughts and rising sea levels, are projected; these targets also pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius (United Nations 2015).

CARB adopted the *Final 2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan) on December 16, 2022, which traces the State's the pathway to achieve its carbon neutrality and an 85 percent reduction in 1990 emissions goal by 2045 using a combined top-down, bottom-up approach under various scenarios. It identifies the reductions needed by each GHG emission sector (e.g., transportation [including off-road mobile source emissions], industry, electricity generation, agriculture, commercial and residential, pollutants with high global warming potential, and recycling and waste) to achieve these goals.

The state has also passed more detailed legislation addressing GHG emissions associated with transportation, electricity generation, and energy consumption, as summarized below.

Transportation-Related Standards and Regulations

CARB certified the Advanced Clean Cars II Program (ACC II Program) on August 25, 2022. The ACC II Program builds upon the existing ACC program and established more stringent zero emissions vehicle (ZEV) sales requirements for future benchmark years. The ACC II Program is designed to ensure that 100 percent of all vehicle sales in the State will be ZEVs by 2035.

CARB has also adopted the Advanced Clean Trucks Regulation (ACT Regulation) which sets requirements for the transition of diesel trucks and vans to zero-emission trucks beginning in 2024. CARB estimates that the ACT Regulation will lower related premature deaths.

Executive Order B-48-18, signed into law in January 2018, requires all state entities to work with the private sector to have at least 5 million ZEVs on the road by 2030, as well as 200 hydrogen-fueling stations and 250,000 EV-charging stations installed by 2025. It specifies that 10,000 of these charging stations must be direct-current fast chargers.

CARB adopted the Low Carbon Fuel Standard (LCFS) in 2007 to reduce the carbon intensity (CI) of California's transportation fuels. Low-CI fuels emit less CO_2 than other fossil fuel–based fuels such as gasoline and fossil diesel. The LCFS applies to fuels used by on-road motor vehicles and off-road vehicles, including construction equipment (Wade, pers. comm., 2017).

In addition to regulations that address tailpipe emissions and transportation fuels, the state legislature has passed regulations to address the amount of driving by on-road vehicles. Since passage of SB 375 in 2008, CARB requires metropolitan planning organizations to develop and adopt sustainable communities strategies as a component of the federally prepared regional transportation plans to show reductions in GHG emissions from passenger cars and light-duty trucks in their respective regions for 2020 and 2035. These plans link land use and housing allocation to transportation planning and related mobile-source emissions. The Fresno Council of Governments (COG) serves as the metropolitan planning organization for Fresno County. The Fresno COG was tasked by CARB to achieve a 5-percent per capita reduction compared to 2012 emissions by 2020 and a 10-percent per capita reduction by 2035, both of which CARB confirmed the region would achieve by implementing the Regional Transportation Plan/Sustainable Communities Strategy (CARB 2019). In March 2018, CARB promulgated revised targets tasking the Fresno COG to achieve a 6-percent and a 13-percent per capita reduction by 2020 and 2035, respectively (CARB 2018). The Fresno COG has not yet prepared a Regional Transportation Plan/Sustainable Communities Strategy to demonstrate that it will meet these targets.

SB 743 of 2013 required that the Governor's Office of Planning and Research (OPR) propose changes to the State CEQA Guidelines to address transportation impacts in transit priority areas and other areas of the state. In response, Section 15064.3 was added to CEQA in December 2018, requiring that transportation impacts no longer consider congestion but instead focus on the impacts of vehicle miles traveled (VMT). In support of these changes, OPR published its *Technical Advisory on Evaluating Transportation Impacts in CEQA,* which recommends that the transportation impact of a project be based on whether the project would generate a level of VMT per capita (or VMT per employee or some equivalent metric) that is 15 percent lower than that of existing development in the region, or that a different threshold is used based on substantial evidence (OPR 2017). OPR's technical advisory

explains that this criterion is consistent with Public Resources Code Section 21099, which states that the criteria for determining significance must "promote the reduction in greenhouse gas emissions" (OPR 2017). This metric is intended to replace the use of delay and level of service to measure transportation-related impacts. More detail about SB 743 is provided in the "Regulatory Setting" section of Section 3.13, "Transportation and Circulation."

Legislation Associated with Electricity Generation

The state has passed legislation requiring the increasing use of renewables to produce electricity for consumers. California's Renewables Portfolio Standard Program was established in 2002 (SB 1078) with the initial requirement to generate 20 percent of their electricity from renewable by 2017, 33 percent of their electricity from renewables by 2020 (SB X1-2 of 2011), 52 percent by 2027 (SB 100 of 2018), 60 percent by 2030 (also SB 100 of 2018), and 100 percent by 2045 (also SB 100 of 2018).

California Building Energy Efficiency Standards (Title 24, Part 6)

The energy consumption of new residential and nonresidential buildings in California is regulated by the California Code of Regulations Title 24, Part 6, Building Energy Efficiency Standards (California Energy Code). The California Energy Commission (CEC) updates the California Energy Code every 3 years with more stringent design requirements for reduced energy consumption, which results in the generation of fewer GHG emissions. The current California Energy code will require builders to use more energy-efficient building technologies for compliance with increased restrictions on allowable energy use. CEC estimates that the combination of mandatory on-site renewable energy and prescriptively required energy efficiency features will result in new residential construction that uses 53 percent less energy than the 2016 standards. Nonresidential buildings are anticipated to reduce energy consumption by 30 percent compared to the 2016 standards primarily through prescriptive requirements for high-efficiency lighting (CEC 2018).

The Title 24 Building Energy Efficiency Standards are enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary in response to local climatologic, geologic, or topographic conditions, provided that these standards are demonstrated to be cost effective and exceed the energy performance required by Title 24 Part 6.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of in landfills, the State Legislature passed the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. According to AB 939, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Through other statutes and regulations, this 50 percent diversion rate also applies to State agencies. In order of priority, waste reduction efforts must promote source reduction, recycling and composting, and environmentally safe transformation and land disposal.

In 2011, AB 341 modified the California Integrated Waste Management Act and directed CalRecycle to develop and adopt regulations for mandatory commercial recycling. The resulting Mandatory Commercial Recycling Regulation (2012) requires that on and after July 1, 2012, certain businesses that generate 4 cubic yards or more of commercial solid waste per week shall arrange recycling services. To comply with this requirement, businesses may either separate recyclables and self-haul them or subscribe to a recycling service that includes mixed waste processing. AB 341 also established a statewide recycling goal of 75 percent; the 50 percent disposal reduction mandate still applies for cities and counties under AB 939, the Integrated Waste Management Act.

Safeguarding California Plan: California's Climate Adaptation Strategy

Safeguarding California is California's overall plan for climate adaptation, originally released in 2014 and most recently updated in 2018, as directed by AB 1482 which requires the plan be updated every 3 years. The plan provides policy guidance for state decision makers and is part of continuing efforts to reduce impacts and prepare for climate risks. This plan establishes California's comprehensive climate strategy, discusses progress to date on the State's various climate adaptation efforts, highlights state agency adaptation initiatives and makes realistic sector-specific recommendations. Policy recommendations in the plan are presented in three main chapters: Social Systems and the Built Environment; Natural and Managed Resource Systems; and Parks, Recreation, and California Culture. The plan

also includes a chapter focused specifically on Climate Justice and provides policy recommendations to ensure that the states adaptation strategies are implemented in and just and equitable manner that benefit California's most disadvantaged communities (CNRA 2018).

LOCAL

San Joaquin Valley Air Pollution Control District

The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the primary agency responsible for addressing air quality concerns in Fresno County. Its role is discussed further in Section 3.3, "Air Quality." SJVAPCD also recommends methods for analyzing project-generated GHGs in CEQA analyses and offers multiple potential GHG reduction measures for land use development projects. SJVAPCD developed thresholds of significance to provide a uniform scale to measure the significance of GHG emissions from land use and stationary source projects in compliance with CEQA and AB 32. SJVAPCD's goals in developing GHG thresholds include ease of implementation, use of standard analysis tools, and emissions mitigation consistent with AB 32. However, SJVAPCD has not developed new thresholds since the passage of SB 32, which mandates a statewide emissions target of 40 percent below 1990 levels by 2030.

City of Fresno General Plan

The City of Fresno General Plan establishes the following policies related to GHG and climate change that are relevant to the project:

- Policy RC-5-c: GHG Reduction through Design and Operations. Increase efforts to incorporate requirements for GHG emission reductions in land use entitlement decisions, facility design, and operational measures subject to City regulation through the following measures and strategies:
  - Promote the expansion of incentive-based programs that involve certification of projects for energy and water efficiency and resiliency. These certification programs and scoring systems may include public agency "Green" and conservation criteria, Energy Star™ certification, CALGreen Tier 1 or Tier 2, Leadership in Energy Efficient Design (LEED™) certification, etc.
  - Promote appropriate energy and water conservation standards and facilitate mixed-use projects, new incentives for infill development, and the incorporation of mass transit, bicycle and pedestrian amenities into public and private projects.
  - Require energy and water audits and upgrades for water conservation, energy efficiency, and mass transit, pedestrian, and bicycle amenities at the time of renovation, change in use, change in occupancy, and change in ownership for major projects meeting review thresholds specified in an implementing ordinance.
  - Incorporate the City's "Guidelines for Ponding Basin/Pond Construction and Management to Control Mosquito Breeding" as conditions of approval for any project using an on-site stormwater basin to prevent possible increases in vector-borne illnesses associated with global climate change.
  - Periodically evaluate the City's facility maintenance practices to determine whether there are additional opportunities to reduce GHGs through facility cleaning and painting, parks maintenance, road maintenance, and utility system maintenance.
  - Periodically evaluate standards and mitigation strategies for highly vehicle-dependent land uses and facilities, such as drive-through facilities and auto-oriented development.

City of Fresno Climate Action Plan

The City adopted its first greenhouse gas reduction plan (GHGRP) in 2014. The City also updated its GHGRP in 2021 to extend its GHG reduction targets beyond 2020 to align with state reduction targets for 2030 as mandated by SB 32 and 2035 to align with the horizon year of the general plan. The GHGRP estimates forecasted emissions in the city using a business-as-usual (BAU) model that does not account for various statewide regulations that will reduce emissions in the city. To establish GHG reduction targets, an adjusted BAU (ABAU) that accounts for such regulations

was also estimated. Following this exercise, an emissions reduction targets of reducing emissions by an additional 29,316 and 209,463 metric tons of carbon dioxide equivalent ($MTCO_2e$) for 2030 and 2035, respectively, through local GHG reduction measures was established. These reductions represent a 1.5 and 11.6 percent reduction in all GHG emissions for 2030 and 2035, respectively, and will be used in this analysis to demonstrate that the project's projected emissions align with the GHGRP.

3.7.2 Environmental Setting

Certain gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected toward space. The absorbed radiation is then emitted from the earth as low-frequency infrared radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on earth.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are found to be responsible for intensifying the greenhouse effect and leading to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. The Sixth Assessment Report contains IPCC's strongest warnings to date on the causes and impacts of climate change. Importantly, the report notes that, in terms of solutions, "We need transformational change operating on processes and behaviors at all levels: individual, communities, business, institutions, and governments. We must redefine our way of life and consumption."

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the lifetime of any GHG molecule depends on multiple variables and cannot be determined with any certainty, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 55 percent are estimated to be sequestered through ocean and land uptake every year, averaged over the last 50 years, whereas the remaining 45 percent of human-caused CO_2 emissions remain stored in the atmosphere (IPCC 2013).

The quantity of GHGs in the atmosphere responsible for climate change is not precisely known, but it is considered to be enormous. No single project alone would measurably contribute to an incremental change in the global average temperature or to global or local climates or microclimates. From the standpoint of CEQA, GHG impacts relative to global climate change are inherently cumulative.

EFFECTS OF CLIMATE CHANGE ON THE ENVIRONMENT

The global average temperature is expected to increase by 3 to 7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2007). According to California's Fourth Climate Change Assessment, depending on future GHG emissions scenarios, average annual maximum daily temperatures in California are projected to increase between 3.6 and 5.8°F by 2050 and by 5.6 to 8.8°F by 2100 (OPR et al. 2018a).

Other environmental resources could be indirectly affected by the accumulation of GHG emissions and resulting rise in global average temperature. In recent years, California has been marked by extreme weather and its effects. Climate model projections for California demonstrate that impacts will vary throughout the state and show a tendency for the northern part of the state to become wetter while the southern portion of California to become drier (Pierce et al., 2018). According to California Natural Resources Agency's (CNRA's) report, *Safeguarding California Plan: 2018 Update* (CNRA 2018), California experienced the driest 4-year statewide precipitation on record from 2012

through 2015; the warmest years on average in 2014, 2015, and 2016; and the smallest and second smallest Sierra snowpack on record in 2015 and 2014 (CNRA 2018). Climate model projections included in California's Fourth Climate Change Assessment demonstrate that seasonal summer dryness in California may be prolonged due to earlier spring soil drying and would last longer into the fall and winter rainy season. Increases in temperature are also predicted to result in changes to California's snowpack. Based on climate model projections, the mean snow water equivalent , a common measurement which indicates the amount of water contained within snowpack, in California is anticipated to decline to two-thirds of its historic average by 2050 and between less than half and less than one-third of historic average by 2100, depending on future emissions scenarios (OPR, CEC, and CNRA 2018a).

Climate model projections demonstrate that California will experience variation in precipitation patterns as well. The Northern Sierra Nevada range experienced its wettest year on record in 2016 (CNRA 2018). As temperatures increase, the increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the snowpack of the Sierra Nevada and Cascade mountains until spring will flow into the Central Valley concurrently with winter rainstorm events. This scenario will place more pressure on California's levee/flood control system (CNRA 2018). As the climate continues to warm, extreme precipitation events in California will increase and could, subsequently, increase the probability of "mega-flood" events (Polade et al. 2017).

Climate change is also projected to result in tertiary impacts on energy infrastructure throughout California. Changes in temperature, precipitation patterns, extreme weather events, and sea-level rise have the potential to affect and decrease the efficiency of thermal power plants and substations, decrease the capacity of transmission lines, disrupt electrical demand, and threaten energy infrastructure with the increased risk of flooding (CNRA 2018).

According to California's Fourth Climate Change Assessment, climate change will create impacts on the State's transportation network that will have 'ripple effects' including direct and indirect impacts on inter-dependent infrastructure networks as well as negative impacts on the economy. Without appropriate adaptations strategies for roadway materials (i.e., asphalt and pavement), researchers estimate that the median total cost to California for 2040-2070 will be between $1 billion and $1.25 billion (OPR, CEC, and CNRA 2018a). The California Department of Transportation (Caltrans) owns and operates more than 51,000 miles along 265 highways, as well as three of the busiest passenger rail lines in the nation. Sea level rise, storm surge, and coastal erosion are imminent threats to highways, roads, bridge supports, airports, transit systems and rail lines near sea level and seaports. Shifting precipitation patterns, increased temperatures, wildfires, and increased frequency in extreme weather events also threaten transportation systems across the state. Temperature extremes and increased precipitation can increase the risk of road and railroad track failure, decrease transportation safety, and increase maintenance costs (CNRA 2018). Modeling for flood events in California demonstrates that approximately 370 miles of highways are susceptible to flooding in a 100-year storm event by the year 2100 (OPR, CEC, and CNRA 2018a).

Water availability and changing temperatures affect the prevalence of pests, disease, and species, which will directly impact crop development, forest health, and livestock production. Other environmental concerns include decline in water quality, groundwater security, and soil health (CNRA 2018). Vulnerabilities of water resources also include risks to degradation of watersheds, alteration of ecosystems and loss of habitat, (OPR, CEC, and CNRA 2018a).

California's Fourth Climate Change Assessment also identifies the impacts climate change will have on public health and social systems. Average temperature increases in California are estimated to have impacts on human mortality, with 6,700 to 11,300 additional annual deaths in 2050, depending on higher or lower emissions scenarios (Ostro et al. 2011). Studies have also shown that impacts from climate change can also have indirect impacts on public health, such as increased vector-borne diseases, and stress and mental trauma due to extreme events, economic disruptions, and residential displacement (Gould & Dervin 2012; McMichael & Lindgren 2011; United States Global Change Research Program 2016).

STATEWIDE GHG EMISSIONS

As discussed previously, GHG emissions are attributable in large part to human activities. The total GHG inventory for California in 2020 was 369 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) (CARB 2022). This is less than the 2020 target of 431 $MMTCO_2e$. Table 3.7-1 summarizes the statewide GHG inventory for California by percentage.

As shown in Table 3.7-1, transportation, industry, and in-state electricity generation are the largest GHG emission sectors.

Emissions of CO_2 are byproducts of fossil fuel combustion. Methane, a highly potent GHG, primarily results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) and is largely associated with agricultural practices, landfills, and forest fires. Nitrous oxide is also largely attributable to agricultural practices and soil management. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution (CO_2 dissolving into the water) and are two of the most common processes for removing CO_2 from the atmosphere.

Table 3.7-1 Statewide GHG Emissions by Economic Sector

Sector	$MMTCO_2e$	Percent
Transportation	141	38%
Industrial	85	23%
Electricity (in state)	41	11%
Residential	33	9%
Agriculture and Forestry	30	8%
Commercial	22	6%
Electricity (Imports)	19	5%
Total	**369**[1]	**100%**

Note: $MMTCO_2e$ = million metric tons of carbon dioxide equivalent.

[1] Numbers do not sum to total because of rounding of whole numbers.

Source: CARB 2022.

A GHG inventory and emissions forecast for the city of Fresno is provided in the City's GHGRP and summarized in Table 3.7-2. These emissions inventories demonstrate the business-as-usual projections for the city without consideration of statewide regulatory measures to reduce GHG emissions. Similar to statewide emissions trends, the transportation sector comprises the greatest GHG emission sector in the city.

Table 3.7-2 City of Fresno 2016 Inventory Update and Business-as-Usual Projections (in $MTCO_2e$)

Emissions Sector	2016	2020	2030	2035
Transportation	1,520,052	1,594,888	1,798,498	1,909,852
Commercial Energy	524,838	557,142	627,373	657,379
Residential Energy	479,371	514,053	579,546	603,951
Fugitive Emissions	270,130	288,573	335,316	357,008
Solid Waste	119,167	127,303	147,923	156,493
Industrial Energy	10,055	10,506	11,528	12,035
Agriculture Energy	20	20	20	20
Total	2,923,633	3,092,486	3,500,204	3,697,738

Notes: Totals may not equal the sum of the numbers because of independent rounding.

$MTCO_2e$ = metric tons of carbon dioxide equivalent.

Source: City of Fresno 2020.

3.7.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

The following resources were used for this analysis:

- the California Emissions Estimator Model (CalEEMod) 2020.4.0 Computer Program (CAPCOA 2021),
- SJVAPCD's Guide to Assessing and Mitigating Air Quality Impacts (GAMAQI) (SJVAPCD 2015), and
- the 2022 Greenhouse Gas Technical Report (Ramboll 2022) (included as Appendix F to this EIR).

Regional and local GHG emissions and associated impacts were estimated in accordance with SJVAPCD-recommended methodologies.

CalEEMod modeling was based on project-specific information (e.g., land use type, construction and operational equipment to be used, trip projections) where available, reasonable assumptions based on typical construction activities, and default values in CalEEMod that are based on the project's location and land use type. Construction emissions were estimated using an equipment inventory and usage assumptions and on-road vehicle activity provided by the applicant and default values in CalEEMod that are based on the project's location. Construction activities associated with the project would likely require the use of equipment such as excavators, loaders, backhoes, generators, welders, dump trucks, pavers, cranes, pumps, tunnel boring equipment, and solids control machinery. For the purpose of this evaluation, it is assumed that construction of the project would begin in May 2023 and end in November 2023.

To assess the climate change impacts that would result from operations of the project, information pertaining to operational emissions provided by the applicant were used in CalEEMod to produce an estimation of GHGs that would result from both off-site and on-site operational trips. The most recent available emissions inventory for Fresno County was derived from EMFAC2021v1.0.2 and applied to CalEEMod to provide the most current vehicle emissions rates for on-road vehicles. These trips include worker commute and customer trips to the project site as estimated in the project's traffic study (Kittleson 2023).

Emissions from energy consumption (electricity and natural gas combustion) were estimated using Pacific Gas and Electric Company (PG&E) emissions factors applied to the intensities provided for the land use types proposed for the project scaled to PG&E's requirements to comply with the RPS. Area-, wastewater-, and solid waste-source emissions were estimated using CalEEMod default values for the proposed land use types (i.e., car wash, commercial center, gas station, and parking lot).

The City's GHGRP contains a consistency checklist designed to streamline CEQA review for development projects within the city of Fresno. The strategies are organized into the following categories: land use and transportation; transportation facilities strategies; transportation demand strategies; energy conservation strategies for new and existing buildings; water conservation strategies; waste diversion and recycling and energy recovery; strategies for existing development; and municipal strategies.

Proposed development projects that are consistent with the GHGRP as determined through the GHGRP CEQA Consistency Checklist may rely on the GHGRP for the cumulative impacts analysis of GHG emissions. For CEQA purposes, GHG impacts are inherently cumulative as no one project is responsible for the global impact of climate change; rather, the emissions of all past, present, and future projects determine the degree of climate change severity. Projects that are not consistent with the GHGRP must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions, and apply appropriate GHG reduction mitigation measures. The GHGRP identifies a range of GHG reduction strategies from which project applicants and lead agencies can select the strategies best suited to reduce the GHG emissions that would be generated by their individual projects.

The first step in the GHGRP checklist is determining whether the proposed project is consistent with the general plan's land use and zoning designations. Projects that require a zoning change must determine whether emissions associated with this change would produce more GHG emissions than the previous zoning designation, which are the

basis for the emissions accounted for in the GHGRP. The project requires an amendment to alter the existing designation from Community Commercial to General Commercial. Based on the allowable floor-to-area ratio anticipated under these two designations, the General Commercial designation has the potential to allow development that would generate greater emissions than the Community Commercial zoning designation. Based on the guidance in the GHGRP checklist, the checklist cannot be used to determine the project's significance.

Thus, a project-level evaluation of GHG emissions has been prepared to demonstrate consistency with the GHGRP. The project is quantitatively evaluated using the same methodology contained in the GHGRP. The project will incorporate various measures contained in the GHGRP, which have been quantified for the project first year of operation (i.e., 2023), as well as 2030 and 2035, to evaluate whether the project would achieve its fair share of reductions and or conflict with the City achieving its reduction targets for those years.

The GHGRP provides an inventory for 2016, as well as an adjusted BAU forecast for 2030 and 2035. The adjusted BAU forecast is used to identify the "gap" between the city's projected emissions and the emissions target the City will need to meet through local GHG-reducing measures. Based on these projections, the City's GHGRP measures would need to reduce the city's communitywide emissions by an additional 1.5 percent and 11.6 percent in 2030 and 2035, respectively. Scaling this percentage to the project level, the project would also need to reduce its emissions by these percentages when compared to an adjusted BAU scenario.

Projected emissions from the project were calculated under an adjusted BAU scenario. This scenario reflects emission reductions that would occur as a result of state policies already in place when the GHGRP was prepared. This approach was taken to frame the project's emissions at the time the GHGRP was prepared in consideration of the regulations that were in place at that time.

Under this scenario, the project's emissions would be 25,191 and 23,308 $MTCO_2e$ in 2030 and 2035, respectively. Applying the 1.5 percent and 11.6 percent reduction identified in the GHGRP for 2030 and 2035, the project would not result in a significant climate change effect if it would:

- reduce emissions that meet or exceed a 381 $MTCO_2e$ target, or 1.5 percent of the project's adjusted BAU emissions, in 2030, or
- reduce emissions that meet or exceed a 2,711 $MTCO_2e$ target, or 11.6 percent of the project's adjusted BAU emissions, in 2035.

See Appendix F for a detailed description of modeling assumptions, CalEEMod outputs, and calculations.

THRESHOLDS OF SIGNIFICANCE

State CEQA Guidelines Section 15064 and relevant portions of Appendix G recommend that a lead agency consider a project's consistency with relevant, adopted plans and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions. An impact on climate change would be significant if implementation of the project would:

- generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.

With respect to GHG emissions, the CEQA Guidelines Section 15064.4(a) states that lead agencies "shall make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate" GHG emissions resulting from a project. The CEQA Guidelines note that an agency has the discretion to either quantify a project's GHG emissions or rely on a "qualitative analysis or performance-based standards" (Section 15064.4[a]). A lead agency may use a "model or methodology" to estimate GHG emissions and has the discretion to select the model or methodology it considers "most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change" (Section 15064.4[c]). The CEQA Guidelines provide that the lead

agency should consider the following when determining the significance of impacts from GHG emissions on the environment (Section 15064.4[b]):

- The extent a project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

CEQA Guidelines Appendix G is a sample Initial Study checklist that includes a number of factual inquiries related to the subject of climate change, as it does on a whole series of additional environmental topics. Notably, lead agencies are under no obligation to use these inquiries in fashioning thresholds of significance on these subjects, or indeed on any subject addressed in the checklist. (*Save Cuyama Valley v. County of Santa Barbara* (2013) 213 Cal.App.4th 1059, 1068.) Rather, with few exceptions, "CEQA grants agencies discretion to develop their own thresholds of significance." (*Ibid*.) Even so, it is a common practice for lead agencies to take the language from the inquiries set forth in Appendix G and to use that language in fashioning thresholds. The City has done so here.

The City has an adopted GHGRP with a checklist available for use in CEQA analyses; however, the project is amending the general plan such that the project would, by a comparative worst-case scenario analysis, have greater emissions than the land use type included in the general plan. Nevertheless, the city has applied the GHGRP's BAU approach to substantiate the significance determination of the project. The use of the GHGRP in determining the project's significance answers both the Appendix G questions of whether the project would directly or indirectly generate substantial GHG emissions as well as conflict with a local or statewide plan to reduce GHG emissions (in this case, the city's GHGRP). Although the GHGRP is not used for CEQA streamlining, the reduction targets of the GHGRP are applicable standards for use to determine a project's cumulative contribution to climate change.

A comparative analysis was prepared to determine if the project's emissions would align with the long-term GHG reduction goals of the City's GHGRP using a BAU approach compared to the project's emissions in light of the most recent GHG regulations, plans, and programs in place at this time. Thus, to determine the potential significance of the project, GHG emissions are disclosed and compared to the GHG reduction goals of the GHGRP. For the purposes of determining the significance of the project, the project would result in a cumulatively considerable contribution to climate change if it would:

- fail to reduce GHG emissions by at least the 381 $MTCO_2e$ reduction target, or 1.5 percent of the project's adjusted BAU emissions, in 2030; or
- fail to reduce GHG emissions by at least the 2,711 $MTCO_2e$ reduction target, or 11.6 percent of the project's adjusted BAU emissions, in 2035.

TOPICS NOT DISCUSSED FURTHER

All issues pertaining to climate change are evaluated in this analysis.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.7-1: Generate GHG Emissions That Would Conflict with the City's Greenhouse Gas Reduction Plan

The project would incorporate various measures that align with similar GHG reduction measures included in the GHGRP as project design features. The project's emissions would also be reduced by new regulatory mechanisms that are in place at the time of writing this Draft EIR that were not in effect at the time the GHGRP was prepared such as the Advanced Clean Cars II Program and the Advanced Clean Trucks regulation. Through the incorporation of on-site reduction measures derived from the GHGRP and reductions realized from these aforementioned programs, the project would reduce its emissions by 3,140 and 6,719 $MTCO_2e$ in 2030 and 2035, respectively, as compared to BAU levels of emissions. To demonstrate compliance with the GHGRP, the project would be require to reduce its emissions by 1.5 percent or 381 $MTCO_2e$ and 11.6 percent or 2,711 $MTCO_2e$ below BAU emissions by 2030 and 2035, respectively, and this level of reduction exceeds these standards. Therefore, the project would be consistent with the GHGRP. This impact would be **less than significant.**

The project would generate GHG emissions from project construction and operation. Construction-related activities would generate GHG emissions from the use of heavy-duty off-road equipment, materials transport, and worker commutes. Based on modeling conducted for the project, construction is estimated to generate a total of 1,050 $MTCO_2e$. These emissions are amortized over a 30-year period and included in the total emissions evaluated below.

Operation of the project would also generate GHG emissions from vehicle trips accessing the project site, electricity consumption, on-site natural gas combustion, and solid waste and wastewater generation. For the first year of operation (2023), the project's emissions total 22,428 $MTCO_2e$/year.

As summarized in the "Methodology" section, the project's adjusted BAU emissions were estimated for 2030 and 2035. These emissions account for a project scenario wherein no on-site GHG reduction measures are in place using the regulatory setting in place when the GHGRP was adopted. Table 3.7-3 summarizes the project's adjusted BAU emissions for 2030 and 2035 and identifies the reductions needed for the project to align with the reduction targets of the GHGRP.

Table 3.7-3 Adjusted Business-as-Usual Emissions from the Project in 2030 and 2035

Emissions Category	2030 ($MTCO_2e$)	2035 ($MTCO_2e$)
Area Sources	<1	<1
Energy Usage	275	233
Mobile Source	24,342	22,504
Wastewater Generation	34	31
Solid Waste Disposal	540	540
Operational Total	**25,191**	**23,308**
Percent Reduction Needed from Adjusted BAU	1.5%	11.6%
Emissions Reduction Needs	**381**	**2,711**

Note: $MMTCO_2e$ = million metric tons of carbon dioxide equivalent.

Source: Emissions estimated by Ramboll Environ in 2023.

The project has made several commitments to on-site GHG reduction measures that align with those contained in the GHGRP. As indicated in Chapter 2, "Project Description," the project would participate in PG&E's Solar Choice program, which provides 100 percent renewable energy to customers enrolled in the program. The project would also implement a solid waste diversion program that is consistent with the measures of the GHGRP. Additionally, the project would construct and maintain EV chargers in line with Part 11 of the 2022 Title 24 California Building Code (CalGreen Code) (i.e., 5 percent of all parking stations shall be a Level 2 charging station, at a minimum).

Notably, CARB has developed and adopted new regulations that serve to reduce statewide GHG emissions from the on-road mobile source sector. As discussed in greater detail in Section 3.7.1, the ACC II Program and the ACT regulation are regulatory measures designed to electrify on-road gasoline and diesel fuel passenger vehicles, and light-, medium-, and heavy-duty trucks. These regulations would amend the adjusted BAU scenario in 2030 and 2035 contained in the GHGRP and would be represented in future updates to the GHGRP.

Table 3.7-4 summarizes the project's anticipated emissions in 2030 and 2035 following the application of on-site GHG reduction measures that the project has committed to. Table 3.7-4 also shows the reductions that would be achieved through the implementation of the ACC II Program and ACT regulation. Table 3.7-2 also reflects the implementation of Mitigation Measure 3.13-2, identified in Section 3.13, "Transportation and Circulation," which would establish a mandatory commute reduction program for employees.

Table 3.7-4 Project Emissions in 2030 and 2035 including Project Design Features

Emissions Category	2030 ($MTCO_2e$)	2035 ($MTCO_2e$)
Area Sources	<1	<1
Energy Usage	148	148
Mobile Source[1]	21,782	16,943
Wastewater Generation	34	31
Solid Waste Disposal	365	365
Operational Total	**22,338**	**17,479**
Reduction Achieved	**3,140**	**6,719**
Emissions Reduction Needs	**381**	**2,711**
Meets Reduction?	**Yes**	**Yes**

Note: $MMTCO_2e$ = million metric tons of carbon dioxide equivalent.

[1] Estimated mobile source emissions from the project account for the reductions that would be achieved by the Advanced Clean Cars II Program and the Advanced Clean Trucks Program

Source: Emissions estimated by Ramboll Environ in 2023.

As shown above in Table 3.7-4, the project would achieve a 3,140 and 6,719 $MTCO_2e$ reduction in GHG emissions in 2030 and 2035, respectively. This level of reduction would exceed the necessary reductions of 381 and 2,711 $MTCO_2e$ in 2030 and 2035, respectively, as identified in the GHGRP.

Notably, the GHGRP was prepared in consideration of the state's long-term reduction targets established in SB 32 (i.e., reducing statewide emissions by 40 percent below a 1990 inventory). SB 32 was considered an interim target to meeting the goal of reducing GHGs by 80 percent below 1990 levels by 2050 and directed by Executive Order S-3-05. Since the GHGRP was adopted, the state has passed more stringent targets, which are codified in AB 1279. These targets include reducing emissions by 85 percent below 1990 levels and achieving carbon neutrality by no later than 2045.

The 2022 Scoping Plan provides the framework for achieving these aggressive targets, and includes language that can be interpreted as revising the goal for 2030 to 48 percent reduction from 1990 levels as compared to the 40 percent reduction legislated in SB 32 (CARB 2022: 71). The goals established in the GHGRP were designed to adhere to the, then, most current GHG reduction target mandated by SB 32 (i.e., 40 percent reduction from 1990 levels by 2030). It is therefore foreseeable that the GHGRP's existing targets could be interpreted as inconsistent with the state's current long-term GHG reduction goals for 2030 (i.e., 48 percent below 1990 levels by 2030) and 2045 (i.e., 85 percent reduction from 1990 levels and carbon neutrality).

Nevertheless, the project would be fully operational before 2030 and includes several design elements that mirror the GHG reduction measures within the GHGRP. Moreover, the GHGRP is structured to be monitored and updated on an annual basis to evaluate the effectiveness of its strategies and to track progress throughout the General Plan's horizon year of 2035. To be a qualified GHGRP for CEQA purposes, the GHGRP updates would allow for the City to adjust its GHG reduction targets to account for the state's most recently adopted statewide targets legislated by AB

1279. Additionally, the use of CAP consistency for CEQA determinations is still supported by CARB in Appendix D of the 2022 Scoping Plan (CARB 2022: 7-10). The 2022 Scoping Plan does not explicitly state that the new reduction goals of AB 1279 disqualify existing CAPs that align with the state's previous target of reducing emissions by 40 percent from the 1990 inventory.

Therefore, because the GHGRP is designed to be updated periodically, and it is assumed that such updates would account for the state's most recent long-term GHG reduction goals of AB 1279, consistency with the GHGRP's reduction goals are still considered an appropriate threshold for determining the significance of the project's cumulative contribution to global climate change. Because the project would exceed the GHGRP's target reduction goals, the project's emissions would align with the GHGRP. Therefore, this impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

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3.8 HAZARDS AND HAZARDOUS MATERIALS

This section describes the potential impacts of the project related to hazardous materials and public health. The evaluation provided in this section is based on information in the Phase II Environmental Site Assessment (ESA) prepared for the project site (Kleinfelder 2021) which is attached as Appendix G, and public databases containing lists of known hazardous waste/hazardous material sites, such as records from the State Water Resources Control Board's (SWRCB's) GeoTracker database and California Department of Toxic Substances' (DTSC's) EnviroStor database. Potential hazardous air emissions associated with operation of the project are addressed in Section 3.3, "Air Quality." Water quality concerns and potential for contamination or impairment are evaluated in Section 3.9, "Hydrology and Water Quality."

Public comments on the notice of preparation related to hazards and hazardous materials included concern over fumes generated from the gas station and their potential effect on sensitive receptors of River Bluff Elementary School and Rio Vista Middle School along with residents in the vicinity. Evaluation of the potential hazards associated with the gas station are presented below and in Section 3.3, "Air Quality."

3.8.1 Regulatory Setting

FEDERAL

Management of Hazardous Materials

Various federal laws address the proper handling, use, storage, and disposal of hazardous materials and require measures to prevent or address accidental release. The U.S. Environmental Protection Agency (EPA) is the agency primarily responsible for enforcement and implementation of federal laws and regulations pertaining to hazardous materials. Applicable federal regulations pertaining to hazardous materials are primarily contained in Code of Federal Regulations (CFR) Titles 29, 40, and 49. Hazardous materials, as defined in the Code, are listed in 49 CFR 172.101. Management of hazardous materials is governed by the following laws.

- The Toxic Substances Control Act of 1976 (15 U.S. Code [USC] Section 2601 et seq.) regulates the manufacturing, inventory, and disposition of industrial chemicals, including hazardous materials. Section 403 of the Toxic Substances Control Act establishes standards for lead-based paint hazards in paint, dust, and soil.
- The Resource Conservation and Recovery Act (RCRA) of 1976 (42 USC 6901 et seq.) is the law under which EPA regulates hazardous waste from the time the waste is generated until its final disposal ("cradle to grave").
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (also called the Superfund Act or CERCLA) (42 USC 9601 et seq.) gives EPA authority to seek out parties responsible for releases of hazardous substances and ensure their cooperation in site remediation.
- The Superfund Amendments and Reauthorization Act of 1986 (Public Law 99-499; USC Title 42, Chapter 116), also known as SARA Title III or the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), imposes hazardous materials planning requirements to help protect local communities in the event of accidental release.
- The Spill Prevention, Control, and Countermeasure (SPCC) rule includes requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines. The rule requires specific facilities to prepare, amend, and implement SPCC Plans. The SPCC rule is part of the Oil Pollution Prevention regulation, which also includes the Facility Response Plan rule.

Transport of Hazardous Materials

The U.S. Department of Transportation (USDOT) Office of Hazardous Materials Safety regulates transport of hazardous materials between states and is responsible for protecting the public from dangers associated with such transport. The federal hazardous materials transportation law, 49 USC 5101 et seq. (formerly the Hazardous Materials Transportation Act 49 USC 1801 et seq.) is the basic statute regulating transport of hazardous materials in the United

States. Hazardous materials transport regulations are enforced by the Federal Highway Administration, the U.S. Coast Guard, the Federal Railroad Administration, and the Federal Aviation Administration.

Worker Safety

The federal Occupational Safety and Health Administration (OSHA) is the agency responsible for assuring worker safety in the handling and use of chemicals identified in the Occupational Safety and Health Act of 1970 (Public Law 91-596, 9 USC 651 et seq.). OSHA has adopted numerous regulations pertaining to worker safety, contained in CFR Title 29. These regulations set standards for safe workplaces and work practices, including standards relating to the handling of hazardous materials and those required for excavation and trenching.

STATE

Management of Hazardous Materials

California Health and Safety Code

California Health and Safety Code Section 25501 defines a hazardous material as follows:

> "Hazardous material" means any material that, because of its quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. "Hazardous materials" include, but are not limited to, hazardous substances, hazardous waste, and any material which a handler or the administering agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

"Hazardous wastes" are defined in California Health and Safety Code Section 25141(b) as wastes that:

> … because of their quantity, concentration, or physical, chemical, or infectious characteristics, [may either] cause, or significantly contribute to an increase in mortality or an increase in serious illness [or] pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

For purposes of this section, the term "hazardous materials" refers to both hazardous substances and hazardous wastes.

Under Chapter 6.95 of the California Health and Safety Code (Hazardous Materials Release Response Plans and Inventory), qualifying businesses are required to prepare a Hazardous Materials Business Emergency/Contingency Plan (HMBEP), which must include hazardous materials and hazardous waste management procedures and emergency response procedures, including emergency spill cleanup supplies and equipment. A HMBEP must be submitted by any business that handles a hazardous material or a mixture containing a hazardous material in quantities equal to, or greater than:

- a total weight of 500 pounds or a total volume of 55 gallons;
- 200 cubic feet of a compressed gas at standard temperature and pressure; and/or
- a radioactive material handled in quantities for which an emergency plan is required pursuant to Parts 30, 40, or 70 of Chapter 10, Title 10, CFR, or equal to or greater than the amounts specified above, whichever amount is less.

Hazardous Waste Control Law and Universal Waste Rule

Under CCR Title 22 and the California Hazardous Waste Control Law, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste. California's Universal Waste Rule allows individuals and businesses to transport, handle, and recycle certain common hazardous wastes, termed universal wastes, in a manner that differs from the requirements for most hazardous wastes. Universal wastes include televisions, computers, and other electronic devices, as well as batteries, fluorescent lamps, mercury thermostats, and other mercury-containing equipment. The hazardous waste regulations (CCR Title 22, Division 4.5, Chapter 11) identify seven categories of hazardous wastes that

can be managed as universal wastes. Any unwanted item that falls within one of these waste streams can be handled, transported, and recycled following the simple requirements set forth in the universal waste regulations.

California Accidental Release Prevention Program

The goal of the California Accidental Release Prevention Program (CCR Title 19, Division 2, Chapter 4.5) is to reduce the likelihood and severity of consequences of any releases of extremely hazardous materials. Any business that handles regulated substances (chemicals that pose a major threat to public health and safety or the environment because they are highly toxic, flammable, or explosive, including ammonia, chlorine gas, hydrogen, nitric acid, and propane) must prepare a risk management plan. The risk management plan is a detailed engineering analysis of the potential accident factors present at a business and the measures that can be implemented to reduce this accident potential. The plan must provide safety information, hazard data, operating procedures, and training and maintenance requirements. The list of regulated substances is found in Article 8, Section 2770.5 of the program regulations.

Transport of Hazardous Materials

The State of California has adopted U.S. Department of Transportation regulations for the movement of hazardous materials originating within the state and passing through the state; state regulations are contained in Title 26 of the California Code of Regulations (CCR). State agencies with primary responsibility for enforcing state regulations and responding to hazardous materials transportation emergencies are the California Highway Patrol and the California Department of Transportation. Together, these agencies determine appropriate container types and license hazardous waste haulers to transport hazardous waste on public roads.

Management of Construction Activities

Through the Porter-Cologne Water Quality Act and the National Pollution Discharge Elimination System (NPDES) program, RWQCBs have the authority to require proper management of hazardous materials during project construction. For a detailed description of the Porter-Cologne Water Quality Act, the NPDES program, and the role of the Central Valley RWQCB, see Section 3.9, "Hydrology and Water Quality."

The State Water Resources Control Board (SWRCB) adopted the statewide NPDES Construction General Permit in August 1999. The state requires that projects disturbing more than 1 acre of land during construction file a Notice of Intent with the RWQCB to be covered under this permit. Construction activities subject to the Construction General Permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-stormwater discharges to storm sewer systems and other waters. A stormwater pollution prevention plan (SWPPP) must be developed and implemented for each site covered by the permit. The SWPPP must include best management plans (BMPs) designed to prevent construction pollutants from contacting stormwater and keep products of erosion from moving off-site into receiving waters throughout the construction and life of the project; the BMPs must address source control and, if necessary, pollutant control.

Worker Safety

The California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within the state. Cal/OSHA standards are typically more stringent than federal OSHA regulations and are presented in Title 8 of the CCR. Cal/OSHA conducts on-site evaluations and issues notices of violation to enforce necessary improvements to health and safety practices.

California Fire Code

The California Fire Code is contained in Title 24 of the CCR, Part 9, also referred to as the California Building Standards Code. The California Fire Code incorporates the International Fire Code and necessary California amendments. It prescribes regulations consistent with nationally recognized good practices to safeguard life and property from the hazards of fire, explosion, and dangerous conditions arising from the storage, handling, and use of hazardous materials, as well as provisions to assist emergency response personnel. Chapter 23, Motor Fuel-Dispensing Facilities and Repair Garages, sets forth regulations for gas stations and repair garages such as location of dispensing devices, emergency disconnect switches and shutoff valves, and spill control.

Fire Hazard Severity Zones

Public Resources Code (PRC) Sections 4201-4204, and Government Code Sections 51175–51189, require identification of fire hazard severity zones (FHSZs) within the state of California. Fire prevention areas considered to be under state jurisdiction are referred to as "state responsibility areas." In state responsibility areas, the California Department of Forestry and Fire Protection (CAL FIRE) is required to delineate three hazard ranges: moderate, high, and very high; whereas "local responsibility areas," which are under the jurisdiction of local entities (e.g., cities, counties), are only required to identify very high FHSZs. The hazard ranges are measured quantitatively, based on: vegetation, topography, weather, crown fire potential (a fire's tendency to burn upwards into trees and tall brush), and ember production and movement.

LOCAL

City of Fresno General Plan

The City of Fresno General Plan includes the following policies that pertain to hazards and hazardous materials and are relevant to this analysis:

- **Policy NS-4-a: Processing and Storage.** Require safe processing and storage of hazardous materials, consistent with the California Building Code and Uniform Fire Code, as adopted by the City.
- **Policy NS-4-c: Soil and Groundwater Contamination Reports.** Require an investigation of potential soil or groundwater contamination whenever justified by past site uses. Require appropriate mitigation as a condition of project approval in the event soil or groundwater contamination is identified or could be encountered during site development.
- **Policy NS-4-e: Compliance with County Program.** Require that the production, use, storage, disposal, and transport of hazardous materials conform to the standards and procedures established by the County Division of Environmental Health. Require compliance with the County's Hazardous Waste Generator Program, including the submittal and implementation of a Hazardous Materials Business Plan, when applicable.
- **Policy NS-4-f: Hazardous Materials Facilities.** Require facilities that handle hazardous materials or hazardous wastes to be designed, constructed, and operated in accordance with applicable hazardous materials and waste management laws and regulations.
- **Policy NS-6-f: Emergency Vehicle Access.** Require adequate access for emergency vehicles in all new development, including adequate widths, turning radii, hard standing areas, and vertical clearance.

Fresno County Department of Public Health

A Certified Unified Program Agency (CUPA) is a local agency that has been certified by the California Environmental Protection Agency (Cal/EPA) to implement the local Unified Program. The CUPA can be a county, city, or joint powers authority. The Fresno County Department of Public Health is the certified CUPA for the city of Fresno and vicinity. As such, Fresno County provides oversight of businesses that (CERS 2015):

- Require HMBEPs;
- Require California accidental release prevention plans;
- Operate underground storage tanks (USTs);
- Operate aboveground storage tanks;
- Generate aboveground storage tanks;
- Generate hazardous waste(s); and
- Have on-site treatment of hazardous waste/tiered permits.

Compliance is achieved through routine inspections of regulated facilities, and investigation of citizen-based complaints and inquiries regarding improper handling and/or disposal of hazardous materials and/or hazardous waste.

Emergency Response

Fresno County prepared the Fresno County Multi-Hazard Mitigation Plan in coordination with the City of Fresno and other participating jurisdictions to reduce the vulnerability of the County and its residents to future hazard events. The plan assesses hazard risks and identifies goals and objectives to reduce the County's vulnerability to hazards. To meet the identified goals and objectives of the plan, mitigation actions are described specific to each participating jurisdiction, including the actions listed below which are pertinent to implementation of the proposed project (Fresno County 2018).

Fresno County Mitigation Actions

- **County 1:** Develop and Conduct a Multi-Hazard Seasonal Public Awareness Program
- **County 2:** Identify Critical Facilities and Inspect for Vulnerability to Major Hazards
- **County 3:** Upgrade or Replace Critical County Facilities Found to be Vulnerable to Major Hazards

City of Fresno Mitigation Actions

- **Fresno 1:** Establish Post-Disaster Action Plan for City Continuity of Operations Plan

3.8.2 Environmental Setting

PAST AGRICULTURAL USE OF THE PROJECT SITE

The project site was used as an orchard from approximately 1937 through 1998. The orchard was removed between 1998 and 2002, and the site has been vacant since then. Chemicals formerly used in orchards included organochlorine pesticides (OCPs), as well as heavy metals and compounds, such as arsenic and lead, which may persist in soil for decades.

Ten composite soil samples (including one duplicate) and ten discrete soil samples (including one duplicate) were collected from the project site in 2021 and analyzed for presence of OCPs, arsenic, and lead. The reported concentrations of OCPs, arsenic, and lead present in the soil samples were below their respective human health screening criteria for commercial/industrial soils, and below thresholds for classification as a California-regulated or RCRA hazardous waste (Kleinfelder 2021).

DOCUMENTED HAZARDOUS MATERIALS SITES

Riverside Golf Course

A leaking UST released petroleum at the Riverside Golf Course, which is located immediately north of the project site, in 1989 (SWRCB 2021a). The storage tanks and 1,820 cubic yards of impacted soil were removed in 1989. Cleanup is complete and the case was closed by the SWRCB in 1999 (SWRCB 2021b). Fresno County issued a Certification of Response Actions indicating that the remaining levels of contamination present did not pose a threat to groundwater, public health, or safety, and further assessment and cleanup were not required (Fresno County 1999).

AIRPORTS AND AIR HAZARDS

Airport influence areas are used in land use planning to identify areas commonly overflown by aircraft as they approach and depart an airport, or as they fly within established airport traffic patterns. The closest airport, Sierra Sky Airport, is a small, privately owned airport approximately 2 miles east of the project site. Sierra Sky Airport was created to serve residents in the adjacent subdivision, Sierra Sky Park, and contains one runway (Paquette 2007). The closest publicly owned airport, Fresno-Chandler Executive Airport, is approximately 9 miles southeast of the project site. Fresno Yosemite International Airport is approximately 11 miles southeast of the site. The airport influence areas include six safety zones which limit land use based on the zone type. The project site is not located within the airport planning area or safety zones for the Sierra Sky Airport, Fresno-Chandler Executive Airport, or Fresno Yosemite International Airport (Fresno County ALUC 2018, n.d.).

SCHOOLS

The schools closest to the project site are Rio Vista Middle School and River Bluff Elementary School, located south of West Herndon Avenue. The outdoor areas of Rio Vista Middle School are approximately 130 feet from the southeast corner of the project site (see Figure 2-2 in Chapter 2, "Project Description"). Other schools in the vicinity include William Saroyan Elementary School, located approximately 1 mile to the southeast; Forkner Elementary School and Figarden Elementary School located approximately 2.8 miles to the east; and Teague Elementary School approximately 2.6 miles to the southeast.

WILDLAND FIRE HAZARD

The project site is not located within a designated urban-wildland interface area nor is it near designated State Responsibility Areas. According to maps published by CAL FIRE, the city of Fresno does not contain any land classified as a Very High FHSZ. The project site is classified as "Unzoned" (CAL FIRE 2007).

3.8.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

The following reports and data sources related to potentially hazardous conditions were reviewed for this analysis:

- available literature, including documents published by federal, State, County, and City agencies;
- applicable City of Fresno General Plan policies; and
- Phase II Environmental Site Assessment for the project (Appendix G), prepared by Kleinfelder (2021).

Project construction and operation were evaluated against the hazardous materials information gathered from these sources to determine whether any risks to public health and safety or other conflicts would occur.

THRESHOLDS OF SIGNIFICANCE

An impact related to hazards and hazardous materials would be significant if implementation of the project would:

- create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- create a significant hazard to the public or the environment through reasonably foreseeable upset and/or accident conditions involving the release of hazardous materials into the environment;
- emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school;
- 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 it create a significant hazard to the public or the environment;
- for a project located within an airport land use plan or, where such a plan has not been adopted, within 2 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;
- impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; or
- expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.

TOPICS NOT DISCUSSED FURTHER

Result in a Safety Hazard or Excessive Noise for People Residing or Working in the Project Area

The project site is not located within the airport planning area or safety zones for the Sierra Sky Airport, Fresno-Chandler Executive Airport, or Fresno Yosemite International Airport (Fresno County ALUC 2018, n.d.). No other airport land use plans are applicable to the project site. Additionally, construction of the project would last for approximately 170 days, and the construction equipment used (e.g., forklift, excavators, and graders) would not be large enough to impede the use of aircraft in the area. The new facility would be approximately 32 feet high and would not be tall enough to interfere with existing airport operations at the Sierra Sky Airport, Fresno-Chandler Executive Airport, or Fresno Yosemite International Airport. The project site is not within an airport influence area established to identify locations where there is potential for a project to result in a safety hazard or excessive noise for people residing or working in the project area. Therefore, no further analysis is required by CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.8-1: Create a Significant Hazard through Routine Transport, Use, or Disposal of Hazardous Materials

Project construction and operation would involve the routine transport, use, and disposal of hazardous materials. Given compliance with applicable regulations which would reduce impacts associated with the use, transport, storage, and sale of hazardous materials, including measures taken to address the safety of USTs and the handling of hazardous materials in accordance with the HMBEP and the local CUPA, impacts associated the routine transport, use, and disposal of hazardous materials would be **less than significant.**

Short-Term Construction Impacts

Construction would involve the transport, use, storage, and disposal of hazardous materials and petroleum products that are commonly used at construction sites. These hazardous materials could include diesel fuel, lubricants, paints and solvents, and cement products containing strong basic or acidic chemicals. Hazardous waste generated during construction may consist of fuel and lubricant containers, paint and solvent containers, and cement products containing strong basic or acidic chemicals. Although the transportation of hazardous materials could result in accidental spills or other hazards, the USDOT Office of Hazardous Materials Safety prescribes strict regulations for the safe transportation of hazardous materials, as described in 49 USC 5101. These standard accident and hazardous materials recovery training and procedures are enforced by the state and followed by private state-licensed, certified, and bonded transportation companies and contractors.

Given that the project would disturb more than 1 acre of land, Costco would be required to file a Notice of Intent with the RWQCB and apply for a Construction General Permit. Project construction activities would be subject to the requirements of the Construction General Permit, which would regulate clearing, grading, stockpiling, and excavation during construction. A SWPPP would be developed for the project as part of the Construction General Permit. The SWPPP would include best management practices (BMPs) designed to prevent construction pollutants from contacting stormwater and keep products of erosion from moving off-site into receiving waters throughout the construction and life of the project, as described in Section 3.9, "Hydrology and Water Quality."

Short-term construction impacts related to the transport, use, and disposal of hazardous materials would be **less than significant** with implementation of the project-specific SWPPP, and compliance with the CUPA and safety regulations prescribed by the USDOT Office of Hazardous Materials Safety for transportation of hazardous materials.

Long-Term Operational Impacts

Operation would include the routine transport of fuel to the fuel facility, and approximately two to three trucks per day would be used to deliver fuel. While delivering the fuel, the truck would be parked over the USTs. The trucks would not block access to any of the fueling positions or occupy any queuing space or parking spaces in a way that

could cause an accident leading to the release of gasoline during fueling. The project would be subject to standard regulations related to the routine transport, storage, and dispensing of gasoline.

The project's gas station would be designed to minimize potential hazards related to the fuel. Specifically, the fuel pump dispensers would be equipped with automatic shutoffs and other safety device and signage, as required by fire, building, and health codes. All USTs would be double walled. In accordance with Title 23, Section 2635(b) of the CCR, USTs would have spill containment and overfill prevention systems. Fuel tank storage areas would include appropriate safety design, equipment, and signage to protect public health and safety from leaks, fires, or spills involving vehicle fuel if any were to occur on the project site. In addition, a SWPPP would be prepared and would include BMPs designed to prevent project-generated pollutants from entering stormwater and moving off-site into receiving waters throughout the construction and life of the project. Refer to Section 3.9, "Hydrology and Water Quality," for more detailed information related to the SWPPP that would be prepared for the project.

The project would also include the regular operation of a 4,800 square-foot car wash. The potentially hazardous materials associated with the car wash include the solvents and detergents used to wash the car along with potential oils and lubricants associated with ongoing operation of the machinery used to power the car wash. The water from the car wash would be collected and recycled, and all washing would occur within the covered structure. In addition, all potential spills would be handled in accordance with the HMBEP, as described below.

Potentially hazardous materials may also be used, stored, and sold at the Costco warehouse. Appropriate documentation for all hazardous materials, fuel, and other hazardous waste transported, sold, and stored in connection with operation of the project would be provided as required for compliance with existing hazardous materials regulations. As previously stated, the State of California requires all businesses that handle more than a specified amount of hazardous materials or extremely hazardous materials to submit an HMBEP to the appropriate CUPA. Given the amount of fuel that would be routinely transported to the project site for the gas station, a HMBEP would be developed for the project and submitted to the Fresno County Department of Public Health, the certified CUPA for the city of Fresno and surrounding vicinity. The HMBEP would include an inventory of the hazardous materials used at the project site and emergency response plans and procedures to be implemented in the event of a significant or threatened significant release of a hazardous material. The HMBEP would also include the Material Safety Data Sheet for each hazardous and potentially hazardous substance used, including fuel for the gas station, which would summarize the physical and chemical properties of the hazardous materials and their health impacts. In the event of an accidental release of fuel or other hazardous materials during project operation, the HMBEP would require the immediate notification to all appropriate agencies and personnel of a release. The HMBEP would identify local emergency medical assistance appropriate for potential accident scenarios, contact information of all company emergency coordinators of the business, a listing and location of emergency equipment at the business, an evacuation plan, and a training program for business personnel.

Given the design measures that would be implemented to improve the safety of the gas station and USTs; compliance with applicable regulations which would reduce impacts associated with the use, transport, storage, and sale of hazardous materials; and the handling of hazardous materials in accordance with the HMBEP, long-term operational impacts associated the routine transport, use, and disposal of hazardous materials would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.8-2: Create a Significant Hazard through Reasonably Foreseeable Upset and Accident Conditions Involving the Release of Hazardous Materials into the Environment or be Located on a Site which is Included on a List of Hazardous Materials Sites Compiled Pursuant to Government Code Section 65962.5 and would Create a Significant Hazard to the Public or the Environment

Implementation of the project could result in release of hazardous materials due to release of chemicals associated with past agricultural use of the site, location on a site that is on a list of known hazardous materials sites, or due to operation of the project, which would involve the use, storage, and sale of potentially hazardous materials. The potential for past use of the project site to result in substantial hazard has been evaluated in, including soil sampling as part of a Phase II ESA. Operation of the project would be subject to regulations designed to reduce the potential for the project to create hazardous conditions through a reasonably foreseeable upset or accident condition. There is no evidence of a substantial hazard to the public or the environment. This impact would be **less than significant**.

Past Agricultural Use

As described above in Section 3.8.2, "Environmental Setting," the project site was used as an orchard from approximately 1937 through 1998, and pesticides (OCPs, arsenic, and lead) may be present. However, the Phase II ESA soil sample analyses indicate that the reported concentrations of OCP, arsenic, and lead are below the human health screening criteria for commercial/industrial soils, and below thresholds for classification as a California-regulated or Federal RCRA hazardous waste (Kleinfelder 2021). The soil does not contain concentrations of hazardous materials that are a concern to human health and safety and construction would not create a hazard to the public or the environment due to potential to release hazardous materials.

Known Hazardous Materials Sites

A former hazardous materials site identified in the SWRCB GeoTracker database is situated along the northern boundary of the project site adjacent to Spruce Avenue. In 1989, Riverside Golf Course removed a UST that had leaked and released petroleum hydrocarbons to the area beneath the tank. Fresno County, along with SWRCB, deemed cleanup of the site complete in 1999 (Fresno County 1999; SWRCB 2021b). Fresno County determined that the levels of contamination remaining at the site did not pose a significant threat to public health and safety following cleanup of the leaking UST, and that the remaining hydrocarbon contamination from the unauthorized petroleum spill would continue to degrade over time (Fresno County 1999). Although buildout of Spruce Avenue and the work at the golf course (e.g., modification to the sprinkler system, fence installation) could occur in the vicinity of this site, there is not a potential for a substantial hazard because the site was fully remediated 23 years ago. No other hazardous materials sites were identified on the state Cortese list via the DTSC EnviroStor database or the EPA Envirofacts/Enviromapper website within 2,000 feet of the project site (DTSC 2021; EPA 2021).

Facility Operations

As described above in Impact 3.8-1 and below in Impact 3.8-3, during operation of the project, potentially hazardous materials may be: used, stored, and sold at the Costco warehouse; used in association with the car wash; and stored and dispensed at the gas station. Appropriate documentation for all hazardous materials, fuel, and other hazardous waste transported, sold, and stored in connection with operation of the project would be provided as required for compliance with existing hazardous materials regulations. The project's gas station would be designed to minimize potential hazards related to the fuel. Specifically, the fuel pump dispensers would be equipped with automatic shutoffs and other safety device and signage, as required by fire, building, and health codes. A HMBEP would be developed for the project and submitted to the Fresno County Department of Public Health, the certified CUPA for the city of Fresno and surrounding vicinity. The HMBEP would include an inventory of the hazardous materials used at the project site and emergency response plans and procedures to be implemented in the event of a significant or threatened significant release of a hazardous material. The HMBEP would also include the Material Safety Data Sheet for each hazardous and potentially hazardous substance used, including fuel for the gas station, which would summarize the physical and chemical properties of the hazardous materials and their health impacts. In the event of an accidental release of fuel or other hazardous materials during project operation, the HMBEP would require the

immediate notification to all appropriate agencies and personnel of a release. The HMBEP would identify local emergency medical assistance appropriate for potential accident scenarios, contact information of all company emergency coordinators of the business, a listing and location of emergency equipment at the business, an evacuation plan, and a training program for business personnel.

The project's potential to result in a reasonably foreseeable upset involving the release of hazardous materials would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.8-3: Emit Hazardous Emissions or Handle Hazardous or Acutely Hazardous Materials, Substances, or Waste within 0.25 Mile of an Existing or Proposed School

Compliance with all relevant regulations for the handling and transport of hazardous materials would reduce the potential for the generation of hazardous waste typical of construction activities. Additionally, the potential for operation of the project to result in hazardous effects on either school would be limited because the gas station would be designed to minimize potential for accidental releases of fuel into the environment. For these reasons, the project would result in a **less-than-significant impact** on schools within 0.25 mile of the project site.

The project site is in proximity to Rio Vista Middle School and River Bluff Elementary School. There are no other schools within 0.25 mile of the project site. Project construction would involve the use of hazardous materials and generation of hazardous waste typical of construction activities including fuel and lubricant containers, paint and solvent containers, and cement products containing strong basic or acidic chemicals. The construction contractor would be required to comply with all relevant regulations, including the Toxic Substances Control Act of 1976 which regulates the disposal of hazardous materials, the federal hazardous materials transportation law which regulates the transportation of hazardous materials that is overseen by the USDOT, and Chapter 6.95 of the California Health and Safety Code which requires the preparation of a HMBEP, as described below in more detail. Compliance with these regulations would minimize potential hazardous material effects to Rio Vista Middle School and River Bluff Middle School during construction of the project.

Operation of the project would involve the ongoing use of a gas station. As described above in Impact 3.8-1, the gas station would be designed to minimize potential for accidental releases of fuel into the environment. The fuel pump dispensers would be equipped with automatic shutoffs and the USTs would be double walled. USTs would also have spill containment and overfill prevention systems. Fuel tank storage areas would include appropriate safety design, equipment, and signage to protect public health and safety from leaks, fires, or spills involving vehicle fuel if any were to occur on the project site. Potentially hazardous air emissions associated with operation of the gas station are addressed in Section 3.3, "Air Quality." Additionally, the automated car wash would be enclosed within a structure, limiting the potential for wastewater to be released into the environment.

A HMBEP would also be developed for project construction and operation and submitted to the Fresno County Department of Public Health, the certified CUPA for the city of Fresno and surrounding vicinity. The HMBEP would include an inventory of the hazardous materials used at the project site and emergency response plans and procedures to be implemented in the event of a release of a hazardous material. Preparing an emergency response plan through the HMBEP would help prevent potential impacts to the surrounding schools if hazardous emissions or materials were released during construction or operation of the project. The HMBEP would also include the Material Safety Data Sheet for each hazardous and potentially hazardous substance used, including fuel for the gas station, which would summarize the physical and chemical properties of the hazardous materials and their health impacts. In the event of an accidental release of fuel or other hazardous materials during project operation, the HMBEP would require the immediate notification to all appropriate agencies and personnel of a release. The HMBEP would identify local emergency medical assistance appropriate for potential accident scenarios, contact information of all company emergency coordinators of the business, a listing and location of emergency equipment at the business, an evacuation plan, and a training program for business personnel. Coordination with outside agencies and

implementation of the emergency response plans in the HMBEP would aid in reducing the potential impact on surrounding schools in the event of an accidental release of hazardous materials. Given that the gas station would be designed to minimize potential for accidental releases of fuel into the environment and both construction and operation activities would comply with the HMBEP developed for the project, the potential for the project to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.8-4: Impair Implementation of or Physically Interfere with the Implementation of an Adopted Emergency Response Plan or Emergency Evacuation Plan

The Fresno County Multi-Hazard Mitigation Plan does not identify formal evacuation routes. Compliance with the conditions of the Street Work and Traffic Control Permit during any potential road closures, applicable general plan policies, and review of the site plan by the City Fire Department would result in a **less-than-significant impact** on implementation of an adopted emergency response plan or emergency evacuation plan.

The project is within the jurisdiction of the Fresno County Multi-Hazard Mitigation Plan, as described above in Section 3.8.2, "Environmental Setting." The Fresno County Multi-Hazard Mitigation Plan does not identify formal evacuation routes. If roadways must be closed temporarily during construction, the project applicant would be required to obtain a Street Work and Traffic Control Permit from the City of Fresno Director of Public Works. In obtaining the permit, the applicant would be required to coordinate and get approval of the proposed dates of the road closures from the City's engineer. Depending on the type of roadway requiring closure, certain additional measures would be implemented to maintain traffic safety including the posting of the road closure up to 5 days prior to the closure and the creation of a detour route during the closure (City of Fresno 2019).

As discussed further in Section 3.13, "Transportation and Circulation," the project's site plan would be reviewed by the City Fire Department and the final site plan would be required to meet all Fire Department and General Plan Policy NS-6-f requirements for emergency vehicle access, turnaround, and vertical clearance, as well as secure evacuation routes. Additionally, review of the site plan by the City Fire Department would ensure that the appropriately sized evacuation routes are built into the project design. Accordingly, the roadway traffic generated by the project would not obstruct emergency vehicle response, an adopted emergency response plan, or evacuation plan, and the impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.8-5: Expose People or Structures, Either Directly or Indirectly, to a Significant Risk of Loss, Injury, or Death Involving Wildland Fires

The project site is not located within a designated urban-wildland interface area nor is it near designated State Responsibility Areas. Existing development and irrigated agricultural land surround the project site, and the likelihood for wildland fire in the area is low. The project design would comply with existing regulations and would ensure the Costco facility and associated tire center, gas station, and drive-through car wash meet the standards for emergency access, fuel modification, setback, signage, and water supply, which help prevent damage to structures or people by reducing wildfire hazards. Therefore, this impact would be **less than significant**.

Project implementation would result in the construction and operation of a Costco facility with an attached tire center and a detached gas station and drive-through car wash on a parcel of land that is currently undeveloped. As discussed above in Section 3.8.2, "Environmental Setting," the project site is not located within a designated urban-wildland interface area nor is it near designated State Responsibility Areas. According to maps published by CAL FIRE,

the city of Fresno does not contain any land classified as a Very High FHSZ. The project site is classified as "Unzoned" (CAL FIRE 2007). The project site is surrounded by existing development and irrigated agricultural land, and the likelihood for wildland fire in the area is low.

The project would also be designed to meet the building standards of the California Fire Code and California Building Standards Code, which include measures such as ignition-resistant construction, automatic interior fire sprinklers, a robust water delivery system, and adequate emergency and fire apparatus access. Given that the project site is not located in a high fire risk area and the Costco facility and associated tire center, gas station, and drive-through car wash would be designed to meet current fire safety design standards, the impacts from wildfire risk would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.9 HYDROLOGY AND WATER QUALITY

This section identifies the regulatory context and policies related to hydrology and water quality, describes the existing hydrologic conditions at the project site, and evaluates the project's potential hydrology and water-quality impacts. Water supply is addressed in Section 3.14, "Utilities."

No comments received in response to circulation of the notice of preparation that address hydrology and water quality.

3.9.1 Regulatory Setting

FEDERAL

Clean Water Act

The U.S. Environmental Protection Agency (EPA) is the lead federal agency responsible for water quality management. The Clean Water Act (CWA) is the primary federal law that governs and authorizes water quality control activities by EPA as well as the states. Various elements of the CWA address water quality. These are discussed below.

CWA Water Quality Criteria/Standards

Pursuant to federal law, EPA has published water quality regulations under Title 40 of the Code of Federal Regulations (CFR). Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the act, water quality standards consist of designated beneficial uses of the water body in question and criteria that protect the designated uses. Section 304(a) requires EPA to publish advisory water quality criteria that accurately reflect the latest scientific knowledge on the kind and extent of all effects on health and welfare that may be expected from the presence of pollutants in water. Where multiple uses exist, water quality standards must protect the most sensitive use. As described in the discussion of state regulations below, the State Water Resources Control Board (SWRCB) and its nine-regional water quality control boards (RWQCBs) have designated authority in California to identify beneficial uses and adopt applicable water quality objectives.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established under the CWA to regulate municipal and industrial discharges to surface waters of the United States. NPDES permit regulations have been established for broad categories of discharges including point source waste discharges and nonpoint source stormwater runoff. Each NPDES permit identifies limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits.

"Nonpoint source" pollution originates over a wide area rather than from a definable point. Nonpoint source pollution often enters receiving water in the form of surface runoff and is not conveyed by way of pipelines or discrete conveyances. Two types of nonpoint source discharges are controlled by the NPDES program: discharges caused by general construction activities and the general quality of stormwater in municipal stormwater systems. The goal of the NPDES nonpoint source regulations is to improve the quality of stormwater discharged to receiving waters to the maximum extent practicable. The RWQCBs in California are responsible for implementing the NPDES permit system (see the discussion below).

National Flood Insurance Act

The Federal Emergency Management Agency (FEMA) is tasked with responding to, planning for, recovering from, and mitigating against disasters. The Federal Insurance and Mitigation Administration within FEMA is responsible for administering the National Flood Insurance Program (NFIP) and administering programs that aid with mitigating future damages from natural hazards.

FEMA prepares Flood Insurance Rate Maps (FIRMs) that delineate the regulatory floodplain to assist local governments with the land use planning and floodplain management decisions needed to meet the requirements of NFIP. Floodplains are divided into flood hazard areas, which are areas designated per their potential for flooding, as delineated on FIRMs. Special Flood Hazard Areas are the areas identified as having a 1 percent chance of flooding in each year (otherwise known as the 100-year flood). In general, the NFIP mandates that development is not to proceed within the regulatory 100-year floodplain if the development is expected to increase flood elevation by 1 foot or more.

STATE

California Porter-Cologne Act

California's primary statute governing water quality and water pollution issues with respect to both surface waters and groundwater is the Porter-Cologne Water Quality Control Act of 1970 (Porter-Cologne Act). The Porter-Cologne Act grants the SWRCB and each of the nine RWQCBs power to protect water quality and is the primary vehicle for implementation of California's responsibilities under the Clean Water Act. The applicable RWQCB for the proposed project is the Central Valley RWQCB. The SWRCB and the Central Valley RWQCB have the authority and responsibility to adopt plans and policies, regulate discharges to surface and groundwater, regulate waste disposal sites, and require cleanup of discharges of hazardous materials and other pollutants.

Under the Porter-Cologne Act, each RWQCB must formulate and adopt a water quality control plan (known as a "Basin Plan") for its region. The Basin Plan for the Central Valley Region includes a comprehensive list of waterbodies within the region and detailed language about the components of applicable Water Quality Objectives (WQOs). Through the Basin Plan, the Central Valley RWQCB executes its regulatory authority to enforce the implementation of total maximum daily loads, and to ensure compliance with surface WQOs. The Basin Plan includes both narrative and numerical WQOs designed to provide protection for all designated and potential beneficial uses in all its principal streams and tributaries. Applicable beneficial uses include municipal and domestic water supply, irrigation, non-contact and contact water recreation, groundwater recharge, fresh water replenishment, hydroelectric power generation, and preservation and enhancement of wildlife, fish, and other aquatic resources.

The Central Valley RWQCB also administers the adoption of waste discharge requirements, manages groundwater quality, and adopts projects within its boundaries under the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (General Permit).

NPDES Construction General Permit for Stormwater Discharges Associated with Construction Activity

The SWRCB adopted the statewide NPDES General Permit in August 1999. The state requires that projects disturbing more than 1 acre of land during construction file a Notice of Intent with the RWQCB to be covered under this permit. Construction activities subject to the General Permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non stormwater discharges to storm sewer systems and other waters. A stormwater pollution prevention plan (SWPPP) must be developed and implemented for each site covered by the permit. The SWPPP must include best management practices (BMPs) designed to prevent construction pollutants from contacting stormwater and keep products of erosion from moving off-site into receiving waters throughout the construction and life of the project; the BMPs must address source control and, if necessary, pollutant control.

NPDES Stormwater Permit for Discharges from Small Municipal Separate Storm Sewer Systems

The Municipal Stormwater Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4s). Stormwater is runoff from rain or snow melt that runs off surfaces such as rooftops, paved streets, highways or parking lots and can carry with it pollutants such as oil, pesticides, herbicides, sediment, trash, bacteria, and metals. The runoff can then drain directly into a local stream, lake, or bay. Often, the runoff drains into storm drains that eventually drain untreated into a local waterbody.

In 2016, the Central Valley RWCQB issued a region-wide MS4 permit (Order No. R5-2016-0040) covering the entire Central Valley Region, including the city of Fresno, to promote greater watershed/drainage shed coordination, water quality measure protections, and program implementation efficiencies (California Water Boards 2022).

California Water Code

The California Water Code is enforced by the California Department of Water Resources (DWR). The mission of DWR is "to manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments." DWR is responsible for promoting California's general welfare by ensuring beneficial water use and development statewide.

Groundwater Management

Groundwater Management is outlined in the California Water Code, Division 6, Part 2.75, Chapters 1-5, Sections 10750 through 10755.4. The Groundwater Management Act was first introduced in 1992 as Assembly Bill (AB) 3030, and has since been modified by Senate Bill (SB) 1938 in 2002, AB 359 in 2011, and the Sustainable Groundwater Management Act (SGMA; SB 1168, SB 1319, and AB 1739) in 2014. The intent of these acts is to encourage local agencies to work cooperatively to manage groundwater resources within their jurisdictions and to provide a methodology for developing a Groundwater Management Plan.

SGMA became law on January 1, 2015, and applies to all groundwater basins in the state (Water Code Section 10720.3). By enacting SGMA, the legislature intended to provide local agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater within their jurisdiction (Water Code Section 10720.1).

Pursuant to SGMA, any local agency that has water supply, water management, or land use responsibilities within a groundwater basin may elect to be a "groundwater sustainability agency" for that basin (Water Code Section 10723). In 2017, the North Kings Groundwater Sustainability Agency (North Kings GSA) elected to become a GSA pursuant to Water Code Section 10723.8 and undertake sustainable groundwater management in the portion of the Kings Subbasin underlying the agency's boundary. The North Kings GSA is a joint powers authority consisting of the following public agencies: Fresno Irrigation District, Fresno County, City of Fresno, City of Clovis, City of Kerman, Biola Community Services District, Garfield Water District, and International Water District (North Kings GSA 2019). In November 2019, the North Kings GSA completed a groundwater sustainability plan (GSP) for the Kings Subbasin that was filed with the State in January 2020. DWR recommended approval of the GSP in March of 2023. GSAs are required to begin implementing their GSPs as soon as they are adopted locally.

California Code of Regulations

Underground Storage Tank Regulations

The SWRCB Underground Storage Tank Regulations (California Code of Regulations [CCR] Title 23, Division 3, Chapter 16), establish: construction requirements for new underground storage tanks; separate monitoring requirements for new and existing underground storage tanks, uniform requirements for unauthorized release reporting, and for repair, upgrade, and closure of underground storage tanks.

Worker Safety Regulations

The California Occupational Safety and Health Administration (Cal/OSHA) assumes primary responsibility for developing and enforcing workplace safety regulations within the state. Cal/OSHA standards are codified in Title 8 of the CCR.

LOCAL

City of Fresno General Plan

The City of Fresno General Plan (City of Fresno 2014a) includes the following policies that pertain to hydrology and water quality and are relevant to this analysis.

- **Policy NS-3-h: Runoff Controls.** Implement grading regulations and related development policies that protect area residents from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities.
- **Policy NS-3-i: New Development Must Mitigate Impact.** Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD [Fresno Metropolitan Flood Control District] to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.
- **Policy PU-7-a: Reduce Wastewater.** Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows.
- **Policy PU-8-g: Review Project Impact on Supply.** Mitigate the effects of development and capital improvement projects on the long-range water budget to ensure an adequate water supply for current and future uses.
- **Policy RC-7-c: Best Practices for Conservation.** Require all City Facilities and all new private development to follow U.S. Bureau of Reclamation Best Management Practices for water conservation, as warranted and appropriate.

Fresno Municipal Code

Chapter 6: Municipal Services and Utilities

Chapter 6 of the Fresno Municipal Code contains the following regulations pertaining to hydrology and water quality.

Article 7: Urban Storm Water Quality Management and Discharge Control

This article prohibits illicit discharges and connections to the storm drain system. The chapter also addresses stormwater quality in accordance with the requirements of the NPDES permit, prohibits the discharge of non-stormwater into the storm drain system, and requires the reduction of pollutants in stormwater discharges by implementing BMPs and low impact development features for new development and redevelopment projects.

Fresno Metropolitan Flood Control District's Storm Drainage and Flood Control Master Plan

The Storm Drainage and Flood Control Master Plan contains an estimate of the total costs of constructing the local drainage facilities and improvements required by the plan, together with their appurtenances, and a map of each local drainage area showing generally its boundaries and location of the planned local drainage facilities and improvements.

Grading Plan Check Process

Before obtaining a grading permit, all development projects are required to submit grading plans to the City of Fresno for review and approval. Developers must submit plans and fees to satisfy the grading plan check process (City of Fresno 2021a).

Urban Water Master Plan

The 2020 UWMP was adopted by the City Council on July 14, 2021. The 2020 UWMP assesses current and projected water supplies along with the reliability of those water supplies; evaluates the current and future type of water demand and type of customers; describes required conservation measures implemented by water suppliers; and prepares a response plan, in the event of a water shortage.

Underground Storage Tank Closure Guidelines

A gas station maintenance contractor installs and/or removes underground fuel storage tanks up to 20,000 gallons which have been or are to be used for dispensing gasoline, diesel fuel, waste oil or kerosene (no chemicals). This work involves the installation and/or removal of all incidental tank related piping, electrical work, including the installation of vapor probes in back fill areas of the tanks and any associated calibration work, including but not limited to the testing and adjustment of leak detection and vapor recovery equipment, such as automatic tank gauges, leak line detectors, vapor recovery lines, and in-station diagnostics. This contractor also performs the installation of auto

hoisting equipment, grease racks, compressors, air hoses, and other gas station equipment. All contractors performing work must implement all safety standards established by Cal/OSHA (Fresno County 2009).

The Fresno County Department of Public Health provides underground storage tank closure guidelines. These guidelines provide a process to ensure that:

- underground storage tanks are removed or abandoned safely;
- property permits are obtained prior to initiating any work on the property,
- soil samples are obtained properly, and
- all paperwork is submitted in order, to the appropriate agencies.

Prior to conducting any activity associated with an underground storage tank closure, a permit shall be obtained from the Fresno County Department of Public Health. Upon removing the underground storage tank, dispenser, and piping, soil and/or groundwater samples must be obtained under the direction of the Fresno County Department of Public Health. Closure documentation required by the underground storage tank closure guidelines includes:

- Underground Storage Tank Unified Program Consolidated Forms reflecting permanent underground tank closure;
- copies of all the closure process sample analytical results;
- a scaled site drawing that includes the sample locations and depths, and the tank, dispenser, and piping locations;
- copies of laboratory chain of custody forms and documentation of precision and accuracy; and
- proper tank disposal documentation.

Additional permits may be necessary from the local fire department, building department, or law enforcement agency that has site jurisdiction (Fresno County 2009).

3.9.2 Environmental Setting

SURFACE WATER

The western slopes of the Sierra Nevada drain to the west through the city of Fresno via the San Joaquin and Kings Rivers. The Kings River is connected to the San Joaquin River by the James Bypass, a manmade canal. The San Joaquin River is 366 miles long and spans from the Sierra Nevada Mountains to the San Francisco Bay via the San Joaquin Valley. Much of the water that flows through the San Joaquin River has a variety of uses including municipal and domestic water supply, agricultural, industrial, recreational, freshwater and wildlife habitat, and migration and spawning grounds (City of Fresno 2021b).

The project site is located approximately 0.3 mile south of the San Joaquin River. Water quality in the San Joaquin River is affected by both natural and anthropogenic sources, including soil erosion; stormwater runoff; wastewater discharges, industrial, residential, and agricultural runoff; recreational activity; and wildlife. Water quality issues associated with the segment of the San Joaquin River that flows near the project site (Friant Dam to Mendota Pool) is listed on the SWRCB's 303(d) list for invasive species and pH (SWRCB 2016). There are no agricultural ponds, recharge basins, irrigation canals, and other similar features located on the project site.

GROUNDWATER

The project site is underlain by the Kings Groundwater Subbasin, which is an alluvial basin bounded north and south by the San Joaquin and Kings Rivers, respectively, the Sierra Nevada mountains on the northeast, and the Westside and Delta-Mendota Subbasins to the west-southwest. The aquifer system is comprised of unconfined and confined groundwater in the western parts of the subbasin where lacustrine clay beds exist. East of the lacustrine clays, clay beds separate shallower unconfined water from deeper confined groundwater (North Kings GSA 2019).

The project site is located within the North Kings GSA plan area. The plan area is approximately 311,000 acres and is comprised primarily of agricultural and urban land use designations. The North Kings GSA plan area is a conjunctive use area, utilizing groundwater resources to supplement available surface water supplies to meet water demands. Groundwater levels have fallen substantially over the last century throughout the San Joaquin Valley, including within the North Kings GSA plan area. This is largely due to extraordinary groundwater extraction in adjacent GSPs. Notably, a large cone of depression west of the North Kings GSA plan area has caused increased groundwater flow in that direction. Monitoring of the area since the 1920s indicates that there is minimal subsidence occurring within the North Kings GSA plan area boundary, with the greatest levels occurring toward the western edge (North Kings GSA 2019).

Through its various surface water resources and several decades of proactive groundwater recharge activities, the North Kings GSA plan area has not experienced significant overdraft conditions like elsewhere in the Kings Groundwater Subbasin. Drought and other challenges, however, have contributed to a gradual decline in overall groundwater conditions that will be addressed through the implementation of the GSP for the North Kings region. The North Kings GSA is projected to reach sustainability by 2040 if groundwater flows from within the North Kings GSA plan area to areas governed by neighboring GSAs and basins are reduced and projects are developed to mitigate present and future projected impacts. Management actions included in the GSP to address groundwater sustainability consist of education and outreach, well head requirements, groundwater allocation, and groundwater pumping restrictions (North Kings GSA 2019).

On the project site, subsurface soil consists of alluvial deposits composed of interbedded layers of silts and clays with variable amounts of sand. Groundwater was not encountered to a maximum depth of 50 below the ground surface during soil sampling conducted in 2021. The elevation of the site is approximately 300 feet above mean sea level and regional well data indicates that groundwater levels at the site are currently approximately 200 feet above mean sea level, or 100 feet below the ground surface (Kleinfelder 2021).

STORMWATER DRAINAGE

The project site is located within the Fresno Metropolitan Flood Control District (FMFCD), which plans, implements, operates, and maintains storm drainage facilities within the Fresno-Clovis metropolitan area. The storm drainage facilities within a drainage area consist of storm drain inlets, pipeline, retention basins, urban detention (water quality) basins, and stormwater pump stations. FMFCD 's local stormwater drainage system consists of interconnected surface conveyances, storm drains, retention basins, pump stations and outfalls, which discharge to groundwater, irrigation canals, creeks, and the San Joaquin River. The raw surface water recharges the groundwater basin to sustain the groundwater supply for the city. The groundwater recharge volume can vary based on surface water supply availability and is represented as an addition to annual groundwater supplies (City of Fresno 2021a).

In compliance with the federal Clean Water Act and implementing stormwater permit regulations, FMFCD and five other local public agencies (Fresno County, City of Fresno, City of Clovis, California State University, Fresno, and California Department of Transportation) developed a stormwater quality management program to be implemented in the Fresno-Clovis metropolitan area. The program proposal was submitted to the Central Valley RWQCB as a part of the NPDES municipal stormwater permit process and a permit was issued to the participating agencies in September 1994. The MS4 permit was renewed in 5-year increments until 2018. In April 2018, the Cities of Clovis and Fresno, Fresno County, California State University, Fresno, and FMFCD submitted Notices of Intent to obtain coverage under the General MS4 Permit (Order R5-2016-0040). The General Permit requires continued implementation of the existing Stormwater Quality Management Program until a new plan is approved. MS4 permits for the Cities of Clovis and Fresno, Fresno County, California State University, Fresno, and FMFCD were assigned in May 2018.

The local stormwater drainage program provides control and safe disposal of stormwater runoff generated by local land uses. The metropolitan portion of FMFCD is divided into local drainage areas of approximately 1 to 2 square miles. Within the drainage areas, the FMFCD operates and maintains a complex system of surface conveyances, storm drains, pump stations and retention basins that capture and recharge stormwater to the groundwater aquifer. The system is designed to move water from a basin and discharge to other FMFCD facilities, or to irrigation canals, creeks, and the San Joaquin River (City of Fresno 2016). The project site is located within the EH local stormwater drainage area, which is served by a retention or detention facility. The area east of North Arthur Avenue is in the EG basin and

drainage is directed to Spruce Avenue (Chapman, pers. comm., 2021). There are existing stormwater inlets at the northeast, northwest, and southwest corners of the project site that lead to 24-inch, 30-inch, and 36-inch pipes, respectively. There is also an existing 7-acre basin adjacent to the Riverside Golf Course northeast of the project site that serves the adjacent, EG drainage basin.

FLOODING AND DAM INUNDATION

FEMA prepares maps of the 100-year floodplains for communities in the United States. For areas within the 100-year floodplain, there is a 1 percent chance of flooding for any given year and these areas are considered to be at high-risk. Maps are also available for 500-year floods, which mean that in any given year, the risk of flooding in the designated area is 0.2 percent. Areas within the 100-year floodplain that are financed by federally backed mortgages are subject to mandatory federal insurance requirements and building standards to reduce flood damage. According to FEMA Map Panel 06019C1535H, the project site is not located within a 100-year flood zone (FEMA 2009).

Three dams control flows on the San Joaquin River and the Kings River: the Friant, Mendota, and Pine Flat Dams. In addition to the dams on the two rivers, there are reservoirs and detention basins that have been constructed to prevent flooding (City of Fresno 2014b). Dam failure is the uncontrolled release of impounded water behind a dam. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism can all cause a dam to fail. There is no historic record of dam failure in Fresno County (Fresno County 2018). While both the unincorporated and incorporated areas of the county are considered at risk for dam failure, the project site is not designated as an area subject to inundation due to dam breach (DWR 2022).

3.9.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

Evaluation of potential hydrologic and water quality impacts is based on a review of existing documents and studies that address water resources in the vicinity of the project. Information obtained from these sources was reviewed and summarized to describe existing conditions and to identify potential environmental effects, based on the standards of significance presented in this section. In determining the level of significance, the analysis assumes that the project would comply with relevant federal, state, and local laws, ordinances, and regulations.

THRESHOLDS OF SIGNIFICANCE

An impact on hydrology and water quality would be significant if implementation of the project would:

- violate any water-quality standards or waste-discharge requirements or otherwise substantially degrade surface or groundwater quality;
- substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin;
- 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 that would:
  - result in substantial erosion or siltation on site or off site;
  - substantially increase the rate or amount of surface runoff in a manner that would result in flooding on site or off site;
  - create or contribute runoff water that would exceed the capacity of existing or planned stormwater- drainage systems or provide substantial additional sources of polluted runoff;
  - impede or redirect flood flows;

- in flood hazard, tsunami, or seiche zones risk release of pollutants due to project inundation; or
- conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

TOPICS NOT DISCUSSED FURTHER

Risk Release of Pollutants Due to Project Inundation in a Flood Hazard, Tsunami, or Seiche Zone

According to FEMA FIRM Panel 06019C1535H, the project site is not within a floodplain, a FEMA-designated floodway, or an inundation area (FEMA 2009). Therefore, the project does not present a risk of release of pollutants in a flood hazard, tsunami, or seiche zone. There would be no impact; therefore, no further analysis is required by CEQA.

The project area is located inland with no large water bodies located in the vicinity, and there is no known history of mud flow in the vicinity. The project would not subject people or structures to a significant risk of inundation from sea level rise, tsunami, seiche, or mudflow. Therefore, there would be no impact, and no further analysis is required by CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.9-1: Violate Water Quality Standards or Waste Discharge Requirements or Otherwise Degrade Water Quality

Project construction activities such as grading, excavation, and trenching could result in erosion and sedimentation, and discharge of other nonpoint source pollutants. In addition, the project would include fuel storage and dispersal, tire maintenance, and a car wash facility that could generate stormwater pollutants including oils, lubricants, and heavy metals. Regulations apply to the project that would reduce potentially significant impacts, including the NPDES Permit Program, underground storage tank regulations contained in CCR, Title 23, Water, Division 3, Chapter 16 (underground storage tank regulations), Central Valley RWQCB General Permit for Stormwater Discharges from MS4s (Order R5-2016-0040), and FMFCD's Storm Drainage and Flood Control Master Plan. Because compliance with these regulations and BMPs would be incorporated into the project, there would not be a violation of water quality standards or waste discharge requirement or interference with implementation of a water quality control plan. Because water quality would not be degraded, this impact would be **less than significant**.

Short-Term Construction Impacts

Construction activities associated with the project would include grading, exaction, placing of fill, trenching, spoil pile storage, and backfilling of trenches. These types of earth-moving activities would increase the potential for erosion and sedimentation, particularly during storm events. Additionally, construction equipment and vehicles could deposit constituents such as diesel fuel, hydraulic fluid, oil, and exhaust into the environment that could be conveyed within stormwater runoff to surface waters or groundwater. Construction activities use concrete, solvents, glues, oils, paints, and generate trash, all of which could contribute to polluted stormwater runoff. Polluted stormwater runoff could contribute to degradation of downstream surface waters or groundwater.

All earth-disturbing activities during construction would be subject to the NPDES Permit Program, administered by the Central Valley RWQCB. As required by NPDES, the project would be required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ). The NPDES Construction General Permit identifies limits on discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not adversely affect water quality or human health. Construction activities subject to the Construction General Permit include clearing, grading, and other ground-disturbing activities such as stockpiling or excavation. The Construction General Permit requires development and implementation of a SWPPP and BMPs such as maintaining or creating drainages to convey and direct surface runoff away from bare areas, and installing physical barriers such as berms, silt fencing, waddles, straw bales, and gabions. Because the project would be required to comply with the provisions of the Construction General Permit,

including preparation of a SWPPP and implementation of all identified BMPs, short-term construction impacts associated with water quality standards and waste discharge requirements would be minimized.

The project would be implemented in compliance with underground storage tank regulations contained in CCR, Title 23, Water, Division 3, Chapter 16 (underground storage tank regulations) to protect water quality.

Long-Term Operational Impacts

Development of the site with a Costco warehouse building, car wash, fueling facilities, and paved parking areas would create impervious surfaces within the site. Fuel could be spilled while being dispensed to auto and trucks or during fuel deliveries. Oils, lubricants, heavy metals, and other water quality contaminants would create residue on the paved surfaces of the site, which could be carried in stormwater runoff during rain events and could reach surface or groundwaters. Additionally, a leak in an underground storage tank could result in the potential contamination of groundwater.

The underground storage tank regulations (CCR, Title 23, Division 3, Chapter 16) require rigorous design, construction, testing, and monitoring for all underground storage tank systems. These regulations require reinforcement of tank areas that receive the greatest wear and an independent secondary containment system large enough to contain 150 percent of the volume of the largest tank, or 10 percent of the total volume of all tanks, whichever is greater. A leak interception and detection system is also required that prevents stored fuel from contacting groundwater. Additionally, the owners of all new underground storage tanks are required to develop a routine monitoring and reporting plan, and a response plan for any unauthorized release before the storage tank system is put into service.

Costco would construct utility improvements within the site to service the proposed uses and connect to available utilities adjacent to the project site. The car wash facility would include only the automated car wash within the structure. Wash water would be recycled. The approximately 22-acre site would be paved and graded such that stormwater would runoff into the existing storm drain system. Stormwater from the site would be directed to existing FMFCD drainage facilities in North Riverside Drive, West Spruce Avenue, and West Herndon Avenue. The City of Fresno, FMFCD, Fresno County, the City of Clovis, and California State University Fresno are covered under the region-wide Central Valley RWQCB General Permit for Stormwater Discharges from MS4s (Order R5-2016-0040). This Region-wide MS4 Permit requires that the City and its co-permittees implement water quality and watershed protection measures for all development projects. The waste discharge requirements contained in the region-wide MS4 Permit have been designed to be consistent with the water quality standards and goals established in the Central Valley RWQCB's Basin Plan. In addition, the project would be designed in a matter consistent with FMFCD's Storm Drainage and Flood Control Master Plan. Implementation of the SWPPP and BMPs, which include programs, technologies, processes, practices, and devices that control, prevent, remove, or reduce pollution, would reduce impacts to surface waters to acceptable levels and long-term project impacts to surface or groundwater quality would not exceed acceptable levels.

As discussed above, regulations apply to the project that would reduce potentially significant impacts, including the NPDES Permit Program; underground storage tank regulations contained in CCR, Title 23, Water, Division 3, Chapter 16 (underground storage tank regulations); Central Valley RWQCB General Permit for Stormwater Discharges from MS4s (Order R5-2016-0040); and FMFCD's Storm Drainage and Flood Control Master Plan. Because compliance with these regulations and BMPs would be incorporated into the project, there would not be a violation of water quality standards or waste discharge requirement or interference with implementation of a water quality control plan. Because water quality would not be degraded, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.9-2: Substantially Decrease Groundwater Supplies; Interfere with Groundwater Recharge, Such That the Project May Impede Sustainable Groundwater Management of the Basin; or Conflict with or Obstruct Implementation of a Water Quality Control Plan or Sustainable Groundwater Management Plan

The project would receive water from the City of Fresno Department of Public Utilities, which relies on groundwater and surface water supplies. The North Kings GSA is projected to reach sustainability by 2040 if groundwater flows from within the North Kings GSA plan area to neighboring GSAs and basins are reduced and projects are developed to address present and future projected groundwater conditions. The project would be consistent with the City of Fresno 2020 UWMP and would not impede management actions included in the GSP. Because the project would not decrease groundwater supplies or interfere with groundwater recharge such that implementation of a sustainable groundwater management would be impeded, or conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, this impact would be **less than significant**.

As discussed above under Section 3.9.2, "Environmental Setting," the North Kings GSA is projected to reach sustainability by 2040 if groundwater flows from within the North Kings GSA plan area to neighboring GSAs and basins are reduced and projects are developed to address present and future projected groundwater conditions. Management actions included in the GSP to address groundwater sustainability consist of education and outreach, well head requirements, groundwater allocation, and groundwater pumping restrictions.

As described further in Section 3.14, "Utilities," the project would be supplied water through the City of Fresno Department of Public Utilities in accordance with the City's *2020 Urban Water Management Plan* (UWMP). The city relies on groundwater from the North Kings Subbasin; surface water from Central Valley Project (CVP), through a contract with the United States Bureau of Reclamation; Kings River water, through a contract with Fresno Irrigation District; and recycled water (City of Fresno 2021b). The groundwater yields identified in the North Kings GSA GSP were used to develop the 2020 UWMP. Water supply and demand factors within the City's UWMP rely on existing land use designations. Although the project involves re-zoning of the site, the site remains zoned for commercial use. Because the UWMP does not differentiate between different commercial zoning districts, the project is accounted for in the City's UWMP. Because the UWMP is based on the yields in the GSP, the project's water demand would not interfere with implementation of the GSP. Further, although project implementation would create impervious conditions on the project site, which would interfere with natural groundwater recharge that may occur through the silty and sandy alluvial subsoils, runoff would be channeled to a retention facility within the local stormwater drainage area that capture and recharge stormwater to the groundwater aquifer.

The project involves development of a retail building, car wash, fueling facilities, and paved parking areas. It is located on a parcel zoned for commercial uses, and would be rezoned to a different commercial use. There are no project features that could affect education and outreach activities included in the GSP. In addition, the project does not include wells. Water supplied to the project is accounted for in the City's current UWMP, and would therefore not interfere with projected groundwater allocations or groundwater pumping restrictions as water supplies from the City would be adjusted as necessary. Because the project would not decrease groundwater supplies or interfere with groundwater recharge such that implementation of a sustainable groundwater management would be impeded, or conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan, this impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.9-3: Substantially Alter the Existing Drainage Pattern of the Site or Area in a Manner That Would Result in Substantial Erosion or Siltation, Substantially Increase in Surface the Rate or Amount of Surface Runoff in a Manner That Would Result in Flooding or Exceedance of the Capacity of Existing or Planned Stormwater Drainage Systems, or Impede or Redirect Flood Flows

The project would add approximately 22 acres of impervious surface to the currently undeveloped site, which would change the existing drainage rate and pattern of the site and could degrade downstream surface waters. The project is located within an area served by facilities identified in FMFCD's Storm Drainage and Flood Control Master Plan. In addition, the project would be required to comply with the City of Fresno grading plan check process and NPDES Construction General Permit Region-wide MS4. This impact would be **less than significant**.

The project site is undeveloped, does not contain streams or rivers, and does not contain impervious surfaces. As discussed in Impact 4.9-1 above, construction of the project would result in ground-disturbing activities such as grading, excavation, trenching, and spoil pile storage. The project would add approximately 22 acres of impervious surface to the currently undeveloped site, which would change the existing drainage rate and pattern of the site and could increase soil erosion that could contribute to degradation of downstream surface waters. It is anticipated that the stormwater runoff from the project site would flow west through the 36-inch pipes in West Herndon Avenue to the 54-inch pipes in North Golden State Boulevard and the existing 15-acre basin adjacent to SR 99. In addition, FMFCD would require construction of the inlet identified in the Storm Drainage and Flood Control Master Plan on Spruce Avenue in conjunction with development of North Arthur Avenue and Spruce Avenue. This would be constructed within the disturbance area of the Spruce Avenue extension. Both the EH and EG drainage areas have permanent drainage service and have been sized for the runoff of the proposed project (Chapman, pers. comm., 2021).

The applicant would construct utility improvements within the site to service the proposed uses and connect to available utilities adjacent to the project site. Stormwater from the site would be directed to existing FMFCD drainage facilities in North Riverside Drive, West Spruce Avenue, and West Herndon Avenue, located within the EH local stormwater drainage area. In addition, the project would be required to comply with the City of Fresno grading plan check process and NPDES Construction General Permit Region-wide MS4. Compliance with the grading plan check process requires that all new development drains properly and is routed to the appropriate location. Additionally, these regulations would result in appropriate handling of stormwater on site to reduce potential for substantial increased runoff and minimize potential for downstream flooding. Participation in the Region-wide MS4 permit would reduce water quality impacts to surface and groundwater by ensuring that discharged water meets the water quality standards and goals established in the Central Valley RWQCB's Basin Plan through the implementation of BMPs described above. The runoff generated by the project is not anticipated to exceed the capacity of existing and planned stormwater drainage systems. This impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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3.10 LAND USE AND PLANNING

This land-use analysis evaluates the project's consistency with applicable land-use plans and policies. The physical environmental effects associated with the project, many of which pertain to issues of land use compatibility (e.g., noise, aesthetics, air quality) are evaluated in other sections of Chapter 3 of this Draft EIR.

Public comments on the notice of preparation related to land use and planning included concern over rezoning the project site from CC/EA/UGM/cz (Community Commercial/Expressway Overlay/Urban Growth Management/conditions of zoning) zone district to the CG/UGM/cz (General Commercial/Urban Growth Management/conditions of zoning) zone district. Evaluation of the potential impact associated with this rezone is presented below in Section 3.10.3, "Environmental Impacts and Mitigation Measures."

3.10.1 Regulatory Setting

FEDERAL

No federal plans, policies, regulations, or laws related to land use are applicable to the project.

STATE

Planning and Zoning Laws

California Government Code Section 65300 et seq. establishes the obligation of cities and counties to adopt and implement general plans. The general plan is a comprehensive, long-term, and general document that describes plans for the physical development of a city or county and of any land outside its boundaries that, in the city's or county's judgment, bears relation to its planning. The general plan addresses a broad range of topics, including at a minimum land use, circulation, housing, conservation, open space, noise, and safety. In addressing these topics, the general plan identifies the goals, objectives, policies, principles, standards, and plan proposals that support the city's or county's vision for the area. The State Zoning Law (California Government Code, Section 65800 et seq.) establishes that zoning ordinances, which are laws that define allowable land uses within a specific zone district, are required to be consistent with the general plan. Local general plan policies and zoning ordinances, as they relate to the proposed project, are summarized below.

LOCAL

City of Fresno General Plan

The City of Fresno General Plan (City of Fresno 2014) establishes the following policies related to land use and planning that are relevant to the project:

- Policy LU-6-a: Design of Commercial Development. Foster high quality design, diversity, and a mix of amenities in new development with uses through the consideration of guidelines, regulations and design review procedures.
- Policy LU-6-d: Neighborhood and Community Commercial Center Design. Plan for neighborhood mixed use and community commercial uses to implement the Urban Form concepts of this Plan, promote the stability and identity of neighborhoods and community shopping areas, and allow efficient access without compromising the operational effectiveness of the street system.

Bullard Community Plan

The Bullard Community Plan (City of Fresno 1991) outlines the public land use policy to direct the physical growth and change of the Bullard Community. Originally adopted in December of 1988 and most recently updated in 1991, this plan was developed assuming a 20-year horizon. As an adopted community plan, the Bullard Community Plan continues to guide development of the area. Where there is a conflict between the Bullard Community Plan and

other planning guidelines (Including adopted design guidelines, the development code, and the general plan), those other planning guidelines take precedence (refer to City of Fresno Code of Ordinances, Section 15-104[B][4]).

The potentially applicable goals and policies within the Bullard Community Plan are listed below:

- 4.2.3. Goals
  - Designate enough land for commercial use to meet the needs of the anticipated population.
  - Distribute the new commercial land use designations at logical, marketable, convenient and accessible locations.
- 4.2.4 Policies/Implementation Measures

1. All new retail commercial uses shall be developed as part of planned unified shopping centers, except on Blackstone Avenue.
2. Retail commercial development within the undeveloped northwest portion of the Bullard Plan-Area shall occur at three commercial "nodes" of no more than 15 acres each located at the following intersections: Polk/Sierra, Bullard/Dante, and Herndon/Bryan Avenues. The 15 acres of commercial use may be developed entirely on a single corner of the intersection or may be developed on two corners of the intersection as a 10-acre neighborhood shopping center and a 5 acre accessory center or combination thereof.
3. New retail commercial development shall be designed and located so as to minimize its impact as an attractive nuisance to any public or private school of elementary through high school grades.
7. The following development standards for interface areas between properties zoned or planned for commercial or office uses, and properties zoned or planned for residential uses, shall be mandatory for land north of West Herndon Avenue (excepting the Herndon townsite and the Pinedale Redevelopment Area) and advisory for all other areas.
   a. All loading and storage areas shall be screened from view of adjoining property zoned or planned for residential uses, by a combination of landscape planting and a solid masonry wall. Loading space shall be located not less than one hundred fifty feet from the boundary of said residential property; however, the proximity of loading areas may be reduced to not less than forty feet from the boundary of residential property, if the Director of the Development Department or the Planning Commission finds that additional screening and noise attenuating methods have been designed to adequately protect adjoining residential property. All storage shall be within an enclosed structure. Outdoor storage is expressly prohibited;
   b. Roof-mounted and detached mechanical equipment for commercial and office uses shall be screened from view and acoustically baffled, to prevent the noise level rating for the equipment from exceeding 55 L_{dn}, measured at the nearest property line;
   c. A landscaped setback twenty feet wide, containing deciduous and evergreen trees, shall be planted and maintained along the property line between commercial and office uses and abutting properties zoned or planned for residential uses, and along abutting local streets, provided, however, that this requirement shall not apply to those parcels of land which are one acre or less in size, or to parcels larger than one acre, subject to Director review and approval of landscape plans;
   d. No commercial or office building shall be constructed within fifty-feet of the property line of abutting properties zoned or planned for residential uses;
   e. The following wall and berm treatment shall be required for commercial uses and office uses:
      (1) A solid masonry wall six feet in height, an earth berm six feet in height, or any combination of solid masonry wall and earth berm that provides a continuous barrier six feet in height, shall be erected on, or along, the property line between properties zoned or planned for commercial and office uses and properties zoned or planned for residential uses;

(2) A solid masonry wall three and one-half feet in height, an earth berm three and one-half feet in height, or any combination of solid masonry wall and earth berm that provides a continuous barrier three and one-half feet in height, shall be erected on, or along, the setback line twenty feet from and parallel with the right-of-way line of abutting local streets;

(3) Earth berms shall be planted with grass or ground cover, and maintained by the property owner;

f. The provisions of the approved commercial district or office district shall apply to outdoor advertising for commercial and office uses, excepting freestanding signs in a commercial district, wherein there shall be permitted one freestanding sign containing the name of buildings and occupants or groups thereof, and shall be not more than one hundred and twenty-five square feet in area, and not more than twenty feet in height, and shall not be located within any required landscaped setback or landscaped transition setback area.

Fresno Municipal Code

Chapter 15: Citywide Development Code

The Citywide Development Code, Chapter 15 (City of Fresno 2015), establishes land use classifications and regulations to implement the General Plan. The Development Code is the primary tool that regulates development within the city.

Article 12

Article 12 establishes use regulations, development standards, and design standards for Commercial Districts within the city of Fresno. Lands within the city designated as Commercial District are meant to provide for a full range of commercial uses to serve the city's existing and future needs; establish design standards to create a unified and attractive character along commercial streets; and ensure that new development is designed to minimize traffic and parking impacts on surrounding residential neighborhoods. The Commercial District designation is also meant to implement and provide appropriate regulations for general plan classifications of "Main Street Commercial," "Community Commercial," "Regional Commercial," "General Commercial," "Highway and Auto Commercial," and "Commercial Recreation." The project site is designated as Community Commercial within the City of Fresno General Plan which allows for medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores, and supporting uses.

3.10.2 Environmental Setting

The project site is located within a 22.4-acre parcel located at the northeast corner of the intersection of West Herndon Avenue and North Riverside Drive in the city of Fresno. Surrounding land uses include a residential neighborhood to the west, a public golf course to the north (Riverside Golf Course), a vacant lot and self-storage facility to the east, a gas station and vacant lot to the south, Rio Vista Middle School and River Bluff Elementary School to the southeast, and a large-scale retail development (Marketplace at El Paseo Shopping Center) to the southwest.

The existing City of Fresno General Plan designation for the project site is Community Commercial (CC) (City of Fresno 2014). Land within the city designated as Community Commercial are meant to serve local needs including convenience shopping and small offices through commercial development (City of Fresno 2014). The CC designation allows for a variety of commercial facilities including medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores, and supporting uses. Additionally, West Herndon Avenue is designated, depending on the specific segment, as either an expressway or superarterial, the two highest roadway classifications in the General Plan, throughout the project site's vicinity and is designated as a superarterial between the project site and State Route 99.

The project site is also zoned as CC/EA/UGM/cz in the Title 15 Citywide Development Code. Similar to the City of Fresno General Plan designation, CC zoning designation is intended for commercial development that primarily serves local needs such as convenience shopping and offices. Specific uses allowed include medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores, and supporting uses (City of Fresno 2016).

The Expressway Area Overlay District is applied to Expressways, Super Arterials, and other streets that may be designated by the City. The district is intended to:

- Protect land uses and residences proximate to designated major streets.
- Limit development that may potentially be detrimental to the general health, safety, and welfare and to existing and future infrastructure operations and improvements.
- Mitigate noise to acceptable levels in residential base districts.

Use regulations and development standards are governed by the base district, except that residential buildings cannot be constructed within 200 feet of the road's right-of-way without specific mitigation for road noise and no non-residential buildings or signage can be constructed within 30 feet of the road's right-of-way.

3.10.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

Evaluation of potential land-use impacts is based on a review of the planning documents pertaining to the project study area including that City of Fresno General Plan (City of Fresno 2014), General Plan Program EIR (City of Fresno 2021), and the Chapter 15 Citywide Development Code. In determining the level of significance, this analysis assumes that the project would comply with relevant state and local ordinances and regulations related to land use.

THRESHOLDS OF SIGNIFICANCE

An impact on land-use impact would be significant if implementation of the project would:

- physically divide an established community; and/or
- 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.

TOPICS NOT DISCUSSED FURTHER

Physically Divide an Established Community

The project would occupy a currently undeveloped parcel surrounded by a residential neighborhood to the west, Riverside Golf Course to the north, a vacant lot and self-storage facility to the east, two schools to the southeast, a gas station and vacant lot to the south, and a large-scale retail development to the southwest. Given the range of uses that surround the site, development on this vacant parcel would not divide and established community. The project also involves making roadway improvements, including extending West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue. Because implementing the project would not divide an established community and would improve circulation on and around the site, there would be no impact. Therefore, no further analysis is required by CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.10-1: Cause a Significant Environmental Impact Due to a Conflict with Relevant Plans, Policies, and Zoning Adopted for the Purpose of Avoiding or Mitigating an Environmental Effect

The proposed project would require a general plan amendment (GPA), rezone, and conditional use permit (CUP). Requests for discretionary permits require that the project be evaluated for compliance and consistency with a variety of policy and regulatory programs adopted to avoid or reduce the severity of potential environmental effects. Evaluation of resource-specific plans and policies (e.g., transportation improvement plans, greenhouse gas reduction plans) are evaluated separately in the topical sections of this EIR. The project would not conflict with City policies adopted for the purposes of avoiding or mitigating an environmental effect. This impact would be **less than significant**.

The City of Fresno General Plan and Title 15 Citywide Development Code are the primary planning documents for the City of Fresno. The project includes the following entitlements, as described in Chapter 2, "Project Description," which would eliminate conflicts with the adopted land use designations and zoning regulating development or the project site.

- Amend the General Plan to change the planned land use designations for the project site from CC to the General Commercial (GC) planned land use designation and reclassify a portion of West Herndon Avenue between North Riverside Drive and North Hayes Avenue from Expressway to Super Arterial.
- Amend the Official Zoning Map of the City of Fresno to reclassify the project site from the CC/EA/UGM/cz zone district to the CG/UGM/cz zone district.
- Approve a Planned Development Permit to modify parking lot development standards to allow for 36.5-foot-tall light fixtures rather than 25-foot light fixtures.

As described above, the project site is currently identified as CC, a general plan land use designation applied to locations intended to serve local needs. The project includes an amendment to the City of Fresno General Plan to change the land use designation for the project site to GC. Allowable uses under the GC designation include wholesale businesses and specialized retail not normally found in shopping centers with potential to generate higher volumes of traffic (City of Fresno 2014). The proposed Costco facility would be a wholesale business and would therefore be consistent with the GC designation. Similarly, the CG designation would allow for large-format retail and fuel sales, which would be the primary uses at the project site, and the car wash, which is not allowed under the current zoning. Amending the Official Zoning Map of the City of Fresno to reclassify the project site from the CC/EA/UGM/cz zone district to the CG/UGM/cz zone district would ensure that the project is consistent with the zoning on site. Finally, a portion of West Herndon Avenue would be reclassified from Expressway to Super Arterial to allow the construction of a turn pocket where West Herndon Avenue meets the private North Arthur Avenue right-of-way. The proposed zoning changes are a part of the project and would not result in a conflict with relevant plans, policies, or zoning given that approval of the zoning change would occur prior to development of the site, ensuring that the proposed project features are consistent with the zoning requirements.

These proposed changes to the general plan land use designations, zoning, and parking lot standards are evaluated throughout this document. For example, Section 3.1, "Aesthetics," analyzes the project's consistency with the lighting requirements applicable to the CG zoning district and the potential impact resulting from the taller light fixtures. Similarly, consistency with City of Fresno General Plan Policy LU-6-a, which requires new development to foster high quality design, diversity, and a mix of amenities through compliance with guidelines, regulations, and design review procedures and Policy LU-6-d, which requires commercial development to implement the Urban Form concepts, promote the stability and identity of neighborhoods and community shopping areas, and allow efficient access without compromising the operational effectiveness of the street system are evaluated in Section 3.1, "Aesthetics," and in Section 3.13, "Transportation and Circulation."

The Bullard Community Plan policies are intended to direct the physical growth and change of the Bullard Community as detailed above in Section 3.10.1, "Regulatory Setting." Policy 1 requires all new retail commercial uses to be developed as a part of planned and unified shopping centers. The proposed Costco facility would be designed as a unified shopping center within the project area with a self-contained warehouse, gas station, and car wash. The proposed buildings are designed to relate to the proposed surrounding development by using similar building materials and architectural detailing, further creating a sense of unity. Policy 2 requires that retail commercial development within the Bullard Community Plan area to occur at three nodes, one of which is located at the West Herndon/Bryan Avenue intersection located directly southwest of the project site. This policy, which was established before the area was developed, limits commercial development to 15 acres. Policy 2 relates to community design and was not adopted for the purpose of avoiding or mitigating an environmental effect.

Policy 3 requires new retail commercial development to minimize effects as an attractive nuisance to any public or private school of elementary through high school grades and was not adopted for the purpose of avoiding or mitigating an environmental effect. The closest schools to the project site are Rio Vista Middle School and River Bluff Elementary School, located south of West Herndon Avenue. The outdoor areas of Rio Vista Middle School are approximately 130 feet from the southeast corner of the project site. Once operational, students attending Vista Middle School and River Bluff Elementary School could easily access the project site. However, customers would need to be a Costco member to enter the warehouse, and the food court would be located within the warehouse. There are no outdoor facilities except for the car wash and gas stations that would be accessible to students. It is unlikely that students would spend time outside of the Costco warehouse given the lack of amenities; therefore, the project would not be an attractive nuisance, and would comply with Policy 3.

Policy 7 outlines development standards for interface areas between properties planned for commercial use and properties zoned or planned for residential uses. Directly west of the project site on North Riverside Drive is residential development. Therefore, there would be an interface area between the proposed project and the residential development to the west that falls under the requirements of Policy 7. Policy 7a requires all loading and storage areas to be screened from view of adjoining property zoned or planned for residential uses. The truck loading dock would be located on the southern facade of the building, and a portion of the loading dock would be viewable to residents. However, dense landscaping composed of evergreen and deciduous trees and shrubs would provide visual screening to residents located adjacent to the project site. Policy 7b requires roof-mounted and detached mechanical equipment for commercial and office uses to be screened from view and acoustically baffled; however, no roof-mounted or detached mechanical equipment is proposed for this project. Therefore, the project would be consistent with Policy 7b. Policy 7c requires a 20-foot landscaped setback containing deciduous and evergreen trees to be planted and maintained along the property line between commercial uses and abutting properties zoned or planned for residential uses. The project's landscape design has incorporated a perimeter buffer which includes evergreen and deciduous trees and shrubs, consistent with Policy 7c. Additionally, the Costco warehouse would be built in the southeastern portion of the project site, with a landscaped parking lot and North Riverside Drive buffering the building from the residential development. The project site is more than 50 feet from the property line of the residential development to the west, and would be in compliance with Policy 7e. The earth berm and masonry wall requirements detailed in Policy 7e do not apply to the project given that North Riverside Drive separates the project site from the residential development. However, the project would include improvements to North Riverside Drive, including construction of a 12-foot-wide multiuse trail and a 3-foot-tall, landscaped berm between the trail and parking lot, satisfying the intent of Policy 7e. No freestanding advertising signs are proposed, and Policy 7f does not apply.

Therefore, although implementation of the project would result in commercial development of the entire project site (22.4 acres), because the development would be consistent with the other policies in the community plan that address potential environmental effects of commercial development. Additionally, the project would be consistent with the City of Fresno General Plan policies related to land use and planning. The City of Fresno General Plan indicates that relevant policies and portions of plans are reflected in the general plan "resulting in a consolidation and update of planning documents" (City of Fresno 2014: 3-46). Where there are inconsistencies between the general plan and community plans, Implementing Policy D-7-a of the City of Fresno General Plan commits the City to amend or repeal the community plans. Per Implementing Policy D-7-a, the Bollard Community Plan will be amended and consolidated with the Pinedale Community Plan. Last updated in 2007, the Pinedale Community Plan does not currently include the project site.

Requests for discretionary permits require compliance and consistency with a variety of policy and regulatory programs adopted to avoid or reduce the severity of potential environmental effects. Resource-specific plans and policies (e.g., transportation improvement plans, greenhouse gas reduction plans) are evaluated separately in the topical sections of this EIR. With respect to land use planning, approval of the requested entitlements would change the underlying land use designation and zoning to be consistent with the proposed project. The project would not conflict with City policies adopted for the purposes of avoiding or mitigating an environmental effect. Therefore, impacts related to consistency with relevant plans, policies, and zoning would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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3.11 NOISE AND VIBRATION

This section includes a summary of applicable regulations related to noise and vibration, a description of ambient-noise conditions, and an analysis of potential short-term construction and long-term operational-source noise impacts associated with the proposed project. Mitigation measures are recommended as necessary to reduce significant noise impacts. Additional data is provided in Appendix H, "Noise Measurement Data and Noise Modeling Calculations."

There were no comments received during the project's scoping period related to noise (see Appendix A).

3.11.1 Regulatory Setting

FEDERAL

U.S. Environmental Protection Agency Office of Noise Abatement and Control

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate Federal noise control activities. In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at more local levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, documents and research completed by the EPA Office of Noise Abatement and Control continue to provide value in the analysis of noise effects.

Federal Transit Administration

To address the human response to ground vibration, the Federal Transit Administration (FTA) has set forth guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines are presented in Table 3.11-1.

Table 3.11-1 Ground-Borne Vibration (GBV) Impact Criteria for General Assessment

Land Use Category	GVB Impact Levels (VdB re 1 micro-inch/second)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 [4]	65 [4]	65 [4]
Category 2: Residences and buildings where people normally sleep.	72	75	80
Category 3: Institutional land uses with primarily daytime uses.	75	78	83

Notes: VdB = vibration decibels referenced to 1 microinch per second and based on the root mean square velocity amplitude.

[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day.

[2] "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.

[3] "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.

[4] This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research would require detailed evaluation to define acceptable vibration levels.

Source: FTA 2018: 123–126.

STATE

California General Plan Guidelines

The State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (OPR) (2017), provides guidance for the compatibility of projects within areas of specific noise exposure. Acceptable and unacceptable community noise exposure limits for various land use categories have been determined to help guide new land use decisions in California communities. In many local jurisdictions, these guidelines are used to derive local noise standards and guidance. Citing EPA materials and the State Sound Transmissions Control Standards, the State's general plan guidelines recommend interior and exterior CNEL of 45 and 60 decibels (dB) for residential units, respectively (OPR 2017: 378).

California Department of Transportation

In 2020, the California Department of Transportation (Caltrans) published the Transportation and Construction Vibration Manual (Caltrans 2020). The manual provides general guidance on vibration issues associated with construction and operation of projects in relation to human perception and structural damage. Table 3.11-2 presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

Table 3.11-2 Caltrans Recommendations Regarding Levels of Vibration Exposure

PPV (in/sec)	Effect on Buildings
0.4-0.6	Architectural damage and possible minor structural damage
0.2	Risk of architectural damage to normal dwelling houses
0.1	Virtually no risk of architectural damage to normal buildings
0.08	Recommended upper limit of vibration to which ruins and ancient monuments should be subjected
0.006-0.019	Vibration unlikely to cause damage of any type

Notes: PPV= peak particle velocity; in/sec = inches per second.

Source: Caltrans 2020: 38.

LOCAL

City of Fresno General Plan

The City of Fresno General Plan (City of Fresno 2014) addresses noise and vibration within the Noise and Safety Element. The noise-related policies applicable to the proposed project include:

- **Policy NS-1-a: Desirable and Generally Acceptable Exterior Noise Environment.** Establish 65 dB L_{dn} or CNEL as the standard for the desirable maximum average exterior noise levels for defined usable exterior areas of residential and noise-sensitive uses for noise, but designate 60 dB L_{dn} or CNEL (measured at the property line) for noise generated by stationary sources impinging upon residential and noise sensitive uses. Maintain a 65 dB L_{dn} or CNEL as the maximum average exterior noise levels for non-sensitive commercial land uses, and maintain 70 dB L_{dn} or CNEL as maximum average exterior noise level for industrial land uses, both to be measured at the property line of parcels where noise is generated which may impinge on neighboring properties.
- **Policy NS-1-b: Conditionally Acceptable Exterior Noise Exposure Range.** Establish the conditionally acceptable noise exposure level range for residential and other noise sensitive uses to be 65 dB L_{dn} or require appropriate noise reducing mitigation measures as determined by a site-specific acoustical analysis to comply with the desirable and conditionally acceptable exterior noise level and the required interior noise level standards set in Table 9-2 (presented as Table 3.11-3, below).

Table 3.11-3 Transportation (Non-Aircraft) Noise Source

Noise Sensitive Land Use[1]	Outdoor Activity Areas (L_{dn} dB)[2]	Interior Spaces (L_{dn} dB)[2]
Residential	65	45
Transient Lodging	65	45
Hospitals, Nursing Homes	65	45
Theaters, Auditoriums, Music Halls	-	35
Churches, Meeting Halls	65	45
Office Buildings	-	45
Schools, Libraries, Museums	-	45

Notes: dB = decibels; L_{dn} = day-night average sound level.

[1] Where the location of outdoor activity areas is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.

[2] As determined for a typical worst-case hour during periods of use.

Source: City of Fresno 2014: 9-18.

Table 3.11-4 Stationary Noise Sources

	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Equivalent Sound Level (L_{eq}), dB	50	45
Maximum Sound Level (L_{max}), dB	70	65

Note: dB = decibels.

Source: City of Fresno 2014: 9-18.

- Policy NS-1-c: Generally Unacceptable Exterior Noise Exposure Range. Establish the exterior noise exposure of greater than 65 dB L_{dn} or CNEL to be generally unacceptable for residential and other noise sensitive uses for noise generated by sources in Policy NS-1-a, and study alternative less noise-sensitive uses for these areas if otherwise appropriate. Require appropriate noise reducing mitigation measures as determined by an acoustical analysis to comply with the generally desirable or generally acceptable exterior noise level and the required 45 dB interior noise level standards set in Table 9-2 (presented as Table 3.11-3, above) as conditions of permit approval.
- Policy NS-1-g: Noise mitigation measures which help achieve the noise level targets of the General Plan include, but are not limited to, the following:
  - Facades with substantial weight and insulation;
  - Installation of sound-rated windows for primary sleeping and activity areas;
  - Installation of sound-rated doors for all exterior entries and primary sleeping and activity areas;
  - Greater building setbacks and exterior barriers;
  - Acoustic baffling of vents for chimneys, attic, and gable ends;
  - Installation of mechanical ventilation systems that provide fresh air under closed window conditions.

  The aforementioned measures are not exhaustive and alternative designs may be approved by the City, provided that a qualified Acoustical Consultant submits information demonstrating that the alternative design(s) will achieve and maintain the specific targets for outdoor activity areas and interior spaces.
- Policy NS-1-i: Mitigation by New Development. Require an acoustic analysis where new development of industrial, commercial or other noise generating land uses (including transportation facilities such as roadways, railroads, and airports) may result in noise levels that exceed the noise level exposure criteria established by Tables 9-2 and 9-3 [presented as Table 3.11-3 and Table 3.11-4 above] to determine impacts, and require developers to mitigate these impacts in conformance with Tables 9-2 and 9-3 [presented as Table 3.11-3 and Table 3.11-4 above] as a condition of permit approval through appropriate means. Noise mitigation measures may include:
  - The screening of noise sources such as parking and loading facilities, outdoor activities, and mechanical equipment;
  - Providing increased setbacks for noise sources from adjacent dwellings;
  - Installation of walls and landscaping that serve as noise buffers;
  - Installation of soundproofing materials and double-glazed windows; and
  - Regulating operations, such as hours of operation, including deliveries and trash pickup.

  Alternative acoustical designs that achieve the prescribed noise level reduction may be approved by the City, provided a qualified Acoustical Consultant submits information demonstrating that the alternative designs will achieve and maintain the specific targets for outdoor activity areas and interior spaces. As a last resort, developers may propose to construct noise walls along roadways when a compatible with aesthetic concerns and neighborhood character. This would be a developer responsibility, with no City funding.

- **Policy NS-1-j: Significance Threshold**. Establish, as a threshold of significance for the City's environmental review process, that a significant increase in ambient noise levels is assumed if the project would increase noise levels in the immediate vicinity by 3 dB L_{dn} or CNEL or more above the ambient noise limits established in the City's General Plan.
- **Policy NS-1-k: Proposal Review.** Review all new public and private development proposals that may potentially be affected by or cause a significant increase in noise levels, per Policy NS-1-I, to determine conformance with the policies of the General Plan's Noise and Safety Element. Require developers to reduce the noise impacts of new development on adjacent properties through appropriate means.
- **Policy NS-1-l: Enforcement.** Continue to enforce applicable State Noise Insulation Standards and Uniform Building Code noise requirements, as adopted by the City.
- **Policy NS-1-m: Transportation Related Noise Impacts.** For projects subject to City approval, require that the project sponsor mitigate noise created by new transportation and transportation-related station noise sources, including roadway improvement projects, so that resulting noise levels do not exceed the City's adopted standards for noise sensitive land uses.
- **Policy NS-1-n: Best Available Technology.** Require new noise sources to use best available control technology to minimize noise emissions.
- **Policy NS-1-o: Sound Wall Guidelines.** Acoustical studies and noise mitigation measures for projects shall specify the heights, materials, and design for sound walls and other noise barriers. Aesthetic considerations shall also be addressed in these studies and mitigation measures such as variable noise barrier heights, a combination of a landscaped berm with wall, and reduced barrier height in combination with increased distance or elevation differences between noise source and noise receptor, with a maximum allowable height of 15 feet. The City will develop guidelines for aesthetic design measures of sound walls, and may commission area wide noise mitigation studies that can serve as templates for acoustical treatment that can be applied to similar situations in the urban area.
- **Policy NS-1-p: Airport Noise Compatibility.** Implement the land use and noise exposure compatibility provisions of the adopted Fresno Yosemite International Airport Land Use Compatibility Plan, the Fresno-Chandler Executive Airport Master and Environs Specific Plan, and the Sierra Sky Park Land Use Policy Plan to assess noise compatibility of proposed uses and improvements within airport influence and environs areas.

City of Fresno Municipal Code

Chapter 10, Article 1 (Noise Regulations) of the Fresno Municipal Code establishes excessive noise guidelines and exemptions. Chapter 15, Article 25 (Section 15-2506, "Noise") of the Fresno Municipal Code applies to noise sources resulting from or relating to new development or the expansion of a use or activity (City of Fresno 2022). The noise standards contained in Chapter 15 of the municipal code match those in the General Plan; therefore, those provisions are not duplicated below. Additionally, Section 15-1604, "Expressway Area Overlay District," is intended to mitigate noise to acceptable levels from major streets that are classified as Expressways, Super Arterials, and other streets that may be designated by the City.

Section 10-102(b): Definitions, Ambient Noise

"Ambient Noise" is the all-encompassing noise associated with a given environment, being usually a composite of sounds from many sources near and far. For the purpose of this ordinance, ambient noise level is the level obtained when the noise level is averaged over a period of 15 minutes, without inclusion of the offending noise, at the location and time of day at which comparison with the offending noise is to be made. Where the ambient noise level is less than that designated in this section (see Table 3.11-5), however, the noise level specified herein shall be deemed to be the ambient noise level for that location.

Table 3.11-5 Acceptable Ambient Noise Level

Land Use	Time	Sound Level (dB)
Residential	10 p.m. to 7 a.m.	50
	7 p.m. to 10 p.m.	55
	7 a.m. to 7 p.m.	60
Commercial	10 p.m. to 7 a.m.	60
	7 a.m. to 10 p.m.	65
Industrial	Anytime	70

Note: dB = decibels.

Source: City of Fresno 2022.

Section 10-105: Excessive Noise Prohibited

No person shall make, cause, or suffer or permit to be made or caused upon any premises or upon any public street, alley, or place within the city, any sound or noise which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing or working in the area, unless such noise or sound is specifically authorized by or in accordance with this article. The provisions of this section shall apply to, but shall be limited to, the control, use, and operation of the following noise sources:

- Radios, musical instruments, phonographs, television sets, or other machines or devices used for the amplification, production, or reproduction of sound or the human voice.
- Animals or fowl creating, generating, or emitting any cry or behavioral sound.
- Machinery or equipment, such as fans, pumps, air conditioning units, engines, turbines, compressors, generators, motors or similar devises, equipment, or apparatus.
- Construction equipment or work, including the operation, use or employment of pile drivers, hammers, saws, drills, derricks, hoists, or similar construction equipment or tools.

Section 10-109: Exceptions

The provisions of this article shall not apply to:

- Construction, repair or remodeling work accomplished pursuant to a building, electrical, plumbing, mechanical, or other construction permit issued by the city or other governmental agency, or to site preparation and grading, provided such work takes place between the hours of 7:00 a.m. and 10:00 p.m. on any day except Sunday.
- Emergency work.
- Any act or acts which are prohibited by any law of the State of California or the United States.

Section 10-110: Permits

Projects that would generate noise prohibited by the code may apply for a discretionary permits. The Chief Administrative Officer shall issue the requested permit unless he finds that the public interest will suffer and that such public detriment exceeds the hardship to be suffered by the applicant if the permit is not issued.

Section 15-1604: Expressway Area (EA) Overlay District

A. **Purpose.** As used herein, the Expressway Area (EA) Overlay District means major streets that are classified as Expressways, Super Arterials, and other streets that may be designated by the City. The Expressway Area (EA) Overlay District is established to:

    1. Protect land uses and residences proximate to designated major streets.
    2. Limit development that may potentially be detrimental to the general health, safety, and welfare and to existing and future infrastructure operations and improvements.

3. Mitigate noise to acceptable levels.

B. **Use Regulations.** Those uses permitted in the Base District, subject to the limitations and conditions set forth therein.

C. **Development Standards.** Development Standards shall be as required by the Base District, except as follows:

1. Residential Districts. No building shall be erected within 200 feet of the right-of-way line, except as follows:

a. An acoustical study determines that interior noise can be mitigated to acceptable levels.

b. In no case shall the minimum building setback be less than 75 feet from the center line of the nearest moving traffic lane of the abutting roadway.

c. Any barrier necessary to achieve acceptable noise levels shall not be less than eight feet in height and may be a wall, an earth berm, or any combination of wall and earth berm.

d. Where no frontage road is required along the expressway, any landscaped open space transition setback separating properties zoned for residential uses shall contain a wall, berm, or any combination of wall and berm, not less than eight feet high and located 50 feet from and parallel to the center line of the nearest moving lane of the abutting roadway.

2. **Non-Residential Districts.** No buildings, nor private signage, shall be erected within 30 feet of the right-of-way.

Section 15-2506: Noise

…

h) Exemptions. The following are exempted from conformance to the noise standards of this section.

…

6. Public Works Construction Projects, Maintenance, and Repair. Street, utility, and similar construction projects undertaken by or under contract to the City, or the State of California or a public utility regulated by the California Public Utilities Commission, as well as maintenance and repair operations conducted by such parties, including street sweeping, debris and litter removal, removal of downed wires, restoring electrical service, repairing traffic signals, unplugging sewers, vacuuming catch basins, repairing of damaged poles, removal of abandoned vehicles, repairing of water hydrants and mains, gas lines, oil lines, sewers, storm drains, roads, and sidewalks.

Section 15-2507: Vibration

No vibration shall be produced that is transmitted through the ground and is discernible without the aid of instruments by a reasonable person at the lot lines of the site. Vibrations from temporary construction, demolition, and vehicles that enter and leave the subject parcel (e.g., construction equipment, trains, trucks, etc.) are exempt from this standard.

3.11.2 Environmental Setting

ACOUSTIC FUNDAMENTALS

Prior to discussing the noise setting for the project, background information about sound, noise, vibration, and common noise descriptors is needed to provide context and a better understanding of the technical terms referenced throughout this section.

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a human ear. Noise is defined as loud, unexpected, annoying, or unwanted sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this large range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB).

Addition of Decibels

Because decibels are logarithmic units, SPLs cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness at the same time, the resulting sound level at a given distance would be 3 dB higher than if only one of the sound sources was producing sound under the same conditions. For example, if one idling truck generates an SPL of 70 dB, two trucks idling simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level approximately 5 dB louder than one source.

A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz and perceive sounds within this range better than sounds of the same amplitude with frequencies outside of this range. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an "A-weighted" sound level (expressed in units of A-weighted decibels) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Thus, noise levels are typically reported in terms of A-weighted decibels. All sound levels discussed in this section are expressed in A-weighted decibels. Table 3.11-6 describes typical A-weighted noise levels for various noise sources.

Table 3.11-6 Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet	— 100 —	
Gas lawn mower at 3 feet	— 90 —	
Diesel truck at 50 feet at 50 miles per hour	— 80 —	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, daytime, Gas lawn mower at 100 feet	— 70 —	Vacuum cleaner at 10 feet, Normal speech at 3 feet

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
Commercial area, Heavy traffic at 300 feet	— 60 —	
Quiet urban daytime	— 50 —	Large business office, Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime	— 30 —	Library, Bedroom at night
Quiet rural nighttime	— 20 —	
	— 10 —	Broadcast/recording studio
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Notes: dB= decibels

Source: Caltrans 2013: Table 2-5.

Human Response to Changes in Noise Levels

The doubling of sound energy results in a 3-dB increase in the sound level. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear can discern 1-dB changes in sound levels when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000–8,000 Hz) range. In general, the healthy human ear is most sensitive to sounds between 1,000 and 5,000 Hz and perceives both higher and lower frequency sounds of the same magnitude with less intensity (Caltrans 2013: 2-18). In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people can begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness (Caltrans 2013: 2-10). Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

Vibration

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV and RMS vibration velocity are normally described in inches per second (in/sec) or in millimeters per second. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings (FTA 2018: 110; Caltrans 2020: 6).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2018: 110, 199; Caltrans 2020: 7). This is based on a reference value of 1 micro inch per second.

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Ground vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2018: 120; Caltrans 2020: 27).

Table 3.11-7 summarizes the general human response to different ground vibration-velocity levels.

Table 3.11-7 Human Response to Different Levels of Ground Noise and Vibration

Vibration-Velocity Level	Human Reaction
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Note: VdB = vibration decibels referenced to 1 microinch per second and based on the root mean square velocity amplitude.

Source: FTA 2018: 120.

Typical outdoor sources of perceptible ground vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur to fragile buildings.

Vibrations generated by construction activity can be transient, random, or continuous. Transient construction vibrations are generated by blasting, impact pile driving, and wrecking balls. Continuous vibrations are generated by vibratory pile drivers, large pumps, and compressors. Random vibration can result from jackhammers, pavement breakers, and heavy construction equipment. Construction activities can generate sufficient ground vibrations to pose a risk to nearby structures. Constant or transient vibrations can weaken structures, crack facades, and disturb occupants (FTA 2018: 113). Table 3.11-8 presents vibration levels for typical pieces of equipment used during construction.

Table 3.11-8 Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 ft, in/sec	Approximate Lv at 25 ft
Pile Driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	typical	0.17	93
Clam shovel drop (slurry wall)		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.21	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Note: PPV = peak particle velocity; Lv = root mean square vibration velocity level in decibels, vibration decibels referenced to 1 microinch per second

Source: FTA 2018: 184.

Common Noise Descriptors

Noise in our daily environment fluctuates over time. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors used throughout this section.

Equivalent Continuous Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound level that occurs during the same period (Caltrans 2013: 2-48). For instance, the 1-hour equivalent sound level, also referred to as the hourly L_{eq}, is the energy average of sound levels occurring during a 1-hour period and is the basis for noise abatement criteria used by Caltrans and FTA (Caltrans 2013: 2-47; FTA 2018: 210).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period (Caltrans 2013: 2-48; FTA 2018: 207–208).

Day-Night Level (L_{dn}): L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB "penalty" applied to sound levels occurring during nighttime hours between 10:00 p.m. and 7:00 a.m. (Caltrans 2013: 2-48; FTA 2018: 214).

Community Noise Equivalent Level (CNEL): CNEL is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to sound levels occurring during the nighttime hours between 10:00 p.m. and 7:00 a.m. and a 5-dB penalty applied to the sound levels occurring during evening hours between 7:00 p.m. and 10:00 p.m. (Caltrans 2013: 2-48).

Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which a noise level decreases with distance depends on the following factors.

Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Roads and highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources, thus propagating at a slower rate in comparison to a point source. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

Ground Absorption

The propagation path of noise from a source to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling (i.e., when sound energy bounces off a nonabsorbent material) provides additional attenuation associated with geometric spreading. Traditionally, this additional attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), additional ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the attenuate rate associated with cylindrical spreading, the additional ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance. This would hold true for point sources, resulting in an overall drop-off rate of up to 7.5 dB per doubling of distance.

Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels, as wind can carry sound. Sound levels can be increased over large distances (e.g., more than 500 feet) from the source because of atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also affect sound attenuation.

Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content, or pitch, of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction (Caltrans 2013: 2-41; FTA 2018: 42). Barriers higher than the line of sight provide increased noise reduction (FTA 2018: 16). Vegetation between the source and receiver is rarely effective in reducing noise because it does not create a solid barrier unless there are multiple rows of vegetation (FTA 2018: 15, 104, 106).

EXISTING NOISE ENVIRONMENT

Existing Noise- and Vibration-Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels, and because of the potential for nighttime noise to result in sleep disruption. Additional land uses such as schools, transient lodging, historic sites, cemeteries, and places of worship are also generally considered sensitive to increases in noise levels. These land use types are also considered vibration-sensitive land uses in addition to commercial and industrial buildings where vibration would interfere with operations within the building, including levels that may be well below those associated with human annoyance.

The nearest noise-sensitive receptors include a neighborhood of single-family residences located west of the project site, the closest of which is approximately 90 feet from the project site boundary on the opposite side of North Riverside Drive. Other noise-sensitive receptors in the area include Rio Vista Middle School and River Bluff Elementary School. Rio Vista Middle School and River Bluff Elementary School are located approximately 850 feet and 1,230 feet south of the project site boundary, respectively. See Figure 3.11-1 for locations of sensitive land uses relative to the project site.

Existing Noise Sources

The predominant noise source in the project area is vehicle traffic on the surrounding roadway network [e.g., North Riverside Drive, West Herndon Avenue, North Golden State Boulevard, and State Route (SR) 99]. To assess existing traffic noise and potential long-term (operation-related) noise impacts due to project-generated increases in traffic, noise levels were estimated using proprietary calculators based on Caltrans' and the FHWA's traffic noise propagation equations and recommended methods, using project-specific traffic data. The analysis is based on the reference noise emission levels for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors. Truck usage and vehicle speeds on area roadways were estimated from field observations and the project-specific TIA. Unless noted, the modeling conducted does not account for any natural or human-made shielding (e.g., the presence of walls or buildings) or reflection off building surfaces. Additionally, average daily traffic (ADT) along specific roadway segments were provided by Kittelson & Associates, Inc. and included in Appendix D. Table 3.11-9 summarizes the modeled existing traffic noise levels at 50 feet from the centerline of each area roadway segment identified for analysis, and lists distances from each roadway centerline to the 70, 65, and 60 L_{dn} traffic noise contours. For further details on traffic-noise modeling inputs and parameters, refer to Appendix H.

Table 3.11-9 Summary of Modeled Existing Traffic Noise Levels

Roadway Segment/Segment Description	L_{dn} at 50 feet from Roadway Centerline	Distance (feet) from Roadway Centerline to L_{dn} Contour			Exceeds 65 L_{dn}/CNEL Exterior Noise Standard for Residential Uses?[2]
		70	65	60	
North Riverside Drive (between Spruce Avenue and the northernmost project driveway)[1]	52.0	2	8	25	No
North Riverside Drive (between the northernmost project driveway and Fir Avenue)[1]	53.6	4	11	36	No
North Riverside Drive (between Fir Avenue and the southernmost project driveway)[1]	54.0	4	12	39	No
North Riverside Drive (between the southernmost project driveway and West Herndon Avenue)[1]	54.0	4	12	39	No
West Herndon Avenue (west of North Riverside Drive) [1]	65.8	61	191	605	Yes
West Herndon Avenue (between North Riverside Drive and North Arthur Avenue) [1]	66.4	70	221	698	Yes
West Herndon Avenue (east of North Arthur Avenue) [1]	66.4	70	221	698	Yes

Notes: L_{dn} = day-night level.

All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow, and does not account for shielding of any type or finite roadway adjustments. All noise levels are reported as A-weighted noise levels. For additional details, refer to Appendix H for detailed traffic data, and traffic-noise modeling input data and output results.

[1] Noise levels include a 5 dB reduction to account for attenuation from cinderblock wall/soundwall along residential property line.

[2] The 65 dBA CNEL/L_{dn} residential noise standards are summarized in Table 3.11-3. These are the City of Fresno's noise standards adopted for evaluating long-term noise associated with traffic.

Source: Data modeled by Ascent Environmental in 2022.

Source: Adapted by Ascent Environmental in 2022.

Figure 3.11-1 Noise-Sensitive Receptors

3.11.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

Construction Noise and Vibration

To assess potential short-term (construction-related) noise and vibration impacts, sensitive receptors and their relative exposure were identified. Project-generated construction source noise and vibration levels were determined based on methodologies, reference emission levels, and usage factors from FTA's *Guide on Transit Noise and Vibration Impact Assessment* methodology (FTA 2018) and FHWA's *Roadway Construction Noise Model User's Guide* (FHWA 2006). Reference levels for noise and vibration emissions for specific equipment or activity types are well documented and the usage thereof common practice in the field of acoustics.

Operational Noise and Vibration

With respect to non-transportation noise sources (e.g., stationary) associated with proposed project implementation, the assessment of long-term (operational-related) impacts was based on reconnaissance data, reference noise emission levels, and measured noise levels for activities and equipment associated with project operation (e.g., heating, ventilation and air conditioning [HVAC] units, delivery docks), and standard attenuation rates and modeling techniques.

To assess potential long-term (operation-related) noise impacts due to project-generated increases in traffic, noise levels were estimated in using calculations consistent with the Federal Highway Administration's Traffic Noise Model Version 2.5 (FHWA 2004) and project-specific traffic data (see Appendix H for further information). The analysis is based on the reference noise emission levels for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors. Truck usage and vehicle speeds on area roadways were estimated from field observations and the project-specific traffic report. Note that the modeling conducted does not account for any natural or human-made shielding (e.g., the presence of walls or buildings) or reflection off building surfaces.

Selection of Noise Metrics for Thresholds of Significance

The thresholds of significance used in this analysis utilize different noise metrics, including L_{dn}, L_{eq}, L_{max}, CNEL, and single-event noise level (SENL); that allow evaluation of a range of noise impacts. The type of noise metric applied to each noise source analyzed is dependent on the nature and duration of the noise generated by the source. Generally, L_{dn} and CNEL standards are used to evaluate noise sources that generate consistent noise levels throughout the day. L_{eq} metrics are generally used to evaluate noise-generating activities that do not persist all day but do last for most of an hour or longer. L_{max} metrics are used to evaluate the loudest noise levels generated by sources that produce a range of noise levels over time. The SENL metric is used to evaluate noise sources that expose receptors for a relatively short period (i.e., less than 1 minute) because it captures both the magnitude and the duration of a sound event. Noise standards established by the City are applied as significance criteria if they are expressed in the appropriate metric for the noise source being analyzed. The City has established noise standards using the L_{dn}/CNEL, L_{max}, and L_{eq} metrics. However, because the City has not established SENL standards for analyzing heavy vehicle activity that expose receptors for a relatively short period, this noise impact analysis applies SENL standards recommended by the Federal Interagency Committee on Aviation Noise (FICAN).

THRESHOLDS OF SIGNIFICANCE

Thresholds are based on Appendix G of the State CEQA Guidelines, noise policies and standards in the City's Municipal Code, City of Fresno General Plan policies, and Caltrans and FTA vibration and noise standards. A noise or vibration impact is considered significant if implementation of the proposed project would:

- generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

- result in short-term construction-related activity occurring outside of exempt daytime hours (i.e., 10:00 p.m. and 7:00 a.m., Monday through Saturday) as identified in the City's Municipal Code Section 10-109 and would exceed the City's ambient noise standard of 50 dB L_{eq} for residential uses between the hours of 10:00 p.m. and 7:00 a.m. (Table 3.11-5);
- expose nearby sensitive receptors to operational non-transportation noise sources exceeding the City's stationary noise standards of 50 dB L_{eq} or 70 L_{max} between the hours of 7:00 a.m. and 10:00 p.m. and 45 dB L_{eq} or 65 L_{max} between the hours of 10:00 p.m. and 7:00 a.m. (Table 3.11-4) and/or ambient noise standards as applicable (Table 3.11-5);

- generate a substantial permanent increase in traffic noise levels at noise-sensitive land uses in excess of the following standards:
  - where noise levels currently do not exceed applicable noise standard of 65 dB L_{dn}/CNEL for residential uses from transportation sources (Table 3.11-3) but would exceed Table 3.11-3 standards for the same land use as a result of project implementation; or
  - where Table 3.11-3 transportation noise standards are currently exceeded, result in substantial increases in noise of at least 3 dB (City of Fresno General Plan Policy NS-1-j);
  - expose nearby residential structures to SENLs generated by truck pass-bys resulting from the project higher than an interior noise level of 65 SENL (FICAN 1997);
- generate excessive groundborne vibration or groundborne noise levels;
  - result in construction-generated vibration levels exceeding Caltrans' recommended standards with respect to the prevention of structural building damage (0.2 and 0.08 in/sec PPV for normal and historical buildings, respectively) or FTA's maximum-acceptable-vibration standard with respect to human response (80 VdB for residential uses) at nearby existing vibration-sensitive land uses; or
  - for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

TOPICS NOT DISCUSSED FURTHER

For a Project Located Within the Vicinity of a Private Airstrip or an Airport Land Use Plan or, Where Such a Plan has Not Been Adopted, Within 2 Miles of a Public Airport or Public Use Airport, Expose People Residing or Working in the Project Area to Excessive Noise Levels

The project site is located approximately 1.8 miles west of Sierra Sky Park Airport. The Sierra Sky Park Airport is a private airstrip and is subject to the adopted Sierra Sky Park Land Use Policy Plan. The Sierra Sky Park Airport Land Use Policy Plan identifies normally acceptable exterior and interior noise levels of 60 CNEL and 45 CNEL, respectively, for residential land uses (Fresno County Airport Land Use Commission 1995: 2). Based on noise contour maps provided in the Sierra Sky Park Airport Land Use Policy Plan and Fresno Council of Governments' Airport Land Use Compatibility Plan, the project area is outside of the 60 CNEL noise contour (Fresno County Airport Land Use Commission 1995: Figure 1; Fresno COG 2018: Exhibit H2). Operation of the proposed project would not result in the exposure of people residing or working in the project area to excessive aircraft-related noise levels, and any impact would be less than significant. Therefore, no further analysis is required under CEQA.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.11-1: Generate a Substantial Temporary Increase in Ambient Noise Levels in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies

Construction would be located in close proximity to existing noise-sensitive receptors. Most noise-generating construction activity would be performed during daytime hours, when construction noise is exempt from noise standards by the City of Fresno Municipal Code. However, it is possible that construction activity may be required during the non-exempt evening and nighttime hours (10:00 p.m. to 7:00 a.m., Monday through Saturday, and all-day Sunday) for activities such as large continuous concrete pours. Thus, potential nighttime construction activities could expose nearby noise-sensitive receptors to noise levels that exceed City nighttime noise standards as detailed in the Municipal Code. Mitigation Measure 3.11-1 would implement noise reduction measures to minimize construction noise and reduce noise exposure during the nighttime. However, it cannot be ensured that all impacts would be reduced to meet City noise standards during construction activity. Thus, the impact would be **significant and unavoidable**.

On-Site Construction

As discussed in Chapter 2, "Project Description," construction activities would consist of grading and site preparation; utility installation and connection; roadway, driveway, and parking lot construction; building construction and equipment installation; and landscape installation. The construction staging area would be located on-site. Construction would last approximately 170 days. Construction activities would primarily occur during daytime hours; however, limited activities, such as pouring concrete slabs, could require work to start as early as 2:00 a.m. No pile driving or blasting would take place.

Construction-generated noise levels would fluctuate depending on the type, number, and duration of equipment used. The effects of construction noise largely depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise-sensitive receptors, and the ambient noise environment at nearby receptors. Construction equipment would vary by phase, but the entire construction process would include operation of the following types of equipment: loaders, scrapers, compactors, rollers, graders, pavers, excavators, and forklifts. Noise generated from these pieces of equipment would be intermittent and short in duration, as typical use is characterized by short periods of full-power operation followed by extended periods of lower power, idling, or powered-off conditions.

The grading and site preparation phases typically generate the most substantial noise levels because of the associated on-site equipment. Site preparation equipment and activities include graders and excavators. Additionally, approximately 325 loads of aggregate base would be imported onto the site and approximately 3,000 cubic yards of utility and foundation spoils would be off-hauled.

It is expected that the primary sources of noise would include rollers, graders, scrapers, pavers, and excavators. Noise emission levels from these types of construction equipment as well as other common equipment types are shown in Table 3.11-10, below. Modeling for on-site construction noise conservatively assumed simultaneous operation of four pieces of heavy equipment (a scraper, paver, roller, and grader) within close proximity at the edge of the project site. These four pieces of equipment would generate a combined noise level of 87.6 dB L_{eq} at 50 feet. Construction noise would attenuate to the City of Fresno's daytime noise standard for residential uses of 60 dB L_{eq} at a distance of 1,193 feet. Calculations of these combined noise levels are provided in Appendix H.

Table 3.11-10 Noise Levels Generated by Construction Equipment

Equipment Type	Typical Noise Level (dB) at 50 feet
Backhoe	80
Compactor	80
Excavator	85
Forklift/Manlift	85
Grader	85
Paver	85
Roller	85
Scraper	85

Note: dB = decibel.

Source: FHWA 2006: 3.

Noise-sensitive receptors that could be adversely affected by construction noise are shown in Table 3.11-11. The distance to, and daytime noise exposure levels at, each receptor location were estimated for the closest possible construction activities (at the project boundary) and are summarized in Table 3.11-11.

The attenuated noise level at the nearest noise-sensitive receptor, a single-family residence located approximately 90 feet from the western project boundary, would be 82.4 dB L_{eq}. Based on documented noise attenuating features of noise barriers, a barrier that is just tall enough to break the line of sight between a noise source and a receptor provides at least 5 dB of noise reduction and can achieve an approximate 1 dB additional reduction for each 2 feet of height above where the sound barrier breaks the line of sight (with a maximum theoretical total reduction of 20 dB) (FHWA 2010: 56). An approximately 6-foot-tall cinderblock wall is located along the property line of the residences west of North Riverside Drive functioning as a noise barrier between the project site and the residential noise-sensitive receptors. Therefore, the noise level generated by construction activity would be further reduced to 77.4 dB L_{eq} at the nearest noise-sensitive receptor. Assuming the average exterior-to-interior noise level reduction of 24 dB typically provided by residential buildings with the windows closed (EPA 1978: 11), the interior noise level at the sensitive receptor nearest to where the construction activity could occur would be approximately 53.4 dB L_{eq}. Detailed inputs and parameters for the estimated construction noise attenuation calculations are also provided in Appendix H.

Table 3.11-11 Levels of Noise Exposure at Noise-Sensitive Receptors during Typical Daytime Construction Activity

Sensitive Receptor[1]	Distance to Sensitive Receptor (feet)	Exterior Daytime Construction Noise Level at Sensitive Receptor (L_{eq})	Interior Daytime Construction Noise Level at Sensitive Receptor (L_{eq})	Exceeds 60 dB L_{eq} Exterior Daytime Noise Standard?[3]
Single-Family Residence (adjacent to North Riverside Drive west of project site)	90	77[2]	53[2]	Yes
Rio Vista Middle School	850	63	39	Yes
River Bluff Elementary School	1,230	60	36	No

Notes: L_{eq} = Hourly Equivalent Sound Level; dB = decibel

Assumes all equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture-specified noise levels for each piece of heavy construction equipment.

[1] See Exhibit 3.11-1 for locations of sensitive land uses relative to the project site.

[2] Noise levels include a 5 dB reduction to account for attenuation from cinderblock wall along residential property line.

[3] 60 dBA L_{eq} is the daytime (7:00 a.m. to 7:00 p.m.) acceptable ambient noise level, as summarized in Table 3.11-5.

Source: Data modeled by Ascent Environmental in 2021.

The City of Fresno Noise Ordinance (City of Fresno Municipal Code Chapter 10, Section 10-109) exempts construction-related noise, provided that all construction activities are performed between 7:00 a.m. and 10:00 p.m., any day except Sunday. As described in Chapter 2, "Project Description," construction would primarily occur during the day and, thus, would be exempt from City noise standards; however, some construction activities would be required to start as early as 2:00 a.m.

Construction activities would only be permitted during the nighttime hours if there are no other reasonable options. For example, some foundation designs require that once the pouring of concrete begins, the pour must continue without pause until complete. In some instances, such a concrete pour may take 20 or more hours, requiring work to occur during the nighttime hours. To ensure a comprehensive evaluation of potential environmental effects, this EIR assumes the potential for limited outdoor nighttime construction activity.

As shown in Table 3.11-12, if a continuous nighttime concrete pour were required (likely the most noise intensive nighttime construction activity that might occur), associated noise could expose nearby noise-sensitive receptors, including locations where people normally sleep, (e.g., single-family residences west of the project site) to noise levels that exceed applicable standards. The exterior noise level at the sensitive receptor located closest to the project site would reach 68 dB $L_{eq.}$ As discussed above, a barrier breaking the line of sight between a noise source and a receptor provides at least 5 dB of noise reduction (FHWA 2010: 56). An approximately 6-foot-tall cinderblock wall is located along the property line of the residences west of North Riverside Drive functioning as a noise barrier between the project site and the residential noise-sensitive receptors. Therefore, applying a 5 dB of noise reduction the noise level generated by nighttime construction activity would be 63 dB L_{eq} at the nearest sensitive receptor. However, noise associated with nighttime construction would still exceed the City's exterior noise standard of 50 dB between the hours of 10:00 p.m. and 7:00 a.m.

Table 3.11-12 Levels of Noise Exposure at Noise-Sensitive Receptors during a Nighttime Concrete Pour

Sensitive Receptor	Distance to Sensitive Receptor (feet)	Exterior Nighttime Construction Noise Level at Sensitive Receptor (L_{eq})[1]	Interior Nighttime Construction Noise Level at Sensitive Receptor (L_{eq})[1]	Exceeds Nighttime Noise Standards?
Single-family Residence (along North Riverside Drive west of project site)	400	63	39	Yes

Notes: L_{eq} = Hourly Equivalent Sound Level

Assumes all equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture-specified noise levels for each piece of heavy construction equipment.

[1] Assumes 2 concrete mixer trucks, 1 concrete pump truck, and 1 tractor. Noise levels incorporate a 5 dB noise reduction due to existing sound wall located along North Riverside Drive.

Source: Data modeled by Ascent Environmental in 2021.

Assuming the average exterior-to-interior noise level reduction of 24 dB typically provided by residential buildings with the windows closed (EPA 1978: 11), the highest L_{eq} in the interior of rooms for all nearby sensitive receptors where people normally sleep, could reach 39 dB L_{eq}. This does not exceed the local interior noise standard of 45 dB. However, because the exterior nighttime noise standard of 50 dB between the hours of 10:00 p.m. and 7:00 a.m. could be exceeded during construction, this impact would be a potentially significant.

Off-Site Construction

As portrayed in Figure 2-10 located in Chapter 2, "Project Description," off-site construction activities would include intersection improvements at West Fir Avenue and North Riverside Drive, West Herndon Avenue and North Riverside Drive, and West Herndon Avenue and a proposed private driveway along the eastern boundary of the project site (North Arthur Avenue). Additionally, the proposed project would involve the construction of West Spruce Avenue from North Riverside Drive to North Sandrini Avenue and a private north-south right-of-way, North Arthur Avenue, along the project's eastern boundary. Off-site improvements would also include utility connections and the construction of pedestrian and bicycle facilities along the project's western and southern frontages.

As previously stated, construction noise would be short-term; however, off-site construction activity would occur in close proximity to the single-family residences to the west of the project site. Modeling of off-site construction noise included simultaneous operation of two pieces of heavy equipment (i.e., a paver and grader) due to the spatial constraints associated with simultaneously operating heavy equipment in close proximity to one another on a smaller project site such as a linear alignment or intersection. Table 3.11-13 presents anticipated noise levels from off-site construction at each of the intersections where construction would take place.

Table 3.11-13 Levels of Noise Exposure at Noise-Sensitive Receptors during Off-Site Construction

Off-Site Improvement Intersection Location	Distance to Nearest Sensitive Receptor (feet)	Exterior Construction Noise Level at Sensitive Receptor (L_{eq})	Interior Construction Noise Level at Sensitive Receptor (L_{eq})
West Fir Avenue, North Riverside Drive, main Costco driveway	60	84	60
West Herndon Avenue and North Arthur Avenue	1,000	60	36
West Herndon Avenue and North Riverside Drive	80	80	58

Notes: L_{eq} = Hourly Equivalent Sound Level

Assumes all equipment is fitted with a properly maintained and operational noise control device, per manufacturer specifications. Noise levels listed are manufacture-specified noise levels for each piece of heavy construction equipment.

Source: Data modeled by Ascent Environmental in 2021.

As detailed above, the City Municipal Code exempts construction activity that takes places between the hours of 7:00 a.m. and 10:00 p.m., Monday through Saturday, from local noise standards (Chapter 10, Section 10-109). Additionally, as detailed in Section 15-2506 of the City's Municipal Code, development noise standards are exempt for "street, utility, and similar construction projects undertaken by or under contract to the City."

Summary

Construction activities would primarily occur during daytime hours (i.e., 7:00 a.m. to 10:00 p.m.) and thus would be exempt from the City's noise control ordinance. However, on-site construction could start as early as 2:00 a.m. and the exterior nighttime noise standard of 50 dB between the hours of 10:00 p.m. and 7:00 a.m. could be exceeded during nighttime construction activities. Therefore, the impact related to construction noise would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.11-1: Implement Additional Measures to Reduce Exposure to Construction Noise Reduction during Noise-Sensitive Time Periods

For all outdoor construction activity that is to take place outside of the City of Fresno construction noise exception timeframes (i.e., 10:00 p.m. and 7:00 a.m., Monday through Saturday, and all hours of the day on Sunday), and that is anticipated to generate interior noise levels at sensitive receptors that exceed the City of Fresno General Plan interior noise standard of 45 dB for residential land uses, the construction contractor shall comply with the following measures:

- Consistent with Section 10-110 of the City Noise Control Ordinance, obtain an exception to Article 1, "Noise Regulations," through the Chief Administrative Officer. A permit may be issued authorizing noises prohibited by the noise ordinance whenever it is found that the public interest will be served thereby or that extreme hardship will result from the strict enforcement.
- Install temporary noise curtains as close as possible to the noise-generating activity such that the curtains obstruct the direct line of sight between the noise-generating construction activity and the nearby sensitive receptors. Temporary noise curtains shall consist of durable, flexible composite material featuring a noise barrier layer bounded to sound-absorptive material on one side. The noise barrier layer shall consist of rugged, impervious, material with a surface weight of at least one pound per square foot.

- Noise-reducing enclosures and techniques shall be used around stationary noise-generating equipment (e.g., concrete mixers, generators, compressors).
- Operate heavy-duty construction equipment at the lowest operating power possible. All construction equipment shall be properly maintained and equipped with noise-reduction intake and exhaust mufflers and engine shrouds, in accordance with manufacturers' recommendations. Equipment engine shrouds shall be closed during equipment operation.
- Where available and feasible, construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. Self-adjusting backup alarms shall automatically adjust to 5 dB over the surrounding background levels. All non-self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels.
- Provide a minimum of one week of advanced notice to owners of all residential located within 350 feet of where nighttime construction activity would take place. This noticing shall inform the recipients of when and where nighttime construction would occur and the types of measures being implemented to lessen the impact at potentially affected receptors. This noticing shall also provide the contact information for the designated disturbance coordinator. The disturbance coordinator shall receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem.

Significance after Mitigation

The proposed project is anticipated to require limited nighttime construction, which has the potential to result in short-term, temporary exceedances of the nighttime exterior noise standard. Interior noise standards would not be exceeded and sleep disruption is not anticipated. Therefore, actual effects would be limited to individuals outdoors between 10:00 p.m. and 7:00 a.m. on the specific night(s) of construction and their experience of the tranquil nighttime environment.

Implementation of Mitigation Measure 3.11-1 would provide substantial reductions in levels of construction noise exposure at noise-sensitive receptors by ensuring proper equipment use; and requiring the use of enclosures, shields, and noise curtains (noise curtains typically can reduce noise by up to 10 dB [EPA 1971]). Thus, construction noise could potentially be reduced from 63 dB L_{eq} prior to mitigation to approximately 53 db L_{eq} after Mitigation Measure 3.11-1 is implemented. Although noise reduction would be achieved with implementation of these measures, the effectiveness of Mitigation Measure 3.11-1 would depend upon the specific site conditions at the time of construction. Because it cannot be assured that the applicable noise standards can be met, this impact would remain **significant and unavoidable**.

Impact 3.11-2: Generate Excessive Groundborne Vibration or Groundborne Noise Levels

Construction activity associated with the proposed project would generate short-term increases in vibration near sensitive receptors in the vicinity of the project site. Based on the distance between the equipment anticipated to be used during construction and the location of nearby sensitive receptors, vibration levels would not exceed applicable state and federal thresholds with respect to structural damage and human annoyance. Additionally, City of Fresno Municipal Code Section 15-2507 exempts construction activity from vibration standards. Thus, the impact would be **less than significant.**

Operation of the proposed project would not result in any new long-term operational sources of ground vibration. Some ground vibration would be generated during project construction.

On-Site Construction

Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Construction-related ground vibration is normally associated with impact equipment such as jackhammers and the operation of some heavy-duty construction equipment, such as dozers and trucks. The effects of ground vibration may be unnoticeable at the lowest levels, result in low-rumbling sounds and detectable vibrations at moderate levels, and cause sleep disturbance in places where people normally sleep or annoyance in buildings that are primarily used for daytime functions.

Construction activities would require the use of heavy-duty off-road equipment such as rollers, graders, excavators, and trucks (e.g., material and equipment haul trucks). No pile driving or blasting would take place. Table 3.11-8 presents vibration levels for typical pieces of equipment used during construction.

Of the heavy-duty equipment that could be used during project construction, the highest level of ground vibration would be generated by a vibratory roller. A vibratory roller operated within approximately 26 feet of an existing building or structure could expose that structure to levels of ground vibration that exceed Caltrans' recommended level of 0.2 inches per section (in/sec) PPV with respect to the prevention of structural damage. Also, a vibratory roller operated within 73 feet of a building could expose the building occupants to ground vibration levels that exceed the FTA maximum-acceptable vibration standard of 80 VdB with respect to human annoyance for residential uses. Because all construction activity would take place more than 73 feet from sensitive receptors (nearest receptor is approximately 90 feet from the project boundary), there would be no exceedance of Caltrans' recommended level of 0.2 in/sec PPV with respect to the prevention of structural damage or FTA's standard of 80 VdB with respect to human annoyance for residential uses. Refer to Appendix H for detailed vibration modeling calculations. Furthermore, City of Fresno Municipal Code Section 15-2507 exempts construction activity from the City's vibration standard. Therefore, the proposed project's exposure of persons to excessive levels of groundborne vibration during construction would be less than significant.

Off-Site Construction

Off-site construction would involve construction equipment such as loaded trucks which generate vibration level of 0.076 in/sec PPV and 86 VdB at 25 feet (FTA 2018: 184). Vibration from operation of a loaded truck could exceed the threshold of significance of 0.2 in/sec PPV for structural damage within 14 feet of construction activity and the threshold with respect to human response of 80 VdB within 40 feet of bulldozing activity. Refer to Appendix H for detailed vibration modeling calculations. The nearest vibration-sensitive receptors at each off-site infrastructure improvement location are over 40 feet away from where construction associated with off-site improvements would occur. Thus, construction activities would not result vibration levels at sensitive receptors exceeding Caltrans- or FTA-recommended standards with respect to the prevention of structural damage and human annoyance, respectively. Additionally, Section 15-2507 of the City of Fresno municipal code exempts short-term construction from the City's vibration standards. Therefore, the proposed project's exposure of persons to excessive levels of groundborne vibration during off-site construction would be less than significant.

Summary

All construction activity associated with the project would be located further than necessary to avoid substantial structural damage and human annoyance due to vibration. Construction would not exceed 80 VdB or 0.2 PPV during on-site construction or off-site construction associated with the proposed project. Furthermore, the City's municipal code exempts construction activity from local noise ordinance standards. Therefore, the impact related to construction vibration would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.11-3: Generate a Substantial Permanent Increase in Ambient Noise Levels in the Vicinity of the Project due to Operational Stationary and On-Site Noise in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies

The proposed project would involve the generation of noise from various stationary and operational non-transportation noise sources. The HVAC equipment, parking area, tire center, car wash, and transformer and trash compactor would not exceed appliable City standards. However, the loading area could result in potentially significant levels of noise depending on project design. Implementation of Mitigation Measure 3.11-3 would require the implementation of design features to reduce the noise levels anticipated from each noise source. For this reason, the impact related to long-term operational non-transportation noise would be **less than significant with mitigation incorporated**.

This impact analyzes potential exposure of existing sensitive receptors to noise generated by non-transportation activities associated with operation of the proposed project.

HVAC Equipment

Development of the proposed project would result in the installation of stationary noise sources used during building operation such as HVAC equipment. The proposed Costco warehouse would be located near the southwest corner of the project site. Based on proposed project site plans, all mechanical equipment associated with building operations, such as HVAC equipment and the emergency backup generator, would be located in enclosed areas on the eastern building façade. Noise levels from HVAC equipment vary substantially depending on unit efficiency, size, and location. Noise levels from HVAC equipment range from 45 to 70 dB L_{eq} at 50 feet (EPA 1971). The nearest sensitive receptor would be located approximately 900 feet from the eastern building façade of the proposed Costco warehouse. Using the highest noise level for HVAC equipment, the nearest sensitive receptors could be exposed to a noise level of 44.9 dB L_{eq} (see Appendix H for detailed calculations). As previously discussed, a barrier that is just tall enough to break the line of sight between a noise source and a receptor provides at least 5 dB of noise reduction (FHWA 2010: 56). An approximately 6-foot-tall cinderblock wall is located along the property line of the residences west of North Riverside Drive functioning as a noise barrier between the project site and the residential noise-sensitive receptors. Accounting for a 5 dB noise reduction from the sound wall, noise generated by HVAC equipment would be reduced to 39.9 dB $L_{eq.}$ Applying an additional 24 dB noise reduction, following EPA guidance, the HVAC system would result in an interior noise level of 15.9 dB L_{eq}. Additionally, the noise level would likely be even lower because the HVAC equipment would be enclosed. Therefore, noise generated by HVAC equipment would meet the City's interior noise standard of 45 dB as well as the City's most stringent noise standard of 45 dB L_{eq} from stationary noise sources during nighttime hours. For this reason, the impact related to HVAC equipment would be less than significant.

Heavy Vehicles (Loading and Delivery)

The proposed project would include the operation of heavy vehicles on-site (i.e., idling trucks, on-site truck circulation, trailer-mounted refrigeration units, doors slamming, and truck deliveries). Noise generated by these types of activities is considered a non-transportation noise source because it is not linear in nature. As detailed in Chapter 2, "Project Description," the Costco truck loading dock would be located along the southern façade of the building, and the bay doors would be equipped with sealed gaskets to limit noise. Additionally, the southwestern portion of the building would accommodate the loading of small box trucks for Costco's online order and delivery service. The bay doors for this loading area would also be equipped with sealed gaskets to limit noise. It is estimated that fuel would be delivered to the gasoline facility in two to three trucks per day. Fuel delivery trucks would be parked over the underground tanks.

Based on reference noise levels and accounting for typical usage factors of individual pieces of equipment, such activities could result in noise levels of approximately 82 dB L_{eq} and 86 dB L_{max} at a distance of 50 feet. Additionally, the proposed land use and services provided on the project site (e.g., truck loading and deliveries of goods, tires, and fuel) could result in many on-site heavy vehicles operating simultaneously. Thus, these activities could generate a combined hourly average noise level of approximately 84 dB L_{eq} and a maximum noise level as high as 86 dB L_{max} at 50 feet. Detailed inputs and parameters for the estimated operational non-transportation noise exposure levels are provided in Appendix H.

The noise-sensitive receptor nearest to the proposed project that could be adversely affected by operational non-transportation noise is shown in Table 3.11-14 and is located approximately 500 feet west of the project boundary.

Table 3.11-14 Levels of Noise Exposure at Off-Site Noise-Sensitive Receptors during Operational Non-Transportation Activity

Sensitive Receptor	Distance to Nearest Sensitive Receptor (feet)	Operational Non-Transportation Noise Exposure Level at Sensitive Receptor (Exterior)		Potentially Exceeds Exterior Noise Standard?
		L_{eq} (dB)	L_{max} (dB)	
Single-Family Residence (along North Riverside Drive west of project site)	500	59[1]	61[1]	Yes

Notes: L_{eq} = Hourly Equivalent Sound Level; dB = decibel; L_{max} = Maximum Sound Level

[1] Noise levels include a 5 dB reduction to account for attenuation from cinderblock wall along residential property line.

Source: Data modeled by Ascent Environmental in 2021.

Operational non-transportation noise levels could be as high as 64 dB L_{eq} and 66 dB L_{max} at the nearest sensitive receptor. Based on documented noise attenuating features of noise barriers, a barrier that is just tall enough to break the line of sight between a noise source and a receptor provides at least 5 dB of noise reduction (FHWA 2010: 56). An approximately 6-foot-tall cinderblock wall is located along the property line of the residences west of North Riverside Drive functioning as a noise barrier between the project site and the residential noise-sensitive receptors. Therefore, the noise level generated by loading dock activity would be further reduced to 59 dB L_{eq} and 61 dB L_{max}, as shown in Table 3.11-14.

An additional exterior-to-interior noise level reduction of 24 dB typically provided by residential buildings with the windows closed (EPA 1978: 11) would result in interior noise levels at the nearest surrounding residences of approximately 35 dB L_{eq} and would, thus, not exceed the City's interior noise standard of 45 dB. Although noise generated by the loading dock would not exceed the City's interior noise standard, it may potentially exceed exterior noise standards (i.e., 50 dB between 10:00 p.m. and 7:00 a.m., 55 dB between 7:00 p.m. and 10:00 p.m., and 60 dB between 7:00 a.m. and 7:00 p.m.). For this reason, the impact related to loading and delivery would be potentially significant.

Parking and Gas Station

Based on the current conceptual plan the proposed project would include 829 parking spaces to accommodate Costco members and employees. The nearest sensitive receptor is a single-family residence located approximately 90 feet from the parking area. Additionally, the proposed project would include a Costco members-only gas station adjacent to West Spruce Avenue. The gas station would accommodate a total of 32 fueling positions and operate from 5:00 a.m. to 10:00 p.m. daily. Noise generated from parking lots and gas stations is associated with people talking, horns honking, engines starting, doors slamming, engines idling, car alarms sounding, and various other sounds associated with moving vehicles. These noise sources are typically short, intermittent throughout the day, and vary as a function of the number of vehicles present throughout the day (i.e., peak hours would result in more noise). Noise associated with the proposed parking lot and gas station was calculated using weekend midday peak hour traffic volumes (i.e., 2,130 trips). It is anticipated that the parking and fueling area would result in daytime noise levels of 65.7 dB L_{eq} at 50 feet and 47.6 dB L_{eq} the nearest sensitive receptor, approximately 400 feet away from a center point of the parking area. See Appendix H for detailed modeling. As discussed, the approximately 6-foot cinderblock sound wall along the property line of the residences west of North Riverside Drive would provide an additional noise reduction of 5 dB. Therefore, the noise from the parking area would attenuate to 42.6 dB L_{eq}; and thus, not exceed the City's ambient noise standard of 60 dB L_{eq} between the hours of 7:00 a.m. and 7:00 p.m. and 55 dB L_{eq} between the hours of 7:00 p.m. to 10:00 p.m. Some operational activity would also occur in the early morning hours prior to 7:00 a.m. These noise levels (primarily associated with the gas station and parking) are anticipated to be substantially lower than the modeled noise level of 42.6 dB L_{eq} for project operation, which would not exceed the City's nighttime noise standard of 45 dB L_{eq} between the hours of 10:00 p.m. and 7:00 a.m. Furthermore, considering the 24 dB noise attenuation for residential building with the windows closed, the noise generated by parking would remain well

below interior noise standards for sensitive land uses at 18.6 L_{eq}. Therefore, noise generated by parking associated with the proposed project would be less than significant.

Car Wash

The proposed project would involve the implementation of a Costco members-only automated carwash located at the northern boundary of the project site, adjacent to the gas station. The proposed hours of operation for the project are Monday through Friday from 9:00 a.m. to 8:30 p.m. and Saturday and Sunday from 9:00 a.m. to 7:00 p.m.

Noise from automated car wash facilities occurs as a result of the general operating of pumps, compressors, high-pressure applicators and spray nozzles, scrubbers, and dryers. The majority of the mechanical equipment (such as pumps and compressors) would be fully enclosed within an equipment room adjacent to the car wash tunnel, which would limit noise. The dryers, however, are the dominant noise source associated with car wash systems.

The proposed project includes a drying assembly at the exit of the car wash tunnel which would face the single-family residences west of North Riverside Drive. The distance from the car wash exit to the nearest residential property line is approximately 350 feet. An 80 HP Stealth High Powered Quiet Drying System generates a noise level of 69 dB at 50 feet (City of Sacramento 2018: 7). The noise generated by the car wash would therefore attenuate to a noise level of 52.1 dB L_{eq} at the nearest sensitive receptor. Thus, the noise level would not exceed the City's ambient noise standard of 60 dB L_{eq} between the hours of 7:00 a.m. and 7:00 p.m. and 55 dB L_{eq} between the hours of 7:00 p.m. to 10:00 p.m. Therefore, noise generated by the car wash would be less than significant.

Tire Center

The tire center would operate Monday through Friday from 9:00 a.m. to 8:30 p.m., Saturday from 9:00 a.m. to 7:00 p.m., and Sunday from 10:00 a.m. to 7:00 p.m. The primary source of noise from a tire service center is from air wrenches used to loosen and tighten the lug nuts on a tire. Other common sources of noise from a tire center could include air compressors, tire inflation, on-vehicle tire balancing at a high spin rate, and brake drum resurfacing. The noises generated by the tire center are short-term heightened levels of noise and would not all occur simultaneously.

The traditional Costco warehouse tire center layout is for a row of service bays with individual roll-up doors typically facing the parking lot and vehicle staging area. The proposed project's tire center would have all its service areas located inside the building with the roll-up doors located along the northern façade.

Although noise measurements at tire service centers throughout California have shown some variation because of differences in activity, intensity, and layout, they tend to cluster in a fairly narrow band. The combination of lug wrench operation plus numerous other noise sources (e.g., car starts, car horn, dropped tools, banging hammer on a stuck brake drum, air compressor, phone ringing, boom box music) comprise the total noise generation expected from the tire facility associated with the proposed project. Table 3.11-15 presents reference noise measurements at various tire center facilities.

Table 3.11-15 Noise Measurements at Similar Tire Centers in California

Tire Center	Measurement Distance (feet)	Measurement Period Noise Level (L_{eq})
American Tire Depot, Orange	50	65 dB
American Tire Depot, Costa Mesa	50	62 dB
Costco Tire Center, Culver City	70	60 dB
Firestone, Chino Hills	52	58 dB
Les Schwab, Yuba City	75	57 dB
Costco Tire Center, Tustin	60	59 dB

Notes: L_{eq} = Hourly Equivalent Sound Level; dB = decibel

Source: City of Redding 2018: Table 4.10-17.

Based on the measured noise levels shown in Table 3.11-15, a reference noise level of 65 dB L_{eq} at 50 feet from the tire center façade is a reasonably conservative input assumption. The shortest distance between the Costco warehouse building boundary and the nearest sensitive receptor west of the project is approximately 400 feet. Therefore, the noise level from the tire center would attenuate to a level of 46.9 dB L_{eq} at the closest sensitive receptor, and thus, not exceed the exterior noise City standard of 60 dB L_{eq} for residential areas between the hours of 7:00 a.m. and 7:00 p.m. or the 55 dBA L_{eq} evening time (i.e., 7:00 p.m. to 10:00 p.m.) noise standard. Therefore, the noise impacts associated with the Costco warehouse tire center would be less than significant.

Transformer and Trash Compactors

As described in Chapter 2, "Project Description," a transformer and two trash compactors would be located along the southern edge of the building near the loading dock. Trash compactors would generally be operated in the early morning hours (i.e., 6:00 a.m. to 9:00 a.m.) or evening hours (7:00 p.m. to 10:00 p.m.) but could also be operated on a limited basis during facility hours of operation. There would be no direct line-of-sight to residences. At most modern stores, compactors are located near the receiving area to provide indoor storage of baled material, simplify any clean-up of spills, and to address noise, odor, and rodent control issues. The measured noise level of a Marathon Vert-I-Pack compactor was measured at 74 dB at 3 feet or 50 dB at a distance of 50 feet (City of Cypress 2018). The trash compactor noise level would attenuate to a level of 32 dB at a distance of 400 feet, which is the distance between the nearest sensitive receptors west of the project site measured from the project's southwestern boundary. See Appendix H for detailed modeling. Noise generated by the transformer and trash compactors would not exceed the City's most stringent exterior noise standard of 45 dB L_{eq} from stationary sources; therefore, the noise impacts associated with trash handling would be less than significant.

Summary

The proposed project's operational activity would involve various non-transportation noise sources which would affect nearby sensitive receptors. Combined noise levels from non-transportation noise sources would fluctuate depending on each noise source's location and proximity to sensitive receptors, the presence of noise barriers (i.e., building walls), operating hours, and if the nature of each noise is intermittent or continuous. Although noise may combine from the various generators analyzed above, it is unlikely that combined noise levels would increase to levels that exceed the City's noise standards at nearby sensitive receptors. As detailed in Section 3.11.2, "Environmental Setting," above, a doubling of sound energy corresponds to a 3-dB increase. Thus, two identical sources each producing sound of the same loudness at the same time would need to occur to result in a 3 dB increase in noise which is perceptible and would result in an adverse effect to humans. The HVAC equipment, parking area, gas station, car wash, tire center, and transformer and trash compactors would not exceed ambient noise standards for residential uses during daytime hours (i.e., 60 dB L_{eq}) and/or daytime noise standards from stationary sources (i.e., 50 dB L_{eq}). Operation of the loading dock area could expose nearby sensitive receptors to noise levels exceeding applicable City standards. Therefore, the impact related to long-term operational non-transportation noise would be **potentially significant**.

Mitigation Measures

Mitigation Measure 3.11-3: Reduce Exposure of Existing Sensitive Receptors to Noise Generated by Loading Dock Activity

The project applicant shall construct a sound wall or other noise attenuating feature west of the loading docks with a demonstrated ability to result in a 4 dB noise decrease at the existing residences along North Riverside Drive

Significance after Mitigation

The implementation of Mitigation Measure 3.11-3 would reduce noise levels to meet required standards. Therefore, the impact after mitigation would be **less than significant**.

Impact 3.11-4: Generate a Substantial Permanent Increase in Ambient Noise Levels in the Vicinity of the Project due to Traffic Noise Levels in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies

The proposed project is expected to increase traffic along the surrounding roadway network, and thus, increase traffic noise in the vicinity of the project site. Project-generated traffic noise would not result in an exceedance of the City's interior or exterior standard at any sensitive receptors (residences) along North Riverside Drive. Additionally, although existing noise levels on West Herndon Avenue exceed the City's exterior noise standard of 65 dB L_{dn}/CNEL for nearby residential uses, project-generated traffic would not result in an exceedance of interior noise standards (i.e., 45 L_{dn}/CNEL) or a substantial increase (i.e., greater than 3 dB) in transportation noise. Thus, the impact would be **less than significant**.

Project-generated vehicle trips would result in an increase in average daily traffic volumes and associated increases in traffic noise levels along affected roadway segments near the project site. To analyze the impact of project-generated operational transportation noise sources, traffic noise levels under existing and existing-plus-project conditions were modeled for affected roadway segments. For further details on traffic volumes and conditions, see Section 3.13, "Transportation and Circulation." Refer to Appendix H for detailed noise modeling input parameters.

The general plan includes maximum average exterior noise levels (Table 9-25 of the General Plan Noise and Safety Element, presented as Table 3.11-3 above) that are designed to protect sensitive land uses from excessive noise levels. These noise standards vary based on the land use type; and thus, are dependent on the land use type and proximity to existing freeways and roadways. Traffic volume increases could result in potentially significant impacts if traffic noise levels exceed the City's exterior noise compatibility standard of 65 dB L_{dn}/CNEL for residential uses. Additionally, the project would result in potentially significant impacts if there were a traffic noise increase of 3 dB L_{dn}/CNEL or greater at locations with existing noise levels exceeding the City's 65 dB L_{dn}/CNEL exterior noise standard (General Plan Noise and Safety Element Policy NS-1-j t).

Table 3.11-16 summarizes the modeled traffic noise levels at the nearest applicable off-site receptors from the roadway centerlines under existing and existing plus project conditions, along with the overall net change in noise level as a result of project-generated traffic.

Table 3.11-16 Summary of Modeled Traffic Noise Levels under Existing and Existing Plus Project Conditions

Segment Description		Noise (dB L_{dn}/CNEL) at 50 feet from Roadway			Significant Change?
		Existing	Plus Project	Change	
1	North Riverside Drive (between Spruce Avenue and the northernmost project driveway)[1]	52.0	56.3	NA[2]	No
2	North Riverside Drive (between the northernmost project driveway and Fir Avenue)[1]	53.6	59.3	NA[2]	No
3	North Riverside Drive (between Fir Avenue and the southernmost project driveway)[1]	54.0	63.3	NA[2]	No
4	North Riverside Drive (between the southernmost project driveway and West Herndon Avenue)[1]	54.0	63.6	NA[2]	No
5	West Herndon Avenue (west of North Riverside Drive)[1]	65.8	67.6	1.8	No
6	West Herndon Avenue (between North Riverside Drive and North Arthur Avenue)[1]	66.4	67.4	1	No
7	West Herndon Avenue (east of North Arthur Avenue)[1]	66.4	67.4	1	No

Notes: dB = decibel.

[1] Noise levels include a 5 dB reduction to account for attenuation from cinderblock wall/soundwall along residential property line.

2 NA indicated where existing noise levels do not exceed the City's 65 dB Ldn/CNEL exterior noise standard and change is not used to determine potential for impact.

Source: Modeled by Ascent Environmental in 2022 based on traffic data provided by Kittelson & Associates, Inc. in 2022.

Existing noise levels on West Herndon Avenue could potentially exceed the City's exterior noise standard of 65 dB L_{dn}/CNEL for nearby residential uses. However, interior noise levels for residential buildings along this roadway would not exceed the City of Fresno General Plan interior noise standard of 45 L_{dn}/CNEL because the existing and existing plus-project-noise levels are below 68 L_{dn}/CNEL; and thus, when the 24 dB noise attenuation for residential building with the windows closed is applied, the interior noise levels would not exceed 45 L_{dn}/CNEL (68-24=44). Additionally, although the existing noise levels along West Herndon Avenue are above the City's noise standard, the traffic noise generated by the project would not result in a substantial increase (i.e., greater than 3 dB).

As detailed in Chapter 2, "Project Description," the proposed project includes the construction of West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue. This extension of West Spruce Avenue would improve access to the project site but would also likely result in the redistribution of some existing and future trips in the vicinity of the project site. The extension of West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue would introduce a new roadway that would abut Riverside Golf Course to the north and the proposed project site to the south. Although neither of these uses are considered noise sensitive receptors for the purposes of this analysis, there are residences located east and west of this proposed roadway segment that would experience an increase in traffic noise associated with the redistribution of trips along the surrounding roadway network and the introduction of a new noise source (i.e., the proposed roadway segment).

Based on the surrounding land use context and roadway network, the likely redistribution of trips due to the extension of West Spruce Avenue would be associated with the new routes available to vehicles traveling between the development in the vicinity of the projects site and West Herndon Avenue and North Riverside Drive. Additionally, the proposed roadway segment could be used by cut through traffic during peak travel times when roadway facilities along West Herndon Avenue in the vicinity of the project site are experiencing increases in delay. However, this redistribution would likely be minimal in that the most direct route to the primary surrounding roadways (i.e., West Herndon Avenue and North Riverside Drive) from existing and proposed development north of West Herndon Avenue would remain via existing roadways. The exception to this would be for the residential development north of West Spruce Avenue between North Hayes Avenue and North Sandrini Avenue (approximately 155 single family homes). Due to the location of the westernmost roadway used to access this development (i.e., North Sandrini Avenue), a high percentage of westbound trips exiting, and eastbound trips entering the development would likely use the West Spruce Avenue extension. In order to provide a conservative analysis, it was assumed that all of the daily trips associated with this residential development would use the West Spruce Avenue extension to access the surrounding roadway network. This is conservative because the West Spruce Avenue extension would not provide the shortest or most direct route for trips headed south or east would from the existing residential development. Using the weekday daily trip generation rate from the ITE Trip Generation Manual (11th Edition) for single-family detached housing (ITE Land Use Code 210), this development likely produces approximately 1,500 trips per day.

In order to not exceed the City's 65 dB L_{dn}/CNEL exterior noise standard (General Plan Noise and Safety Element Policy NS-1-j t) at the homes nearest to where this new roadway segment would be located, ADT should not exceed 9,000 ADT. Because of the relatively low volume of vehicles from existing development that would likely use this roadway segment (see trip generation quantification above), although the travel patterns in the vicinity of the project site would change with the extension of West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue, it can be assumed that the number of trips along this roadway segment with implementation of the proposed project would not exceed 9,000 ADT.

As detailed above, existing noise levels along North Riverside Drive (between Spruce Avenue and West Herndon Avenue) are below the City's exterior standard of 65 dB L_{dn}/CNEL for residential uses (i.e., maximum 54 dB L_{dn}/CNEL). Additionally, as detailed above, the extension of West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue would not result in an exceedance of the City's exterior standard of 65 dB L_{dn}/CNEL at nearby residential uses. Therefore, the impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

Impact 3.11-5: Generate a Substantial Permanent Increase in Ambient Noise Levels in the Vicinity of the Project due to Intermittent Single-Event Noise Levels from Trucks in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies

The proposed project has the potential to expose nearby residents to SENLs due to operation of heavy vehicles accessing the project site during operational activities. The closest sensitive receptor west of North Riverside Drive could experience interior noise levels of approximately 66.4 dB SENLs exceeding a threshold of 65 dB SENL. Mitigation Measure 3.11-3 (as detailed under Impact 3.11-3) and Mitigation Measure 3.11-5 would require the use of design interventions. The implementation of Mitigation Measures 3.11-3 and 3.11-5 would reduce the impact to **less than significant with mitigation incorporated**.

The proposed project would result in heavy vehicles (ranging in size from 26-foot-long single-axle trailers to 70-foot-long double-axle trailers) entering and exiting the project site using the surrounding roadway network during more noise-sensitive early-morning hours. In addition to increases in average daily traffic noise, intermittent SENLs associated with the operation of heavy vehicles on the surrounding roadway network and increases in the frequency of occurrence of such levels would be of additional concern, particularly during the more noise-sensitive nighttime and early morning hours.

Although the average daily noise descriptors (i.e., L_{dn} and CNEL) incorporate a nighttime weighting or "penalty" that is intended to reflect the expected increased sensitivity to noise annoyance at night, L_{dn} and CNEL standards do not fully protect residents from sleep disturbance. The SENL describes a receiver's cumulative noise exposure from a single impulsive noise event (e.g., a passing truck, a truck downshifting to engine brake, or an aircraft flying overhead), which is a rating of a discrete noise event that compresses the total sound energy of the event into a 1-second period, measured in decibels (Caltrans 2011). These noise events can be more startling to receptors if they occur when ambient noise levels are quieter, such as during nighttime hours.

Many studies have been conducted regarding the effects of single-event noise on sleep disturbance, but because of the wide variation in the reaction of test subjects to SENLs of various levels, no definitive consensus has been reached with respect to a universal criterion to apply. Upon a review of studies about sleep disturbance and aircraft-generated SENLs, the Federal Interagency Committee on Aviation Noise (FICAN) provided estimates of the percentage of people expected to be awakened when exposed to specific SENLs inside a home (FICAN 1997). According to FICAN's review, 10 percent of the population is estimated to be awakened when the SENL interior noise level is 81 dB. An estimated 5 to 10 percent of the population is affected when the SENL interior noise level is between 65 and 81 dB, and few sleep awakenings (less than 5 percent) are predicted if the interior SENL is less than 65 dB. However, FICAN did not recommend a threshold of significance based on the percent of people awakened.

For the purposes of this analysis, exposure of interior rooms of residential structures, regardless of location, to SENLs from truck pass-bys generated by the project that exceed 65 SENL, which is the level determined by FICAN to result in sleep disturbance to 5 percent of the exposed population (FICAN 1997), would be considered significant.

Noise levels generated by passing haul trucks typically range from approximately 87 to 90 SENL at 50 feet (EPA 1971). The southernmost driveway along a new private roadway, North Arthur Avenue, would serve as primary truck access. Secondary truck access would be along the southernmost driveway along North Riverside Drive. The nearest sensitive receptor is located approximately 40 feet from where the SENL's could occur (a single-family residence located west of North Riverside Drive). Additional noise attenuation could be provided by a cinderblock sound wall observed between the roadway and receptor; however, it may not be tall enough to break the line of sight between where SENLs could occur and the residences' second floor where bedrooms are typically located. Although studies have found that human-made barriers can provide additional noise reduction of 5 dB between a receiver and a noise source (Caltrans 2013: 2-41; FTA 2018: 42), a 5 dB noise reduction was not applied for the cinderblock wall to maintain a conservative analysis. Assuming the average exterior-to-interior noise level reduction of 24 dB typically provided by residential buildings with the windows closed (EPA 1978: 11), the interior SENL at the sensitive receptor nearest to where the heavy vehicle activity could occur would be approximately 66.4 SENL. Thus, SENL's at the nearest noise-sensitive receptors would exceed 65 SENL. Therefore, noise generated by SENLs would be potentially significant.

Mitigation Measures

The project applicant shall incorporate one of the following mitigation measures to reduce potential noise impacts from SENLs:

Mitigation Measure 3.11-5: Implement Traffic Noise Reduction Measures along North Riverside Drive

The project proponent shall implement noise reduction measures to ensure that exterior noise levels at residential land uses near the west side of North Riverside Drive do not exceed the City's current noise standard of 65 dB L_{dn}/CNEL under existing-plus-project conditions. This measure is consistent with General Plan Policy NS-1-I, which recommends the use of design alterations to reduce noise impacts. This performance standard can be achieved using either of the following measures:

- Pave the roadway segment with rubberized hot-mix asphalt or equivalent surface treatment with known noise-reducing properties on top of the roadway surface. The rubberized hot-mix asphalt overlay shall be designed with appropriate thickness and rubber component quantity (typically 15 percent by weight of the total blend), such that traffic noise levels are reduced by an average of 4 to 6 dB (noise levels vary depending on travel speeds, meteorological conditions, and pavement quality) as compared to noise levels generated by vehicle traffic traveling on standard asphalt. Rubberized hot-mix asphalt has been found to achieve this level of noise reduction in other parts of California (Sacramento County 1999). Pavement will require more frequent than normal maintenance and repair to maintain its noise attenuation effectiveness. The applicant shall fund the incremental cost for maintaining the roadway segment with the surface treatment.
- Construct a sound barrier taller than the 6-foot cinderblock wall that is currently present from West Spruce Avenue to West Herndon Avenue. The sound barrier shall be constructed of solid material (e.g., wood, brick, adobe, an earthen berm, boulders, or combination thereof). The reflectivity of each sound barrier shall be minimized to ensure that traffic noise reflected off the barrier does not contribute to an exceedance of applicable L_{eq} standards at other receptors. The level of sound reflection from a barrier can be minimized with a textured or absorptive surface or with vegetation on or next to the barrier. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction (Caltrans 2013: 2-41; FTA 2018: 42). Barriers higher than the line of sight provide increased noise reduction (FTA 2018: 16). Scenic quality factors shall be taken into account during design, such as using more natural materials (e.g., berms and boulders) to reduce the visible mass of a wall. All barriers shall be designed to blend into the landscape along the roadway, to the extent feasible. Ensuring a character consistent with the surrounding area may involve the use of strategically placed native trees or other vegetation; the addition of special materials (e.g., wood or stonework) on the façade of the sound wall; and/or a sound wall that is covered in vegetation. Additionally, the sound barrier shall meet the standards established in General Plan Policy NS-1-o which establishes aesthetic considerations for sound walls including a maximum allowable height of 15 feet. If the sound barriers ensure that exterior traffic noise levels on the residential properties would not exceed 60 dB L_{eq}, then the applicant shall not be required to pave the roadway with a special low-noise surface treatment. Sound wall construction would only be implemented if all of the property owners on the west side of North Riverside Drive between West Herndon Avenue and West Spruce Avenue collectively agree to the mitigation.

Significance after Mitigation

The implementation of Mitigation Measure 3.11-5 would require the project applicant to construct a sound wall and/or pave North Riverside Drive with noise reducing materials. The implementation of one of this mitigation measure would ensure residents near North Riverside Drive would not experience SENL above 65. For this reason, the impact related to SENLs would be reduced to **less than significant with mitigation incorporated.**

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3.12 PUBLIC SERVICES AND RECREATION

This section provides an overview of existing public services and evaluates the potential for implementation of the project to affect availability, service level, or capacity of public services, including fire-protection services, police-protection services, parks and recreation, and public schools, and, if such an effect is determined to occur, whether new or expanded facilities would be required that could result in a potentially significant impact to the environment. Other publicly provided utility services, such as water and wastewater treatment, and stormwater management are addressed in Section 3.14, "Utilities."

Comments received in response to the notice of preparation released for this draft EIR expressed concern about the potential for the proposed project to impede access to the San Joaquin River or otherwise interfere with existing recreational opportunities in the project area. This issue is discussed below.

3.12.1 Regulatory Setting

FEDERAL

No federal plans, policies, regulations, or laws are applicable to the provision of public services for the project.

STATE

California Health and Safety Code

State fire regulations are set forth in Section 13000 et seq. of the California Health and Safety Code, which includes regulations for building standards (as set forth in the California Building Code), fire protection and notification systems, fire protection devices such as extinguishers, smoke alarms, high-rise building and childcare facility standards, and fire-suppression training.

California Fire Code

An important requirement for fire suppression is adequate fire flow, which is the amount of water, expressed in gallons per minute (gpm), available to control a given fire and the length of time this flow is available. The total fire flow needed to extinguish a structural fire is based on a variety of factors, including building design, internal square footage, construction materials, dominant use, height, number of floors, and distance to adjacent buildings. Minimum requirements for available fire flow at a given building are dependent on standards set in the California Fire Code.

LOCAL

City of Fresno General Plan

The City of Fresno General Plan includes the following policies that pertain to hydrology and water quality and are relevant to this analysis.

- Policy POSS-1-a: Parkland Standard. Implement a standard of at least three acres of public parkland per 1,000 residents for Pocket, Neighborhood, and Community parks throughout the city, while striving for five acres per 1,000 residents for all parks throughout the city, subject to identifying additional funding for Regional Parks, Open Space/Natural Areas, and Special Use Parks/Facilities.
- Policy POSS-3-c: Link Parks with Walkways. Link public open space to adjacent, schools, and residential uses and Activity Centers through a series of landscaped linear walkways and bikeways that enhance and encourage pedestrian use.

- **Policy POSS-7-h: Interlink City and San Joaquin River Parkway Trail Networks.** Strive to connect the parkway trail network to other trails in the vicinity, in order to create a community and regional trail system that offers a variety of different route combinations and enhances public access to the parkway.
- **Policy PU-1-c: Safety Considerations in Development Approval.** Continue to identify and apply appropriate safety, design and operational measures as conditions of development approval, including, but not limited to, street access control measures, lighting and visibility of access points and common areas, functional and secure onsite recreational and open space improvements within residential developments, and use of State licensed, uniformed security.
- **Policy PU-1-g: Plan for Optimum Service.** Create and adopt a program to provide targeted police services and establish long-term steps for attaining and maintaining the optimum levels of service - 1.5 unrestricted officers per 1,000 residents.
- **Policy PU-1-i: Crime and Nuisances.** Assist community and neighborhood groups seeking to reduce crime and nuisances they associate with high concentrations of establishments with off-sale or on-sale liquor licenses through Police Department consultations, other available services, and programs such as Neighborhood Watch.
- **Policy PU-1-j: Lighting and Safety.** Ensure adequate lighting at off-sale liquor stores to help deter crime and to promote a more inviting and safe atmosphere around them.
- **Policy PU-2-e: Service Standards.** Strive to achieve a community wide risk management plan that include the following service level objectives 90 percent of the time:
  - First Unit on Scene – First fire unit arriving with minimum of three firefighters within 5 minutes and 20 seconds from the time the unit was alerted to the emergency incident.
  - Effective Response Force – Provide sufficient number of firefighters on the scene of an emergency within 9 minutes and 20 seconds from the time of unit alert to arrival. The effective response force is measured as 15 firefighters for low risk fire incidents and 21 firefighters for high risk fire incidents and is the number of personnel necessary to complete specific tasks required to contain and control fire minimizing loss of life and property.
- **Policy PU-2-f: Plan for Optimum Service.** Create and adopt a program to provide appropriate number of employees to effectively respond to call volume and type; and establish a long-term plan to attain a level of service of 0.81 firefighters per 1,000 residents.
- **Policy PU-3-d: Review Development Applications.** Continue Fire Department review of development applications, provide comments and recommend conditions of approval that will ensure adequate on-site and off-site fire protection systems and features are provided.

City of Fresno Municipal Code, Sections 12-4.801 and 12-4.901

In order to implement the goals and objectives of the general plan, and to mitigate the impacts caused by future development in the city, certain fire department and police facilities must be constructed. The City Council has determined that a Fire Facilities Fee and Police Facilities Fee are needed in order to finance these public facilities and to pay for each development's fair share.

3.12.2 Environmental Setting

FIRE PROTECTION

The City of Fresno Fire Department provides fire suppression, fire prevention, hazardous materials mitigation, rescue, and emergency medical services. The fire department aims to respond to the scene of an emergency within 4 minutes of notification (City of Fresno 2020: 4.15-2). Nearby fire stations include 6239 North Polk Avenue (Station 14) and the temporary station at 5983 North La Ventana (Station 18), each of which have an engine operated by a three-person crew. Station 14 also has a brush rig (City of Fresno 2020: 4.15-4). The project site is served by Station 14. In 2021, Station 14 responded to 970 incidents (including fire, emergency medical calls, traffic collisions, other hazards, and false alarms); 28 percent of these calls were responded to within 4 minutes (City of Fresno 2022).

LAW ENFORCEMENT

The City of Fresno Police Department provides a full range of police services including uniformed patrol response, crime prevention, tactical crime enforcement, and traffic enforcement and accident prevention. The police department has a target ratio of 1.5 unrestricted officers per 1,000 residents. The project site is in the northwest policing district. The police station for this district is located at 3080 West Shaw Avenue, approximately 4 miles southwest of the project site (City of Fresno 2020: 4.15-5).

SCHOOLS

The project site is within an area served by Central Unified School District. The district has 24 school sites that serve over 16,000 students.

RECREATION

The City of Fresno owns and operates a park system that includes more than 80 public parks, trails, regional parks, neighborhood parks, educational facilities, community pools, splash parks, and dual-use ponding basins. School facilities supplement the City's park system and are available for recreational use through joint-use agreements (City of Fresno 2020: 4.15-8).

The closest recreation amenity to the project site, Riverside Golf Course is located immediately north of the project site and is one of three courses owned by the City of Fresno. Riverbottom Park is located in the floodplain of the San Joaquin River adjacent to the Santa Fe Railroad, approximately 1 mile northeast of the project site. The park is a component of the San Joaquin River Parkway, a planned 22-mile natural and recreational area extending from Friant Dam to State Route 99, that is managed by the San Joaquin River Conservancy and provides open space and passive recreation opportunities. Trails connect Riverbottom Park to parking at the northern terminus of North Riverside Drive.

3.12.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

Impacts on public services that would result from the project were identified by comparing existing service capacity and facilities against future demand associated with project implementation. The project proposes construction of a commercial facility in an area with existing City services. For the purpose of this analysis, the project is not anticipated to directly or indirectly contribute residents to the city. Rather, the project would serve the existing population that is currently afforded public services.

THRESHOLDS OF SIGNIFICANCE

An impact on public services and recreation would be significant if implementation of the project would:

- result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services (i.e., fire, police, schools, or other public facilities);
- increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; and/or
- include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

TOPICS NOT DISCUSSED FURTHER

Result in Substantial Adverse Physical Impacts Associated with the Provision of New or Physically Altered Governmental Facilities, or the Need for New or Physically Altered Governmental Facilities, the Construction of Which Could Cause Significant Environmental Impacts in Order to Maintain Acceptable Service Ratios, Response Times, or other Performance Objectives for Schools, Libraries, and Other Public Facilities

The project would not include additional housing. Employees of the existing Costco warehouse and MDO would transfer to the proposed facility. Due to proximity, employees would not need to move and would remain in the community. The project would not result in population growth that would substantially increase demand for public amenities such as schools and libraries. For these reasons, the project would not have significant impacts associated with provision of new or physically altered governmental facilities. Therefore, no further analysis is required by CEQA.

Increase the Use of Existing Neighborhood and Regional Parks or Other Recreational Facilities Such That Substantial Physical Deterioration of the Facility Would Occur or Be Accelerated; and/or Include Recreational Facilities or Require the Construction or Expansion of Recreational Facilities

The project would not include additional housing and would not result in additional employees that would increase use of, or demand for, recreational facilities. Because the project is non-residential, it is not required to provide recreation facilities. The project would not substantially increase demand for, or use of, existing parks and would not result in significant recreation impacts. In addition, the minor modifications to River Golf Course required to accommodate the project would not substantially affect the use of the golf course. The required modifications to the existing irrigation system, relocation of the path for the golf carts, and installation of new fence and nets have been evaluated in this EIR and would not constitute a substantial physical deterioration or construction or expansion with the potential to result in additional, adverse physical effects on the environment. Therefore, no further analysis is required by CEQA.

Limit Access to Existing Recreational Facilities

As noted above, the City received public comments during the scoping period regarding the potential for the project to limit access to recreational facilities, including trails. Although not explicitly required by CEQA, the following information is provided for informational purposes.

Development of the proposed project would not physically obstruct access to existing recreational opportunities, including the trails along the San Joaquin River that connect to Riverbottom Park. Moreover, the project would facilitate multi-modal access to these existing facilities because it would include construction of 12-foot-wide pedestrian and bicycle paths along the project's frontage with West Herndon Avenue and North Riverside Drive. These paths would be consistent with the City's Active Transportation Plan and would support General Plan Policies POSS-3-c and POSS-7-h regarding linking city pathways with parks and the San Joaquin Parkway Trail Networks. The project would not preclude access to existing or planned recreational facilities.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.12-1: Result in Substantial Adverse Physical Impacts Associated with the Provision of New or Physically Altered Fire or Police Facilities or the Need for New or Physically Altered Governmental Facilities

The project site is in a developing suburban area that is within the service area of the City's fire and police departments. The proposed facility would serve the city's existing population in northwest Fresno. The project would not introduce new residents to the area and new or physically altered facilities would not be required. Further, the project would comply with all applicable fire safety regulations and pay fire impact fees. Therefore, impacts to public services would be **less than significant**.

The project would construct a commercial facility on vacant land identified for commercial development in the City of Fresno General Plan. The project site is in a developing suburban area that is within the service area of the City's fire and police departments. The proposed Costco facility would serve the city's existing population in northwest Fresno and is consistent with the type of development the City has planned for the site. The project would not introduce new residents to the area and would not affect service ratios. For these reasons, the demand for public services generated by the project would be within the planned service demand of the existing providers.

All site plans and building designs would be reviewed by the City Fire Department to verify that the project would comply with City fire code and other standards pursuant to General Plan Policy PU-3-d. This process would ensure that the project would include appropriately designed fire suppression facilities (i.e., sprinklers, extinguishers, fire hydrants) and adequate emergency access, as noted in Fresno Fire Department Policy. The City would identify and apply appropriate safety, design, and operational measures as conditions of development approval pursuant to General Plan Policies PU-1-c and PU-1-j.

Further, impact fees are collected from new development for the construction of fire and police facilities (as established in Sections 12-4.901 and 12-4.801 of the Fresno Municipal Code). The project would be required to deposit a Fire Service Fee and a Police Service Fee with the City prior to occupancy of the facility. Payment of the required fees would provide funding to supplement staff and equipment and reduce impacts to fire and police protection services.

The project would not introduce new residents to the area, is consistent with the type of land use planned for the site, is mostly surrounded by existing development currently served by fire and police services, and would pay impact fees that contribute funds for public services. New or physically altered facilities would not be required. Further, the project would comply with all applicable fire safety regulations. For these reasons, substantial adverse physical effects associated with the provision of new or physically altered fire or police facilities or the need for new or physically altered governmental facilities are not anticipated. Therefore, impacts to public services would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

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3.13 TRANSPORTATION AND CIRCULATION

This section describes the applicable federal, state, and local transportation regulations and policies; discusses the existing roadway network and transportation facilities in the vicinity of the proposed project; and analyzes the potential impacts from implementation of the proposed project on transportation. Mitigation measures that would reduce impacts, where applicable, are also discussed. Information contained within this section was provided primarily in the *Fresno Costco Relocation Transportation Impact Analysis* (TIA) prepared for the proposed project (Kittelson & Associates 2023), which is included as Appendix D of this EIR and incorporated herein.

Pursuant to Senate Bill (SB) 743, Public Resources Code (PRC) Section 21099, and California Code of Regulations (CCR) Section 15064.3(a), generally, vehicle miles traveled (VMT) is the most appropriate measure of transportation impacts and a project's effect on automobile delay shall no longer constitute a significant impact under CEQA. Therefore, the transportation analysis herein evaluates impacts using VMT and does not include level of service (LOS) analysis. Although not addressed in this EIR, an analysis of traffic operations (i.e., intersection and freeway LOS analysis) for the proposed project was conducted by Kittelson & Associates and is included in the TIA (Kittelson & Associates 2023) attached as Appendix D.

Comments received regarding transportation in response to the notice of preparation include concerns related to increased traffic and safety, including safety concerns along Golden State Boulevard, grade separation for High Speed Rail, and the number of driveways into the project site. Comments also provide access and roadway design suggestions for the vicinity of the proposed project site. Because a project's effects on automobile delay no longer constitute a significant impact under CEQA, comments related to automobile delay (e.g., LOS, congestion) are not addressed herein. See Appendix A for all notice of preparation comments received.

3.13.1 Regulatory Setting

FEDERAL

Federal Highway Administration

The Federal Highway Administration (FHWA), an agency of the U.S. Department of Transportation, provides stewardship over the construction and preservation of the nation's highways, bridges, and tunnels. FHWA also conducts research and provides technical assistance to state and local agencies to improve safety, mobility, and livability and to encourage innovation in these areas. FHWA also provides regulation and guidance related to work zone safety, mobility, and temporary traffic control device implementation.

STATE

California Department of Transportation

The California Department of Transportation (Caltrans) is the state agency responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as the segments of the Interstate Highway System that lie within California. Caltrans District 6 is responsible for the operation and maintenance of State Route (SR) 99 in the vicinity of the proposed project site. Caltrans requires a transportation permit for any transport of heavy construction equipment or materials that necessitates the use of oversized vehicles on state highways.

The Caltrans Transportation Impact Study Guide (TISG) was prepared to provide guidance to Caltrans Districts, lead agencies, tribal governments, developers, and consultants regarding Caltrans' review of a land use project or plan's transportation analysis using a VMT metric. This guidance is not binding on public agencies, and it is intended to be a reference and informational document. The TISG replaces the Guide for the Preparation of Traffic Impact Studies and is for use with local land use projects, not for transportation projects on the State Highway System (Caltrans 2020).

Senate Bill 743

SB 743, passed in 2013, required the Governor's Office of Planning and Research (OPR) to develop new State CEQA guidelines that address traffic metrics under CEQA. As stated in the legislation, upon adoption of the new guidelines, "automobile delay, as described solely by LOS or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment pursuant to this division, except in locations specifically identified in the guidelines, if any."

OPR published its proposal for the comprehensive updates to the State CEQA Guidelines in November 2017 which included proposed updates related to analyzing transportation impacts pursuant to Senate Bill 743. These updates indicated that VMT would be the primary metric used to identify transportation impacts. In December of 2018, OPR published the most recent version of the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (OPR 2018) which provides guidance for VMT analysis.

In December 2018, OPR and the State Natural Resources Agency submitted the updated CEQA Guidelines to the Office of Administrative Law for final approval to implement SB 743. The Office of Administrative Law subsequently approved the updated CEQA Guidelines. As of July 1, 2020, implementation of Section 15064.3 of the updated CEQA Guidelines apply statewide.

REGIONAL

Fresno Council of Governments

The Fresno County Council of Governments (Fresno COG) is a voluntary association of local governments and a regional planning agency composed of 16 member agencies, including the City of Fresno. Fresno COG is one of 18 metropolitan planning organizations (MPO) across California. The primary functions of Fresno COG involve transportation planning and programming. Fresno COG is responsible for developing and adopting the Regional Transportation Plan (RTP) and Sustainable Communities Strategy (SCS) in an effort to meet state goals to reduce greenhouse gas emissions through coordinated land use and transportation planning.

Regional Transportation Plan

The most recent RTP was adopted by the Fresno COG board of directors in July 2022. The RTP serves as a blueprint establishing long term goals and policies to meet a regional vision for the future transportation system. The SCS is a state-mandated component of the RTP which requires MPOs to determine an approach to meet greenhouse gas emission reductions through land use and transportation planning strategies. The 2022 RTP includes goals and policies streamlined to focus on five key policy areas: equity, sustainability and resiliency, infrastructure and safety, economy, and innovation (Fresno COG 2022).

Fresno County SB 743 Implementation Regional Guidelines

The Fresno County SB 743 Implementation Regional Guidelines, adopted in July 2020, was developed as a guide for Fresno COG's member agencies choosing to establish their own VMT guidance and thresholds as appropriate for their individual jurisdictions (Fresno COG 2021). The document contains recommended project screening criteria, threshold and VMT analysis for development projects, transportation projects, and land use plans, and potential mitigation strategies.

Fresno County Transportation Authority and Measure C

The Fresno County Transportation Authority (FCTA) is a regional agency that was created to administer the voter-passed Measure C program in 1986. Measure C was a 20-year program that achieved a half-cent sales tax for transportation expenditures and infrastructure. After its 20-year duration, the program was extended in 2006 for another 20 years. The FCTA established goals and core values for using these funds for building roads, expanding the bicycling network, expanding the transit network and transit services, and supporting vanpools and ride hailing services.

Fresno County Congestion Management Process

The Fresno County Congestion Management Process (CMP) is a systematic and regionally acceptable approach for managing congestion. Its responsibilities are to provide information on transportation system performance and assess alternative strategies for alleviating congestion and improving mobility. The CMP has identified a CMP network that includes SR 41 from the SR 99 interchange to the Madera/Fresno County line, SR 99 from the Madera/Fresno County line to the Jensen Avenue interchange, SR 168 from the SR 180 interchange to the West Herndon Avenue interchange, and SR 180 from the SR 99 interchange to the SR 168 interchange.

Fresno County Regional Active Transportation Plan

The Fresno County Regional Active Transportation Plan (ATP) was adopted in January 2018. The Fresno County ATP serves as a guide for planning and program development involving biking, walking, and other human-powered transportation in the region (Fresno COG 2018: ES-1). The Fresno County ATP proposed several projects to build out the active transportation network and meet regional goals to increase safety and walking and bicycling trips. The Fresno County ATP recommends specific improvements for jurisdictions without their own adopted ATPs and reproduces the planned bicycle and pedestrian network maps for the four jurisdictions that had already developed their own ATPs at the time. The City's planned bicycle and pedestrian networks are included in Chapter 18.

LOCAL

City of Fresno Municipal Code

Chapter 10 of the City Municipal Code provides regulations related to Fire Prevention including the City's adoption of the 2019 California Fire Code. Chapter 13 addresses the general provisions for sidewalks streets, parkways, and underground utilities. Chapter 14 addresses traffic and circulation. Chapter 15 includes the citywide development code.

City of Fresno General Plan

The General Plan, adopted in December 2014, is the City's blueprint for future growth and development. The General Plan's Mobility and Transportation Element, identifies objectives and policies to meet goals for the local transportation and circulation system (City of Fresno 2014). The following Mobility and Transportation policies pertain to the proposed project:

- Policy MT-1-a: Transportation Planning Consistent with the General Plan. Continue to review local, regional, and inter-regional transportation plans and capital improvement plans, and advocate for the approval and funding of State highway and rail projects, consistent with the General Plan and discourage projects inconsistent with the General Plan.
- Policy MT-1-b: Circulation Plan Diagram Implementation. Design and construct planned streets and highways that complement and enhance the existing network, as well as future improvements to the network consistent with the goals, objectives and policies of the General Plan, as shown on the Circulation Diagram (Figure MT-1), to ensure that each new and existing roadway continues to function as intended.
- Policy MT-1-f: Match Travel Demand with Transportation Facilities. Designate the types and intensities of land uses at locations such that related travel demands can be accommodated by a variety of viable transportation modes and support Complete Neighborhoods while avoiding the routing of excessive or incompatible traffic through local residential streets.
- Policy MT-1-g: Complete Streets Concept Implementation. Provide transportation facilities based upon a Complete Streets concept that facilitates the balanced use of all viable travel modes (pedestrians, bicyclists, motor vehicle and transit users), meeting the transportation needs of all ages, income groups, and abilities and providing mobility for a variety of trip purposes, while also supporting other City goals.
- Policy MT-1-i: Local Street Standards. Establish and implement local roadway standards addressing characteristics such as alignment, width, continuity and traffic calming, to provide efficient neighborhood circulation; to allow convenient access by residents, visitors, and public service and safety providers; and to promote neighborhood integrity and desired quality of life by limiting intrusive pass-through traffic.

- **Policy MT-1-j: Transportation Improvements Consistent with Community Character.** Prioritize transportation improvements that are consistent with the character of surrounding neighborhoods and supportive of safe, functional and Complete Neighborhoods; minimize negative impacts upon sensitive land uses such as residences, hospitals, schools, natural habitats, open space areas, and historic and cultural resources. In implementing this policy, the City will design improvements to:
  - Facilitate provision of multi-modal transportation opportunities;
  - Provide added safety, including appropriate traffic calming measures;
  - Promote achievement of air quality standards;
  - Provide capacity in a cost effective manner; and
  - Create improved and equitable access with increased efficiency and connectivity.
- **Policy MT-2-b: Reduce Vehicle Miles Traveled and Trips.** Partner with major employers and other responsible agencies, such the San Joaquin Valley Air Pollution Control District and the Fresno Council of Governments, to implement trip reduction strategies, such as eTRIP, to reduce total vehicle miles traveled and the total number of daily and peak hour vehicle trips, thereby making better use of the existing transportation system.
- **Policy MT-2-i: Transportation Impact Studies.** Require a Transportation Impact Study (currently named *Traffic Impact Study*) to assess the impacts of new development projects on existing and planned streets for projects meeting one or more of the following criteria, unless it is determined by the City Traffic Engineer that the project site and surrounding area already has appropriate multi-modal infrastructure improvements.
  - When a project includes a General Plan amendment that changes the General Plan Land Use Designation.
  - When the project will substantially change the off-site transportation system (auto, transit, bike or pedestrian) or connection to the system, as determined by the City Traffic Engineer.
  - Transportation impact criteria are tiered based on a project's location within the City's Sphere of Influence. This is to assist with areas being incentivized for development…
- **Policy MT-4-b: Bikeway Improvements.** Establish and implement property development standards to assure that projects adjacent to designated bikeways provide adequate right-of-way and that necessary improvements are constructed to implement the planned bikeway system shown on Figure MT-2 to provide for bikeways, to the extent feasible, when existing roadways are reconstructed; and alternative bikeway alignments or routes where inadequate right-of-way is available.
- **Policy MT-4-c: Bikeway Linkages.** Provide linkages between bikeways, trails and paths, and other regional networks such as the San Joaquin River Trail and adjacent jurisdiction bicycle systems wherever possible.
- **Policy MT-4-e: Minimum Bike Lane Widths.** Provide not less than 10 feet of street width (five feet for each travel direction) to implement bike lanes for designated Class II bikeways along roadways. Strive for 14 feet of street width (seven feet for each travel direction) for curbside bike lanes where right-of-way is available.
- **Policy MT-5-a: Sidewalk Development.** Pursue funding and implement standards for development of sidewalks on public streets, with priority given to meeting the needs of persons with physical and vision limitations; providing safe routes to school; completing pedestrian improvements in established neighborhoods with lower vehicle ownership rates; or providing pedestrian access to public transportation routes.
- **Policy MT-5-d: Pedestrian Safety.** Minimize vehicular and pedestrian conflicts on both major and non-roadways through implementation of traffic access design and control standards addressing street intersections, median island openings and access driveways to facilitate accessibility while reducing congestion and increasing safety. Increase safety and accessibility for pedestrians with vision disabilities through the installation of Accessible Pedestrian Signals at signalized intersections.

- **Policy MT-6-g: Path and Trail Development.** Require all projects to incorporate planned multi-purpose path and trail development standards and corridor linkages consistent with the General Plan, applicable law and case-by-case determinations as a condition of project approval.
- **Policy MT-6-i: Path and Trail Design Standards.** Designate and design paths and trails in accordance with design standards established by the City that give consideration to all path and trail users (consistent with design, terrain and habitat limitations) and provide for appropriate widths, surfacing, drainage, design speed, barriers, fences, signage, visibility, intersections, bridges, and street cleaning.
- **Policy MT-6-j: Variety in Path and Trail Design.** Provide for different levels and types of usable pedestrian and bicycle corridors, including broad, shaded sidewalks; jogging paths; paved and all terrain bicycle paths; through block passageways; and hiking trails. Where a designated multipurpose path route is adjacent to a public right-of-way which accommodates bike lane, allow for flexibility in path design, so that bike lanes may be substituted for the bicycle component of the multipurpose path where it is safe and appropriate to do so.
- **Policy MT-6-k: Path and Trail Buffers.** Use landscaping with appropriate and adequate physical and visual barriers (e.g., masonry walls, wrought iron, or square-tube fencing) to screen path and trail rights-of ways and separate paths and trails from mining operations, drainage facilities, and similar locations as warranted.
- **Policy MT-6-l: Environmentally Sensitive Path and Trail Design.** Develop paths and trails with minimum environmental impact by taking the following actions:
  - Surface paths and trails with materials that are conducive to maintenance and safe travel, choosing materials that blend in with the surrounding area;
  - Design paths and trails to follow contour lines where the least amount of grading (fewest cuts and fills) and least disturbance of the surrounding habitat will occur;
  - Beautify path and trail rights-of-way in a manner consistent with intended use, safety, and maintenance;
  - Use landscaping to stabilize slopes, create physical or visual barriers, and provide shaded areas; and
  - Preserve and incorporate native plant species into the landscaping.
- **Policy MT-8-c: New Development Facilitating Transit.** Continue to review development proposals in transportation corridors to ensure they are designed to facilitate transit. Coordinate all projects that have residential or employment densities suitable for transit services, so they are located along existing or planned transit corridors or that otherwise have the potential for transit orientation to FAX, and consider FAX's comments in decision-making.

Bullard Community Plan

The Bullard Community Plan, adopted in 1988, tiers from the City's 1984 General Plan by providing specificity necessary to guide the day-to-day development decisions for the community plan area. Additionally, the Bullard Community Plan seeks to focus on and address challenges unique to the Bullard Community Plan area. Similar to the General Plan, the Bullard Community Plan states the public land use policy that directs the physical growth of the Bullard Community. The following Bullard Community Plan policy from Section 4.2.4 is applicable to the proposed project (City of Fresno 1988):

- **Policy 4**. Commercial areas shall be designed such that commercial traffic will not route through local residential streets.

City of Fresno CEQA Guidelines for Vehicle Miles Traveled Thresholds

In 2020, City Council adopted the City of Fresno *CEQA Guidelines for VMT Thresholds*. The *CEQA Guidelines for VMT Thresholds* was developed to provide guidance for analyzing transportation impacts of proposed projects to comply with CEQA pursuant to SB 743 as well as to ensure alignment with local policies and regulations established in the General Plan. This document serves as a detailed guideline for preparing VMT analysis for development projects, transportation projects, and plans consistent with SB 743 requirements. The CEQA Guidelines for VMT Thresholds identifies a significance threshold for retail projects of no net increase in regional VMT.

City of Fresno Active Transportation Plan

The City of Fresno's ATP, adopted in March 2017, provides a comprehensive guide outlining the vision for active transportation in the city. The plan lays out the following goals to improve bicycle access and connectivity in Fresno:

- Equitably improve the safety and perceived safety of walking and bicycling in Fresno;
- Increase walking and bicycling trips in Fresno by creating user-friendly facilities;
- Improve the geographical equity of access to walking and bicycling facilities in Fresno; and
- Fill key gaps in Fresno's walking and bicycling networks (City of Fresno 2016).

Complete Streets Policy

The City's Complete Streets Policy was adopted by the City Council on October 10, 2019, to guide the implementation of the City's complete streets and multimodal objectives and policies within the Fresno General Plan. The Complete Streets policy aids the planning, design, and construction of transportation facilities that balance safety, access, and mobility for users of all abilities and ages (City of Fresno 2019a). The City has integrated complete streets designs into its policies in compliance with Assembly Bill 1358.

City of Fresno Public Works Department Policies and Procedures

Policy number 210.01, "Traffic Control Policies and Procedures," was issued in June 2019 to govern the preparation and submittal of a temporary Traffic Control Plan (TCP). This policy was enacted to ensure consistent and efficient submittal and review of TCPs and ensure that they are prepared and submitted in accordance with the current edition of the California Manual on Traffic Control Devices, the City of Fresno Standard Specifications, and City of Fresno Policies (City of Fresno 2019b).

Policy number 210.1, "Conditions for Roadway Closures and Lane Closures," was issued in March 2019 to govern the issuance of Street Work and TCPs to close roadways to through traffic or close travel lanes on roadways within the city of Fresno. This policy was enacted pursuant to Article 2 of Chapter 13 of the Fresno Municipal Code which requires applicants seeking to encroach upon, or work within, a public right-of-way to first obtain a permit from the Director of Public Works and comply with the applicable terms, conditions, and restrictions (City of Fresno 2019c).

3.13.2 Environmental Setting

ROADWAY SYSTEM

There are several types of roadways in the city which include freeways, expressways, superarterials, arterials, collectors, local, and drive streets. A description of each is provided below. Existing roadway classifications are also provided in Figure 2-7 in Chapter 2, "Project Description."

Freeway

Multiple-lane divided (median island separation) roadways on adopted state route alignments servicing through and crosstown traffic, with no access to abutting property and no at-grade intersections. Freeways are under the jurisdiction of the state, and outside the control of the City. In the proposed project area, SR 99, also known as Golden State Highway, is a north-south freeway traversing the Central Valley. SR 99 connects to Interstate 5 near Wheeler Ridge to the south and ends at SR 36 near Red Bluff to the north. In the City of Fresno, SR 99 has six lanes. The nearest interchange is at West Herndon Avenue approximately 0.5 miles west of the proposed project site.

Expressway

Four- to six-lane divided (median island separation) roadways primarily serving through and crosstown vehicle traffic, with at-grade major street intersections located at approximately one-half mile intervals and no driveways for direct motor vehicle access to abutting property. West Herndon Avenue is an east-west roadway with four to six lanes and a

raised planted median from the southwest corner of the proposed project site to the east. West Herndon Avenue is designated an expressway east of North Riverside Drive. The posted speed limit is 45 miles per hour (mph).

Superarterial

Four- to six-lane divided (median island separation) roadways with a primary purpose of moving multiple modes of travel traffic to and from major traffic generators and among subregions. A select number of motor vehicle access points to adjacent properties or local streets between the major street intersections may be approved by the City. Access points will be limited to right-turn entrance and exit vehicular movements, as well as select left-turn partial openings in medians from the superarterials to surrounding properties or neighborhoods, limited to one location per half-mile. No left turns are allowed out of local streets or properties. West Herndon Avenue is designated as superarterial from the southwest corner of the proposed project site, where the roadway intersects with North Riverside Drive, to its terminus west of SR 99.

Arterial

Four- to six-lane divided (median island separation) roadways with somewhat limited motor vehicle access to abutting properties, and with the primary purpose of moving traffic within and between neighborhoods and to and from freeways and expressways. In addition to major street intersections, appropriately designed and spaced local street intersections may allow left-turn movements to and from the arterial streets. In the proposed project area, North Riverside Drive is a north-south roadway with two lanes north of West Herndon Avenue and four lanes south of West Herndon Avenue. The posted speed limit is 40 mph. North Riverside Drive becomes West Bullard Avenue south of North Veterans Boulevard.

Collector

Two- to four-lane undivided (opposing travel lanes generally not separated by a median island) roadways, with the primary function of connecting local streets and arterials and neighborhood traffic generators and providing access to abutting properties. Local street intersections and motor vehicle access points from abutting properties are allowed consistent with the City's engineering standards and accepted traffic engineering practices. Collectors typically have a center two-way left-turn lane. In the proposed project area, West Spruce Avenue is an east-west collector street with two lanes west of North Riverside Drive and four lanes within the residential development east of the proposed project site. The road does not currently connect through from North Riverside Drive, along the north perimeter of the proposed project site, to the residential development to the east. The posted speed limit is 40 mph to the east of North Riverside Drive with unposted speed limit to the west. West Spruce Avenue provides access to residential areas around the proposed project site.

Local

Two- to three-lane roadways designed to provide direct access to properties, while discouraging excessive speeds and volumes of motor vehicle travel incompatible with neighborhoods being served through the implementation of multiple, well-connected routes and traffic calming measures. The alignments of future local streets are typically not specified by the General Plan Circulation Diagram, but existing local streets may be depicted for informational purposes. In specific circumstances, local streets are designated where necessary to assure adequate access and implementation of Complete Neighborhoods with well-connected routes for motor vehicle, bicycle and pedestrian travel. The existing neighborhoods east and west of the proposed project site are served by local streets.

TRANSIT SYSTEM

Public transportation in the city consists of public buses, express bus service, demand-response paratransit, and passenger rail. Fresno Area Express (FAX) is the principal transit provider in the city operated by the Fresno Department of Transportation. FAX operates 18 routes with a fleet of over 100 buses. Handy Ride is a demand-response service for seniors and persons with disabilities, as required by the Americans with Disabilities Act (ADA). FAX is the largest transit provider in the region with over 10 million annual boardings (Fresno COG 2019: 21).

FAX bus Route 3 and bus Route 20 provide service near the proposed project site. The 3 line runs between the Marketplace at El Paseo and the Clovis Community College/Herndon area east of the proposed project site. Service frequency is approximately every 15 minutes between 5:00 a.m. and 9:00 p.m. on weekdays and 9:30 a.m. and 7:00 p.m. on weekends. The Route 20 line operates between the Marketplace at El Paseo and Fresno City College north of downtown. Buses operate on approximately 45 minutes headways between 5:30 a.m. and 10:00 p.m. on weekdays and 6:30 a.m. and 7:30 p.m. on weekends. The nearest bus stops for both lines are located on North Riverside Drive, in front of the Marketplace at El Paseo, approximately 0.2 miles from the southwest corner of the proposed project site.

The Fresno County Rural Transit Agency and Amtrak also provide services for regional travel outside of the Fresno-Clovis Metropolitan Area. Fresno County Rural Transit Agency provides service to many of the unincorporated communities in Fresno County such as Coalinga and Mendota. The San Joaquin Line is one of Amtrak's passenger rail services with connections between the San Joaquin Valley, Sacramento Valley, San Francisco Bay Area, and Los Angeles. Greyhound provides similar bus service to these regions.

BICYCLE SYSTEM

The bicycle and pedestrian transportation system in the City of Fresno is composed of bikeways and trails. The city is generally flat, which provides a favorable environment for bicycling and walking as a mode of transportation. The General Plan classifies bicycle facilities into the following four types:

- **Class I Bikeway (Bike Path):** Bike paths, often referred to as shared-use paths or trails, are off-street facilities that provide exclusive use for non-motorized travel, including bicyclists and pedestrians. Bike paths have minimal cross flow with motorists and are typically located along landscaped corridors.
- **Class II Bikeway (Bike Lane):** Class II bike lanes are on-street facilities that use striping, stencils, and signage to denote preferential or exclusive use by bicyclists. On-street bikes lanes are located adjacent to motor vehicle traffic. Bike lanes are intended to alert drivers about the predictable movements of bicyclists and provide adequate space for comfortable riding. Current City standards require bike lanes on all new collectors and arterials; many existing collectors are already constructed with Class II bike lanes.
- **Class III Bikeway (Bike Route):** Class III bike routes are on-street pavement markings or signage that connect the bicycle roadway network. Class III bike routes can be utilized to connect bicycle lanes or paths along corridors that do not provide enough space for dedicated lanes on low-speed and low-volume streets. Shoulders are useful but not required on streets with Class III bike routes.
- **Class IV Bikeways (Separated Bikeways):** Class IV separated bikeways, commonly known as "cycle tracks," are physically separated bicycle facilities that are distinct from the sidewalk and designed for exclusive use by bicyclists. They are located within the street right-of-way, but provide similar comfort when compared to Class I multi-use paths. The key feature of a separated bikeway is a vertical element that provides further separation from motor vehicle traffic (City of Fresno 2016).

As of 2016, the city's bicycle system was comprised of 38 miles of Class I, 431 miles of Class II, and 22 miles of Class III bicycle facilities (City of Fresno 2016: 61). The following bicycle facilities are present in the vicinity of the project site:

- Class II bike lane on North Riverside Drive south of the proposed project site, from West Herndon Avenue to Carnegie Avenue;
- Class II bike lane on North Hayes Avenue east of the proposed project site, from West Herndon Avenue to West Spruce Avenue;
- Class II bike lane on West Spruce Avenue for approximately 1 mile from North Sandrini Avenue east to West Herndon Avenue; and
- Class II bike lane on Veterans Boulevard south of the proposed project site, from West Wathen Avenue to North Hayes Avenue.

PEDESTRIAN SYSTEM

As of 2016, the City of Fresno pedestrian system consisted of 1,984 miles of sidewalks (City of Fresno 2016). The following pedestrian facilities are present in the vicinity of the project site:

- A multiuse path is available on the north side of West Herndon Avenue starting east of the project site and continuing to the east; however, a sidewalk is not present on the north side of the street along the project site to North Riverside Drive. No sidewalk is present on the south side of West Herndon Avenue to the east of North Riverside Drive. West of North Riverside Drive, a sidewalk is present on the north side of West Herndon Avenue for approximately 350 feet, then discontinues. A sidewalk is continuously present on the south side of West Herndon Avenue west of North Riverside Drive in the vicinity of the project site.
- Sidewalks are present on the west side of North Riverside Drive, both north and south of West Herndon Avenue. Sidewalks are not present along the project frontage (east side) of North Riverside Drive. They are present on the east side of North Riverside Drive to the south of West Herndon Avenue for approximately 500 feet.
- The North Riverside Drive/West Herndon Avenue signalized intersection has marked crosswalks on the west and south legs with pedestrian signal heads serving those crosswalks. These two crosswalks feature curb ramps with high-visibility truncated dome pads.

3.13.3 Environmental Impacts and Mitigation Measures

METHODOLOGY

Vehicle Miles Traveled

The City has developed and adopted VMT guidelines and thresholds (i.e., *CEQA Guidelines for VMT Thresholds*) to meet the State requirements set by SB 743 and address CEQA Guidelines Section 15064.3. Therefore, the VMT analysis herein primarily relies on the guidance provided in the City's VMT guidance and CEQA Guidelines Section 15064.3. The City's CEQA Guidelines align with the OPR Technical Advisory which establishes that any net increase in total VMT would indicate a significant impact.

The City of Fresno *CEQA Guidelines for VMT Thresholds* Section 3.1 regarding Development Projects states that if a project includes a General Plan Amendment or a Rezone, none of the screening criteria may apply, and that the City must evaluate such projects on a case-by-case basis. The proposed project includes both a General Plan Amendment and a Rezone and does not meet the screening criteria. As such, a quantitative VMT analysis is required.

For projects that are not screened out, a quantitative analysis of VMT impacts must be prepared and compared against the adopted VMT thresholds of significance. The City of Fresno *CEQA Guidelines for VMT Thresholds* includes thresholds of significance for development projects, transportation projects, and land use plans. These thresholds of significance were developed using the County of Fresno as the applicable region, and the required reduction of VMT (as adopted in the City of Fresno *CEQA Guidelines for VMT Thresholds*) corresponds to Fresno County's contribution to the statewide greenhouse gas emission reduction target. In order to reach the statewide greenhouse gas reduction target of 15 percent, Fresno County must reduce its greenhouse gas emissions by 13 percent. The method of reducing greenhouse gas by 13 percent is to reduce VMT by 13 percent as well.

The City's adopted VMT thresholds for development projects are consistent with the regional VMT thresholds set by Fresno COG. For residential and non-residential (except retail) development projects, the adopted threshold of significance is a 13 percent reduction, which means that projects that generate VMT in excess of a 13 percent reduction from the existing regional VMT per capita or per employee would have a significant environmental impact. Projects that reduce VMT by more than 13 percent would be presumed to result in a less than significant impact. For retail projects, the adopted threshold is any net increase in VMT per employee compared to existing VMT per employee.

Quantitative assessments of the VMT generated by a development project are determined using the COG Activity Based Model (ABM), which is a tour-based model.

As previously described, Kittleson & Associates prepared the project TIA analyzing potential impacts to the transportation system. The VMT analysis methodology utilized a market-based GIS approach using data obtained from the applicant, as detailed below.

The following trip types characterize the proposed project trips:

- Primary trips: an entirely new trip on the roadway system for the express purpose of driving to and from the Costco facility;
- Pass-by trips: existing trips that are on roadways adjacent to the proposed project site, which allow motorists to turn into the Costco development and continue to their ultimate destination when their shopping is concluded; and
- Diverted trips: existing trips on nearby roadways in which a motorist decides to drive out-of-direction for a distance to stop at the Costco facility, and when their shopping is concluded, continues to their trip to the ultimate destination.

The methodology for VMT analysis uses the anticipated travel characteristics of the proposed project, trip generation and trip length assumptions, and vehicle trip distribution for Costco members and employees, as described below:

- Assessment of project trip generation
  - Including: members (accounting for primary and diverted member trips), warehouse employees, and gas station employees for the proposed project, as well as car wash employees, market delivery operation (MDO) on-site employees, and MDO delivery employees.
  - Excluding: members making pass-by trips, warehouse delivery trucks and fuel delivery trucks for the proposed Costco facility, as well as MDO delivery trucks from the depot and MDO delivery-to-members/other warehouse trucks. VMT is not affected by pass-by trips; thus, they were not assessed in the VMT analysis. Additionally, CEQA Guidelines Section 15064.3(a) states that VMT refers to the amount and distance of **automobile** travel attributable to a project. The City's CEQA Guidelines and the OPR Technical Advisory describe that the term "automobile" as used in Section 15064.3(a), refers to on-road passenger vehicles, specifically cars and light trucks; heavy vehicles are not included in the definition. Therefore, heavy-duty trucks (i.e., delivery trucks) were not included in the VMT analysis. However, it should be noted that the LOS analysis presented in the TIA considers all vehicle types, including heavy duty trucks. See Appendix D.
- Assessment of members' average primary trip length based on customers' approximate home locations.
- Assessment of customers' diverted trip length based on expected routes drivers of these trip types would take for the proposed project.
- Assessment of warehouse, gas station, and car wash employee average trip length based on the Fresno COG VMT Calculation Tool average employee trip lengths for the relevant transportation analysis zones (TAZs).
- Assessment of MDO on-site and delivery employee average trip length based on the Fresno COG VMT Calculation Tool average employee trip length for the relevant TAZs.
- Calculation of overall expected change in regional VMT that would result from the proposed project.

See Appendix D for additional details related to the TIA methodology.

Safety

The City's *Traffic Impact Study Report Guidelines* do not contain formally adopted thresholds of significance for vehicle queuing at intersections as it pertains to transportation hazard impacts. For the purposes of this section, a vehicle queue that overflows the available storage for a turn pocket and blocks the adjacent travel lane or that queues to an upstream signal blocking through traffic is considered a potential safety hazard and would be considered a significant impact. Therefore, the transportation hazards impact discussion identifies a significant impact as occurring at locations where the proposed project traffic would cause the queue length for a turn pocket to overflow its available storage compared to no project conditions or cause a queue to spillback into an upstream

signalized intersection. An analysis of 95th percentile queue lengths was performed using Synchro software version 10. The queue length that has only a 5 percent probability of being exceeded during a given analysis period (expressed in feet) is defined as the 95th percentile queue length. Queue lengths for the a.m., p.m., and Saturday midday peak hours were analyzed due to these typically being the times of day at which traffic along roadways would be greatest.

THRESHOLDS OF SIGNIFICANCE

The significance criteria used to evaluate the proposed project impacts to transportation under CEQA are based on Appendix G of the CEQA Guidelines, City of Fresno *CEQA Guidelines for VMT Thresholds,* and CEQA Guidelines Section 15064.3. An impact to the transportation system would be significant if implementation of the proposed project would:

- conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities;
- conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b);
- substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); and/or
- result in inadequate emergency access.

TOPICS NOT DISCUSSED FURTHER

All topics related to transportation are evaluated in this section.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.13-1: Conflict with a Program, Plan, Ordinance, or Policy Addressing the Circulation System, Including Transit, Roadway, Bicycle, and Pedestrian Facilities

The proposed project would be consistent with established City and regional policies and plans related to bicycle and pedestrian facilities and transit service in the project area. The proposed project's off-site improvements include construction of bicycle facilities along its western, southern, and northern frontages (North Riverside Drive, West Herndon Avenue, and Spruce Avenue, respectively) and would be consistent with the City of Fresno Active Transportation Program. Additionally, although demand would be minimal, the existing transit service has the capacity to accommodate any increase in ridership generated by the proposed project. Lastly, the proposed project's reclassification of West Herndon Avenue between North Riverside Drive and North Hayes Avenue would allow the project to construct the proposed intersection that would provide additional access to the project site. This general plan amendment would allow for consistency between the proposed project and the general plan. Therefore, the project would not conflict with a plan, program, ordinance, or policy addressing the circulation system. This impact would be **less than significant**.

As detailed in Chapter 2, "Project Description," the proposed project involves a general plan amendment to reclassify the portion of West Herndon Avenue between North Riverside Drive and North Hayes Avenue from expressway to superarterial, thus allowing for the construction of an intersection where West Herndon Avenue meets the private North Arthur Avenue right-of-way. The current classification of expressway would not permit the construction of this intersection. The proposed intersection where West Herndon Avenue meets the North Arthur Avenue right-of-way would allow access to the proposed project site via two north-south streets, rather than solely from North Riverside Drive. This may result in easier travel for southbound drivers along North Riverside Drive, including nearby residents and visitors to the Riverside Golf Course. West Herndon Avenue is currently designated as a superarterial from SR 99 to the southwest corner of the project site. Extending the superartial designation east by approximately 1,000 feet would be consistent with the overall intent of the circulation diagram established in the City's general plan and would not result in any conflicts with the general plan as a whole. Additional analysis pertaining to bicycle and pedestrian facilities as well as transit service is provided below.

Bicycle and Pedestrian Facilities

The general plan establishes the City of Fresno's commitment to increasing active transportation as a form of travel within its jurisdiction. General Plan Goals MT-4 through MT-6 and their associated supporting policies, detailed above in Section 3.13.1, "Regulatory Setting," inform the City's direction in providing bicycle and pedestrian improvements throughout the transportation network. Generally, these policies promote the implementation of bicycle infrastructure and supportive facilities from new development to create a fully integrated active transportation system that increases safety and comfort for pedestrians and bicyclists.

As detailed in Chapter 2, "Project Description," the proposed project involves the construction of a Costco retail facility with an attached tire center, home delivery services, a detached gas station, and a drive-through car wash. There are no existing bicycle or pedestrian facilities along the proposed project site boundary. Trail improvements provided by the proposed project would include Class I bicycle facilities along the project's frontage on West Herndon Avenue and North Riverside Drive which is consistent with future facilities identified in the City of Fresno's ATP (City of Fresno 2016) adjacent to the proposed project site. The proposed project also involves the construction of West Spruce Avenue along the northern proposed project site boundary. The City has identified the construction of Spruce Avenue, including Class II bicycle facilities, as a condition of approval (City of Fresno 2022), which would be consistent with the City of Fresno's ATP.

The City Municipal Code requires the implementation of short-term bicycle parking for new development (Article 24, Section 15-2429). The proposed project would provide bicycle parking in accordance with the municipal code including supplying the appropriate number of spaces and locating them as detailed in the ordinance.

As discussed, the proposed project would construct Class I bike paths along the project site's western and southern frontages, construct Class II bike lanes on the proposed project's northern frontage, and include bike parking as required in the City's Municipal Code. Therefore, the impact on bicycle and pedestrian facilities would be less than significant.

Transit Services

As discussed above in Section 3.13.2, "Environmental Setting," FAX provides fixed route bus service in the proposed project area. Route 3 runs south of the proposed project site along West Herndon Avenue. The north end of Route 20 is located just south of the proposed project site and runs southeast to the VA Medical Center. Local and regional plans do not identify any future planned or programmed transit improvements in the vicinity of the proposed project site. The general plan encourages the implementation of transit infrastructure in the city through Objective MT-1 which strives to create and maintain a transportation system that is safe, efficient, provides access in an equitable manner, and optimizes travel by all modes.

The proposed land uses on the project site include bulk shopping, vehicle fueling, car wash services, and tire repair service. Thus, the nature of the proposed project does not lend itself to substantially increasing transit ridership; however, some employees may choose to commute by transit to and from the Costco facility. Additionally, on-site food court amenities and light shopping could generate some transit trips, although the total increase of potential transit trips generated by the proposed project would be minimal. Furthermore, the proposed project would not conflict with existing transit stops south of the project. The proposed project's implementation of off-site bicycle and pedestrian facilities as described above would benefit first/last mile travel to and from the existing transit facilities in the vicinity of the proposed project.

Local and regional plans do not include transit improvements in the project area, and the proposed project would not generate a substantial increase in transit ridership. Additionally, the proposed project would not affect existing transit stops, and bicycle and pedestrian improvements provided by the proposed project would benefit transit riders in the area. Therefore, the proposed project would not conflict with a program, plan, ordinance, or policy addressing transit services. Thus, the impact on transit services would be less than significant.

Summary

The nature of bulk shopping and auto-oriented services at the Costco facility does not lend itself to substantially increased transit ridership. Additionally, the proposed project would not conflict with any existing transit stops. Furthermore, off-site bicycle and pedestrian improvements could enhance first/last mile connections for transit riders using the bus stops in the vicinity of the proposed project. The proposed project would provide short-term bicycle parking as required by the City Municipal Code (Article 24, Section 15-2429). Consistent with the City of Fresno's ATP, the proposed project involves the construction of off-site Class I bicycle facilities along the proposed project frontage on West Herndon Avenue and North Riverside Drive and Class II bicycle facilities along newly constructed Spruce Avenue. For these reasons, the impact would be **less than significant**.

Consistency with programs, plans, ordinances, and policies related to roadways are addressed in Impacts 3.13-2 and 3.13-3, below.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.13-2: Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) Regarding Vehicle Miles Traveled

The proposed project would result in a net increase of 129,326 regional daily VMT. The implementation of Mitigation Measure 3.13-2, which requires the project applicant to provide a mandatory Commute Reduction Program would be geared towards reducing employee trips which accounts for less than 2 percent of trips. Due to the nature of the proposed project which involves shopping in bulk and other auto-oriented services on-site, it would be infeasible to implement other mitigation to minimize VMT impacts from Costco members. Therefore, the proposed project's impact to VMT would be **significant and unavoidable**.

Construction

Construction activities would be temporary and intermittent in nature; and, thus, would not result in long-term increases in vehicular trips. The peak number of construction workers is estimated to be 80-100 personnel during four weeks of construction. Assuming all construction workers would drive alone and generate two trips per day (commuting to the proposed project site and back), construction personnel would generate at most 200 trips per day during a short-term period. Therefore, the number of daily construction trips generated would be fewer than 500 trips per day, thus satisfying the screening thresholds for projects that generate a low volume of daily traffic established in the City of Fresno *CEQA Guidelines for VMT Thresholds*. Therefore, construction activities are not expected to result in a significant increase to VMT.

Operations

As detailed in Table 3.13-1, the proposed project is anticipated to generate 191,032 new daily VMT. The trip types included in the VMT analysis include member trips as well as employee trips. For detailed information regarding trip generation, trip length, and VMT methodology and analysis see Appendix D.

Table 3.13-1 Proposed Project Daily VMT

Trip Type	Daily VMT
Member Primary	173,528
Member Pass-by	0
Member Diverted	4,119
Warehouse, Fuel Station, + Car Wash Employees	9,210
MDO Warehouse Employees	2,824
MDO Driver Employees	1,351
MDO Deliveries[1]	--
Fuel Truck Delivery[1]	--
Warehouse Truck Delivery[1]	--
Total Daily VMT	**191,032**

[1] Delivery truck trips are excluded from the VMT calculation as heavy vehicles are not required to be evaluated for VMT impacts pursuant to CEQA.

Source: Kittelson & Associates 2023.

The existing Costco facility located on West Shaw Avenue is located approximately 2.6 miles from the proposed project site and would be decommissioned when the new Costco facility becomes operational. Since the proposed project would replace the existing Costco warehouse located on West Shaw Avenue, the VMT associated with that warehouse would be eliminated. Table 3.13-2 shows daily VMT calculations for the existing Costco warehouse located on West Shaw Avenue.

Table 3.13-2 Existing Costco Daily VMT

Trip Type	Daily VMT
Member Primary	106,943
Member Pass-by	0
Member Diverted	4,636
Warehouse and Fuel Station Employees	4,152
MDO Warehouse Employees	2,944
MDO Driver Employees	1,408
MDO Deliveries[1]	--
Fuel Truck Delivery[1]	--
Warehouse Truck Delivery[1]	--
Total Daily VMT	**120,083**

[1] Delivery truck trips are excluded from the VMT calculation as good movement is not evaluated for identifying transportation impacts pursuant to CEQA.

Source: Kittelson & Associates 2023.

It is assumed that a future unknown retail use would backfill the existing Costco facility located on West Shaw Avenue. Additionally, the existing Costco fuel station is assumed to remain operational after the Costco vacates the existing facility and another retail use becomes moves into the building. Table 3.13-3 shows the total daily VMT estimated for the existing Costco fuel station, which would remain operational, as well as the estimated VMT for a generic retail use, which is assumed to backfill the existing Costco facility located on West Shaw Avenue.

Table 3.13-3 Existing West Shaw Avenue Building Backfill Retail Use and Costco Fuel Station Daily VMT

	Daily VMT
Backfill Retail Use	31,673
Fuel Station	26,704
Total Daily VMT	**58,377**

Source: Kittelson & Associates 2023.

Because the existing Costco on Shaw Avenue would close and existing MDO operations would be relocated following construction of the project, the total VMT for Costco's existing operations (member and warehouse employee trips, MDO employee trips, and fuel station trips) disclosed in Table 3.13-2 are assumed to be eliminated. This is a reduction on 120,083 daily VMT. However, the gas station would remain operational and it is reasonable to assume that the vacant facility would be backfilled with a new retail use. When the 58,377 daily VMT (shown in Table 3.13-3) that is anticipated from these future uses is attributed to the West Shaw Avenue site, the net change in daily VMT would be -61,706, as shown in Table 3.13-4. The daily VMT for the proposed project, as shown in Table 3.13-1, would be 191,032.

Table 3.13-4 Overall Change in Regional Daily VMT with Relocated Costco Warehouse

Scenario	Daily VMT
Difference in West Shaw Avenue Site	-61,706
Existing Shaw Costco	-120,083
Backfill Retail Use	31,673
Fuel Station	26,704
Relocated Costco Facility (Herndon Avenue)	191,032
Total Daily VMT	**129,326**

Source: Kittelson & Associates 2023.

As detailed in Table 3.13-4, the change in regional daily VMT with the relocation of the Costco warehouse and MDO operations is 129,326 (i.e., 191,032 – 61,706 = 129,326). The City of Fresno *CEQA Guidelines for VMT Thresholds* states that "VMT generated by retail projects would indicate a significant impact for any net increase in total VMT" (City of Fresno 2020); therefore, the proposed project would result in a significant impact to VMT.

Summary

Construction activity is temporary and would generate fewer than 500 daily trips; thus, the proposed project meets the screening criteria established in the City of Fresno *CEQA Guidelines for VMT Thresholds* while construction activities occur. Operational VMT attributed to the proposed project is expected to result in a net increase of average daily VMT by 129,326. Because the proposed project would result in an increase in VMT, this impact would be **significant**.

Mitigation Measures

Table 3.13-3 presents the most recent California Air Pollution Control Officers Association (CAPCOA) *Handbook for Analyzing GHG Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (Handbook) measures for reducing greenhouse gas emissions within the transportation sector. Most of the measures quantified in the CAPCOA Handbook aim to reduce VMT and encourage mode shifts from single-occupancy vehicles to shared (e.g., transit) or active modes of transportation (e.g., bicycle) (CAPCOA 2021). Although all transportation measures are provided below, not all are applicable or feasible given the implementation scale, nature of the proposed project, and/or limited jurisdictional authority of Costco, the applicant, to implement particular measures. The following mitigation measures have been proposed based on the analysis of feasibility and applicability included in Table 3.13-5.

Table 3.13-5 Transportation Sector Measures to Reduce VMT

	Mitigation Measure	Maximum Potential VMT Reduction[1]	Feasible/Applicable to the project?	Notes
T-1	Increase Residential Density	30% from project VMT	N/A	The proposed project does not include residential uses.
T-2	Increase Job Density	30% from project VMT	N/A	This is a plan/communitywide strategy and is not applicable.
T-3	Provide Transit-Oriented Development	31% from project VMT	N/A	This is a plan/communitywide strategy and is not applicable.
T-4	Integrate Affordable and Below Market Rate Housing	28.6% from project/site multifamily residential VMT	N/A	The proposed project does not include residential uses.
T-5	Implement Commute Trip Reduction Program (Voluntary)	4% project/site employee commute VMT	Yes	See Mitigation Measure 3.13-2 below.
T-6	Implement Commute Trip Reduction Program (Mandatory Implementation and Monitoring)	26% from project/site employee commute VMT	Yes	See Mitigation Measure 3.13-2 below.
T-7	Implement Commute Trip Reduction Marketing	4% project/site employee commute VMT	Yes	See Mitigation Measure 3.13-2 below.
T-8	Provide Ridesharing Program	8% project/site employee commute VMT	Yes	See Mitigation Measure 3.13-2 below.
T-9	Implement Subsidized or Discounted Transit Program	5.5% from employee/resident	Yes	See Mitigation Measure 3.13-2 below.
T-10	Provide End-of-Trip Bicycle Facilities	4.4% project/site employee commute VMT	Yes	See Mitigation Measure 3.13-2 below.
T-11	Provide Employer-Sponsored Vanpool	20.4% project/site employee commute VMT	Yes	See Mitigation Measure 3.13-2 below.

	Mitigation Measure	Maximum Potential VMT Reduction[1]	Feasible/Applicable to the project?	Notes
T-12	Price Workplace Parking	20% project/site employee commute VMT	N/A	Measure ineffective due to readily available, uncontrolled and free parking in the immediate vicinity of the proposed project.
T-13	Implement Employee Parking Cash-Out	12% project/site employee commute VMT	N/A	Measure ineffective due to readily available, uncontrolled and free parking in the immediate vicinity of the proposed project.
T-14	Provide Electric Vehicle Charging Infrastructure	--	N/A	See Mitigation Measure 3.3-2a. This measure does not affect VMT.
T-15	Limit Residential Parking Supply	13.7% from residences' VMT	N/A	The proposed project does not include residential uses.
T-16	Unbundle Residential Parking Costs from Property Cost	15.7% from project VMT	N/A	The proposed project does not include residential uses.
T-17	Improve Street Connectivity	30% from vehicle travel in the plan/community	Yes	The proposed project would construct West Spruce Avenue along the northern project site boundary improving street connectivity. Additionally, the project would construct North Arthur Avenue along the eastern project site boundary, connecting West Spruce Avenue and West Spruce Avenue. See Chapter 2, "Project Description."
T-18	Provide Pedestrian Network Improvement	6.4% from vehicle travel in the plan/community	Yes	Pedestrian facility improvements provided as part of the proposed project. See Chapter 2, "Project Description."
T-19-A	Construct or Improve Bike Facility	0.8% from vehicles parallel roadways	Yes	Bicycle facility improvements provided as part of the proposed project. See Chapter 2, "Project Description."
T-19-B	Construct or Improve Bike Boulevard	0.2% from vehicles on roadway	Yes	Bicycle facility improvements provided as part of the proposed project. See Chapter 2, "Project Description."
T-20	Expand Bikeway Network	0.5% from vehicles on roadway	Yes	Bicycle facility improvements provided as part of the proposed project. See Chapter 2, "Project Description."
T-21-A	Implement Conventional Carshare Program	0.15% from vehicle travel in the plan/community	No	This is a plan/communitywide strategy and is not feasible.
T-21-B	Implement Electric Carshare Program	VMT reduction not quantified—see CAPCOA handbook	No	This is a plan/communitywide strategy and is not feasible.
T-22-A	Implement Pedal (Non-Electric) Bikeshare Program	0.2% from vehicle travel in the plan/community	No	This is a plan/communitywide strategy and is not feasible.
T-22-B	Implement Electric Bikeshare Program	0.06% from vehicle travel in the plan/community	No	This is a plan/communitywide strategy and is not feasible.
T-22-C	Implement Scootershare Program	0.07% from vehicle travel in the plan/community	No	This is a plan/communitywide strategy and is not feasible.

	Mitigation Measure	Maximum Potential VMT Reduction[1]	Feasible/Applicable to the project?	Notes
T-23	Provide Community-Based Travel Planning	2.3% from vehicle travel in the plan/community	N/A	The proposed project does not include residential uses. This measure applies to residences.
T-24	Implement Market Price Public Parking (On-Street)	30% from vehicle travel in the plan/community	No	The applicant, Costco, does not have jurisdiction over public on-street parking facilities and operation.
T-25	Extend Transit Network Coverage or Hours	4.6% from vehicle travel in the plan/community	No	The applicant, Costco, does not have jurisdiction over the operation of transit service.
T-26	Increase Transit Service Frequency	11.3% from vehicle travel in the plan/community	No	The applicant, Costco, does not have jurisdiction over the operation of transit service.
T-27	Implement Transit-Supportive Roadway Treatments	0.6% from vehicle travel in the plan/community	No	This is a plan/communitywide strategy and is not feasible.
T-28	Provide Bus Rapid Transit	13.8% from vehicle travel in the plan/community	No	The applicant, Costco, does not have jurisdiction over the operation of transit service.
T-29	Reduce Transit Fares	1.2% from vehicle travel in the plan/community	No	This is a plan/communitywide strategy and is not feasible.
T-30	Use Cleaner-Fuel Vehicles	--	N/A	This measure does not affect VMT.

Notes: VMT = Vehicle Miles Traveled; N/A = not applicable

Source: Mitigation Measures and VMT Reduction Potential provided by CAPCOA 2021 *Handbook for Analyzing Greenhouse Gas Emissions Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*

Mitigation Measure 3.13-2: Provide a Mandatory Commute Reduction Program for Costco Employees

Costco shall provide a Mandatory Commute Reduction program for employees that achieves at least a 26 percent reduction in employee VMT. The commute reduction program shall be provided to the City for approval prior to issuance of a certificate of occupancy. Specific actions may include the following measures described in the California Air Pollution Control Officers Association's *Quantifying Greenhouse Gas Mitigation Measures Handbook*:

- **Commute Trip Reduction Marketing (estimated to result in up to 4 percent employee VMT reduction)**: Costco shall implement a marketing strategy to promote Costco's commute reduction program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT and greenhouse gas emissions. The following features (or similar alternatives) shall be provided:
  - on-site or online commuter information services,
  - employee transportation coordinators,
  - on-site or online transit pass sales, and
  - guaranteed ride home service.
- **Provide Ridesharing Program (estimated to result in up to 8 percent employee VMT reduction)**: Costco shall develop and implement a ridesharing program. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and greenhouse gas emissions. The following strategies provide examples of a multifaceted approach for promoting a rideshare program:
  - designating a certain percentage of desirable parking spaces for ridesharing vehicles,
  - designating adequate passenger loading and unloading and waiting areas for ridesharing vehicles, and

    - providing an app or website for coordinating rides.

- **Implement Subsidized or Discount Transit Program (estimated to result in up to 5.5 percent employee VMT reduction)**: Costco shall provide free transit passes for employees. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and, thus, a reduction in greenhouse gas emissions.
- **Provide End-of-Trip Bicycle Facilities (estimated to result in up to 4.4 percent employee VMT reduction)**: Costco shall install and maintain end-of-trip facilities for employee use. End-of-trip facilities include elements such as bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and greenhouse gas emissions.
- **Provide Employer-Sponsored Vanpool (estimated to result in up to 20.4 percent employee VMT reduction)**: Costco shall implement an employer-sponsored vanpool program. Vanpooling is a flexible form of public transportation that provides groups of 5 to 15 people with a cost-effective and convenient rideshare option for commuting. The mode shift from long-distance, single-occupied vehicles to shared vehicles reduces overall commute VMT, thereby reducing greenhouse gas emissions (CAPCOA 2021).

Significance after Mitigation

Mitigation Measure 3.13-2 would implement Measure T-6 (Mandatory Commute Reduction Program), as identified in the *Handbook for Analyzing Greenhouse Gas Emissions Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* (CAPCOA 2021). The implementation of Mitigation Measure 3.13-2 would reduce employee trips. However, employee trips account for 436 daily trips (less than 2 percent of the total daily trips) and 13,385 VMT (approximately 7 percent of the daily VMT). Based on the California Air Pollution Control Officers Association's estimates in the *Quantifying Greenhouse Gas Mitigation Measures Handbook*, Mitigation Measure 3.13-2 could achieve up to a 26 percent reduction in project employee commute VMT (CAPCOA 2021: 86). Implementation of a mandatory commute reduction program with 100 percent employee participation would only result in a 3,480-mile decrease, or less than 2 percent of the proposed project's total daily regional VMT.

The primary source of daily VMT is warehouse shopping by Costco members. The nature of Costco's land use and business model is auto-oriented. Members purchase items in bulk at Costco facilities, making walking, biking, or transit trips to the warehouse impractical. Therefore, even with the implementation of Mitigation Measures 3.13-2 the impact would be **significant and unavoidable**.

Impact 3.13-3: Substantially Increase Hazards Due to a Geometric Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment)

The proposed project would follow all safety protocol during construction activities and would develop a Traffic Control Plan (TCP) in accordance with City standards. The proposed project would be required to meet City design standards and regulations, including internal circulation and off-site improvement standards for all modes of transportation. Additionally, the proposed project would be subject to ministerial review by the City; thus, ensuring applicable design requirements related to safety are met. However, as detailed in the TIA, the proposed project would not meet safety thresholds related to intersection queuing. The City has issued several conditions of approval for the proposed project that would require the implementation of off-site improvements to reduce transportation hazards. However, no off-site improvements at the intersection of North Golden State Boulevard and West Herndon Avenue are included in the conditions of approval. Therefore, the proposed project's impact to transportation hazards would be **significant and unavoidable**.

Construction

For the purpose of this analysis, project construction is expected to begin in May of 2023 and complete in approximately 170 days. As described in Chapter 2, "Project Description," construction activities would typically take place Monday through Saturday, between 7:00 a.m. and 10:00 p.m.; however, some construction activities would be required to start as early as 2:00 a.m. All phases of construction would comply with City standards and regulations. Additionally, construction staging would be located within the proposed project site. Construction transportation

impacts would be localized and temporary; however, during construction of the proposed project, traffic operations could be degraded. For this reason, the proposed project would be required to follow all local protocols to ensure safety and minimize traffic disturbance during construction activities.

Before construction, the project contractor would be required to obtain a Street Work Permit to allow construction work in the public right-of-way for off-site utility and roadwork improvements. A TCP would be prepared by the contractor in accordance with policy number 210.01 ("Traffic Control Policies and Procedures") of the City of Fresno Public Works Department Policies and Procedures. The TCP would demonstrate appropriate traffic handling during construction activities for all work that could impact the traveling public. Additionally, if off-site construction activities necessitate travel lane closures, the proposed project would be required to follow protocol as described in policy number 210.1 ("Conditions for Roadway Closures and Lane Closures") in the City of Fresno Public Works Department Policies and Procedures. Therefore, any increased hazards related to transportation during construction would be minimized. For this reason, the impact related to transportation hazards during construction would be less than significant.

Operations

As discussed in Chapter 2, "Project Description," the proposed project would involve the development of a new facility on an undeveloped 22.4-acre parcel. The project would include the construction of a retail building, gas station, and car wash. The proposed project would be required to meet all development standards as identified by the City of Fresno. Additionally, the proposed project is subject to City of Fresno review processes, which would ensure that that the project design would comply with all applicable City and industry roadway/driveway design standards.

The Traffic Planning Section of the City's Planning and Development Department provides conditions of approval, site plan review, and design guidelines for commercial development projects. Furthermore, the proposed project would be required to meet all applicable regulations within the City Municipal Code including those in Chapter 13 for off-site roadway, intersection, and sidewalk improvements. At the City's direction, the proposed project would connect West Spruce Avenue north of the proposed project site, as described in Chapter 2, "Project Description." This would be applied as a condition of approval and would make the roadways consistent with the General Plan Mobility and Transportation Element. Figure MT-1 of the General Plan Mobility and Transportation Element designates the planned roadway network of the General Plan and establishes West Spruce Avenue as a collector roadway.

On-site design would comply with the circulation and safety standards as detailed in Chapter 15 of the City of Fresno Municipal Code (Section 15-2423). Each access point along North Riverside Drive and the proposed new private roadway, North Arthur Avenue, would provide adequate sight distance in accordance with City and industry-wide design standards. Additionally, the proposed project would provide 829 parking stalls which would meet City and ADA requirements as detailed in the City of Fresno Parking Manual (1987).

Although the proposed project would follow all safety and design protocol as described above, the TIA found that the proposed project would potentially increase the occurrence of safety hazards due to queuing. The following intersections were determined to not have sufficient storage to contain 95th percentile queues with project implementation. In these locations, project-generated traffic would result in a potentially hazardous transportation condition:

- North Riverside Drive and West Fir Avenue;
- North Riverside Drive and West Herndon Avenue; and
- North Golden State Boulevard and West Herndon Avenue.

At the two intersections on North Riverside Drive, the existing configuration of the intersections would not accommodate the project traffic volumes generated by the project. As a result, queuing traffic could extend beyond the existing left turn pockets, resulting in a hazard to through traffic. For the westbound approach of North Golden State Boulevard and West Herndon Avenue, the queue would extend past the North Weber Avenue intersection.

The City has identified the following improvements as conditions of approval for the proposed project that are applicable to the intersections for which a queuing impact was identified in the TIA (City of Fresno 2022):

- The proposed project shall modify the intersection of West Herndon Avenue and North Riverside Drive to the following configuration prior to occupancy:

- Southbound – two (2) left-turn lanes, two (2) through lanes and one (1) right-turn lane.
- Northbound – two (2) left-turn lanes, two (2) through lanes and one (1) right-turn lane.
- Eastbound – two (2) left-turn lanes, three (3) through lanes and one (1) right-turn lane.
- Westbound – two (2) left-turn lanes, three (3) through lanes and one (1) right-turn lane. If the general plan amendment is not approved, the westbound right-turn lane shall be extended to accommodate 150 feet of vehicle storage.
- Bike lanes shall be provided in all directions. (Not required on westbound West Herndon Avenue if the general plan amendment is not approved).
- If the general plan amendment is not approved, the westbound right-turn lane shall be extended to accommodate 150 feet of vehicle storage.

- The proposed project shall install a traffic signal with protected left-turn phasing per City of Fresno standards at the intersection of North Riverside Drive and West Fir Avenue prior to occupancy. This intersection is not subject to reimbursement under the TSMI fee program. The intersection should be constructed to include the following configuration:
  - Northbound – one (1) left-turn lane, two (2) through lanes and one (1) right-turn lane.
  - Southbound – one (1) left-turn lane, two (2) through lanes and one (1) right-turn lane.
  - Eastbound – one (1) left-turn lane, one (1) shared through right-turn lane.
  - Westbound – two (2) left-turn lanes, one (1) shared through right-turn lane.
  - Bike lanes shall be provided in northbound and southbound directions.

With the intersection improvements detailed above, the potential queuing at the intersections of North Riverside Drive and West Fir Avenue and North Riverside Drive and West Herndon Avenue would be reduced such that they would not exceed the provided lane storage capacities. However, the conditions of approval do not require improvements to the intersection of North Golden State Boulevard and West Herndon Avenue due to the upcoming High Speed Rail project at this intersection which limits the available right of way for improvements. Thus, the queue of the westbound approach of North Golden State Boulevard and West Herndon Avenue would continue to extend past the North Weber Avenue intersection. Because the proposed project would result in safety hazards related to queuing, the impact related to transportation hazards during operation would be significant.

Summary

Transportation hazards related to construction would be temporary. Additionally, the construction contractor would be required to develop and implement a TCP to minimize any potential hazards during construction. The proposed project's design would be required to meet all City design standards and would be subject to review by the City's Traffic Operations and Planning Division, Traffic Planning Section. Through this review, the City would backcheck designs and confirm that the appropriate safety elements are included. The proposed project would be required to comply with the City's conditions of approval which include off-site improvements that would reduce the potential queuing hazards at the intersections of North Riverside Drive and West Fir Avenue and North Riverside Drive and West Herndon Avenue. However, the conditions of approval do not require improvements to the intersection of North Golden State Boulevard and West Herndon Avenue due to the upcoming High Speed Rail project at this intersection which limits the available right of way for improvements. Thus, the queue of the westbound approach of North Golden State Boulevard and West Herndon Avenue would continue to extend past the North Weber Avenue intersection. Therefore, the proposed project could substantially increase transportation hazards during project operation. This impact would be **significant.**

Mitigation Measures

Mitigation Measure 3.13-3: Provide Off-Site Improvements

Costco shall provide the following off-site improvements to alleviate queuing that would result in transportation hazards to the greatest extent feasible prior to issuance of a certificate of occupancy:

- North Golden State Boulevard and West Herndon Avenue: Revise signal phasing to optimize green-time allocation relative to anticipated volumes. To reduce queue blockage of the intersection, "DO NOT BLOCK" pavement markings are required for the full width of North Weber Avenue. On the north leg of the intersection (i.e., North Golden State Boulevard, northeast of West Herndon Avenue), reconstruct the median to extend the south bound dual left-turn pocket as far north as possible without interfering with the existing north bound left-turn pocket at West Kathryn Avenue.

All off-site improvements shall be designed in accordance with City roadway design standards and are subject to review by the City and responsible emergency service providers.

Significance after Mitigation

Following construction of project off-site improvements detailed in Mitigation Measure 3.13-3, the southbound left-turn queue at the North Golden State Boulevard and West Herndon Avenue intersection would continue to overflow the available storage for the turn pocket and block the adjacent travel lane by approximately 50 feet. Constraints in the median preclude increasing the southbound left-turn lanes to fully accommodate the 95th percentile queue. As discussed above, existing roadway layout and approved projects in the area preclude additional design features to address this impact. Specifically, the alignment of the California High Speed Rail parallels the existing railway northeast of North Golden State Boulevard and limits the available right of way for improvements. According to analysis in the TIA, the spillback condition would occur during the most congested period of the day and would not be a continuous condition. However, because the southbound left-turn queue at the North Golden State Boulevard and West Herndon Avenue would continue to overflow the available storage for the turn pocket and block the adjacent travel lane during certain times throughout the day, this would remain a transportation hazard with mitigation. Therefore, the impact would be **significant and unavoidable.**

Impact 3.13-4: Result in Inadequate Emergency Access

The proposed project would be designed according to City of Fresno standards and would be reviewed and approved by the City of Fresno and the appropriate emergency service providers. Additionally, the proposed project would develop a TCP to ensure sufficient emergency access is maintained during construction activities. The proposed project would meet all City design standards, municipal code regulations, and requirements provided in the 2019 California Fire Code as adopted by the City of Fresno. Additionally, the proposed project would be subject to review by the City and emergency service departments to ensure adequate access is provided. Thus, the proposed project would provide adequate emergency access during construction and operation. This impact would be **less than significant**.

As discussed in Impact 3.13-3, above, all improvements related to the proposed project would meet City of Fresno design standards and safety protocol while construction activities are performed. The proposed project would also be required to follow the provisions set forth in the City of Fresno Municipal Code Section 15-2423, "Circulation and Safety," which provides that parking lots shall be "designed so that sanitation, emergency, and other public service vehicles can provide service without backing unreasonable distances or making other dangerous or hazardous turning movements, as determined by the Review Authority" (City of Fresno Municipal Code Section 15-2423). Additionally, the proposed project would follow standards set forth in the 2019 California Fire Code as adopted by the City of Fresno Section 10-50100, "Adoption of the California Fire Code," of the Municipal Code which establishes minimum width dimensions to maintain adequate access for fire apparatus roads at no less than 24 feet. Section 3310.1 of the 2019 California Fire Code identifies minimum requirements to provide required emergency access during construction activities.

Emergency vehicle access to the project site would be accommodated by the driveways located on North Riverside Drive and within the drive aisles in the parking lot and to the queue storage area of the gas station. The intersection

of North Riverside Drive and West Herndon Avenue would serve as the primary access point for emergency vehicles to service the Costco retail building and MDO facility. The driveway furthest north on North Riverside Drive would provide emergency access to the northern portion of the site including the car wash and gas station. Additionally, the proposed site plan provides adequate lane width and curb radii to accommodate emergency vehicles.

Further, as detailed in Impact 3.13-3, above, the proposed project includes the reclassification of West Herndon Avenue from expressway to superarterial which would allow for the construction of a new driveway where West Herndon Avenue meets North Arthur Avenue. Increasing the number of access points to the project site may assist in the event of an emergency.

The proposed project would be required to follow all state, county, and City requirements to ensure any potential impacts to emergency vehicles are minimized during construction and maintained during operations. Therefore, the proposed project would not result in inadequate emergency access; thus, the impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

3.14 UTILITIES

This section evaluates the availability of existing utility and infrastructure systems (water, wastewater, stormwater, electricity, and natural gas) to serve the project and the impact of the project on these systems. No public comments on the notice of preparation related to utilities and service systems were received.

3.14.1 Regulatory Setting

FEDERAL

Clean Water Act

The Clean Water Act (CWA) employs a variety of regulatory and non-regulatory tools to reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established under the CWA to regulate municipal and industrial discharges to surface waters. NPDES permit regulations have been established for broad categories of discharges including point source waste discharges and nonpoint sources (nonpoint source discharges are further discussed in Section 3.9, "Hydrology and Water Quality"). Each NPDES permit identifies limits on allowable concentrations and mass loadings of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that EPA must consider in setting effluent limits for priority pollutants.

NPDES permits cover various industrial and municipal discharges, including discharges from storm sewer systems in larger cities, stormwater generated by industrial activity, runoff from construction sites disturbing more than 1 acre, and mining operations. Point source dischargers must obtain a discharge permit from the proper authority (usually a state, sometimes EPA, a tribe, or a territory). So-called "indirect" point source dischargers are not required to obtain NPDES permits. "Indirect" dischargers send their wastewater into a public sewer system, which carries it to the municipal sewage treatment plant, through which it passes before entering any surface water.

The CWA was amended in 1987 with Section 402(p) requiring NPDES permits for nonpoint source (i.e., stormwater) pollutants in discharges. Stormwater sources are diffuse and originate over a wide area rather than from a definable point. The goal of the NPDES stormwater regulations is to improve the water quality of stormwater discharged to receiving waters to the "maximum extent practicable" using structural and nonstructural best management practices (BMPs). BMPs can include educational measures (e.g., workshops informing the public of what impacts can result when household chemicals are dumped into storm drains), regulatory measures (e.g., local authority of drainage-facility design), public-policy measures (e.g., labeling storm-drain inlets as to impacts of dumping on receiving waters) and structural measures (e.g., filter strips, grass swales, and detention ponds).

STATE

Urban Water Management Planning Act

In 1983, the California Legislature enacted the Urban Water Management Planning Act (UWMPA) (California Water Code Sections 10610–10656). The UWMPA states that every urban water supplier that provides water to 3,000 or more customers, or that provides more than 3,000 acre-feet (af) of water annually, should make every effort to ensure the level of reliability in its water service is sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years. This effort includes the adoption of an Urban Water Management Plan (UWMP) by every urban-water supplier and an update of the plan every 5 years. The UWMPA has been amended several times since 1983 with the most recent amendment occurring with Senate Bill (SB) 318 in 2004. The UWMPA and SB

610, described below, are interrelated; the UWMP is typically relied upon to meet the requirements for SB 610. The City of Fresno adopted the 2020 Fresno UWMP on July 15, 2021 (City of Fresno 2021a).

Senate Bill 610

SB 610 makes changes to the UWMPA to require additional information in UWMPs if groundwater is identified as a source available to the supplier. Required information includes a copy of any groundwater management plan adopted by the supplier, a copy of the adjudication order or decree for adjudicated basins, and if non-adjudicated, whether the basin has been identified as being overdrafted or projected to be overdrafted in the most current California Department of Water Resources (DWR) publication on that basin. If the basin is in overdraft, that plan must include current efforts to eliminate any long-term overdraft. A key provision in SB 610 requires that any project subject to the California Environmental Quality Act supplied with water from a public water system be provided a specified water supply assessment, except as specified in the law.

Sustainable Groundwater Management Act

On September 16, 2014, a three-bill legislative package was signed into law, composed of Assembly Bill (AB) 1739, SB 1168, and SB 1319, collectively known as the Sustainable Groundwater Management Act (SGMA). The Governor's signing message states "a central feature of these bills is the recognition that groundwater management in California is best accomplished locally." The SGMA provides a framework for sustainable management of groundwater supplies by local authorities, with the potential for state intervention if necessary to protect the resource. The act requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local water basins and adopt locally based management plans. The groundwater basin that serves Fresno has been designated by DWR as high priority and subject to a condition of critical overdraft.

California Integrated Waste Management Act

To minimize the amount of solid waste that must be disposed of in landfills, the State Legislature passed the California Integrated Waste Management Act of 1989 (AB 939), effective January 1990. According to AB 939, all cities and counties were required to divert 25 percent of all solid waste from landfill facilities by January 1, 1995, and 50 percent by January 1, 2000. Solid waste plans are required to explain how each city's AB 939 plan will be integrated with the county plan. In order of priority, the plans must promote source reduction, recycling and composting, and environmentally safe transformation and land disposal.

In 2011, AB 341 modified the California Integrated Waste Management Act, established a statewide recycling goal of 75 percent, and directed CalRecycle to develop and adopt regulations for mandatory commercial recycling. The resulting Mandatory Commercial Recycling Regulation requires that on and after July 1, 2012, certain businesses that generate 4 cubic yards or more of commercial solid waste per week shall arrange for recycling services. To comply with this requirement, businesses may either separate recyclables and self-haul them or subscribe to a recycling service that includes mixed waste processing.

AB 1826 (Chapter 727, Statutes of 2014; Mandatory Commercial Organics Recycling) requires businesses that generate a specified amount of organic waste per week to arrange for recycling services for that waste, requires jurisdictions to implement recycling programs to divert organic waste from businesses subject to the law, and requires periodic reporting to CalRecycle by jurisdictions on their progress in implementing the program. Organic waste includes food waste, green waste, landscape and pruning waste, nonhazardous wood waste, and food-soiled paper waste. Effective January 1, 2017, businesses that generate 4 cubic yards of organic waste per week shall arrange for organic waste recycling services.

California Code of Regulations, Energy Efficiency Standards

Energy consumption in new buildings in California is regulated by State Building Energy Efficiency Standards (CALGreen) contained in the California Code of Regulations, Title 24, Part 2, Chapter 2-53. Title 24 applies to all new construction of both residential and nonresidential buildings, and regulates energy consumed for heating, cooling, ventilation, water heating, and lighting. The 2016 Building Energy Efficiency Standards have improved efficiency requirements from previous codes and the updated standards are expected to result in a statewide consumption reduction.

LOCAL

City of Fresno General Plan

The City of Fresno General Plan (2014a) establishes the following policies relevant to the project:

- **Policy PU-4-c: System Extension and Cost Recovery.** Pursue enlargement or extension of the sewage collection system where necessary to serve planned urban development, with the capital costs and benefits allocated equitably and fairly between the existing users and new users.
- **Policy PU-4-d: Capacity Modeling.** Continue development and utilization of citywide sewer flow monitoring and computerized flow modeling to determine availability of sewer collection system capacity to serve planned urban development.
- **Policy PU-8-b: Potable Water Supply and Cost Recovery.** Prepare for provision of increased potable water capacity (including surface water treatment capacity) in a timely manner to facilitate planned urban development consistent with the General Plan. Accommodate increase in water demand from the existing community with the capital costs and benefits allocated equitably and fairly between existing users and new users, as authorized by law, and recognizing the differences in terms of quantity, quality and reliability of the various types of water in the City's portfolio.
    - Consistent with fiscal management policies and strategies in the Economic Development and Fiscal Sustainability Element, new users will be obligated to pay for the cost of being attached to the potable water supply and distribution system and surface water treatment through connection fees, including the cost of any incremental burden that they may place on the entire system in terms of both infrastructure and water resources, and pay for the full operational costs of extraordinary facilities, as authorized by law.
- **Policy PU-8-c: Conditions of Approval.** Set appropriate conditions of approval for each new development proposal to ensure that the necessary potable water production and supply facilities and water resources are in place prior to occupancy.
- **Policy PU-8-g: Review Project Impact on Supply.** Mitigate the effects of development and capital improvement projects on the long-range water budget to ensure an adequate water supply for current and future uses.
- **Policy PU-6-a: Treatment Capacity and Cost Recovery.** Prepare for and consider the implementation of increased wastewater treatment and reclamation facility capacity in a timely manner to facilitate planned urban development within the Metropolitan Area consistent with this General Plan. Accommodate increase in flows and loadings from the existing community with the capital costs and benefits allocated equitably and fairly between existing users and new users, as authorized by law.
- **Policy PU-7-a: Reduce Wastewater.** Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows
- **Policy PU-9-b: Compliance with State Law.** Continue to pursue programs to maintain conformance with the Solid Waste Management Act of 1989 or as otherwise required by law and mandated diversion goals.
- **Policy RC-8-a: Existing Standards and Programs.** Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.
- **Policy RC-8-c: Energy Conservation in New Development.** Consider providing an incentive program for new buildings that exceed California Energy Code requirements by fifteen percent.

3.14.2 Environmental Setting

Public utilities in the project area are provided by various entities, as identified in Table 3.14-1 and discussed in detail below.

Table 3.14-1 Utilities Providers for the Project Area

Utility	Agency/Provider
Water Supply	City of Fresno Water Division
Wastewater Collection, Conveyance, and Treatment	City of Fresno Wastewater Management Division
Stormwater Conveyance	City of Fresno Department of Public Utilities
Solid Waste Collection	City of Fresno Solid Waste Management Division
Electrical Service	Pacific Gas and Electric Company (PG&E)
Natural Gas	PG&E

Sources: City of Fresno n.d.d.; City of Fresno 2014b, 2021a.

WATER SUPPLY

The City of Fresno supplies potable water to its residential, commercial, institutional, industrial, and landscape irrigational customers in the city through a water distribution system that consists of about 1,860 miles of distribution and transmission mains; 202 active municipal groundwater wells; three surface water treatment facilities (SWTFs) with current rated capacities ranging from 4 to 54 million gallons per day (mgd); five water storage facilities with pump stations, including one at each of the SWTFs plus two in the distribution system; and three booster pump facilities (City of Fresno 2021a). Surface water treatment facilities (SWTFs) supply approximately half of the city's potable water demand. The remaining potable water is supplied from groundwater from the North Kings Subbasin located in the southern part of the San Joaquin Valley; surface water from the Central Valley Project (CVP), through a contract with the U.S. Bureau of Reclamation (Reclamation); Kings River water, through a contract with the Fresno Irrigation District (FID); and recycled water (City of Fresno 2021a). The CVP is a network of dams, reservoirs, canals, hydroelectric powerplants and other facilities that extends through central California to reduce flood risk for the Central Valley and supply valley domestic and industrial water (Reclamation n.d.).

The 2020 UWMP was adopted by the City Council on July 15, 2021. The City's 2020 UWMP is a long-term water resource planning document created to ensure there is enough water to meet both existing and future demands in the city. The 2020 UWMP assesses current and projected water supplies along with the reliability of those water supplies; evaluates the current and future type of water demand and type of customers; describes required conservation measures implemented by water suppliers; and prepares a response plan, in the event of a water shortage. The 2020 UWMP was prepared in accordance with the UWMPA, which stipulates that every urban water supplier in California supplying water directly or indirectly to 3,000 or more customers or supplying more than 3,000 af of water annually shall adopt and submit an UWMP to DWR (City of Fresno 2021a).

Surface Water Supply

Surface water serves as a primary source of water supply within the city with completion of the Southeast Surface Water Treatment Facility (SESWTF), a 54 mgd surface water treatment facility in southeast Fresno. The SESWTF provides nearly one-half of the city's annual water demand. Production from this facility may ultimately be 80 mgd if it is determined that the facility is capable of safely running at higher filter loading rates. With the SESWTF operational, along with the other SWTFs in the city (Northeast Surface Water Treatment Facility [NESWTF] and the T-3 Water Storage and Modular Surface Water Treatment Facility [T-3 SWTF]) the City provided greater than 50 percent of its potable supply through surface water for the first time in 2019 and 2020. The City expects to provide half or more of its potable demand using its surface water supply sources going forward.

In addition to surface water provided from the aforementioned SWTFs, the City contracts with FID for Kings River water and with Reclamation for CVP water from the Friant-Kern Canal. The City has secured a surface water supply from Reclamation CVP Friant Division for an annual water supply of 60,000 af of Class 1 water through an agreement

originally executed in 1961. The agreement was last renewed in 2010 as a Section 9(d) contract that provides water from the San Joaquin River in perpetuity. The City also has an agreement with FID to provide the City with an allocated 115,000 af per year of Kings River water in normal-year conditions. The City's annual Kings River supply allocation is dependent on annual precipitation, Sierra Nevada mountain snowpack, and natural river flow conditions. The annual variability of these sources results in variable allocations to the City. The City executed its most recent agreement with FID in 2016. The 2016 agreement identifies the City's contracted percentage of FID's Kings River water based on the city's water service area located within FID service area as a percentage of the FID land area up to the 29 percent cap. As the City incorporates new users and the water service area expands, the percentage of Kings River supply increases. The City has historically not used all its available FID Kings River allocation in any given year, although it pays a flat rate for its total allocation regardless of use. Water unused by the city is reallocated by FID to its other customers. The surface water supply from these sources is used either for potable uses through treatment and distribution or delivery to recharge basins for groundwater recharge (City of Fresno 2021a).

Groundwater Supply

The City's groundwater supply is sourced from the Kings Subbasin, which is part of the greater San Joaquin Valley Groundwater Basin. The City is a member of the North Kings Groundwater Sustainability Agency (GSA), which was formed following passage of the SGMA of 2014. The SGMA requires governments and water agencies of "critically overdrafted" basins to reach sustainability by 2040. The Kings Subbasin was designated a critically overdrafted basin by DWR and the North Kings GSA is working within the SGMA framework to reach groundwater sustainability. The City plans to limit its use of groundwater and maximize its existing water rights and surface water supply sources.

Water Service Reliability

Normal Year

In normal years, it is anticipated that the City would have an excess of water through 2045 for each of the water supply categories, as shown below in Table 3.14-2.

Table 3.14-2 Normal Year Supply and Demand

Water Supply	2025	2030	2035	2040	2045
Ground water [1]	138,090 AF	143,630 AF	149,100 AF	154,490 AF	159,820 AF
Surface Water – CVP [2]	60,000 AF	60,000 AF	60,000 AF	60,000 AF	60,000 AF
Surface Water – Kings River [3]	125,030 AF	131,600 AF	131,600 AF	131,600 AF	131,600AF
Recycled Water [4]	5,910 AF	5,910 AF	5,910 AF	5,910 AF	5,910 AF
Supply Totals	**329,030 AF**	**341,140 AF**	**346,610 AF**	**352,000 AF**	**357,330 AF**
Potable Demand	136,504 AF	147,356 AF	154,210 AF	161,076 AF	167,947 AF
Non-Potable Demand	62,700 AF	65,400 AF	68,100 AF	70,800 AF	73,500 AF
Demand Totals	**199,204 AF**	**212,756 AF**	**222,310 AF**	**231,876 AF**	**241,447 AF**
Difference	**129,826 AF**	**128,384 AF**	**124,300 AF**	**120,124 AF**	**115,883 AF**

Notes: AF = acre-feet.

[1] Groundwater yields were estimated for normal years, as shown in Table 6-1 of the 2020 GWMP.

[2] CVP yields were estimated from long-term average allocations, as shown in Table 6-2 in the 2020 GWMP.

[3] Kings River yields were estimated from long-term average allocations, as shown in Table 6-3 in the 2020 GWMP.

[4] Recycled water yields were projected supply values from Table 6-6 of the 2020 GWMP, excluding agricultural irrigation demand that does not offset the City's potable demand.

Source: City of Fresno 2021a.

Single Dry Year

The single-dry-year water supply availability is based on the City's water supply data from 2015, which marked the lowest surface water supply year during the 2012-2017 drought. In this scenario, it is anticipated that the City would have an excess of water through 2045 for each of the water supply categories, as shown below in Table 3.14-3. If necessary, the City would pump beyond its estimated sustainable yield during dry periods and balance out the pumping with recharge in normal or wet periods.

Table 3.14-3 Single Dry Year Supply and Demand

Water Supply	2025	2030	2035	2040	2045
Ground water [1]	138,090 AF	143,630 AF	149,100 AF	154,490 AF	159,820 AF
Surface Water – CVP [2]	0 AF	0 AF	0 AF	0 AF	0 AF
Surface Water – Kings River [3]	45,852 AF	45,852 AF	45,852 AF	45,852 AF	45,852 AF
Recycled Water [4]	5,910 AF	5,910 AF	5,910 AF	5,910 AF	5,910 AF
Supply Totals	**189,852 AF**	**195,392 AF**	**200,862 AF**	**206,252 AF**	**211,582 AF**
Potable Demand	136,504 AF	147,356 AF	154,210 AF	161,076 AF	167,947 AF
Non-Potable Demand	27,588 AF	28,776 AF	29,964 AF	31,152 AF	32,340 AF
Demand Totals	**164,092 AF**	**176,132 AF**	**184,174 AF**	**192,228 AF**	**200,287 AF**
Difference	**25,760 AF**	**19,260 AF**	**16,688 AF**	**14,024 AF**	**11,295 AF**

Notes: AF = acre-feet.

[1] Groundwater yields were estimated sustainable yields from Table 6-1 of the 2020 GWMP.

[2] CVP yields were based on the actual allocation during 2015 (0 AF).

[3] Kings River yields were based on the actual total FID allocation in 2015 (42,935 AF) but with the projected City percentage of FID supply for the future years considered as shown in Table 6-3 in the 2020 GWMP.

[4] Recycled water yields were projected supply values from Table 6-6 of the 2020 GWMP, excluding agricultural irrigation demand that does not offset the City's potable demand.

Source: City of Fresno 2021a.

Multiple Dry Years

During multiple dry years, it is anticipated that the City would have an excess of water through 2045 for each of the water supply categories, as shown below in Table 3.14-4. There would be seasonal variability with surface water availability in dry years, and the City would be required to work closely with surface water suppliers to minimize impacts to the City's SWTFs. However, it is anticipated that sufficient good-quality water would be available to permit the SWTFs to operate.

Table 3.14-4 Multiple Dry Years Supply and Demand

	Water Supply	2025	2030	2035	2040	2045
First Year	Ground water [1]	138,090 AF	143,630 AF	149,100 AF	154,490 AF	159,820 AF
	Surface Water – CVP [2]	30,000 AF	30,000 AF	30,000 AF	30,000 AF	30,000 AF
	Surface Water – Kings River [3]	99,725 AF	99,725 AF	99,725 AF	99,725 AF	99,725 AF
	Recycled Water [4]	5,910 AF	5,910 AF	5,910 AF	5,910 AF	5,910 AF
	Supply Totals	**273,725 AF**	**279,265 AF**	**284,735 AF**	**290,125 AF**	**295,455 AF**
	Potable Demand	136,504 AF	147,356 AF	154,210 AF	161,076 AF	167,947 AF
	Non-Potable Demand	62,700 AF	65,400 AF	68,100 AF	70,800 AF	73,500 AF
	Demand Totals	**199,204 AF**	**212,756 AF**	**222,310 AF**	**231,876 AF**	**241,447 AF**
	Difference	**74,521 AF**	**66,509 AF**	**62,425 AF**	**58,249 AF**	**54,008 AF**

	Water Supply	2025	2030	2035	2040	2045
Second Year	Ground water [1]	138,090 AF	143,630 AF	149,100 AF	154,490 AF	159,820 AF
	Surface Water – CVP [2]	37,200 AF	37,200 AF	37,200 AF	37,200 AF	37,200 AF
	Surface Water – Kings River [3]	93,426 AF	93,426 AF	93,426 AF	93,426 AF	93,426 AF
	Recycled Water [4]	5,910 AF	5,910 AF	5,910 AF	5,910 AF	5,910 AF
	Supply Totals	**274,626 AF**	**280,166 AF**	**285,636 AF**	**291,026 AF**	**296,356 AF**
	Potable Demand	136,504 AF	147,356 AF	154,210 AF	161,076 AF	167,947 AF
	Non-Potable Demand	62,700 AF	65,400 AF	68,100 AF	70,800 AF	73,500 AF
	Demand Totals	**199,204 AF**	**212,756 AF**	**222,310 AF**	**231,876 AF**	**241,447 AF**
	Difference	**75,422 AF**	**67,410 AF**	**63,326 AF**	**59,150 AF**	**54,909 AF**
Third Year	Ground water [1]	138,090 AF	143,630 AF	149,100 AF	154,490 AF	159,820 AF
	Surface Water – CVP [2]	0 AF	0 AF	0 AF	0 AF	0 AF
	Surface Water – Kings River [3]	73,568 AF	73,568 AF	73,568 AF	73,568 AF	73,568 AF
	Recycled Water [4]	5,910 AF	5,910 AF	5,910 AF	5,910 AF	5,910 AF
	Supply Totals	**217,568 AF**	**223,108 AF**	**228,578 AF**	**233,968 AF**	**239,298 AF**
	Potable Demand	136,504 AF	147,356 AF	154,210 AF	161,076 AF	167,947 AF
	Non-Potable Demand	53,763 AF	46,281 AF	43,526 AF	40,677 AF	37,761 AF
	Demand Totals	**190,267 AF**	**193,637 AF**	**197,736 AF**	**201,753 AF**	**205,708 AF**
	Difference	**27,301 AF**	**29,471 AF**	**30,842 AF**	**32,215 AF**	**33,589 AF**
Fourth Year	Ground water [1]	138,090 AF	143,630 AF	149,100 AF	154,490 AF	159,820 AF
	Surface Water – CVP [2]	0 AF	0 AF	0 AF	0 AF	0 AF
	Surface Water – Kings River [3]	45,852 AF	45,852 AF	45,852 AF	45,852 AF	45,852 AF
	Recycled Water [4]	5,910 AF	5,910 AF	5,910 AF	5,910 AF	5,910 AF
	Supply Totals	**189,852 AF**	**195,392 AF**	**200,862 AF**	**206,252 AF**	**211,582 AF**
	Potable Demand	136,504 AF	147,356 AF	154,210 AF	161,076 AF	167,947 AF
	Non-Potable Demand	26,047 AF	18,564 AF	15,810 AF	12,960 AF	10,045 AF
	Demand Totals	**162,551 AF**	**165,920 AF**	**170,020 AF**	**174,036 AF**	**177,992 AF**
	Difference	**27,301 AF**	**29,471 AF**	**30,842 AF**	**32,215 AF**	**33,589 AF**
Fifth Year	Ground water [1]	138,090 AF	143,630 AF	149,100 AF	154,490 AF	159,820 AF
	Surface Water – CVP [2]	45,000 AF	45,000 AF	45,000 AF	45,000 AF	45,000 AF
	Surface Water – Kings River [3]	125,840 AF	125,840 AF	125,840 AF	125,840 AF	125,840 AF
	Recycled Water [4]	5,910 AF	5,910 AF	5,910 AF	5,910 AF	5,910 AF
	Supply Totals	**314,840 AF**	**320,380 AF**	**325,850 AF**	**331,240 AF**	**336,570 AF**
	Potable Demand	136,504 AF	147,356 AF	154,210 AF	161,076 AF	167,947 AF
	Non-Potable Demand	62,700 AF	65,400 AF	68,100 AF	70,800 AF	73,500 AF
	Demand Totals	**199,204 AF**	**212,756 AF**	**222,310 AF**	**231,876 AF**	**241,447 AF**
	Difference	**115,636 AF**	**107,624 AF**	**103,540 AF**	**99,364 AF**	**95,123 AF**

Notes: AF = acre-feet.

[1] Groundwater yields were estimated sustainable yields from Table 6-1 of the 2020 GWMP.

[2] CVP yields were based on the actual allocations in 2012 through 2016, which ranged from 0 to 45,000 AF.

[3] Kings River yields were based on the actual total FID allocations in 2012 to 2016, which ranged from 42,935 to 110,824 but with the projected City percentage of FID supply for the future years considered as shown in Table 6-3 in the 2020 GWMP.

[4] Recycled water yields were projected supply values from Table 6-6 of the 2020 GWMP, excluding agricultural irrigation demand that does not offset the City's potable demand.

Source: City of Fresno 2021a.

WASTEWATER AND STORMWATER

Wastewater

The City of Fresno owns and maintains the wastewater collection system that serves the city, which consists of 1,630 miles of pipes ranging in size from 4 inches in diameter to 84 inches in diameter. This collection system also uses 15 lift stations throughout the city, ranging in pumping capacity from 0.25 mgd to 2.2 mgd. Two wastewater treatment plants serve the city: the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF) and the North Fresno Wastewater Reclamation Facility (NFWRF) (City of Fresno 2021a).

The RWRF treats flows from the city along with sewered county areas, the city of Clovis, Pinedale County Water District, and Pinedale Public Utility District. The RWRF is the fourth largest municipal wastewater facility in northern California, with an average monthly flow capacity of 88 mgd (City of Fresno n.d.a). The RWRF includes preliminary, primary, secondary, and tertiary treatment units with disinfection (City of Fresno 2021a). Treated wastewater from RWRF is used to irrigate fields with alfalfa, silage corn, Sudangrass and other fiber crops not used for human consumption.

The NFWRF was constructed as part of a residential, commercial, and golf course development located in the northern portion of the city. As a condition of the planned community, the developer was required to construct a wastewater treatment facility that would produce tertiary level effluent for use within the development to ensure the overall project had a net zero impact on water resources. The NFWRF has an average monthly flow capacity of 0.71 mgd that could be expanded to 1.25 mgd with approval of increased use of the ultraviolet (UV) light disinfection system by the State Water Resources Control Board Department of Drinking Water. The disinfected tertiary effluent from NFWRF is used to irrigate the Copper River Ranch Golf Course and turf within the surrounding area. Unused treated effluent is diverted to the City's collection system to the RWRF (City of Fresno 2021a).

Stormwater

The Fresno Metropolitan Flood Control District (FMFCD) manages the stormwater infrastructure and flows within the city and the larger Fresno-Clovis Metropolitan Area. Most stormwater in the city drains to urban stormwater basins, where the water is retained to attenuate peak flow runoff and recharge groundwater, or is pumped to local irrigation canals for conveyance away from the municipal areas. FMFCD estimates that stormwater recharge in urban basins during the winter months ranges from 7,000 af per year to 22,200 af per year. Stormwater capture and infiltration are considered an integral component of natural groundwater recharge for the Kings Subbasin (City of Fresno 2021a).

ENERGY

Electricity

Pacific Gas and Electric Company (PG&E) provides the majority of electricity to the city via underground and above-ground service lines as part of its Greater Fresno Area service territory. The greater Fresno area generates approximately 3,987 megawatts (MW) of electricity through thermo, hydro, solar, and biomass facilities. The largest electrical generating facility is the Helms Pumped Storage Plant that pumps water up and down between two reservoirs located at different elevations. The Helms Pumped Storage Plant produces and stores up to 1,212 MW of electricity that represents approximately 30 percent of the electricity produced in the greater Fresno area (City of Fresno 2014b).

Natural Gas

PG&E is the natural gas service provider in the greater Fresno area. PG&E owns and maintain several natural gas transmission lines in the region that feed local distribution lines that connect to individual service lines. Approximately 90 percent of the natural gas supply for PG&E is from out-of-state imports. The primary pipeline that extends through California includes Lines 400 and 401 consisting of 725 miles of 36-inch and 42-inch pipelines. These pipelines extend from the TransCanada's system that originates in Canada and extends through Malin, Oregon (City of Fresno 2014b).

TELECOMMUNICATIONS

AT&T is the largest provider of cellular and fixed telephone services in the city. Telephone lines are located throughout the greater Fresno area (City of Fresno 2014b).

SOLID WASTE

The City manages an intensive solid waste diversion program and is on track to be zero waste by the year 2025 (City of Fresno 2021a). Recycling of construction and demolition material is required for any building, relocation, or demolition project permitted by the City that generates at least 8 cubic yards of material by volume and all waste must be hauled to a City-approved facility. The City's Solid Waste Division provides weekly curbside collection of residential bulky goods, recycling, green waste, as well as waste oil and waste oil filters (City of Fresno 2021b).

Garbage disposed of in the city of Fresno is taken to Cedar Avenue Recycling and Transfer Station. Once trash has been off-loaded at the transfer station, it is sorted and non-recyclable solid waste is loaded onto large trucks and taken to the American Avenue Landfill. The American Avenue Landfill is operated by Fresno County and located near the city of San Joaquin, approximately 17 miles southwest of the project site (City of Fresno 2021b). The City has disposed of municipal solid waste at the American Avenue Landfill since 1993. The American Avenue Landfill has a maximum permitted capacity of 32,700,000 cubic yards and a remaining capacity of 29,358,535 cubic yards, with an estimated closure date of August 31, 2031. The maximum permitted throughput is 2,200 tons per day (CalRecycle n.d.). The American Avenue Landfill is a mixed waste processing facility.

In December 2011, the City privatized its commercial waste collection services and granted several companies exclusive franchises for collecting and hauling commercial and multi-family solid waste and recycling material in the city. Allied Waste Services is responsible for servicing the northern portion of the city and Mid Valley Disposal is responsible for the southern section of the city, with Ashlan Avenue being the dividing line (City of Fresno n.d.c). The project area is within the jurisdiction of Allied Waste Services. Franchise haulers provide and maintain containers; respond to customer complaints/concerns and provide roll-off and compactor services to residential, multi-family and commercial customers respective to their agreements (City of Fresno 2021a).

3.14.3 Environmental Impacts and Mitigation Measures

ANALYSIS METHODOLOGY

Water Demand and Wastewater Output

CEQA Guidelines Section 15155 requires preparation of a water supply assessment (WSA) when a project is of sufficient size to be defined as a "water-demand project." Several characteristics can deem a project a "water-demand project" including:

- A shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space (CEQA Guidelines Section 15155(a)(1)(B).

The project is estimated to employ approximately 300 individuals, and the warehouse and gas station would encompass approximately 241,342 square feet. It does not meet the definition of a "water demand project" pursuant to Section 15155 of the State CEQA Guidelines. Preparation of a WSA is not required for the project.

The project is anticipated to require a total of 17.01 million gallons per year (mgy) of water (3.38 mgy of indoor water, 1.67 mgy of outdoor water for landscape irrigation, and 11.95 mgy of water used in the car wash) and is estimated to produce 13.15 mgy of wastewater. This wastewater estimate conservatively assumes that all water entering the warehouse becomes wastewater (i.e., no consumptive use of indoor water) and includes 9.73 mgy of wastewater generated by the car wash. The indoor water demand of the project was calculated by the applicant based on fixture counts and use estimates for indoor use and irrigation water demand for the existing North Costco Wholesale

building from 2013 (Sievert pers. comm. 2023). Irrigation water demand and carwash water use and wastewater generation are based on design information prepared for the proposed project.

Electricity and Natural Gas Demand

The project would have a 2,116-megawatt-hour annual electricity demand and a 2,753,494-thousand-British-thermal-unit annual natural gas demand. Energy use (both electricity and natural gas) was calculated for the project using CalEEMod. To calculate energy use, CalEEMod uses the California Commercial End Use Survey (CEUS) database to develop energy intensity values. The CEUS data lists energy use intensity by building type, "end-use," and CEC forecasting climate zone. Each nonresidential land use in CalEEMod is matched to the appropriate CEUS building type. The CEUS end uses are grouped according to whether the end use is subject to Title 24 building requirements or not.

Solid Waste Production

The project would produce approximately 1,073.52 tons per year of solid waste. Solid waste production for the project was calculated using CalEEMod which uses the overall California Waste Stream composition to generate the necessary types of different waste disposed into landfills.

THRESHOLDS OF SIGNIFICANCE

An impact to utilities and service systems would be significant if implementation of the project would:

- require or result in the relocation or construction of new or expanded water, or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects;
- have insufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years;
- result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand, in addition to the provider's existing commitments;
- generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals; or
- not comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

TOPICS NOT DISCUSSED FURTHER

All thresholds are evaluated below.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Impact 3.14-1: Require or Result in the Relocation or Construction of New or Expanded Water, Wastewater Treatment or Storm Water Drainage, Electric Power, Natural Gas, or Telecommunications Facilities, the Construction or Relocation of which could cause Significant Environmental Effects

The project would develop a currently vacant site into a Costco facility, which would require extending the surrounding utility infrastructure onto the project site. All utility infrastructure extensions and hookups would occur within the disturbance area of the project site, the environmental effects of which have been analyzed in this EIR. The project's projected demand for water, electric power, and natural gas, along with the project's projected wastewater and stormwater output, are within the existing and future capacity of the utility providers that serve the project site. For these reasons, the project would not require the relocation or construction of new or expanded utility infrastructure that could result in significant environmental effects that are not evaluated in this EIR; the impact would be **less than significant.**

The project site is a vacant parcel, and the existing utility infrastructure that follow the roadways surrounding the parcel would be extended onto the project site to serve the proposed Costco facility, as detailed below. Costco would construct utility improvements within the project site to service the proposed uses and connect to available utilities adjacent to the site.

Water Supply

There is an existing water line in West Herndon Avenue and an existing well near the northeast corner of the project site. The applicant would be required to destruct any existing on-site well in compliance with the State of California Well Standards, Bulletin 74-81 and 74-90 or current revisions issued by California Department of Water Resources and City of Fresno standards. Water service would be provided by the City of Fresno Department of Public Utilities via existing facilities located in the North Riverside Drive right-of-way. There would not be any water service connections to the existing 16-inch water main in West Herndon Avenue. The construction of West Spruce Avenue from North Riverside Drive to the intersection with North Sandrini Avenue would also include installation of water mains in the road right of way. These features are project components that would implement planned infrastructure connections, which are evaluated throughout this EIR. Upgrade or relocation of additional infrastructure would not be required because there is adequate capacity in the existing infrastructure to accommodate service to the site.

Wastewater

Sewer service would be provided by the City of Fresno Department of Public Utilities via existing facilities located in the North Riverside Drive right-of-way. The existing lines have adequate capacity to serve the project and new or upgraded lines or wastewater treatment facilities would not be required because there is adequate capacity in the existing infrastructure to accommodate service to the site. The project also includes installation of an 8-inch sanitary sewer main in West Spruce Avenue. These features are project components that would implement planned infrastructure connections. The environmental effects of implementing these project components are evaluated throughout this EIR.

Stormwater

Stormwater from the site would be directed to existing FMFCD drainage facilities in North Riverside Drive, West Spruce Avenue, and West Herndon Avenue along with the additional proposed stormwater drainage facilities. It is anticipated that the stormwater runoff would flow west through the 36-inch pipes in West Herndon Avenue to the 54-inch pipes in North Golden State Boulevard and the existing 15-acre basin adjacent to SR 99. In addition, FMFCD would require construction of the inlet identified in the Storm Drainage and Flood Control Master Plan on Spruce Avenue in conjunction with development of North Arthur Avenue and Spruce Avenue. This would be constructed within the disturbance area of the Spruce Avenue extension. The existing infrastructure has been sized for the runoff of the proposed project site (Chapman pers. comm. 2021).

As described above in Section 3.14.2, "Environmental Setting," FMFCD manages stormwater infrastructure. Development of the site with a warehouse building, car wash, fueling facilities, and paved parking areas would create approximately 22 acres of additional impervious surface. The proposed stormwater drainage facilities (e.g., storm drainage mechanisms and storm water pipes) would be designed and constructed in compliance with the City of Fresno and FMFCD Development Standards. Furthermore, all disturbance associated with construction of the stormwater drainage facilities would occur within the disturbance area of the project, and as analyzed in Section 3.9, "Hydrology and Water Quality," the stormwater drainage facilities would be constructed in compliance with City of Fresno grading plan check process and NPDES Construction General Permit.

FMFCD's Post-Development Standards Technical Manual describes the stormwater management requirements for "Priority Projects," which are includes commercial developments greater than 100,000 square feet, automotive repair shops, parking lots 5,000 square feet or greater with 25 or more parking spaces and potentially exposed to urban runoff, streets and roads; and retail gasoline outlets. All Priority Projects must mitigate the Stormwater Quality Design Volume (SWQDV) or Stormwater Quality Design Flow (SWQDF) through low-impact developemnt or treatment-based stormwater quality BMPs or a combination thereof. Development of the on-site stormwater facilities would minimize effect of the additional impervious area on peak runoff volumes. Additional stormwater facilities would not be required.

Electric Power, Natural Gas, and Telecommunication

The project would require electricity and natural gas during operation. PG&E indicated in a will-serve letter that it has the capacity to provide gas and electric service to the project site and support the project's projected 2,116-megawatt-hour annual electricity demand and a 2,753,494-thousand-British-thermal-unit annual natural gas demand. It is the project applicant's obligation to coordinate permanent and temporary power installation; permanent power infrastructure must be in place for receive a certificate of occupancy. There are existing power and gas lines in the area that would serve the project. AT&T provides telecommunication service to the area. Infrastructure is typically co-located with existing power lines. Powerlines and telecommunications would be extended from existing public rights of way.

Summary

The project's anticipated water demand, wastewater and stormwater output, along with its projected electric and natural gas demand would be within the capacity of the existing utility infrastructure. All proposed utility hookups to existing infrastructure would occur within the disturbance area of the project site and adjacent street rights-of-way, including where Spruce Avenue would be improved as a public street and North Arthur Avenue would be improved as a private street. The project would therefore have a **less-than-significant impact** related to the relocation or construction of new utility infrastructure.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.14-2: Have Insufficient Water Supplies Available to Serve the Project and Reasonably Foreseeable Future Development during Normal, Dry, and Multiple Dry Years

The UWMP projects that the City would have an excess of water through 2045 during normal, dry, and multiple dry years. While the project would require a GPA from Community Commercial to General Commercial, the UWMP does not differentiate between commercial districts. Therefore, the project is accounted for within the UWMP's water supply calculation. Given that the project's water demand is accounted for in the City's UWMP projections for future development during normal, dry, and multiple dry years, and that the UWMP projections found that the City would have an excess of water in the aforementioned drought scenarios, there would be sufficient water supplies to serve the project. The impact would be **less than significant**.

As detailed above in Section 3.14.2, "Environmental Setting," the City of Fresno manages a water distribution system composed of distribution and transmission mains, municipal groundwater wells, three SWTFs, water storage facilities, and booster pump facilities (City of Fresno 2021a). The City's water is sourced from SWTFs and groundwater from the North Kings Subbasin.

As described above in Section, 3.14.2, "Environmental Setting," the 2020 UWMP is a long-term water resource planning document used by the City to ensure there is enough water to meet both existing and future demands. The UWMP projects that the City would have an excess of water through 2045 during normal, dry, and multiple dry years as illustrated above in Table 3.14-1, Table 3.14-2, and Table 3.14-3. The City sources its potable and non-potable water from groundwater, surface water, and recycled water to ensure that enough water is available in a potential drought. In a normal year, the City would have an excess of 115,883 af of water in 2045. That excess would decrease to 11,295 af in 2045 in a single dry year, and would increase to 95,123 af in the fifth year of multiple dry years (City of Fresno 2021a). In multiple dry years the City would work closely with surface water suppliers to minimize impacts to the City's SWTFs.

The City's 2020 UWMP projects potable water demand through 2045 using land use-based projections sourced from the City's Geographic Information System (GIS) database and the City's General Plan. The land use-based projections correspond with the planned land use at buildout as described in the City's General Plan. As analyzed in Section 3.10, "Land Use and Planning," the project site is identified as Community Commercial and would include a General Plan amendment (GPA) to redesignate the site to General Commercial. The GPA would allow for the slightly more intensive commercial use of the site which currently does allow for commercial use. The UMWP combines all commercial land use designations (which include both Community Commercial and General Commercial) into one category and anticipates that the city's commercial acreage would increase by 2 percent (4,100 acres) by 2056 (City of Fresno 2021a: Table 4-3). The projected water demand for commercial land use in 2045 is anticipated to be 25,496 acre-feet annually, or 8,308 mgy (City of Fresno 2021a: Table 4-6). The project is anticipated to require 17.01 mgy of water, of which 3.38 mgy would be used for indoor water, 11.95 would be used by the car wash, and 1.67 mgy would be required for outdoor water. The project's water demand is a fraction (less than 1 percent) of the City's anticipated potable water demand for commercial use. Given that the water demand projections already account for commercial water demand on the project site, the project is not anticipated to strain the existing and future water system in a way that would require the relocation or construction of new or expanded infrastructure.

Given that the project's water demand is accounted for in the City's UWMP projections for future development during normal, dry, and multiple dry years, and that the UWMP projections found that the City would have an excess of water in the aforementioned drought scenarios, there would be sufficient water supplies to serve the project. The impact would be **less than significant**.

Mitigation Measures

No mitigation is required for this impact.

Impact 3.14-3: Result in a Determination by the Wastewater Treatment Provider Which Serves or May Serve the Project That It Has Inadequate Capacity to Serve the Project's Projected Demand in Addition to the Provider's Existing Commitments

The City of Fresno Department of Public Utilities provides wastewater and sewer service to the project site. All wastewater is diverted to one of the City's two wastewater treatment plants that have an average flow capacity of 88.71 mgd. The project would produce approximately 0.05 mgd of wastewater. Given the fractional contribution to the wastewater system, the project would have a **less-than-significant impact**.

The City of Fresno Department of Public Utilities is responsible for providing sewer service to the project site. Wastewater from the project site is carried through the City's wastewater collection system to be treated at either the RWRF or NFWRF as described above in Section 3.14.2, "Environmental Setting." The RWRF and NFWRF have an average flow capacity of 88 mgd and 0.71 mgd, respectively.

As explained above, wastewater generation has been assumed to equate to indoor water demand plus estimated wastewater generated through operation of the car wash. This is the highest possible rate of generate and assumes no consumptive use. The project is projected to create 13.15 mgy of wastewater, which is equivalent to 0.04 mgd. The project's wastewater output would be less than 1 percent of the capacity of the two wastewater treatment plants that serve the city. Most of the wastewater produced would be typical of commercial developments, consisting of

bathrooms and kitchen drains. Water from the proposed car wash would be recycled before being released into the City's wastewater collection system.

The City of Fresno Department of Public Utilities has reviewed the proposed project and has identified sewer facility charges as conditions of approval. The Department of Public Utilities has not identified inadequate capacity to serve the project's projected demand in addition to the City's existing commitments (Diaz and Gray pers. comm. 2021). Based upon the relative quantity of wastewater produced by the project and the consistency of the project with the General Plan land use designation for the project site, upon which the Department of Public Utilities bases future wastewater generation projections, it is anticipated that there is adequate capacity to accommodate provision of sewer service to the project site. The impact would be **less than significant.**

Mitigation Measures

No mitigation is required for this impact.

Impact 3.14-4: Generate Solid Waste in Excess of State or Local Standards, or in Excess of the Capacity of Local Infrastructure, or Otherwise Impair the Attainment of Solid Waste Reduction Goals or Not Comply with Federal, State, and Local Management and Reduction Statutes and Regulations Related to Solid Waste

The project would comply with all applicable federal, state, and local management and reduction statutes related to solid waste, including the state Integrated Waste Management Act and the solid waste policies of the City of Fresno General Plan. The project's anticipated solid waste production of 2.9 tons per day would comprise 0.13 percent of the American Avenue Landfill's maximum permitted throughput of 2,200 tons per day. The project would have a **less-than-significant impact**.

Construction is not anticipated to generate substantial solid waste. Vegetation clearing would require some disposal, but grading would be otherwise balanced and no demolition would occur. Decommissioning of the existing Costco gas station would result in the removal and disposal of the underground fuel tanks and any identified contaminated soil at an approved hazardous waste disposal facility.

During operation, the project would generate approximately 1,073.52 tons of solid waste per year, which would be equivalent to 2.9 tons per day. The project area is served by an exclusive franchise operation managed by Allied Waste Services which provides both solid waste and recycling services. As described above in Section 3.14.2, "Environmental Setting," the closest landfill to the project site is the American Avenue Landfill which has a remaining capacity of 29,358,535 cubic yards and a maximum permitted throughput is 2,200 tons per day (CalRecycle n.d.). The project's anticipated solid waste production of 2.9 tons per day would comprise 0.13 percent of the American Avenue Landfill's maximum permitted throughput of 2,200 tons per day. The project would not generate solid waste in excess of the capacity of local infrastructure. Following closure of the American Avenue Landfill (anticipated in 2031), solid waste would be transported by the licensed waste hauler to the facility identified to accept waste from the city.

Additionally, the project would comply with all applicable federal, state, and local management and reduction statutes related to solid waste, including the state Integrated Waste Management Act and the solid waste policies of the City of Fresno General Plan. As detailed in Section, 3.14.1, "Regulatory Setting," the Integrated Waste Management Act requires businesses that generate 4 cubic yards or more of commercial solid waste per week to arrange for recycling services. The project would have recycling services provided by Allied Waste, and the American Avenue Landfill is a mixed waste processing facility. The Integrated Waste Management Act also requires businesses that generate 8 cubic yards of organic waste per week to arrange for organic waste recycling services. The project is not anticipated to generate more than 8 yards of organic waste per week; however, Allied Waste provides organic waste services that the project could use during operation. Given that Allied Waste Services provides both organic waste and recycling services, the project would comply with the Integrated Waste Management Act. Additionally, the City's General Plan has a policy of ensuring compliance with state law (PU-9-b). The project would not be inconsistent with established regulations or generate solid waste that exceeds the capacity of existing infrastructure. This impact would be **less than significant**.

4 CUMULATIVE IMPACTS

4.1 INTRODUCTION TO THE CUMULATIVE ANALYSIS

This Draft EIR provides an analysis of cumulative impacts of the proposed project taken together with other past, present, and probable future projects producing related impacts, as required by Section 15130 of the State CEQA Guidelines. The goal of such an exercise is twofold: first, to determine whether the overall long-term impacts of all such projects would be cumulatively significant; and second, to determine whether the incremental contribution to any such cumulatively significant impacts by the project would be "cumulatively considerable" (and thus significant). (See State CEQA Guidelines Sections 15130[a]–[b], 15355[b], 15064[h], and 15065[c]; and *Communities for a Better Environment v. California Resources Agency* [2002] 103 Cal. App. 4th 98, 120.) In other words, the required analysis intends first to create a broad context in which to assess cumulative impacts, viewed on a geographic scale beyond the project site itself, and then to determine whether the project's incremental contribution to any significant cumulative impacts from all projects is itself significant (i.e., "cumulatively considerable").

Cumulative impacts are defined in State CEQA Guidelines Section 15355 as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." A cumulative impact occurs from "the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time" (State CEQA Guidelines Section 15355[b]).

Consistent with State CEQA Guidelines Section 15130, the discussion of cumulative impacts in this Draft EIR focuses on significant and potentially significant cumulative impacts. Section 15130(b) of the State CEQA Guidelines provides, in part, the following:

> 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. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact.

4.2 CUMULATIVE SETTING

4.2.1 Geographic Scope

The geographic area that could be affected by the project and is appropriate for a cumulative impact analysis varies depending on the environmental resource topic, as presented in Table 4-1.

Table 4-1 Geographic Scope of Cumulative Impacts

Resource Topic	Geographic Area
Aesthetics	Project vicinity
Agricultural and Forestry Resources	City of Fresno
Air Quality	Regional (San Joaquin Valley Air Pollution Control District—pollutant emissions that have regional effects) Local (immediate vicinity—pollutant emissions that are highly localized)
Archaeological, Historical, and Tribal Cultural Resources	Regional
Biological Resources	Regional
Energy	Regional
Greenhouse Gas Emissions and Climate Change	Global
Hazards and Hazardous Materials	Project vicinity
Hydrology and Water Quality	Regional
Land Use and Planning	City of Fresno
Noise and Vibration	Project vicinity
Public Services and Recreation	City of Fresno
Transportation and Circulation	City of Fresno
Utilities	City of Fresno

Source: Compiled by Ascent Environmental in 2022.

4.2.2 Cumulative Impact Approach

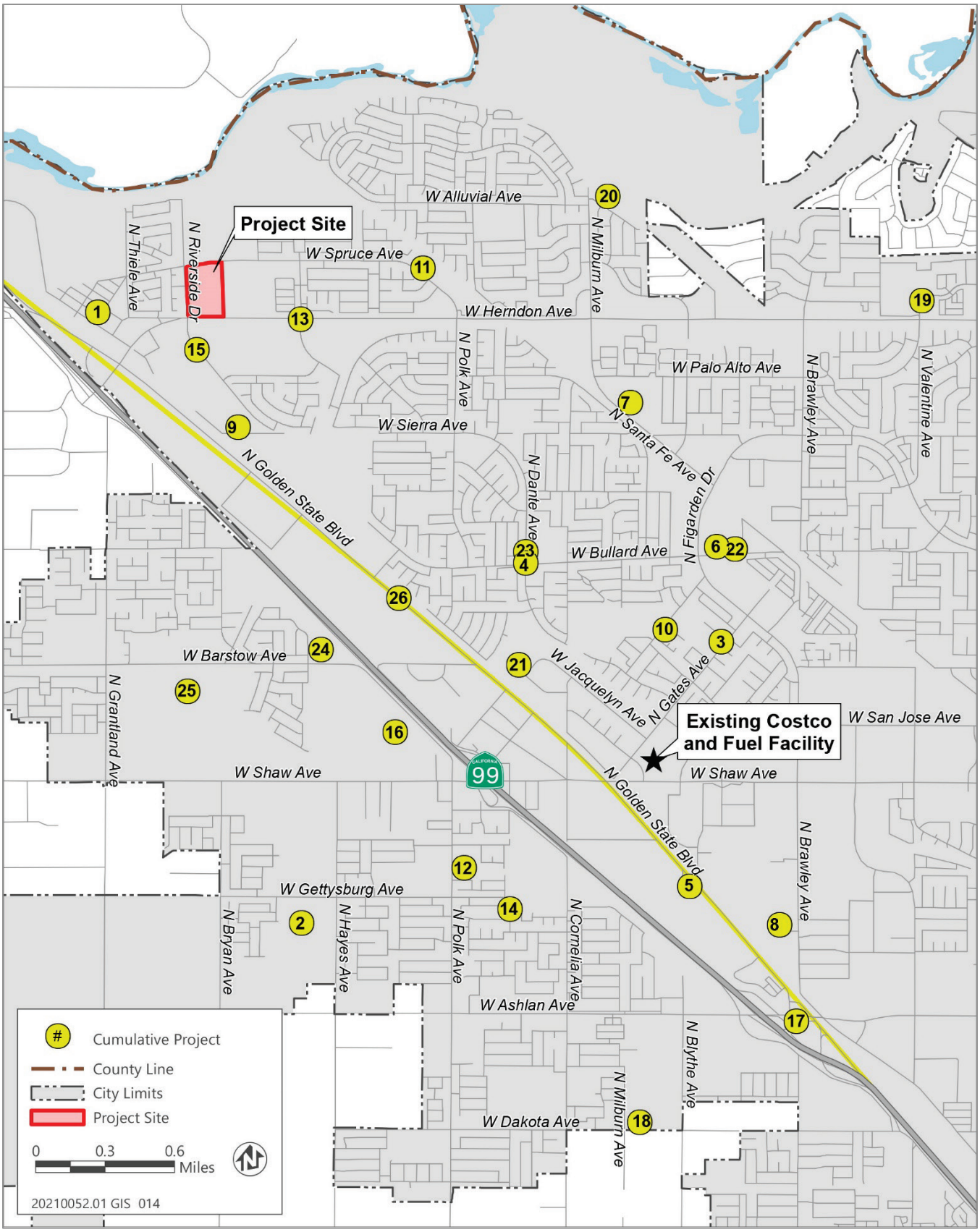
The State CEQA Guidelines identify two basic methods for establishing the cumulative environment in which the project is to be considered: the use of a list of past, present, and probable future projects (the "list approach") or the use of adopted projections from a general plan, other regional planning document, or certified EIR for such a planning document (the "plan approach"). For this Draft EIR, the list approach was taken.

LIST OF RELATED PROJECTS

The list of past, present, and probable future projects used for this cumulative analysis is restricted to those projects that have occurred or are planned to occur (i.e., pending applications at the time of the NOP release) within the city. For the purposes of this discussion, these projects that may have a cumulative effect on the resources of the project area will often be referred to as the "related projects." These related projects are identified in Figure 4-1 and described in Table 4-2; the map numbering corresponds to the numbers in Table 4-2.

This list of projects was utilized in the development and analysis of the cumulative settings and impacts for each resource topic. Past and current projects in the project vicinity were also considered as part of the cumulative setting as they contribute to the existing conditions upon which the proposed project and each probable future project's environmental effects are compared.

Significance criteria, unless otherwise specified, are the same for cumulative impacts as project impacts for each environmental topic area. When considered in relation to other reasonably foreseeable projects, cumulative impacts to some resources may be significant and more severe than those caused by the proposed project alone.



Source: Information received from the City of Fresno in 2021; adapted by Ascent Environmental in 2021.

Figure 4-1 Cumulative Project Map

Table 4-2 Cumulative Project List

No.	Project Name	Project Description	Location	Status
1	North Elgin Avenue Multifamily Residential Development	A multifamily residential duplex would be constructed.	7035 North Elgin Avenue	The building development permit was approved with conditions by the City of Fresno in 2019. Construction of the project has not begun.
2	Hayes Avenue Residential Development	The project would develop a 98-lot single family residential subdivision.	4417 North Hayes Avenue	The project hearing approving the development permit was complete in 2019. Construction of the project has not begun.
3	West Regency Avenue Multifamily Townhouse	The project would construct a 2-unit detached multi-family townhouse	4277 West Regency Avenue	The development permit is currently under review by the City of Fresno.
4	Dante Avenue Multifamily Residential Development	The project would involve construction of 64 multifamily use dwelling units adjacent to an existing multifamily residential development	North Dante Avenue and West Bullard Avenue	The development permit was approved by the City of Fresno in 2019. Construction of the project has not begun.
5	Drywall Supply Company Reconstruction	The project would involve the reconstruction and reconfiguration of the existing drywall supply business impacted by the realignment of North Golden State Boulevard for the High-Speed Rail project.	4565 North Golden State Boulevard	The development permit is under review by the City of Fresno.
6	Brighten Academy Child Day Care Facility	The project would involve the construction of a 4,704 sq. ft. child day care facility.	4250 West Bullard Avenue	The development permit was approved by the City of Fresno in 2020. Construction of the project has not begun.
7	Northpointe Church New Office Building	The project would involve the construction of a new office building to be used by church staff members.	4625 West Palo Alto Avenue	The development permit was approved by the City of Fresno in 2020. Construction of the project has not begun.
8	HVAC Office/Warehouse Building	The project would involve the construction of a new 4,976 sq. ft. office/warehouse building on an existing lot.	4048 West Ashcroft Avenue	The development permit was approved by the City of Fresno in 2020. Construction of the project has not begun.
9	Floor & Decor at El Paseo	The project would involve a retail development in Phase III of the Marketplace at El Paseo shopping center. The retail development would include an 80,000 sq. ft. building to be a Floor & Decor retail store and two pad sites at the property frontage to be built at a future date.	6417 North Riverside Drive	The development permit was approved by the City of Fresno in 2020. Construction of the project has not begun.
10	Avalon Triplex	The project would construct a new triplex. Two of the units will be 1,255 sq. ft. and one unit will be 1,208 sq. ft.	4465 West Avalon Avenue	Approved by the City of Fresno in 2019.

No.	Project Name	Project Description	Location	Status
11	Spruce Avenue Multi-Tenant Office building	The project would involve the construction of a new 9,320 sq. ft. multi-tenant office building.	5550 West Spruce Avenue	The development permit was approved by the City of Fresno in 2020. Construction of the project has not begun.
12	Barcus II TPM	The project would involve the subdivision of two residential parcels encompassing a total of ±0.29 acres on the west side of North Barcus Avenue into two single-family residential properties with a ±6.78-acre remainder that will encompass the existing church campus.	4710 North Polk Avenue	The development permit was approved by the City of Fresno in 2020. Construction of the project has not begun.
13	Riverside Crossing	The project would involve the construction of a 185-unit apartment complex.	6271 North Hayes Avenue	The development permit was approved by the City of Fresno in 2020. Construction of the project has not begun.
14	Barcus Avenue Apartment Complex	The project would involve the construction of a new 13-building apartment complex. One of the buildings will be an office/community building. In total, there are 96 apartment units proposed.	North Barcus Avenue and West Donner Avenue	The project is on hold as of December 2020.
15	Tentative Tract Map Tract 6172	The project would involve the development of 45 multi-family residential buildings which yields 234 units.	6640 North Riverside Drive	The project is in the planning phase, and the Final Action Letter was sent in 2020.
16	California 99 Self-Storage	The project would involve the development of a 120,000 sq. ft. self-storage space and support buildings.	5303 North Island Waterpark Drive	The project is under review by the City of Fresno as of April 2021.
17	Jack's Truck Wash	The project would involve the construction of a 5,750 sq. ft. metal building for truck car wash, minor truck maintenance, tire exchange, and drive dispatch office.	4011 West Ashlan Avenue	The project is on hold as of April 2021.
18	Milburn/Dakota Park	The project would develop a park. Amenities include a multi-use field, covered stage, playgrounds, a water play area, restrooms, picnic shelters, a rubberized jogging track, dog park, multi-use courts (for tennis, basketball, futsal, and pickleball), and an exercise area. The neighborhood park will also include 33 parking spaces and a connection to John Steinbeck Elementary School to the north.	3520 North Milburn Avenue	The development permit was approved in June 2021. Construction of the project has not begun.
19	Lincoln Park Apartments	The project would involve the construction of an 88-unit multi-family residential development located at the northeast corner of West Herndon and North Prospect Avenues.	3311 West Fir Avenue	The development permit is under review by the City of Fresno.
20	Single Family Residential Alluvial – Bluff	The project would involve the construction of a new 4,000 sq. ft. home with a 1,500 sq. ft. attached garage on the existing vacant lot.	4748 West Alluvial Avenue	The development permit was approved in August 2021. Construction of the project has not begun.
21	Toor Trucking Office Building	The project would involve the construction of a new 450 sq. ft. office building for an existing truck parking lot.	4951 West Jacquelyn Avenue	The development permit was approved in September 2021. Construction of the project has not begun.

No.	Project Name	Project Description	Location	Status
22	Bullard-Figarden Apartments	The project would involve the construction of 192 multi-family dwelling units in 24 multi-family buildings and a community building.	West Bullard Avenue and North Figarden Drive	The development permit is under review by the City of Fresno.
23	Dante Apartments	The project would involve the construction of a 52-unit apartment complex.	North Dante Avenue and West Bullard Avenue	The development permit was approved in October 2021. Construction of the project has not begun.
24	Barstow Truck Parking	The project would involve the construction and development of a truck parking facility with a 5,400 sq. ft. of Auto/Truck Service Center and a 5,400 sq. ft. truck wash with two tunnels.	6050 West Barstow Avenue	The development permit is under review by the City of Fresno.
25	Westbridge Apartments	The project involves the construction of a 176-unit multi-family project inclusive of an office/community building/pool and recreation facilities.	6785 West Barstow Avenue	The development permit is under review by the City of Fresno.
26	California High Speed Rail: Merced to Fresno project section	The approximately 65-mile project section would provide essential connections between the Central Valley and the Silicon Valley with stations in downtown Fresno and downtown Merced.	Roughly parallel to State Route 99 and Golden State Boulevard in Fresno	Under construction.

Notes: sq. ft. = square feet.

All the listed projects are located in the city of Fresno.

Source: Data provided by the City of Fresno in 2021.

4.3 ANALYSIS OF CUMULATIVE IMPACTS

The following sections contain a discussion of the cumulative effects anticipated from development of the proposed project, taken together with other past, present, and probable future projects producing related impacts, for each of the environmental issue areas evaluated in this Draft EIR. The analysis conforms with Section 15130(b) of the State CEQA Guidelines, which specifies that 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. The discussion should be guided by the standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact."

When considered in relation to other reasonably foreseeable projects, cumulative impacts to some resources would be significant and more severe than those caused by the proposed project alone.

For purposes of this EIR, the project would result in a significant cumulative effect if:

- The cumulative effects of related projects (past, current, and probable future projects) are not significant and the incremental impact of implementing the proposed project is substantial enough, when added to the cumulative effects of related projects, to result in a new cumulatively significant impact; or
- The cumulative effects of related projects (past, current, and probable future projects) are already significant and implementation of the proposed project makes a considerable contribution to the effect. The standards used herein to determine a considerable contribution are that either the impact must be substantial or must exceed an established threshold of significance.

This cumulative analysis assumes that all mitigation measures identified in Chapter 3 to mitigate project impacts are adopted and implemented, and all elements of the design build performance criteria that would minimize environmental effects are implemented. The analysis herein analyzes whether, after implementation of project-

specific mitigation and performance criteria that minimize environmental effects, the residual impacts of the project would cause a cumulatively significant impact or would contribute considerably to existing/anticipated (without the project) cumulatively significant effects. Where the project would so contribute, additional mitigation is recommended where feasible.

Impact 4-1: Cumulative Aesthetics Impacts

The project would contribute regional changes to aesthetics. The effects of these changes are highly subjective and tend to be localized. The combined effects of other projects in the cumulative impact area would not be cumulatively significant and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for aesthetics is the project vicinity. Effects on scenic resources generally occur at the interface between development and the scenic resources. For this reason, they tend to be localized. As described in Section 3.1, "Aesthetics," the project would result in a less-than-significant effect on the visual character and quality of the site and would be consistent with regulations governing scenic quality. The project would not adversely affect nighttime views in the area.

The viewshed for the cumulative aesthetics setting is the project site and vicinity and includes viewing groups, which are mostly composed of people traveling along arterial roadways that traverse the viewshed, such as West Herndon Avenue, and those using Riverside Golf Course to the north. Most of northwestern Fresno and the nearby unincorporated areas exhibit relatively flat topography which is either urbanized or dominated by crop farming interspersed with rural communities and open space areas; however, the project vicinity is dominated by urban development interspersed with vacant parcels designated for development. As planned cumulative development occurs over time the overall visual environment may change. Whether this overall change in land use is experienced as an adverse or beneficial outcome is highly subjective. However, the anticipated development in the cumulative impact area may result in a different visual environment than currently exists. The incremental effects of the project related to scenic resources, visual character and quality, and light and glare would not combine with development that would occur as a result of forecasted growth in adjacent areas to produce cumulatively considerable impacts because adjacent development would also be subject to general plan policies, zoning, and other ordinances or regulations in place to protect scenic resources and limit light and glare. The cumulative effects of related projects are not significant, and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-2: Cumulative Agriculture and Forestry Resources Impacts

Although portions of the city, including the project site, were historically used for agriculture, the City has planned for urbanization of the incorporated city through its general plan. Therefore, although there is an existing, adverse cumulative condition related to the loss of Farmland in the city of Fresno the project would not substantially contribute to the impact. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for agricultural and forestry resources is the city of Fresno because citywide actions affect the loss of these resources in the region. Development of the project and other anticipated projects in the city of Fresno would not result in the loss of substantial forestry resources. No cumulative impact would occur.

Development associated with implementation of the City of Fresno General Plan would result in the continued loss of farmland in the region. The City of Fresno General Plan Master Environmental Impact Report identified that development according to the of land uses in the general plan would result in the loss of up to 15,903 acres of FMMP-designated farmland (City of Fresno 2014: 5.2-12). This cumulative impact would be significant.

Although the project site is not zoned for agriculture and is not under Williamson Act contract, it is designated Farmland of Local Importance. Development of the project site would result in permanent conversion of this land. However, the project would not result in a considerable contribution to the overall significant cumulative effect on conversion of agricultural lands. Farmland of Local Importance is not a designation of concern under CEQA. If the project site was designated as Important Farmland, which it is not, the conversion of the project site would result in loss of less than 1.01 percent of the 15,903 acres of Farmland planned loss under implementation of the general plan. This would not result in a cumulatively considerable contribution.

In addition, the parcel is currently designated for a use other than agriculture and surrounded by existing urban development. Although portions of the city, including the project site, were historically used for agriculture, the City has planned for urbanization of the incorporated city through its general plan. Therefore, although there is an existing, adverse cumulative condition related to the loss of Farmland in the city of Fresno the project would not substantially contribute to the impact. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-3: Cumulative Air Quality Impacts

There is a cumulative impact related to air quality in the city of Fresno. However, the project's contribution to this cumulatively significant air quality impact would not be cumulatively considerable. Cumulative impacts would be **less than significant**.

Air quality impacts are assessed at the air basin level. As discussed in Section 3.3, "Air Quality," the project site is within the San Joaquin Valley Air Basin (SJVAB). The conditions in the SJVAB define the geographic context and the impacts identified in Section 3.3 are inherently cumulative because the thresholds established by the air district are developed considering the broader landscape and anticipated development wholistically. As stated in Section 3.3, the region is currently in nonattainment for emissions of ozone precursors (reactive organic gases [ROG] and oxides of nitrogen [NO_X]), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$). When concentrations of ozone, PM_{10}, or $PM_{2.5}$ exceed the ambient air quality standard, then those sensitive to air pollution (such as children, the elderly, and the infirm) could experience health effects such as: decrease of pulmonary function and localized lung edema in humans and animals; increased mortality risk; and risk to public health, implied by altered connective tissue metabolism, altered pulmonary morphology in animals after long-term exposures, and pulmonary function decrements in chronically exposed humans. Cumulative development in the region will continue to increase the concentration of pollutants from construction activities, traffic, natural gas combustion in buildings, area sources, and stationary sources.

In accordance with CEQA Guidelines Section 15064, subdivision (h)(3), a lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements in a previously approved plan or mitigation program. As shown in Table 3.3-7, all air quality pollutants would be below established thresholds. This level of emissions indicates that the project would not conflict with long-term regional air quality planning in the SJVAB. Additionally, as long-term regional air quality planning is directly tied to attainment of the national and state air quality standards, the project would not contribute substantially to adverse health outcomes associated with cumulative air quality impairment. Generation of toxic air contaminants (TACs) and carbon dioxide hotspots are localized impacts. Projects would need to be in the same general area to result in cumulatively considerable impacts. None of the projects listed in Table 4-2 are anticipated to result in substantial, cumulative effects on the sensitive receptors identified for the project due to spatial separation and implementation of standard mitigation imposed by SVAPCD. Finally, there is not a cumulatively considerable impact related to odor in the project area, and as disclosed in Section 3.3, the project is not anticipated to result in significant odor impacts.

Therefore, although the cumulative condition of air quality in the SJVAB is significant, the project would not substantially contribute to the impact. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-4: Cumulative Archaeological, Historical, and Tribal Cultural Resources Impacts

The project could contribute to cumulative impacts associated with damage or loss of cultural resources. There is no feasible mitigation for this impact beyond Mitigation Measures 3.4-1a and 3.4-1b. The project's contribution to this cumulatively significant impact would not be cumulatively considerable. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for archaeological, historical, and tribal cultural resources is the region because some archaeological resources could have regional importance, and individual impacts to these resources could collectively result in greater, more adverse impacts. Because all significant cultural resources are unique and nonrenewable members of finite classes, meaning there are a limited number of significant cultural resources, all adverse effects erode a dwindling resource base.

The historic lands of the Yokuts have been affected by development since Spanish explorer Gabriel Moraga crossed Yokut territory in 1808. The discovery of gold at Sutter's Mill in Coloma in 1848 was the catalyst that caused a dramatic alteration of Native American cultural patterns as a flood of Euro-Americans entered the region. In 1854, gold was discovered in the upper reaches of the Kern River, which brought a tremendous influx of miners into eastern Kern County. When the Gold Rush was over, many of the miners settled in the Central Valley communities and established farms, ranches, and lumber mills. These activities have resulted in an existing significant adverse effect on archaeological resources and human remains.

Impacts to a subsurface archaeological find at one project site are generally not made worse by impacts from another project to a cultural resource at another site. Rather, the resources and the effects upon them are generally independent. No known unique archaeological, historical, or tribal cultural resources, are located within the boundaries of the project site; nonetheless, project-related earth-disturbing activities could damage undiscovered resources. Implementation of Mitigation Measures 3.4-1a and 3.4-1b would reduce the project's contribution to a less-than-significant level by requiring that a worker environmental awareness program be prepared and provided to all construction personnel and supervisors who will have the potential to encounter and alter archaeological resources, requiring construction to halt if potential archaeological resources are discovered, coordination with Native American groups (if applicable), implementation of preservation options (including data recovery, mapping, capping, or avoidance), and proper curation if significant artifacts are recovered.

Therefore, the proposed project would not result in a considerable contribution to a significant cumulative impact related to archaeological, historical, or tribal cultural resources. Cumulative impacts would be **less than significant**.

Mitigation Measures

No additional mitigation is required.

Impact 4-5: Cumulative Biological Resources Impacts

The project would contribute to cumulative biological resources impacts associated with construction and operation of land uses in the cumulative impact area. Mitigation Measures 3.5-1a and 3.5-1b would prevent potential adverse effects on these species. The project's contribution to this cumulatively significant impact would be less than cumulatively considerable. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for biological resources is the region where similar habitat and distribution of species occurs. Sensitive habitats for biological resources in the vicinity of the project site and in the region have been modified over time as land has been developed and converted to agricultural and urban uses. Future projects in the region, including projects described in Table 4-2, could continue to result in losses of sensitive habitats and special-status species. Although individual projects would be required to mitigate for significant impacts on a project-by-project basis, they may result in residual impacts that combine with the existing adverse condition to create a significant cumulative condition related to special-status species and sensitive habitats.

The project site and vicinity are located in an area of the city characterized by intensive residential and commercial development. There are no state or federally protected wetlands, sensitive natural communities, wildlife movement corridors, or wildlife nursery sites on the project site. However, project impacts include potentially significant impacts on burrowing owl, Swainson's hawk, white-tailed kite, other nesting raptors, and other nesting native birds. Mitigation Measures 3.5-1a and 3.5-1b would address potential adverse effects on these species and would reduce impacts to a less-than-significant level.

Because the project would either have no impact or a negligible impact on biological resources after mitigation, it would not have a considerable contribution to any significant cumulative impact related to biological resources. Cumulative impacts would be **less than significant**.

Mitigation Measures

No additional mitigation is required.

Impact 4-6: Cumulative Energy Impacts

Cumulative development would result in increased energy demand and consumption from increased construction activities, vehicle trips, and electrical and natural gas consumption. The cumulative effects of related projects are not significant and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for energy impacts is the region to reflect the scale at which energy resources and consumption are managed. Potential impacts related to increased energy consumption are evaluated in Section 3.6, "Energy." Construction of the project would result in a temporary increase in fuel consumption. For the proposed project and the various projects identified in Table 4-2, it is anticipated that fuel would not be consumed in a wasteful manner during construction, as it is in the interest of construction contractors to meet project schedules and minimize costs. This translates to various efficiencies, including in the use of energy resources. Therefore, impacts related to energy would not be cumulatively significant on a regional scale.

During operation, the project would use electricity and natural gas to operate the facility. As explained in Section 3.6, this energy demand represents a relatively small contribution to cumulative energy demand. Moreover, the project would comply with the 2022 California Energy Code, which is intended to increase the energy efficiency of new development projects in the state, as verified through the permitting process. The 2022 California Energy Code (and subsequent updates), which the project is subject to, is designed to move the state closer to its zero-net energy goals. For these same reasons, the project would be consistent with the City's general plan. As also stated in Section 3.6.1, PG&E, as an electricity utility, is required to comply with the future benchmarks of the state's RPS (i.e., 52 percent renewable by 2027, 60 percent by 2030, and 100 percent by 2045). Because electricity utilities in the state are required to increase the percentage of renewable energy sources in the electricity they provide, over time electricity consumed as part of the project will increasingly be provided by renewable sources. Additionally, through regulatory mechanisms in place, such as the Advanced Clean Cars program and Advanced Clean Trucks, gasoline and diesel fuel consumption will continue to decrease as California's on-road transportation sectors electrifies over time. Because the project's incremental increase in electricity, natural gas, gasoline, and diesel fuel consumption would represent a small percentage of total consumption within the context of the county, and because buildings and vehicles will become increasingly more energy efficient and electric into the future, the project would not result in the wasteful, inefficient, or unnecessary consumption of energy.

The cumulative effects of related projects are not significant, and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-7: Cumulative Greenhouse Gas Emissions and Climate Change Impacts

There is an existing substantial adverse impact related to greenhouse gas (GHG) emissions and global climate change. However, the project's contribution to this cumulatively significant impact would not be cumulatively considerable. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for GHG emissions and climate change is global. Climate change is an inherently cumulative issue and relates to development in the region, California, and, most of all, the world. Whereas most pollutants with localized air quality effects have relatively short atmospheric lifetimes (approximately 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere long enough to be dispersed around the globe. Although the lifetime of any GHG molecule depends on multiple variables and cannot be determined with any certainty, it is understood that more carbon dioxide (CO_2) is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. The combination of GHG emissions from past, present, and future projects contribute substantially to the phenomenon of global climate change and its associated environmental impacts. Therefore, the impacts discussed in Section 3.7, "Greenhouse Gas Emissions and Climate Change," are also the cumulative effects of the project.

Through the incorporation of on-site reduction measures derived from the City's Greenhouse Gas Reduction Program (GHGRP) and reductions realized from state programs, the project would reduce its emissions by 3,140 and 6,719 $MTCO_2e$ in 2030 and 2035, respectively, when compared to emissions modeled using the assumptions in the GHGRP. The reductions identified for the project exceed the relative reductions identified in the GHGRP. Therefore, the project would be consistent with the GHGRP.

Based on consistency with the GHGRP, which itself is consistent with the state's targets established to address the existing cumulative condition of global climate change, the project would not have a considerable contribution to the cumulative condition. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-8: Cumulative Hazards and Hazardous Materials Impacts

Hazardous materials and safety issues generally occur independently of one another and are related to site-specific and project-specific characteristics and conditions. Compliance with all applicable federal, state, and local regulations related to hazards and hazardous materials on a project-by-project basis would ensure that site-specific impacts are appropriately addressed and cannot combine with site-specific impacts from other project sites. The cumulative effects of related projects are not significant and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for hazards and hazardous materials is the project vicinity because the effects of accidental release of hazardous materials, safety hazards near airports, physical interference with emergency response or evacuation plans, and exposure to wildland fires are localized. To contribute to a cumulative effect, two effects would need to occur in relatively close proximity.

Topics addressed in Section 3.8, "Hazards and Hazardous Materials," are related to the transport, use, or disposal of hazardous materials or hazardous waste; reasonably foreseeable upset and accident conditions; hazardous emissions, particularly near schools; inclusion on a list of hazardous materials sites; proximity to airports; and consistency with emergency evacuation plans. Existing regulations specify mandatory actions that must occur during project development and operation and potential safety issues related to proximity to schools and airports. In addition, impacts related to hazardous materials and safety issues generally occur independently of one another and are related to site-specific and project-specific characteristics and conditions. Because these effects are generally localized, they typically do not combine to result in greater cumulative impacts.

As described in Section 3.8, impacts resulting from development of the project would be less than significant because discretionary development would be required to comply with federal, state, and local regulations that would substantially lessen potential impacts. The incremental effects of the project related to hazards and hazardous materials would not combine with cumulative development to produce cumulatively considerable cumulative impacts because future projects would also be required to comply with federal, state, and local regulations to minimize hazards and hazardous materials impacts. With implementation of existing regulations, the project's incremental impacts related to hazards and hazardous materials would not be cumulatively significant, and the project would not have a considerable contribution such that a new cumulatively significant impact related to hazards and hazardous materials would occur. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-9: Cumulative Hydrology and Water Quality Impacts

The effects of buildout of the project on surface water quality, groundwater quality and quantity, alteration of drainage patterns, and flood hazards would be addressed though compliance with existing regulations. Development associated with anticipated projects in the cumulative impact area would be subject to similar state and local regulations. The combined effects of other projects in the cumulative impact area would not be cumulatively significant and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for hydrology and water quality impacts is the region because water resources are interconnected and changes in hydrology and water quality can have far-reaching effects. For this reason, the resources are managed and regulated at the watershed and basin level. Future development would be subject to the National Pollutant Discharge Elimination System (NPDES) MS4 permit and would be required to comply with best management practices (BMPs) in the Development Code; General Plan policies related to hydrology and water quality; and the General Construction NPDES permit. New development projects would require implementation of plans that identify and implement a variety of BMPs to reduce the potential for erosion or sedimentation. As a result of compliance with these regulations, impacts associated with individual projects would not be substantial and, in the cumulative scenario, would not combine with impacts associated with other development (which would be subject to similar requirements) within the watershed or groundwater basin to cause an increase in stormwater runoff rates or volumes and would not introduce new sources of surface water and groundwater pollution.

The City of Fresno is part of the North Kings Groundwater Sustainability Agency (GSA), and operates subject to a Groundwater Sustainability Plan. The City of Fresno would provide water to the proposed project (upon approval), and the City will be subject to the requirements of the GSA. The proposed project does not conflict with any adopted water quality or sustainable groundwater management plan. The City's compliance with the GSA would ensure that impacts are less than cumulatively considerable.

Thus, impacts from combined projects in the cumulative impact area are not cumulatively significant, and the impact of the project would not be cumulatively considerable. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-10: Cumulative Land Use and Planning Impacts

Land use and planning impacts would occur where there would be physical division of established communities or inconsistency land use plans and regulations adopted to avoid or mitigate environmental effects. There is not a significant cumulative impact as a result of community division or development of projects that do not adhere to adopted plans and regulations. The cumulative effects of related projects are not significant and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

The geographic scope of cumulative land use and planning impacts is primarily confined to the city of Fresno. Cumulative growth and development have been planned for by the City as part of its general plan and the county authorizes development consistent with its plans and policies. There is not a significant cumulative impact as a result of community division or development of projects that do not adhere to adopted plans and regulations.

Cases where projects are approved despite inconsistencies with applicable policies, standards, and regulations would be isolated and would not combine such that there is a cumulative effect to land use and planning in the region. Further, no significant land use impacts were identified as a result of the project because development would not physically divide a community, conflict with any relevant policies or plans adopted for mitigating environmental impacts, or disturb a Habitat Conservation Plan or Natural Communities Conservation Plan. The cumulative effects of related projects are not significant and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-11: Cumulative Noise and Vibration Impacts

The ambient noise along West Herndon Avenue is influenced by roadway noise that exceeds the City's standards. The project's contribution to this cumulatively significant noise impact would be less than cumulatively considerable. Cumulative impacts would be **less than significant**.

Noise and vibration impacts associated with future development under the project are analyzed in Section 3.11, "Noise and Vibration." Noise and vibration impacts are based on factors related to site-specific and project-specific characteristics and conditions, including distance to noise sources, barriers between land uses and noise sources, and other factors. Noise impacts are typically site-specific and only combine when cumulative development occurs in close proximity. For this reason, the geographic scope of the cumulative impact analysis for noise and vibration is the project vicinity.

The project would result in a significant and unavoidable noise impact associated with temporary nighttime construction noise. Due to the distribution characteristics of sound and vibration, construction noise and vibration are generally limited to the vicinity of individual project sites. Therefore, projects must be both proximate and implemented concurrently to have a cumulative effect. Although noise and vibration impacts would remain significant and unavoidable for the project, there would not be cumulative impacts due to combined construction noise and vibration to which the project would contribute.

Impact 3.11-4 evaluates the project's contribution to cumulative, ambient noise levels due to traffic generation. As described in Section 3.11, existing noise levels on West Herndon Avenue exceed the City's exterior noise standard of 65 dB L_{dn}/CNEL for residential uses. Future development may result in additional traffic that contributes to noise along area roadways. This is an existing adverse condition. Although the existing noise levels along West Herndon Avenue are above the City's noise standard, the traffic noise generated by the project would not result in a substantial increase. The 1 decibel increase in traffic noise would be imperceptible and would not be a cumulatively considerable contribution to ambient noise on West Herndon Avenue in the cumulative condition. The project would result in noise that exceeds the City's standard due to increased traffic along North Riverside Drive. This impact would be addressed through implementation of Mitigation Measures 3.11-5a and 3.11-5b. Although there is an existing,

adverse cumulative condition associated with roadway noise, along West Herndon Avenue, the project would not contribute significantly to this condition. Cumulative impacts would be **less than significant**.

Mitigation Measures

No additional mitigation is required.

Impact 4-12: Cumulative Public Services and Recreation Impacts

The project would not result in substantial demand for public services. The cumulative effects of related projects are not significant and the project would not have a considerable contribution such that a new cumulatively significant impact would occur. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for public services and recreation is the city of Fresno because these resources are managed by the City. Impacts to public services related to development of the project are analyzed in Section 3.12, "Public Services and Recreation." This assessment includes an analysis of the need for new facilities or modification to facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for schools, emergency services, police protection, fire protection, and other public facilities. The project site is in a developing suburban area that is within the service area of the City's fire and police departments. The proposed project would serve the city's existing population in northwest Fresno. The project would not introduce new residents to the area and new or physically altered facilities would not be required. The incremental effects of the project would not combine with other development that would occur in the cumulative context to produce cumulatively considerable impacts because future development projects would be site-specific and would be required to evaluate the physical environmental impacts of constructing new or expanded public services infrastructure by local ordinances and state regulations. Such future development projects would be required to provide offsite improvements, or feasible mitigation as appropriate, which would reduce the significance of potential impacts such that they would not be cumulatively considerable.

Thus, the project would not have a cumulatively considerable contribution such that a new cumulatively significant public services impact would occur. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Impact 4-13: Cumulative Transportation and Circulation Impacts

The project would result in an increase in vehicle miles traveled (VMT). Growth projected in the cumulative impact area could also result in increased VMT. Cumulative transportation impacts would be significant. The project's contribution to this cumulatively significant transportation impact would be cumulatively considerable. Cumulative impacts would be **significant and unavoidable**.

The geographic scope of the cumulative impact analysis for transportation and circulation is the city of Fresno because this is the jurisdictional limit of the lead agency and where most VMT from the project would occur. The traffic analyses conducted for the project accounted for cumulative traffic in the region in the evaluation of VMT, geometric design features and incompatible uses, as well as emergency access. The discussion of VMT impacts associated with the project in Impact 3.13-2 is inherently a cumulative impact analysis because it addresses project generated VMT based on an efficiency threshold that is aligned with long-term goals and relevant plans. The proposed project would result in a net increase of 129,326 regional daily VMT. The implementation of Mitigation Measure 3.13-2, which requires the project applicant to provide a mandatory Commute Reduction Program would be geared towards reducing employee trips which accounts for less than 2 percent of trips. Due to the unique nature of the project which involves bulk shopping that generally requires access to a personal automobile and is often a single-destination outing, it would be infeasible to implement other mitigation to minimize VMT impacts from Costco members for the reasons disclosed in Section 3.13, "Transportation and Circulation." Therefore, the project's contribution to substantial effects related to VMT would be cumulatively considerable.

Mitigation Measures

No additional feasible mitigation measures are available to reduce impacts.

Significance after Mitigation

The project's contribution to the cumulative impact would be cumulatively considerable. Cumulative impacts would be **significant and unavoidable**.

Impact 4-14: Cumulative Utilities Impacts

The combined demand for some utilities, such as electricity, could result in the need to construct new or expected infrastructure. The cumulative effects of related projects would be potentially significant. However, the demand for utilities from the project and associated environmental effects would not result in cumulatively considerable environmental effects. Cumulative impacts would be **less than significant**.

The geographic scope of the cumulative impact analysis for utilities is the city of Fresno because these services are provided and managed by the City. Future development within the city would be guided by the general plan, Development Code, and other associated planning and policy documents. The City and utility providers would be involved in the development review process for all projects in the city and would continue to provide input during the review of new projects to ensure that they comply with all federal, state, and local regulations and ordinances protecting utility services, including complying with all water conservation measures and solid waste reduction measures implemented by the City or the state. The combined demand for some utilities, such as electricity, could result in the need to construct new or expected infrastructure. The cumulative effects of related projects would be potentially significant.

As explained further in Section 3.14, "Utilities," the project would not result in utility demand that would result in cumulatively considerable environmental effects. The project site is in an area with existing utilities, and utility providers have planned for commercial development on the property. The project would not result in a considerable contribution to the cumulatively significant impact of utility construction. Cumulative impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

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5 OTHER CONSIDERATIONS

5.1 GROWTH INDUCEMENT

CEQA Section 21100(b)(5) specifies that the growth-inducing impacts of a project must be addressed in an EIR. Section 15126.2(e) of the State CEQA Guidelines provides the following guidance for assessing growth-inducing impacts of a project:

> Discuss 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 (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also, discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can induce growth directly, indirectly, or both. Direct growth inducement would result if a project involved construction of new housing. Indirect growth inducement would result, for instance, if implementing a project resulted in any of the following:

- substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises);
- substantial short-term employment opportunities (e.g., construction employment) that indirectly stimulates the need for additional housing and services to support the new temporary employment demand; and/or
- removal of an obstacle to additional growth and development, such as removing a constraint on a required public utility or service (e.g., construction of a major sewer line with excess capacity through an undeveloped area).

Growth inducement itself is not an environmental effect but may foreseeably lead to environmental effects. If substantial growth inducement occurs, it can result in secondary environmental effects, such as increased demand for housing, demand for other community and public services and infrastructure capacity, increased traffic and noise, degradation of air or water quality, degradation or loss of plant or animal habitats, conversion of agricultural and open-space land to urban uses, and other effects.

5.1.1 Growth-Inducing Impacts of the Project

GROWTH-INDUCING EFFECTS OF CONSTRUCTION

Project construction is expected to begin in May of 2023 and last approximately 170 days. Construction could require up to 100 temporary workers, which are anticipated to originate from the existing regional labor pool (i.e., relocation of construction workers would not likely be necessary). The peak construction workforce would occur during the last four weeks of construction and may require up to 100 workers. Construction jobs supporting the project would be temporary and it is the nature of construction work that construction contractors bid and work on projects based on their availability and need for work, and in regions that are accessible to their work force. As existing construction projects near completion, contractors may seek out new construction projects to maintain employment for the same workers. Although it is possible that some construction workers could move to the city or the region as a result of the proposed project and cumulative projects, the existing labor force is anticipated to be sufficient to meet construction employment needs for these projects. For these reasons, substantial population growth or increases in housing demand in the region as a result of these construction jobs is not anticipated. Therefore, the project would not

directly induce population growth by bringing substantial numbers of construction jobs to the area, or result in associated increases in demand for housing or goods and services.

GROWTH-INDUCING EFFECTS OF OPERATION

Operation of the proposed Costco facility would essentially replace the existing Costco facility at 4500 West Shaw Avenue in the city of Fresno that has been in operation since 1985. The customer base has outgrown the current location on West Shaw Avenue, and the existing Costco facility's continued operation could lead to future traffic and parking concerns. The proposed Costco facility would be sized to accommodate the current and projected membership base in northwest Fresno. Several utility improvements to the project site would be required to service the proposed uses and connect to available utilities, including extension of water, sewer, and stormwater services. The project would also require construction of off-site improvements to improve circulation during operation, as described in Section 2.2.4, "Project Design."

Generally, infrastructure and utility improvements have the potential to be growth-inducing because they can remove a constraint on a required public utility or service. However, the roadway infrastructure and utility improvements necessary for operation of the project would be limited to areas on the project site and adjacent to the project site that would fill gaps in existing infrastructure according to the respective master plans. Utility improvements would be restricted to those that are required to connect the proposed Costco facilities to existing utility infrastructure, and the off-site roadway improvements would be restricted to those allowing for safe access to the project site from the adjacent roadways. Neither type of infrastructure improvement would induce growth through extending roadway or utility infrastructure to new areas or from increasing infrastructure capacity.

The project includes a general plan amendment to reclassify the portion of West Herndon Avenue between North Riverside Drive and North Hayes Avenue from expressway to superarterial. Both are four- to six-lane divided (median island separation) roadways. Expressways have major street intersections located at approximately one-half mile intervals and no driveways for direct motor vehicle access to abutting property. A select number of motor vehicle access points to adjacent properties or local streets between the major street intersections may be approved by the City along superarterials. This re-designation would not affect the capacity of the roadway in a manner that could support additional or unplanned growth.

The number of employees residing in Fresno County exceeds the number of jobs available (US Census 2017). Therefore, employees who live in Fresno County tend to travel outside the county to their place of employment. The City of Fresno's General Plan focuses on improving economic growth through encouraging mixed-uses and higher intensities in developed areas (City of Fresno 2014: 3-3). The project would not create new employment opportunities; a maximum of 300 employees would work at the proposed Costco facility, which is the same maximum number of employees at the existing Costco facility on West Shaw Avenue. Additionally, the employees at the existing facility would relocate to the new facility, further reducing the potential of the project to induce long-term economic growth. For these reasons, operation of the project is not expected to result in direct or indirect population growth.

5.2 SIGNIFICANT AND UNAVOIDABLE ADVERSE IMPACTS

Section 15126.2(c) of the State CEQA Guidelines requires EIRs to include a discussion of significant environmental effects that cannot be avoided if the proposed project is implemented. As documented throughout Chapter 3, "Environmental Impacts and Mitigation Measures," and Chapter 4, "Cumulative Impacts," of this Draft EIR, after implementation of the recommended mitigation measures, most of the impacts associated with the project would be reduced to a less-than-significant level. The following impacts are considered significant and unavoidable; that is, no feasible mitigation is available to reduce the project's impacts to a less-than-significant level:

- Impact 3.11-1: Generate a Substantial Temporary Increase in Ambient Noise Levels in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies
- Impact 3.13-2: Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) Regarding Vehicle Miles Traveled

- Impact 3.13-3: Substantially Increase Hazards Due to a Geometric Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment)
- Impact 4-13: Cumulative Transportation and Circulation Impacts

5.3 SIGNIFICANT AND IRREVERSIBLE ENVIRONMENTAL CHANGES

The State CEQA Guidelines require a discussion of any significant irreversible environmental changes that would be caused by the project. Specifically, Section 15126.2(d) states:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generation to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

The project would result in the irreversible and irretrievable commitment of energy and material resources during construction and operation, including the following:

- construction materials, including such resources as soil, rocks, wood, concrete, glass, and steel;
- land area committed to the new Costco facilities; and
- energy expended in the form of electricity, gasoline, diesel fuel, and oil for equipment and transportation vehicles that would be needed for project construction and operation.

The use of these nonrenewable resources is expected to account for a minimal portion of the region's resources and would not affect the availability of these resources for other needs within the region. Construction activities would not result in inefficient use of energy or natural resources. Construction contractors would be required to comply with emissions control measures applicable to the project. Long-term project operation would not result in substantial increase in consumption of energy and natural resources. See Section 3.6, "Energy," of this EIR for further discussion.

As described in Section 2.3, "Project Objectives," an operational goal of the project is to reduce energy consumption by incorporating sustainable design features and systems with enhanced energy efficiencies meeting state and federal requirements. To meet this goal, the project would construct a new commercial building with updated technology and decommission the existing Costco facility on West Shaw Avenue which began operation in 1985. Notwithstanding the project benefit of improved efficiency, construction and operational activities related to the project would result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels (including fuel oil), natural gas, and gasoline for automobiles and construction equipment.

With respect to operational activities, compliance with all applicable building codes, as well as project mitigation measures, would require that natural resources are conserved or recycled to the maximum extent feasible. Nonetheless, a long-term increase in the demand for electricity, natural gas, and water would occur. However, as discussed in Impact 3.6-1 in Section 3.6, "Energy," the project would not involve a wasteful or unjustifiable use of energy or other resources, and energy conservation efforts would also occur with the proposed construction and operation of the project. Therefore, the use of energy on-site would occur in an efficient manner.

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6 ALTERNATIVES

6.1 INTRODUCTION

State CEQA Guidelines Section 15126.6(a) requires EIRs to describe:

> a range of reasonable alternatives to the project, or to the location of the project, which 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, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather, it must consider a range of potentially feasible alternatives that will avoid or substantially lessen the significant adverse impacts of a project, and foster informed decision making and public participation. An EIR is not required to consider alternatives that are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

This section of the State CEQA Guidelines also provides guidance regarding what the alternatives analysis should consider. Subsection (b) further states the purpose of the alternatives analysis is as follows:

> Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code [PRC] Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

The State CEQA Guidelines require that the EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines Section 15126.6[d]).

The State CEQA Guidelines further require that the "no project" alternative be considered (CEQA Guidelines Section 15126.6[e]). The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving a proposed project with the impacts of not approving the proposed project. If the no project alternative is the environmentally superior alternative, CEQA requires that the EIR "shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines Section 15126[e][2]).

In defining "feasibility" (e.g., "feasibly attain most of the basic objectives of the project"), CEQA Guidelines Section 15126.6(f)(1) states, in part:

> Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives.

In determining what alternatives should be considered in the EIR, it is important to consider the objectives of the project, the project's significant effects, and unique project considerations. These factors are crucial to the development of alternatives that meet the criteria specified in Section 15126.6(a). Although, as noted above, EIRs must contain a discussion of "potentially feasible" alternatives, the ultimate determination as to whether an alternative is feasible or infeasible is made by the lead agency's decision-making body, here the City Council. (See CEQA Sections 21081.5, 21081[a] [3].)

6.2 CONSIDERATIONS FOR SELECTION OF ALTERNATIVES

6.2.1 Attainment of Project Objectives

The State CEQA Guidelines require that an EIR include a statement of objectives for the project, and that the objectives include the underlying purpose of the project. These objectives help the lead agency determine the alternatives to evaluate in the EIR (see CEQA Guidelines Section 15124[b]) and gauge whether alternatives or mitigation measures that are feasible meet the basic project objectives. The specific project objectives, as stated by the project proponent, are as follows:

- Construct and operate a new membership-only Costco Commercial Center in northwest Fresno that serves the local community with a wide variety of goods and services from both nationally known businesses and regional and local businesses.
- Locate the new membership-only Costco Commercial Center in a location that is convenient for its members, the community, and employees to travel to for shopping and working.
- Locate the new membership-only Costco Commercial Center in an area serviced by adequate existing infrastructure, including roadways and utilities.
- Establish a facility of sufficient size to provide a state-of-the-art facility that integrates several services, including home and/or business delivery service, under one roof.
- Meet demand for automobile services, including gasoline, car wash, and tire center.
- Create a commercial use with architecture designed to facilitate integration with the overall design context for an area, including the surrounding community.
- Reduce energy consumption by incorporating sustainable design features and systems with enhanced energy efficiencies meeting State and federal requirements.
- Continue and increase big-box retail store sales tax revenues received by the City.
- Improve availability of integrated retail sales of goods and services in the northwest area of Fresno.
- Minimize circulation conflicts between automobiles and pedestrians for retail stores and gas stations.

6.2.2 Environmental Impacts of the Project

Sections 3.1 through 3.14 of this Draft EIR address the environmental impacts of implementation of the proposed project. Potentially feasible alternatives were developed with consideration of avoiding or lessening the significant, and potentially significant, adverse impacts of the project, as identified in Chapter 3 of this Draft EIR and summarized below. If an environmental issue area analyzed in this Draft EIR is not addressed below, it is because no significant impacts were identified for that issue area.

Four impacts that would result from project implementation were determined to be significant and unavoidable. The first impact is associated with short-term, nighttime construction near sensitive receptors and the potential to exceed established noise thresholds. The work window for certain activities associated with project construction would require activities that extend beyond the daytime hours (i.e., 7:00 a.m. to 10:00 p.m. Monday through Saturday) exempt from the City's noise control ordinance. To reduce this impact, an alternative would need to be located on a site that is not proximate to sensitive receptors or would eliminate the need for nighttime construction activity.

The second impact considered significant and unavoidable is the generation of a net increase in vehicle miles traveled (VMT), or the amount of travel induced by the project. The proposed Costco facility is intended to serve the growing customer base in northwest Fresno and would result in redirection of trips from the existing Costco facility located on West Shaw Avenue, approximately 2.6 miles southeast of the project site. As discussed further in Section 3.13, "Transportation and Circulation," Costco's land use and business model is auto oriented. Because members purchase

items in bulk at Costco facilities, walking, biking, or transit trips to the warehouse are impractical. An alternative that reduces VMT may be more centrally located, reducing travel distance for the greatest number of customers, and/or located near other destinations that could be combined with a trip to the Costco facility. These same alternative locations may reduce the other transportation impacts related to roadway hazards and cumulative transportation impacts.

SIGNIFICANT AND UNAVOIDABLE IMPACTS

- **Impact 3.11-1:** Generate a Substantial Temporary Increase in Construction Noise Levels in Excess of Applicable Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies
- **Impact 3.13-2:** Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) Regarding Vehicle Miles Traveled
- **Impact 3.13-3:** Substantially Increase Hazards Due to a Geometric Design Feature (e.g., Sharp Curves or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment)
- **Impact 4-13:** Cumulative Transportation Impacts

IMPACTS REDUCED TO LESS THAN SIGNIFICANT WITH MITIGATION

- **Impact 3.4-1:** Cause a Substantial Adverse Change in the Significance of Archaeological Resources
- **Impact 3.4-2:** Cause a Substantial Adverse Change in the Significance of a Tribal Cultural Resource
- **Impact 3.4-4:** Directly or Indirectly Destroy a Unique Paleontological Resource or Site or Unique Geologic Feature
- **Impact 3.5-1:** Result in Disturbance to or Loss of Special-Status Wildlife Species and Habitat
- **Impact 3.11-3:** Generate a Substantial Permanent Increase in Ambient Noise Levels in the Vicinity of the Project due to Operational Stationary and On-Site Noise in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies
- **Impact 3.11-4:** Exposure of Existing Sensitive Receptors to Excessive Traffic Noise Levels
- **Impact 3.11-5:** Generate a Substantial Permanent Increase in Ambient Noise Levels in the Vicinity of the Project due to Intermittent Single-Event Noise Levels from Trucks in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies

6.3 ALTERNATIVES CONSIDERED BUT NOT EVALUATED FURTHER

As described above, State CEQA Guidelines Section 15126.6(c) provides that the range of potential alternatives for the project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. Alternatives that fail to meet the fundamental project purpose need not be addressed in detail in an EIR. (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* (2008) 43 Cal.4th 1143, 1165-1167.)

In determining what alternatives should be considered in the EIR, it is important to acknowledge the objectives of the project, the project's significant effects, and unique project considerations. These factors are crucial to the development of alternatives that meet the criteria specified in Section 15126.6(a). Although, as noted above, EIRs must contain a discussion of "potentially feasible" alternatives, the ultimate determination as to whether an alternative is feasible or infeasible is made by lead agency decision-maker(s). (See Pub. Resources Code, § 21081(a)(3).) At the time of action on the project, the decision-maker(s) may consider evidence beyond that found in this EIR in addressing such determinations. The decision-maker(s), for example, may conclude that a particular alternative is infeasible (i.e., undesirable) from a policy standpoint, and may reject an alternative on that basis provided that the decision-maker(s) adopts a finding, supported by substantial evidence, to that effect, and provided that such a finding reflects a reasonable balancing of the relevant economic, environmental, social, and other considerations supported by

substantial evidence. (*City of Del Mar v. City of San Diego* (1982) 133 Cal.App.3d 401, 417; *California Native Plant Society v. City of Santa Cruz* (2009) 177 Cal.App.4th 957, 998.)

The EIR should also identify any alternatives that were considered by the lead agency but were rejected during the planning or scoping process and briefly explain the reasons underlying the lead agency's determination. The following alternatives were considered by the City of Fresno but are not evaluated further in this Draft EIR.

6.3.1 Off-Site Alternatives

As established in Section 15126.6(f)(2) of the State CEQA Guidelines, the rule of reason applied to assessment of alternative locations in a CEQA evaluation is whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or substantially lessen significant effects of the project need be considered in the EIR. As described above, alternative locations for the proposed Costco facility could reduce anticipated impacts associated with construction noise and transportation by locating the facility on appropriately designated property of adequate size (approximately 20 to 25 acres) that is not near existing sensitive receptors but also central to other land uses so that VMT is reduced. A preliminary evaluation did not identify any other properties in northwest Fresno that were appropriately zoned (i.e., zoned for commercial use), adequately sized, and sufficiently distant from sensitive receptors that could be affected by nighttime construction.

The City received a public comment requesting evaluation of three specific alternative sites after the close of the scoping period: the southeast corner of West Herndon Avenue and Hayes Avenue, the area west of North Riverside Drive and north of Veterans Boulevard, and the area west of Bullard Avenue and south of Veterans Boulevard. As discussed further below, these alternatives were dismissed from further analysis due to feasibility and because they would not clearly address the project's significant environmental effects.

SOUTHEAST CORNER OF WEST HERNDON AVENUE AND HAYES AVENUE

There are three parcels at the southeast corner of Hayes and West Herndon Avenues: two parcels of approximately 1 acre zoned for office use and two parcels (13 acres and 7 acres) zoned for multifamily residential. Collectively, these parcels would provide approximately enough space to accommodate the proposed project. However, these parcels are under different ownership and the property is bisected by a Fresno Metropolitan Flood Control (FMCD) easement that runs to a small parcel owned by FMFCD in the middle of the site.

In addition to land acquisition and coordination with FMCD, development of the Costco facility at this location would require a general plan amendment and rezone. State law limits the City's ability to downzone residentially designated land. Senate Bill 330, known as the Housing Crisis Act, prevents the City from reducing residential capacity on a site zoned for housing without identifying replacement capacity. Government Code Section 65863 requires that cities ensure their general plans provide for regional housing needs. In addition, cities and counties are required to have no "net loss" of lower and moderate-income dwelling units. The City cannot take action that would reduce identified affordable housing sites for these income categories. Additionally, conceptual plans to develop apartments on this property have already been submitted to the City. Finally, the location across Hayes from the entrance to River Bluff Elementary school would not reduce effects on sensitive receptors or potential for traffic hazards.

This alternative location would not reduce anticipated impacts associated with construction noise and VMT. The alternative location is near the proposed project site and would result in development that requires similar construction techniques and has similar operational constraints to VMT reduction (i.e., purchasing goods in bulk can be incompatible with use of alternative modes of transportation). The site is also near sensitive receptors (residences along West Millbrae Avenue and River Bluff Elementary west of Hayes Avenue). The alternative was dismissed from further analysis because it would not lessen the environmental impacts of the project and may be infeasible due to State housing regulations and existing ownership and easement conditions.

AREA WEST OF NORTH RIVERSIDE DRIVE AND NORTH OF VETERANS BOULEVARD

There are three undeveloped parcels of approximately 8 acres, 6 acres, and 9 acres that are zoned for light industrial use in the area west of North Riverside Drive and north of Veterans Boulevard. In addition to land acquisition, development of the Costco facility at this location would require a general plan amendment and zoning designation change. However, if the three parcels were purchased and combined, this could be adequate land for the proposed facility.

The alternative site is located in the project site vicinity (northwest Fresno), approximately two-thirds of a mile south of the proposed project site. Similar to the proposed project site, it is separated from a residential subdivision by North Riverside Drive. Overall, the proximity of the alternative site to sensitive receptors is similar to the project.

Because the alternative site is in a similar area of the city and located within similar proximity to sensitive receptors, implementation of the project at the alternative site would not likely result in substantial reduction in VMT or construction noise. In addition, site access would be restricted to North Riverside Drive because Veterans Boulevard is designated as an expressway in the area and the slope of the overpass, which is substantially above grade in the area, would prohibit direct access. This could result in queuing impacts.

Finally, the parcels would have to be acquired by the project applicant. If the property owner(s) are willing to sell, all parties would need to negotiate mutually agreeable terms. Therefore, the feasibility of this alternative is unknown. Because this off-site alternative would not likely minimize significant impacts associated with the proposed project, and its feasibility is uncertain, it is rejected from further consideration.

AREA WEST OF BULLARD AVENUE AND SOUTH OF VETERANS BOULEVARD

This area is comprised of two parcels, an 11-acre parcel zoned for multi-family residential and a 9-acre parcel zoned for light industrial uses. Combined, these parcels may provide adequate land for the proposed project. In addition to land acquisition, development of the Costco facility at this location would require a general plan amendment and zoning designation change. State law limits the City's ability to downzone residentially designated land. Senate Bill 330 prevents the City from reducing residential capacity on a site zoned for housing without identifying replacement capacity. Government Code Section 65863 requires that cities ensure their general plans provide for regional housing needs. In addition, cities and counties are required to have no "net loss" of lower and moderate-income dwelling units. The City cannot take action that would reduce identified affordable housing sites for these income categories.

Similar to the alternative site discussed above, this site is in the same general vicinity of the project (northwest Fresno), located less than 1 mile to the south of the project site. Because it is in the general vicinity of the project site, it is unlikely that implementation of the project at the alternative site would result in a substantial VMT reduction compared to the project at the proposed site.

Fewer sensitive receptors are located near this alternative site; however, unlike the residences near the project site, the residences near the alternative site do not have sound walls protecting their rear yards. Therefore, it is uncertain if implementation of the project at this location would minimize construction noise impacts.

To implement the project at this location, the parcels would have to be acquired by the project applicant. If the property owner(s) are willing to sell, all parties would need to negotiate mutually agreeable terms. This land also has power pole easements running through the property and the future alignment of West Escalon Avenue which could preclude a viable site plan. For these reasons, the feasibility of this alternative is unknown. Because this off-site alternative would not likely minimize significant impacts associated with the proposed project, and its feasibility is uncertain, it is rejected from further consideration.

6.3.2 Redevelopment of the Existing Costco Facility

Under this alternative, the existing Costco facility would be renovated in its current location, but not expanded. Certain upgrades would be possible, including improved energy efficiency. However, site constraints would prevent expansion of the Costco facility and consolidation of the MDO processing, as envisioned with the proposed project.

Existing concerns with traffic and parking would persist with continued use of the redeveloped Costco property as the customer base in northwest Fresno continues to grow. This alternative would not adequately meet most of the project objectives, including constructing and operating a new warehouse in northwest Fresno, reducing energy consumption, providing a convenient location, providing a state-of-the-art Costco facility (including home and/or business delivery service), minimizing circulation conflicts, and developing a Costco facility that is large enough to accommodate all the uses and services that Costco provides to its members elsewhere. For these reasons, this alternative is dismissed from further consideration.

6.3.3 No Gas Station Alternative

An alternative that would remove the gas station from the project was considered based on public comments. Under an alternative without the gas station, all other project elements would remain unchanged. As explained above in Section 6.2, "Considerations for Selection of Alternatives," alternatives evaluated in detail should reduce the significant impacts anticipated with implementation of the proposed project. The significant and unavoidable impacts of the project as proposed, related to construction noise and operational transportation, would not be substantially lessened by this alternative.

Short-term construction noise may be slightly reduced because the gas station facility would not be constructed. As with the proposed project, construction activity under this alternative would be expected to expose existing sensitive receptors northeast and west of the site to construction noise that exceeds standards. This alternative would require implementation of the same mitigation measures as the proposed project. However, as with the proposed project, it cannot be ensured that these measures would reduce equipment noise to meet City noise standards during construction activity.

Related to vehicle trips, this alternative would eliminate VMT from customers traveling to the project site for the sole purpose of purchasing gas. However, because customers who would otherwise combine fueling with a Costco shopping trip would have to purchase gas elsewhere, the net effect on VMT is unclear.

Operation of the project would contribute to a permanent increase in ambient noise levels in the area from activities including delivery vehicles, landscape maintenance, HVAC equipment operation, and traffic noise. This alternative may result in slight reductions in operational noise because there would be no fuel delivery trucks, fewer idling cars queuing for gas, and potential for fewer overall trips on North Riverside Drive and Spruce Avenue. Impacts related to potential for effects on biological resources would not change because the disturbance footprint would be the same. Potential effects on cultural or tribal cultural resources may be slightly reduced due to the potential for reduced earthwork in an alternative where excavation is not required for the underground storage tanks at the gas station.

This alternative would meet all of the established project objectives, except one: the objective to meet member demand for automobile services, including gasoline, car wash, and tire center.

This alternative was dismissed from detailed evaluation because it does not address the significant impacts of the project in a meaningful way that will result in substantial reductions to the severity of potential impacts.

6.3.1 No Spruce Avenue Connection

This alternative would construct Spruce Avenue along the northern boundary of the project site, but would not extend the roadway east to connect to the existing terminus of Spruce Road. This alternative would reduce the potential for traffic noise to affect the residences north of Spruce Avenue. This alternative is not consistent with the City's general plan and would restrict safe and efficient traffic flow in the area. It should also be noted that even if this improvement were not a condition of project approval, because it is an identified roadway connection in the general plan, it would likely be developed in the near future, regardless of project approval. For these reasons, the alternative has been dismissed from detailed analysis.

6.4 ALTERNATIVES SELECTED FOR DETAILED ANALYSIS

The following alternatives are evaluated in this Draft EIR:

- **Alternative 1a: No Project Alternative** assumes continued operation of the existing Costco facility at its current location, but also assumes development of the project site with the type and intensity of commercial uses consistent with the existing General Plan land use designation and zoning.
- **Alternative 1b: No Development Alternative** assumes continued operation of the existing Costco facility at its current location and no development of the project site.
- **Alternative 2: Reduced Size Costco Warehouse** assumes that the proposed warehouse at the proposed site would be similar in size to the existing Costco warehouse.
- **Alternative 3: Mixed-Use Costco Center Alternative** would adjust the land use mix on the project site to include high-density residential development intended to promote VMT efficiency.

Further details on these alternatives, and an evaluation of environmental effects relative to the proposed project, are provided below. As described above, the alternatives are intended to "avoid or substantially lessen" the significant impacts of the project (CEQA Guidelines Section 15126.6[a]). For this reason, the alternative evaluation below focuses on the environmental resources where there is a significant impact identified (prior to mitigation) in Chapter 3: aesthetics; archaeological, historical, and tribal cultural resources; biological resources; noise and vibration; and transportation and circulation. Resources in which the project would generate less-than-significant impacts are only specifically evaluated where there is a potential for a substantial change in the severity of the impact.

6.4.1 Alternative 1a: No Project Alternative - Development Consistent with Existing Land Use and Zoning

The State CEQA Guidelines (Section 15126.6[e][1]) states the purpose for describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. The guidelines suggest two typical paths for discussing the no project alternative: 1) when the project is the revision of an existing land use or regulatory plan, the no project alternative would be a continuation of the existing plan not the future, or 2) if the project is other than a land use plan, for example a development project on identifiable property, the no project alternative is the circumstance under which the project does not proceed, specifically the practical result of the project's non-approval (not a set of artificial assumptions that would be required to preserve the existing physical environment).

In the case of this no project alternative, because the project site is designated and zoned for commercial use, is surrounded on all sides by existing development, has immediate access to adjacent roads and public utilities, and contains no major development constraints, it is reasonably foreseeable that this project site would be developed in the moderately near future. Also, because the project includes amendments to the City's General Plan and rezoning of the site, examining an alternative that maintains the current land use designation and zoning would be useful to decision makers.

For these reasons, Alternative 1a assumes that development of the site would occur consistent with existing land use designation (Community Commercial) and zoning (Community Commercial) of the site (it would be speculative to assume otherwise). The existing Community Commercial designation allows a floor area ratio (FAR) of 1.0, whereas the proposed General Commercial designation allows a FAR of 2.0, which is twice the floor area allowed under the existing designation. Also, whereas the General Commercial designation allows uses with higher traffic volumes, such as strip malls, wholesale businesses, and specialized retail, the Community Commercial designation is intended for commercial development that primarily serves local needs, such as medium-scale retail, office, civic and entertainment use, supermarkets, drug stores, and supporting uses. Based on the applicable development standards, and assuming that future development would be consistent with City standards related to building coverage, setbacks, landscaping, and building heights, future development of the site is anticipated to include commercial/retail development totaling approximately 120,000 square feet (s.f.), which is approximately half the intensity of the

proposed project. It should be noted that, although Alternative 1a would include less overall development, this analysis assumes that no portion of the site would remain vacant, and that the entire site would be graded. However, because there would be less overall floor area, there would likely be opportunities for increased landscape areas.

Under Alternative 1a, the existing Costco facility on West Shaw Avenue would continue to operate. Operation of the existing facility is accounted for in the baseline, existing conditions described throughout this EIR. For this reason, continued operation and associated energy use, VMT, and air pollutant and greenhouse gas (GHG) emissions of the magnitude disclosed for existing operations are considered a continuation of baseline conditions and are not considered impacts resulting from Alternative 1a. However, the existing Shaw Avenue Costco has existing circulation challenges and limited parking would persist with intensification of the use of the Costco property as the customer base in northwest Fresno continues to grow. Alternative 1a would not achieve the basic project objective of establishing a facility of sufficient size that integrates several services, including home and/or business delivery service, under one roof. Alternative 1awould also not meet the project objective related to meeting demand for automobile services, including gasoline, car wash, and tire center because the car wash is not consistent with existing zoning. Other objectives related to operation of a retail center that serves the community with a wide variety of goods in northwest Fresno that is serviced by adequate infrastructure, creating a commercial center that is integrated with the overall design context, reducing energy consumption, increasing taxable sales, and minimizing circulation conflicts could be achieved by commercial development of the site under Alternative 1a.

ALTERNATIVE EVALUATION

Less-than-Significant Project Impacts

The proposed project would result in less-than-significant impacts (with no mitigation measures required) related to aesthetics, agricultural and forestry resources, air quality, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, greenhouse gas emissions, land use, mineral resources, population and housing, public services, recreation, utilities, and wildfire. Implementation of Alternative 1a would result in less overall development than the project and would be consistent with the existing general plan land use designation and zoning for the project site. Alternative 1a assumes development of the project site with a commercial use that is consistent with the existing zoning. Under this alternative, it is assumed that the entire site would be graded, although the overall level of construction would be slightly less. Potential to generate long-term operational emissions of ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ would be similar to the project, and similar SJVAPCD standards would likely be applied. Because the proposed project would result in less-than-significant impacts related to the issues listed above, the No Project Alternative would result in a *similar* level of impact.

Archaeological, Historical, and Tribal Cultural Resources

Alternative 1a, similar to the proposed project, would include grading of the entire project site. The proposed project's impacts to archaeological, tribal cultural, and paleontological resources are less than significant with implementation of mitigation measures. Alternative 1a would require similar mitigation measures and its impacts would be reduced in the same manner. Therefore, the overall level of impact would be *similar*.

Biological Resources

Grading of the entire site is assumed under Alternative 1a, and the same mitigation measures would be required. These mitigation measures, as applied to either the proposed project (as described in Section 3.5, "Biological Resources") or the No Project Alternative, would reduce impacts to less than significant. Therefore, the overall impact would be *similar*.

Noise and Vibration

The project would result in a significant impact related to construction noise, primarily due to the need for nighttime construction. The need for nighttime construction relates primarily to the large foundation necessary for a Costco facility. Under Alternative 1a, the overall floor area would be substantially smaller than the proposed project and may also consist of a series of smaller structures (depending on the specific development); therefore, overnight foundation pouring may not be necessary under this scenario. Also, the smaller size would also likely allow for increased site design flexibility, which could place structures farther from existing sensitive receptors than under the proposed

project. Because of these reasons, there is a reasonable likelihood that Alternative 1a could result in a substantial reduction to the project's significant impacts related to construction noise. This impact would be *less*.

Transportation and Circulation

As described above, unlike the proposed General Commercial designation, which allows uses with higher traffic volumes, the existing Community Commercial designation is intended for commercial development that primarily serves local needs, such as medium-scale retail, office, civic and entertainment use, supermarkets, drug stores, and supporting uses. Therefore, a project consistent with this designation would generally be more VMT efficient than a wider-serving project, such as a Costco facility. Also, whereas some transportation demand management (TDM) measures are not very effective for a Costco facility (i.e., shoppers buying in bulk would not generally be able use bicycles or transit), they may be much more feasible for a local-serving retail development. Therefore, Alternative 1a may substantially reduce the project's significant impacts related to VMT and traffic hazards due to overall reduced traffic volumes. The impact would be *less*.

6.4.2 Alternative 1b: No Project Alternative – No Development

The No Development Alternative is a version of the "no project" alternative wherein the existing environmental setting is maintained. The existing Costco facility on West Shaw Avenue would continue to operate.

This alternative assumes that permissible development would not occur on the project site and the lot would remain vacant. Alternative 1b is provided for informational purposes and discloses the effects on the environment if the environmental setting were maintained. Although the site remaining undeveloped is a potential outcome of not approving the proposed project, decision-makers could only select and implement this alternative if the City also purchased the property or changed the land use designation to ensure a "no development" outcome. Otherwise, it is reasonably foreseeable that development of the property would occur as described in Alternative 1a. The No Development Alternative would not meet any of the objectives established for the project.

ALTERNATIVE EVALUATION

Less-than-Significant Project Impacts

The proposed project would result in less-than-significant impacts (with no mitigation measures required) related to aesthetics, agricultural and forestry resources, air quality, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, greenhouse gas emissions, land use, mineral resources, population and housing, public services, recreation, utilities, and wildfire. The No Development Alternative would eliminate all environmental effects of construction and operation identified in Chapter 3 of this EIR. The proposed project would result in less-than-significant impacts related to the issues listed above and the No Development Alternative would result in *less* impact. The exceptions would be impacts related to land use. These are discussed individually below.

Archaeological, Historical, and Tribal Cultural Resources

This alternative would eliminate the potential for development to disturb archaeological, tribal cultural, and paleontological resources present on the project site. This would avoid a significant impact of the project. The No Development Alternative would result in *less* impact.

Biological Resources

This alternative would eliminate the effect of development on biological resources present on the project site. This would avoid a significant impact of the project. The No Development Alternative would result in *less* impact.

Land Use

Alternative 1b would not conflict with City policies adopted for the purposes of avoiding or mitigating an environmental effect. However, the No Development Alternative would not be consistent with the existing general plan land use designation and zoning, which have been established by the City to identify appropriate locations for

development. Eliminating the development potential of the project site could result in increased pressure to develop commercial land uses in other areas of northwest Fresno that are less suitable for this type of development. Overall, the No Development Alternative would result in impacts that are *similar* to the proposed project.

Noise and Vibration

This alternative would eliminate the effect of construction noise on sensitive receptors. This would avoid a significant impact of the project. The No Development Alternative would result in *less* impact.

Transportation and Circulation

Under the No Development Alternative, the project site would not generate VMT or contribute to traffic that results in queuing hazards. This would avoid a significant impact of the project. The No Development Alternative would result in *less* impact.

6.4.3 Alternative 2: Reduced Size Costco Warehouse

The significant impacts associated with the project that cannot be minimized or avoided through mitigation relate to traffic queuing, VMT, and construction noise. Reducing the size of the Costco warehouse would result in a reduction in total VMT. Regarding the project's significant impact related to noise, a smaller version of the project may allow more flexibility in terms of site design and layout, potentially providing more distance between specific project elements and existing sensitive receptors. Because noise generally attenuates according to the "inverse square law" (i.e., a doubling of distance from a point source reduces sound pressure by approximately 6 dB), the amount of increased distance a smaller structure would allow would not likely avoid the impact, but in combination with the mitigation measures identified, the construction-related noise impact would be further reduced.

The Reduced Size Costco Warehouse Alternative assumes development of a Costco warehouse on the project site that is the same size as the existing Costco warehouse on Shaw Avenue. As with redevelopment of the existing Costco site, a smaller warehouse would not accommodate consolidation of the MDO and those processes would continue at their current location. The fueling station would also be substantially smaller than the proposed station, and there would be no car wash. The site would be designed to place the smaller structure as far as reasonably possible from existing sensitive receptors that back onto North Riverside Drive across from the project site. Under this alternative, there may be a slight reduction in construction activity, but the general duration and types of construction would be similar.

This alternative would likely not adequately meet several of the project objectives, including expanding the space available for integrated retail sales and services in the local market, providing a state-of-the-art facility to better serve the membership in the greater Fresno area, integrated automobile services, and developing a facility that is large enough to accommodate all the uses and services that Costco provides to its members elsewhere.

ALTERNATIVE EVALUATION

Less-than-Significant Project Impacts

The proposed project would result in less-than-significant impacts (with no mitigation measures required) related to aesthetics, agricultural and forestry resources, air quality, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, greenhouse gas emissions, land use, mineral resources, population and housing, public services, recreation, utilities, and wildfire. Implementation of the Reduced Size Costco Warehouse Alternative would result in less intense development on the project site, although the overall level of ground disturbance and the construction period and intensity would be similar. Overall operations would be similar. Because the proposed project would result in less-than-significant impacts related to the issues listed above, the Reduced Size Costco Warehouse Alternative would result in a *similar* level of impact.

Archaeological, Historical, and Tribal Cultural Resources

Implementation of the Reduced Size Costco Warehouse Alternative, similar to the proposed project, would include grading of the entire project site. The proposed project's impacts to archaeological, tribal cultural, and paleontological resources are less than significant with implementation of mitigation measures. The Reduced Size Costco Warehouse Alternative would require similar mitigation measures and its impacts would be reduced in the same manner. Therefore, the overall level of impact would be *similar*.

Biological Resources

Grading of the entire project site is assumed under the Reduced Size Costco Warehouse Alternative, and the same mitigation measures would be required. These mitigation measures, as applied to either the proposed project (as described in Section 3.5, "Biological Resources") or the Reduced Size Costco Warehouse Alternative, would reduce impacts to less than significant. Therefore, the overall impact would be *similar*.

Noise and Vibration

As described above, one of the project's significant impacts relates to construction noise, primarily due to the need for nighttime construction. It is likely that a smaller Costco warehouse structure would still require overnight construction for the foundation pour. Also as described above, due to the way noise attenuates, even if the smaller Costco warehouse was moved farther away from existing residences that back onto North Riverside Drive, it likely would not be enough to avoid or substantially reduce the impact. However, the increased distance, in combination with the mitigation measures identified in Section 3.11, "Noise and Vibration," would result in a slight reduction in the level of nighttime noise. Therefore, the impact would be *slightly less*.

Transportation and Circulation

Decreasing the size of the Costco warehouse would reduce the total VMT generated because the alternative would involve fewer shoppers, fewer employees, and fewer deliveries than the proposed project. However, as discussed in Section 3.13, "Transportation and Circulation," the City's *CEQA Guidelines for VMT Thresholds* states that "VMT generated by retail projects would indicate a significant impact for any net increase in total VMT." Although the Reduced Size Costco Warehouse Alternative may result in a slight decrease in total VMT, it would not eliminate the VMT generated. It would also not change the effectiveness of mitigation measures (i.e., shoppers buying in bulk would not typically use bicycle or transit). Therefore, although the Reduced Size Costco Warehouse Alternative would likely result in a modest reduction in the overall VMT, it would not minimize or avoid the impact altogether, and the impact would be *slightly less* under the alternative.

6.4.4 Alternative 3: Mixed-Use Costco Center Alternative

A possible approach for reducing project impacts related to VMT would be to adjust the land use mix to include land uses with higher VMT efficiency. High-density residential, especially in combination with retail and commercial development, is usually one of the more VMT-efficient land uses. Given the large number of commercial/retail uses in the area and the generally low level of medium- and high-density housing, a high-density housing development may perform moderately well in this location compared to the project. However, a Costco warehouse facility would not provide the ideal retail facility to coexist on the same property as a multi-family housing development. A grocery-store-anchored shopping center or other mixed-retail center that would allow residents to walk to shopping and possible jobs would be more appropriate. Also, to accommodate a high-density housing structure, the Costco warehouse component would need to occupy a much smaller footprint.

Under the Mixed-Use Costco Center Alternative, a two-story Costco warehouse would be developed within a smaller footprint to allow room for a low-to-mid-rise, high-density housing development on the project site. The overall floor area would likely be smaller than the proposed Costco warehouse but may be larger than the existing Costco warehouse. Due to site constraints, no gas station, car wash, or MDO facility would be included under this alternative.

Critically, the Costco warehouse structure would be designed such that loading docks and other noise- and air-pollutant-generating facilities and equipment are located on the side of the building farthest from any sensitive receptor and as far from sensitive receptors as possible, including the on-site high-density residential structure. It

should be noted that this design constraint may affect the feasibility of this alternative and that more detailed design work would be needed to make the final feasibility determination.

If feasible, this alternative would likely not meet several project objectives, including developing a Costco facility that is large enough to accommodate all the uses and services that Costco provides to its members elsewhere and meeting member demand for automobile services, including gasoline. Also, because this alternative would involve large multi-story structures in an area dominated by one-and two-story residential development and single-story commercial development, it would likely not achieve the objective related to integration with the overall design context for the area.

ALTERNATIVE EVALUATION

Less-than-Significant Project Impacts

The proposed project would result in less-than-significant impacts (with no mitigation measures required) related to aesthetics, agricultural and forestry resources, air quality, energy, geology and soils, hazards and hazardous materials, hydrology and water quality, greenhouse gas emissions, land use, mineral resources, population and housing, public services, recreation, utilities, and wildfire. Implementation of the Mixed-Use Costco Center Alternative would result in greater intensity of development on the project site, although the overall level of ground disturbance and the construction period and intensity would be similar. The proposed project would result in less-than-significant impacts related to the issues listed above and the Mixed-Use Costco Center Alternative would result in a *similar* level of impact. Two exceptions would be impacts related to aesthetics and land use. These are discussed individually below.

Aesthetics

The proposed project would result in less-than-significant impacts related to aesthetics. However, the Mixed-Use Costco Center Alternative would involve development of structures much larger in scale than the proposed project, including a two-story Costco warehouse and a low-to-mid-rise high-density housing development. Under this alternative the mass of structures on the project site would be much more prominent and would not generally be consistent with the one- and two-story single-family residential development or the single-story commercial development in the vicinity. The contrast would be especially stark on the northern portion of the site, which is adjacent the fairway for Riverside Golf Course. Although this change in visual character may not rise to the level of a significant impact that cannot be minimized, it would be *greater* than the proposed project.

Archaeological, Historical, and Tribal Cultural Resources

Implementation of the Mixed-Use Costco Center Alternative, similar to the proposed project, would include grading of the entire project site. The proposed project's impacts to archaeological, tribal cultural, and paleontological resources are less than significant with implementation of mitigation measures. The Mixed-Use Costco Center Alternative would require similar mitigation measures and its impacts would be reduced in the same manner. Therefore, the overall level of impact would be *similar*.

Biological Resources

Grading of the entire project site is assumed under the Mixed-Use Costco Center Alternative, and the same mitigation measures would be required. These mitigation measures, as applied to either the proposed project (as described in Section 3.5, "Biological Resources") or the Mixed-Use Costco Center Alternative, would reduce impacts to less than significant. Therefore, the overall impact would be *similar*.

Noise and Vibration

One of the project's significant impacts relates to construction noise, primarily due to the need for nighttime construction. Due to the constrained size of the project site to support a Costco warehouse and a housing development, this alternative could increase the effects of construction noise by placing the construction areas closer to existing sensitive receptors. Also, the taller structures may require pile driving, which could result in increased impacts related to vibration. However, the modified design of this alternative may limit the need for nighttime construction associated with continuous concrete pours for large foundations. Overall, the impacts associated with the Mixed-Use Costco Center Alternative would be *similar*.

Transportation and Circulation

Because the Mixed-Use Costco Center Alternative would result in a smaller commercial warehouse and includes uses that are more VMT efficient than the Costco warehouse facility alone, the alternative would likely result in somewhat reduced VMT impacts compared to the project. However, because the project site is not in a jobs-rich area that would support walkable/bikeable employment for on-site residents, the VMT efficiency associated with the residential development would be limited, and not likely enough to counter the project's daily VMT generation. As discussed above, the City's *CEQA Guidelines for VMT Thresholds* establishes that any increase in net VMT for retail projects would be a significant impact. Therefore, although the project would likely result in modest reductions, it would not avoid or minimize the significant impact related to VMT. Effects on queuing and roadway hazards would be reduced. The overall impact would be *slightly less*.

6.5 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Because the No Development Alternative (Alternative 1b, described above in Section 6.4.2) would avoid all adverse impacts resulting from construction and operation of the proposed project, as analyzed in Chapter 3 of this Draft EIR, it is the environmentally superior alternative. However, the No Development Alternative would not meet the objectives the project. The No Project Alternative (Alternative 1a, described above in Section 6.4.1) would also avoid the significant and unavoidable effects of the project, while achieving some of the project objectives related to providing a commercial center on the site.

When the environmentally superior alternative is the No Project Alternative, the State CEQA Guidelines (Section 15126[d][2]) require selection of an environmentally superior alternative from among the other action alternatives evaluated. As illustrated in Table 6-1, below, Alternative 2: Reduced Size Costco Warehouse would be environmentally superior action alternative because although the environmental impacts would be similar to the proposed project, and no significant impacts or significant and unavoidable impacts would be completely avoided, the project's significant impacts related to VMT and construction noise would be slightly reduced.

Table 6-1 Summary of Environmental Effects of the Alternatives Relative to the Proposed Project

Environmental Topic	Proposed Project	Alternative 1a: No Project/Development	Alternative 1b: No Project/No Development	Alternative 2: Reduced Size Costco Warehouse	Alternative 3: Mixed-Use Costco Center
Aesthetics	LTS	Similar	Less	Similar	Greater
Agricultural and Forestry Resources	LTS	Similar	Less	Similar	Similar
Air Quality	LTSM	Similar	**Less**	Similar	Similar
Archaeological, Historical, and Tribal Cultural Resources	LTSM	Similar	**Less**	Similar	Similar
Biological Resources	LTSM	Similar	**Less**	Similar	Similar
Energy	LTS	Similar	Less	Similar	Similar
Greenhouse Gas Emissions and Climate Change	LTS	Similar	Less	Similar	Similar
Hydrology and Water Quality	LTS	Similar	Less	Similar	Similar
Hazards and Hazardous Materials	LTS	Similar	Less	Similar	Similar
Land Use and Planning	LTS	Similar	Similar	Similar	Similar
Noise and Vibration	SU	**Less**	**Less**	Slightly Less	Similar
Public Services	LTS	Similar	Less	Similar	Similar
Transportation and Circulation	SU	**Less**	**Less**	Slightly Less	Slightly Less
Utilities	LTS	Similar	Less	Similar	Similar

Notes: bold text indicates that the project avoids or minimizes a significant impact associated with the project; LTS = less than significant; LTSM = less than significant with mitigation; SU = significant and unavoidable

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Chapter 6 Alternatives

No references used in this chapter.

Appendix A

Notice of Preparation and Comments Received Suring the Scoping Period

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT AND SCOPING MEETING FOR THE COSTCO COMMERCIAL CENTER PROJECT

Date:	October 22, 2021
To:	State Clearinghouse, Responsible and Trustee Agencies, Interested Parties, and Organizations
Subject:	Notice of Preparation of an Environmental Impact Report and Scoping Meeting for the Costco Commercial Center Project, Fresno, California
Lead Agency:	City of Fresno Planning and Development Department 2600 Fresno Street, Room 3043 Fresno, CA 93721 (559) 621-8277
Contact:	Jose Valenzuela, Planner III Planning and Development Department 2600 Fresno Street, Room 3065 Fresno, CA 93721 (559) 621-8070 Jose.Valenzuela@fresno.gov
Comment Period:	October 22, 2021 – November 22, 2021

PURPOSE OF NOTICE

The Costco Wholesale Corporation (Costco) proposes to construct the Costco Commercial Center (hereafter "project"), which comprises a new Costco facility (including loading docks and internal space to provide last-mile home delivery of big and bulky items) with an attached tire center and a detached gas station and drive-through car wash in the City of Fresno. As the lead agency, the City of Fresno will prepare an Environmental Impact Report (EIR) for the project and is issuing this Notice of Preparation (NOP) per Section 15082 of the California Environmental Quality Act (CEQA) Guidelines. The purpose of this NOP is to provide agencies, interested parties, and organizations with sufficient information describing the project and the potential environmental effects to enable meaningful input related to the scope and content of information to be included in the EIR. The EIR will evaluate the potential environmental impacts of the project on both a direct and cumulative basis and identify potentially feasible mitigation measures or alternatives that may lessen or avoid impacts.

The City is requesting input from the public and responsible and trustee agencies on environmental issues associated with development of the project, as described in this NOP.

Comments received during this public comment period will be used to focus the environmental analyses in the EIR.

PUBLIC REVIEW PERIOD AND SCOPING MEETING

This NOP is available for public review and comment for 30 days beginning October 22, 2021. The City will hold a public scoping meeting to inform interested parties about the project and provide agencies and the public with an opportunity to submit comments on the scope and content of the EIR. In response to COVID-19, the public scoping meeting will be conducted virtually on November 2, 2021 at 6:00 p.m.

Web link: https://zoom.us/j/98798625753

Call-in Information: 1-669-900-9128

Webinar ID: 98798625753

Meeting Date: November 2, 2021

Meeting Time: 6:00 p.m.

Any interested person may appear at the public hearing electronically, by either Zoom meeting or telephone. If you have any questions regarding the scoping meeting, contact Jose Valenzuela, Project Planner, at (559) 621-8070 or Jose.Valenzuela@fresno.gov. Si necesita información en Español, comuníquese con Jose Valenzuela al teléfono (559) 621-8070 o por correo electrónico jose.valenzuela@fresno.gov.

Submitting Comments

Comments and suggestions as to the appropriate scope of analysis in the EIR are invited from all interested parties. Written comments or questions concerning the EIR should be directed to the City's project manager at the following address. Comments must be received by 5:00 p.m. on November 22, 2021. Please include the commenter's full name and address.

Jose Valenzuela, Planner III
Planning and Development Department
2600 Fresno Street, Room 3065
Fresno, CA 93721
(559) 621-8070
Jose.Valenzuela@fresno.gov

Si necesita información en Español, comuníquese con Jose Valenzuela al teléfono (559) 621-8070 o por correo electrónico jose.valenzuela@fresno.gov.

Copies of this NOP may be reviewed at the following locations:

- Fresno County Public Library during library hours;
- City of Fresno, 2600 Fresno Street, Room 3065 between 7:00 a.m. and 6:00 p.m.; or
- Online at: https://www.fresno.gov/cityclerk/notices-publications/

PROJECT OVERVIEW

The project would develop a new Costco retail building; gas station; car wash; and associated parking areas, driveways, and other supporting infrastructure. The existing Costco at 4500 West Shaw Avenue would relocate to the new facility, which would be sized to accommodate the customer base in northwest Fresno. The existing Costco gas station would be decommissioned, including removal of the underground storage tanks. The existing and proposed Costco sites are shown in Figure 1.

The project would allow Costco to expand services in the area to include a larger gas station and a car wash, as well as a loading area to facilitate last-mile home delivery of big and bulky items in the Fresno area. The Costco retail building is consistent with established zoning for the parcel; however, a re-zone and General Plan amendment would be required to permit the proposed car wash.

The project also includes a proposed General Plan amendment and rezoning to reclassify the adjacent portion of West Herndon Avenue from expressway to super arterial to allow the construction of an intersection where West Herndon Avenue meets the Arthur Avenue right-of-way. The intersection would allow project traffic to access the project site via two north-south streets, rather than solely from North Riverside Drive. This would permit easier travel for southbound drivers along North Riverside Drive, including nearby residents and visitors to the Riverside Golf Course.

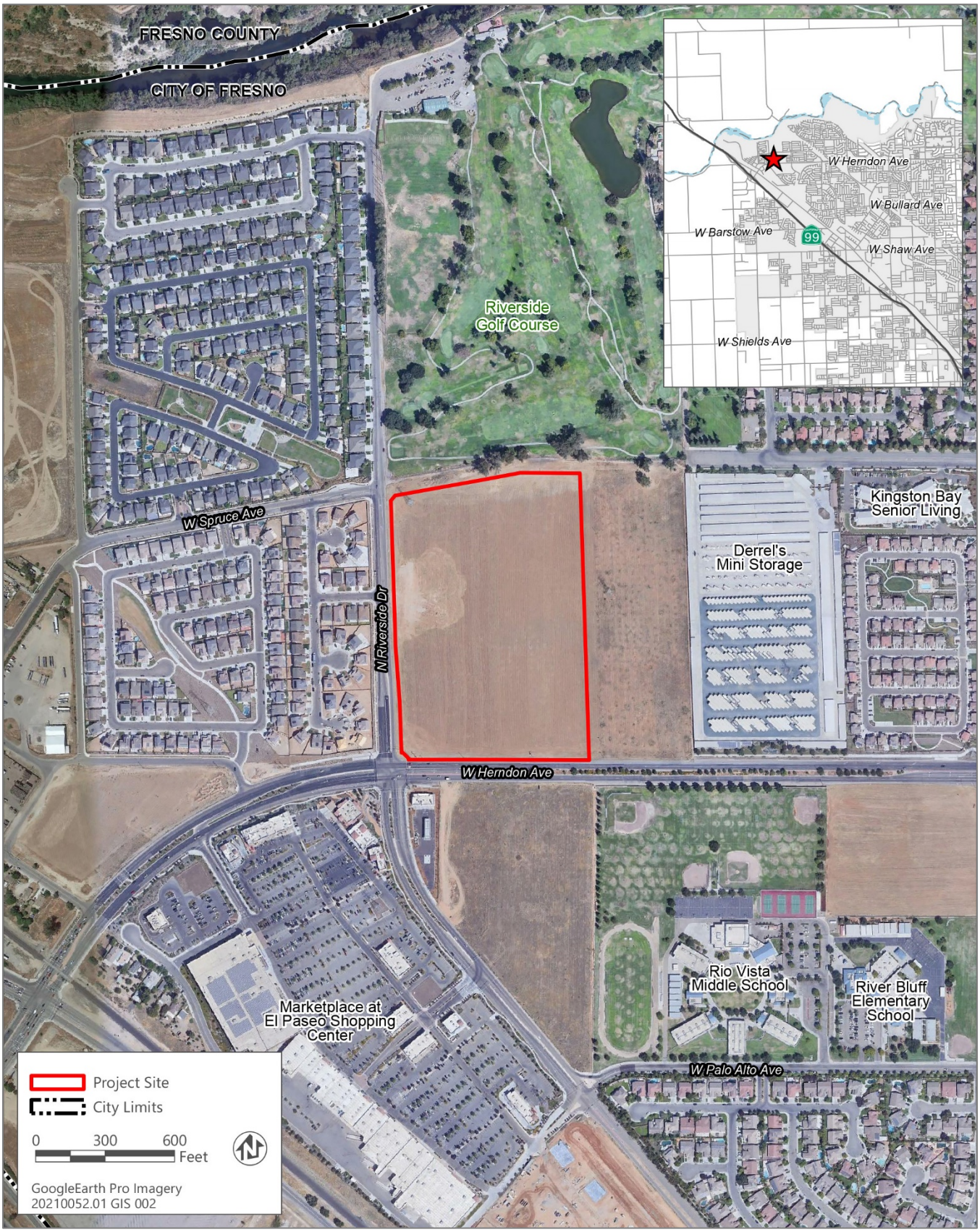
Costco Wholesale facilities are operated on a membership-only basis. The warehouse and car wash hours are anticipated to be Monday through Friday from 9:00 a.m. to 8:30 p.m., and Saturday and Sunday from 9:00 a.m. to 7:00 p.m. The fuel station would operate from 5:00 a.m. to 10:00 p.m. daily.

Project Location

The proposed location of the Costco Commercial Center site is a vacant 22.4-acre parcel located at the northeast corner of the intersection of West Herndon Avenue and North Riverside Boulevard in the City of Fresno. The project site is a single parcel, bordered by West Spruce Avenue to the north, the right-of-way of (currently unbuilt) Arthur Avenue to the east, West Herndon Avenue to the south, and North Riverside Boulevard to the east. The site's address is 7120 North Riverside Drive and the assessor's parcel number (APN) is 503-02-012 (Figure 2). Local access to the site is provided by West Herndon Avenue, West Spruce Avenue, and North Riverside Boulevard. Regional access is provided by State Route (SR) 99, via the West Herndon Avenue interchange approximately 0.5 mile to the southwest.

Source: adapted by Ascent in 2021

Figure 1 Regional Location of Project and Existing Costco



Source: adapted by Ascent in 2021

Figure 2 Project Location

Requested Entitlements

The project would require the following entitlements from the City of Fresno:

- A General Plan Amendment and rezoning to reclassify the portion of West Herndon Avenue fronting the project site from expressway to super arterial, to change the site's General Plan Land Use Designation from Community Commercial to General Commercial, and to change the site's zoning designation from CC (Commercial – Community) to CG (Commercial General);
- A conditional use permit (CUP) per Table 15-1202 in Section 15-1202 of the Fresno Municipal Code to establish a Large-Format Retail, Service Station, and Car Wash within the CG zone;
- A CUP per Section 15-2706 the Fresno Municipal Code to establish a new use including the sale of alcoholic beverages for off-site consumption;
- A Planned Development Permit per Section 15-59 of the Fresno Municipal Code to allow variation from the standards for parking lot lighting in Section 15-2015; and
- Approval of a Parcel Map for the subdivision of the existing parcel into two resultant parcels.

Project Elements

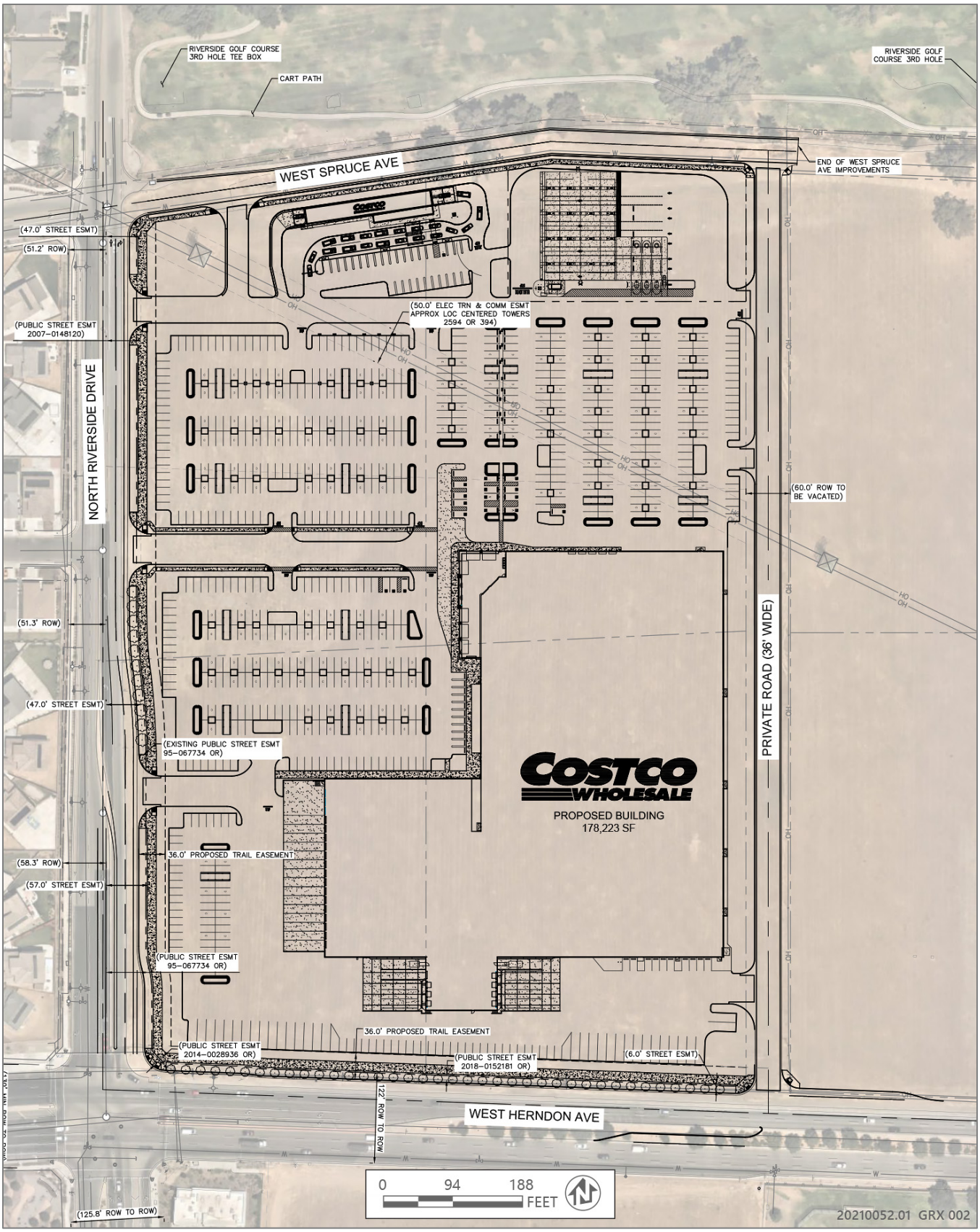
COSTCO RETAIL BUILDING

The proposed Costco building would be 178,223 square feet (sq. ft.); of which approximately 57,000 sq. ft. would be reserved for storage and receiving (Figure 3). The structure would be set in the southeastern corner of the project site, with parking provided primarily to the north and east of the building. The sales floor area would include a tire center, optical exams and optical sales, hearing aid testing and sales, food service preparation and sales, meat preparation and sales, bakery and sales of baked goods, and alcohol sales. The southwest portion of the warehouse would contain areas for receiving, storing, and loading items for last-mile home delivery of big and bulky items.

COSTCO GAS STATION

The project would include a Costco members-only gas station on the northern portion of the project site adjacent to West Spruce Avenue. The facility would include an approximately 11,500 square-foot canopy and a 125 square-foot controller enclosure. There would be four covered fueling islands, each with four two-sided fuel dispensers to provide for the fueling of eight cars at each island, for a total of 32 fueling positions. The fueling station would also have eight stacking lanes, allowing approximately 40 cars to wait for pumps at any given time in addition to the 32 cars at the dispensers. The dispensers would be fully automated and self-service. A Costco attendant would be present at all times of operation to oversee operations and assist members. Four underground fuel tanks would also be installed at the southern edge of the gas station.

Lights would be recessed into the canopy to provide both lighting during operating hours and a lower level of security lighting after hours.



Source: Image produced and provided by Kimley Horn & Associates in 2021

Figure 3 Site Plan

COSTCO CAR WASH

A Costco members-only automated carwash would be located at the northeastern corner of the project site, adjacent to the gas station. The car wash structure would be approximately 4,800 sq. ft. The car wash facility would include only the automated car wash within the structure. No self-service car vacuum stations would be provided.

SITE ACCESS AND CIRCULATION

The proposed development would provide multiple points of access to the project site. The primary entrance to the warehouse would be located along North Riverside Drive, with a full-service driveway aligned with West Fir Drive. This proposal includes the installation of traffic control devices at the intersection of West Fir Drive, North Riverside Drive, and the Costco main driveway. Two additional right-in/right-out driveways along North Riverside Drive would provide secondary vehicle access to the project site. The existing right-of-way along on the eastern edge of the project is for a private driveway, Arthur Avenue, would provide a north-south connection between West Herndon Avenue and West Spruce Drive. The Arthur Avenue roadway would meet West Herndon Avenue with right-in and right-out access from Arthur Avenue. The Applicant is also proposing a median cut on West Herndon Drive to allow left-in turning from West Herndon Drive.

At the eastern edge of the project site, two additional right-in/right-out driveways are proposed along Arthur Avenue for customer access. A third driveway is proposed along Arthur Avenue near the southern boundary of the project site that would provide delivery, service, and emergency vehicle access. The primary truck access route would be the southernmost driveway along Arthur Avenue, with a secondary truck route using the southernmost driveway along North Riverside Drive. The truck loading dock would be located on the southern facade of the building. The bay doors would be equipped with sealed gaskets to limit noise.

The project would also include construction of 12-foot-wide pedestrian and bicycle paths along the project's frontage with West Herndon Avenue and North Riverside Drive.

RESPONSIBLE AGENCIES

For the purposes of CEQA, the term "Responsible Agency" includes all public agencies other than the Lead Agency that have discretionary approval power over the project (CEQA Guidelines Section 15381). Discretionary approval power may include such actions as issuance of a permit, authorization, or easement needed to complete some aspect of the proposed project. Responsible agencies may include, but are not limited to, the following:

- California Department of Transportation, District 3;
- California Department of Fish and Wildlife, Region 4;
- Central Valley Regional Water Quality Control Board; and
- San Joaquin Valley Air Pollution Control District.

POTENTIAL ENVIRONMENTAL EFFECTS

The EIR will describe the direct and indirect environmental impacts of construction and operation of the project. It is anticipated that the EIR will address potential impacts in the following issue areas. In addition, the EIR will evaluate alternatives, growth-inducing impacts, and cumulative impacts.

Aesthetics

The EIR will describe the existing visual character of the project site and the surrounding suburban and rural land use conditions. The analysis will evaluate the significance of changes in the visual character and the site, including light and glare.

Agriculture

The project site is designated Farmland of Local Importance by the California Department of Conservation's Farmland Mapping and Monitoring Program. All potentially significant direct and indirect impacts on agriculture resources that could result from project implementation will be described.

Air Quality

The EIR will describe existing air quality conditions at the project site, including the locations of nearby sensitive receptors and the applicable regulations and policies, such as the Environmental Review Guidelines and Procedures for Implementing CEQA from the San Joaquin Valley Air Pollution Control District. The analysis will disclose construction- and operation-related emissions of criteria air pollutants and precursors, and toxic air contaminants.

Biological Resources

The project site has been previously graded and used for agriculture. A comprehensive review of the sensitive resources with potential to be affected by the project will be conducted. The likelihood of presence in the project area will be based on habitat suitability, species ranges, and documented occurrences. The EIR will assess the potential impacts of the project on biological resources.

Historic, Archaeological, and Tribal Cultural Resources

The EIR will summarize known cultural resources in the project area, applicable state and local regulations related to prehistoric, historic, and tribal cultural resources, and the results of the City's consultation process. There is the potential for buried prehistoric and historic-era resources within the project area and potential impacts to these resources during project construction will be considered in the EIR.

Energy

The EIR will summarize federal, state, and local policies and regulations concerning energy consumption and energy efficiency that would be applicable to the project, including applicable policies in the City of Fresno General Plan and the City's Greenhouse Gas (GHG) Reduction Plan. The EIR will also evaluate whether the project would include features that would make it energy efficient, including efficiency with respect to the vehicle miles traveled (VMT) by motor vehicles, and the degree to which the project would comply with existing energy standards.

Greenhouse Gases and Climate Change

The analysis will apply thresholds of significance aligned with statewide and regionwide GHG targets for 2030 and beyond, including consistency with the most recent GHG Reduction Plan prepared by the City in 2014 and updated in 2020.

Hazards and Hazardous Materials

The EIR will summarize the results of the Phase I and II Environmental Site Assessments prepared for the project site. The EIR will identify any existing issues related to hazards and hazardous materials in the project area and identify impacts that could occur from construction and operation. The use of hazardous materials in project operation and disposal of any hazardous wastes would be subject to numerous laws and regulations at all levels of government.

Hydrology and Water Quality

The EIR will evaluate drainage, runoff, and other water quality concerns. There are no surface waters within the project site.

Land Use

The Land Use section will discuss the proposed General Plan amendment and rezoning. The evaluation will focus on consistency with applicable land use plans adopted to avoid or mitigate an environmental effect. The EIR will examine the existing land use patterns in the area and describe any potential for division or conflicts with existing communities.

Noise and Vibration

Implementing the proposed project would result in short-term and long-term increases in ambient noise levels. The EIR will include a description of the existing noise environment, including noise sources and sensitive receptors in the project area. The EIR will then assess potential short-term (i.e., construction) and long-term (i.e., operational) noise impacts to sensitive receptors.

Public Services

The conversion of the previously undeveloped project site to commercial uses would result in an increased demand for emergency services (police and fire) and other services. The EIR section will discuss the anticipated demand for services and analyze the capacity of the existing services; however, the impact analysis significance determination will be based on whether the project would trigger the need for new or expanded public facilities, the construction of which could result in significant impacts on the environment.

Transportation and Circulation

This section of the EIR will be based on a CEQA-compliant VMT analysis using City of Fresno CEQA Guidelines for Vehicle Miles Traveled adopted on June 25, 2020 that establish VMT thresholds of significance. The EIR will evaluate safety impacts and conflicts with bicycle, pedestrian, and transit plans and facilities, along with any impacts associated with geometric design features of the project (e.g., sharp curves or dangerous intersections).

Utilities

The EIR will discuss the potential increase in demand for water supply and treatment, wastewater treatment, and solid waste from project implementation. The analysis will assess any potential for project operation to affect the ability for existing and planned facilities to meet the projected increase in demand.

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From:	Anthony Botti
To:	Jose Valenzuela
Subject:	NW Fresno Costco Proposal
Date:	Wednesday, November 03, 2021 12:37:01 PM

Hi Jose,

I hope this is a proper way of submitting my public comment for the new Costco project.

I live in this general area, but on the west side of Highway 99 (Bullard and Grantland). I support a new Costco being constructed at the parcel located at Herndon and Riverside. I know Costco will have to make some serious traffic improvements, but I would like to state some that I see as being the most beneficial.

1) We would definitely need two left hand turn lanes heading east on Herndon that turn north onto Riverside Drive. Therefore, at least two lanes would need to be created on northbound Riverside. I would like to see those lanes start further west on Herndon, in line with Farrington Street. As it stands right now, that median causes a traffic hazard as motorists using the turn lane to make a u-turn or go into the neighborhood often impede traffic trying to continue through east on Herndon. It will only get worse as Costco shoppers enter the picture.

2) I know right hand turns off of Herndon into shopping centers are basically non-existent, but I think this is one place it is much needed. For traffic heading westbound, it would be nice to see a frontage road created just after the storage facility. This could take those vehicles directly into the Costco lot without having to go up to the Riverside traffic light. That frontage road would lessen the congestion to benefit EB traffic turning north on Riverside and WB travelers, who might live in the neighborhood, to have easier access to make a right turn on Riverside by not fighting Costco customers. That frontage road could also help delivery trucks not have to make a tight right turn onto Riverside.

The other huge plus to putting a Costco here is that it will close the Shaw location, which as you know becomes a traffic nightmare, especially if there is a train coming through. It will make the left hand turn much safer for those EB Shaw motorists looking to make a northbound turn onto Jennifer Ave. That existing Costco parking lot is so much easier to navigate when the store is closed for a holiday, so it will make it much safer for Pep Boys, Winco and all other businesses in that shopping center.

Thank you,

Anthony Botti

From: Conni Youngman
To: Jose Valenzuela
Subject: Proposed Costco at Herndon & Riverside
Date: Friday, November 19, 2021 2:46:13 PM

External Email: Use caution with links and attachments

Dear Mr. Valenzuela,

We are writing to express our concerns regarding the proposed Costco at the corner of Herndon and Riverside Drive in northwest Fresno.

We have lived in our current home, just east of the proposed Costco, for 29 years. When we moved to this location, there was virtually nothing out that way. We understand and appreciate growth. Most of the growth in the area has been good. However, as the Costco is currently proposed, there will be nothing beneficial to the area or the residents.

The zoning for this parcel appears to be CC or Commercial-Community which was obviously designated with good reason because of the surrounding neighborhood. According to Fresno's own development code, this parcel was not intended to be for large scale, big-box retail. To re-zone this parcel to allow this development would be tragic.

The most concerning part of this is the impact on the environment of the surrounding neighborhoods. In our whole area, there is very, very little greenbelt, except for Riverside Golf Course and the area around the San Joaquin River. Currently, we can walk west down Spruce Avenue, across the walking path south of Riverside Golf Course, then turn north on Riverside Drive and get to a very nice path above the river. This proposed Costco will not only ruin all of that, but with the proposed gas station and its ridiculous 32 gas pumps, there will be so much pollution from the gas fumes and cars idling at the gas station, one would need a gas mask to walk through there. I cannot imagine the thought process to even consider putting 32 gas pumps directly in front of a lovely public golf course, across the street from homes, or across the street from a school's athletic field. It just boggles the mind.

Imagine if you will, the homeowners who bought along and near Riverside Drive, thinking they were across from a golf course on the bluffs, and now they are across from a supersized Costco with its supersized gas station and car wash and all the associated traffic, fumes, noise, and trash that goes along with it. The housing developments along Riverside Drive are fairly new and there was absolutely no disclosure of a potential mega gas station for this location. How unfair…really just unfair.

We honestly cannot imagine a worse location for this project in all of northwest Fresno. The detrimental impact on the neighborhood and surrounding environment will be devastating. We hope you will not approve this development.

Sincerely,

Kirk and Conni Youngman
5912 W. Locust Avenue

Fresno, CA 93722
(559) 473-5595
youngmanc@sbcglobal.net

Sent from my iPhone

Fresno Costco Scoping Meeting 11/2/2021 6pm

Notes from Public Comments

Larry Hodges—Resident west of Riverside Golf Course

- Traffic congestion, safety, and access
- Concern that more residents aren't participating/public outreach

Conni Youngman—Resident east of Costco site

- Traffic congestion
- Gas station next to golf course
- Lighting
- Idling cars near golf course
- Connection of Spruce Ave?

Rangel Melendez

- Cars idling at gas station
- No "green" included in development
- Proximity to San Joaquin river and lack of greenway/parkland in vicinity
- Project will impact how the area is developed
- Project should be moved away from river
- More green spaces should be developed in area (lack of parks)
- AQ issues
- Proximity to schools
- Fumes from gas station
- Requested to see CEQA steps slide
- Project is good (job creator) but proposed in wrong location

Terry—Resident east of project

- Spruce being punched through?
- How are electrical lines being handled?
- Who owns property to the east of the site?

From:	Futsum Tesfai
To:	Jose Valenzuela
Cc:	Phillip Siegrist
Subject:	Jose.valenzuela@fresno.gov Phillip.siegrist@fresno.gov
Date:	Thursday, August 26, 2021 1:18:32 PM

External Email: Use caution with links and attachments

To Jose and Phillip,

I am the homeowner who lives at 6628 w Fallon Ave fresno ca 93722 and I joined you at Costco video call. My name is Futsumberhan Tesfai and I hope you can please forgive my email coming simply so late to let you know me my family and neighborhood directly oppose a Costco being built on Shaw and Herndon . I am a state inspector and 3rd party to the building department and while doing an inspection the supervisor and I start a conversation about where I live and when I brought up the Costco to him yesterday, he begged and pleaded for me to beg the city of fresno to not do this, he now lives next to a Super Walmart built by his home and he told me that was the worst thing that ever happened to his family. He never gets a chance to simply come home he is always in traffic and there is so much disruption. He is the one who reminded me to write this email. Please I will not write anymore if the city of fresno doesn't care about my family and wants what is happening to this guy happen to my family by you building this Costco in one of the most busiest streets in fresno that happens to be right next to our home. If the city of fresno wants the homeless at Costco all day to come walking distance to my home then build this Costco but if the city cares about my family and hears the people that live here they would not build this Costco and let us enjoy our peaceful safe neighborhood.

Kindest Regards

CEO Energy Specialist
Christ Jesus
Service Done By
Futsumberhan Tesfai
559-470-3674

From: Kati Pitts
To: Jose Valenzuela
Subject: PUBLIC COMMENTARY: Costco Relocation Project
Date: Wednesday, November 03, 2021 6:37:39 PM

External Email: Use caution with links and attachments

Hello Mr. Valenzuela,

I submitted some feedback regarding the proposed Costco site relocation several months ago to Councilmember Karbassi. I was made aware today that a meeting took place yesterday regarding the project with opportunity for public comment. As it is not entirely clear where one should submit public comment outside the scope of that meeting, and your name is listed on the City's website for the project, I am forwarding to you for consideration. If this should go elsewhere, please feel free to redirect.

Our family and our neighbors remain in strong opposition to this site being used for the purposes under consideration. Frankly, given the proximity of other high-traffic elements in the area and the surrounding environment (which is not similar in composition to the current W. Shaw Avenue site) Costco is not a welcome addition to the neighborhood.

Please let me know if any additional discussion on the matter is requested.

Thank you,
Kati Pitts

> ----- Forwarded Message -----
> **From:** "Kati Pitts" <kati.pitts@yahoo.com>
> **To:** "Andrew.Kloose@fresno.gov" <Andrew.Kloose@fresno.gov>
> **Sent:** Mon, May 17, 2021 at 10:37 AM
> **Subject:** RE: Contact District 2 Form submitted on City Council
> Thank you, Andrew. If Mr. Karbassi would like to speak with us any further, he is more than welcome to email or call.
>
> Have a wonderful day,
> Kati Pitts
>
> Sent from Yahoo Mail on Android
>
> On Mon, May 17, 2021 at 10:21 AM, Andrew Kloose <Andrew.Kloose@fresno.gov> wrote:
>
> > Good morning Kati,
> >
> > Thank you for contacting our office. I will share you message from your family on this subject with Councilmember Karbassi.

Thank you,

Andrew Kloose
Council Assistant – Councilmember Mike Karbassi
City of Fresno, District 2
2600 Fresno Street
Fresno, CA 93721
Office: (559) 621-8000

City of FRESNO

From: Kati Pitts <wordpress@fresno.gov>
Sent: Saturday, May 15, 2021 10:27 PM
To: District2 <District2@fresno.gov>
Subject: Contact District 2 Form submitted on City Council

First Name	Kati
Last Name	Pitts
Address	6911 W Sapphire Dr, 93722
Email	kati.pitts@yahoo.com
Phone Number	(559) 930-1855
Subject	Proposed Costco Location at Herndon/Riverside
Message	Mr. Karbassi, Please accept this message as notice of our family's staunch opposition to the proposed/planned Costco location at Herndon Avenue and Riverside Drive in NW Fresno. The traffic this business would bring is absolutely unwelcome. The parcel of property in question is directly across from schools who require many students to walk home (across Herndon Avenue) on Riverside Drive, and an increase in traffic would greatly impact student safety. I'd also like to remind you of the road rage incident in 2019 at the local Costco site, which remains a risk of recurrence and would further endanger students and residents. As a resident of the Elderberry on the Bluff community, located directly across from the site in question, our homeowners are significantly concerned about the risk to our property value as well as access to our homes. Increased traffic, noise, loitering, and homeless encampments are all current issues at the W. Shaw Costco location, and are significant concerns to our residents. We urge you - please fight for our homes, our safety, our children's safety. The property in

	question should NOT be zoned for anything but residential use. STOP COSTCO. Help them find a more appropriate location. Sincerely, The Pitts Family (Chris, Kati, Cole (age 13) and Cayson (age 9)
IP Address	45.23.63.128
User-Agent (Browser/OS)	Google Chrome 90.0.4430.210 / Android
Referrer	https://www.fresno.gov/citycouncil/district-2/contact-us/

From: Nunya B Zwaaks
To: Jose Valenzuela
Subject: EIR west Fresno
Date: Tuesday, November 02, 2021 8:05:40 PM

Nay. Objection; Land owner has not given consent to use; Land is not Vacant; Costco is not wanted/needed or requested by any of the living.

TABLE MOUNTAIN RANCHERIA
CULTURAL RESOURCES DEPARTMENT

Brenda D. Lavell
Tribal Chairperson

Beverly J. Hunter
Tribal Vice-Chairperson

Jenna Gosselaar
Tribal Secretary/Treasurer

Richard L. Jones
Tribal Council Member-At-Large

Michelle Heredia-Cordova
Tribal Council Member-At-Large

"Preserving our past, Protecting our future"

Robert Pennell
Cultural Resources Department Director

Office (559) 325-0351
Fax (559) 325-0394

23736 Sky Harbour Road

P.O. Box 410

Friant, California 93626

Office (559) 316-6330

Fax (559) 822-6340

CERTIFIED 3675 3909

October 19, 2021

Jose Valenzuela, Planner III
City of Fresno
2600 Fresno Street, Third Floor
Fresno, Ca. 93721

RE: Project Notifications for Environmental Assessment No. P21-01960, P21-01959, P21-03251, P21-03252 for Plan Amendment, Rezone Application No. P21-01960, Conditional Use Permit Application No. P21-01959, ABC Conditional Use Permit Application No. P21-03251, Planned Development Permit Application No. P21-03252, and the relate vesting tentative tract map, in the City of Fresno, Fresno County

Dear: Jose Valenzuela

Table Mountain Rancheria is responding to your letter dated, October 11, 2021, regarding, Project Notifications for Environmental Assessment No. P21-01960, P21-01959, P21-03251, P21-03252 for Plan Amendment/Rezone Application No. P21-01960, Conditional Use Permit Application No. P21-01959, ABC Conditional Use Permit Application No. P21-03251, Planned Development Permit Application No. P21-03252, and the relate vesting tentative tract map, in the City of Fresno, Fresno County. Thank you for notifying Table Mountain Rancheria of the potential development and request for consultation. The Rancheria is very interested in this project as it lies within our cultural area of interest.

If you have already conducted a record search, please provide Table Mountain Rancheria with copies of any cultural resource report you may have.

At this time, please contact our office at (559) 325-0351 or rpennell@tmr.org to coordinate a discussion and meeting date regarding your project.

Sincerely,

Robert Pennell
Tribal Cultural Resources Director

November 17, 2021

Mr. Jose Valenzuela, Planner III
City of Fresno Planning and Development Department
2600 Fresno Street, Room 3065
Fresno, CA 93721

Dear Mr. Valenzuela:

Below are my additional comments on Environmental Review Process- Scoping Meeting for Costco Development on Herndon and Riverside Dr.

I would like to add to my verbal comments during the On-line meeting the points below to be considered:

Seems the Costco development on northwest Fresno has many fans as the current location is always congested with customers of Costco and other retail locations in the area. However, there are many environmental areas this project will overlap, and I believe this will be detrimental to the community.

The proposed development represents approximately 27% increase size of building, compared to the current location at Shaw Ave. (~130,000 ft^2. to 173,000+ ft^2).

There will also be 32 new gas pumps replacing the existing 12 gas pumps – an increase of 266% gas pump for the delight of Costco customers only. Some neighbors I have talked to about this say this will be an improvement not having many cars, 16 or more, at a time idling waiting for gas to be pumped. The larger capacity of gas pumps will attract many more customers driving their vehicles.

Hopefully the new Costco will also create new jobs as this will be a larger store and, of course, new employees will be needed.

On the other hand, a larger store will need additional loading/unloading bays for the products being sold. This means that additional trucks will be coming through the area to offload/load their cargo. This will in no doubt contribute to the air pollution in the area. Vehicular traffic will also be another contributor to the already polluted air we have to breathe in Fresno.

Following are my strong points to oppose to this development:

- **Vehicular and products delivering traffic contributing to air pollution**
- **32 gas pumps emitting vapors and the potential for as many as twice if not more vehicles idling waiting to pump gas contributing to pollution.**
- **The two above being close to River Bluff Elementary School and Rio Vista Middle School.**
- **Traffic to the closest area that can be called a park (San Joaquin River Trail behind Riverside Golf Course), will be limited.**
- **There seems that no additional "Green" areas are earmarked for development for recreation of residents along this new Costco.**

We already have had the Market Place at El Paseo contributing to these detrimental activities of pollution where eight gas pumps at the Valero Gas Station and 12 additional gas pumps at the ne 76-Gas station have been built and yet no other efforts to provide Green areas for the enjoyment of this once only housing community has happened.

I sure hope the Environmental Impact Committee and the City of Fresno Planning and Development Department (Jose Valenzuela, Planner III) take into consideration these and other's residents' requests to stop this development and to relocate it to other areas where the Costco can actually make a positive impact on the community and the environment is not affected. I recommend any place south of the 180-freeway, West of the 99 and 41 freeways or what is called Southwest Fresno.

Thanks

Rangel Melendez

CC:
Mike Karbassi
Facebook
Nextdoor

Appendix B

Geotechnical Study

May 20, 2021
Kleinfelder Project No. 20212905.001A

Costco Wholesale
999 Lake Drive
Issaquah, Washington 98027

Attention: Ms. Kim Katz
Director of Real Estate Development

SUBJECT: Geotechnical Study
Proposed Costco Wholesale Warehouse and Fuel Facility
NE Corner of West Herndon Avenue and North Riverside Drive
Fresno, California 93722
CW# 20-0569

Dear Ms. Katz:

Kleinfelder is pleased to present this report summarizing our geotechnical study for the proposed Costco Wholesale Warehouse and Fuel Facility located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The conclusions and recommendations presented in this report are subject to the limitations presented in Section 7.

We appreciate the opportunity to provide geotechnical engineering services to you on this project. If you have any questions regarding this report or if we can be of further service, please do not hesitate to contact Andrea Traum 408.595.3275, or Andy Franks, Kleinfelder's Client Account Manager for Costco at 480.650.4905.

Sincerely,

KLEINFELDER, INC.

Dan Dockendorf, EIT
Project Engineer

Andrea Traum, PE, LEED AP
Senior Program Manager

KLEINFELDER 380 North First Street, Suite A, San Jose, CA 95112 p | 949.727.4466

GEOTECHNICAL STUDY
PROPOSED COSTCO WHOLESALE WAREHOUSE AND FUEL FACILITY
NE CORNER OF WEST HERNDON AVENUE AND NORTH RIVERSIDE DRIVE
FRESNO, CALIFORNIA 93722
CW# 20-0569
KLEINFELDER PROJECT NO. 20212905.001A

MAY 20, 2021

A Report Prepared for:

Ms. Kim Katz
Costco Wholesale
999 Lake Drive
Issaquah, Washington 98027

GEOTECHNICAL STUDY
PROPOSED COSTCO WHOLESALE WAREHOUSE AND FUEL FACILITY
NE CORNER OF WEST HERNDON AVENUE AND NORTH RIVERSIDE DRIVE
FRESNO, CALIFORNIA 93722
CW# 20-0569

Dan Dockendorf, EIT
Project Engineer

Brian E. Crystal, PE, GE
Principal Geotechnical Engineer

KLEINFELDER
380 North First Street, Suite A
San Jose, CA 95112
Phone: 831.755.7900

May 20, 2021
Kleinfelder Project No. 20212905.001A

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EXECUTIVE SUMMARY

This report presents the results of Kleinfelder's geotechnical study for proposed Costco Wholesale Warehouse (CW# 20-0569) located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The purpose of our geotechnical study was to evaluate soil and groundwater conditions at the site and provide geotechnical recommendations for project design and construction. We based our study on the Costco Wholesale Development Requirements (CWDRs), Version 2020, dated December 18, 2020.

Kleinfelder understands Costco plans to purchase an approximately 23.7-acre site to construct a new approximately 178,000-square-foot warehouse, fuel facility, and car wash. The warehouse building will be a single-story, steel-framed structure (30 feet in height) with concrete-masonry unit and metal walls. The fuel facility will contain three 40,000-gallon underground storage tanks (USTs), a fuel additive UST, four fueling islands, and a pre-manufactured metal canopy. The car wash will consist of an approximately 180-foot tunnel with an automobile queuing area. The building surroundings will consist mainly of surface parking with landscape areas. Two outparcels located on the western side of the property parallel to Riverside Drive are also included in this study. The current civil plans do not specify the future developments for these outparcels.

Grading plans are still in development and the finished floor elevations (FFE) for the warehouse has not yet been established. We anticipate the finished grades of will generally match existing grades, with less than 5 feet of cut or fill. Surface elevations indicate that existing grades vary from a high at approximate Elevation 302 feet at the southern portion of the site bordering West Herndon Avenue to a low at approximate Elevation 294 feet at the northern portion of the site bordering the Riverside Golf Course.

The project site is located north of West Herndon Avenue and east of North Riverside Drive as shown on Figure 1. The warehouse is planned in the southeastern portion of the property and the fuel facility is on the northeastern corner. The remainder of the site will be covered in surface parking and drive aisles and landscaping. At the time of our field exploration, the site was covered by light vegetation and tilled soil. The surface of the site was fairly dry at the time of exploration, when the site was flooded with rain, it was inaccessible with a truck mounted drill rig. Based on a review of aerial photography dating back to 1998 the site was used for agricultural purposes.

Subsurface conditions at the site were explored by drilling 38 borings and excavating 18 test pits. A total of 21 borings and 6 test pits were drilled/excavated in the building area; 13 borings and 5 test pits were drilled/excavated in the parking and drive areas; 4 borings and 1 test pit were

drilled/excavated in the fuel facility; 2 test pits were excavated within the car wash facility; and finally 2 test pits were excavated within the outparcels adjacent to the Costco parking lot. The borings were drilled using truck-mounted, hollow-stem-auger drilling equipment to depths of approximately 21½ and 51½ below the existing ground surface (bgs) in the warehouse building area; approximately 11½ feet bgs in the parking and drive areas; and approximately 26½ feet bgs in the fuel facility area. The test pits were excavated to depths of about 10 feet bgs or practical refusal with a rubber tired backhoe. The approximate locations of the borings and test pits are presented on Figure 2, Exploration Location Map.

The soils encountered within our borings and test pits were comprised primarily of alluvial fan deposits to the maximum depth of our field explorations (51½ feet bgs). There was an observed "plow zone" across the site at depths varying between 6 and 16 inches deep across the site. This plow zone or topsoil layer consisted of tilled sandy lean clays and silts with variable amounts of sand. The observed organic content of the topsoil was between ½ and 1½ percent. The alluvial deposits underlaying the topsoil were generally composed of interbedded layers of stiff to very stiff silts and clays with variable amounts of sand and medium dense to dense poorly graded sands, and silty sand. Soils between approximately 3 to 6 feet were observed to be weakly to moderately cemented underlain by soils with no visible cementation to the maximum depths explored in this investigation.

Based on the results of our field exploration, it is our professional opinion that the proposed project is geotechnically feasible, provided the recommendations presented in the geotechnical report are incorporated into the project design and construction. We identified the following key geotechnical considerations during our study.

- The proposed Costco warehouse building, fuel facility, and car wash may be supported on a conventional shallow foundation system. Overexcavation and recompaction of the on-site soils is recommended to mitigate loose shallow soils and provide relatively uniform support for the proposed warehouse and other improvements.
- Soils within 10 feet of the warehouse pad (including the entrance canopy, building aprons, utility pads, stairs, ramps, stoops, and the loading dock) should be overexcavated to a depth of at least 4 feet below existing grade or 2 feet below the bottom of the footings and floor slabs, whichever is deeper, and replaced as structural fill. If fill soils are encountered at the base of the overexcavation within the warehouse pad, the overexcavation should continue until the fill is removed. The on-site soils can be moisture conditioned and reused as structural fill.

- Existing soils below the car wash facility should be overexcavated to depth of at least 2 feet below the bottom of foundations, moisture conditions, and replaced as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 5 feet.
- Soils in pavement, sidewalk, and other flatwork areas should be overexcavated to a depth of at least 18 inches below existing grade or 12 inches below the finished subgrade elevation, whichever is deeper. The overexcavated soils can be moisture conditioned and recompacted as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 2 feet.
- Difficult excavation conditions may be encountered within the strongly cemented hardpan layers observed between 4 and 6 feet across the site.
- Organic matter in the topsoil is low (between ½ to 1½ percent) based on laboratory testing Stripping of topsoil is not necessary. However, any roots and vegetative matter in excess of one inch should be removed by screening or raking prior to reuse as structural fill. After screening or raking, the surface soils can be moisture conditioned and used as structural fill.
- Following overexcavation and prior to replacing soils, the exposed subgrade should be compacted with at least a 10-ton roller, fully-loaded tandem-axle dump truck or water truck. Areas identified as being soft or yielding may require additional compaction or overexcavation, as determined by Kleinfelder.
- The on-site clays should not be used as retaining wall backfill. The granular backfill, which should meet the requirements for imported fill as defined in Section 5.2.4, should extend behind walls a horizontal distance of at least one-half the height of the wall.
- We recommend granular (sandy) fill soils and imported material should be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557) in accordance with the CWDRs. Clayey fill soils should be compacted at least 92 percent of the soil's maximum dry unit weight (ASTM D1557). Compacting clayey soils to at least 92 percent relative compaction will achieve the necessary strength assumed in our design recommendations.
- The site soils are fine-grained, moisture sensitive, and susceptible to disturbance, rutting, and pumping during construction. The contractor should plan to repair subgrade conditions that become unstable/disturbed and should develop a plan to manage subgrade trafficability across the site throughout the construction period. Features of this plan may include temporary surface haul roads, limited traffic routes, etc.

- The resistivity values found for the samples tested indicate that the soil may be corrosive ferrous metals. The concentrations of soluble sulfates indicate that the subsurface soils represent a Class S0 exposure to sulfate attack on concrete in contact with the soil based on ACI 318-14 Table 19.3.1.1 (ACI, 2014). Therefore, in accordance with ACI Building Code 318-14, no special provisions for selection of cement type are required.
- Based on the results of the infiltration testing and our laboratory testing, it is our opinion that the site is suitable for infiltration BMPs, provided the following recommendations are incorporated into the design and construction. Due to the variability in infiltration rates, we recommend that a design infiltration rate of 0.3 inch per hour be used for the soils at the base of the BMPs.

The findings, conclusions, and recommendations presented in this executive summary should not be relied upon without consulting our geotechnical report for more information. The conclusions and recommendations presented in this report are subject to the limitations presented in Section 7.

1 INTRODUCTION

This report presents the results of Kleinfelder's geotechnical study for proposed Costco Wholesale Warehouse (CW# 20-0569) located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The location of the project site is presented on Figure 1, Site Vicinity Map. The purpose of our geotechnical study was to evaluate soil and groundwater conditions at the site and provide geotechnical recommendations for project design and construction. The scope of our services was presented in our proposal titled, "Proposal for Geotechnical Study, Proposed Costco Wholesale Warehouse and Fuel Facility, NEC of West Herndon Avenue and North Riverside Drive, Fresno, California, CW# 20-0569," dated December 4, 2020. We based our study on the Costco Wholesale Development Requirements (CWDRs), Version 2020, dated December 18, 2020.

This report presents a description of the services performed, a discussion of the geotechnical conditions observed at the site, and recommendations developed from our engineering analyses of field and laboratory data. Individuals using this report should read the limitations presented in Section 7.

1.1 PROJECT DESCRIPTION

Kleinfelder understands Costco plans to purchase an approximately 23.7-acre site to construct a new approximately 178,000-square-foot warehouse, fuel facility, and car wash. The warehouse building will be a single-story, steel-framed structure (30 feet in height) with concrete-masonry unit and metal walls. The fuel facility will contain three 40,000-gallon underground storage tanks (USTs), a fuel additive UST, four fueling islands, and a pre-manufactured metal canopy. The car wash will consist of an approximately 180-foot tunnel and automobile queuing area. The building surroundings will consist mainly of surface parking with landscape areas. Two outparcels located on the western side of the property parallel to Riverside Drive are also included in this study. The current civil plans do not specify the future developments for these outparcels.

Based on the CWDRs, we understand maximum column loads will be on the order of 150 kips, typical wall loads will be approximately 4.5 kips per lineal foot, canopy column loads will be approximately 50 kips, and the total slab load (dead plus live loads) will be approximately 500 psf. The warehouse surroundings will consist mainly of parking with a loading dock and some landscaped areas. Parking and drive areas will be paved with either Portland cement concrete or asphalt concrete pavements.

Grading plans are still in development and the finished floor elevations (FFE) for the warehouse has not yet been established. We anticipate the finished grades of will generally match existing grades, with less than 5 feet of cut or fill. Surface elevations indicate that existing grades vary from a high at approximate Elevation 302 feet at the southern portion of the site bordering West Herndon Avenue to a low at approximate Elevation 294 feet at the northern portion of the site bordering the Riverside Golf Course.

1.2 SCOPE OF SERVICES

The scope of our geotechnical study consisted of a literature review, subsurface explorations, geotechnical laboratory testing, engineering evaluation and analysis, and preparation of this report. Studies to assess environmental hazards that may affect the soil and groundwater at the site were beyond our geotechnical scope of services. The following paragraphs present a description of our services.

1.2.1 Task 1 – Background Data Review

We reviewed readily-available published and unpublished geologic literature in our files and the files of public agencies, including selected publications prepared by the California Geological Survey (formerly known as the California Division of Mines and Geology) and the U.S. Geological Survey (USGS). We also reviewed readily available seismic and faulting information, including data for designated earthquake fault zones as well as our in-house database of faulting in the general site vicinity.

1.2.2 Task 2 – Field Exploration

Subsurface conditions at the site were explored by drilling 38 borings and excavating 18 test pits. A total of 21 borings and 6 test pits were drilled/excavated in the building area; 13 borings and 5 test pits were drilled/excavated in the parking and drive areas; 4 borings and 1 test pit were drilled/excavated in the fuel facility; 2 test pits were excavated within the car wash facility; and finally 2 test pits were excavated within the outparcels adjacent to the Costco parking lot.

The borings were drilled using truck-mounted, hollow-stem-auger drilling equipment to depths of approximately 21½ and 51½ below the existing ground surface (bgs) in the warehouse building area; approximately 11½ feet bgs in the parking and drive areas; and approximately 26½ feet bgs in the fuel facility area. The test pits were excavated to depths of about 10 feet bgs or practical refusal with a rubber tired backhoe. The approximate locations of the borings and test pits are presented on Figure 2, Exploration Location Map.

Prior to commencement of the fieldwork, Underground Service Alert (USA) was notified and various geophysical techniques were used at the boring and test pit locations to identify potential conflicts with subsurface structures. A Kleinfelder staff engineer supervised the field operations and logged the explorations. Selected samples were retrieved, placed in plastic bags, or sealed, and transported to our Stockton laboratory for evaluation. Descriptions used on the logs result from field observations and data, as well as from laboratory test data. Stratification lines on the logs represent the approximate boundary between soil types, and the actual transition may vary and can be gradual. Appendix A presents a description of the field exploration program, exploration logs, test pit logs and a legend of terms and symbols used on the logs.

1.2.3 Task 3 – Laboratory Testing

Laboratory testing was performed on representative bulk and relatively undisturbed samples to assist in soil classification and development of engineering parameters for geotechnical design. Laboratory testing consisted of moisture content, dry unit weight, sieve analysis, wash sieve (percent passing No. 200 sieve), Hydrometer, Atterberg limits, direct shear, unconfined compression, modified Proctor, and R-value. Laboratory testing was performed by Kleinfelder's laboratory with the exception of corrosivity testing, which was performed by Sunland Analytical of Sacramento, California. Appendix B presents the results of the laboratory testing performed for this study.

Analytical testing was performed on a composite topsoil sample for essential elements in accordance with CWDRs, and sixteen topsoil samples were tested for organic content. The topsoil analysis and organic content testing were performed by Waypoint Analytical to assess soil fertility, localized concentrations of various metals, and organic content. Appendix B also presents analytical test results.

1.2.4 Task 4 – Geotechnical Analyses

We analyzed field and laboratory data relative to the finished grades, warehouse layout, and structural loads to provide geotechnical recommendations for design and construction. We evaluated feasible foundation systems, concrete slab support, pavement design, and earthwork.

1.2.5 Task 5 – Report Preparation

This report summarizes the services performed, data acquired, and our findings, conclusions, and geotechnical recommendations for the design and construction of the proposed improvements.

Our report includes the following items:

- An executive summary;
- Vicinity map and field exploration location map showing the approximate boring and test pit locations;
- Boring and test pit logs (Appendix A);
- Results of laboratory testing (Appendix B);
- Discussion of general site conditions;
- Discussion of general subsurface conditions as encountered in our field exploration,
- Discussion of regional and local geology and site seismicity;
- Discussion on liquefaction and seismic settlement;
- Recommendations for seismic design parameters in accordance with the 2019 California Building Code (CBC);
- Recommendations for foundation design, allowable bearing pressures, embedment depths, and compatibility constraints under various loading conditions;
- Anticipated total and differential static settlements;
- Recommendations for site preparation, earthwork, temporary slope inclinations, fill placement, and compaction specifications, including the excavation characteristics of subsurface soil deposits and formational materials;
- Recommendations for support of floor slabs and slabs-on-grade;
- Recommendations for flexible and rigid pavement structural sections for light- and heavy-duty pavement based on Equivalent Single Axle loading presented in the CWDRs;
- Recommendations for design of retaining structures, including active and at-rest lateral earth pressures, passive and frictional resistance, and applicable surcharge loads;
- Fuel Facility Underground Storage Tank (UST) excavation side slopes, including temporary shoring recommendations, if required; and
- Preliminary evaluation of the corrosion potential of the on-site soils

2 SITE CONDITIONS

2.1 SITE DESCRIPTION

The project site is located north of West Herndon Avenue and east of North Riverside Drive as shown on Figure 1. The site is currently bounded by West Herndon Avenue to the south, North Riverside Drive to the east, Riverside Golf Course to the north and a vacant lot and industrial warehouses to the east. The warehouse is planned in the southeastern portion of the property, the fuel facility in the northeastern corner, and the car wash facility directly west of the fuel facility. The remainder of the site will be covered by surface parking and drive aisles and landscaping. Two smaller outparcels located on the northwest and southwest corners of the site are planned to be occupied by other tenants.

At the time of our field exploration, the project site and associated outparcels were covered by light vegetation and plowed/tilled soil. The surface of the site was fairly dry at the time of exploration; however, a few weeks early, the site was flooded and inaccessible with a truck mounted drill rig due to recent rains. Based on a review of aerial photography dating back to 1998 the site was used for agricultural purposes.

3 GEOLOGY

3.1 GEOLOGIC SETTING

Geologic mapping compiled by the CGS (Matthews and Burnett, 1965) indicates the site geology is composed of Recent Great Valley fan deposits north of the San Joaquin River, Recent Great Valley stream and channel deposits within the San Joaquin River, and Pleistocene nonmarine deposits south of the San Joaquin River. The Natural Resources Conservation Survey (NRCS, formerly Soil Conservation Service) has mapped the soils in the project site area as Hanford sandy loam, which consists primarily of sand and silt.

3.2 SUBSURFACE CONDITIONS

The soils encountered within our borings and test pits were comprised primarily of alluvial fan deposits to the maximum depth of our field explorations (51½ feet bgs). There was an observed "plow zone" across the site at depths varying between 6 and 16 inches deep across the site. This plow zone or topsoil layer consisted of tilled sandy lean clays and silts with variable amounts of sand. The observed organic content of the topsoil was between ½ and 1½ percent. The alluvial deposits underlaying the topsoil were generally composed of interbedded layers of stiff to very stiff silts and clays with variable amounts of sand and medium dense to dense poorly graded sands, and silty sand. Soils between approximately 4 to 6 feet were observed to be weakly to strongly cemented (hardpan) underlain by soils with no visible cementation to the maximum depths explored in this investigation.

3.3 GROUNDWATER

According to regional well record data published by the California Department of Water Resources (DWR), current groundwater levels in the site area are between approximately Elevation 197 to 200 feet above mean sea level (msl, based on WGS84 vertical datum). Groundwater was not encountered at the time of the field exploration to a maximum depth of 50 feet below ground surface.

It is possible that groundwater conditions at the site could change due to variations in rainfall, groundwater withdrawal or recharge, construction activities, well pumping, or other factors not apparent at the time the explorations were performed.

3.4 ASSESSMENT OF POTENTIAL GEOLOGIC HAZARDS

3.4.1 Localized Faulting

Earthquakes occur as fractures or boundaries with tectonic plates, which comprise the Earth's crust, or lithosphere, move relative to one-another. These boundaries can be discrete faults observed at the surface or as buried (blind) structures at depth. The site is not located within the California Geologic Survey (CGS) designated Alquist-Priolo Earthquake Fault Zone, and no mapped active fault traces are known to project towards or transverse the site (Hart and Bryant, 2007). Because there are no mapped active or potentially active faults in the general vicinity of the site, the potential for fault-related ground surface rupture at the site is considered low.

The site is located in a region traditionally characterized by low seismic activity. Based on review of published data and a current understanding of the geologic framework and tectonic setting of the proposed development, the primary sources of seismic shaking are anticipated to be the Great Valley Fault and San Andreas Fault, which are located at distances of about 42 miles and 65 miles from the site, respectively.

3.4.2 Landsliding

Landslides and other forms of mass wasting, including mud flows, debris flows, soil slips, and rock falls occur as soil or rock moves down slope under the influence of gravity. Landslides are frequently triggered by intense rainfall or seismic shaking. Debris flows are known to travel great distances from their source based on the gradients, channel geometry and amount of fluid within the slide mass.

The site and surrounding area are relatively flat; therefore, landslides or other forms of natural slope instability do not represent a hazard to the project.

3.4.3 Liquefaction and Seismic Compression

The term liquefaction describes a phenomenon in which saturated, cohesionless soils temporarily lose shear strength (liquefy) due to increased pore water pressures induced by strong, cyclic ground motions during an earthquake. Structures founded on or above potentially liquefiable soils may experience bearing capacity failures due to the temporary loss of foundation support, vertical settlements (both total and differential), and/or undergo lateral spreading. The factors known to influence liquefaction potential include soil type, relative density, grain size, confining pressure, depth to groundwater, and the intensity and duration of the seismic ground shaking. Liquefaction

is most prevalent in loose to medium dense, silty, sandy, and gravelly soils below the groundwater table. Due to the lack of groundwater in the upper 50 feet below, liquefaction and its adverse effects are not a hazard at this site.

3.4.4 Expansive Soils

Expansive soils are characterized by their ability to undergo significant volume changes (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors, and may result in unacceptable settlement or heave of structures or concrete slabs supported on grade. The surficial soils are generally sandy lean clays and silts with variable amounts of sand. Based on laboratory test results, the surficial soils exhibit a low expansion potential.

3.4.5 Collapsible Soils

Collapsible soils are characterized by their ability to undergo significant shrinkage (collapse) during inundation. Inundation in soils can result from precipitation, landscape irrigation, utility leakage, roof drainage, perched groundwater, drought, or other factors and may result in unacceptable settlement or heave of structures or concrete slabs supported on grade. Based on soil densities and water contents, the soils encountered are not expected to collapse during inundation, so the impact of collapsible soils for this site is considered low.

3.4.6 Flooding

The Flood Insurance Rate Map prepared by the Federal Emergency Management Agency (FEMA) was reviewed to identify the potential flood hazard for the project. This map indicates the site is within Zone X which is defined as being an area outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance flood. Based on this information the potential for the project site to be impacted by regional flooding is considered low. Based on this information the potential for the project site to be impacted by regional flooding is considered low. Flooding could occur from the nearby San Joaquin River located at approximately 2,000 feet north of the site.

3.4.7 Subsidence

The site is not located in an area of known significant ground subsidence due to the withdrawal of subsurface fluids. Subsidence may be present but adverse impacts have not been recorded.

Therefore, the potential for subsidence occurring at the site due to the withdrawal of oil, gas, or water is considered low.

3.4.8 Oil and Gas Fields

The California Division of Oil, Gas & Geothermal Resources (2021) has not mapped this site within any existing local oil field. Based on the map, the site is located approximately 2.5 miles west of abandoned oil wells which are located within the Streets of Brentwood Mall property. No active wells are known to exist within the project boundary. The nearest well is number API 0401920145 located approximately 2.5 miles east of the project site. This well is listed as plugged and abandoned as of April 27, 2018 (DOGGR, 2021).

4 GEOTECHNICAL DESIGN RECOMMENDATIONS

4.1 GENERAL

Based on the results of our field exploration, laboratory testing, and engineering analyses conducted during this study, it is our professional opinion the proposed project is geotechnically feasible, provided the design and construction recommendations presented in this report are incorporated into the project. We identified the following key geotechnical considerations during our study.

- The proposed Costco warehouse building, fuel facility, and car wash may be supported on a conventional shallow foundation system. Overexcavation and recompaction of the on-site soils is recommended to mitigate loose shallow soils and provide relatively uniform support for the proposed warehouse and other improvements.
- Soils within 10 feet of the warehouse pad (including the entrance canopy, building aprons, utility pads, stairs, ramps, stoops, and the loading dock) should be overexcavated to a depth of at least 4 feet below existing grade or 2 feet below the bottom of the footings and floor slabs, whichever is deeper, and replaced as structural fill. If fill soils are encountered at the base of the overexcavation within the warehouse pad, the overexcavation should continue until the fill is removed. The on-site soils can be moisture conditioned and reused as structural fill.
- Existing soils below the car wash facility should be overexcavated to depth of at least 2 feet below the bottom of foundations, moisture conditioned, and replaced as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 5 feet.
- Soils in pavement, sidewalk, and other flatwork areas should be overexcavated to a depth of at least 18 inches below existing grade or 12 inches below the finished subgrade elevation, whichever is deeper. The overexcavated soils can be moisture conditioned and recompacted as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 2 feet.
- Difficult excavation conditions may be encountered within the strongly cemented hardpan layers observed between 4 and 6 feet across the site.
- Organic matter in the topsoil is low (between ½ to 1½ percent) based on laboratory testing. Stripping of topsoil is not necessary. However, any roots and vegetative matter in excess of one inch should be removed by screening or raking prior to reuse as structural fill. After

screening or raking, the surface soils can be moisture conditioned and used as structural fill.

- Following overexcavation and prior to replacing soils, the exposed subgrade should be compacted with at least a 10-ton roller, fully-loaded tandem-axle dump truck or water truck. Areas identified as being soft or yielding may require additional compaction or overexcavation, as determined by Kleinfelder.
- The on-site clays should not be used as retaining wall backfill. The granular backfill, which should meet the requirements for imported fill as defined in Section 5.2.4, should extend behind walls a horizontal distance of at least one-half the height of the wall.
- We recommend granular (sandy) fill soils and imported material should be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557) in accordance with the CWDRs. Clayey fill soils should be compacted at least 92 percent of the soil's maximum dry unit weight (ASTM D1557). Compacting clayey soils to at least 92 percent relative compaction will achieve the necessary strength assumed in our design recommendations.
- The site soils are fine-grained, moisture sensitive, and susceptible to disturbance, rutting, and pumping during construction. The contractor should plan to repair subgrade conditions that become unstable/disturbed and should develop a plan to manage subgrade trafficability across the site throughout the construction period. Features of this plan may include temporary surface haul roads, limited traffic routes, etc.
- The resistivity values found for the samples tested indicate that the soil may be corrosive ferrous metals. The concentrations of soluble sulfates indicate that the subsurface soils represent a Class S0 exposure to sulfate attack on concrete in contact with the soil based on ACI 318-14 Table 19.3.1.1 (ACI, 2014). Therefore, in accordance with ACI Building Code 318-14, no special provisions for selection of cement type are required.
- Based on the results of the infiltration testing and our laboratory testing, it is our opinion that the site is suitable for infiltration BMPs, provided the following recommendations are incorporated into the design and construction. Due to the variability in infiltration rates, we recommend that a design infiltration rate of 0.3 inch per hour be used for the soils at the base of the BMPs.

The following opinions, conclusions, and recommendations are based on the properties of the materials encountered in the borings and test pits, the results of the laboratory-testing program, and our engineering analyses performed, and should be incorporated into project design and construction.

4.2 2019 CBC SEISMIC DESIGN PARAMETERS

According to the 2019 California Building Code, every structure, and portion thereof, including non-structural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7-16, excluding Chapter 14 and Appendix 11A. The Seismic Design Category for a structure may be determined in accordance with Section 1613.3.5 of the 2019 CBC.

Based on information obtained from the investigation, published geologic literature and maps, and on our interpretation of the 2019 CBC criteria, it is our opinion that the project site may be classified as Site Class D, Stiff Soil, according to Section 1613.3.2 of 2019 CBC and Table 20.3-1 of ASCE/SEI 7-16. Approximate coordinates for the site are noted below.

Latitude: 36.83809 °N
Longitude: 119.90885 °W

The Risk-Targeted Maximum Considered Earthquake (MCER) mapped spectral accelerations for 0.2 seconds and 1 second periods (Ss and S1) were estimated using Section 1613.3 of the 2019 CBC and the California Office of Statewide Planning and Development (OSHPD) seismic design maps web-based application (available at https://seismicmaps.org/). In accordance with Section 11.4.8 of ASCE 7-16, a site-specific ground motion analysis is required for Site Class D sites with an S1 greater than 0.2 g. However, a site-specific ground motion analysis is not required if the seismic response coefficient (Cs) is determined in accordance with requirements of Chapter 12 and exceptions as noted in Section 11.4.8. The assumption that Cs may be determined in accordance with the requirements of Chapter 12 and exceptions as noted in Section 11.4.8 should be verified by the project structural engineer during final design. The 2019 CBC Seismic Design Parameters (non-site-specific) for these structures are summarized in table 1.

TABLE 1
2019 CBC SEISMIC DESIGN PARAMETERS

DESIGN PARAMETER	RECOMMENDED VALUE
Site Class	D
S_s (g)	0.607
S_1 (g)	0.234
F_a	1.315
F_v	N/A*
S_{MS} (g)	0.798
S_{M1} (g)	N/A
S_{DS} (g)	0.532
S_{D1} (g)	N/A
PGA_M (g)	0.351

* Section 11.4.8 of ASCE 7-16 requires a site-specific ground motion hazard analysis be performed for Site Class D sites with S_1 values greater than or equal to 0.2g unless exceptions are taken. If exceptions are taken, then a F_v value of 2.132 could be used only to calculate the T_s value.

4.3 FOUNDATIONS

4.3.1 General

Based on the results of our field exploration, laboratory testing, and geotechnical analyses, the proposed warehouse building, fuel facility canopy and car wash may be supported on conventional shallow spread footing foundations founded on subgrade prepared in accordance with Section 5.2.2. Proposed light poles may be supported on drilled pile foundations. Recommendations for the design and construction of shallow foundations and drilled pile foundations are presented below.

4.3.2 Conventional Shallow Foundations

Allowable Soil Bearing Pressure

Footings founded on engineered fill may be designed for a net allowable soil bearing pressure of 3,000 pounds per square foot (psf) for dead plus sustained live loads. Footings should be embedded at least 18 inches below the lowest adjacent exterior grade. A one-third increase in the above bearing pressures can be used for short term load conditions for wind or seismic loads. The footing dimension and reinforcement should be designed by the structural engineer; however, continuous footings should have minimum widths of 18 inches.

Estimated Settlement

We estimate total static settlement for foundations designed and constructed in accordance with the recommendations presented above to be less than 1 inch. Differential static settlement between similarly loaded footings is estimated to be ½ inch or less over 50 feet.

Lateral Resistance

Lateral load resistance may be derived from passive resistance along the vertical sides of the footings, friction acting at the base of the footing, or a combination of the two. An allowable passive resistance of 250 psf per foot of depth may be used for design. Allowable passive resistance values should not exceed 2,500 psf. An allowable coefficient of friction of 0.30 between the base of the footings and the structural fill soils can be used for sliding resistance using the dead load normal stresses. Friction and passive resistance may be combined without reduction. We recommend that the first foot of soil cover be neglected in the passive resistance calculations if the ground surface is not protected from erosion or disturbance by a slab, pavement, or in a similar manner.

4.3.3 Short Drilled Pile Foundations (Light Poles)

Axial Capacity

The compressive axial capacity of drilled piles may be estimated based on an allowable skin friction capacity of 150 pounds per square foot. The upper one foot of the skin friction capacity should be ignored. The uplift capacity may be estimated as 70 percent of the allowable compressive axial capacity. A one-third increase in the allowable capacities may be used for transient loading conditions such as wind or seismic loads.

Settlement

Static settlement of the proposed light pole foundations supported on short drilled piles, as recommended, is estimated to be less than ½ inch.

Lateral Resistance

The drilled pile foundations lateral resistance can be designed in general accordance with Section 1807.3 of the 2019 CBC. We recommend a lateral soil bearing pressure of 250 psf per foot of depth below grade. The total lateral soil bearing pressure should not exceed 2,500 psf per pile. Since drilled piles will act as isolated pole foundations, the allowable lateral soil bearing pressure may be

increased by a factor of 2 for short-term lateral loads provided the structure will not be adversely affected by ½ inch of lateral movement at the ground surface.

4.4 BUILDING SLAB-ON-GRADE

Concrete slab-on-grade floors are appropriate for the proposed warehouse, provided the subgrade is prepared in accordance with Section 5.2.2. In accordance with the CWDRs, we recommend the slab be a minimum nominal thickness of 6 inches and underlain by at least 6 inches of aggregate base material. Aggregate base materials should meet current Caltrans specifications for Class 2 aggregate base. Please note that Caltrans Class 2 aggregate base may utilize recycled materials. The use of recycled material under building slabs is typically not allowed and requires Costco's approval.

A modulus of subgrade reaction of 150 pounds per cubic inch may be used for design of slabs underlain 6 inches of aggregate base material. Pursuant to current Costco Wholesale standard construction design practices, we have evaluated the necessity of using a steel-reinforced slab. Provided the building slabs are constructed on structural fill prepared as recommended in Section 5.2.4, the proposed warehouse buildings can be built with non-reinforced slabs.

Floor slab control joints should be used to reduce damage due to shrinkage cracking. Control joint spacing is a function of slab thickness, aggregate size, slump and curing conditions. The requirements for concrete slab thickness, joint spacing, and reinforcement should be established by the designer, based on experience, recognized design guidelines and the intended slab use. Placement and curing conditions will have a strong impact on the final concrete slab integrity.

Kleinfelder typically recommends installation of a vapor barrier beneath the slab to mitigate potential moisture issues such as flooring performance and mold. However, we understand that Costco Wholesale has determined that moisture barriers are not to be used in construction of Costco Wholesale warehouses due to adverse effects on concrete curing and performance. Therefore, we have provided construction recommendations that do not include installation of a moisture barrier, with the understanding that there will be an increased risk for adverse moisture issues.

4.5 EXTERIOR FLATWORK

Prior to casting exterior flatwork, the subgrade soils should be scarified, moisture conditioned, and recompacted or overexcavated, as recommended in Section 5.2.2. Additionally, all flatwork

should be underlain at a minimum by 4.0 inches of aggregate base moisture conditioned to at least the optimum moisture content and compacted to not less than 95 percent relative compaction (ASTM D1557). Flatwork should be at least four inches thick. Flatwork subjected to wheel loads should be designed in accordance with Section 4.8.

4.6 SITE DRAINAGE

Foundation and slab performance depends greatly on proper irrigation and how well runoff water drains from the site. This drainage should be maintained both during construction and over the entire life of the project. The ground surface around structures should be graded such that water drains away from structures without ponding. The surface gradient needed to do this depends on the landscaping type. Surface gradients should conform to current Costco Wholesale standards and the CBC.

Pavement underdrains at drainage inlets and catch basins should be included as shown in Detail 16_16 of the CWDRs. Drains should be designed and constructed per Costco's standard details and laterals should extend at least 10 feet from the catch basins. Perimeter foundation drains are not necessary.

Where slabs or pavement areas abut landscaped areas, the aggregate base and subgrade soil should be protected against saturation. Vertical cut off structures are recommended to reduce lateral seepage under slabs from adjacent landscaped areas. Vertical cut-off structures may consist of deepened concrete perimeters, or equivalent, extending at least three inches below the base/subgrade interface. Vertical cut-off structures should be poured neat against undisturbed native soil or compacted fill. The cut-off structures should be continuous.

Operations personnel should be instructed to limit irrigation to the minimum level necessary to properly sustain landscaping plants. Should excessive irrigation, waterline breaks, or unusually high rainfall occur, saturated zones and "perched" groundwater may develop, which could soften subgrade and reduce pavement life, and could also create potholes. We also recommend that the downspouts from roof drains be connected to a designed subsurface drainage system such as a storm sewer, etc. to avoid discharging water onto pavement areas and backfill zones around the warehouse.

Potential sources of water such as water pipes, drains, and the like should be frequently examined for signs of leakage or damage. Any such leakage or damage should be promptly repaired.

Sewer lines beneath the warehouse should have a sufficient slope (at least 1 percent). Plumbing and utility lines should be provided with flexible joints or oversized sleeves where they penetrate floor slabs to prevent breakage caused by different slab movement. In addition, utility trenches should be plugged with cohesive backfill where they enter the building to reduce moisture infiltration along pipe bedding material. The cohesive backfill materials should have a plasticity index (PI) between 15 and 30 and no less than 70 percent of the particles passing the No. 200 sieve.

4.7 RETAINING STRUCTURES

Design earth pressures for retaining structures depend primarily on the allowable wall movement, wall inclination, type of backfill materials, backfill slopes, surcharges, and drainage. The earth pressures provided assume that granular (sandy) soils will used as backfill. The on-site clays should not be used as retaining wall backfill. The granular backfill, which should meet the requirements for imported fill as defined in Section 5.2.4, should extend behind walls a horizontal distance of at least one-half the height of the wall. Determination of whether the active or at-rest condition is appropriate for design will depend on the flexibility of the walls. Walls that are free to rotate at least 0.002 radians (deflection at the top of the wall of at least 0.002 x H, where H is the unbalanced wall height) may be designed for the active condition. Walls that are not capable of this movement should be assumed rigid and designed for the at-rest condition. The recommended active and at-rest earth pressures and passive resistance values are provided in Table 2.

TABLE 2
LATERAL EARTH PRESSURES FOR RETAINING STRUCTURES
(ONSITE/IMPORTED GRANULAR BACKFILL)

Wall Movement	Backfill Condition	Equivalent Fluid Pressure (pcf)	Seismic Increment (pcf)
Free to Deflect (active condition)	Level	40	9H*
Restrained (at-rest condition)		60	N/A**

*Note: * Walls supporting more than 6 feet of backfill should be designed to support an incremental seismic lateral pressure, which is applied as a triangular pressure distribution with a maximum pressure at the bottom of the wall, not inverted, and H is the height of the wall.*

*** for restrained walls, use the static active earth pressure and seismic increment to check the seismic condition; use at-rest earth pressure only to check the static condition; the larger loading of both cases should be used for the design of restrained walls.*

The above lateral earth pressures do not include the effects of surcharges (e.g., traffic, footings), compaction, or truck-induced wall pressures. Any surcharge (live, including traffic, or dead load) located within a 1:1 (horizontal to vertical) plane drawn upward from the base of the excavation

should be added to the lateral earth pressures. The lateral contribution of a uniform surcharge load located immediately behind walls may be calculated by multiplying the surcharge by 0.33 for cantilevered walls under active conditions and 0.50 for restrained walls under at-rest conditions. Walls adjacent to areas subject to vehicular traffic should be designed for a 2-foot equivalent soil surcharge (250 psf). Lateral load contributions from other surcharges located behind walls may be provided once the load configurations and layouts are known.

Walls should be properly drained or designed to resist hydrostatic pressures. Adequate drainage is essential to provide a free-drained backfill condition so that there is no hydrostatic buildup behind the wall. Walls should also be appropriately waterproofed to reduce the potential for staining. Drainage behind loading dock walls can consist of weep holes placed along the base of the wall. Weep holes should be spaced 10 to 15 feet apart and connected with a gravel drain consisting of approximately 2 cubic feet of clean gravel per foot of wall length wrapped with filter fabric. Other types of retaining walls should have a continuous back drain as described below.

For backfill of walls with a continuous back drain, except for the upper 2 feet, the backfill immediately behind retaining walls (minimum horizontal distance of 2 feet measured perpendicular to the wall) should consist of free-draining ¾-inch crushed rock wrapped with filter fabric. The upper 2 feet of cover backfill should consist of relatively impervious material. A 4-inch-diameter perforated PVC pipe, placed perforations down at the bottom of the rock layer leading to a suitable gravity outlet, should be installed at the base of the walls.

As an alternative to the gravel drain noted above, a manufactured drain panel may be utilized behind retaining walls in addition to normal waterproofing. This system generally consists of a prefabricated drain panel lined with filter fabric. At the wall base, we recommend that a gravel drain be installed to collect and discharge drainage to a suitable outlet. The drain should consist of a 4-inch-diameter perforated PVC pipe, placed perforations down at the bottom of approximately 2 cubic feet of clean gravel per foot of wall length. The gravel drain should be wrapped in filter fabric (Mirafi 140N or equivalent). The pipe should be sloped to drain to a suitable outlet and cleanouts should be provided at appropriate intervals.

If drainage behind the wall is omitted, the wall should be designed for full hydrostatic pressure. The design of any drain system should be submitted to Kleinfelder for review to check that our recommendations have been properly incorporated into the design. Installation of the drainage system should be reviewed and documented by a Kleinfelder representative.

4.8 PAVEMENT SECTIONS

The required pavement structural sections will depend on the expected wheel loads, volume of traffic, and subgrade soils. We have provided asphalt concrete pavement sections for traffic indices provided in the CWDRs (Costco, 2020). Positive drainage of the paved areas should be provided since moisture infiltration into the subgrade may decrease the life of pavements. Curbing located adjacent to paved areas should be founded in the subgrade, not the aggregate base, in order to provide a cutoff, which reduces water infiltration into the base course.

The following pavement sections provided above are based on the soil conditions encountered during our field exploration, our assumptions regarding final site grades, and limited laboratory testing.

4.8.1 Costco Pavement Design Parameters

We developed pavement design recommendations using traffic loading parameters provided in the Costco Wholesale Development Requirements and the following test data:

- A 20-year pavement design life;
- Light-duty pavements subject to 6,600 passenger vehicle trips per day (Traffic Index of 5.0);
- Heavy-duty pavements subject to 30 tractor-trailer truck tips per day (Traffic Index of 7.0);
- For asphalt concrete pavements, a design R-value of 50 based on laboratory test results; and
- For Portland cement concrete (PCC) Pavements, a 28-day flexural strength (modulus of rupture determined by the third-point method) of at least 550 pounds per square inch (psi) (approximate compressive strength of 4,000 psi); a modulus of subgrade reaction (k value) of 150 pounds per cubic inch (pci) for native subgrade; and interlock at the control joints.

4.8.2 Asphalt Concrete Pavement

We have developed new asphalt concrete pavement, also referred to as Hot Mix Asphalt (HMA) pavements sections in accordance the Caltrans Highway Design Manual in lieu of the Asphalt Institute Manual Series (MS-1) so that the pavement structural sections are somewhat comparable to the existing sections. HMA should conform to requirements of the Costco Wholesale Specification Section 321216, Asphalt Paving. Table 2 presents recommended HMA

pavement sections. The designer should select the appropriate pavement sections based on project requirements. Prior to placement of aggregate base, pavement subgrade should be prepared in accordance with Section 5.2.2.

TABLE 3
RECOMMENDED MINIMUM ASPHALT CONCRETE PAVEMENT SECTIONS

Traffic Use	Traffic Index, TI	Asphalt Concrete* (inches)	Aggregate Base* (inches)
Light-Duty Pavement	5.0	3.0	4.0
Heavy-Duty Pavement	7.0	4.0	5.0

* Rounded to the closest ½ inch.

4.8.3 Asphalt Performance Grade Binder

An asphalt performance grade (PG) binder of 64-10 should be used for the project and is locally available. This recommendation was developed in accordance with Costco Wholesale Asphalt Paving Specification Section 321216. Air temperature data near the project site was used with the MERRA Climate Data option and the PG binder was selected using the FHWA program LTTPBind Online web-based tool based on the AASHTO M323-13 standard. The high-end and low-end temperature rating was selected to provide a reliability of at least 98 and 90 percent, respectively.

4.8.4 Portland Cement Concrete Pavement

We designed PCC pavement in accordance with the Portland Cement Association (PCA) Thickness Design for Concrete Pavements (PCA, 1984) using the design parameters stated above. For heavy-duty pavements, we recommend that PCC pavement should be comprised of 7.0 inches of PCC with 4.0 inches of aggregate base. Prior to placement of aggregate base, pavement subgrade should be prepared in accordance with Section 5.2.2.

Longitudinal and transverse joint spacing should not exceed 12 feet and 15 feet, respectively. Joint details should conform to PCA guidelines. Expansion joints in concrete slabs should be sealed with petroleum resistant sealant to prevent minor releases from impacting subsurface soil.

4.8.5 Aggregate Base

Aggregate base materials should meet current Caltrans specifications for Class 2 aggregate base and be compacted to at least 95 percent relative compaction (ASTM D1557). Caltrans Class 2 aggregate base utilizes recycled materials and require Costco's approval prior to use.

4.8.6 Pavement Maintenance

Pavements may undergo movement due to changes in subgrade moisture content. This movement tends to accelerate pavement deterioration. A crack sealing program should be performed annually to slow pavement deterioration. Any areas where surface water stands on the surface should be remediated. Over time, as cracking becomes more pronounced, a slurry seal coat should be applied.

4.9 SOIL CORROSIVITY

We performed laboratory testing for parameters commonly used to evaluate corrosivity of soils, including pH, minimum resistivity, chloride, and soluble sulfate content. Table 4 presents the results.

TABLE 4
CORROSION TEST RESULTS

Location	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (percent)	Soluble Chloride Content (percent)
TP-2	4-6	4,020	7.4	7.8	3.4
TP-4	4-6	6,160	7.3	11.5	3.0
TP-6	4-6	3,480	6.9	25.9	2.8
TP-9	4-6	10,450	6.4	1.0	0.8
TP-10	4-6	7,240	6.7	4.6	0.9

These tests are a generalized indicator of soil corrosivity for the samples tested. Other soils on site may be more, less, or similarly corrosive in nature. Imported fill materials should be tested to confirm that their corrosion potential is not more severe than those noted.

Although Kleinfelder does not practice corrosion engineering, resistivity values between 3,000 to 5,000 ohm-cm are normally considered corrosive and resistivity values between 5,000 to 10,000

ohm-cm are considered moderately corrosive to buried ferrous metals (NACE, 2006). The concentrations of soluble sulfates indicate that the subsurface soils represent a Class S0 exposure to sulfate attack on concrete in contact with the soil based on ACI 318-14 Table 19.3.1.1 (ACI, 2014). Therefore, in accordance with ACI Building Code 318-14, no special provisions for selection of cement type are required. The project structural engineer should review this data to determine if remedial measures are necessary for the concrete reinforcing steel.

4.10 INFILTRATION TESTING AND STORMWATER MANAGEMENT

We evaluated the feasibility for infiltration throughout surrounding parking areas by performing a total of four borehole infiltration tests. Infiltration may be controlled primarily by factors such as the type and porosity of the surface filtering media, maintenance of these media, surface slope, surface vegetation, and intensity, duration, and type of precipitation. Surface drainage and maintenance will typically determine the site's infiltration rate and the amount of water that will infiltrate for any given storm.

Based on visual soil classification and laboratory testing of the soil samples collected during our field explorations, the upper approximately 1 to 2 feet of the subsurface soils consist predominantly sandy lean clays and silts with variable amounts of sand underlain by sandy silts and silty sands to 5 feet bgs. Table 5 summarizes the unfactored short-term in-situ percolation rates for each test location.

TABLE 5
UNFACTORED SHORT-TERM PERCOLATION RATES

Infiltration Test Location	Tested Depth from Ground Surface (ft)	Short-Term Percolation Rate (in/hr)	Soil Description
INF-1	3-5	0.36	Sandy Silt (ML)
INF-2	3-5	1.38	Silty Sand (SM)
INF-3	3-5	0.75	Silty Sand (SM)
INF-4	3-5	1.05	Silty Sand (SM)

Note: Short-term percolation rate includes a reduction factor using the "Porchet Method" to adjust for non-vertical percolation through the sides of the borehole.

The short-term percolation rates provided in Table 5 have been reduced to account for non-vertical percolation through the sides of the borehole, but do not include any safety factors for long-term performance. While Fresno County does not provide specific guidance on a factor of safety, we recommend using a factor of safety of at least 3 due to the variability in test results and to account for long-term performance. The civil engineer should determine the applicability

of the factor of safety and may apply a higher factor of safety depending on the performance objectives. The long-term infiltration rate was estimated by dividing the short-term percolation rates shown in Table 4 and are presented in Table 6.

TABLE 6
LONG-TERM INFILTRATION RATES

Infiltration Test Location	Short-Term Percolation Rate (in/hr)	Minimum Recommended Factor of Safety	Long-Term Infiltration Rate (in/hr)
INF-1	0.36	3	0.1
INF-2	1.38	3	0.5
INF-3	0.75	3	0.3
INF-4	1.05	3	0.4

Based on the results of the infiltration testing and our laboratory testing, it is our opinion that the site is suitable for infiltration BMPs, provided the following recommendations are incorporated into the design and construction. Due to the variability in infiltration rates, we recommend that a design infiltration rate of 0.3 inches per hour be used for the basin invert elevations between 3 to 5 feet bgs.

If infiltration BMPs are impractical due to existing site constraints, we recommend alternatives, such as bio-filtration/bio-retention systems (bio-swales and planter boxes), be implemented at the project site. If bio-filtration/bio-retention systems are employed, we recommend that the BMPs be built such that water exiting from them will not seep into the foundation areas or beneath slabs and pavement. If planters are located within 10 feet of the building or building foundations, or adjacent to slabs and pavements, then some means of diverting water away from the building, building foundation soils, or soils that support slabs and pavements would be required, such as lining the planters.

5 CONSTRUCTION RECOMMENDATIONS

5.1 GENERAL

The following recommendations should be used by the contractor for construction of the project.

5.2 EARTHWORK

5.2.1 General

Site preparation and earthwork operations should be performed in accordance with applicable codes, safety regulations and other local, state, or federal specifications, and the recommendations included in this report. References to maximum dry unit weights are established in accordance with the latest version of ASTM Standard Test Method D1557 (modified Proctor). The earthwork operations should be observed and tested by a representative of Kleinfelder.

5.2.2 Site Preparation

Abandoned utilities and other existing features within the proposed development areas (if any are encountered) should be removed and the excavation(s) backfilled with engineered fill. Debris produced by demolition operations, including wood, steel, piping, plastics, etc., should be separated and disposed of off-site. Existing utility pipelines or conduits that extend beyond the limits of the proposed construction and are to be abandoned in place, should be plugged with non-shrinking cement grout to prevent migration of soil and/or water. Demolition, disposal, and grading operations should be observed and tested by a representative of Kleinfelder.

Prior to grading and subgrade preparation, all vegetation should be cut and removed from the site. Roots and vegetative matter in excess of one inch should be removed by screening or raking. Other than plant roots, organic matter in the topsoil is minimal based on our laboratory testing (between ½ and 1½ percent). Based on the organic content tests, stripping of topsoil is not necessary. After grubbing, the surface soils can be moisture conditioned and recompacted as structural fill.

Soils within 10 feet of the warehouse building pad should be overexcavated to a depth of at least 4 feet below existing grade or 2 feet below the bottom of the footings and floor slabs, whichever is deeper. If fill soils are encountered at the base of the overexcavation within the building pads, the overexcavation should continue until the fill is removed. It should be noted that some isolated

areas did encounter fill deeper than 4 feet bgs. The overexcavated soils can be moisture conditioned and recompacted as structural fill.

Existing soils below the car wash facility should be overexcavated to depth of at least 2 feet below the bottom of foundations, moisture conditioned, and replaced as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 5 feet.

Soils in pavement, sidewalk, and other flatwork areas should be overexcavated to a depth of at least 18 inches below existing grade or 12 inches below the finished subgrade elevation, whichever is deeper. The overexcavated soils can be moisture conditioned and recompacted as structural fill. The overexcavation should extend beyond the proposed improvements a horizontal distance of at least 2 feet.

Following overexcavation and prior to replacing soils, the exposed subgrade should be compacted with at least a 10-ton roller, fully-loaded tandem-axle dump truck or water truck. Areas identified as being soft or yielding may require additional compaction or overexcavation as determined by Kleinfelder.

Should grading be performed during or following extended periods of rainfall, the moisture content of the near-surface soils will be significantly above the optimum moisture content. These conditions could seriously impede grading by causing an unstable subgrade condition. Typical remedial measures include deep scarification and drying, removal and replacement with crushed rock and geotextile fabric, and/or lime treatment.

The site soils are fine-grained, moisture sensitive, and susceptible to disturbance, rutting, and pumping during construction. The contractor should plan to repair subgrade conditions that become unstable/disturbed and should develop a plan to manage subgrade trafficability across the site throughout the construction period. Features of this plan may include temporary surface haul roads, limited traffic routes, etc.

5.2.3 Foundation Excavations

Shallow Foundations

Following excavation to the foundation subgrade elevations, the exposed subgrade should be observed by a representative of the geotechnical engineer to evaluate the presence of satisfactory materials at design elevations. If unsatisfactory material, such as soft or disturbed soil, debris or

otherwise unsuitable soil is present at the base of footing excavations, then unsuitable materials should be overexcavated and replaced (e.g. with structural concrete, 2-sack sand-cement slurry, structural fill) to the depth and extent determined by the geotechnical engineer.

Drilled Pile Foundations

The performance and capacities of piles can be influenced significantly by the selected construction methods and procedures used. Construction methods that create large zones of disturbance around the drilled shafts can lead to lower than expected skin friction due to excessive stress relief around the shaft length. Drilling of the pile shafts should be accomplished using conventional heavy-duty excavation equipment maintained in good condition.

The on-site soils contain sandy layers and caving of the pile shafts could occur. Temporary steel casing may be required to stabilize the sides of the pile shaft. Concrete should be placed immediately after drilling of the hole is complete. The concrete should be pumped to the bottom of the drilled shaft using a down hole tremie. If steel casing is used, the casing should be removed as the concrete is placed but the bottom of the casing should be kept at least 5 feet below the top of the concrete.

5.2.4 Fill Material and Compaction Criteria

All material placed below foundation elements, structural elements, slabs, parking areas and roadways should be considered structural fill. The on-site soils, minus debris, organic matter, or other deleterious materials may be used as structural fill. Rock or other soil fragments greater than 3 inches in size should not be used in the fills.

Import soils, if required, should have no particles greater than 3 inches in maximum dimension, no less than 70 percent of the particles passing the No. 4 sieve, no more than 30 percent of particles passing the No. 200 sieve, and a Plasticity Index (PI) less than 12. The contractor should provide documentation that all imported soil is free of hazardous materials, including petroleum or petroleum byproducts, chemicals, and harmful minerals. Test results with the geotechnical and analytical properties of the proposed import material should be provided to Costco for approval prior to transportation and use on site.

We recommend granular (sandy) fill soils and imported material should be compacted to at least 95 percent of the maximum dry unit weight (ASTM D1557) in accordance with the CWDRs. Clayey fill soils should be compacted to at least 92 percent of the soil's maximum dry unit weight

(ASTM D1557). Compacting clayey soils to at least 92 percent relative compaction will achieve the necessary strength assumed in our design recommendations.

Fill should be placed in loose horizontal lifts not more than 8 inches thick (loose measurement). The moisture content of the fill should be maintained at -2 to +2 percent of optimum for sandy soils and above optimum for clayey soils during compaction. The moisture content of the clayey fill is considered very important, and therefore, both relative compaction and moisture content should be used to evaluate compaction acceptance. If both criteria are not within the specified tolerances, the fill should not be accepted, and the contractor should rework the material until the fill is placed within the specified tolerances.

Processing of on-site soil maybe required prior to placement as structural fill. Processing may require ripping the material, disking to break up clumps, and blending to attain uniform moisture contents necessary for compaction. Compaction of mass graded areas should be accomplished with a sheep's foot type roller compactor to aid in moisture conditioning. Utility trench backfill should be mechanically compacted. Flooding should not be permitted. Table 7 presents structural fill placement and compaction criteria.

TABLE 7
STRUCTURAL FILL PLACEMENT AND COMPACTION CRITERIA

Fill Location/Use	Material Type	Relative Compaction[1] (ASTM D698)	Moisture Content Range	Minimum Compaction Testing Frequency Per Lift
Aggregate Base for Pavements and Concrete Slabs	Aggregate Base	At least 95 percent	-2 to +2% of optimum	10,000 Square Feet
Structural Areas (Building Pads)	On-site Soils or Imported Material	At least 92 percent for clayey soils At least 95 percent for sandy soils	Above optimum -2 to +2% of optimum	10,000 Square Feet
Subgrade for Pavements, Sidewalks and Other Flatwork Areas	On-site Soils or Imported Material	At least 92 percent for clayey soils At least 95 percent for sandy soils	Above optimum -2 to +2% of optimum	15,000 Square Feet
Foundation and Retaining Wall Backfill	Imported Material	At least 95 percent for sandy soils	-2 to +2% of optimum	1,000 Square Feet

Utility Trenches Backfill	On-site Soils or Imported Material	At least 92 percent for clayey soils At least 95 percent for sandy soils	Above optimum -2 to +2% of optimum	150 Linear Feet
Lawns or Unimproved Areas	On-site Soils or Imported Material	At least 90 percent	-2 to +2% of optimum	20,000 Square Feet

Note: [1] Where two or more compaction specifications coincide, the more stringent specification should be utilized.

5.2.5 Excavation Characteristics

The upper soils are sandy soils. The excavations for the USTs and foundations should be excavatable with conventional heavy-duty construction equipment maintained in good condition. However, caving of the sidewalls during excavation in sandy soils may occur depending on conditions at the time of excavation and should be anticipated by the contractor. In addition, difficult excavation may be encountered in heavily-cemented, hardpan layers located between 4 and 6 feet below grade.

A representative of Kleinfelder should be present during excavation in this area to observe the soil conditions. If soft, loose, or deleterious materials are encountered in the base of the excavation then the materials should be removed and replaced as compacted fill or otherwise remediated to provide competent bearing material under site improvements.

5.2.6 Temporary Excavations

All excavations must comply with applicable local, state, and federal safety regulations, including OSHA requirements. The responsibility for excavation safety and stability of temporary construction slopes lies solely with the contractor. We are providing this information below solely as a service to our client. Under no circumstances should this information provided be interpreted to mean that Kleinfelder is assuming responsibility for final engineering of excavations or shoring, construction site safety, or the contractors' activities; such responsibility is not being implied and should not be inferred.

Minor sloughing and/or raveling of slopes should be anticipated as they dry out. Where space for sloped embankments is not available, shoring will be necessary. In addition, excavations within a 1:1 plane extending downward from a horizontal distance of 2 feet beyond the bottom outer edge of existing improvements should not be attempted without bracing and/or underpinning the footings, as discussed above. The geotechnical engineer or their field representative should

observe the excavations so that modifications can be made to the excavations, as necessary, based on variations in the encountered soil conditions. All applicable excavation safety requirements and regulations, including OSHA requirements, should be met.

All trench excavations should be braced and shored in accordance with good construction practice and all applicable safety ordinances and codes. Stockpiled (excavated) materials should be placed no closer to the edge of an excavation than a distance equal to the depth of the excavation, but no closer than 4 feet.

5.2.7 Oversize Material

Oversized material (e.g. material greater than 3 inches in diameter) is not anticipated to be encountered. However, if encountered, material larger than 3 inches in diameter should be removed and disposed of off-site.

5.2.8 Trench Backfill

Pipe zone backfill (i.e. material beneath and in the immediate vicinity of the pipe) should consist of imported soil less than ¾-inch in maximum dimension. Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of onsite soil or imported fill that meets the requirements for engineered fill provided above.

If imported material is used for trench zone backfill, we recommend it consist of silty sand. In general, gravel should not be used for trench zone backfill due to the potential for soil migration into the relatively large void spaces present in this type of material and for water seepage along trenches backfilled with coarse-grained sand and/or gravel.

Recommendations provided above for pipe zone backfill are minimum requirements only. More stringent material specifications may be required to fulfill local building requirements and/or bedding requirements for specific types of pipes. We recommend the project civil engineer develop these material specifications based on planned pipe types, bedding conditions, and other factors beyond the scope of this study.

Trench backfill should be placed and compacted in accordance with recommendations provided for engineered fill in Section 5.2.4. Mechanical compaction is recommended; ponding or jetting should be avoided, especially in areas supporting structural loads or beneath concrete slabs supported on grade, pavements, or other improvements.

5.3 UNSTABLE SUBGRADE CONDITIONS

Should grading be performed during or following extended periods of rainfall, the moisture content of the near-surface soils will be significantly above the optimum moisture content. The moisture contents of the near surface soils during our field exploration were over optimum moisture content from recent rains and irrigation from agricultural use. These conditions could seriously impede grading by causing an unstable subgrade condition. Typical remedial measures include the following:

- Drying: Drying unstable subgrade involves disking or ripping wet subgrade to a depth of approximately 18 to 24 inches and allowing the exposed soil to dry. Multiple passes of the equipment (likely on a daily basis) will be needed because as the surface of the soil dries, a crust forms that reduces further evaporation. Frequent disking will help prevent the formation of a crust and will promote drying. This process could take several days to several weeks depending on the material, the depth of ripping, the number of passes, and the weather.
- Removal and Replacement with Crushed Rock and Geotextile Fabric: Unstable subgrade could be overexcavated 12 to 24 inches below existing grade and replaced with ¾- or 1-inch crushed rock underlain by geotextile fabric. The geotextile fabric should consist of a woven geotextile, such as Mirafi HP series or equivalent. The final depth of removal will depend upon the conditions observed in the field once overexcavation begins. The geotextile fabric should be placed in accordance with the manufacturer's recommendations.
- Chemical Treatment: Unstable subgrade could be stabilized by mixing the upper 12 to 18 inches of the subgrade with Portland cement, Class C flyash or lime. For estimating purposes, an application rate of 10 to 12 percent Class C flyash, 3 to 5 percent high calcium quick lime, or 4 to 5 percent Portland cement may be used. Final application rates should be determined in the field at the time of construction in consultation with the geotechnical engineer. Chemical treatment should be performed by a specialty contractor experienced in this work. Since soil treatment uses the on-site soil, the expense of importing material can be avoided.

5.4 EXTERIOR FLATWORK

Prior to casting exterior flatwork, the existing soils should be overexcavated and subgrade soils should be moisture conditioned and recompacted as recommended in Section 5.2.2. The

moisture content of the finished subgrade soils should be maintained around optimum prior to the placement of any flatwork or structural fill. Careful control of the water/cement ratio should be performed to avoid shrinkage cracking due to excess water or poor concrete finishing or curing.

5.5 TEMPORARY SHORING

5.5.1 General

Temporary shoring may be required in the proposed UST area where the excavation cannot be adequately sloped. Temporary shoring may consist of a turn-key shoring system, soldier piles and lagging, or other system. General recommendations for design of temporary shoring are presented below.

The shoring design must be provided by a civil engineer registered in the State of California and experienced in the design and construction of shoring under similar conditions. Once the final excavation and shoring plans are complete, the plans and design should be reviewed by Kleinfelder for conformance with the design intent and geotechnical recommendations provided herein.

5.5.2 Lateral Pressures

For the design of cantilevered shoring, an equivalent fluid pressure of 40 pounds per cubic foot (pcf) may be used for level backfill. Where the surface of the retained earth slopes up away from the shoring, a greater pressure should be used. Design data can be developed for additional cases when the design conditions are established.

In addition to the recommended earth pressure, any surcharge (live, including traffic, or dead load) located within a 1H:1V plane drawn upward from the base of the shored excavation should be added to the lateral earth pressures. The lateral contribution of a uniform surcharge load located immediately behind the wall may be calculated by multiplying the surcharge by 0.33 for the level backfill condition. Lateral load contributions of surcharges located at a distance behind the shored wall may be provided once the load configurations and layouts are known. As a minimum, a 2-foot equivalent soil surcharge (250 psf) is recommended to account for traffic or nominal construction loads. It should be noted that the above pressures do not include hydrostatic pressure and assume groundwater will not be encountered in the excavation.

5.5.3 Design of Soldier Piles

All soldier piles should extend to a sufficient depth below the excavation bottom to provide the required lateral resistance. We recommend the required embedment depths be calculated based on the principles of force and moment equilibrium. For this method, the allowable passive pressure against soldier piles that extend below the level of excavation may be assumed to be equivalent to a fluid pressure of 300 pcf. The maximum lateral resistance value should not exceed 3,000 psf. To account for arching, the passive resistance may be assumed to act over a width 2.4 times the width of the embedded portion of the pile, provided adjacent piles are spaced at least 2.5 pile diameters, center-to-center.

Drilling of the soldier pile shafts could be accomplished using heavy-duty drilling equipment. The on-site soils are sandy, and caving of the pile shafts could occur. In addition, difficult drilling may be encountered in heavily-cemented, hardpan layers. Temporary steel casing may be required to stabilize the sides of the pile shaft. Concrete for piles should be placed immediately after the drilling of the hole is complete. The concrete should be pumped to the bottom of the drilled shaft using a tremie. Once concrete pumping is initiated, a minimum head of 5 feet of concrete above the bottom of the tremie should be established and maintained throughout the concrete placement to prevent contamination of the concrete by soil inclusions. If steel casing is used, the casing should be removed as the concrete is placed.

To develop full lateral resistance, provisions should be taken to assure firm contact between the soldier piles and undisturbed materials. The concrete placed in the soldier pile excavations may be a lean-mix concrete. However, the concrete used in that portion of the soldier pile that is below the planned excavated level should provide sufficient strength to adequately transfer the imposed loads to the surrounding materials.

5.5.4 Lagging

Continuous treated timber lagging should be used between the soldier piles. The lagging should be installed as the excavation proceeds. If treated timber is used, the lagging may remain in place after backfilling. The lagging should be designed for the recommended earth pressure but limited to a maximum value of 400 psf.

Some caving and running of the upper soils should be anticipated. To reduce the potential for loss of ground and settlement of the soil behind the wall, the contractor should backfill any space between the lagging and the cut slope with clean sand or sand-cement slurry after installation.

5.5.5 Deflection

Shoring adjacent to existing structures or improvements should be designed and constructed to reduce potential movement. The shoring system designer should evaluate potential deflections in their design.

5.5.6 Monitoring

Some deflection of the shored excavation should be anticipated during the planned excavation. We recommend the project civil engineer perform a survey of all existing utilities and structures adjacent to the shored excavation. The purpose of this survey would be to evaluate the ability of existing utility lines or improvements to withstand horizontal movements associated with a shored excavation and to establish the baseline condition in case of unfounded claims of damage. If existing improvements are not capable of withstanding anticipated lateral movements, alternative shoring systems may be required.

Horizontal and vertical movements of the shoring system should be monitored by a licensed surveyor. The construction monitoring and performance of the shoring system are ultimately the contractor's responsibility. However, at a minimum, we recommend that the top of shoring be surveyed prior to excavation and that the top and bottom of the soldier beams be surveyed on a weekly basis until the shoring is not needed. Surveying should consist of measuring movements in vertical and two perpendicular horizontal directions.

5.6 PAVEMENTS

5.6.1 HMA Design

Hot Mix Asphalt (HMA) should conform to requirements of the Costco Wholesale Specification Section 321216, Asphalt Paving. Section 1.3.C of the HMA specification requires that the HMA section be placed in at least two lifts. The HMA specification allows the use of ½- or ¾-inch Nominal Maximum Aggregate Size (NMAS) mixes for the base course and ⅜- or ½-inch NMAS mixes for surface course. Maximum and minimum HMA compacted lift thicknesses are provided in Table 3.1 in Section 3.3.B of the HMA specification.

5.6.2 Construction Considerations

The pavement sections provided above are contingent on the following recommendations being implemented during construction.

- Pavement subgrade should be prepared as recommended in Section 5.2.2.
- Subgrade soils should be in a stable, non-pumping condition at the time the aggregate base materials are placed and compacted.
- Aggregate base materials should be compacted to at least 95 percent relative compaction (ASTM D1557).
- Asphalt paving materials and placement methods should meet current Costco Wholesale Specifications Section 321216.
- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.

Note that pavement materials and construction must be completed in strict accordance with the Costco's specifications that contain very specific pavement material (asphalt, aggregate and concrete) criteria and construction practices to be used (compaction and material sampling). The general contractor and pavement construction subcontractor should be aware that asphalt and concrete mix designs must be submitted to the design architect and Kleinfelder at least 45 days prior to the scheduled production and laydown for review and approval.

6 ADDITIONAL SERVICES

6.1 PLANS AND SPECIFICATIONS REVIEW

We recommend Kleinfelder perform a review of geotechnical related portions of the project plans and specifications before they are finalized to see that geotechnical recommendations have been properly interpreted and implemented during design. If we are not accorded the privilege of performing this review, we can assume no responsibility for misinterpretation of our recommendations.

6.2 CONSTRUCTION OBSERVATION AND TESTING

The construction process is an integral design component with respect to the geotechnical aspects of a project. Because geotechnical engineering is an inexact science due to the variability of natural processes, and because we sample only a limited portion of the soils affecting the performance of the proposed structure, unanticipated or changed conditions can be encountered during grading. Proper geotechnical observation and testing during construction are imperative to allow the geotechnical engineer the opportunity to verify assumptions made during the design process. Therefore, we recommend that Kleinfelder be retained during the construction of the proposed improvements to observe compliance with the design concepts and geotechnical recommendations, and to allow design changes in the event that subsurface conditions or methods of construction differ from those assumed while completing this study.

Our services are typically needed at the following stages of grading:

- After demolition and grubbing;
- During grading;
- During the installation of temporary construction shoring;
- After the overexcavation, but prior to subgrade preparation;
- During utility trench backfill;
- During fill placement of wall backfill;
- During base placement and site paving; and
- After excavation for foundations.

7 LIMITATIONS

This geotechnical study has been prepared for the exclusive use of Costco Wholesale and their agents for specific application to the proposed Costco Wholesale (CW# 20-0569) located at the northeast corner of West Herndon Avenue and North Riverside Drive in Fresno, California. The findings, conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering practice. No other warranty, express or implied, is made.

The scope of services was limited to a background data review and the field exploration described in Section 1.2. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on our field exploration and laboratory testing programs, and engineering analyses.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil or groundwater conditions could vary between or beyond the points explored. If soil or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the estimated Traffic Index or locations of the improvements, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid until the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, preparation of foundations, and placement of engineered fill and trench backfill. These services provide Kleinfelder the opportunity to observe the actual soil and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's geotechnical engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and foundation construction.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance, but in no event later than one year from the date of the report. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of this report and the nature of the new project, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party and the client agrees to defend, indemnify, and hold harmless Kleinfelder from any claims or liability associated with such unauthorized use or non-compliance.

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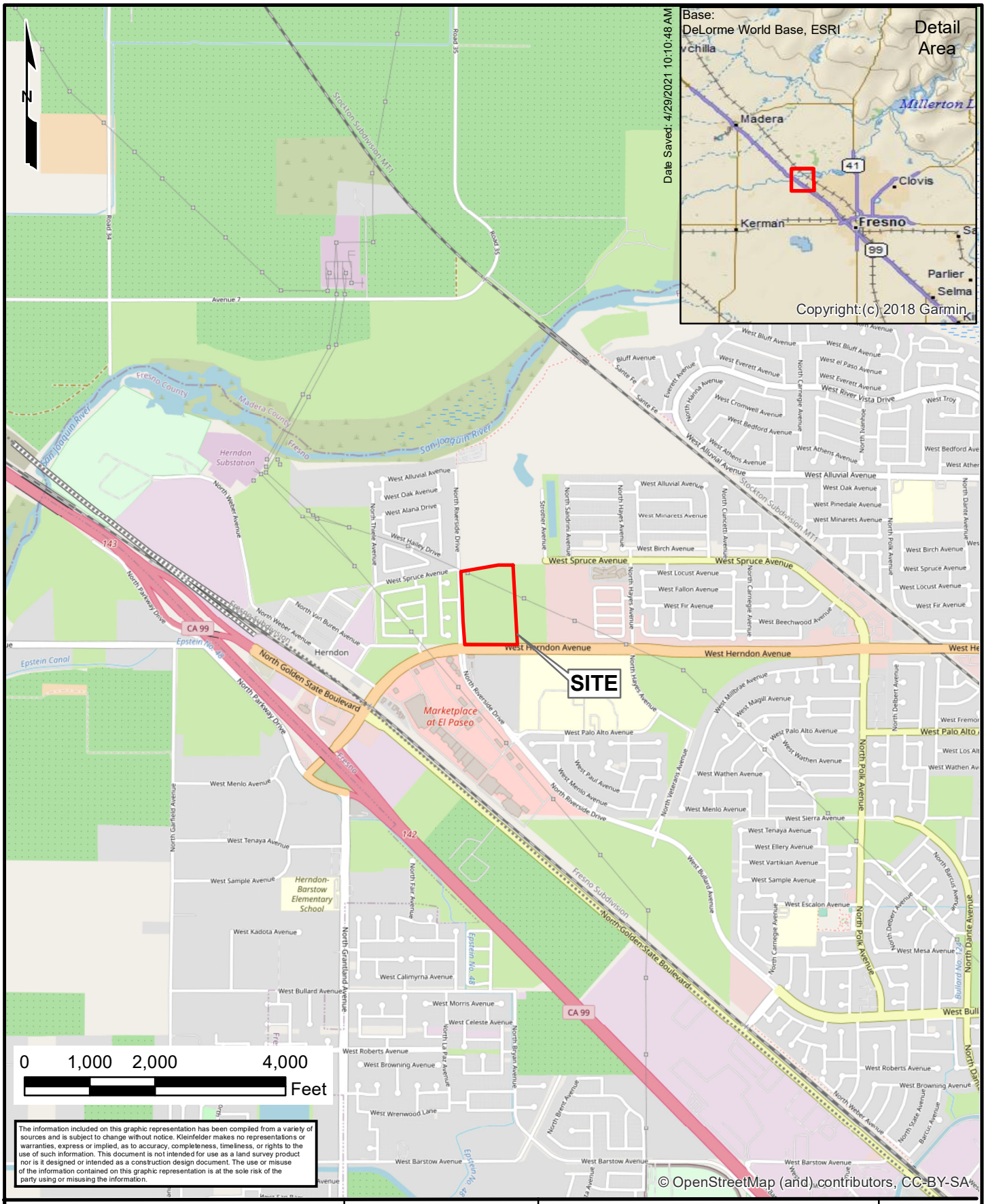
Figures



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SITE VICINITY MAP

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

1

LEGEND

- PROPERTY BOUNDARY
- BORING LOCATION (Kleinfelder, 2021 Investigation)
- INFILTRATION TEST LOCATION (Kleinfelder, 2021 Investigation)
- TEST PIT LOCATION (Kleinfelder, 2021 Investigation)

0 200 400

SCALE: 1" = 200' SCALE IN FEET

REFERENCE:
BASE MAPPING CREATED FROM PLAN TITLED " PRELIMINARY OVERALL GRADING, SHEET C1.10", DATED: 04/01/2021 AND PREPARED BY KIMLEY HORN AND ASSOCIATES, INC.

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PROJECT NO.	20212905
DRAWN BY	JDS
CHECKED BY	DD
DATE:	04/29/2021
REVISED:	

EXPLORATION LOCATION MAP

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
2

PLOTTED: 4/29/2021 9:51 AM BY: jeff sala
CAD FILE: W:\2021\20212905.001A - Costco Fresno New Warehouse\20212905.dwg LAYOUT: F2

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Appendix A

APPENDIX A
FIELD EXPLORATIONS

GENERAL

Subsurface conditions at the site were explored by drilling 38 borings and excavating 18 test pits. A total of 21 borings and 6 test pits were drilled/excavated in the building area; 13 borings and 5 test pits were drilled/excavated in the parking and drive areas; 4 borings and 1 test pit were drilled/excavated in the fuel facility; 2 test pits were excavated within the car wash facility; and finally 2 test pits were excavated within the outparcels adjacent to the Costco parking lot.

The borings were drilled using truck-mounted, hollow-stem-auger drilling equipment to depths of approximately 21½ and 51½ below the existing ground surface (bgs) in the warehouse building area; approximately 11½ feet bgs in the parking and drive areas; and approximately 26½ feet bgs in the fuel facility area. The test pits were excavated to depths of about 10 feet bgs or practical refusal with a rubber tired backhoe. The approximate locations of the borings and test pits are presented on Figure 2, Exploration Location Map.

Prior to commencement of the fieldwork, Underground Service Alert (USA) was notified and various geophysical techniques were used at the boring locations to identify potential conflicts with subsurface structures. In addition, Kleinfelder also employed a private utility location company (1st Call Utility location services) to clear all excavation areas prior to the commencement of fieldwork.

The boring and test pit logs are presented as Figures A-3 through A-62. An explanation to the log is presented as Figures A-1 through A-2. The Boring/Test Pit Log describes the earth materials encountered, samples obtained and show field and laboratory tests performed. The log also shows the location, boring/test pit number, drilling/excavation date and the name of the drilling/excavation subcontractor. The borings and test pits were logged by a Kleinfelder engineer using the Unified Soil Classification System. The boundaries between soil types shown on the logs are approximate because the transition between different soil layers may be gradual.

A modified-California sampler was used to obtain drive samples of the soil encountered. This sampler consists of a 2.5-inch O.D., 2-inch I.D. split barrel shaft that is pushed or driven a total of 18-inches into the soil at the bottom of the boring. The soil was retained in six-inch sleeves for laboratory testing. An additional 2 inches of soil from each drive remained in the cutting shoe and was usually discarded after visually classifying the soil. The sampler was driven using a

140-pound hammer falling 30 inches. The total number of blows required to drive the sampler the final 12 inches is termed blow count and is recorded on the Log of Boring.

Samples were also obtained using a Standard Penetration Sampler (SPT). This sampler consists of a 2-inch O.D., 1-inch I.D. split barrel shaft that is advanced into the soils at the bottom of the drill hole a total of 18 inches. The sampler was driven using a 140-pound hammer falling 30 inches. The total number of hammer blows required to drive the sampler the final 12 inches is termed the blow count (N) and is recorded on the Log of Boring. The procedures we employed in the field are generally consistent with those described in ASTM Standard Test Method D1586.

Bulk and grab samples of the near-surface soils were directly retrieved from the auger cuttings from the borings and the excavated material in the test pits.

SAMPLE/SAMPLER TYPE GRAPHICS

BULK SAMPLE

CALIFORNIA SAMPLER
(3 in. (76.2 mm.) outer diameter)

STANDARD PENETRATION SPLIT SPOON SAMPLER
(2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

WATER LEVEL (level where first observed)

WATER LEVEL (level after exploration completion)

WATER LEVEL (additional levels after exploration)

OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

ABBREVIATIONS
WOH - Weight of Hammer
WOR - Weight of Rod

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu≥4 and 1≤Cc≤3		**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu<4 and/ or 1>Cc>3		**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu≥4 and 1≤Cc≤3		**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu<4 and/ or 1>Cc>3		**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES			**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (Half or more of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu≥6 and 1≤Cc≤3		**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu<6 and/ or 1>Cc>3		**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu≥6 and 1≤Cc≤3		**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu<6 and/ or 1>Cc>3		**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES			**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

FINE GRAINED SOILS (Half or more of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit 50 or greater)	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

NOTE: USE MATERIAL DESCRIPTION ON THE LOG TO DEFINE A GRAPHIC THAT MAY NOT BE PROVIDED ON THIS LEGEND.

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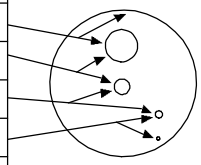
GRAPHICS KEY

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-1

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



SECONDARY CONSTITUENT

	AMOUNT	
Term of Use	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT - N_{60} (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q_u)(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP <0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP <1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP <2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP <4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

PLASTICITY

DESCRIPTION	LL	Either the LL or the PI (or both) may be used to describe the soil plasticity. The ranges of numbers shown here do not imply that the LL ranges correlate with the PI ranges for all soils.	PI
Non-Plastic	NP		NP
Low	< 30		< 15
Medium	30 - 50		15 - 25
High	> 50		> 25

LL is from Casagrande, 1948. PI is from Holtz , 1959.

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.

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SOIL DESCRIPTION KEY

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-2

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-1**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84017°
Longitude: -119.90781°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, red, moist, organic material, fine sand (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 1.5 feet
				S2											Switched to Hollow Stem Auger
			SILT (ML): low to medium plasticity, pink to brown, moist, hard, iron oxide	S3		BC=12 17 20	6" 6" 6"		28.9						
290	5		Trace fine sand	S4		BC=11 20 19	6" 6" 6"								
			Sandy SILT (ML): non-plastic, pink to brown, moist, very stiff, iron oxide	S5		BC=5 10 9	6" 6" 6"								
285	10		**SILT (ML)**: low plasticity, pink, moist, hard, iron oxide	S6		BC=11 14 21	6" 6" 6"		12.9	99.6					
			Poorly Graded SAND (SP): fine to medium-grained, pink, moist, dense												
280	15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.												
275	20														
270	25														
265	30														

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-1

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-3

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-2**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84002°
Longitude: -119.99090°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
290	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 1.5 feet
				S2											Switched to Hollow Stem Auger
			SILT (ML): low to medium plasticity, pink to brown, white mottling, moist, very stiff, weak to moderately cemented, iron oxide	S3		BC=10 12 9	6" 6" 6"		28.1			71			
285	5		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pink to reddish brown, moist, dense	S4		BC=15 20 20	6" 6" 6"		10.1 15.6	99.2					
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, yellowish brown, moist, medium dense	S5		BC=4 4 6	6" 6" 6"		2.1						
280	10		Fine to coarse grained sand	S6		BC=7 11 21 PP=4.5	6" 6" 6"		10.9	102.2					
			SILT (ML): low plasticity, light pink, moist, stiff, weakly cemented												
275	15														
270	20														
265	25														
260	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-2

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-4

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-3**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83934°
Longitude: -119.90809°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, red, (Plow depth observed = 0-6 inches)	S1 S2											Hand Auger down to 1.5 feet
			Clayey SAND (SC): fine to medium-grained, non-plastic to low plasticity, red, moist, moderately cemented	S3					6.6						Switched to Hollow Stem Auger
290	5		**Clayey SAND with Silt (SC)**: very dense, strongly cemented	S4 S5		BC=25 30 50/3"	NR 6" 6"								
			SILT with Sand (ML): non-plastic, pink to reddish yellow, moist, hard	S6		BC=2 15 17	6" 6" 6"		10.7						
285	10		**Poorly Graded SAND with Silt (SP-SM)**: fine to coarse-grained, yellowish brown, moist, dense	S7		BC=12 17 19 PP=4.5	6" 6" 6"		3.8	104.2					
280	15														
275	20														
270	25														
265	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 23, 2021.

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE:	3/5/2021

BORING LOG KB-3

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-5

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-4**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83929°
Longitude: -119.90932°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine to medium sand, (Plow depth observed = 0-5 inches)	S1					8.4						Hand Auger down to 1.5 feet
				S2											
				S3					5.6						Switched to Hollow Stem Auger
			Clayey SAND (SC): fine to medium-grained, low plasticity, red, moist, hard pan layer at 2.75 feet	S4											
290	5		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pinkish brown, moist, dense	S5		BC=14 18 18	6" 6" 6"		10.0						
			Poorly Graded SAND (SP): reddish brown, moist, medium dense	S6		BC=12 12 15	6" 6" 6"		2.6	98.2					
285	10		Loose	S7		BC=3 4 5	6" 6" 6"					3.8			
280	15														
275	20														
270	25														
265	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-4

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-6
PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-5**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84022°
Longitude: -119.90800°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Clayey SAND (SC): non-plastic, pale brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Lean CLAY with Sand (CL)												Hand layer from 2.5 to 3 feet
			Clayey SILT (CL-ML): low to medium plasticity, brown, moist, hard, moderately cemented	S3		BC=16 16 20	6" 6" 6"		21.0						Switched to Hollow Stem Auger
290	5		Low plasticity	S4		BC=27 43 45	6" 6" 6"		15.0	110.0					
			Silty SAND (SM): non-plastic, pink, moist, dense, fine to medium grained sand, iron oxide	S5		BC=8 18 24	6" 6" 6"		11.1	106.8					
285	10		4" Layer of (CL-ML) at 11 feet	S6		BC=11 16 18	6" 6" 6"		11.3	98.1					
			Sandy SILT (ML): non-plastic, brown, moist, hard, fine sand	S7		BC=15 30 27	6" 6" 6"		10.0						
280	15		**SILT with Sand (ML)**: non-plastic, pale brown, moist, very stiff, fine sand	S8		BC=10 11 15	6" 6" 6"		6.3	101.3					
			SILT (ML): non-plastic, pink to brown, moist, hard	S9		BC=12 16 17	6" 6" 6"								
275	20		Low to medium plasticity	S10		BC=15 30 50/6"	6" 6" 6"		10.4	114.3					
			Medium plasticity, very stiff	S11		BC=8 8 14	6" 6" 6"								
270	25		Non plasticity, hard	S12		BC=23 32 49 BC=0									
265	30														

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-5

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FRESNO, CALIFORNIA 93722

FIGURE
A-7

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-6**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84004°
Longitude: -119.90816°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, fine to medium sand, (Plow depth observed = 0-7 inches)	S1											Hand Auger down to 1.25 feet
				S2					10.4						Hand layer from 1.25 to 2.5 feet
			Silty CLAY (CL-ML): low to medium plasticity, brown, moist, hard, weakly cemented						31.8						Switched to Hollow Stem Auger
				S3		BC=30 31 35	6" 6" 6"								
290	5		**Silty CLAY with Sand (CL-ML)**: low plasticity, brown, moist, hard, weak to moderately cemented, fine to medium sand			BC=25 30 35	6" 6" 6"								
				S4					5.0	111.8			NP	NP	
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, yellowish brown, moist, very dense			BC=7 9 12	6" 6" 6"								
			SILT with Sand (ML): fine-grained, non-plastic, pale brown to reddish yellow, moist, very stiff	S5					6.2	108.5					
285	10					BC=7 9 12	6" 6" 6"								
			Poorly Graded SAND (SP): fine to coarse-grained, pink, moist, medium dense	S6											
			SILT with Sand (ML): non-plastic, brown, moist, hard, weakly cemented			BC=10 31 30	6" 6" 6"								
			Low plasticity	S7											
280	15		Moderately cementation, medium plasticity			BC=20 20 21	6" 6" 6"								
				S8					8.7	98.9					
			Pink to brown			BC=13 21 29	6" 6" 6"								
			Increase in sand content	S9											
275	20		Brown to yellowish brown, fine sand, low plasticity			BC=25 30 32	6" 6" 6"								
				S10											
			Poorly Graded SAND (SP): pink to brown, moist, medium dense, fine sand			BC=2 5 8	NR NR NR								
				S11											
270	25					BC=4 8 10	NR								
				S12											
265	30														

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-6

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FRESNO, CALIFORNIA 93722

FIGURE
A-8
PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-7**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84000°
Longitude: -119.90836°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, fine sand, (Plow depth observed = 0-8 inches)	S1											Hand Auger down to 1.5 feet
				S2					10.5						
			SILT (ML): low plasticity, brown, moist, hard, moderately to strongly cemented												Hand layer from 1.5 to 3.25 feet
				S3		BC=38 48 50/3"	6" 6" 6"		27.5				NP	NP	Switched to Hollow Stem Auger
290	5			S4		BC=21 20 25	6" 6" 6"		10.7	109.3					
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, non-plastic, yellowish brown, moist, dense												
			Sandy SILT (ML): non-plastic, pale brown, moist, very stiff, fine to medium sand	S5		BC=11 11 12	6" 6" 6"								
285	10			S6		BC=7 9 8	6" 6" 6"								
			Poorly Graded SAND with Silt (SP-SM): reddish yellow, moist, medium dense, fine sand												
			SILT (ML): non-plastic, pink to brown, moist, hard	s7		BC=13 14 41	6" 6" 6"								
280	15		**SILT with Sand (ML)**: non-plastic, pale brown, moist, very stiff	S8		BC=7 9 21	6" 6" 6"								
			Silty CLAY (CL-ML): low to medium plasticity, brown, moist, hard, trace fine sand	S9		BC=25 25 41	6" 6" 6"		11.7	120.2					
275	20		**SILT with Sand (ML)**: non-plastic, pink to brown, moist, stiff	S10		BC=7 6 7	6" 6" 6"								
				S11		BC=5 7 8	6" 6" 6"								
270	25		**Poorly Graded SAND with Silt (SP-SM)**: brown pale, moist, medium dense, fine sand	S12		BC=9 10 11	6" 6" 6"								
265	30														

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-7

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FRESNO, CALIFORNIA 93722

FIGURE
A-9

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-8**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83988°
Longitude: -119.90844°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, fine sand, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 1.5 feet
				S2											Hand layer from 1.5 to 3.5 feet
290	5		**Sandy SILT (ML)**: non-plastic, brown to yellish brown, moist, hard, moderately to strongly cemented, fine sand	S3		BC=31 48 50/2"	6" 6" 6"								Switched to Hollow Stem Auger
			SILT (ML): low plasticity, brown, moist, very stiff, weakly cemented	S4		BC=13 16 12	6" 6" 6"		11.9	101.1					
285	10		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pink to brown, moist, medium dense	S5		BC=8 10 14	6" 6" 6"								
			Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, reddish yellow, moist, dense	S6		BC=9 15 24	6" 6" 6"		6.2	108.5					
280	15		**SILT with Sand (ML)**: low to medium plasticity, reddish yellow, moist, medium stiff	S7		BC=2 4 9	6" 6" 6"					73			
			SILT (ML): non-plastic, pinkish brown, moist, hard	S8		BC=6 12 20	6" 6" 6"								
275	20		Trace fine sand, yellowish brown, very stiff	S9		BC=12 12 13	6" 6" 6"								
				S10		BC=8 9 16	6" 6" 6"		9.0	102.8					
270	25		**SILT with Sand (ML)**: non-plastic, pale brown, moist, stiff, fine sand	S11		BC=3 4 6	6" 6" 6"					82			
			SILT (ML): low to medium plasticity, pale brown, moist, hard, iron oxide	S12		BC=8 16 25	6" 6" 6"								
265	30														
260															

The boring was terminated at approximately 26.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/5/2021

BORING LOG KB-8

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-10

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-9**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83877°
Longitude: -119.90798°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-12 inches)	S1					9.5						Hand Auger down to 2.5 feet
				S2											
			Sandy Lean CLAY (CL): red, fine to medium grained sand	S3					11.1						Switched to Hollow Stem Auger
	5		**Silty CLAY with Sand (CL-ML)**: low plasticity, brown, moist, hard, weakly cemented, fine sand Decrease in sand content	S4		BC=7 12 50/2"	6" 6" 6"								
290			**SILT with Clay (ML)**: non-plastic, reddish brown to light brownish gray, moist, hard			BC=20 25 24	6" 6" 6"								
			Poorly Graded SAND with Silt and Clay (SP-SM): non-plastic, yellowish brown, moist, medium dense, fine to medium sand	S5					11.9	100.8					
	10					BC=3 7 9	6" 6" 6"								
285			**Silty SAND (SM)**: non-plastic, pink, moist, medium dense, fine sand	S6					11.2	100.8		47			
	15		**SILT with Sand (ML)**: non-plastic, pink, moist, hard, fine sand	S7		BC=9 13 18	6" 6" 6"		11.1						
280															
	20		**Poorly Graded SAND with Clay (SP-SC)**: non-plastic, olive brown, moist, dense, fine to medium sand	S8		BC=12 16 21	6" 6" 6"		6.9	112.0					
275															
	25		**Poorly Graded SAND (SP)**: fine to medium-grained, brown, moist, medium dense Fine to coarse grained	S9		BC=7 8 10	6" 6" 6"		2.6			3.1		
270															
	30			S10		BC=5 5 7	6" 6" 6"								
265															

LABORATORY RESULTS

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-9

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FIGURE

A-11

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-9**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83877°
Longitude: -119.90798°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
260			**Poorly Graded SAND (SP)**: fine to medium-grained, brown, moist, medium dense	S11		BC=6 7 9	6" 6" 6"
	40		**Silty CLAY with Sand (CL-ML)**: low to medium plasticity, pink to brown, moist, very stiff, weakly cemented, fine sand	S12		BC=6 13 16	6" 6" 6"
255	45		**SILT with Sand (ML)**: non-plastic, pale brown, moist, hard, fine sand	S13		BC=14 43 50/2"	6" 6" 6"
250	50		**Sandy Lean CLAY (CL)**: medium plasticity, light reddish brown, moist, very stiff, weakly cemented, fine sand	S14		BC=9 9 12	6" 6" 6"
245							
	55						
240							
	60						
235							
	65						
230							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The boring was terminated at approximately 51.5 ft. below ground surface. The boring was backfilled with neat cement on February 25, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-9

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-11

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-10**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83875°
Longitude: -119.90853°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Sandy Lean CLAY (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-12 inches)	S1 / S2											Hand Auger down to 2 feet
			Lean CLAY with Sand (CL): low to medium plasticity, brown, moist, fine sand	S3					11.3						Switched to Hollow Stem Auger
	5		**Silty CLAY (CL-ML)**: medium plasticity, yellowish brown, moist, hard	S4		BC=17 23 28	6" 6" 6"		16.5	100.6			26	5	
290			**Poorly Graded SAND (SP)**: fine to coarse-grained, reddish yellow, moist, medium dense	S5		BC=7 8 9	6" 6" 6"		1.4	102.2					
	10		Pink to reddish yellow	S6		BC=4 5 7	6" 6" 6"		1.1	97.1					
285															
	15		**Silty CLAY (CL-ML)**: medium plasticity, pink to brown, moist, hard	S7		BC=7 16 19	6" 6" 6"		18.3						
280			**Lean CLAY with Sand (CL)**: medium plasticity, dark pink, moist, very stiff												
	20		**Poorly Graded SAND (SP)**: fine to coarse-grained, pink, moist, dense	S8		BC=8 14 21	6" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/5/2021

BORING LOG KB-10

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-12

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-11**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83871°
Longitude: -119.90914°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, red, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.75 feet
				S2											
			Moderately cemented	S3					9.7						Switched to Hollow Stem Auger
290	5		**SILT (ML)**: non-plastic, black to brown, moist, medium stiff, weakly cemented	S4		BC=3 6 7	6" 6" 6"		11.0	100.5					
			Stiff	S5		BC=6 6 13	6" 6" 6"		10.9	99.4					
285	10		**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, non-plastic, yellowish brown, moist, dense	S6		BC=12 14 21	6" 6" 6"		5.7	106.1					
280	15		**SILT with Sand (ML)**: fine-grained, non-plastic, pink to brown, moist, hard	S7		BC=10 20 24	6" 6" 6"		9.1						
275	20		**Poorly Graded SAND (SP)**: fine to medium-grained, pink to brown, moist, dense	S8		BC=7 14 20	6" 6" 6"								
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/5/2021

BORING LOG KB-11

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-13

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-12**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Cool/Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83875°
Longitude: -119.91006°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-9 inches)	S1					9.0						Hand Auger down to 0.75 feet Switched to Hollow Stem Auger
			Clayey SAND (SC): low to medium plasticity, reddish yellow, white mottle, moist, very stiff, strongly cemented	S2		BC=8 11 18	6" 6" 6"		4.7	107.1					
290	5		**Poorly Graded SAND with Clay (SP-SC)**: fine to medium-grained, non-plastic, reddish yellow to pink, moist, very dense, moderately cemented	S3		BC=11 30 40	6" 6" 6"								
			SILT with Sand (ML): non-plastic, pink, moist, very stiff, fine sand	S4		BC=3 12 13	6" 6" 6"		9.5	94.0					
285	10		**SILT (ML)**: low to medium plasticity, pink, moist, stiff, weakly cemented	5A		BC=4 6 8	6" 6" 6"		21.5						
280	15														
275	20														
270	25														
265	30														

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE:	3/5/2021

BORING LOG KB-12

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-14

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-13**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny & cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83844°
Longitude: -119.91035°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-9 inches)	S1											Hand Auger down to 1.0 feet
				S2											Switched to Hollow Stem Auger
				S3					3.9						
			Poorly Graded SAND with Clay (SP-SC): fine to medium-grained, low plasticity, reddish brown, moist, moderately cemented												
	5		**SILT (ML)**: pink, moist, very stiff, moderately to strongly cemented												
			Trace fine sand, non plastic	S4		BC=9 10 18	6" 6" 6"		6.2	105.6					
290			**SILT with Sand (ML)**: pink to reddish brown, moist, very stiff			BC=6 9 10	3" 6" 6"		17.1						
	10			S5											
						BC=13 18 23	6" 6" 6"								
			Poorly Graded SAND (SP): fine to coarse-grained, reddish yellow & pink, moist, dense	S6											
285															
	15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.												
280															
	20														
275															
	25														
270															
	30														
265															

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-13

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-15

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-14**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Warm/Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83843°
Longitude: -119.90938°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.0 feet
				S2											
				S3					8.9						Switched to Hollow Stem Auger
			Sandy Lean CLAY (CL): low to medium plasticity, reddish brown, moist, fine to medium sand												
	5		**SILT with Sand (ML)**: low plasticity, pink with iron oxyde, moist, hard, weak to moderately cemented	S4		BC=17 21 34 PP=3.5	6" 6" 6"								
290			**Silty SAND (SM)**: fine-grained, pink, moist, medium dense	S5		BC=6 7 8	6" 6" 6"		5.0						
	10		Very dense	S6		BC=25 50/5"	NR								
285	15														
280	20														
275	25														
270	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-14

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-16

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-15**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83838°
Longitude: -119.90912°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, red, moist, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 1.5 feet
				S2					9.5						
			SILT with Sand (ML): light yellowish brown, low to moderate, moist, stiff, fine sand												Switched to Hollow Stem Auger
						BC=5 5 5	6" 6" 6"		13.9						
			SILT (ML): low plasticity, yellowish brown, white mottling, moist, stiff	S3											
290	5		Moderately to strongly cementation, hard			BC=6 15 16	6" 6" 6"								
				S4					13.2	104.4					
			Poorly Graded SAND (SP): fine to coarse-grained, yellowish brown, moist, medium dense			BC=5 7 9	6" 6" 6"								
				S5					11.2	94.5					
285	10					BC=5 5 6	NR NR 6"		16.0						
			Clayey SILT with Sand (CL-ML): low to medium plasticity, yellowish brown, moist, stiff, fine to coarse sand	S6											
280	15		**Poorly Graded SAND with Sand (SP)**: fine to coarse-grained, pink, moist, medium dense			BC=8 9 17	6" 6" 6"								
				S7					2.2	109.1					
			Lean CLAY with Sand (CL): medium plasticity, yellowish brown, moist, very stiff												
275	20		**Poorly Graded SAND (SP)**: fine to medium-grained, reddish yellow, moist, medium dense			BC=7 7 9	6" 6" 6"								
				S8											
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 25, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE:	3/8/2021

BORING LOG KB-15

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-17

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-16**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83846°
Longitude: -119.90884°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approx. Elevation (ft)	Depth (ft)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Lean CLAY with Sand (CL)**: low plasticity, reddish brown, moist, (Plow depth observed = 0-6 inches)	S1					8.9						Hand Auger down to 2.5 feet
				S2											
			Increase in sand content	S3					18.5						Switched to Hollow Stem Auger
			SILT (ML): low to medium plasticity, yellowish brown, moist, hard												
	5					BC=35 43 32	6" 6" 6"								
290			**SILT with Sand (ML)**: low plasticity, yellowish brown, moist, hard, fine to medium sand	S4					10.4	118.1					
			Poorly Graded SAND (SP): fine to coarse-grained, reddish yellow, moist, medium dense			BC=6 8 5	6" 6" 6"								
				S5					7.7	106.2					
	10					BC=5 7 9	6" 6" 6"								
285				S6											
			Fine grained, trace clay												
	15					BC=3 5 9	6" 6" 6"								
280			**Lean CLAY with Sand (CL)**: medium plasticity, moist, stiff	S7											
			Poorly Graded SAND (SP): fine to coarse-grained, pink, moist, medium dense												
	20					BC=9 13 14	6" 6" 6"								
275				S8											
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-16

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-18

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-17**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83846°
Longitude: -119.90885°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, fine sand, (Plow depth observed = 0-12 inches)	S1					10.1				17	6	
				S2											
				S3					9.3						
	5		**Silty CLAY (CL-ML)**: low to medium plasticity, reddish brown, moist, hard	S4		BC=13 25 33 PP=>4.5	6" 6" 6"		21.1	102.1					
290			**Poorly Graded SAND with Silt and Clay (SP-SM)**: fine to medium-grained, non-plastic, reddish yellow, moist, medium dense	S5		BC=7 7 9	6" 6" 6"		6.3						
	10		**Poorly Graded SAND (SP)**: fine to coarse-grained, non-plastic to low plasticity, brown, moist, medium dense, trace Silt and Clay	S6		BC=9 10 10	6" 6" 6"		3.1	110.7					
285															
	15		**Clayey SAND (SC)**: fine to coarse-grained, low plasticity, olive brown, moist, medium dense	S7		BC=7 8 13	3" 6" 6"								
280															
	20		**Poorly Graded SAND (SP)**: fine to coarse-grained, pale red to pink, moist, medium dense	S8		BC=6 8 12									
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-17

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-19

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-18**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83824°
Longitude: -119.90793°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low plasticity, red, fine to medium sand, (Plow depth observed = 0-7 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Iron present, increase in sand content						6.9						Switched to Hollow Stem Auger
				S3											
	5		**Sandy SILT (ML)**: reddish yellow, moist, hard, moderately to strongly cemented, fine to medium sand	S4		BC=18 38 37	6" 6" 6"		32.6						
			SILT (ML): low plasticity, pink to brown, moist, hard, moderately cemented	S5											
290			**Silty SAND (SM)**: non-plastic, brownish pink, moist, medium dense, iron oxide	S6		BC=13 17 16	6" 6" 6"		6.6	102.3					
	10		**Poorly Graded SAND with Silt (SP-SM)**: fine-grained, non-plastic, pink, moist, medium dense	S7		BC=4 6 6	6" 6" 6"								
285															
	15		Increase in sand size, fine to coarse grained	S8		BC=9 12 12	6" 6" 6"		2.6	112.8					
280			**Silty SAND (SM)**: fine-grained, olive brown, moist, medium dense												
	20			S9		BC=5 5 5	6" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-18

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-20

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-19**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83822°
Longitude: -119.90842°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: low plasticity, reddish brown, (Plow depth observed = 0-12 inches)	S1					8.1						
				S2											
			Lean CLAY with Sand (CL): medium plasticity, red												
			SILT (ML): low plasticity, pink to red, moist, hard, moderately to strongly cemented	S3		BC=17 15 18	6" 6" 6"		22.1						
290	5		Iron oxide	S4		BC=9 21 41 PP=>4.5	6" 6" 6"		23.5						
			Trace fine sand, very stiff	S5		BC=9 10 16	6" 6" 6"								
285	10		**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium dense	S6		BC=6 6 8	6" 6" 6"								
280	15		Fine to coarse grained	S7		BC=4 7 12	3" 6" 6"								
275	20		Yellowish brown, trace Silt, fine to medium grained, dense	S8		BC=13 16 16	6" 6" 6"								
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-19

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-21

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-20**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83821°
Longitude: -119.90903°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295			**Lean CLAY with Sand (CL)**: low to medium plasticity, red, moist, fine to medium sand, (Plow depth observed = 0-4 inches)	S1											Hand Auger down to 1.5 feet
				S2					21.0						Switched to Hollow Stem Auger
			Silty CLAY with Sand (CL-ML): low plasticity, reddish yellow, moist, very stiff, fine sand	S3		BC=31 15 10	6" 6" 6"								
290	5		Moderate to strongly cemented, hard, non plastic	S4		BC=10 25 43	6" 6" 6"		17.5	103.3					
			Poorly Graded SAND (SP): fine to coarse-grained, pink to yellow, moist, medium dense	S5		BC=9 9 17	6" 6" 6"		1.7	103.0					
285	10			S6		BC=6 7 9	6" 6" 6"		1.1	101.0					
280	15		**Silty SAND (SM)**: yellowish brown, moist, dense, fine sand	S7		BC=6 7 26	4" 6" 6"								
275	20		**Poorly Graded SAND (SP)**: fine to coarse-grained, light gray to pink, moist, dense	S8		BC=10 16 21	6" 6" 6"								
270	25		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 25, 2021.												
265	30														

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-20

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-22

PAGE: 1 of 1

BORING LOG KB-21

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Cool/Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

Latitude: 36.83803°
Longitude: -119.91001°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0	**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-6 inches)	S1					9.9						Hand Auger down to 1.0 feet Switched to Hollow Stem Auger
		Clayey SAND (SC): fine to medium-grained, low plasticity, reddish yellow, moist, medium dense, moderately to strongly cemented	S2		BC=14 14 8	6" 6" 6"					27			
290	5	**Poorly Graded SAND with Clay (SP-SC)**: fine to coarse-grained, yellowish brown, moist, medium dense, trace 1/2" gravel	S3		BC=8 10 17	6" 6" 6"		4.3	121.4					
		Poorly Graded SAND (SP): fine to medium-grained, reddish yellow to pink, moist, medium dense	S4		BC=4 4 6	6" 6" 6"								
285	10	Increase in sand size, fine to coarse grained	S5		BC=4 6 9	6" 6" 6"		2.3	106.5					
280	15													
275	20													
270	25													
265	30													

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-21

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-23

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-22**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83793°
Longitude: -119.90899°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Red, increase in sand content, fine to medium sand	S3					6.3						Switched to Hollow Stem Auger
	5		**SILT with Sand (ML)**: low to medium plasticity, brown to reddish brown, moist, hard	S4		BC=20 23 17	6" 6" 6"		14.9	105.6					
290			Increase in sand content	S5		BC=11 11 13	6" 6" 6"		9.8	109.3					
	10		**Silty SAND (SM)**: fine to medium-grained, non-plastic, pale brown, moist, medium dense												
285			**Poorly Graded SAND (SP)**: yellowish brown, moist, medium dense, fine to coarse sand, trace fine gravel	S6		BC=4 6 6	6" 6" 6"		3.2	98.3		2.9			
	15		Slight decrease in sand size, fine to medium grained	S7		BC=5 6 9	6" 6" 6"								
280			**Silty SAND (SM)**: brown, moist, medium dense, fine sand												
	20			S8		BC=4 6 8	6" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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BORING LOG KB-22

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-24

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-23**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Warm	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83796°
Longitude: -119.90855°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: low plasticity, red, moist, fine sand, (Plow depth observed = 0-8 inches)	S1					10.1						Hand Auger down to 1.0 feet
				S2											Switched to Hollow Stem Auger
						BC=33 50/2"	4" 6"		16.1						
			Silty SAND (SM): fine to medium-grained, non-plastic, brown, moist, very dense, strongly cemented	S3											
290	5		**Poorly Graded SAND (SP)**: fine to medium-grained, yellowish brown, moist, medium dense	S4		BC=3 3 7	6" 6" 6"		3.5	107.5					
			Sandy SILT (ML): fine-grained, non-plastic, pale brown, moist, very stiff	S5		BC=6 9 15	6" 6" 6"		5.7	103.0					
285	10		**Silty SAND (SM)**: fine to medium-grained, pale reddish brown, moist, dense	S6		BC=10 19 28	6" 6" 6"		9.3	103.5					
			SILT (ML): low plasticity, pink, moist, hard												
280	15		**Silty SAND (SM)**: fine to medium-grained, yellowish brown, moist, medium dense	S7		BC=6 6 11	6" 6" 6"					34			
275	20			S8		BC=14 30 50	6" 6" 6"								
270	25														
265	30														

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE:	3/8/2021

BORING LOG KB-23

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-25

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-24**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83799°
Longitude: -119.90808°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approx. Elevation (ft)	Depth (ft)	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0	**Sandy Lean CLAY (CL)**: fine to medium-grained, low plasticity, reddish brown, low cemented, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 1.5 feet
			S2											
			S3					21.5						Switched to Hollow Stem Auger
		Sandy SILT (ML): reddish yellow to pale red												
		SILT (ML): non-plastic, pink to brown, white mottling, moist, very stiff, strongly cemented	S4		BC=8 12 11	6" 6" 6"								
290	5	No cementation, low plasticity, trace fine sand, iron oxide	S5		BC=8 12 21	6" 6" 6"		19.4	101.3					
		Poorly Graded SAND with Silt (SP-SM): fine to medium-grained, pale red, moist, loose	S6		BC=4 3 4	6" 6" 6"		3.4						
285	10	No silt, trace up to 3/8" subrounded to subangular gravel, medium dense	S7		BC=5 5 8	6" 6" 6"		1.5	116.5					
		Reddish yellow, dense												
280	15		S8		BC=8 15 20	6" 6" 6"								
		Sandy SILT (ML): olive brown, moist, hard, fine sand												
275	20		S9		BC=21 25 23 PP=4.5	6" 6" 6"								
270	25													
265	30													

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/8/2021

BORING LOG KB-24

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-26

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-25**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83771°
Longitude: -119.90790°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-10 inches)	S1 S2											Hand Auger down to 1.0 feet Switched to Hollow Stem Auger
									5.0	113.7					
			Clayey SAND (SC): fine to medium-grained, non-plastic, reddish brown, moist, very dense	S3		BC=50/2"	2"								
	5		Decrease in Clay, medium dense	S4		BC=3 20 15 13	6" 6" 6"		5.7						
290			**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, reddish yellow, moist, dense	S5		BC=14 19 13	6" 6" 6"		7.5	106.9					
	10		Decrease in Silt, medium dense	S6		BC=5 7 10	6" 6" 6"		9.5						
285			**Poorly Graded SAND (SP)**: yellowish brown to reddish yellow, moist, medium dense, fine sand												
	15			S7		BC=6 10 13	6" 6" 6"		1.9	101.9					
280			**SILT with Sand (ML)**: low plasticity, pinkish brown, moist, hard, low cemented, fine sand												
	20		Non plastic	S8		BC=12 16 25	6" 6" 6"								
275			The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.												
	25														
270															
	30														
265															

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-25

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-27

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-26**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83773°
Longitude: -119.90833°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Clayey SAND (SC)**: fine-grained, non-plastic, red, moist, (Plow depth observed = 0-6 inches)	S1 S2											Hand Auger down to 2.0 feet Switched to Hollow Stem Auger
						BC=23 21 15	6" 6" 6"								
			Silty SAND (SM): pink to brown, moist, dense, moderately cemented, fine sand	S3					23.7						
	5		**Sandy SILT (ML)**: low plasticity, yellowish brown, moist, very stiff, weak to moderately cemented, fine sand			BC=8 11 17	6" 6" 6"								
				S4					9.0	108.4		64			
290			Very stiff			BC=10 14 21	6" 6" 6"								
				S5					9.0	108.4					
	10		**SILT (ML)**: low plasticity, pink & red, moist, very stiff			BC=11 17 21	6" 6" 6"								
285				S6											
	15		**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, yellowish brown, moist, medium dense			BC=9 10 14	6" 6" 6"								
280				S7											
	20		**SILT with Sand (ML)**: non-plastic, pink, moist, hard			BC=11 17 27	6" 6" 6"								
				S8											
275	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-26

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-28

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-27**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83773°
Longitude: -119.90885°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Silty SAND (SM)**: fine to medium-grained, low plasticity, reddish brown, moist, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.0 feet
				S2											
			SILT (ML): brown, moist, moderately to strongly cemented	S3					12.7						Switched to Hollow Stem Auger
	5			S4		BC=13 8 9	6" 6" 6"		8.1	103.1					
290			**Poorly Graded SAND with Sand (SP-SM)**: non-plastic, brown, moist, medium dense, fine sand			BC=5 8 10	6" 6" 6"					8.7			
			Decrease in Silt content	S5					5.5	102.5					
	10			S6		BC=4 4 8	6" 6" 6"								
285			**Sandy SILT (ML)**: non-plastic, pale brown to pink, moist, stiff, fine sand												
	15					BC=8 10 1	6" 6" 6"								
280			Very stiff	S7											
			Silty SAND (SM): pink to brown, moist, medium dense, fine sand												
	20					BC=10 11 12	6" 6" 6"								
				S8											
275			The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.												
	25														
270															
	30														
265															

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-27

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-29

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-28**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83757°
Longitude: -119.90963°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-6 inches) Low to medium plasticity	S1											Hand Auger down to 1.5 feet
				S2											Switched to Hollow Stem Auger
				S3		BC=13 21 13	3" 6" 6"								
	5		**Poorly Graded SAND with Silt (SP-SM)**: fine to coarse-grained, yellowish brown, moist, medium dense						5.6	115.2					
			SILT (ML): non-plastic, yellowish brown, moist, stiff, weak cemented, trace fine sand	S4		BC=4 6 6	4" 6" 6"								
290			**Silty SAND (SM)**: fine to medium-grained, non-plastic, pink, moist, very stiff	S5		BC=9 22 23	6" 6" 6"		11.7	108.8					
	10		**Poorly Graded SAND with Silt (SP-SM)**: fine to medium-grained, non-plastic, reddish yellow, moist, medium dense	S6		BC=4 6 8	6" 6" 6"								
285	15														
280															
	20														
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-28

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-30

PAGE: 1 of 1

Date Begin - End:	2/26/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-29**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83745°
Longitude: -119.90896°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Silty SAND (SM)**: low plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.5 feet
				S2											
				S3											Switched to Hollow Stem Auger
	5		Fine to medium sand, pale brown, medium dense	S4		BC=8 7 10	6" 6" 6"		6.8	112.2					
290	10		**Poorly Graded SAND with Silt (SP-SM)**: non-plastic, pink to brown, moist, medium dense, fine sand	S5		BC=6 6 5	6" 6" 6"		4.3	96.2					
			6" Layer of Sllt, brown	S6		BC=10 19 20	6" 6" 6"		9.8	105.1					
285	15		**Silty SAND (SM)**: non-plastic, pale brown, moist, dense, fine sand												
			Sandy SILT (ML): non-plastic, pale brown, moist, very stiff, fine sand	S7		BC=10 14 11	6" 6" 6"								
280	20		Dense												
			Silty CLAY (CL-ML): low to medium plasticity, brown, moist, hard, weak to moderately cemented, trace sand	S8		BC=6 16 17	6" 6" 6"								
275	25		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 26, 2021.												
270	30														
265															

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY:	DD
DATE:	3/8/2021

BORING LOG KB-29

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-31

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-30**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83753°
Longitude: -119.90850°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-8 inches)	S1					10.9						Hand Auger down to 3.0 feet
				S2											
			Clayey SAND (SC): fine to medium-grained, low plasticity, red, moist	S3					10.8			34			Switched to Hollow Stem Auger
	5		**SILT with Sand (ML)**: non-plastic, pink to reddish brown, moist, hard, fine sand			BC=7 16 17	6" 6" 6"								
				S4					9.0	104.1					
			Poorly Graded SAND with Silt (SP-SM): reddish yellow, moist, medium dense, fine sand			BC=4 4 7	6" 6" 6"								
290			**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium dense	S5					1.1	90.4					
	10					BC=10 11 21	6" 6" 6"								
			Silty SAND (SM): yellowish brown, dense, fine sand, poorly graded	S6											
285															
	15		Medium dense	S7		BC=7 9 10	6" 6" 6"								
280															
	20		**SILT (ML)**: low plasticity, pink to brown, moist, hard	S8		BC=7 10 11 PP=4.5	3" 6" 6"								
275															
	25														
270															
	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-30

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-32

PAGE: 1 of 1

Date Begin - End:	2/23/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-31**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Not Available	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83751°
Longitude: -119.90805°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-6 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Decrease in Clay content	S3					8.8						Switched to Hollow Stem Auger
	5		**Sandy SILT (ML)**: non-plastic, pink to reddish yellow, moist, hard, moderately to strongly cemented, fine sand	S4		BC=15 23 24 PP=>4.5	6" 6" 6"		17.5	98.3					
290			**Poorly Graded SAND (SP)**: non-plastic, yellowish brown, moist, loose, fine sand	S5		BC=3 4 5	2" 6" 6"	SM				13			
	10		Medium dense	S6		BC=4 8 12	6" 6" 6"		2.8	100.2					
285			**Silty SAND (SM)**: reddish brown, medium dense, fine sand												
	15		Increase in sand content	S7		BC=8 10 12	6" 6" 6"								
280			**SILT (ML)**: low plasticity, pink, moist, very stiff, weakly cemented												
	20		**Sandy SILT (ML)**: non-plastic, pink to brown, moist, hard, fine sand	S8		BC=12 24 50/3"	6" 6" 6"								
275	25														
270	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 23, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/9/2021

BORING LOG KB-31

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-33

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-32**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83728°
Longitude: -119.90788°
Approximate Ground Surface Elevation (ft.): 300.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, red, moist, fine sand, (Plow depth observed = 0-6 inches)	S1					8.8						
				S2											
			Decrease in Clay content	S3					6.4						
									4.0	119.6					
295	5		**Poorly Graded SAND with Clay (SP-SC)**: non-plastic, red, moist, medium dense, fine to medium sand, gravel (up to 3/8" subangular subrounded)	S4		BC=12 10 9	6" 6" 6"								
			Fine to coarse sand, loose	S5		BC=4 4 6	6" 6" 6"		2.5	113.3					
290	10		**Poorly Graded SAND (SP)**: fine to medium-grained, pinkish brown, moist, medium dense	S6		BC=4 5 6	6" 6" 6"					6.2			
285	15		Fine to coarse grained, brown, dense	S7		BC=8 16 16	6" 6" 6"								
280	20		Very dense, pink	S8		BC=17 26 27	6" 6" 6"								
			SILT (ML): low plasticity, light pink, moist, hard, low cemented												
275	25		The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.												
270	30														

LABORATORY RESULTS

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE:	3/9/2021

BORING LOG KB-32

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-34

PAGE: 1 of 1

Date Begin - End:	2/24/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-33**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83735°
Longitude: -119.90832°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist, fine sand, (Plow depth observed = 0-8 inches)	S1					10.0						Hand Auger down to 1.75 feet
				S2											Switched to Hollow Stem Auger
			Clayey SAND (SC): fine to medium-grained, non-plastic, red, moist, dense	S3		BC=24 27 24	6" 6" 6"								
	5		**Sandy SILT (ML)**: non-plastic, pink to brown, moist, hard, moderately to strongly cemented, fine sand Stiff	S4		BC=16 17 7	6" 6" 6"		14.5						
290			**Silty SAND (SM)**: reddish yellow, moist, loose, fine sand	S5		BC=6 6 3	6" 6" 6"		6.6	105.2					
	10		Fine to medium grained	S6		BC=2 3 6	6" 6" 6"					25			
285			**Sandy SILT (ML)**: low plasticity, pink, moist, very stiff, low cemented, fine sand												
	15			S7		BC=7 11 13	6" 6" 6"								
			Poorly Graded SAND (SP): fine to medium-grained, pink to brown, moist, medium dense	S8					5.3						
280															
	20		Fine sand, dense												
				S9		BC=7 13 21 PP=>4.5	6" 6" 6"								
			SILT (ML): low plasticity, pink, moist, hard												
275	25														
270	30														
265															

The boring was terminated at approximately 21.5 ft. below ground surface. The boring was backfilled with neat cement on February 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-33

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-35

PAGE: 1 of 1

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-34**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83725°
Longitude: -119.90873°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: red, moist, loose, (Plow depth observed = 0-8 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Lean CLAY with Sand (CL): low to medium plasticity, reddish brown, moist Decrease in sand content	S3					9.0				19	5	Switched to Hollow Stem Auger
	5		**Sandy SILT (ML)**: non-plastic, yellowish brown, moist, hard, moderately to strongly cemented, fine sand			BC=32 49 50	6" 6" 6"								
				S4					12.9	106.8					
			SILT (ML): non-plastic, brownish gray, moist, hard, weakly cemented			BC=16 31 36	6" 6" 6"								
290			Moderately cemented, iron oxide	S5					19.4	98.2					
	10		**Silty SAND (SM)**: yellowish brown, moist, dense, fine sand			BC=9 16 23	6" 6" 6"								
			SILT (ML): low plasticity, brownish gray, moist, hard	S6					8.3	112.4					
285															
	15		**Silty SAND (SM)**: non-plastic, pink t yellowish brown, moist, medium dense, fine sand			BC=5 6 8	6" 6" 6"					22			
				S7											
280															
	20		Decrease in sand content, pink, very dense	S8		BC=17 19 50/4"	6" 6" 6"								
			SILT (ML): non-plastic, light brownish gray, moist, hard	S9											
275															
	25		**Silty SAND (SM)**: non-plastic, light gray, moist, medium dense, fine sand			BC=10 13 19	6" 6" 6"								
				S10					3.8	95.3					
270															
	30		**SILT with Sand (ML)**: light gray, moist, very stiff, fine sand			BC=7 8 11	6" 6" 6"								
				S11					7.9			76			
265			**Silty CLAY (CL-ML)**: medium plasticity, gray, moist, very stiff												

LABORATORY RESULTS

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PROJECT NO.:	20212905.001A
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CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-34

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-36

Date Begin - End:	2/25/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-34**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83725°
Longitude: -119.90873°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
260	40		**Silty CLAY (CL-ML)**: medium plasticity, gray, moist, very stiff	S12 S13		BC=8 16 16 PP=3.75	6" 6" 6"
			SILT with Sand (ML): non-plastic, brownish gray, moist, hard, weak to moderately cemented, fine sand	S14		BC=25 29 33	6" 6" 6"
255	45		**Poorly Graded SAND (SP)**: gray to light gray, moist, very dense, fine sand				
			Silty SAND (CL-ML): medium plasticity, yellowish brown, moist, trace fine to medium sand	S15		BC=12 18 18	6" 6" 6"
250	50		**Clayey SAND with Silt (SC)**: fine to medium-grained, low plasticity, yellowish brown, moist, dense	S16		BC=11 17 17	6" 6" 6"
245	55						
240	60						
235	65						
230							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The boring was terminated at approximately 51.5 ft. below ground surface. The boring was backfilled with neat cement on February 25, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-34

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-36

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-35**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83705°
Longitude: -119.90914°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): fine to medium-grained, low plasticity, reddish yellow, moist, (Plow depth observed = 0-8 inches)	S1 / S2					6.7						Hand Auger down to 1.0 feet Switched to Hollow Stem Auger
295	5		**Poorly Graded SAND with Clay (SP-SC)**: fine to coarse-grained, non-plastic, yellowish brown, moist, medium dense, trace 3/8" gravel, subrounded to subangular	S3		BC=2 10 12	6" 6" 6"								
			Poorly Graded SAND with Gravel (SP): fine to coarse-grained, yellowish brown to brown, moist, loose	S4		BC=3 3 2	6" 6" 6"		3.5			6.9			
290	10		**Poorly Graded SAND (SP)**: fine to coarse-grained, pink to brown, moist, medium dense	S5		BC=5 7 10	6" 6" 6"		1.5	103.7					
			Decrease in sand size, fine to medium grained	S6		BC=3 4 10	6" 6" 6"								
285	15														
280	20														
275	25														
270	30														
265															

LABORATORY RESULTS

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-35

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-37

PAGE: 1 of 1

BORING LOG KB-36

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.23702°
Longitude: -119.90781°
Approximate Ground Surface Elevation (ft.): 301.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
300			**Lean CLAY with Sand (CL)**: fine to medium-grained, low to medium plasticity, reddish brown, moist, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.5 feet
				S2											
				S3											Switched to Hollow Stem Auger
			Sandy Lean CLAY (CL): low plasticity, reddish yellow, moist, weak to moderately cemented, fine to medium sand												
	5		**Clayey SAND (SC)**: fine to medium-grained, low plasticity, reddish yellow, moist, medium dense, weakly cemented, trace 3/8" gravel	S4		BC=9 7 8	6" 6" 6"								
295															
				S5		BC=4 2 4	6" 6" 6"								
	10		**Poorly Graded SAND (SP)**: fine to coarse-grained, reddish brown, moist, loose, trace 3/8" subrounded gravel												
290			Pink to brown, medium dense	S6		BC=7 7 9	6" 6" 6"								
	15														
285															
	20														
280															
	25														
275															
	30														
270															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-36

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-38

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-37**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83765°
Longitude: -119.90779°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: medium plasticity, red, moist, fine sand, (Plow depth observed = 0-12 inches)	S1											Hand Auger down to 2.5 feet
				S2					10.8						
			Increase in sand content	S3					10.3						Switched to Hollow Stem Auger
	5		**Poorly Graded SAND with Silt (SP-SM)**: fine-grained, yellowish brown, moist, medium dense	S4		BC=6 10 9	6" 6" 6"		4.3						
290			**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium dense	S5		BC=6 9 11	6" 6" 6"		1.8	99.3					
	10		**Silty SAND (SM)**: fine-grained, reddish yellow, moist, medium dense	S6		BC=4 5 8	6" 6" 6"								
285	15														
280	20														
275	25														
270	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	GG
CHECKED BY:	DD
DATE:	3/9/2021

BORING LOG KB-37

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-39

PAGE: 1 of 1

Date Begin - End:	2/22/2021	**Drilling Company:**	Moore Twining	**BORING LOG KB-38**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	HA/HSA	**Hammer Efficiency:**	88%
Weather:	Sunny/Clear	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION | LABORATORY RESULTS

Latitude: 36.83864°
Longitude: -119.90785°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Grassy field

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Lean CLAY with Sand (CL)**: low to medium plasticity, red, moist, fine to medium sand, (Plow depth observed = 0-8 inches)	S1											Hand Auger down to 2.5 feet
				S2											
			Decrease in sand content (metal formate)	S3											Switched to Hollow Stem Auger
	5		**SILT with Sand (ML)**: low plasticity, pink, moist, hard, moderately cemented	S4		BC=19 25 25 PP=>4.5	6" 6" 6"		5.6	119.7					
290			Weak cementation, fine sand, medium stiff	S5		BC=3 4 4	6" 6" 6"		10.5						
	10		**Poorly Graded SAND (SP)**: fine to medium-grained, pink, moist, medium stiff	S6		BC=5 8 10	6" 6" 6"		1.9	101.2					
285	15														
280	20														
275	25														
270	30														
265															

The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with auger cuttings on February 22, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
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DATE:	3/9/2021

BORING LOG KB-38

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE
A-40

PAGE: 1 of 1

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining	**PERCOLATION TEST HOLE LOG INF-1**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.84003°
Longitude: -119.90856°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): reddish brown, moist												2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2
			Silty SAND (SM): reddish brown, moist, medium dense, fine to medium-grained												
290	5		**Sandy SILT (ML)**: brownish gray, moist, very stiff, Moderately Cemented	INF-1		BC=12 16 9	12"								
285	10														
280	15														
275															

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-1

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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-41

PAGE: 1 of 1

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining	**PERCOLATION TEST HOLE LOG INF-2**	
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83927°
Longitude: -119.90917°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
295	0		**Lean CLAY with Sand (CL)**: low plasticity, reddish brown, moist				
			Silty SAND (SM): reddish brown, moist, fine to medium-grained				
				INF-2		BC=3 2 5	12"
	5						
290							
	10						
285							
	15						
280							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
							2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-2

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FRESNO, CALIFORNIA 93722

FIGURE
A-42

PAGE: 1 of 1

PERCOLATION TEST HOLE LOG INF-3

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83808°
Longitude: -119.91016°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
295	0		**Sandy Lean CLAY (CL)**: low plasticity, reddish brown, moist												2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2
			Silty SAND (SM): reddish brown, moist, medium dense, fine to medium-grained												
				INF-3		BC=12 7 7	12"								
	5														
290															
	10														
285															
	15														
280															

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-3

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-43

PERCOLATION TEST HOLE LOG INF-4

Date Begin - End:	3/01/2021	**Drilling Company:**	Moore Twining		
Logged By:	SD	**Drill Crew:**	James/Yvan		
Hor.-Vert. Datum:	Not Available	**Drilling Equipment:**	CME-75		
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	88%
Weather:	Sunny/Cool	**Exploration Diameter:**	6 in. O.D.	**Hammer Cal. Date:**	5/01/2020

FIELD EXPLORATION

Latitude: 36.83711°
Longitude: -119.90929°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in. Pocket Pen(PP)= tsf	Recovery (NR=No Recovery)
295	5		**Lean CLAY with Sand (CL)**: low to medium plasticity, reddish brown, moist **Silty SAND (SM)**: brown, moist, medium dense, fine to medium-grained	INF-4		BC=5 12 12	
290	10						
285	15						
280							

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
							2" perforated PVC pipe installed in hole surrounded by gravel. Hole presoaked on 3/1, test completed on 3/2

The percolation test hole was terminated at approximately 5 ft. below ground surface. The percolation test hole was backfilled with auger cuttings on March 02, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.:	20212905.001A
DRAWN BY:	SD
CHECKED BY:	DD
DATE:	3/2/2021

PERCOLATION TEST HOLE LOG INF-4

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FRESNO, CALIFORNIA 93722

FIGURE
A-44

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 10'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 1

Latitude: 36.83963°
Longitude: -119.90856°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): fine to coarse-grained sand, reddish brown, Observed Plow Depth 16 inches deep	1									
			Silty SAND (SM): reddish brown, strongly cemented, hard pan	2									
290	5												
285	10												

The test pit was terminated because of backhoe refusal (▲) at approximately 3.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.: 20212905.001A
DRAWN BY: JDS
CHECKED BY: DD
DATE: 2/16/2021

TEST PIT LOG TP- 1

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-45

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 9'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 2

FIELD EXPLORATION

Latitude: 36.83896°
Longitude: -119.91019°
Approximate Ground Surface Elevation (ft.): 294.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low to medium plasticity, reddish brown, moist, Observed Plow Depth 7 inches deep	1									**R-Value=** 75
			Poorly Graded SAND with Silt (SP-SM): fine to coarse-grained sand, yellowish brown, moist, fine to coarse gravel										
290				2									Corrosion
	5												
			Poorly Graded SAND (SP): fine to coarse-grained sand, reddish brown, moist, trace cementation										
			grades to medium to coarse sand										
285													
	10												
280													
	15												
275													

The test pit was terminated because of caving at approximately 9 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

KLEINFELDER
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PROJECT NO.: 20212905.001A

DRAWN BY: JDS

CHECKED BY: DD

DATE: 2/16/2021

TEST PIT LOG TP- 2

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-46

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 16'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 3

FIELD EXPLORATION

Latitude: 36.83879°
Longitude: -119.90825°
Approximate Ground Surface Elevation (ft.): 297.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type
295	0		**Sandy Lean CLAY (CL)**: low to medium plasticity, reddish brown, Observed Plow Depth 12 inches deep	1	
			Silty SAND (SM): fine to medium-grained, reddish brown, moderate to strong cementation		
				2	
	5		**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown with light brownish gray		
290					
	10				
285					
	15				
280					

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.: 20212905.001A
DRAWN BY: JDS
CHECKED BY: DD
DATE: 2/16/2021

TEST PIT LOG TP- 3

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-47

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 14'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 4

FIELD EXPLORATION

Latitude: 36.83824°
Longitude: -119.90981°
Approximate Ground Surface Elevation (ft.): 295.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): low plasticity, reddish brown, Observed Plow Depth 12 inches deep	1									**Proctor - ASTM D1557 Method A=** Max. Dry Unit Wt.: 128.5 pcf Opt. Water Content: 8.2%
			Sandy SILT (ML): fine to coarse-grained sand, reddish brown										
			moderately cemented	2									
290	5												
			Poorly Graded SAND (SP): fine-grained sand, yellowish brown										
285	10												
280	15												

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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PROJECT NO.: 20212905.001A

DRAWN BY: JDS

CHECKED BY: DD

DATE: 2/16/2021

TEST PIT LOG TP- 4

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-48

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 14'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 5

FIELD EXPLORATION

Latitude: 36.83831°
Longitude: -119.90827°
Approximate Ground Surface Elevation (ft.): 296.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type
295	0		**Sandy Lean CLAY (CL)**: reddish brown, Observed Plow Depth 12 inches deep	1	
			Silty SAND (SM): fine to coarse-grained sand, yellowish brown, moderate to strong cementation		
			light gray with reddish brown intermixed		
			Poorly Graded SAND (SP): fine-grained sand, light gray	2	
	5		**Sandy SILT (ML)**: fine-grained sand, non-plastic, light brownish gray		
290			**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown and light gray intermixed		
	10				
285					
	15				
280					

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE: 2/16/2021

TEST PIT LOG TP- 5

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-49

PAGE: 1 of 1

TEST PIT LOG TP- 6

Date Begin - End:	1/19/2021	**Excavation Company:**	Landscape Services
Logged By:	SL	**Excavation Crew:**	Dan
Hor.-Vert. Datum:	Not Available	**Excavation Equip.:**	CAT 420E
Plunge:	N/A degrees	**Excav. Dimensions:**	12'x 2' ft
Weather:	Sunny/Cool		

Latitude: 36.83782°
Longitude: -119.90804°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, reddish brown, Observed Plow Depth 12 inches deep	1									
			Silty SAND (SM): fine to coarse gained sand, light grayish brown										
295													
	5		**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown and light gray	2									Corrosion
290													
	10		The test pit was terminated at approximately 9.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.										
285													
	15												
280													

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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CHECKED BY:	DD
DATE:	2/16/2021

TEST PIT LOG TP- 6

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-50

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 14'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 7

FIELD EXPLORATION

Latitude: 36.83755°
Longitude: -119.90900°
Approximate Ground Surface Elevation (ft.): 298.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): dark brown, Observed Plow Depth 15 inches deep	1									**R-Value=** 75
295			**Poorly Graded SAND with Silt (SP-SM)**: fine-grained sand, dark brown, moderately cemented										
	5		**Poorly Graded SAND (SP)**: fine-grained sand, yellowish brown	2									
290			fine-grained sand, light gray, some moderate cementation										
	10												
285													
	15												
280													

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE: 2/16/2021

TEST PIT LOG TP- 7

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-51

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 13'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 8

FIELD EXPLORATION

Latitude: 36.83742°
Longitude: -119.90874°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type
			Sandy Lean CLAY (CL): reddish brown, Observed Plow Depth 6 inches deep	1	
			Silty SAND (SM): fine to medium-grained sand, light gray, weak cementation		
			Poorly Graded SAND (SP): fine-grained sand, light gray, some moderate cementation, hard pan		
295				2	
	5		yellowish brown		
290					
	10				
285					
	15				
280					

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The test pit was terminated at approximately 10 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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TEST PIT LOG TP- 8

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-52

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 13'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP- 9

FIELD EXPLORATION

Latitude: 36.83726°
Longitude: -119.90824°
Approximate Ground Surface Elevation (ft.): 300.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Sandy Lean CLAY (CL): low plasticity, reddish brown, Observed Plow Depth 16 inches deep	1									**Proctor - ASTM D1557 Method A=** Max. Dry Unit Wt.: 133.8 pcf Opt. Water Content: 7.2%
			Sandy SILT (ML): reddish brown, moderate to strong cementation										
				2									
295	5		fine-grained sand, light gray, moderatly cemented										Corrosion
			fine to medium-grained sand, reddish brown										
290	10		fine to coarse-grained sand, grades to poorly graded sand										
285	15												

The test pit was terminated at approximately 10.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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TEST PIT LOG TP- 9

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-53

PAGE: 1 of 1

Date Begin - End: 1/19/2021 **Excavation Company:** Landscape Services

Logged By: SL **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 13'x 2' ft

Weather: Sunny/Cool

TEST PIT LOG TP-10

FIELD EXPLORATION

Latitude: 36.83721°
Longitude: -119.90966°
Approximate Ground Surface Elevation (ft.): 299.00
Surface Condition: Bare Earth

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Lean CLAY with Sand (CL): low plasticity, reddish brown, dry, Observed Plow Depth 16 inches deep	1									
			Silty SAND (SM): fine to coarse-grained, reddish brown, moist, weak to moderate cementation										
			moderate cementation intermixed										
295				2									
	5												Corrosion
			light gray, moderate to strong cementation										
290													
	10												
285													
	15												
280													

The test pit was terminated at approximately 9.5 ft. below ground surface. The test pit was backfilled with excavated material on January 19, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:
The exploration location and elevation are approximate and were estimated by Kleinfelder.

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DATE: 2/16/2021

TEST PIT LOG TP-10

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NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-54

PAGE: 1 of 1

TEST PIT LOG TP-11

Date Begin - End:	4/24/2021	**Excavation Company:**	Landscape Services
Logged By:	SD	**Excavation Crew:**	Dan
Hor.-Vert. Datum:	Not Available	**Excavation Equip.:**	CAT 420E
Plunge:	N/A degrees	**Excav. Dimensions:**	12'x 2' ft
Weather:	Clear/Sunny		

FIELD EXPLORATION

Latitude: °
Longitude: °
Surface Condition: Grass & Weeds

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Sandy Lean CLAY (CL): fine to medium-grained sand, brown, moderately cemented, plowed zone 0-10"	1			2.8						
			2									
		SILT with Sand (ML): dark grayish brown, strongly cemented, Hard Pan	3			13.3				NP	NP	
5												
10												
15												

The test pit was terminated because of backhoe refusal (↑) at approximately 5.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.
GENERAL NOTES:

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TEST PIT LOG TP-11

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-55

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-12

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		FIELD EXPLORATION			LABORATORY RESULTS							
		Latitude: ° Longitude: ° Surface Condition: Grass & Weeds										
		Sandy Lean CLAY: fine-grained sand, brown, moist, plowed zone 0-9"	1			3.1						
			2									
		increase in sand content reddish brown										
		strongly cemented	3			23.7						
		Hard Pan										
5		The test pit was terminated because of backhoe refusal (↑) at approximately 4.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										
10												
15												

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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DATE: 5/7/2021

TEST PIT LOG TP-12

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-56

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 10'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-13

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds			LABORATORY RESULTS							
		Sandy SILT (ML): fine-grained sand, brown, weakly cemented, plowed zone 0-9"	1			3.2						
			2									
		SILT with Sand (ML): dark grayish brown, Hard Pan	3									
5												
10												
15												

The test pit was terminated because of backhoe refusal (↑) at approximately 5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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PROJECT NO.:	20212905.001A
DRAWN BY:	JDS
CHECKED BY:	DD
DATE:	5/7/2021

TEST PIT LOG TP-13

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-57

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-14

Latitude: °
Longitude: °
Surface Condition: Grass & Weeds

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (CL): fine to medium-grained sand, brown, plowed zone 0-8"	1			2.9						
			2									
		Silty SAND (SM): strongly cemented, Hard Pan	3									
5		The test pit was terminated because of backhoe refusal (↑) at approximately 4 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										
10												
15												

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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DATE: 5/7/2021

TEST PIT LOG TP-14

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
A-58

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-15

Latitude: °
Longitude: °
Surface Condition: Grass & Weeds

Depth (feet)	Graphical Log	Lithologic Description	Sample Number	Sample Type	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Sandy Lean CLAY (CL): yellowish brown, moist, plowed zone 0-12"	1			2.6				17	2	
			2									
		SILT with Sand (ML): grayish brown to yellowish brown, moist, Hard Pan										
		Poorly Graded SAND with Silt (SP-SM): fine to medium-grained sand, reddish brown, moist	3									
5												
10												
15												

FIELD EXPLORATION

LABORATORY RESULTS

The test pit was terminated because of backhoe refusal (↑) at approximately 5.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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DATE: 5/7/2021

TEST PIT LOG TP-15

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-59

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-16

Depth (feet)	Graphical Log	FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds Lithologic Description	Sample Number	Sample Type	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (SM): fine to medium-grained sand, brown, moist, plowed zone 0 to 11"	1			3.8				19	2	
			2									
		Sandy SILT (ML): reddish brown to brown, Hard Pan										
5		**Lean CLAY with Sand (CL)**: fine-grained sand, medium plasticity, trace sand	3			4.6						

The test pit was terminated because of backhoe refusal (↑) at approximately 5.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

10

15

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TEST PIT LOG TP-16

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE

A-60

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 11'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-17

Depth (feet)	Graphical Log	FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds Lithologic Description	Sample Number	Sample Type	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (SM): fine to medium-grained sand, brown pale, moist, plowed zone 0 to 10"	1			2.0						
			2									
		Poorly Graded SAND with Silt (SP-SM): moist	3									
5		The test pit was terminated because of backhoe refusal (↑) at approximately 5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

10

15

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DATE: 5/7/2021

TEST PIT LOG TP-17

COSTCO FRESNO NEW WAREHOUSE
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FRESNO, CALIFORNIA 93722

FIGURE

A-61

PAGE: 1 of 1

Date Begin - End: 4/24/2021 **Excavation Company:** Landscape Services

Logged By: SD **Excavation Crew:** Dan

Hor.-Vert. Datum: Not Available **Excavation Equip.:** CAT 420E

Plunge: N/A degrees **Excav. Dimensions:** 12'x 2' ft

Weather: Clear/Sunny

TEST PIT LOG TP-18

Depth (feet)	Graphical Log	FIELD EXPLORATION Latitude: ° Longitude: ° Surface Condition: Grass & Weeds Lithologic Description	Sample Number	Sample Type	LABORATORY RESULTS USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
		Silty SAND (SM): fine to medium-grained sand, brown, moist, plowed zone 0 to 11"	1			3.8						
			2									
		Silty SAND (SM): olive brown, moist	3									
5		The test pit was terminated because of backhoe refusal (↑) at approximately 4.5 ft. below ground surface. The test pit was backfilled with excavated material on April 24, 2021.										
10												
15												

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during excavation or after completion.

GENERAL NOTES:

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DATE: 5/7/2021

TEST PIT LOG TP-18

COSTCO FRESNO NEW WAREHOUSE
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N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE

A-62

PAGE: 1 of 1

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Appendix B

APPENDIX B
LABORATORY TESTING

GENERAL

Laboratory tests were performed on selected samples as an aid in classifying the soils and to evaluate physical properties of the soils that may affect foundation design and construction procedures. Laboratory testing was performed by Kleinfelder's in house laboratory. Corrosivity testing was performed by Sunland Analytical and Topsoil analytical testing was performed by Waypoint Analytical. The tests were performed in general conformance with the current ASTM or Caltrans standards. A description of the laboratory-testing program is presented below.

MOISTURE AND UNIT WEIGHT

Moisture content and dry unit weight tests were performed on selected samples recovered from the borings. Moisture contents were determined in general accordance with ASTM Test Method D 2216; dry unit weight was calculated using the entire weight of the samples collected in general accordance with ASTM Test Method D 7263. Results of these tests are presented on the boring logs and attached to this appendix.

WASH SIEVE

Selected soil samples were tested for the percent passing the No. 200 sieve, which was performed by wash sieving in accordance with ASTM Standard Test Method D1140. Results of these tests are presented on the boring logs and attached to this appendix.

ATTERBERG LIMITS

Atterberg limits testing was performed on a selected soil samples to assist in classification. Testing was performed in general accordance with ASTM D4318. Results of these tests are presented on the boring logs and attached to this appendix.

UNCONFINED COMPRESSIVE STRENGTH

Select drive samples were tested for their relative compressive strength in accordance with ASTM Standard Test Method D 2166. Results are presented as an attachment to this appendix.

MAXIMUM DENSITY AND OPTIMUM MOISTURE

Maximum density and optimum moisture content testing was performed on one bulk sample of the near surface soils to evaluate the compaction characteristics of the onsite soils. Maximum density and optimum moisture content testing was performed in general accordance with ASTM Standard Test Method D1557, Method B. The test result is attached.

DIRECT SHEAR

Select drive samples were tested for direct shear in accordance with ASTM Standard Test Method D 3080. Results are presented as an attachment to this appendix.

R-VALUE

Resistance value (R-value) tests were performed on selected bulk soil samples obtained to evaluate pavement support characteristics of the near-surface onsite soils. R-value tests were performed in accordance with ASTM Standard Test Method D2844. The test results are attached to this appendix.

SOIL CORROSIVITY TESTS

A series of chemical tests were performed on a selected sample of the near-surface soils to estimate pH, resistivity and sulfate and chloride contents. Test results may be used by a qualified corrosion engineer to evaluate the general corrosion potential with respect to construction materials. The tests were performed by Sunland Analytical of Sacramento, CA. The results of the tests are presented in Table 4 of Section 4.9 of the report and attached to this appendix.

TOPSOIL ANALYTICAL TESTS

Topsoil analytical testing was performed on one composite sample of the near-surface soils by Waypoint Analytical of Anaheim, California. The composite topsoil sample was tested for percentages of organic matter, percentages of deleterious material, pH, mineral content, micro and macro nutrient content, and herbicide presence in the soil. Eight discrete topsoil samples were tested for organic contents. The test results are presented in the Waypoint Analytical report attached to this appendix.

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-1	3.0			28.9								
KB-1	11.0	S6		12.9	99.6							
KB-2	3.0	S3	BROWN SILT (ML)	28.1				71				
KB-2	5.0			10.1								
KB-2	6.0	S4		15.6	99.2							
KB-2	7.5			2.1								
KB-2	11.0	S6		10.9	102.2							
KB-3	2.0	S3		6.6								
KB-3	7.5			10.7								
KB-3	11.0	S7		3.8	104.2							
KB-4	0.5	S2		8.4								
KB-4	2.0	S3		5.6								
KB-4	5.0			10.0								
KB-4	8.5	S6		2.6	98.2							
KB-4	10.0	S7	REDDISH BROWN POORLY GRADED SAND (SP)					3.8				
KB-5	3.0			21.0								
KB-5	6.0	S4		15.0	110.0							
KB-5	8.5	S5		11.1	106.8							
KB-5	11.0	S6		11.3	98.1							
KB-5	12.5			10.0								
KB-5	16.0	S8		6.3	101.3							
KB-5	21.0	S10		10.4	114.3							
KB-6	0.5	S2		10.4								
KB-6	2.0			31.8								
KB-6	6.0	S4		5.0	111.8				NP	NP	NP	
KB-6	8.5	S5		6.2	108.5							
KB-6	16.0	S8		8.7	98.9							
KB-7	0.5	S2		10.5								

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic
NA = Not Available

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LABORATORY TEST RESULT SUMMARY

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RIVERSIDE DR.
FRESNO, CALIFORNIA 93722

FIGURE
B-1

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-7	3.0	S3		27.5					NP	NP	NP	
KB-7	6.0	S4		10.7	109.3							
KB-7	18.5	S9		11.7	120.2							
KB-8	6.0	S4		11.9	101.1							
KB-8	11.0	S6		6.2	108.5							
KB-8	12.5	S7	REDDISH YELLOW SILT WITH SAND (ML)					73				
KB-8	21.0	S10		9.0	102.8							
KB-8	22.5	S11	BROWN SILT WITH SAND (ML)					82				
KB-9	0.5	S2		9.5								
KB-9	2.0	S3		11.1								
KB-9	8.5	S5		11.9	100.8							
KB-9	11.0	S6		11.2	100.8			47				
KB-9	15.0			11.1								
KB-9	21.0	S8		6.9	112.0							
KB-9	25.0	S9	BROWN POORLY GRADED SAND (SP)	2.6				3.1				
KB-10	2.0	S3		11.3								
KB-10	6.0	S4	YELLOWISH BROWN SILTY CLAY (CL-ML)	16.5	100.6				26	21	5	
KB-10	8.5	S5		1.4	102.2							
KB-10	11.0	S6		1.1	97.1							
KB-10	15.0			18.3								
KB-11	2.0	S3		9.7								
KB-11	6.0	S4		11.0	100.5							
KB-11	8.5	S5		10.9	99.4							
KB-11	11.0	S6		5.7	106.1							
KB-11	15.0			9.1								
KB-12	0.0	S1		9.0								
KB-12	4.0	S2		4.7	107.1							
KB-12	8.5	S4		9.5	94.0							

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FIGURE
B-2

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-12	10.0			21.5								
KB-13	2.0	S3		3.9								
KB-13	6.0	S4		6.2	105.6							
KB-13	7.5			17.1								
KB-14	1.5	S3		8.9								
KB-14	7.5			5.0								
KB-15	0.5	S2		9.5								
KB-15	3.0			13.9								
KB-15	6.0	S4		13.2	104.4							
KB-15	8.5	S5		11.2	94.5							
KB-15	10.0			16.0					NP	NP	NP	
KB-15	16.0	S7		2.2	109.1							
KB-16	0.5	S2		8.9								
KB-16	2.0	S3		18.5								
KB-16	6.0	S4		10.4	118.1							
KB-16	8.5	S5		7.7	106.2							
KB-17	0.5	S2	REDDISH BROWN SILTY CLAY (CL-ML)	10.1					17	11	6	
KB-17	3.0	S3		9.3								
KB-17	6.0	S4		21.1	102.1							
KB-17	7.5			6.3								
KB-17	11.0	S6		3.1	110.7							
KB-18	2.0			6.9								
KB-18	5.0			32.6								
KB-18	8.5	S6		6.6	102.3							
KB-18	16.0	S8		2.6	112.8							
KB-19	0.5	S2		8.1								
KB-19	3.0			22.1								
KB-19	6.0	S4		23.5								

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FRESNO, CALIFORNIA 93722

FIGURE
B-3

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-20	2.0			21.0								
KB-20	6.0	S4		17.5	103.3							
KB-20	8.5	S5		1.7	103.0							
KB-20	11.0	S6		1.1	101.0							
KB-21	0.0	S1		9.9								
KB-21	3.0	S2	REDDISH YELLOW CLAYEY SAND (SC)					27				
KB-21	6.0	S3		4.3	121.4							
KB-21	11.0	S5		2.3	106.5							
KB-22	2.0	S3		6.3								
KB-22	6.0	S4		14.9	105.6							
KB-22	8.5	S5		9.8	109.3							
KB-22	11.0	S6	YELLOWISH BROWN POORLY GRADED SAND (SP)	3.2	96.4			2.9				
KB-23	0.5	S2		10.1								
KB-23	2.0			16.1								
KB-23	6.0	S4		3.5	107.5							
KB-23	8.5	S5		5.7	103.0							
KB-23	11.0	S6		9.3	103.5							
KB-23	15.0	S7	YELLOWISH BROWN SILTY SAND (SM)					34				
KB-24	1.5			21.5								
KB-24	6.0	S5		19.4	101.3							
KB-24	7.5			3.4								
KB-24	11.0	S7		1.5	116.5							
KB-25	2.0			5.0	113.7							
KB-25	5.0			5.7								
KB-25	8.5	S5		7.5	106.9							
KB-25	10.0			9.5								
KB-25	16.0	S7		1.9	101.9							
KB-26	3.0	S3		23.7								

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FIGURE
B-4

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-26	6.0	S4	YELLOWISH BROWN SANDY SILT (ML)	9.0	108.4			64				
KB-26	8.5	S5		9.0	108.4							
KB-27	2.0	S3		12.7								
KB-27	6.0	S4		8.1	103.1							
KB-27	7.5	S5	BROWN POORLY GRADED SAND WITH SILT (SP-SM)					8.7				
KB-27	8.5	S5		5.5	102.5							
KB-28	4.0			5.6	115.2							
KB-28	8.5	S5		11.7	108.8							
KB-29	6.0	S4		6.8	112.2							
KB-29	8.5	S5		4.3	96.2							
KB-29	11.0	S6		9.8	105.1							
KB-30	0.5	S2		10.9								
KB-30	2.5	S3	REDDISH BROWN CLAYEY SAND (SC)	10.8				34				
KB-30	6.0	S4		9.0	104.1							
KB-30	8.5	S5		1.1	90.4							
KB-31	2.0	S3		8.8								
KB-31	6.0	S4		17.5	98.3							
KB-31	7.5	S5	BROWN POORLY GRADED SAND WITH SILT (SP-SM)					13				
KB-31	11.0	S6		2.8	100.2							
KB-32	0.5	S2		8.8								
KB-32	2.0	S3		6.4								
KB-32	4.0			4.0	119.6							
KB-32	8.5	S5		2.5	113.3							
KB-32	11.0	S6	BROWN POORLY GRADED SAND (SP)					6.2				
KB-33	0.5	S2		10.0								
KB-33	4.0			14.5								
KB-33	8.5	S5		6.6	105.2							
KB-33	11.0	S6	REDDISH YELLOW SILTY SAND (SM)					25				

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LABORATORY TEST RESULT SUMMARY

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FIGURE
B-5

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
KB-33	16.0	S8		5.3								
KB-34	2.0	S3	BROWNINSH GRAY SILTY CLAY (CL-ML)	9.0					19	14	5	
KB-34	6.0	S4		12.9	106.8							
KB-34	8.5	S5		19.4	98.2							
KB-34	11.0	S6		8.3	112.4							
KB-34	15.0	S7	LIGHT GRAY SILTY SAND (SM)					22				
KB-34	26.0	S10		3.8	95.3							
KB-34	31.0	S11	LIGHT GRAY SILT WITH SAND (ML)	7.9				76				
KB-35	0.5	S2		6.7								
KB-35	5.0	S4	BROWN POORLY GRADED SAND WITH GRAVEL (SP)	3.5				6.9				
KB-35	8.5	S5		1.5	103.7							
KB-37	0.5	S2		10.8								
KB-37	2.0	S3		10.3								
KB-37	5.0	S4		4.3								
KB-37	8.5	S5		1.8	99.3							
KB-38	6.0	S4		5.6	119.7							
KB-38	7.5	S5		10.5								
KB-38	11.0	S6		1.9	101.2							
TP-10	5.0	2										Corrosion
TP-11	0.0	1		2.8								
TP-11	4.0	3	BROWN SILT WITH SAND (ML)	13.3					NP	NP	NP	
TP-12	0.0	1		3.1								
TP-12	3.0	3		23.7								
TP-13	0.0	1		3.2								
TP-14	0.0	1		2.9								
TP-15	0.0	1	YELLOWISH BROWN SANDY LEAN CLAY (CL)	2.6					17	15	2	
TP-16	0.0	1	BROWN SANDY SILT (ML)	3.8					19	17	2	
TP-16	4.0	3		4.6								

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NA = Not Available

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LABORATORY TEST RESULT SUMMARY

COSTCO FRESNO NEW WAREHOUSE
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FIGURE
B-6

Exploration ID	Depth (ft.)	Sample No.	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
						Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
TP-17	0.0	1		2.0								
TP-18	0.0	1		3.8								
TP- 2	0.0	1	BROWN POORLY GRADED SAND WITH SILT (SP-SM)									**R-Value=** 75
TP- 2	4.5	2										Corrosion
TP- 4	0.0	1	REDDISH BROWN SANDY SILT (ML)									**Proctor - ASTM D1557 Method A=**
												Maximum Dry Unit Weight: 128.5 pcf
												Optimum Water Content: 8.2%
TP- 6	5.0	2										Corrosion
TP- 7	0.0	1	DARK BROWN POORLY GRADED SAND WITH SILT (SP-SM)									**R-Value=** 75
TP- 9	0.0	1	REDDISH BROWN SANDY SILT (ML)									**Proctor - ASTM D1557 Method A=**
												Maximum Dry Unit Weight: 133.8 pcf
												Optimum Water Content: 7.2%
TP- 9	5.0	2										Corrosion

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
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NA = Not Available

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LABORATORY TEST RESULT SUMMARY

COSTCO FRESNO NEW WAREHOUSE
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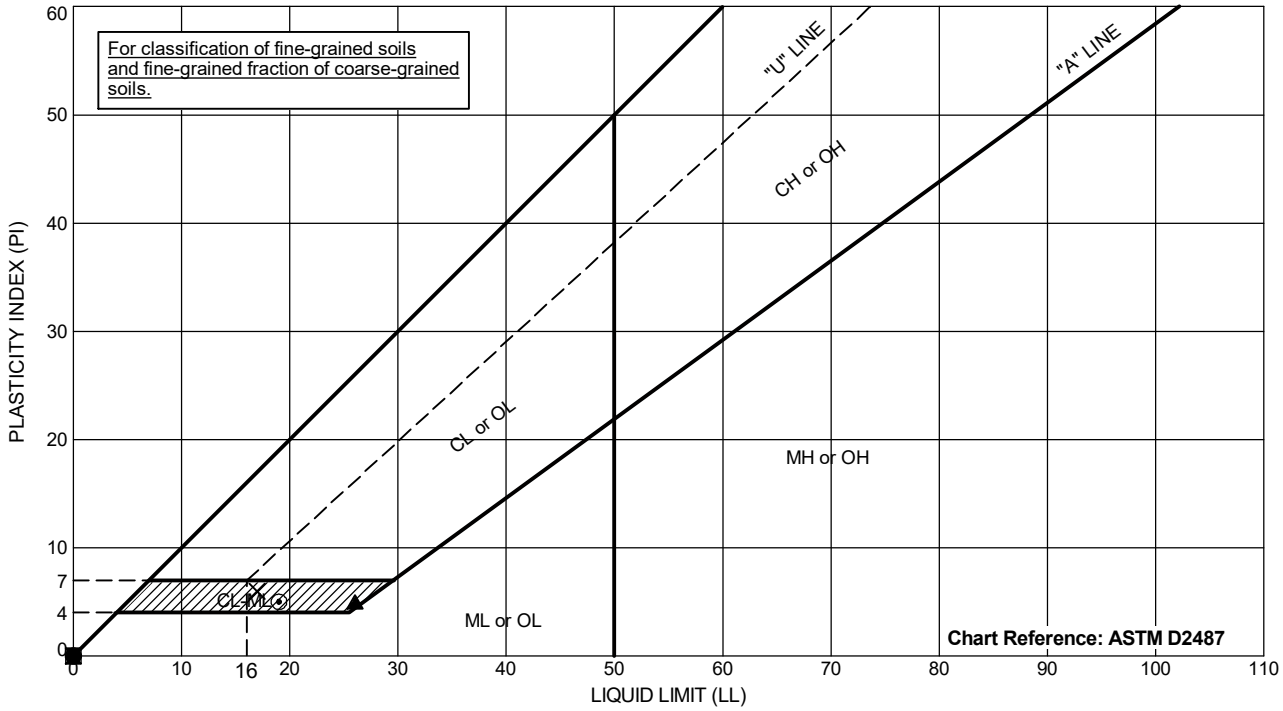
FIGURE
B-7



Exploration ID		Depth (ft.)	Sample Number	Sample Description	Passing #200	LL	PL	PI
●	KB-6	6	S4		NM	NP	NP	NP
⊠	KB-7	3	S3		NM	NP	NP	NP
▲	KB-10	6	S4	YELLOWISH BROWN SILTY CLAY (CL-ML)	NM	26	21	5
×	KB-17	0.5	S2	REDDISH BROWN SILTY CLAY (CL-ML)	NM	17	11	6
⊙	KB-34	2	S3	BROWNISH GRAY SILTY CLAY (CL-ML)	NM	19	14	5

Testing performed in general accordance with ASTM D4318.
NP = Nonplastic
NA = Not Available
NM = Not Measured

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DATE:	3/9/2021

ATTERBERG LIMITS

COSTCO FRESNO NEW WAREHOUSE
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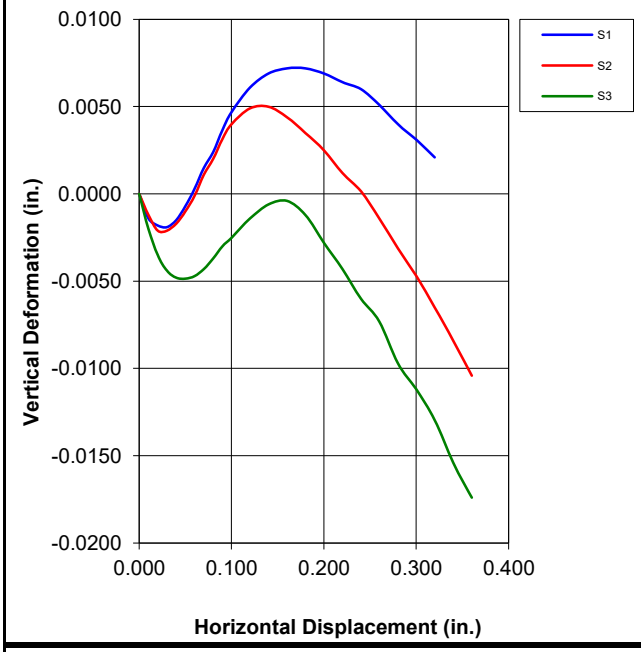
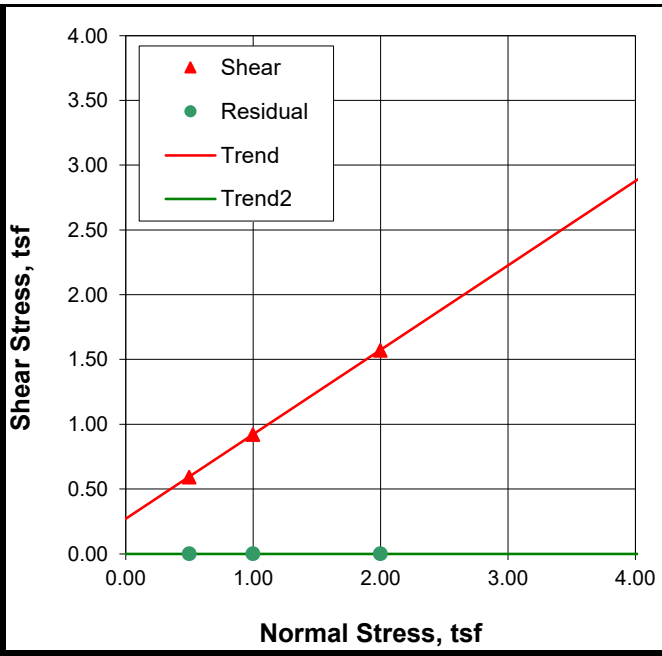
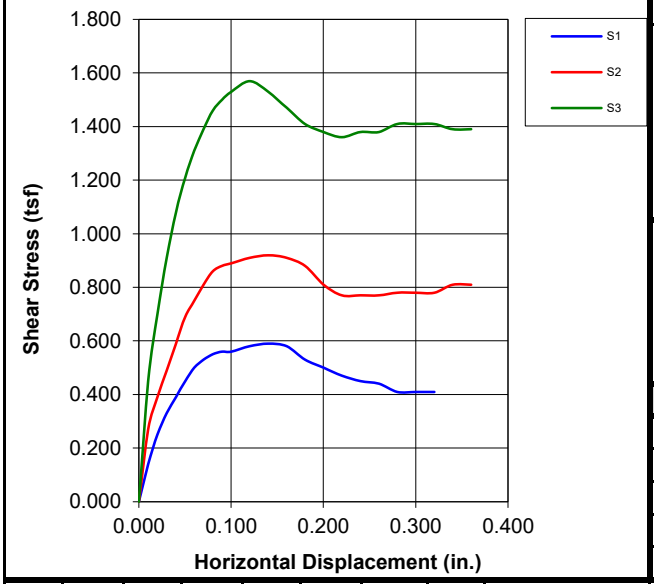
FIGURE

B-8







Specimen Number		1	2	3	4
Initial	Water Content, %	3.8	3.3	3.5	
	Dry Density, pcf	104.6	106.4	105.7	
	Void Ratio	0.611	0.584	0.595	
	Saturation, %	16.9	15.2	15.7	
	Diameter, in	2.42	2.42	2.42	
	Height, in	0.96	0.96	0.96	
At Test	Water Content, %	20.5	21.4	20.4	
	Dry Density, pcf	112.2	111.3	112.5	
	Void Ratio	0.491	0.506	0.500	
	Diameter, in	2.42	2.42	2.42	
	Height, in	0.89	0.91	0.90	
Maximum Shear Stress, tsf		0.59	0.92	1.57	
Residual Shear Stress, tsf		na	na	na	
Hoizontal Displacment, in.		0.140	0.140	0.120	
Normal Stress, tsf		0.50	1.00	2.00	
Strain Rate, in./min.		0.005	0.005	0.005	

LL:	nm	PL:	nm	PI:	nm	G_S:	2.70	Assumed

	c, tsf	ϕ, deg.	Tan ϕ
Failure	0.3	33.1	0.65
Residual	na	na	na

Test Conditions: Undisturbed / Inundated

Specimen 1: Light Brownish Gray Sandy Silt

Specimen 2: Light Brownish Gray Sandy Silt

Specimen 3: Light Brownish Gray Sandy Silt

Boring:	KB-8
Sample:	S4
Depth, ft:	8
Test Date:	3/5/21

Remarks: nm = not measured, na = not applicable

The determination of strength envelopes and the development of relationships to aid in interpreting and evaluating test results are beyond the scope of this test method. The user of this report retains the sole responsibility to evaluate and approve any interpreted values from the testing.

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Bright People. Right Solutions.
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.: 20212905
ENTRY BY: A. Catanuso
CHECKED BY:
DATE: 3/8/21

DIRECT SHEAR TEST ASTM D3080

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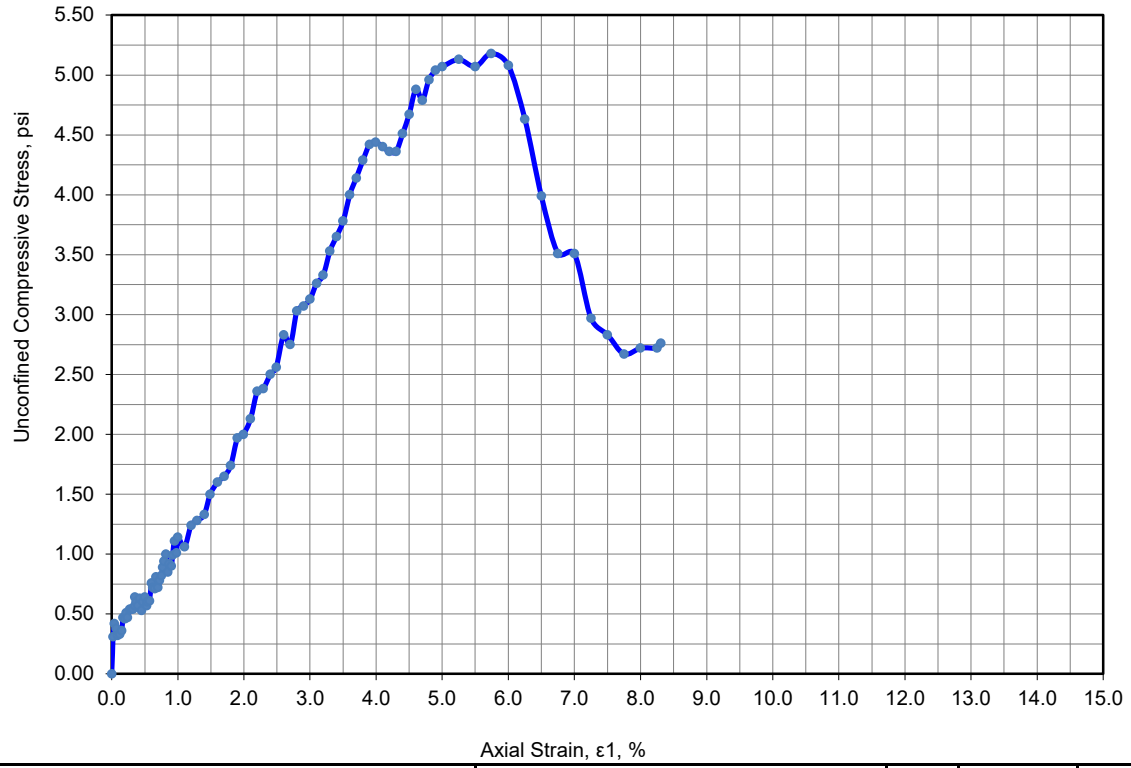
FIGURE
B-9



Specimen Failure Picture				
	Specimen No.			1
	Initial	Diameter, in	D_O	2.40
		Height, in	H_O	5.29
		Height to Diameter Ratio		2.21
		Water Content, %	ω_O	9.6
		Dry Density, lbs/ft^3	γd_o	93.1
		Saturation, %	S_O	32.0
		Void Ratio	e_O	0.810
	Time to Failure, min.		t_f	5.8
	Unconfined Compressive Strength, psi		q_u	5.18
	Shear Strength, psi		s_u	2.59
	Strain at Failure, %		ε_f	5.7
	Average Rate of Strain to Failure, %/min		ε	1.0

Description of Specimen: Light Brownish Gray SILT

Amount of Material Finer than the No. 200, %: nm

LL:	PL:	PI:	G_S:	Specimen Type:	Test Method:
nm	nm	nm	2.70 Assumed	Intact	ASTM D2166

Boring:	KB-8
Sample:	S8
Depth, ft:	16.0
Test Date:	3/11/21

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.
9969 Horn Rd., Sacramento, CA 95827

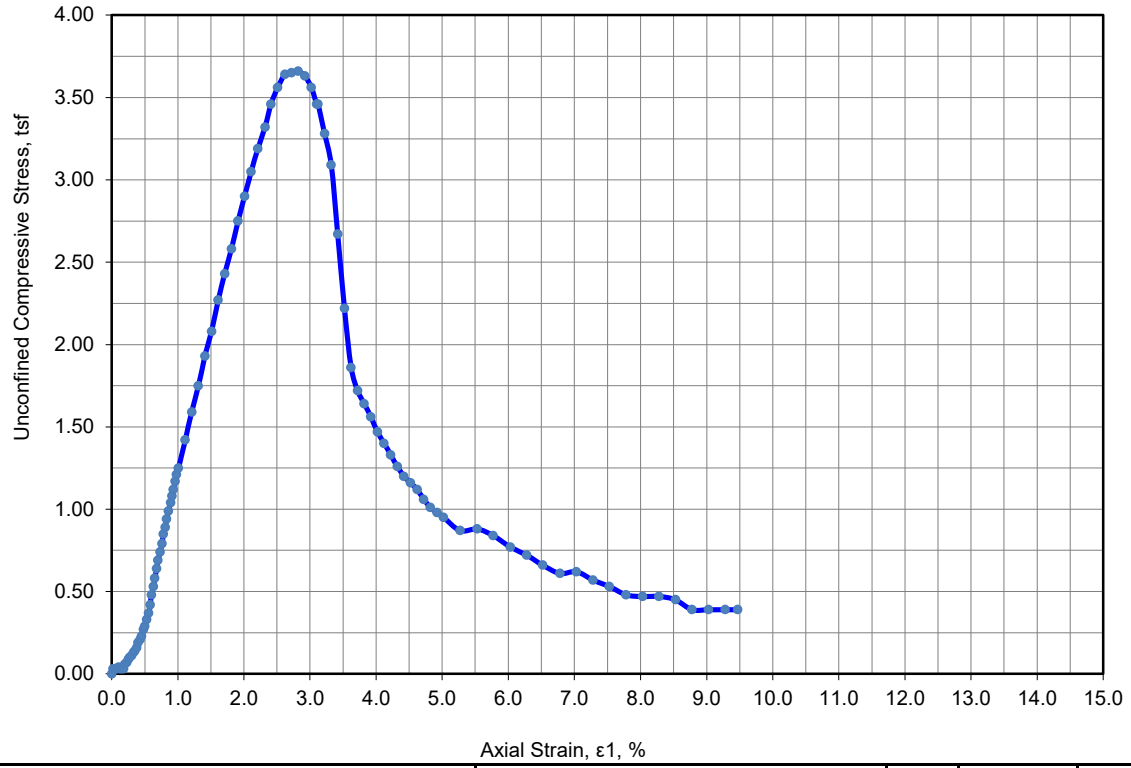
PROJECT NO.:	20212905
ENTRY BY:	A Catanuso
CHECKED BY:	J. Slinkard
DATE:	3/15/2021

UNCONFINED COMPRESSION TEST (UC)

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RVIERSIDE DR
FRESNO, CALIFORNIA 93722

FIGURE

B-10



Specimen Failure Picture

Specimen No.			1
Initial	Diameter, in	D_O	2.41
	Height, in	H_O	5.03
	Height to Diameter Ratio		2.08
	Water Content, %	ω_O	21.7
	Dry Density, lbs/ft^3	γd_o	100.8
	Saturation, %	S_O	87.4
	Void Ratio	e_O	0.672
Time to Failure, min.		t_f	5.6
Unconfined Compressive Strength, tsf		q_u	3.66
Shear Strength, tsf		s_u	1.83
Strain at Failure, %		ε_f	2.8
Average Rate of Strain to Failure, %/min		$\dot{\varepsilon}$	0.5

Description of Specimen: Light Brownish Gray SILT

Amount of Material Finer than the No. 200, %: nm

LL:	PL:	PI:	G_S:	Specimen Type:	Test Method:
nm	nm	nm	2.70 Assumed	Intact	ASTM D2166

Boring:	KB-7
Sample:	S7
Depth, ft:	13.5
Test Date:	3/11/21

Remarks: nm= not measured, na = not applicable

KLEINFELDER
Bright People. Right Solutions.
9969 Horn Rd., Sacramento, CA 95827

PROJECT NO.:	20212905
ENTRY BY:	A Catanuso
CHECKED BY:	J. Slinkard
DATE:	3/15/2021

UNCONFINED COMPRESSION TEST (UC)

COSTCO FRESNO NEW WAREHOUSE
NEC OF W. HERNDON AVE. &
N. RVIERSIDE DR
FRESNO, CALIFORNIA 93722

FIGURE

B-11

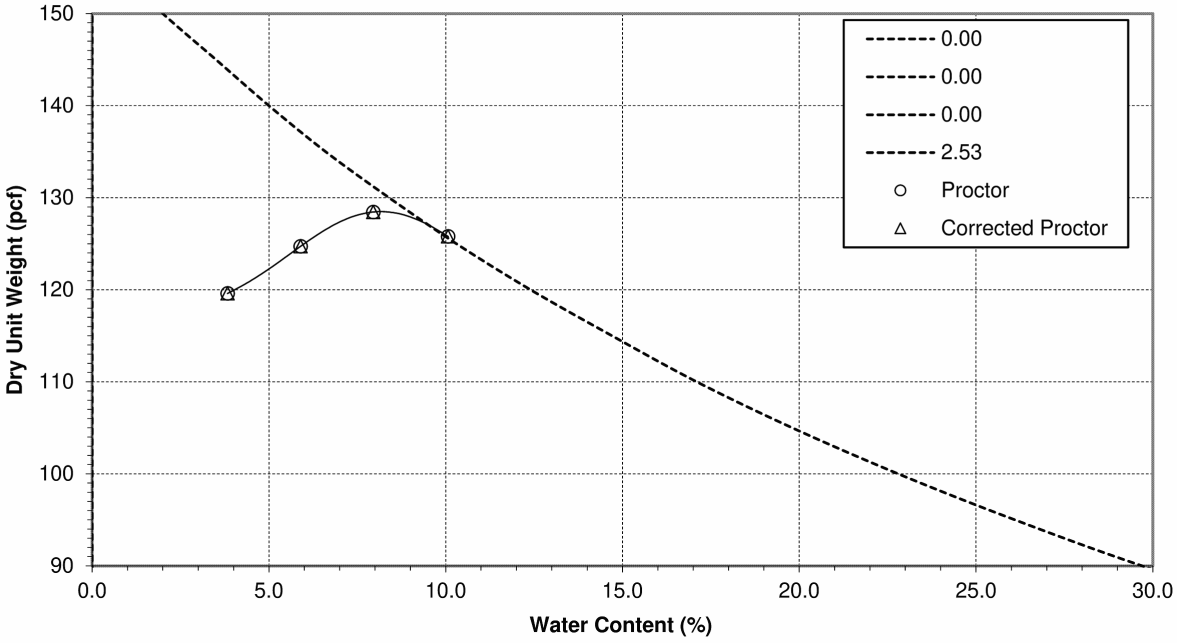
Laboratory Test Report

Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/29/2021** by **J. Carmichael**

Material Description: **Reddish Brown Sandy Silt**

Location: **TP - 4 @ 0'-3'**



Test Method: ASTM D1557 A	Uncorrected	Corrected
Maximum Dry Unit Weight (pcf)	**128.5**	**na**
Optimum Water Content (%)	**8.2**	**na**
Oversize Fraction, retained on #4 (%)		**<5**
Bulk Specific Gravity of Oversize Fraction		**na**

Rammer Type: Manual

Specimen Preparation: Moist

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

Laboratory Test Report

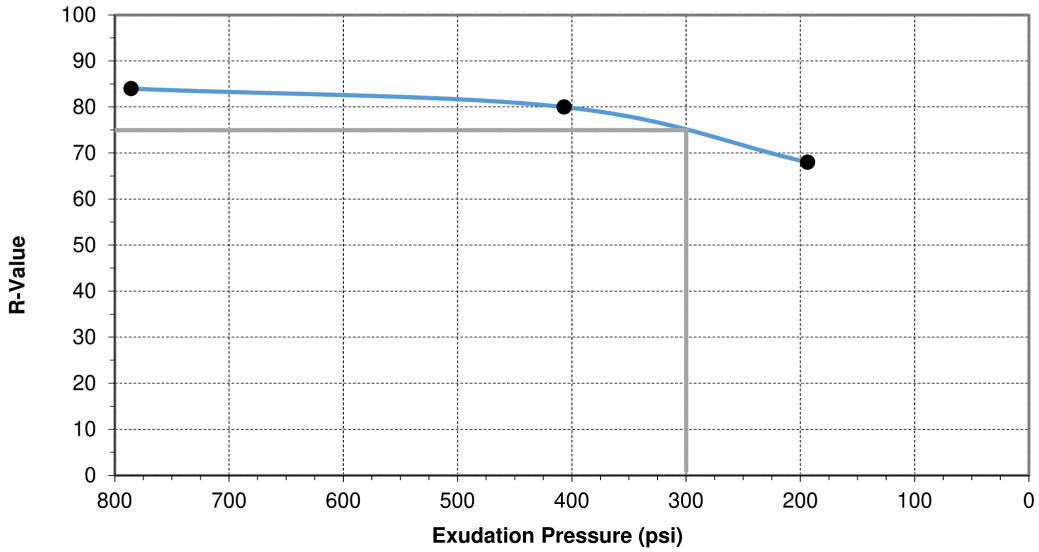
Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/28/2021** by **K. DeSouza**

Test Method: **ASTM D2844**

Material Description: **Yellowish Brown Poorly Graded SAND with silt and gravel**

Specific Location: **TP-2 0'-3'**



Briquette No.	A	B	C
Dry Unit Weight at Test (pcf)	126.7	125.3	125.8
Expansion Pressure (psf)	35	74	113
Exudation Pressure (psi)	194	407	786
Moisture at Time of Test (%)	9.1	8.7	8.2
Resistance Value	68	80	84
R - VALUE AT 300 PSI EXUDATION PRESSURE:			**75**

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

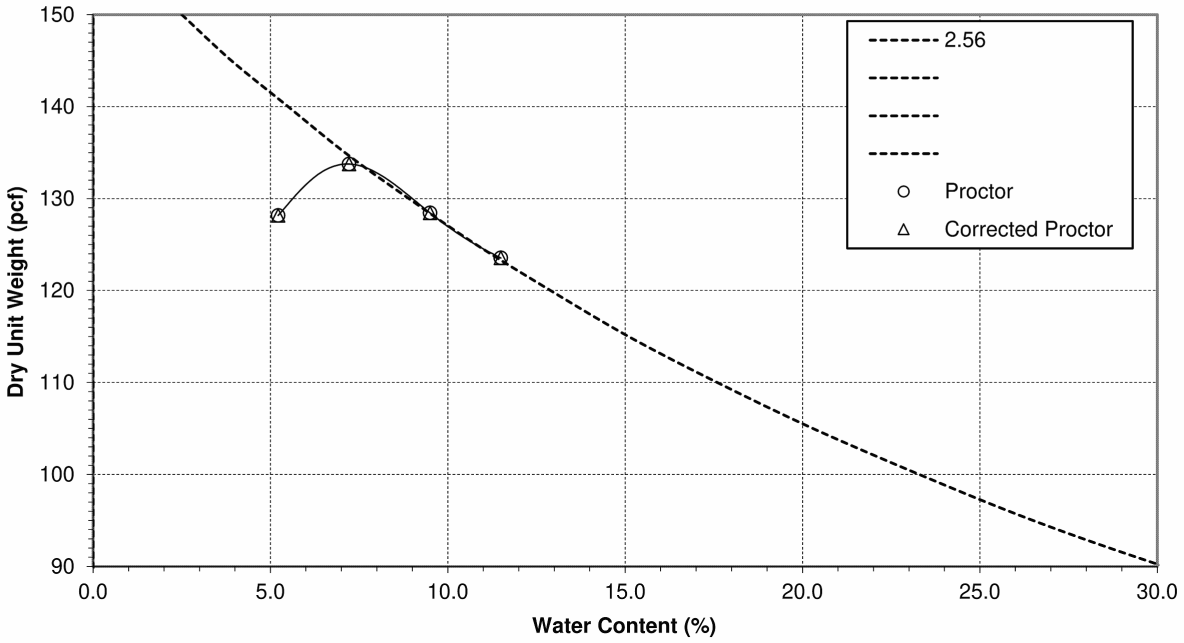
Laboratory Test Report

Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/29/2021** by **K. DeSouza**

Material Description: **Reddish Brown Sandy Silt**

Location: **TP-9 @ 0'-3'**



Test Method: ASTM D1557 A	Uncorrected	Corrected
Maximum Dry Unit Weight (pcf)	**133.8**	**na**
Optimum Water Content (%)	**7.2**	**na**
Oversize Fraction, retained on #4 (%)		**<5**
Bulk Specific Gravity of Oversize Fraction		**na**

Rammer Type: Manual

Specimen Preparation: Moist

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

Laboratory Test Report

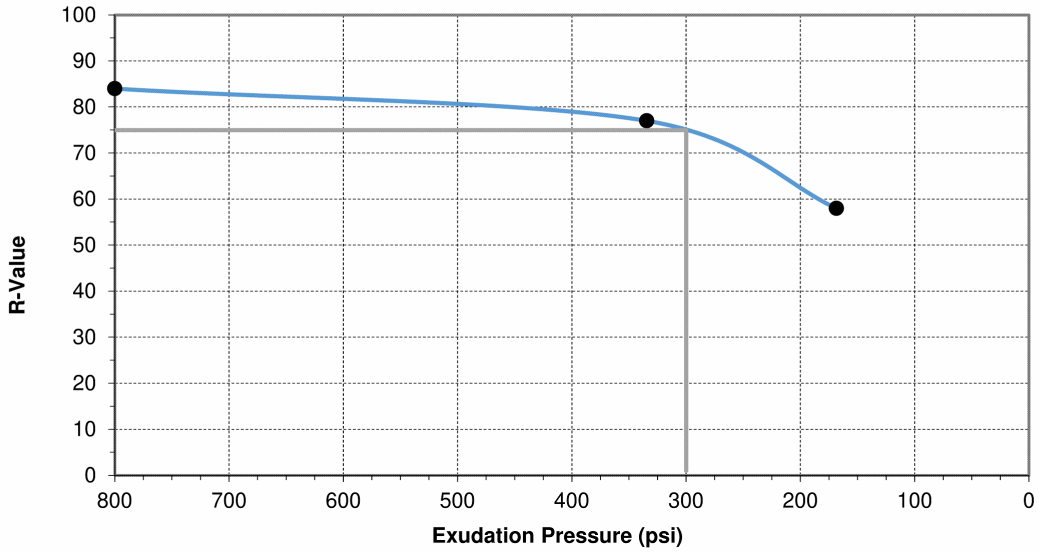
Client:	**Costco Wholesale**	Report No.:	**21-SAC-00138 Rev. 0**	Issued:	**2/8/2021**
Project:	**20212905.001A**				
	CSM Costco Fresno, CA New Whse/Gas GEO	Sampled by:		Date:	**1/19/2021**
	01-000L - Lab Testing	Submitted by:	**Adam Wohletz**	Date:	**1/25/2021**

Tested on **1/28/2021** by **K. DeSouza**

Test Method: **ASTM D2844**

Material Description: **Dark Brown Poorly Graded SAND with silt**

Specific Location: **TP-7 0'-3'**



Briquette No.	A	B	C
Dry Unit Weight at Test (pcf)	121.0	121.3	121.2
Expansion Pressure (psf)	0	39	74
Exudation Pressure (psi)	168	334	800
Moisture at Time of Test (%)	11.1	10.2	9.3
Resistance Value	58	77	84
R - VALUE AT 300 PSI EXUDATION PRESSURE:			**75**

Reviewed on 2/8/2021 by Jarod Slinkard,
Lab Supervisor

Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20212905
Lab No.: 21
Boring No. / Location: INF-1
Sample ID: 21-SAC-00367
Sample Depth, ft.: 3.5
Material Description: Brownish Gray Sandy Silt
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	90
No. 20	88
No. 40	80
No. 60	73
No. 140	59
No. 200	53.2

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.029	38.0
0.019	32.6
0.012	27.2
0.008	22.6
0.006	19.9
0.003	15.4
0.001	12.7

Specific Gravity:	2.7 Assumed

Reviewed By: J. Slinkard

Limitations:
Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided.

Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20212905
Lab No.: 21-SAC-00367
Boring No. / Location: INF-2
Sample ID: S1
Sample Depth, ft.: 3.5
Material Description: Brown Silty SAND
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	96
No. 20	88
No. 40	68
No. 60	53
No. 140	41
No. 200	37.2

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.031	25.0
0.021	19.2
0.012	14.4
0.009	11.5
0.006	9.6
0.003	7.7
0.001	5.8

Specific Gravity:	2.7 Assumed

Reviewed By: J. Slinkard

Limitations:
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Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20212905
Lab No.: 21-SAC-00367
Boring No. / Location: INF-3
Sample ID: S1
Sample Depth, ft.: 3.5
Material Description: Brown Silty SAND
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	98
No. 20	90
No. 40	71
No. 60	59
No. 140	43
No. 200	34.2

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.033	15.5
0.022	11.6
0.013	7.8
0.009	6.8
0.006	5.8
0.003	3.9
0.001	2.9

Specific Gravity:	2.7 Assumed

Reviewed By: _____

Limitations:
Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided.

Laboratory Test Report

Project Name: Costco Fresno New Warehouse
Project No.: 20211905
Lab No.: 21-SAC-00367
Boring No. / Location: INF-4
Sample ID: S1
Sample Depth, ft.: 3.5
Material Description: Brown Silty SAND
Report Date: March 17, 2021

Particle Size Analysis of Soils (ASTM D422)

Sieve Analysis	
US Standard Sieve Size	Percent Passing
3 Inch	100
2-1/2 Inch	100
2 Inch	100
1-1/2 Inch	100
1 Inch	100
3/4 Inch	100
1/2 Inch	100
3/8 Inch	100
No. 4	100
No. 10	98
No. 20	90
No. 40	72
No. 60	58
No. 140	40
No. 200	31.9

Hydrometer Analysis	
Particle Diameter, mm	Percent Passing
0.034	14.6
0.022	10.7
0.013	7.8
0.009	6.8
0.006	5.8
0.003	4.9
0.001	3.9

Specific Gravity:	2.7 Assumed

Reviewed By: J. Slinkard

Limitations:
Pursuant to applicable building codes, the results presented in this report are for the exclusive use of the client and the registered design professional in responsible charge. The results apply only to the samples tested. If changes to the specifications were made and not communicated to Kleinfelder, Kleinfelder assumes no responsibility for pass/fail statements (meets/did not meet), if provided.

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-2 BAG @4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174954.

EVALUATION FOR SOIL CORROSION

Soil pH	7.41	
Minimum Resistivity	4.02 ohm-cm (x1000)	
Chloride	3.4 ppm	00.00034 %
Sulfate	7.8 ppm	00.00078 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-4 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174955.

EVALUATION FOR SOIL CORROSION

Soil pH	7.33	
Minimum Resistivity	6.16 ohm-cm (x1000)	
Chloride	3.0 ppm	00.00030 %
Sulfate	11.5 ppm	00.00115 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-6 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174956.

EVALUATION FOR SOIL CORROSION

Soil pH	6.87	
Minimum Resistivity	3.48 ohm-cm (x1000)	
Chloride	2.8 ppm	00.00028 %
Sulfate	25.9 ppm	00.00259 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-9 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174957.

EVALUATION FOR SOIL CORROSION

Soil pH	6.43	
Minimum Resistivity	10.45 ohm-cm (x1000)	
Chloride	0.8 ppm	00.00008 %
Sulfate	1.0 ppm	00.00010 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 02/03/2021
Date Submitted 01/27/2021

To: Dan Dockendorf
Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 20212905.001A Site ID : TP-10 BAG @ 4-6.
Thank you for your business.

* For future reference to this analysis please use SUN # 83917-174958.

EVALUATION FOR SOIL CORROSION

Soil pH	6.72	
Minimum Resistivity	7.24 ohm-cm (x1000)	
Chloride	0.9 ppm	00.00009 %
Sulfate	4.6 ppm	00.00046 %

METHODS
pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

SUNLAND ANALYTICAL LAB
11419 Sunrise Gold Cr., Ste.10
Rancho Cordova, CA 95742
(916)852-8557

INVOICE

Inv.No. 103917

Kleinfelder-Fresno
3731 W.Ashcroft Ave
Fresno, CA 93722

Date 02/03/2021
Terms: NET 30, 30+ 15%
Customer P.O.#
Requestor: Dockendorf

ATTENTION ACCOUNTS PAYABLE

* Please indicate Invo.# on remittance

SUN NOS.	SAMPLE LOCATION		ANALYSIS	PRICE
174954	20212905.001A	TP-2 BAG @4-6	CTP.1	144.00
174955	20212905.001A	TP-4 BAG @ 4-6	CTP.1	144.00
174956	20212905.001A	TP-6 BAG @ 4-6	CTP.1	144.00
174957	20212905.001A	TP-9 BAG @ 4-6	CTP.1	144.00
174958	20212905.001A	TP-10 BAG @ 4-6	CTP.1	144.00
		********* Total *********		720.00

Anaheim Office
March 19, 2021
Report 21-068-0006

Kleinfelder, Inc.
380 North First Street
Suite A
San Jose CA 95112

Attn: Dan Dockendorf

RE: Costco Fresno - New Warehouse & Fuel GEO Fresno, CA Job #: 20212905.001A

Background

One composite sample was processed on March 09, 2021 identified as soil from areas where new landscaping is scheduled for installation. Fertilizer and amendment recommendations were requested. The sample was analyzed for horticultural suitability, fertility and physical characteristics. The results of the analyses are attached. Organic matter testing was run separately on individual subsamples and these results are also attached.

Analytical Results and Comments

The reaction of the sample is slightly acidic at a pH of 6.3 with free lime favorably absent. These levels are within the range preferred for most plants. Salinity (ECe), sodium, chloride and boron are safely low. The sodium adsorption ratio (SAR) indicates that sodium is adequately balanced by soluble calcium and magnesium; this balance is important for soil structure quality, which relates to the rate at which water infiltrates the soil. Extractable aluminum is low.

According to the USDA Soil Classification system, the texture of the less than 2mm fraction of the soil is classified as sandy loam. Organic matter content is low at 0.66% dry weight. Based on this information the estimated infiltration rate is moderate at 0.35 inch per hour. Infiltration rates may vary due to differences in compaction across the site.

In terms of soil fertility, phosphorus is low and nitrogen is slightly below optimum. All of the other major nutrients are sufficient for proper plant nutrition at this time. Of the micronutrients; manganese is sufficient. Copper, zinc and iron are low.

Recommendations

Incorporation of nitrogen and phosphorus fertilizer is recommended at the time of planting. Incorporation of a nitrogen stabilized organic amendment or composted greenwaste product is recommended in order to improve soil nutrient holding capacity and porosity. If a composted greenwaste amendment is chosen, that would provide additional phosphorus and potassium as well as supplemental micronutrients, product depending.

The primary symptom of zinc and iron deficiencies is a general yellowing of leaves with veins remaining green. In severe cases, leaves may become pale yellow or whitish, but veins remain green. Brown spots may develop between veins and leaf margins may turn brown. Zinc deficiencies typically appear first on older, interior leaves. Iron deficiency shows first and more severely on the newer growth at branch tips. If these symptoms are present after plant installation they may be treated with an application of a chelated

micronutrient product at the manufacturer's recommended rate. Incorporation of a composted greenwaste amendment would also provide additional micronutrients and may be sufficient to negate any deficiency, product depending.

Boron is safely low for general ornamental plants and may be below optimum levels for plant nutritional purposes. Irrigation water often supplies sufficient boron to meet plant nutritional requirements. However, if boron is low in the irrigation water and/or plants show symptoms of boron deficiency after they are well established, you may consider an application of a product containing boron at the manufacturer's label rate. Boron deficiency symptoms often include stunted or deformed younger growth and tight internodes. Tissue testing can be performed to identify a boron deficiency if it is suspected. Incorporation of a composted greenwaste amendment may be sufficient to negate this deficiency, product depending.

To Prepare for Mass Planting:
Drainage of the root zone should be improved by first loosening the top 10 inches of any undisturbed or compacted soil. The following materials should then be evenly spread and thoroughly blended with the top 6 inches of soil to form a homogenous layer:

Amount per 1000 Square Feet	
5 cubic yards	Nitrogen Stabilized Organic Amendment*
9 pounds	Ammonium Phosphate (16-20-0)*

*The rate may change based on the analysis of the chosen organic amendment. This rate is based on 270 lbs. of dry weight of organic matter per cubic yard of amendment. If a composted greenwaste amendment is chosen that provides a substantial amount of phosphorus, the ammonium phosphate should be replaced with ammonium sulfate (21-0-0) at a 7 pound rate.

To Prepare Backfill For Trees and Shrubs:

- Excavate planting pits at least twice as wide as the diameter of the rootball.
- Soil immediately below the rootball should be left undisturbed to provide support but the sides and the bottom around the side should be cultivated to improve porosity.
- The top of the rootball should be at or slightly above final grade.
- The top 12 inches of backfill around the sides of the rootball of trees and shrubs may consist of the above amended soil or may be prepared as follows:

3 parts	Site Soil
1 part	Nitrogen Stabilized Organic Amendment*

Uniformly blended with:

Amount / Cubic Yard of Backfill	
1/2 pound	Ammonium Phosphate (16-20-0)*

*The rate may change based on the analysis of the chosen organic amendment. This rate is based on 270 lbs. of dry weight of organic matter per cubic yard of amendment. If a composted greenwaste amendment is chosen that provides a substantial amount of phosphorus, the ammonium phosphate should be replaced with ammonium sulfate (21-0-0) at a 1/3 lb. per cubic yard rate.

- Backfill below 12 inches required for 24 inch box or larger material should not contain the organic amendment or fertilizer.
- Ideally a weed and turf free zone should be maintained just beyond the diameter of the planting hole. A 2-4 inch deep layer of coarse mulch can be placed around the tree or shrub. Mulch should be kept a minimum 4 inches from the trunk.
- Irrigation of new plantings should take into consideration the differing texture of the rootball substrate and surrounding soil matrix to maintain adequate moisture during this critical period of establishment.

Maintenance

Maintenance fertilization should rely primarily on a nitrogen only program supplemented with a complete fertilizer in the fall and spring. Beginning 60 days after planting, ammonium sulfate (21-0-0) should be applied at a rate of 5 pounds per 1000 square feet with reapplication every 45-60 days. Alternatively, slow release Sulfur Coated Urea (43-0-0) may be applied at 6 pounds per 1000 square feet every 90 days. Once plants are performing satisfactorily, the frequency of fertilization may be decreased depending on color and rate of growth desired. In the winter for a quick greening effect, calcium nitrate (15.5-0-0) may be applied at a 6 pound rate if applicable. Early fall and spring, substitute a complete fertilizer such as 15-15-15 to help insure continuing adequate phosphorus and potassium.

Alternatively, Blood Meal (12-0-0) provides available nitrogen fairly rapidly while materials such as Feather Meal (12-0-0), Soybean or Cotton Seed Meal (7-1-1) are slower to provide available nitrogen, but they extend the length of time they make this contribution. In order to provide a good supply of nitrogen for a 3-4 month time frame a good combination would be 6 pounds Blood Meal and 14 pounds Feather Meal per 1000 square feet. In the fall and spring, substitute a complete organic fertilizer such as 5-5-5 applied at the manufacturer's label rate. Or, nutrient rich composted greenwaste may be spread in a 1 to 2 inch layer, which generally carries enough nutrition to boost complete nutrition though a source of nitrogen might also be added at a half rate to assure adequate nitrogen availability.

If we can be of any further assistance, please feel free to contact us.

Joe Kiefer, CCA

jkiefer@waypointanalytical.com

Emailed 20 Pages: ddockendorf@kleinfelder.com

Report Number
21-068-0006

Account Number
01944

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Send To: Kleinfelder, Inc.
380 North First Street
Suite A
San Jose, CA 95112

Purchase Order: 20212905.001A
Report Date: 03/15/2021
Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22841
Sample ID: KB 1 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	1.25		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22842
Sample ID: KB 1 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.74		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22843
Sample ID: KB 14 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.98		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22844
Sample ID: KB 14 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.38		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22845
Sample ID: KB 18 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.91		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22846
Sample ID: KB 18 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.76		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22847
Sample ID: KB 25 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	1.19		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22848
Sample ID: KB 25 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.32		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22849
Sample ID: KB 27 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.59		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Report Date: 03/15/2021
Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22850
Sample ID: KB 27 - S2- 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.60		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Report Date: 03/15/2021
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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22851
Sample ID: KB 28 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.94		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22852
Sample ID: KB 28 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.52		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22853
Sample ID: KB 36 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.60		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

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Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22854
Sample ID: KB 36 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.36		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Report Date: 03/15/2021
Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22855
Sample ID: KB 38 - S1 - 0-6

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.88		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

Report Number
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Report Date: 03/15/2021
Date Received: 03/09/2021

Project: Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

REPORT OF ANALYSIS

Date Sampled:

Lab Number: 22856
Sample ID: KB 38 - S2 - 6-12

Analysis	Result	Quantitation Limit	Method	Date and Time Test Started	Analyst
Organic Matter (Titration) , %	0.39		WALK-BLACK	03/11/2021 12:41	AAB

Method Reference:
Methods of Soil Analysis, Part 3 - Chemical Methods, 2nd Ed. Rev. Soil Science Society of America, Black, C.A et al. 1982, pages 995-996.

Comments:

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Project : Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

COMPREHENSIVE SOIL ANALYSIS

Report No : **21-068-0006**
Purchase Order : 20212905.001A
Date Recd : 03/09/2021
Date Printed : 03/15/2021

Sample Description - Sample ID	Half Sat %	pH	ECe dS/m	NO_3-N ppm	NH_4-N ppm	PO_4-P ppm	K ppm	Ca ppm	Mg ppm	Cu ppm	Zn ppm	Mn ppm	Fe ppm	Organic % dry wt.	Lab No.
	TEC	Qual Lime		Sufficiency Factors											
Composite	12	6.3	0.3	10	7	2	126	938	216	0.3	0.9	4	8	0.66	22857
	67	None		0.7		0.1	1.8	1.0	1.8	0.4	0.3	0.7	0.3		

Saturation Extract Values						SAR	Gravel %		Percent of Sample Passing 2 mm Screen					USDA Soil Classification	Lab No.
									Sand						
Ca meq/L	Mg meq/L	Na meq/L	K meq/L	B ppm	SO_4 meq/L		Coarse 5 - 12	Fine 2 - 5	Very Coarse 1 - 2	Coarse 0.5 - 1	Med. to Very Fine 0.05 - 0.5	Silt .002-.05	Clay 0-.002		
2.7	0.9	0.5	0.3	0.09	0.7	0.4	0	0.6	6.6	12.4	41.1	20.8	19.0	Sandy Loam	22857

22857 Chloride (Cl) = 0.470 meq/L
22857 Aluminum = 2.18 meq/L

Sufficiency factor (1.0=sufficient for average crop) below each nutrient value. N factor based on 200 ppm constant feed. SAR = Sodium adsorption ratio. Half Saturation %=approx field moisture capacity. Nitrogen(N), Potassium(K), Calcium(Ca) and Magnesium(Mg) by sodium chloride extraction. Phosphorus(P) by sodium bicarbonate extraction. Copper(Cu), Zinc(Zn), Manganese(Mn) & Iron(Fe) by DTPA extraction. Sat. ext. method for salinity (ECe as dS/m),Boron (B), Sulfate(SO_4), Sodium(Na). Gravel fraction expressed as percent by weight of oven-dried sample passing a 12mm(1/2 inch) sieve. Particle sizes in millimeters. Organic percentage determined by Walkley-Black or Loss on Ignition.

* LOW , SUFFICIENT , HIGH

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Sample Summary Table

Report Number: **21-068-0005**

Client Project Description: **Costco Fresno - New Warehouse & Fuel GEO**
Fresno, CA
Job #: 20212905.001A

Lab No	Client Sample ID	Matrix	Date Collected	Date Received	Method	Lab ID
89358	Composite	Formulation		03/09/2021	SW-7471A	
89358	Composite	Formulation		03/09/2021	SW-DRYWT	
89358	Composite	Formulation		03/09/2021	6010D	

: A&L Analytical Laboratories, Inc., Memphis, TN

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Project Information : Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

Report Number : **21-068-0005**

REPORT OF ANALYSIS

Report Date : 03/17/2021
Received : 03/09/2021

Lab No : **89358**
Sample ID : **Composite**

Matrix: **Formulation**
Sampled:

Analytical Method: 6010D
Prep Method: 3050B

Prep Batch(es): **L541320** 03/15/21 08:42

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Total Barium	**76.6**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Copper	**11.6**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Arsenic	**3.99**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Silver	<1.34	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Chromium	**19.5**	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Cadmium	<0.536	mg/Kg - dry	0.536	5	03/16/21 18:46	TJS	L541650
Total Cobalt	**6.25**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Molybdenum	<1.34	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Nickel	**14.1**	mg/Kg - dry	1.34	5	03/16/21 18:46	TJS	L541650
Total Lead	**7.00**	mg/Kg - dry	1.61	5	03/16/21 18:46	TJS	L541650
Total Selenium	<2.68	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Zinc	**32.1**	mg/Kg - dry	6.70	5	03/16/21 18:46	TJS	L541650
Total Beryllium	**0.772**	mg/Kg - dry	0.268	5	03/16/21 18:46	TJS	L541650
Total Antimony	<2.68	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650
Total Thallium	<5.36	mg/Kg - dry	5.36	5	03/16/21 18:46	TJS	L541650
Total Vanadium	**42.8**	mg/Kg - dry	2.68	5	03/16/21 18:46	TJS	L541650

Qualifiers/ Definitions

B Analyte detected in blank
DF Dilution Factor
MQL Method Quantitation Limit

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Project Information : Costco Fresno - New Warehouse & Fuel GEO
Fresno, CA
Job #: 20212905.001A

Report Number : **21-068-0005**

REPORT OF ANALYSIS

Report Date : 03/17/2021
Received : 03/09/2021

Lab No : **89358**
Sample ID : **Composite**

Matrix: **Formulation**
Sampled:

Analytical Method: SW-7471A **Prep Batch(es):** **L541464** 03/16/21 11:00
Prep Method: SW-7471A (PREP)

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
Mercury (Total)	**0.05540** B	mg/Kg - dry	0.01425	1	03/16/21 13:54	DDB	L541729

Analytical Method: SW-DRYWT

Test	Results	Units	MQL	DF	Date / Time Analyzed	By	Analytical Batch
% Moisture	**6.68**	%		1	03/15/21 17:50	FMM	L541529

Qualifiers/ Definitions

B Analyte detected in blank
MQL Method Quantitation Limit
DF Dilution Factor

KLEINFELDER

Bright People. Right Solutions.

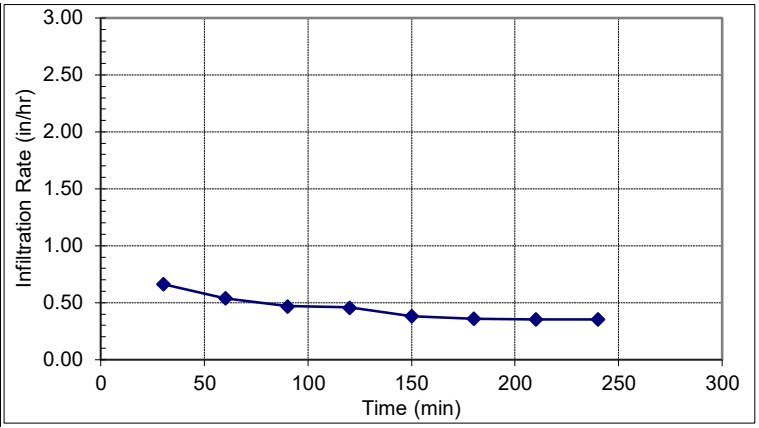
Appendix C

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-1

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
30	30.00	0.53	4.76	0.67
30	60.00	0.43	5.77	0.54
30	90.00	0.38	6.6	0.47
30	120.00	0.37	6.7	0.46
30	150.00	0.31	8.0	0.38
30	180.00	0.30	8.4	0.36
30	210.00	0.29	8.6	0.35
30	240.00	0.29	8.5	**0.36**



$$I_t = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	3.00	Final period drop delta d (in):	3.52
Starting water level (ft, bgs):	3.00	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.50	Diameter of boring (in):	6
Water column height Ho (in):	30		

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Boring Percolation Test Method

Costco Fresno New Warehouse
NEC of W. Herndon Ave & North Riverside Dr.
Fresno, California 93722

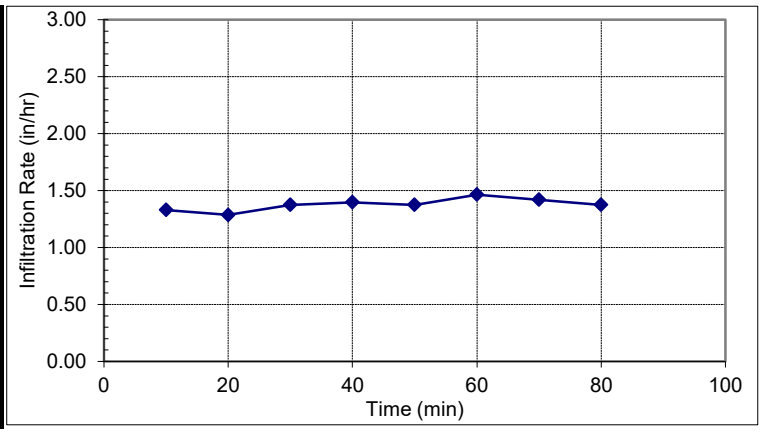
Figure
C-1

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-2

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
10	10.00	0.32	2.60	1.33
10	20.00	0.31	2.69	1.29
10	30.00	0.33	2.5	1.38
10	40.00	0.34	2.5	1.40
10	50.00	0.33	2.5	1.38
10	60.00	0.35	2.4	1.47
10	70.00	0.34	2.5	1.42
10	80.00	0.33	2.5	**1.38**



$$I_t = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	3.0	Final period drop delta d (in):	3.96
Starting water level (ft, bgs):	3.0	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.20	Diameter of boring (in):	6
Water column height Ho (in):	26.4		

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Boring Percolation Test Method

Costco Fresno New Warehouse
NEC of W. Herndon Ave & North Riverside Dr.
Fresno, California 93722

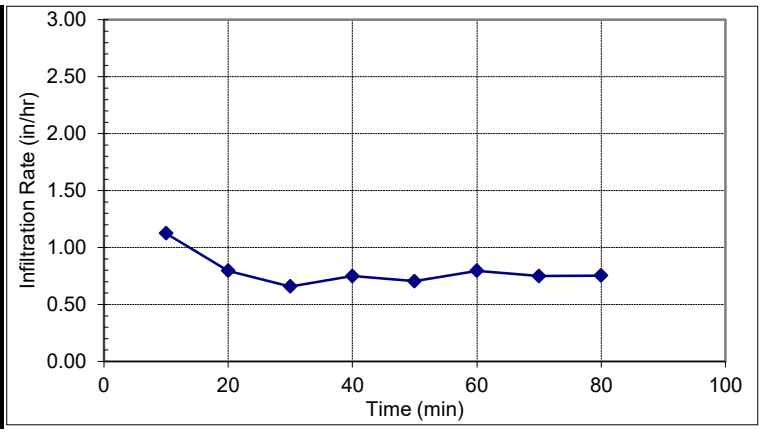
Figure
C-2

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-3

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
10	10.00	0.25	3.33	1.13
10	20.00	0.18	4.63	0.80
10	30.00	0.15	5.6	0.66
10	40.00	0.17	4.9	0.75
10	50.00	0.16	5.2	0.70
10	60.00	0.18	4.6	0.80
10	70.00	0.17	4.9	0.75
10	80.00	0.17	4.9	**0.75**



$$I_t = \frac{\Delta H\ \pi r^2\ 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	3.0	Final period drop delta d (in):	2.05
Starting water level (ft, bgs):	3.0	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.00	Diameter of boring (in):	6
Water column height Ho (in):	24		

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Boring Percolation Test Method

Costco Fresno New Warehouse
NEC of W. Herndon Ave & North Riverside Dr.
Fresno, California 93722

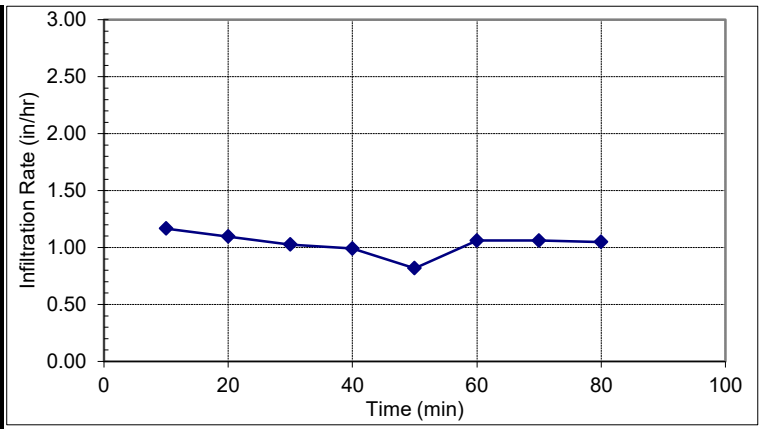
Figure
C-3

Project: Costco Fresno New Warehouse
Tester Dan Dockendorf
Date: March 1, 2021
Location: INF-4

Method: Borehole Percolation Test Procedure

INCREMENTAL INFILTRATION RATE

Time Between Readings (minutes)	Total Elapsed Time (minutes)	Drop in Head (feet)	Percolation Rate (min/in)	Tested Infiltration Rate (in/hour)
10	10.00	0.35	2.38	1.17
10	20.00	0.33	2.53	1.10
10	30.00	0.31	2.7	1.03
10	40.00	0.30	2.8	0.99
10	50.00	0.25	3.3	0.82
10	60.00	0.32	2.6	1.06
10	70.00	0.32	2.6	**1.06**
10	80.00	0.32	2.6	**1.05**



$$I_t = \frac{\Delta H\ \pi r^2 60}{\Delta t(\pi r^2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
$^*r$ = effective radius of test hole
H_{avg} = average head over the time interval, inches

Presoak Level (ft, bgs):	2.5	Final period drop delta d (in):	3.8
Starting water level (ft, bgs):	2.5	Diameter of well casing (in)	2
Well bottom depth (ft, bgs)	5.25	Diameter of boring (in):	6
Water column height Ho (in):	33		

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Project No.: 20212905.001A

Boring Percolation Test Method

Costco Fresno New Warehouse
NEC of W. Herndon Ave & North Riverside Dr.
Fresno, California 93722

Figure
C-4

Appendix C

Air Quality Technical Report

Prepared for
Ascent Environmental, Inc.
Sacramento, California

Project Number
1690023335

Date
June 2023

COSTCO COMMERCIAL CENTER AIR QUALITY TECHNICAL REPORT

FRESNO, CALIFORNIA

RAMBOLL

CONTENTS

CONTENTS *(CONTINUED)*

TABLES

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AB	Assembly Bill
ACC	Advanced Clean Cars
AEI	annual emissions inventory
AERMOD	American Meteorological Society/Environmental Protection Agency regulatory air dispersion model
AP-42	United States Environmental Protection Agency's Compilation of Air Pollutant Emission Factors
APCDs	Air Pollution Control Districts
AQ	air quality
AQAP	Air Quality Attainment Plan
AQMDs	Air Quality Management Districts
ATCM	Airborne Toxic Control Measure
ASFs	age sensitivity factors
AvgHP	Maximum rated average horsepower
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod®	California Emission Estimator Model®
CAP	criteria air pollutant
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	carbon monoxide
CO_2	carbon dioxide
cREL	chronic reference exposure level
CUP	conditional use permit
CY	cubic yard
DPM	Diesel Particulate Matter
DTSC	Department of Toxic Substances Control
EF	emission factor
EIR	Environmental Impact Report
EMFAC	EMission FACtors model
EVR	Enhanced vapor recovery
FAH	Fraction of time at home
g/m^3	gram/cubic meter
GDF	gasoline dispensing facility
GHG	greenhouse gas
HARP	Hot Spots Analysis and Reporting Program
HIA	acute hazard index
HIC	chronic hazard index
HIs	hazard indices
HQ	hazard quotient
HRA	health risk assessment
LDR	Land Disposal Restrictions
LLC	Limited Liability Company

Acronym	Definition
LOS	level of service
MDO	market delivery operation
MSW	municipal solid waste
MT	metric tonnes
NAAQS	National Ambient Air Quality Standards
NED	National Elevation Datasets
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NHTSA	National Highway Traffic Safety Administration
NO	Nitric oxide
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
O_3	ozone
OEHHA	California Office of Environmental Health Hazard Assessment
OFFROAD	Off-road Emissions Inventory Program model
Pb	Lead
PM	particulate matter
PM10	particulate matter less than 10 microns in diameter
PM2.5	particulate matter less than 2.5 microns in diameter
ppm	parts per million by volume
Ramboll	Ramboll US Consulting, Inc.
RCRA	Resource Conservation and Recovery Act
REL	reference exposure level
ROG	reactive organic gases
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
SAFE	Safer Affordable Fuel-Efficient
SCAQMD	South Coast Air Quality Management District
SIP	State Implementation Plan
SJVAB	San Joaquin Valley Air Basin
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO2	Sulfur Dioxide
SOx	sulfur oxide
TACs	Toxic Air Contaminant
TRUs	transportation refrigeration units
USEPA	United States Environmental Protection Agency
USGS	United States Geologic Survey
VDECS	Verified Diesel Emission Control Strategies
VMT	Vehicle miles traveled
VOCs	Volatile Organic Compounds
ZEV	zero emission vehicle

1. INTRODUCTION

Ramboll US Consulting, Inc. (Ramboll) was retained to prepare an Air Quality (AQ) Technical Report for the proposed Costco warehouse and gasoline dispensing facility in Fresno, California (Project).

This AQ Technical Report analyzes the Project's impacts on air quality from construction and operations. In particular, this report describes the existing setting of the Project site, describes the relevant regulatory setting, discusses the methodology used to evaluate AQ emissions related to the Project, and evaluates potential impacts related to AQ that would be affected as a result of implementation of the Project.

1.1 Existing Conditions

The existing 22.4-acre site is currently undeveloped, located within the Bullard Community Plan Area, and designated by both the General Plan and zoning as Community Commercial. The location of the site is in Fresno, California at West Herndon Avenue and North Riverside Drive.

1.2 Project Analysis

The "Project" is defined as Project operation of the newly constructed Costco. Costco Wholesale Corporation (Costco) proposes to construct the Costco Commercial Center, which comprises a new Costco facility (including loading docks and internal space to provide last-mile home delivery of big and bulky items) with an attached tire center and a detached gas station and drive-through car wash in the City of Fresno.

The Project would develop a new Costco retail building; gas station; car wash; and associated parking areas, driveways, and other supporting infrastructure. Costco Wholesale is proposing to construct a wholesale retail facility with approximately 178,000 square feet (sq. ft.); of which approximately 57,000 sq. ft. would be reserved for storage and receiving at the northeast corner of W. Herndon Ave. and N. Riverside Dr (APN 50302012). The project involves the construction of a Costco retail facility that includes an attached tire center, as well as a detached gas station and a drive-through car wash. The project would include a Costco members-only gas station on the northern portion of the project site adjacent to West Spruce Avenue. The facility would include an approximately 11,500 square-foot canopy and a 125 square-foot controller enclosure. There would be four covered fueling islands, each with four two-sided fuel dispensers to provide for the fueling of eight cars at each island, for a total of 32 fueling positions. A Costco members-only automated carwash would be located at the northeastern corner of the project site, adjacent to the gas station. The car wash structure would be approximately 4,800 sq. ft. The project would have its main access points along North Riverside Drive and include approximately 889 parking stalls.

2. ENVIRONMENTAL AND REGULATORY BACKGROUND

2.1 Criteria Air Pollutants

Criteria air pollutants (CAPs) are defined as pollutants for which the federal and state governments have established ambient air quality standards, or criteria, for outdoor concentrations to protect public health. The federal and state standards have been set, with an adequate margin of safety, at levels above which concentrations could be harmful to human health and welfare. These standards are designed to protect the most sensitive people from illness or discomfort. Pollutants of concern include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead. In California, sulfates, vinyl chloride, hydrogen sulfide, and visibility-reducing particles are also regulated as criteria air pollutants. These pollutants are discussed in the following paragraphs.

2.1.1 Ozone

O_3 is a colorless gas that is formed in the atmosphere when volatile organic compounds (VOCs), sometimes referred to as reactive organic gases, and NO_x react in the presence of ultraviolet sunlight. O_3 is not a primary pollutant; it is a secondary pollutant formed by complex interactions of two pollutants directly emitted into the atmosphere. The primary sources of VOCs and NO_X, the precursors of O_3, are automobile exhaust and industrial sources. Meteorology and terrain play major roles in O_3 formation, and ideal conditions occur during summer and early autumn on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in the San Joaquin Valley can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

2.1.2 Nitrogen Dioxide

Most NO_2, like O_3, is not directly emitted into the atmosphere but is formed by an atmospheric chemical reaction between nitric oxide (NO) and atmospheric oxygen. NO and NO_2 are collectively referred to as NO_X and are major contributors to O_3 formation. The primary sources of NO, the precursor to NO_2, include automobile exhaust and industrial sources. High concentrations of NO_2 can cause breathing difficulties and result in a brownish-red cast to the atmosphere, causing reduced visibility. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis, and some increase in bronchitis in children (2 and 3 years old) has also been observed at concentrations below 0.3 parts per million by volume (ppm).

2.1.3 Carbon Monoxide

Carbon Monoxide (CO) is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO is emitted almost exclusively from motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains. In urban areas, such as the Project location, automobile exhaust accounts for the majority of CO emissions. CO is a non-reactive air pollutant that dissipates relatively quickly; therefore, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions, primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when

surface-based temperature inversions are combined with calm atmospheric conditions, a typical situation at dusk in urban areas between November and February. The highest levels of CO typically occur during the colder months of the year when inversion conditions, where a layer of warm air sits atop cool air, are more frequent and can trap pollutants close to the ground. In terms of health, CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can be dizziness, fatigue, and impairment of central nervous system functions.

2.1.4 Sulfur Dioxide

Sulfur Dioxide (SO_2) is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. The main sources of SO_2 are coal and oil used in power plants and industries; as such, the highest levels of SO_2 are generally found near large industrial complexes. In recent years, SO_2 concentrations have been reduced by the increasingly stringent controls placed on stationary source emissions of SO_2 and limits placed on the sulfur content of fuels. SO_2 is an irritant gas that attacks the throat and lungs and can cause acute respiratory symptoms and diminished ventilator function in children. SO_2 can also yellow plant leaves and erode iron and steel.

2.1.5 Particulate Matter

Particulate matter (PM) pollution consists of very small liquid and solid particles floating in the air, which can include smoke, soot, dust, salts, acids, and metals. Particulate matter can form when gases emitted from industries and motor vehicles undergo chemical reactions in the atmosphere. $PM_{2.5}$ and PM_{10} represent fractions of particulate matter. Fine particulate matter, or $PM_{2.5}$, is roughly 1/28 the diameter of a human hair. $PM_{2.5}$ results from fuel combustion (e.g., motor vehicles, power generation, and industrial facilities), residential fireplaces, and woodstoves. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur oxides (SO_X), NO_X, and VOCs. Inhalable or coarse particulate matter, or PM_{10}, is about one- seventh the thickness of a human hair. Major sources of PM_{10} include crushing or grinding operations; dust stirred up by vehicles traveling on roads; wood-burning stoves and fireplaces; dust from construction, landfills, and agriculture; wildfires and brush/waste burning; industrial sources; windblown dust from open lands; and atmospheric chemical and photochemical reactions.

$PM_{2.5}$ and PM_{10} pose a greater health risk than larger-size particles. When inhaled, these tiny particles can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. Very small particles of substances such as lead, sulfates, and nitrates can cause lung damage directly or be absorbed into the bloodstream, causing damage elsewhere in the body. Additionally, these substances can transport absorbed gases, such as chlorides or ammonium, into the lungs, also causing injury. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Suspended particulates also damage and discolor surfaces on which they settle, as well as produce haze and reduce regional visibility.

2.1.6 Lead

Lead (Pb) in the atmosphere occurs as particulate matter. Sources of lead include leaded gasoline, the manufacturing of batteries, paint, ink, ceramics, ammunition, and secondary lead smelters. Prior to 1978, mobile emissions were the primary source of atmospheric lead.

Between 1978 and 1987, the phase-out of leaded gasoline reduced the overall inventory of airborne lead by nearly 95%. With the phase-out of leaded gasoline, secondary lead smelters, battery recycling, and manufacturing facilities are becoming lead-emission sources of greater concern.

Prolonged exposure to atmospheric lead poses a serious threat to human health. Health effects associated with exposure to lead include gastrointestinal disturbances, anemia, kidney disease, and in severe cases, neuromuscular and neurological dysfunction. Of particular concern are low-level lead exposures during infancy and childhood. Such exposures are associated with decrements in neurobehavioral performance, including intelligence quotient performance, psychomotor performance, reaction time, and growth.

2.1.7 Sulfates

Sulfates are the fully oxidized form of sulfur, which typically occur in combination with metals or hydrogen ions. Sulfates are produced from reactions of SO_2 in the atmosphere. Sulfates can result in respiratory impairment, as well as reduced visibility.

2.1.8 Vinyl Chloride

Vinyl chloride is a colorless gas with a mild, sweet odor, which has been detected near landfills, sewage plants, and hazardous waste sites, due to the microbial breakdown of chlorinated solvents. Short-term exposure to high levels of vinyl chloride in air can cause nervous system effects, such as dizziness, drowsiness, and headaches. Long-term exposure through inhalation can cause liver damage, including liver cancer.

2.1.9 Hydrogen Sulfide

Hydrogen sulfide is a colorless and flammable gas that has a characteristic odor of rotten eggs. Sources of hydrogen sulfide include geothermal power plants, petroleum refineries, sewers, and sewage treatment plants. Exposure to hydrogen sulfide can result in nuisance odors, as well as headaches and breathing difficulties at higher concentrations.

2.1.10 Visibility-Reducing Particles

Visibility-reducing particles are any particles in the air that obstruct the range of visibility. Effects of reduced visibility can include obscuring the view shed of natural scenery, reduced airport safety, and discouraging tourism. Sources of visibility-reducing particles are the same as for $PM_{2.5}$ described above.

2.2 Non-Criteria Air Pollutants

2.2.1 Toxic Air Contaminants

A substance is considered toxic if it has the potential to cause adverse health effects in humans, including increasing the risk of cancer upon exposure, or acute and/or chronic non-cancer health effects. A toxic substance released into the air is considered a toxic air contaminant (TAC). Examples include certain aromatic and chlorinated hydrocarbons, certain metals, and asbestos. TACs are generated by a number of sources, including stationary sources such as dry cleaners, gas stations, combustion sources, waste processing facilities and laboratories; mobile sources such as automobiles; and area sources such as landfills. Adverse health effects associated with exposure to TACs may include carcinogenic (i.e., cancer-causing) and non-carcinogenic effects. Non-carcinogenic effects typically affect one or more target organ systems and may be experienced either on short-term (acute) or long-term (chronic) exposure to a given TAC.

2.2.2 Diesel Particulate Matter

Diesel particulate matter (DPM) is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is composed of two phases, gas and particle, both of which contribute to health risks. CARB classified "particulate emissions from diesel-fueled engines" (DPM; 17 CCR 93000) as a TAC in August 1998. DPM is emitted from a broad range of diesel engines: on-road diesel engines of trucks, buses, and cars, and off-road diesel engines including locomotives, marine vessels, and heavy-duty construction equipment, among others. Approximately 70% of all airborne cancer risk in California is associated with DPM.[1] To reduce the cancer risk associated with DPM, CARB adopted a diesel risk reduction plan in 2000.

2.3 Regulatory Setting

2.3.1 Federal and State Ambient Air Quality Standards for Criteria Air Pollutants

The Federal Clean Air Act (CAA) requires the adoption of National Ambient Air Quality Standards (NAAQS), which are periodically updated, to protect the public health and welfare from the effects of air pollution. Current federal standards are set for SO_2, CO, NO_2, O_3, PM_{10}, $PM_{2.5}$, and Pb.[2]

The State of California also has established additional standards, known as the California Ambient Air Quality Standards (CAAQS), which are generally more restrictive than the NAAQS. The current NAAQS and CAAQS are shown in **Table 2-1**.

Specific geographic areas are classified as either "attainment" or "non-attainment" areas for each pollutant based upon the comparison of measured data with the NAAQS and CAAQS. Those areas designated as "non-attainment" for purposes of NAAQS compliance are required to prepare regional air quality plans, which set forth a strategy for bringing an area into compliance with the standards. These regional air quality plans developed to meet federal requirements are included in an overall program referred to as the State Implementation Plan (SIP). If the SIP is deemed acceptable, the United States Environmental Protection Agency (USEPA) will delegate responsibility for implementation pursuant to the SIP to the State and/or its air districts therein.

Whenever the USEPA revises or establishes a new NAAQS, the State and the USEPA have specific obligations to ensure that the NAAQS is met.[3] These are listed below:

- The USEPA must designate areas as meeting (attainment areas) or not meeting (non-attainment areas) the NAAQS within two years after its promulgation.
- States must submit "infrastructure SIPs" to show that they have the basic air quality management program components in place to implement the NAAQS within three years after its promulgation.

[1] CARB. 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. Available at: https://ww2.arb.ca.gov/sites/default/files/classic//diesel/documents/rrpfinal.pdf. Accessed: February 2022.

[2] NAAQS. Available at: https://www.epa.gov/criteria-air-pollutants/naaqs-table. Accessed: February 2022.

[3] USEPA. NAAQS Implementation Process. Available at: https://www.epa.gov/criteria-air-pollutants/naaqs-implementation-process. Accessed: February 2022.

- States must submit non-attainment area SIPs that outline the strategies and emission control measures that will improve air quality and make the area meet the NAAQS within 18 to 36 months after designation.

The steps involved in the SIP process are described below.[4]

- SIPs must be developed with public input and be formally adopted by the State and submitted to the USEPA by the Governor's designee (CARB in California).
- The USEPA reviews each SIP and proposes to approve or disapprove all or part it. The public is then provided with an opportunity to comment on the USEPA's proposed action. The USEPA considers public input before taking final action on a State's plan.
- If the USEPA approves all or part of a SIP, those control measures are enforceable in federal court. In the event a State fails to submit an approvable SIP or if the USEPA disapproves a SIP, the USEPA is required to develop a Federal Implementation Plan.

Table 2-2 summarizes the attainment status of Fresno County (San Joaquin Valley Air Pollution Control District) for the pollutants regulated by the NAAQS and CAAQS.[5] As seen in **Table 2-2**, Fresno County is currently in attainment (including where unclassified) for: the federal PM_{10} standard, the federal and State CO standards, the federal and State NO_2 standards, the federal and State SO_2 standards, the federal and state lead standards, and the State visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride standards. However, as also shown in **Table 2-2**, Fresno County is currently designated as nonattainment for the State 1-hour O_3 standard, the federal and State 8-hour O_3 standards, the State PM_{10} standards, and the federal and State $PM_{2.5}$ standards.[6, 7, 8]

2.3.2 Federal Heavy-duty Engines and Vehicles Fuel Efficiency Standards

In 2010, President Obama issued a memorandum directing federal agencies to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the USEPA and National Highway Traffic Safety Administration (NHTSA) proposed stringent, coordinated federal GHG and fuel economy standards for model year 2017–2025 light-duty vehicles. The proposed standards are projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon (mpg) if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021, and NHTSA intends to set standards for model years 2022–2025 in a future rulemaking.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the USEPA and NHTSA announced fuel economy and GHG standards for medium- and

[4] USEPA. State Implementation Plan Development Process. Available at: https://www.epa.gov/criteria-air-pollutants/naaqs-implementation-process. Accessed: February 2022.

[5] USEPA. Non-attainment Areas for Criteria Pollutants (Green Book). Available at: https://www.epa.gov/green-book. Accessed: February 2022.

[6] Ibid.

[7] California standard attainment status based on CARB website. Available at: http://www.arb.ca.gov/desig/adm/adm.htm. Accessed: February 2022.

[8] SJVAPCD Attainment status. Available at: https://www.valleyair.org/aqinfo/attainment.htm. Accessed: February 2022.

heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles.

In August 2016, the USEPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans, and all types of sizes of buses and work trucks. The final standards are expected to lower carbon dioxide emissions by approximately 1.1 billion metric tons (MT) and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program.[9]

In August 2017, the USEPA asked for additional information and data relevant to assessing whether the GHG emissions standards for model years 2022-2025 remain appropriate. In early 2018, the USEPA Administrator announced that the midterm evaluation for the GHG emissions standards for cars and light-duty trucks for model years 2022-2025 was completed and stated his determination that the current standards should be revised in light of recent data. Subsequently, in April 2018, the USEPA and NHTSA proposed to amend certain existing Corporate Average Fuel Economy (CAFE) standards for passenger cars and light trucks and establish new standards, covering model years 2022-2025. Compared to maintaining the post-2020 standards now in place, the pending proposal would increase U.S. fuel consumption.[10] California and other states have announced their intent to challenge federal actions that would delay or eliminate GHG reductions. In April 2020, NHTSA and EPA amended the CAFE and GHG emissions standards for passenger cars and light trucks and established new less stringent standards, covering model years 2021 through 2026.

On September 27, 2019, the USEPA and NHTSA published the SAFE Rule (Part One).[11] The SAFE Rule (Part One) went into effect in November 2019, and revoked California's authority to set its own GHGs standards and set zero emission vehicle mandates in California. The SAFE Rule (Part One) freezes new zero emission vehicles (ZEV) sales at model year 2020 levels for year 2021 and beyond, and will likely result in a lower number of future ZEVs and a corresponding greater number of future gasoline internal combustion engine vehicles. In response to the USEPA's adoption of the SAFE Rule (Part One), CARB has issued guidance regarding the adjustment of vehicle emissions factors to account for the rule's implications

[9] USEPA and NHTSA. 2016. Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles – Phase 2. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed: February 2022.

[10] NHTSA. 2018. Federal Register, Vol. 83, No. 72, Rules & Regulations, Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light Duty Vehicles. April 13. Available at: https://www.federalregister.gov/documents/2018/04/13/2018-07364/mid-term-evaluation-of-greenhouse-gas-emissions-standards-for-model-year-2022-2025-light-duty. Accessed: February 2022.

[11] USEPA and NHTSA. 2019. Federal Register, Vol. 84, No. 188, The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program. September 27. Available at: https://www.govinfo.gov/content/pkg/FR-2019-09-27/pdf/2019-20672.pdf. Accessed: February 2022.

on criteria air pollutant and greenhouse gas emissions.[12,13] The SAFE Rule is subject to ongoing litigation and on February 8, 2021, the D.C. Circuit Court of Appeals granted the Biden Administration's motion to stay litigation over Part 1 of the SAFE Rule. On April 22 and April 28, 2021, respectively, NHTSA and USEPA formally announced their intent to reconsider the Safe Rule (Part One).[14] In August 2021, USEPA proposed to revise existing national greenhouse gas (GHG) emissions standards for passenger cars and light trucks for Model Years 2023- 2026 to make the standards more stringent. The NHTSA finalized the Corporate Average Fuel Economy Pre-emption rulemaking to withdraw its portions of the SAFE I Rule on December 21, 2021.[15] On March 9, 2022, USEPA reinstated California's authority under the Clean Air Act to implement its own GHG emission standards and ZEV sales mandate and entirely rescinded the SAFE Rule (Part One).

In December 2021, the USEPA finalized federal GHG emissions standards for passenger cars and light trucks for Model Years 2023 through 2026. These standards are the strongest vehicle emissions standards ever established for the light-duty vehicle sector and are based on sound science and grounded in a rigorous assessment of current and future technologies. The updated standards will result in avoiding more than 3 billion tons of GHG emissions through 2050.[16]

2.3.3 Federal Hazardous Air Pollutants Program

The 1977 CAA Amendments required the USEPA to identify National Emissions Standards for Hazardous Air Pollutants (NESHAPs) to protect the public health and welfare. Hazardous air pollutants include certain VOCs, pesticides, herbicides, and radionuclides that present a tangible hazard, based on scientific studies of exposure to humans and other mammals. Under the 1990 CAA Amendments, which expanded the control program for hazardous air pollutants, 189 substances and chemical families were identified as hazardous air pollutants.

2.3.4 California's Air Toxics Program

The state Air Toxics Program was established in 1983 under Assembly Bill (AB) 1807 (Tanner). The California TAC list identifies more than 700 pollutants, of which carcinogenic and non-carcinogenic toxicity criteria have been established for a subset of these pollutants pursuant to the California Health and Safety Code. In accordance with AB 2728, the state list includes the (federal) hazardous air pollutants.

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[12] CARB. 2019. EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One. November 20. Available at: https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf. Accessed: February 2022.

[13] CARB. 2020. EMFAC Off-Model Adjustment Factors for Carbon Dioxide Emissions to Account for the SAFE Vehicles Rule Part One and the Final SAFE Rule. June 26. Available at: https://ww3.arb.ca.gov/msei/emfac_off_model_co2_adjustment_factors_06262020-final.pdf. Accessed: February 2022.

[14] USEPA. 2021. Federal Register, Vol. 86, No. 80, California State Motor Vehicle Pollution Control Standards; Advanced Clean Car Program; Reconsideration of a previous Withdrawal of a Waiver of Preemption; Opportunity for Public Hearing and Public Comment. April 28. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/notice-reconsideration-previous-withdrawal-waiver. Accessed: February 2022.

[15] NHTSA. Available at: https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy. Accessed: May 2022.

[16] USEPA. 2021. Final Rule to Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-revise-existing-national-ghg-emissions. Accessed: January 2022.

The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources; however, AB 2588 does not reduce the quantity of air toxics emissions. Instead, under AB 2588, TAC emissions from individual facilities are quantified and prioritized. "High-priority" facilities are required to perform a health risk assessment, and if specific thresholds are exceeded, are required to communicate the results to the public in the form of notices and public meetings.

In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. The plan is anticipated to result in an 85% decrease in statewide diesel health risk in 2020 compared with the diesel risk in 2000. Additional regulations apply to new trucks and diesel fuel, including the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-Road Diesel Vehicle Regulation, and the New Off-Road Compression-Ignition (Diesel) Engines and Equipment program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. There also are several Airborne Toxic Control Measures that reduce diesel emissions, including In-Use Off-Road Diesel-Fueled Fleets (13 CCR 2449 et seq.) and In-Use On-Road Diesel-Fueled Vehicles (13 CCR 2025).

2.3.5 California Health and Safety Code Section 41700

This section of the Health and Safety Code states that a person shall not discharge from any source whatsoever quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any of those persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property. This section also applies to sources of objectionable odors.

2.3.6 California's Pavley Standards

AB 1493 ("the Pavley Standard" or AB 1493) required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model year 2009 through 2016.

CARB's approach to passenger vehicles (cars and light trucks), under AB 1493, combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. This new approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California. These standards will apply to all passenger and light-duty trucks used by customers, employees of and deliveries to the Project. While AB 1493 focuses on the reduction of GHG emissions, it is anticipated that this regulation would also help reduce criteria air pollutants.

2.3.7 California's Advanced Clean Cars

In January 2012, CARB approved the Advanced Clean Cars (ACC) program,[17] a new emissions-control program for model year 2017 through 2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero-emission vehicles. By 2025, when the rules will be fully implemented, the new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions. While ACC focuses on the reduction of GHG emissions, it is anticipated that this regulation would

[17] Advanced Clean Cars Program. Available at: https://ww2.arb.ca.gov/index.php/our-work/programs/advanced-clean-cars-program. Accessed: February 2022.

also help reduce criteria air pollutants. At the time of this writing, CARB has adopted the Advanced Clean Cars II (ACC II) regulations which "will seek to reduce criteria and greenhouse gas emissions from new light- and medium-duty vehicles beyond the 2025 model year and increase the number of zero emission vehicles (ZEV) for sale".[18]

2.3.8 California's Advanced Clean Trucks

In June 2020, CARB approved the Advanced Clean Trucks regulation, which has requirements for manufacturer ZEV sales and a one-time reporting requirement for large entities and fleets.[19] The Advanced Clean Truck Regulation is part of a holistic approach to accelerate a large-scale transition of zero-emission medium-and heavy-duty vehicles from Class 2b to Class 8. Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines are required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. Large employers including retailers, manufacturers, brokers and others are required to report information about shipments and shuttle services. Fleet owners, with 50 or more trucks, are required to report about their existing fleet operations. This information helps to identify future strategies to ensure that fleets purchase available zero-emission trucks and place them in service where suitable to meet their needs.

2.3.9 California's Diesel Emissions Control Measures

CARB has adopted a number of Airborne Toxic Control Measures (ATCMs) to control diesel particulate emissions and emissions from in-use on- and off-road diesel-fueled vehicles. With the assistance of the Advisory Committee and its subcommittees, CARB developed and approved the *Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles*[20] and the *Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines*.[21] Various control measures adopted by CARB to reduce diesel emissions are summarized below.

2.3.9.1 ATCM: Diesel-Fueled Commercial Motor Vehicle Idling

This ATCM applies to diesel-fueled commercial motor vehicles with gross vehicular weight ratings of greater than 10,000 pounds that are or must be licensed for operation on highways. The measure limits idling of trucks to a maximum of 5 minutes, except when the vehicle is queuing.[22] While this ATCM focuses on the reduction of diesel particulate emissions as a toxic, this regulation would also help reduce criteria air pollutants.

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[18] Advanced Clean Cars II Program. Available at: https://ww2.arb.ca.gov/advanced-clean-cars-ii-meetings-workshops. Accessed: February 2022.

[19] CARB. 2020. Advanced Clean Trucks. Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks. Accessed: February 2022.

[20] CARB. 2000. Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-Fueled Engines and Vehicles. Available at: https://www.arb.ca.gov/diesel/documents/rrpfinal.pdf. Accessed: February 2022.

[21] CARB. 2008. California's Diesel Risk Reduction Plan: Risk Management Guidance for the Permitting of New Stationary Diesel-Fueled Engines. Available at: https://www.arb.ca.gov/diesel/documents/rmg.htm. Accessed: February 2022.

[22] 13 CCR 2485: Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/msprog/truck-idling/13ccr2485_09022016.pdf. Accessed: February 2022.

2.3.9.2 ATCM: Stationary Compression Ignition Engines

This ATCM establishes emission standards and fuel use requirements for new and in-use stationary engines used in prime and emergency back-up applications (non-agricultural) and for new stationary engines used in agricultural applications.[23] While this ATCM focuses on the reduction of diesel particulate emissions as a toxic, this regulation would also help reduce criteria air pollutants.

2.3.9.3 In-Use Off-Road Diesel-Fueled Fleets

These regulations reduce diesel PM and NO_x emissions from in-use, off-road heavy-duty diesel vehicles in California. Such vehicles typically are used in construction, mining, and industrial operations. The regulations, among other requirements, impose limits on idling; require all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System) and labeled; restrict the adding of older vehicles into fleets; and require fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (VDECS) (i.e., exhaust retrofits).

The requirements and compliance dates of the regulations vary by fleet size. Large fleets have compliance deadlines each year from 2014 through 2023, medium fleets each year from 2017 through 2023, and small fleets each year from 2019 through 2028.[24] At the time of writing, CARB is in the process of developing a rule amendment. The target of the amendment aligns with the targets set out by the Draft 2020 Mobile Source Strategy, which sets a goal of reducing statewide NOx emissions from the construction and earth moving sector by 7.5 tpd by 2031.

2.3.9.4 Truck and Bus Regulation

The Truck and Bus Regulation (13 CCR 2025) requires diesel trucks and buses to be upgraded to reduce emissions; newer heavier trucks and buses must meet PM filter requirements; lighter and older heavier trucks must be replaced; and, by January 1, 2023, nearly all trucks and buses will need to have 2010 model year engines or equivalent to reduce PM and NOx emissions.

The regulation applies to nearly all privately- and federally-owned diesel-fueled trucks and buses, and to privately- and publicly-owned school buses with a gross vehicle weight rating greater than 14,000 pounds. The regulation provides a variety of flexibility options tailored to fleets operating low use vehicles, fleets operating in selected vocations like agricultural and construction, and small fleets of three or fewer trucks.

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[23] 17 CCR 93115: Airborne Toxic Control Measure for Stationary Compression Ignition (CI) Engines. Available at: https://govt.westlaw.com/calregs/Document/I32577B50D60811DE88AEDDE29ED1DC0A?originationContext=Search+Result&listSource=Search&viewType=FullText&navigationPath=Search%2fv3%2fsearch%2fresults%2fnavigation%2fi0ad62d2e00000160511f23fc18257bb0%3fstartIndex%3d1%26Nav%3dREGULATION_PUBLICVIEW%26contextData%3d(sc.Default)&rank=1&list=REGULATION_PUBLICVIEW&transitionType=SearchItem&contextData=(sc.Search)&t_T1=17&t_T2=93115&t_S1=CA+ADC+s. Accessed: February 2022.

[24] 13 CCR 2449: General Requirements for In-Use Off-Road Diesel-Fueled Fleets. Available at: https://govt.westlaw.com/calregs/Document/ID1C693E02DDD11E197D9B83B68A61150?originationContext=Search+Result&listSource=Search&viewType=FullText&navigationPath=Search%2fv3%2fsearch%2fresults%2fnavigation%2fi0ad62d2e000001605120fcc918257bd2%3fstartIndex%3d1%26Nav%3dREGULATION_PUBLICVIEW%26contextData%3d(sc.Default)&rank=1&list=REGULATION_PUBLICVIEW&transitionType=SearchItem&contextData=(sc.Search)&t_T1=13&t_T2=2449&t_S1=CA+ADC+s. Accessed: February 2022.

2.3.10 Local Regulations and Guidance

Air pollution often does not conform to city and/or county jurisdictional boundaries, and the State has been divided into air basins based on geographical and meteorological conditions. Air pollution within each air basin is regulated by the regional air pollution control districts/air quality management districts, in a manner that is consistent with and in furtherance of standards adopted by the USEPA and CARB. The Project site is located within the San Joaquin Valley Air Basin (SJVAB) and the jurisdictional boundaries of the San Joaquin Valley Air Pollution Control District (SJVAPCD).

2.3.10.1 San Joaquin Valley Air Pollution Control District

District Plans

While CARB is responsible for the regulation of mobile emission sources within the state, local Air Quality Management Districts (AQMDs) and Air Pollution Control Districts (APCDs) are responsible for enforcing standards and regulating stationary sources. The Project site is located within the SJVAB and is subject to the guidelines and regulations of the SJVAPCD.

The SJVAPCD is responsible for developing and implementing the clean air plan for attainment and maintenance of the ambient air quality standards in the SJVAB. The SJVAPCD's air quality plans include emissions inventories to measure the sources of air pollutants, to evaluate how well different control methods have worked, and to show how air pollution will be reduced. The plans also use computer modelling to estimate future levels of pollution and to demonstrate that the Valley will meet air quality goals. The most recent plans are summarized below.

2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards

In November 2018, SJVAPCD adopted the 2018 Plan for the 1997, 2006, and 2012 $PM_{2.5}$ Standards.[25] This plan addresses the USEPA federal 1997 annual $PM_{2.5}$ standard and 24-hour $PM_{2.5}$ standard; the 2006 24-hour $PM_{2.5}$ standard; and the 2012 annual $PM_{2.5}$ standard. In the report, SJVAPCD included mobile source measures and a comprehensive suite of fiscally responsible local measures for stationary and area sources, including measures to further reduce emissions from industrial sources, residential wood burning and commercial charbroiling.

2016 Plan for the 2008 8-Hour Ozone Standard

In June 2016, SJVAPCD adopted the 2016 Plan for the 2008 8-hour Ozone Standard. [26] Through the comprehensive stationary and mobile source control strategies that previously have been adopted and that are now proposed in this plan, NO_x emissions in the SJVAB are expected to be reduced by over 60% between 2012 and 2031. As a result, the ambient ozone concentrations are projected to decrease dramatically in all areas of the Valley, such that future 8-hour ozone concentrations are expected to demonstrate attainment.

[25] SJVAPCD. 2018. 2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards. Available at: http://www.valleyair.org/pmplans/documents/2018/pm-plan-adopted/2018-Plan-for-the-1997-2006-and-2012-PM2.5-Standards.pdf. Accessed: February 2022.

[26] SJVAPCD (June 2016), "2016 Plan for the 2008 8-Hour Ozone Standard." Available at: https://www.valleyair.org/Air_Quality_Plans/Ozone-Plan-2016/Adopted-Plan.pdf. Accessed: February 2022.

District Rules and Regulations

The SJVAPCD is responsible for planning, implementing, and enforcing federal and state ambient standards in the SJVAB. Below is a list of SJVAPCD rules relevant to the Project:

Regulation II: Permits

Regulation II (Rules 2010-2550) contains a series of rules covering permitting requirements within the SJVAB. SJVAPCD regulations require any person constructing, altering, replacing or operating any source which emits, may emit, or may reduce emissions to obtain an Authority to Construct or a Permit to Operate.

Rule 3135: Dust Control Plan Fee

This rule requires the applicant to submit a fee in addition to a Dust Control Plan. The purpose of this fee is to recover the SJVAPCD's cost for reviewing these plans and conducting compliance inspections.[27]

Rule 4101: Visible Emissions

This rule applies to any source operation that emits or may emit air contaminants. The purpose of this rule is to prohibit the emissions of visible air contaminants to the atmosphere.[28]

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 SJVAPCD enforcement action.[29]

Rule 4601: Architectural Coating

This rule limits VOC content in architectural coatings. This rule also contains requirements for architectural coatings storage, clean up and labeling.[30]

Rule 4622: Gasoline Transfer into Motor Vehicle Fuel Tanks

This rule applies to any gasoline storage and dispensing operation or mobile fueler from which gasoline is transferred into motor vehicle fuel tanks. The purpose of this rule is to limit emissions to gasoline vapors.[31]

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[27] SJVAPCD (October 2005), "Dust Control Plan Fee," Rule 3135. Available at: https://www.valleyair.org/rules/currntrules/2018/R3135-a2.pdf. Accessed: February 2022.

[28] SJVAPCD (February 2005), "Visible Emissions," Rule 4101. Available at: https://www.valleyair.org/rules/currntrules/r4101.pdf. Accessed: February 2022.

[29] SJVAPCD (May 1992), "Nuisance," Rule 4102. Available at: http://www.valleyair.org/rules/currntrules/r4102.pdf. Accessed: February 2022.

[30] SJVAPCD (April 1991), "Architectural Coatings," Rule 4601. Available at: http://www.valleyair.org/rules/currntrules/r4601.pdf. Accessed: February 2022.

[31] SJVAPCD (December 2013), "Gasoline Transfer into Motor Vehicle Fuel Tanks," Rule 4622. Available at: https://www.valleyair.org/rules/currntrules/Rule4622.pdf. Accessed: February 2022.

Rule 4641: Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations

Rule 4641 applies to the manufacture and use of cutback asphalt, slow cure asphalt and emulsified asphalt for paving and maintenance operations. Asphalt paving operations associated with the Project will be subject to Rule 4641.[32]

Regulation VIII: Fugitive PM_{10} Prohibitions

Regulation VIII (Rules 8011-8081) contains a series of rules designed to reduce PM_{10} emissions (predominantly dust/dirt) generated by human activity, including construction and demolition activities, road construction, bulk materials storage, paved and unpaved roads, carryout and track out, etc. If a construction Project is 10 or more acres in area or will include moving, depositing or relocating more than 2,500 cubic yards (CY) per day of bulk materials on at least three days, then a Dust Control Plan must be submitted as specified in Section 6.3.1 of Rule 8021 (Construction, Demolition, Excavation, Extraction and Other Earthmoving Activities). Construction activities shall not commence until the SJVAPCD has approved the Dust Control Plan. The Project may also be subject to additional provisions within Rule 8021, as well as Rule 8031 (Bulk Materials), Rule 8041 (Carryout and Track Out), Rule 8051 (Open Areas), Rule 8061 (Paved and Unpaved Roads), and Rule 8071 (Unpaved Vehicle/Equipment Traffic Areas). For example, Rule 8061 places thresholds and requirements on limiting Visible Dust Emissions from unpaved road segments to 20% opacity.[33]

Rule 9510: Indirect Source Rule

This rule requires the applicants of certain development projects which equal or exceed established applicability thresholds to apply to the SJVAPCD when applying for the development's last discretionary approval.[34] The rule is applicable for a development project which upon full buildout would include 2,000 square feet of commercial space as well as a large development project which upon full buildout would include 10,000 square feet of commercial space. This Project includes a commercial space (warehouse) greater than 10,000 square feet. Projects subject to the rule are required to quantify indirect emissions (mobile source emissions), area source emissions and construction exhaust emissions and to mitigate a portion of these emissions. The Indirect Source Rule was adopted December 2005 and last amended December 2017. Rule 9510 was adopted to reduce the impacts of growth in emissions from all new development in the San Joaquin Valley. Developers of projects subject to Rule 9510 must reduce emissions occurring during construction and operational phases through on-site measures or pay off-site mitigation fees. The reductions for construction equipment exhaust emissions (for equipment greater than 50 horsepower) are 20% of the total NOx emissions and 45% of the total PM_{10} exhaust emissions. For operation, the operational baseline NOx emissions must be reduced by 33.3% and operational baseline PM_{10} emissions by 50% over a period of ten years. One hundred percent of all off-site mitigation fees are used by the SJVAPCD to fund emission reduction projects through its Incentives Programs, achieving emission reductions on behalf of the project. The emission

[32] SJVAPCD (April 1991), "Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations," Rule 4641. Available at: http://www.valleyair.org/rules/currntrules/r4641.pdf. Accessed: February 2022.

[33] SJVAPCD (November 2001), "Paved and Unpaved Roads," Rule 8061. Available at: https://www.valleyair.org/rules/currntrules/r8061.pdf. Accessed: February 2022.

[34] SJVAPCD Rule 9510 (Indirect Source Review). Available online at: https://www.valleyair.org/rules/currntrules/r9510-a.pdf. Accessed: February 2022.

reductions expected from the rule allow the SJVAPCD to achieve attainment of the federal air quality standards for ozone by 2031.[35]

2.3.10.2 City of Fresno General Plan

The City of Fresno's General Plan was adopted in December 2014.[36] The General Plan includes a Resource Conservation and Resilience section which addresses both air quality and greenhouse gas emissions. The City acknowledges its role in improving air quality by supporting and leading, where appropriate, regional, State and federal programs and actions for the improvement of air quality, especially the SJVAPCD's efforts to monitor and control air pollutants from both stationary and mobile sources, which is summarized in Policy RC-4-a. Other implementing policies under the overall RC-4 objective in the General Plan seek to take necessary actions to achieve and maintain compliance with State and federal air quality standards for criteria pollutants.

The City of Fresno's General Plan and Development Code Update Master Environmental Impact Report[37] outlines the local air quality and assesses carbon monoxide hotspot impacts. The report states that no CO hotspot modeling should be required for new projects during General Plan Buildout unless intersection volumes exceed 36,000 peak hour trips.

2.4 Environmental Setting

2.4.1 Local Air Quality Monitoring Data

The Project is located within the SJVAB. The SJVAB consists of eight counties: Fresno, Kern (western and central), Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare. Cumulatively, these counties make up about 16% of California's geographic area, making the SJVAB the second largest air quality basin in the State.

The SJVAB has 37 monitoring stations to measure air quality; 24 operated by the SJVAPCD, 2 by the National Park Service, 2 by tribal groups, 9 by CARB, and 1 jointly operated by the SJVAPCD and CARB. The location of these monitoring stations can be viewed on the SJVAPCD air monitoring webpage map of air monitoring sites in operation.[38]

The monitoring stations closest to the Project site are Fresno – Sierra Skypark #2; Fresno – Garland; and Fresno – First Street. Only one monitoring station in the SJVAPCD measures SO_2, so the Fresno station at First Street was used for this data. The most recent four years of published data at these monitoring stations are provided in **Table 2-3**. The frequency with which the ozone and PM standards have been exceeded at the nearest monitoring sites is displayed in **Table 2-4**.

[35] SJVAPCD. 2016 Ozone Plan for 2008 8-Hour Ozone Standard. Available at: https://www.valleyair.org/Air_Quality_Plans/Ozone-Plan-2016/Adopted-Plan.pdf. Accessed: February 2022.

[36] City of Fresno. 2014. Fresno General Plan. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2019/07/ConsolidatedGP6182020.pdf. Accessed: July 2022.

[37] City of Fresno. 2014. General Plan and Development Code Update. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2016/11/Sec-05-03-Air-Quality-MEIR.pdf. Accessed: July 2022.

[38] SJVAPCD. Air Monitoring. Available at: https://valleyair.org/aqinfo/air-monitoring.htm. Accessed: February 2022.

3. SIGNIFICANCE THRESHOLDS

3.1 California Environmental Quality Act Guidelines

The analysis provided in this report evaluates the significance of the Project's criteria air pollutant emissions by reference to the following questions from Section III, Air Quality, of Appendix G of the California Environmental Quality Act (CEQA) Guidelines[39]:

Threshold 1. Would the Project conflict with or obstruct implementation of the applicable air quality plan?

Threshold 2. Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

Threshold 3. Would the Project expose sensitive receptors to substantial pollutant concentrations?

Threshold 4. Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

An evaluation of the Project based on the significance thresholds discussed below is provided in subsequent sections.

3.2 San Joaquin Valley Air Pollution Control District Thresholds

The SJVAPCD has established significance thresholds[40] to assess the impacts of project-related construction and operational emissions on regional and local ambient air quality. **Table 3-1** shows the mass annual thresholds for construction and operation as adopted by the SJVAPCD for CAP and TAC emissions. As shown in **Table 3-1**, the SJVAPCD has separate operational emissions thresholds for permitted equipment and activities and non-permitted equipment and activities. Permitted equipment and activities are those which require a permit through SJVAPCD. Non-permitted equipment and activities do not require a permit and include area, energy, and mobile sources. The analysis summarized in this report estimates project-related construction and operational mass emissions and compares the emissions to these significance thresholds.

The thresholds represent screening-level thresholds that can be used to evaluate whether project-related emissions would cause a significant impact on air quality. For pollutants in attainment, emissions below the screening-level thresholds would not cause a significant impact. When assessing the significance of project-related impacts on air quality, impacts may be significant when on-site emission increases from construction activities or operational activities exceed the 100 pounds per day screening level of any criteria pollutant after implementation of all enforceable mitigation measures.[41] Under such circumstance, SJVAPCD recommends that an ambient air quality analysis be performed. In the event that emissions exceed these daily thresholds, modeling would be required to demonstrate that

[39] California Natural Resources Agency. 2018. Appendix G of the CEQA Guidelines. Available at: http://resources.ca.gov/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf. Accessed: February 2022.

[40] SJVAPCD. 2015. Air Quality Thresholds of Significance – Criteria Pollutants. March 19. Available at: http://www.valleyair.org/transportation/0714-gamaqi-criteria-pollutant-thresholds-of-significance.pdf. Accessed: February 2022.

[41] SJVAPCD. 2015. GAMAQI. Available at: http://www.valleyair.org/transportation/GAMAQI.pdf. Accessed: July 2022.

the project's total air quality impacts result in ground-level concentrations that are below the CAAQS and NAAQS, including appropriate background levels.

3.3 Project Approach to Significance

This report, relative to threshold 1, evaluates the Project for consistency with applicable plans related to emissions, including the regional air quality attainment plans. This report, relative to threshold 2, quantifies the Project's emissions during construction and operations and compares those results to the applicable SJVAPCD thresholds. Relative to threshold 3, this report includes a CO hotspots analysis and summarizes results of the Health Risk Assessment Technical Report which assesses the potential health risk impacts to sensitive receptors. This report, relative to threshold 4, evaluates the potential for odor-generating activities from the Project.

4. AIR QUALITY EMISSIONS INVENTORY

This section describes the methodology that Ramboll used to develop the criteria air pollutant emission inventories associated with the Project, which include one-time emissions associated with construction of the Project, and annual emissions associated with operation of the Project. Construction is expected to occur in mid- to late-2023. Emissions due to operation of the Project are therefore quantified for 2023. This is a conservative assumption for on-road and off-road mobile sources as vehicular emissions are expected to decrease in future years due to anticipated Statewide improvements and fleet turnover to newer equipment and vehicles. Sub-categories of operational emissions include the following: area, energy, mobile, and gasoline dispensing facility (GDF) sources. The emissions inventory reflects the reasonably foreseeable change based on the discontinued operation of the Costco Warehouse located at 4500 W Shaw Avenue. For purposes of this analysis, 4500 W Shaw Avenue is assumed to be backfilled by a shopping center use.

4.1 Resources

4.1.1 California Emission Estimator Model®

Ramboll primarily utilized the California Emissions Estimator Model (CalEEMod®) version 2020.4.0[42] methodology to assist in quantifying the criteria air pollutant emissions in the inventories presented in this report for the proposed project. CalEEMod® provides methodologies to calculate both construction emissions and operational emissions from a land use development project. It calculates daily or annual criteria air pollutant emissions. Specifically, the model methodology aids the user in the following calculations:

- One-time short-term construction emissions associated with site preparation, grading, building, and paving from off-road construction equipment, and on-road mobile equipment associated with workers, vendors, and hauling.
- Operational emissions associated with the fully built out project, such as on-road mobile vehicle traffic generated by the land uses, emissions from architectural coating, and emissions from consumer products.

CalEEMod® is a statewide program designed to calculate both criteria pollutant and GHG emissions from development projects in California developed under the auspices of the SCAQMD, with input from other California air districts, and is currently supported by numerous lead agencies for use in quantifying the emissions associated with development projects undergoing environmental review. CalEEMod® utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. These models and default estimates use sources such as the USEPA AP-42 emission factors,[43] CARB's on-road and off-road equipment emission models such as the EMission FACtor model (EMFAC) and the Emissions Inventory Program model

[42] SCAQMD. 2020. California Emissions Estimator Model®. Available at: https://www.aqmd.gov/caleemod. Accessed: February 2022.

[43] The USEPA maintains a compilation of Air Pollutant Emission Factors and process information for several air pollution source categories. The data is based on source test data, material balance studies, and engineering estimates. Available at: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors. Accessed: February 2022.

(OFFROAD), and studies commissioned by California agencies such as the California Energy Commission (CEC) and CalRecycle.

As mentioned above, CalEEMod® is based upon the CARB-approved OFFROAD and EMFAC models. OFFROAD[44] is an emission factor model used to calculate emission rates from off-road mobile sources (e.g., construction equipment, agricultural equipment). The off-road diesel emission factors used by CalEEMod® are based on the CARB OFFROAD2011 program. EMFAC2017[45] is the emission factor model used in CalEEMod® to calculate emissions rates from on-road vehicles (e.g., passenger vehicles). EMFAC2017 has been superseded by EMFAC2021. In order to allow for a more accurate representation of mobile source operational emissions associated with the Project, operational mobile source emission factors were estimated using EMFAC2021. These emissions factors were then used to estimate mobile source operational emissions based on CalEEMod® methodology and defaults along with Project specific values where available.

In addition, CalEEMod® contains default values and existing regulation methodologies to use in each specific local air district region. Appropriate statewide default values can be utilized if regional default values are not defined. Ramboll used default factors for the Fresno County area for the emissions inventory, unless otherwise noted in the methodology descriptions below.

4.2 Construction Emissions

This section describes the calculation of criteria air pollutant emissions from construction activities at the Project site. While the exact construction schedule and equipment mix may vary from the current analysis, the emissions are not expected to be higher than that calculated given the conservative assumptions included in the analysis.

The major construction phases included in this analysis are:

- Demolition: involves removing buildings or structures.
- Site Preparation: involves clearing vegetation (grubbing and tree/stump removal) and removing stones and other unwanted material or debris prior to grading.
- Grading: involves the cut and fill of land to ensure the proper base and slope for the construction foundation.
- Paving: involves the laying of concrete or asphalt such as in parking lots or roads.
- Building Construction: involves the construction of structures and buildings.
- Architectural Coating: involves parking and lane striping

The proposed schedule for constructing the Project is shown in **Table 4-1**. Construction-related emissions of ROGs, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$ were estimated using CalEEMod®. PM emissions are composed of exhaust emissions and fugitive emissions. Exhaust emissions are typically given out by a combustion engine of on-road vehicles and/or off-road equipment. Fugitive emissions are PM dust suspended in the air by wind action and

[44] CARB. 2011. Off Road Mobile Source Emission factors. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory. Accessed: February 2022.

[45] CARB. 2015. Mobile Source Emissions Inventory. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools. Accessed: February 2022.

construction related activities. Default on-site equipment lists in CalEEMod® supplemented with Project-specific material movement inputs were used for the various construction phases.

4.2.1 Emissions from Construction Equipment

The emission calculations associated with construction equipment are from off-road equipment engine use based on the equipment list and phase length, and on-road vehicle trips and phase length.

Since the majority of the off-road construction equipment used for construction projects are diesel fueled, CalEEMod® methodology assumes all of the equipment operates on diesel fuel. The calculations include the running exhaust emissions from off-road equipment. Since the equipment is assumed to be diesel, there are no starting emissions associated with the equipment, as these are *de minimis* for diesel-fueled equipment. CalEEMod® calculates the exhaust emissions based on default values for horsepower and load factor from CARB's OFFROAD2011.[46]

Project construction would include on-site equipment during grading/excavation and site preparation that generates fugitive dust. The construction-related equipment mix assumptions are project-specific. See **Table 4-2** for the construction equipment by construction phase. The combustion emissions from this equipment were calculated using CalEEMod®; the fugitive dust emissions from this equipment were calculated using the quantity of material moved and AP-42 emissions factors. PM_{10} and $PM_{2.5}$ emissions from fugitive dust will be controlled by watering consistent with Regulation VIII (Rules 8011 through 8081). For purposes of this analysis, CalEEMod® defaults assume watering the construction site twice a day reduces the fugitive dust emissions by 55%. Additionally, construction equipment greater than 50 hp used at the site shall meet USEPA Tier 3 emission standards for PM_{10} and $PM_{2.5}$ and include particulate matter emissions control equivalent to CARB Level 3 verifiable diesel emission control devices.

4.2.2 Emissions from On-Road Construction Trips

Construction generates on-road vehicle criteria air pollutant emissions from personal vehicles for worker and vendor commuting.

These emissions are calculated in CalEEMod® based on the number of trips and vehicle miles traveled (VMT) along with emission factors from EMFAC2017. The numbers of worker and vendor trips represent defaults from CalEEMod® based on the construction equipment to be used. The number of haul trips was estimated based on the volume of soil to be imported/exported (**Table 4-3**) and the square footage to be demolished (**Table 4-4**).

4.2.3 Fugitive Dust

Fugitive dust contributes to PM_{10} and $PM_{2.5}$ emissions and is generated by the various construction activities occurring at the Project site including entrained road dust, grading, demolition, and truck loading.

Entrained road dust is generated by vehicle travel on paved and unpaved roads. Emission factors for entrained road dust are on a "per mile" basis. In CalEEMod®, entrained road dust emission factors are based on the equations presented in the Paved Roads and Unpaved

[46] SCAQMD. 2020. California Emissions Estimator Model® User's Guide, Appendix A. Available at: https://www.aqmd.gov/caleemod. Accessed: February 2022.

Roads chapters of USEPA's AP-42 and are then multiplied by the total VMT for Project-related trips. Emissions from entrained road dust were estimated using CalEEMod® and are presented in **Appendix A**.

Fugitive dust emissions from bulldozing equipment (i.e., rubber-tired dozers), grading equipment (i.e., graders, rubber-tired dozers, and scrapers), and demolition activity occur during the Project construction. In addition, truck loading activities would generate fugitive dust emissions. The construction material movement and demolition assumptions are presented in **Table 4-3** and **Table 4-4**, respectively. Emissions from these sources were estimated using CalEEMod® and are presented in **Appendix A**.

4.2.4 Architectural Coating

VOC off-gassing emissions result from evaporation of solvents contained in surface coatings. CalEEMod® was used to estimate VOC evaporative emissions from application of surface coatings and these emissions are presented in **Appendix A**.

4.2.5 Paving

CalEEMod® was used to estimate the VOC off-gassing emissions associated with asphalt paving. The emissions associated with paving are presented in **Appendix A**.

4.2.6 Total Construction Emissions

The annual and daily criteria air pollutant emissions associated with construction are shown in **Table 4-5**. As shown in **Table 4-5**, annual and daily criteria air pollutant emissions from construction of the Project are below the SJVAPCD significance thresholds.

4.3 Operational Emissions

This section describes the calculation of criteria air pollutant emissions from Project operational activities. Operational emissions are evaluated for the first year of Project operation in 2023.

4.3.1 Area Sources

Area sources are those emissions that are generally too small to be uniquely identified as point sources and are thus generally aggregated as a group. CalEEMod® estimates emissions for the following sources, which are included under the category of "area" sources: landscaping equipment (e.g., lawn mowers), consumer products, and architectural coatings. Criteria air pollutant emissions due to natural gas combustion in buildings, could also be considered area sources, but are reported by CalEEMod® in the emissions associated with building energy use (described below).

The criteria air pollutant emissions generated by the Project were calculated using CalEEMod® defaults and can be viewed in **Appendix A**.

4.3.2 Energy Sources

Criteria air pollutant emissions are emitted from buildings as a result of activities for which natural gas is typically used as an energy source. Combustion of fossil fuels, such as natural gas, emits criteria air pollutants directly into the atmosphere. Climate Zone 11 was selected based on the CEC forecast climate zone map shown in the CalEEMod® User's Guide. The analysis assumes that the Project's land uses accord to the 2019 Title 24 Standards, as that code cycle became effective on January 1, 2020. To calculate the total building natural gas input for the Project, Ramboll utilized default values provided in CalEEMod®, which are based on the Commercial End-Use Survey (CEUS).

Criteria air pollutant emissions from the natural gas consumption were estimated in CalEEMod® and can be viewed in **Appendix A**.

4.3.3 Operational Gasoline Transfer and Dispensing

Emissions from gasoline transfer and dispensing mainly occur during loading, breathing, refueling, spillage, and from hose permeation. Emission factors were obtained from SJVAPCD staff for EVR Phase I and EVR Phase II installed underground tank. These emissions which are permitted through the SJVAPCD are presented in **Table 4-6**.

4.3.4 Mobile Sources

The criteria air pollutant emissions associated with on-road mobile sources are generated from customers and delivery trucks travelling to and from the Project site. The emissions associated with on-road mobile sources include running, idling and starting exhaust emissions, evaporative emissions, tire wear, brake wear, and entrained road dust. Running emissions are dependent on VMT. Starting and evaporative emissions are associated with the number of starts or time between vehicle uses and the assumptions used in determining these values are described below. In addition, a portion of warehouse delivery trucks will be equipped with transportation refrigeration units (TRUs), which result in emissions when the warehouse delivery truck is docked at the site. Ramboll calculated mobile source emissions using the trip rates and trip length information based on analyses conducted by Kittelson & Associates, Inc (Kittelson).

The analysis includes the reductions from adopted regulatory programs, which are accounted for within the EMFAC2021 model:

- AB 1493 ("the Pavley Standard") required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model year 2009 and thereafter. CalEEMod® and EMFAC2021 include emission reductions for non-commercial passenger vehicles and light-duty trucks of model year 2017 – 2025.
- The ACC program, introduced in 2012, combines the control of smog, soot causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2015 through 2025. CalEEMod® and EMFAC2021 include reductions associated with this regulation that are represented in this analysis. While ACC focuses on the reduction of GHG emissions, it is anticipated that this regulation would also help reduce criteria air pollutants.
- The USEPA/NHTSA advanced fuel economy and GHG standards (Phase 1) were adopted in 2011 for medium and heavy-duty trucks for model years 2014-2018.[47] This Heavy-Duty National Program is intended to reduce fuel use and GHG emissions from medium- and heavy-duty vehicles, semi-trucks, pickup trucks and vans, and all types and sizes of work trucks and buses in between. CalEEMod® and EMFAC2021 include reductions associated with this regulation that are represented in this analysis.

[47] USEPA, Office of Transportation and Air Quality. 2011. Available at: https://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-20740.pdf. Accessed: February 2022.

- The USEPA/NHTSA advanced fuel economy and GHG standards (Phase 2) were adopted in 2016 for medium- and heavy-duty trucks for model years 2018 and beyond.[48] The Phase 2 program includes technology-advancing standards that substantially reduce GHG and criteria pollutant emissions and fuel consumption resulting in an ambitious, yet achievable, program that will allow manufacturers to meet the applicable standards over time, at reasonable cost, through a mix of different technologies. The Phase 2 program's standards will be phased in, beginning with model year 2021 and culminating with model year 2027. [49]

In November 2019, CARB released EMFAC off-model adjustment factors to account for the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One.[50] The SAFE Rule has been incorporated into EMFAC2021, which is used in this analysis.

4.3.4.1 Calculating Mobile Source Emissions

Mobile source emissions calculation requires trip rates and trip lengths for each different trip type in the Project (e.g., passenger vehicles and delivery trucks).

The following sections describe the methodology to derive the necessary inputs. The mobile source calculations were performed using Excel following CalEEMod® methodology in order to capture the Project's mobile emissions.

The Project emissions inventory accounts for the moving of the Costco Warehouse from 4500 W Shaw Avenue to the new Project location (i.e., W. Herndon Avenue and N. Riverside Drive). It is reasonably foreseeable that the 4500 W Shaw Avenue location will be backfilled with a shopping center use, which will have lower mobile emissions compared to the current Costco Warehouse operations. The reduction in mobile emissions from the removal of the Costco Warehouse at 4500 W Shaw Avenue is incorporated into the Project emissions inventory. The VMT and trip rate assumed for the change at 4500 W Shaw Avenue and Project location are detailed in **Appendix B**.

a) Trip Generation Rates

The trip generation rates for the Project were based on Kittelson data. The trips for the northeast corner of W. Herndon Ave. and N. Riverside Dr (Herndon/Riverside) and 4500 W Shaw Ave are shown in **Appendix B** in **Table B-1a** and **Table B-1b**, respectively.

b) Trip Lengths

Trip lengths for passenger vehicles, fuel delivery trucks, and warehouse delivery trucks were provided by Kittelson. The trip length for the MDO delivery trucks is based on the average routed round trip length for Fresno MDO deliveries. These trip lengths for Herndon/Riverside and 4500 W Shaw Ave are presented in **Appendix B, Table B-1a** and **Table B-1b**, respectively.

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[48] USEPA, Office of Transportation and Air Quality. 2016. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed: February 2022.

[49] The emission reductions attributable to Phase 2 of the regulations for medium- and heavy-duty trucks were not included in the Project's emissions inventory due to the difficulty in quantifying the reductions. Excluding these reductions results in a more conservative (i.e., higher) estimate of emissions for the Project.

[50] CARB. 2019. EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicles Rule Part One. Available at: https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf. Accessed: February 2022.

c) Fleet Mix

The fleet mixes derived based on CalEEMod® and EMFAC2021 were used to determine the mix of light-duty vehicles used for member vehicles and employee vehicles. The MDO delivery trucks, fuel delivery trucks, and warehouse delivery trucks were assumed to all be heavy-heavy-duty trucks. The fleet mixes were used to calculate the fleet-weighted average emission factor for each vehicle type. The fleet mixes for the operational mobile trips are shown in **Table B-2** of **Appendix B**.

d) Transportation Refrigeration Units

The Project includes Transport Refrigeration Units (TRUs), which are refrigeration systems powered by diesel internal combustion engines designed to refrigerate or heat perishable products that are transported in various containers, including truck vans, semi-truck trailers, shipping containers, and railcars. These TRUs account for approximately 15% of the warehouse delivery trucks. This analysis assumes that TRUs are plugged in at the loading dock. Emission factors for TRUs were obtained from OFFROAD2021 for TRU trailers in Fresno County and are presented in **Table 4-7**.

e) On-Road Mobile Source Emission Factors

Exhaust, evaporative, tire wear, and brake wear emission factors were obtained from EMFAC2021 for Fresno County and are presented in **Appendix B, Tables B-3 through B-5**. Emission factors for passenger vehicles were calculated as a fleet-weighted average. Entrained road dust emission factors were calculated following guidance in the CalEEMod® User's Guide, Appendix A, which is based on AP-42, Section 13.2.1 for vehicles traveling on paved roads. Entrained road dust emission factors for PM_{10} and $PM_{2.5}$ are shown in **Appendix B, Table B-6**.

4.3.4.2 Mobile Source Emissions

The emission factors for each vehicle type were calculated from EMFAC2021 model outputs. The fleet mixes from **Table B-2** were used to form member vehicle weighted emission factors and employee vehicle weighted emission factors. The emission factors used to estimate mobile emissions from running exhaust, running losses, tire wear, brake wear (**Table B-3**), and entrained road dust (**Table B-6**) are on a "per mile" basis and thus the emissions were calculated by multiplying these factors by the estimated VMT for each vehicle type. The emission factors for starting exhaust and non-running evaporative processes (**Table B-4**) are on a "per trip" basis and thus the emissions were calculated by multiplying these factors by the estimated number of trips for each vehicle type. The emission factors used to estimate criteria air pollutant emissions from idling (**Table B-5**) are on a "per minute of idling" basis and thus the emissions were calculated by multiplying these factors by the estimated idle duration for each vehicle type.

Member vehicles used the member vehicle weighted emission factors, while warehouse, fuel station, and car wash employees and MDO driver and warehouse employee vehicles used the employee vehicle weighted emission factors. The overall mobile source emissions are shown in **Appendix B, Table B-7a** and **B-7b.**

4.3.5 Total Operational Emissions

Table 4-8a summarizes the Project operational criteria air pollutant emissions from permitted and non-permitted sources on an annual basis. **Table 4-8b** summarizes the

Project operational on-site daily criteria air pollutant emissions from permitted and non-permitted sources.

5. HEALTH RISK ASSESSMENT

This HRA evaluates the estimated cancer risk, non-cancer chronic hazard index (HIC), and acute hazard index (HIA) associated with construction and operation of the Project to address the SJVACPD Significance Thresholds.

5.1 Estimated Air Concentrations

To evaluate the health risks and concentration of air toxics in the surrounding area, SJVAPCD recommends estimating concentrations using air pollution dispersion modeling. The methodologies used to evaluate emissions for the Project are based on the most recent SJVAPCD Modeling and Health Risk Assessment Guidelines and the most recent Air Toxics Hot Spots Program Risk Assessment Guidelines from Office of Environmental Health Hazard Assessment (OEHHA).[51,52,53]

Off-site air concentrations of TACs from Project emissions are estimated using the American Meteorological Society/Environmental Protection Agency regulatory air dispersion model (AERMOD). Details on the inputs and methodology used in the dispersion modeling are discussed further in the sections below.

5.1.1 Toxic Air Contaminant Emissions

Ramboll evaluated excess lifetime cancer risk and HIC for off-site receptors from Project construction emissions. In particular, the construction HRA assesses the lifetime cancer risk and HIC associated with DPM emissions from off-road diesel construction equipment and hauling and vendor trucks during construction of the Project. Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen.[54,55] Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. We conservatively assumed that all PM_{10} from diesel fueled equipment and trucks is DPM. Gasoline vehicles were not included in the HRA per the direction from SJVAPCD.[56]

Additionally, Ramboll evaluated the lifetime cancer risk, HIC, and HIA analyses resulting from Project operation, which includes DPM emissions associated with Costco delivery trucks travel and idling, warehouse diesel delivery truck travel and idling, MDO diesel delivery truck travel and idling, and TAC emissions (e.g., benzene) from gasoline transfer and dispensing. Costco members' vehicles are assumed to be gasoline-fueled, hybrid, and electric vehicles. Therefore, TAC emissions associated with Costco members' vehicles are not included in the

[51] SJVAPCD. 2006. Guidance for Air Dispersion Modeling. August. Available at: https://www.valleyair.org/busind/pto/Tox_Resources/Modeling%20Guidance.pdf Accessed: February 2022.

[52] SJVAPCD. Health Risk Assessment Guidance Document for AB2588 and CEQA. Document provided by the SJVAPCD staff, Kyle Melching, via email dated August 4, 2021.

[53] Cal/EPA, OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: February 2022.

[54] Cal/EPA, OEHHA. 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998, meeting.

[55] Cal/EPA, OEHHA. 2018. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. May. Available at: https://www.arb.ca.gov/toxics/healthval/contable.pdf. Accessed: May 2021.

[56] Email communication with SJVAPCD staff, Diana Walker, on August 17, 2021.

operational HRA based on the direction from the District.[57] Detailed emission calculations for the construction and operational HRAs are presented in **Appendix C** and **Appendix D**.

5.1.2 Air Dispersion Modeling Methodology

Ramboll used AERMOD Version 21112 to estimate ambient air concentrations and evaluate the health risks of TACs at off-site receptors. [58,59] For each receptor location, the model generates air concentrations (or air dispersion factors if unit emissions [i.e., 1 g/s] were modeled) that result from emissions from multiple sources.

Air dispersion models such as AERMOD require a variety of inputs such as source parameters, meteorological data, topography information, and receptor parameters. When site-specific information was unknown, default parameter sets that are designed to produce conservative (i.e., overestimates of) air concentrations were used.

5.1.2.1 AERMOD

AERMOD has been approved for use by USEPA, CARB, and SJVAPCD, and incorporates multiple variables in its algorithms including:

- Meteorological data representative of surface and upper air conditions;
- Local terrain data to account for elevation changes; and
- Physical specification of emission sources including information such as:
  - Location;
  - Release height; and
  - Source dimensions.

Dispersion model averaging times are specified based on the averaging times of ambient air quality standards and the air quality significance thresholds established by the appropriate regulatory agencies. For the Project construction HRA, the PERIOD averaging time (average concentration for the 5-year meteorological data set) was used to calculate chronic (long-term) health effects. No acute non-cancer toxicity has been identified for DPM.[60] Thus, an acute HI from Project construction was not calculated.

For the Project operational HRA, the 1-hour averaging time was used to evaluate acute (short-term) effects and the PERIOD averaging time (average concentration for the 5-year meteorological data set) was used to calculate chronic (long-term) health effects.

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[57] Ibid.

[58] USEPA. 2021. User's Guide for the AMS/EPA Regulatory Model (AERMOD). August. Available at: https://gaftp.epa.gov/Air/aqmg/SCRAM/models/preferred/aermod/aermod_userguide.pdf. Accessed: February 2022.

[59] USEPA. 2017. Guideline on Air Quality Models (Revised). 40 Code of Federal Regulations, Part 51, Appendix W. Office of Air Quality Planning and Standards. January. Available at: https://www.epa.gov/scram/clean-air-act-permit-modeling-guidance. Accessed: February 2022.

[60] CARB. 2018. *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values*. August, https://www.arb.ca.gov/toxics/healthval/contable.pdf. Accessed: February 2022.

The following other options in AERMOD were selected for use in this analysis. The regulatory default option was selected based the SJVAPCD modeling recommendations,[61] which established the settings for variables such as rural modeling dispersion option, receptor heights, off-site receptor grid spacing, and emissions source parameters. The air dispersion model was run using a unit emission factor approach. The model output based on a unit emission factor approach was incorporated into a post-processing step with the calculated emission rates to estimate the air concentrations at each receptor.

5.1.2.2 Source Characterization

For the Project construction HRA, DPM emissions from haul trucks and vendor vehicles traveled on the roadway links within 0.25 miles of the site boundary were modeled using line-volume sources in the air dispersion model. Volume sources covering the planned construction areas were used to represent DPM exhaust emissions from the off-road equipment for the construction modeling. 20 meters-by-20 meters volume sources[62] are used to characterize construction off-road equipment with a release height of 5 meters, an initial lateral dimension of 2.3 (length of side/2.15), and an initial vertical dimension of 1.4 m. Modeled construction emission source locations are shown in **Figure 1**.

For the Project operational analysis, DPM emissions from mobile sources traveling on the roadway links within 0.25 miles of the site boundary were modeled as line-volume sources. Point sources were used to represent on-site idling for fuel delivery trucks, warehouse delivery trucks, and MDO delivery trucks, as well as transport refrigeration unit (TRU) emissions when in use by warehouse delivery trucks at the warehouse loading docks. The GDF emission sources were modeled as point sources (loading and breathing emissions) and volume sources (refueling, hose permeation, and spillage). Modeled operational emission source locations are shown in **Figure 2**. Detailed source parameters and their bases were provided in **Appendix E**.

5.1.2.3 Meteorology

SJVAPCD provides AERMOD model-ready meteorological data sets for use in air quality and risk impact analyses in the SJVAB. SJVAPCD's Fresno, CA (Station ID 93193) meteorological data set was selected based on that station's close geographic proximity to the Project. The SJVAPCD meteorological data set for January 1, 2013 to December 31, 2017 was used for the analysis.[63] The meteorological station location is presented in **Figure 3**.

5.1.2.4 Land Use

The land uses surrounding the Project alignment are primarily a mix of developed residential and commercial areas. AERMOD offers the option of using either rural or urban dispersion characteristics. Selection of rural or urban dispersion characteristics depends on the predominant land use within a three-kilometer radius of the site. SJVAPCD recommends that if 50% or more of the land use types within the three-kilometer radius is classified as heavy

[61] SJVAPCD. 2006. Guidance for Air Dispersion Modeling. Available at: http://www.valleyair.org/busind/pto/tox_resources/Modeling%20Guidance.pdf. Accessed: February 2022.

[62] The modeled volume is an approximate representation of the area where construction activity may occur. Slight changes to the exact boundary of the construction activity area are not anticipated to meaningfully alter the analysis findings.

[63] SJVAPCD. Meteorological Data. Available at: ftp://ftp2.valleyair.org/public/Modeling/Meteorological_Data. Accessed: February 2022.

industrial, light/moderate industrial, and/or commercial, then urban dispersion characteristics must be chosen for all Project emissions sources. Otherwise, the rural dispersion characteristics must be chosen.[64] Ramboll determined that less than 50% of the land use within the three-kilometer radius is classified as the urban land use types, and rural dispersion characteristics were therefore used for the Project.

Data specifying terrain elevations of sources and receptors are imported into the model. Elevations are based on National Elevation Datasets (NEDs) and consist of an array of regularly spaced points on a horizontal plane for which an elevation is specified. NED 1-arc second data used in this analysis were obtained from the United States Geologic Survey (USGS).[65]

5.1.2.5 Emission Rates

Emissions were modeled using the χ/Q ("chi over q") method, such that each source group has a unit emission rate (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors (with units of [µg/m^3]/[g/s]). Actual emissions were multiplied by the dispersion factors to obtain concentrations.

For the Project construction analysis, emissions from all modeled construction sources including off-road construction equipment, off-site vendor vehicle travel, and off-site hauling vehicle travel – were assumed to occur between the hours of 7:00 AM and 10:00 PM and 6 days per week for the Project construction duration of one year.

For the Project operational analysis, warehouse delivery trucks and TRUs are expected to operate between 2AM and 1PM, 7 days per week. Emissions from gasoline refueling, hose permeation, and spillage were modeled from 6 AM to 10 PM based on the anticipated operating schedule of the gas station. Emissions from fuel delivery trucks, MDO delivery trucks, and gasoline tank loading and breathing loss were conservatively modeled 24 hours per day, 7 days per week.

5.1.2.6 Receptors

In order to evaluate health impacts to off-site receptors, nearby sensitive receptor populations were identified. SJVAPCD identifies the following as off-site sensitive receptors: schools, daycare facilities, hospitals, and adult/elderly care facilities.[66] The following receptors are included in the AERMOD modeling per SJVAPCD guidance:[67]

- 25 m x 25 m from the site boundary to 100 m from the site boundary;
- 50 m x 50 m from 100 m to 250 m from the site boundary;
- 100 m x 100 m from 250 m to 500 m from the site boundary;
- 250 m x 250 m from 500 m to 1,000 m from the site boundary;
- 500 m x 500 m from 1,000 m to 2,000 m from the site boundary;

[64] SJVAPCD. 2006. Guidance for Air Dispersion Modeling. Available at: http://www.valleyair.org/busind/pto/tox_resources/Modeling%20Guidance.pdf. Accessed: February 2022.

[65] USGS National Elevation Dataset. Available at: https://www.mrlc.gov/tools. Accessed: February 2022.

[66] SJVAPCD. 2006. Guidance for Air Dispersion Modeling. Available at: http://www.valleyair.org/busind/pto/tox_resources/Modeling%20Guidance.pdf. Accessed: February 2022.

[67] Ibid.

- Coarse Grid 100 m x 100 m from 200 m to ¼-mile from the Project;[68] and
- Discrete sensitive receptors.

Sensitive receptor locations within a 2,000 meter radius of the modeled site boundary[69] were procured from a third-party that identified these receptors.[70]

The locations of all receptors are illustrated on **Figure 4**. Receptor heights were assumed to be ground-level based on SJVAPCD guidance.[71]

5.2 Risk Characterization Methods

The Project construction and operational HRA's was conducted in accordance with SJVAPCD risk assessment guidelines.[72] These guidelines are based on OEHHA's 2015 Air Toxics Hot Spots Program Risk Assessment Guidelines.[73] The 2015 OEHHA Guidelines include various updates that are protective of human health, particularly related to estimating potential risks in infants, children, and other sensitive receptors. Lifetime cancer risk, HIC, and HIA were calculated at each receptor. TAC emissions and air dispersion results were input into HARP, version 21081, the OEHHA-recommended program for completing an HRA. Specific steps taken to complete the HRA, such as exposure assessment, dose-response, and risk characterization are described in more detail below.

5.3 Exposure Assessment

To calculate health impacts for comparison to SJVAPCD thresholds, this report assesses risk to residential, worker, and sensitive receptors. The exposure rate for the residential scenario is more conservative than those for other sensitive receptor types (i.e., school child, daycare child, and patients) as residents have the highest exposure frequency, exposure time, and exposure duration, thus for this analysis, sensitive receptors were evaluated using residential exposure assumptions.

Exposure Assumptions: The exposure duration, pathways, exposure analysis methods (e.g., OEHHA 95th High End Method) evaluated in the HRA used to estimate excess lifetime cancer risks for exposed populations were selected in accordance with risk assessment guidelines from OEHHA and SJVAPCD.[74,75] A deposition rate of 0.05 m/s was used for multipathway analysis. For construction HRA, we conservatively assume that exposure begins at birth (age 0), rather than at the third trimester due to higher overall intake of DPM.

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[68] Ibid.

[69] Ibid.

[70] EDR. 2021. EDR Offsite Receptor Report.

[71] SJVAPCD. 2006. Guidance for Air Dispersion Modeling. Available at: http://www.valleyair.org/busind/pto/tox_resources/Modeling%20Guidance.pdf. Accessed: January 2022.

[72] SJVAPCD. Health Risk Assessment Guidance Document for AB2588 and CEQA. Document provided by the SJVAPCD staff, Kyle Melching, via email dated August 4, 2021.

[73] Cal/EPA, OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: February 2022.

[74] Cal/EPA, OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf. Accessed: February 2022.

[75] SJVAPCD. 2006. Guidance for Air Dispersion Modeling. Available at: http://www.valleyair.org/busind/pto/tox_resources/Modeling%20Guidance.pdf. Accessed: February 2022.

Calculation of Intake: The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, IF_{inh}, can be calculated as follows:

$$IF_{inh} = \frac{DBR * FAH * EF * ED * CF}{AT}$$

Where:

IF_{inh} = Intake Factor for Inhalation (m^3/kg-day)

DBR = Daily Breathing Rate (L/kg-day)

FAH = Frequency of time at Home (unitless)

EF = Exposure Frequency (days/year)

ED = Exposure Duration (years)

CF = Conversion Factor, 0.001 (m^3/L)

AT = Averaging Time (days)

The chemical intake or dose is estimated by multiplying the inhalation intake factor, IF_{inh}, by the chemical concentration in air, C_i. When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in the current OEHHA Hot Spots guidance.[76]

5.3.1 Age Sensitivity Factors

As a conservative and health-protective measure, the estimated excess lifetime cancer risks for a resident will be adjusted using age sensitivity factors (ASFs) that account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA 2009 Technical Support Document and OEHHA 2015 Air Toxics Hot Spots Program Risk Assessment Guidelines.[77,78] Cancer risk estimates were weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from two years through 15 years of age. No weighting factor (i.e., an ASF of one, which is equivalent to no adjustment) is applied to ages 16 and older.

5.3.2 Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. For purposes of calculating exposure criteria to be used in risk assessments, adverse health effects are classified into two broad categories – cancer and non-cancer endpoints. Toxicity values that are used to estimate the likelihood of adverse effects occurring in humans at

[76] Cal/EPA, OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Appendix D. February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015gmappendices.pdf. Accessed: September 2021.

[77] Cal/EPA, OEHHA. 2009. Technical Support Document for Cancer Potency Factors: Methodologies for Derivation, Listing of Available Values, and Adjustment to Allow for Early Life Stage Exposures. May. Available online at: https://oehha.ca.gov/air/crnr/technical-support-document-cancer-potency-factors-2009. Accessed: September 2021.

[78] Cal/EPA, OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Appendix D: February. Available at: https://oehha.ca.gov/media/downloads/crnr/2015gmappendices.pdf. Accessed: September 2021.

different exposure levels are identified as part of the toxicity assessment component of a risk assessment. Toxicity factors in the latest HARP Health Database,[79] integrated into the HARP program, were used in this HRA. The HARP program contains the most up-to-date listing of available inhalation and oral cancer potency factors (CPFs), chronic inhalation and oral RELs, and acute RELs approved by California Environmental Protection Agency (Cal/EPA) for use in health risk assessments.

5.4 Risk Characterization

This section describes the methods used to estimate potential adverse effects associated with off-site exposures to chemicals emitted from the Project. The results of the HRA are presented in Section 5.5. HARP was used to estimate carcinogenic risks and non-cancer HIs associated with potential exposures to potential emissions from the Project's construction and operational emissions.

5.4.1 Estimation of Cancer Risks

Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to a chemical is calculated by multiplying the chemical intake or dose at the human exchange boundaries (e.g., lungs) by the chemical-specific cancer potency factor (CPF). For carcinogenic chemicals, both inhalation and non-inhalation pathways must be considered, using the CPFs in HARP. Total risk is the sum of risks attributable to each chemical considered by each pathway.

The equation used to calculate the potential excess lifetime cancer risk for the inhalation pathway is as follows:

$$Riskinh = Ci \; x \; CF \; x \; IFinh \; x \; CPFi \; x \; ASF$$

Where:

Riskinh = Cancer risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)

Ci = Annual average air concentration for chemical (µg/m^3)

CF = Conversion factor (mg/µg)

IFinh = Intake factor for inhalation (m^3/kg-day)

CPFi = Cancer potency factor for chemical (mg chemical/kg body weight-day)$^{-1}$

ASF = Age sensitivity factor (unitless)

A similar equation, using oral dose and the oral CPF, is used to calculate risks from oral exposure. Oral cancer risks include dermal absorption, incidental ingestion of soil, and mother's milk. HARP default exposure parameters were used, as described above.

[79] The latest HARP Health Database is available from ARB here: https://www.arb.ca.gov/toxics/harp/harp.htm. Accessed: February 2022.

5.4.1.1 Estimation of Chronic Non-Cancer Hazard Indices

The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the non-cancer chronic reference exposure level (cREL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ). To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the HQs for all chemicals are summed, yielding a HI:

$$HQi = Ci / cREL$$

$$HI = \sum HQ$$

Where:

HI	=	Hazard index
HQi	=	Chronic hazard quotient for chemical i
Ci	=	Annual average concentration of chemical i (µg/m^3)
cRELi	=	Chronic noncancer reference exposure level for chemical i (µg/m^3)

Estimation of non-inhalation chronic health effects uses a similar method, but the annual average air concentration is replaced by the dose calculated by HARP using the exposure parameters mentioned above, and the appropriate non-inhalation REL is used.

Estimation of an HI for each target organ (also referred to as a segregation of HI by target organ analysis) is recommended by OEHHA because the non-cancer effects of chemicals with different target organs are generally not additive.

5.5 Health Risk Results

Using the health risk assessment options for HARP detailed in **Table 5-1** and **Table 5-2** for the construction HRA and operational HRA, respectively, the potential health impacts during the construction and operation of the Project were estimated at the maximally impacted residential, worker, and sensitive receptors. The cancer risk, HIC, and HIA results of the construction and operational health risk assessment are presented in **Table 5-3**.

6. CO HOTSPOTS

Mobile-source impacts occur on two basic scales of motion. Regionally, Project-related travel will add to regional trip generation and increase the VMT within the local airshed and the SJVAB. Locally, Project traffic will be added to the City's roadway system. There is a potential for the formation of microscale CO "hotspots" in the area immediately around points of congested traffic. Because of continued improvement in mobile emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the basin is steadily decreasing.

Projects contributing to adverse traffic impacts may result in the formation of CO hotspots. To verify that the Project would not cause or contribute to a violation of the CO standard, a screening evaluation of the potential for CO hotspots was conducted. The Fresno Costco Relocation Transportation Impact Analysis prepared by Kittelson evaluated the level of service (LOS) (i.e., increased congestion) impacts at intersections affected by the Project. The potential for CO hotspots was evaluated based on the results of the traffic analysis.

6.1 Regulatory Background

The City of Fresno's General Plan and Development Code Update was reviewed to determine if the Project would require a site-specific hotspot analysis. The localized impacts to ambient CO concentrations from peak traffic volumes within the City were modeled using the CALINE4 CO Hotspots model. It was determined that tripling the maximum traffic volume within the City during the peak hour – 12,000 trips – resulted in an 8-hour CO concentration of 6 ppm, which falls below the 8-hour CAAQS of 9.0 ppm.[80] Because that volume of traffic is very unlikely to occur, it was determined that CO hotspot modeling is not required for new projects unless roadway intersection traffic volumes exceed 36,000 peak hour trips.

Further, SJVAPCD's Guidance for Assessing and Mitigating Air Quality Impacts indicates that the project would result in no potential to create a violation of the CO standard if neither of the following SJVAPCD screening criteria are met at any of the intersections affected by the project:[81]

- A traffic study for the project indicates that the LOS on one or more streets or at one or more intersections in the project vicinity will be reduced to LOS E or F.
- A traffic study indicates that the project will substantially worsen an already existing LOS F on one or more streets or at more or more intersections in the project vicinity.

[80] City of Fresno. 2014. General Plan and Development Code Update. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2016/11/Sec-05-03-Air-Quality-MEIR.pdf. Accessed: February 2022.

[81] SJVAPCD. 2015. Guidance for Assessing and Mitigating Air Quality Impacts. Available at: http://www.valleyair.org/transportation/GAMAQI.pdf. Accessed: February 2022.

6.2 Traffic Study Findings

The Traffic Study[82] prepared for this project evaluated the LOS impacts at six existing intersections and three proposed intersections resulting from new roadways for site access. Kittelson evaluated eight scenarios, which are summarized in **Appendix G**:

- Scenario 1: Existing Conditions (2021),
- Scenario 2: Existing Plus Project Conditions (2021)
- Scenario 3: Existing Plus Project Conditions with Off-Site Improvements (2021)
- Scenario 4: Future Conditions (2042),
- Scenario 5: Future Plus Project Conditions (2042),
- Scenario 6: Future Plus Project with Reclassification Conditions with Off-Site Improvements (2042)
- Scenario 7: Future Plus Project Conditions without Reclassification of W. Herndon Ave. (2042), and
- Scenario 8: Future Plus Project Conditions without Reclassification of W. Herndon Ave. with Off-Site Improvements (2042).

Scenarios 3, 6, and 8 would not result in a reduction of LOS on one or more streets or at one or more intersections in the project vicinity to LOS E or F.

Based on the analysis performed by Kittelson, the LOS impacts show that the following intersections have the potential to reduce to LOS E or F with the Project:

- Scenario 2: Existing Plus Project Conditions (2021)
  - Intersection No. 2 (N Riverside Dr/W Fir Ave): PM and Saturday peak hours
  - Intersection No. 3 (N Riverside Dr/W Herndon Ave): AM, PM, and Saturday peak hours
  - Intersection No. 4 (N Golden State Blvd/W Herndon Ave): PM and Saturday peak hours
- Scenario 5: Future Plus Project Conditions (2042):
  - Intersection No. 2 (N Riverside Dr/W Fir Ave): PM and Saturday peak hours
  - Intersection No. 3 (N Riverside Dr/W Herndon Ave): AM, PM, and Saturday peak hours
  - Intersection No. 4 (N Golden State Blvd/W Herndon Ave): PM and Saturday peak hours
- Scenario 7: Future Plus Project Conditions without Reclassification of W. Herndon Ave. (2042)
  - Intersection No. 2 (N Riverside Dr/W Fir Ave): PM and Saturday peak hours
  - Intersection No. 3 (N Riverside Dr/W Herndon Ave): AM, PM, and Saturday peak hour
  - Intersection No. 4 (N Golden State Blvd/W Herndon Ave): PM and Saturday peak hours

For these intersections listed above, the total traffic volumes are less than the 36,000 vehicles per hour threshold determined in the General Plan. Further, the Project satisfies the remaining SJVAPCD screening criterion because there are no existing LOS F on any of the

[82] Kittelson & Associates, Inc. 2023. Fresno Costco Relocation Transportation Impact Analysis. May.

studied intersections. Therefore, the Project would not result in the potential to create a violation of the CO standard.

7. PROJECT INVENTORY IN CONTEXT

This section assesses the significance of the Project's emissions for purposes of CEQA.

7.1 Threshold 1

Would the Project conflict with or obstruct implementation of the applicable air quality plan?

CARB has developed a three-step approach to determine project conformity with the applicable Air Quality Attainment Plan (AQAP):

1. *Determination that an AQAP is being implemented in the area where the project is being proposed.* SJVAPCD has implemented the current, modified 2016 8-hour AQAP as approved by CARB and approved by USEPA for the 2008 8-hour O3 standard.
2. *The proposed project must be consistent with the growth assumptions of the applicable AQAP.* The Fresno County 2050 growth Projections[83] for the 2018 Public Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS)[84,85] provides for future employment/population factors.
3. *The project must contain in its design all reasonably available and feasible air quality control measures.* The Project incorporates various policy and rule-required implementation measures that would reduce related emissions.

As discussed in **Section 2.3**, SJVAPCD's air quality plans rely on information from CARB and Fresno Council of Governments (Fresno COG) to project future emissions and determine the strategies necessary for the reduction of emissions through regulatory controls. CARB mobile source emission projections and Fresno COG growth projections are based on population, vehicle trends, and land use plans developed by the cities and Fresno County as part of the development of their general plans. As such, projects that propose development that is consistent with the growth anticipated by the general plan(s) would be consistent with the growth projections of the SIP because associated emissions of criteria pollutants in a designated non-attainment area would be accounted for in these air quality plans. If a project proposes development that is greater than anticipated in Fresno COG's growth projections, the project would be in conflict with the regional air quality attainment plans and SIP and could potentially result in a significant air quality impact.

The Project is expected to serve the existing population of the area by providing more convenient access to Costco services, and thus it is not expected to lead to population growth. Therefore, it is consistent with the growth projections developed by Fresno COG for the area. The Project also does not involve a change in land use type that would conflict with that established in the City of Fresno General Plan.

The Project shows conformity with CARB's three step approach and the Project growth was anticipated by the Fresno COG RTP/SCS and incorporated into the AQAP. Implementation of

[83] Fresno County Council of Governments, 2017. Fresno County 2050 Growth Projections. Available at: https://2ave3l244ex63mgdyc1u2mfp-wpengine.netdna-ssl.com/wp-content/uploads/publications/RTP/2018_RTP/Fresno_COG_2050_Projections_Final_Report_050417.pdf. Accessed: February 2022.

[84] Fresno County Council of Governments, 2018. Fresno County 2018 Regional Transportation. Available at: https://www.fresnocog.org/project/regional-transportation-plan-rtp/. Accessed: February 2022.

[85] The 2022 RTP/SCS is in development and 70% complete, but the final adoption is not planned until June 2022.

rule-required measures would ensure that the Project would not obstruct an air quality plan during construction or operation.

7.2 Threshold 2

Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard?

Per **Table 2-2**, the Project region is a designated non-attainment area for ozone (the State 1-hour O_3; federal and State 8-hour O_3) and particulate matter (State PM_{10}; federal and State $PM_{2.5}$). Ozone precursors include VOC and NO_X. As discussed in **Section 4**, estimated emissions for the Project show that the annual emissions for construction (**Table 4-5**) and on-site operations (**Table 4-8a** and **Table 4-8b**) are less than the SJVAPCD significance thresholds for all criteria pollutants. For annual operational criteria air pollutant emissions, the NOx and PM_{10} are above the SJVAPCD significance thresholds prior to compliance with Rule 9510. Through compliance with Rule 9510, the operational PM_{10} and NOx emissions would be below the significance thresholds.

7.3 Threshold 3

Would the Project expose sensitive receptors to substantial pollutant concentrations?

7.3.1 Health Risk Thresholds

The construction-related and operational health risk assessment results were used to assess if the Project would expose off-site receptors to substantial pollutant concentrations. As discussed in **Section 5**, the construction analysis evaluates the health risk resulting from off-road equipment DPM emissions during construction of the Project, as well as the DPM emissions from hauling and vendor trucks. The operational analysis evaluates the health risk resulting from DPM emissions from TRU usage, travel and idling for fuel delivery trucks, warehouse delivery trucks, and MDO delivery trucks, as well as TAC emissions from gasoline transfer and dispensing.

The results of the analyses show that the lifetime cancer risk, HIC, and acute hazard index of the Project-related construction and operational emissions are less than the SJVAPCD significance thresholds (**Table 5-3**).

7.3.2 CO Hotspots

Per **Section 6**, the Project would not result in a CO "hot spot" and a CO "hot spots" analysis is not needed to determine whether the change in the level of service (LOS) of an intersection in the Project area would have the potential to result in exceedances of the CAAQS or NAAQS or expose sensitive receptors to substantial pollutant concentrations.

7.3.3 Health Effects of Criteria Air Pollutants

Significant project criteria air pollutant emissions could potentially lead to increased concentrations of pollutants in the atmosphere and could result in health effects due to the increased emissions. The following section describes the mechanism by which project-related emissions could increase the concentrations of criteria air pollutants in the atmosphere and qualitatively describes the potential health effects.

The ambient concentration of criteria pollutants is a result of complex atmospheric chemistry and emissions of pollutant precursors and direct emissions. NO_X and VOC are precursors to ozone and, and NOx, VOC, and SO_X are precursors to secondarily formed $PM_{2.5}$. Chemical and

physical processes transform some of these precursors to the criteria pollutant concentrations in the atmosphere. The calculation of ozone and secondary $PM_{2.5}$ concentrations resulting from precursors is dependent on the spatial location of the criteria air pollutant emissions and how the emissions are dispersed in the atmosphere. Source apportionment, or the practice of deriving information about pollution sources and the amount they contribute to ambient air pollution levels, is also influenced by the meteorological conditions of the project location.

There are several variables which determine whether emissions of air pollutants from the project move and disperse in the atmosphere in a manner in which concentrations of criteria pollutants would become elevated and result in health impacts. A specific mass of precursor emissions does not equate to an equivalent concentration of the resultant ozone or secondary particulate matter in that area. The resulting concentration of criteria pollutants is influenced by sunlight, other pollutants in the air, complex reactions, and transport. The dispersion is based on the meteorological conditions of the source (the project), local terrain (elevation profile), and the height and size of the source. The surrounding land use, wind direction and wind speed will influence the location where the project emissions disperse. Meteorology, the presence of sunlight, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone or PM formed by emissions of precursors.

The resulting health effects are further based on a complex relationship of multiple variables and factors. The calculated health effects are dependent upon the concentrations of pollutants to which the receptors are exposed, the number and type of exposure pathways for a receptor, and the intake parameters for a receptor, which vary based upon age and sensitivity (i.e. presence of pre-existing conditions). Health effects would be more likely for individuals with greater susceptibility to exposures, and also dependent on the location of receptors relative to the project site impacts whether receptors are exposed to project-related pollutants.

The following is a summary of the health effects from ozone, $PM_{2.5}$ and PM_{10}. Meteorology and terrain play major roles in ozone formation, and ideal conditions occur on days with low wind speeds or stagnant air, warm temperatures, and cloudless skies. Short-term exposures (lasting for a few hours) to ozone at levels typically observed in California can result in health effects. When inhaled, $PM_{2.5}$ and PM_{10} can penetrate the human respiratory system's natural defenses and damage the respiratory tract. $PM_{2.5}$ and PM_{10} can increase the number and severity of asthma attacks and cause or aggravate bronchitis and other lung diseases. Whereas PM_{10} tends to collect in the upper portion of the respiratory system, $PM_{2.5}$ is so tiny that it can penetrate deeper into the lungs and damage lung tissues. Health effects of $PM_{2.5}$ include mortality (all causes), hospital admissions (respiratory, asthma, cardiovascular), emergency room visits (asthma), and acute myocardial infarction (non-fatal). For ozone, the endpoints are mortality, emergency room visits (respiratory) and hospital admissions (respiratory).

For this project, mass emissions for construction are below significance levels. For operation, emissions are also below significance levels for on-site daily emissions. Annual operational emissions are above the significance thresholds for NOx and PM_{10} prior to rule compliance and reduced to below the annual thresholds after rule compliance. The health effects from these emissions have been addressed by the analyses included herein.

The SJVAPCD's Guidance for Assessing and Mitigating Air Quality Impacts establishes thresholds which are based upon scientific data that demonstrate the level of criteria air pollutant emissions that can be accommodated in the San Joaquin Valley without affecting the attainment of the CAAQS and NAAQS. As discussed in **Section 2.3.1**, the CAAQS and NAAQS are set to protect the public health and welfare from the effects of air pollution. Thus, the analyses relative to the SJVAPCD significance thresholds are an indicator for the potential health effects. The District has also adopted health risk thresholds that provide a threshold regarding the potential health effects for air pollutants. The GAMAQI states that "the District has established thresholds of significance for TACs that are extremely conservative and protective of health impacts on sensitive receptors." The CO hotspots analysis further evaluates for health effects based on the CAAQS for CO. The evaluation of the air emissions, which is a measure of potential health effects, are highlighted in **Section 7.1** through **7.3.2**.

7.4 Threshold 4

Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

7.4.1 Odors

According to SJVAPCD's *Guidance for Assessing and Mitigating Air Quality Impacts*, each project that will generate odors should be evaluated to determine the likelihood that it would result in nuisance odors. SJVAPCD recognizes the subjective nature of odor impacts and recommends that each project should be assessed on a "case-by-case" basis, taking into consideration all available pertinent information to qualitatively determine if a significant impact is likely to occur, such as information regarding the characteristics of the buffer zone between the sensitive receptor(s) and the odor source(s), local meteorological conditions, and the nature of the odor source. To facilitate the evaluation of odors, SJVAPCD has produced a list of common types of facilities, along with the distance from the source within which odors could possibly be significant. The list provides a qualitative assessment of a project's potential to adversely affect off-site receptors. The table below presents the list of common facilities and the minimum distance from the source below which the odor impacts may be significant. The Project does not include any uses identified by the SJVAPCD as being associated with odors, and thus the Project would not result in odors adversely affecting a substantial number of people.

SJVAPCD Screening Levels for Potential Odor Sources	
Type of Facility	**Distance**
Wastewater Treatment Facility	2 Miles
Sanitary Landfill	1 Mile
Transfer Station	1 Mile
Composting Facility	1 Mile
Petroleum Refinery	2 Miles
Asphalt Batch Plant	1 Mile
Chemical Manufacturing	1 Mile
Fiberglass Manufacturing	1 Mile

SJVAPCD Screening Levels for Potential Odor Sources	
Type of Facility	**Distance**
Painting/Coating Operations	1 Mile
Food Processing Facility	1 Mile
Feed Lot/Dairy	1 Mile
Rendering Plant	1 Mile

7.4.2 Valley Fever

7.4.2.1 Background

Valley Fever or *coccidioidomycosis* is one of the most studied and oldest known fungal infections. *Coccidioidomycosis* was first discovered in the early 1890s in Domingo Ezcurra, an Argentinean soldier, and in 1900 was established as a fungal disease. After an outbreak in the 1930s in the San Joaquin Valley of California, this disease was given its nickname "San Joaquin Valley Fever," often shortened further to "Valley Fever".[86]

Valley Fever is primarily a disease of the lungs caused by inhalation of spores of the *Coccidioides immitis* fungus. The *Coccidioides* fungus resides in the soil in southwestern United States, northern Mexico, and parts of Central and South America. When weather and moisture conditions are favorable, the fungus "blooms" and forms many tiny spores that lie dormant in the soil. The spores are found in the top few inches of soil, become airborne when the soil is disturbed by wind, vehicles, excavation, or other ground-moving activities, and are subsequently inhaled into the lungs. After the fungal spores have settled in the lungs, they change into a multicellular structure called a spherule. Fungal growth in the lungs occurs as the spherule grows and bursts, releasing endospores, which then develop into more spherules.

Infection occurs when the spores of the fungus become airborne and are inhaled. The fungal spores become airborne when contaminated soil is disturbed by human activities, such as construction and agricultural activities, and natural phenomenon, such as windstorms, dust storms, and earthquakes.

Valley Fever symptoms generally occur within 2-3 weeks of exposure. Approximately 60% of Valley Fever cases are mild and display flu-like symptoms or no symptoms. The remainder developed flu-like symptoms (fatigue, cough, chest pain, fever, rash, headache, and joint aches) that can last for a month and tiredness that can sometimes last for longer than a few weeks. In some cases, painful red bumps may develop. A small percentage of infected persons (<1%) can develop disseminated disease that spreads outside the lungs to the brain, bone, and skin. Without proper treatment, Valley Fever can lead to severe pneumonia, meningitis, and even death. Symptoms may appear 1 to 4 weeks after exposure.

[86] Los Angeles County Department of Health Services. 2004. Coccidioidomycosis: Cases of Valley Fever on the Rise in Southern California. The Public's Health Newsletter for Medical Professionals in Los Angeles County, Volume 4, Number 3. April. Available at: http://www.publichealth.lacounty.gov/media/tph/TPHApril2004.pdf. Accessed: February 2022.

These symptoms are not unique to Valley Fever and may be caused by other illnesses as well. Identifying and confirming this disease requires specific laboratory tests such as: (1) microscopic identification of the fungal spherules in the infected tissue, sputum, or body fluid sample; (2) growing a culture of *Coccidioides immitis* from a tissue specimen, sputum, or body fluid; (3) detection of antibodies (serological tests specifically for Valley Fever) against the fungus in blood serum or other body fluids; and (4) administering the Valley Fever skin test (called coccidioidin or spherulin), which indicates prior exposure to the fungus

Valley Fever is not contagious, and thus cannot be passed from person to person. Most individuals who are infected will recover without treatment within 6 months and will have a life-long immunity to the fungal spores. In severe cases, such as patients with rapid and extensive primary illness, those who are at risk for dissemination of disease, and those who have disseminated disease, antifungal drug therapy is used. Only 1-2% of those exposed who seek medical attention will develop a disease that spreads to other parts of the body other than the lungs. The table below presents infection classifications and normal diagnostic spread as noted in recent research.

Range of Valley Fever Cases[87,88]

Infection Classification	Percent of Total Diagnosed Cases
Asymptomatic infections	60
Infections that resolve spontaneously (with lifelong immunity)	35
Chronic disease or disease disseminated throughout the body	Up to 5
Meningeal infection (affecting brain and/or spinal cord and requiring lifetime treatment)	0.15–0.75

Factors that affect the susceptibility to coccidioidal dissemination are race, sex, pregnancy, age, and immunosuppression. In 2019, there were 9,004 reported Valley Fever cases in California.[89] Consistent with previous years, the highest incidence of Valley fever in 2019 was reported in counties in the Central Valley and Central Coast regions of California, including Kern, Kings, San Luis Obispo, Fresno, Tulare, Madera, and Monterey counties. Of the 9,004 reported cases, 621 were reported for Fresno County.[90] Within Fresno County, elevated

[87] Hector RF, Laniado-Laborin R. 2005. Coccidioidomycosis—A Fungal Disease of the Americas. *PLoS Medicine*. 2005;2(1):e2. doi:10.1371/journal.pmed.0020002. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC545195. Accessed: February 2022.

[88] Saubolle, Michael A., Peter P. McKellar, and Den Sussland. 2007. Epidemiologic, clinical, and diagnostic aspects of coccidioidomycosis. *Journal of clinical microbiology* 45.1: 26-30. Available at: http://jcm.asm.org/content/45/1/26.short. Accessed: February 2022.

[89] California Department of Public Health. 2020. Valley Fever Cases Reach Record High in California in 2019. Available at: https://www.cdph.ca.gov/Programs/OPA/Pages/NR20-321.aspx. Accessed: February 2022.

[90] California Department of Public Health. 2020. Epidemiologic Summary of Valley Fever in California, 2019. https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/CocciEpiSummary2019.pdf. Accessed: February 2022.

areas of Valley Fever activity are known in the western portion, which does not include the City of Fresno.[91]

7.4.2.2 Assessment of Valley Fever Risks

The *Coccidioides immitis* fungus spores found in soil, which are responsible for transmitting the Valley Fever, can disperse in the air when the soil is disturbed during construction activities, and then can be inhaled into the lungs. On-site construction workers potentially could be exposed to Valley Fever from fugitive dust generated during construction of the Project, notably during grading and other earthmoving activities. Construction activities are subject to SJVAPCD Regulation VIII (Fugitive PM_{10} Prohibition). Regulation VIII is intended to reduce ambient concentrations of PM_{10} by requiring actions to prevent, reduce or mitigate anthropogenic fugitive dust emissions. By reducing fugitive dust emissions, Regulation VIII reduces potential exposure to Valley Fever. Since current long-term residents typically already have been exposed to and have developed immunity to Valley Fever, construction activities are not expected to add significantly to exposure of off-site residents to the fungus.

Operation of the Project is not expected to produce significant amounts of fugitive dust. Therefore, operational activities are not expected to add significantly to exposure of off-site residents to the fungus.

[91] Fresno County. Valley Fever in Fresno County. Available at: https://www.co.fresno.ca.us/home/showpublisheddocument/20584/636482356859800000. Accessed: February 2022.

TABLES

Table 2-1. Summary of NAAQS and CAAQS
Costco Commercial Center
Fresno, California

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	-	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM_{10})[9]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		-		
Fine Particulate Matter ($PM_{2.5}$)[9]	24 Hour	-	-	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15.0 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	-	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	-	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		-	-	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	-	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)		Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	-		-	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[11]	-	
	Annual Arithmetic Mean	-		0.030 ppm (for certain areas)[11]	-	
Lead (Pb)[12,13]	30 Day Average	1.5 µg/m^3	Atomic Absorption	-	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Calendar Quarter	-		1.5 µg/m^3 (for certain areas)[12]		
	Rolling 3-Month Average	-		0.15 µg/m^3		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	No National Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Notes:

[1] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[2] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

[3] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Methods specified by the ARB or any equivalent measurement method which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

[5] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[6] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

[7] Reference method as described by the U.S. EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the U.S. EPA.

[8] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

Table 2-1. Summary of NAAQS and CAAQS
Costco Commercial Center
Fresno, California

[9] On December 14, 2012, the national annual PM2.5 primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM10 standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[10] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

[11] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.

[12] The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[13] The national standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

[14] In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Abbreviations:

ARB - Air Resources Board
CAAQS - California Ambient Air Quality Standards
CO - carbon monoxide
lbs - pounds
mg/m^3 - milligrams per cubic meter
NAAQS - National Ambient Air Quality Standards
NO_x - nitrogen oxide compounds (NO + NO_2)
ppm - parts per million
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
U.S. EPA - United States Environmental Protection Agency
µg/m^3 - micrograms per cubic meter
VOC - volatile organic compounds

Table 2-2. SJVAPCD NAAQS and CAAQS Attainment Status
Costco Commercial Center
Fresno, California

Pollutant	Designation/Classification[1]	
	Federal Standards[2]	California Standards[3]
Ozone (1 Hour)	No Federal Standard[4]	Nonattainment/Severe
Ozone (8 Hour)	Nonattainment/Extreme[5]	Nonattainment
Respirable Particulate Matter (PM_{10})	Attainment[6]	Nonattainment
Fine Particulate Matter ($PM_{2.5}$)	Nonattainment[7]	Nonattainment
Carbon Monoxide (CO)	Attainment/Unclassified	Attainment/Unclassified
Nitrogen Dioxide (NO_2)	Attainment/Unclassified	Attainment
Sulfur Dioxide (SO_2)	Attainment/Unclassified	Attainment
Lead (Particulate)	No Designation/Classification	Attainment
Visibility Reducing Particles	No Federal Standard	Unclassified
Sulfates	No Federal Standard	Attainment
Hydrogen Sulfide	No Federal Standard	Unclassified
Vinyl Chloride	No Federal Standard	Attainment

Notes:

[1] See SJVAPCD Attainment Status. Available at: https://www.valleyair.org/aqinfo/attainment.htm. Accessed: September 2021.

[2] See 40 CFR Part 81.

[3] See CCR Title 17 Sections 60200-60210.

[4] Effective June 15, 2005, the U.S. Environmental Protection Agency (EPA) revoked the federal 1-hour ozone standard, including associated designations and classifications. EPA had previously classified the SJVAB as extreme nonattainment for this standard. EPA approved the 2004 Extreme Ozone Attainment Demonstration Plan on March 8, 2010 (effective April 7, 2010). Many applicable requirements for extreme 1-hour ozone nonattainment areas continue to apply to the SJVAB.

[5] Though the Valley was initially classified as serious nonattainment for the 1997 8-hour ozone standard, EPA approved Valley reclassification to extreme nonattainment in the Federal Register on May 5, 2010 (effective June 4, 2010).

[6] On September 25, 2008, EPA redesignated the San Joaquin Valley to attainment for the PM_{10} National Ambient Air Quality Standard (NAAQS) and approved the PM_{10} Maintenance Plan.

[7] The Valley is designated nonattainment for the 1997 $PM_{2.5}$ NAAQS. EPA designated the Valley as nonattainment for the 2006 $PM_{2.5}$ NAAQS on November 13, 2009 (effective December 14, 2009).

Abbreviations:

CAAQS - California Ambient Air Quality Standards
CCR - California Code of Regulations
CFR - Code of Federal Regulations
CO - carbon monoxide
EPA - U.S. Environmental Protection Agency
NAAQS - National Ambient Air Quality Standards
NO_2 - nitrogen dioxide
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
ROG - reactive organic gases
SJVAPCD - San Joaquin Valley Air Pollution Control District
SJVAB - San Joaquin Valley Air Basin
SO_x - sulfur oxide compounds

Table 2-3. Local Ambient Air Quality Data (Fresno County)
Costco Commercial Center
Fresno, California

Pollutant[1,2]	Averaging Time	2017	2018	2019	2020	Most Stringent Ambient Air Quality Standard[3]	Monitoring Station
Ozone	1 hour	0.128 ppm	0.100 ppm	0.097 ppm	0.116 ppm	0.09 ppm (State)	Fresno - Sierra Skypark #2
	8 hours	0.107 ppm	0.087 ppm	0.084 ppm	0.096 ppm	0.070 ppm (State/National)	
PM_{10}	24 hours	153.6 µg/m^3	136.2 µg/m^3	334.9 µg/m^3	283.7 µg/m^3	50 µg/m^3 (State)	Fresno - Garland
	Annual	39.4 µg/m^3	40.6 µg/m^3	35.9 µg/m^3	48.4 µg/m^3	20 µg/m^3 (State)	
$PM_{2.5}$	24 hours	86 µg/m^3	95.7 µg/m^3	51.3 µg/m^3	163.2 µg/m^3	35 µg/m^3 (National)	Fresno - Garland
	Annual	14.8 µg/m^3	16.2 µg/m^3	11.1 µg/m^3	163.2 µg/m^3	12 µg/m^3 (National)	
SO_2	1 hour	7.7 ppb	7.2 ppb	8.9 ppb	16.2 ppb	75 ppb (National)	Fresno - First Street
	24 hours	2.3 ppb	2.6 ppb	2.1 ppb	2.2 ppb	140 ppb (National)	
NO_2	1 hour	51 ppb	43 ppb	41 ppb	43 ppb	100 ppb (National)	Fresno - Sierra Skypark #2
	Annual	7.21 ppb	7.93 ppb	6.98 ppb	7.5 ppb	30 ppb (State)	
CO	1 hour	2.3 ppb	2.1 ppb	1.9 ppb	5 ppb	20 (State)	Fresno - First Street
	8 hours	1.9 ppb	2 ppb	1.5 ppb	2.5 ppb	9.0 (State)	

Notes:

[1] Ozone, PM_{10}, $PM_{2.5}$ data obtained from CARB iDAM: Air Quality Data Statistics. Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. Available at: https://www.arb.ca.gov/adam/select8/sc8start.php.

[2] SO_2, NO_2, and CO data obtained from EPA AirData. Available at: https://www.epa.gov/outdoor-air-quality-data/monitor-values-report. Accessed: September 2021.

[3] Most Stringent Ambient Air Quality Standard obtained from the table of ambient air quality standards available at: https://ww2.arb.ca.gov/sites/default/files/2020-07/aaqs2.pdf. Accessed: September 2021.

Abbreviations:

CARB - California Air Resources Board
CO - carbon monoxide
EPA - Environmental Protection Agency
NO_2 - nitrogen dioxide
ppb - parts per billion
ppm - parts per million
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
SO_2 - sulfur dioxide
µg/m^3 - micrograms per cubic meter

Table 2-4. Frequency of Air Quality Standard Violations
Costco Commercial Center
Fresno, California

Monitoring Site	Year	Number of Days Exceeding Standard[1,2]					
		National 24-Hour PM_{10}	State 24-Hour PM_{10}	National 24-Hour $PM_{2.5}$	State 1-Hour O_3	State 8-Hour O_3	National 8-Hour O_3
Fresno-Sierra Skypark #2 (O3); Fresno-Garland (PM2.5, PM10)	2017	1	97	31	6	46	44
	2018	0	103	36	4	30	27
	2019	3	73	10	2	9	9
	2020	14	100	45	8	19	18

Notes:

[1] * = There was insufficient (or no) data available to determine the value.

[2] Ozone, PM_{10}, $PM_{2.5}$ data obtained from CARB iDAM: Air Quality Data Statistics. Daily exceedances for particulate matter are estimated days because PM_{10} and $PM_{2.5}$ are not monitored daily. Available at: https://arb.ca.gov/adam/select8/sc8start.php. Accessed: September 2021.

Abbreviations:

CARB - California Air Resources Board

O_3 - ozone

PM_{10} - particulate matter less than 10 microns in diameter

$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter

Table 3-1. SJVAPCD Air Quality Significance Thresholds
Costco Commercial Center
Fresno, California

Criteria Air Pollutant Annual Thresholds (tons/year)[1]			
		Operation	
Pollutant	Construction	Permitted Equipment and Activities	Non-Permitted Equipment and Activities
NO_X	10	10	10
VOC	10	10	10
PM_{10}	15	15	15
$PM_{2.5}$	15	15	15
SO_X	27	27	27
CO	100	100	100
Toxic Air Contaminants (TACs) Thresholds[2]			
Carcinogens	Maximum Exposed Individual Cancer Risk ≥ 20 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)		
Non-Carcinogens	Acute: Hazard Index equals or exceeds 1 for the Maximally Exposed Individual		
	Chronic: Hazard Index equals or exceeds 1 for the Maximally Exposed Individual		

Source:

[1] SJVAPCD. San Joaquin Valley Air Pollution Control District Air Quality Thresholds of Significance - Criteria Pollutants. Available at: http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf. Accessed: January 2022.

[2] SJVAPCD. San Joaquin Valley Air Pollution Control District Air Quality Thresholds of Significance - Toxic Air Contaminants. Available at: http://www.valleyair.org/transportation/0714-GAMAQI-TACs-Thresholds-of-Significance.pdf. Accessed: January 2022.

Abbreviations:

$\mu g/m^3$ - micrograms per cubic meter
CO - carbon monoxide
CO_2e - carbon dioxide equivalents
GHG - greenhouse gases
lbs - pounds
MT - metric ton
NO_2 - nitrogen dioxide
NOx - nitrogen oxides
PM_{10} - respirable particulate matter
$PM_{2.5}$ - fine particulate matter
ppm - parts per million
SJVAPCD - San Joaquin Valley Air Pollution Control District
SO_2 - sulfur dioxide
SO_x - sulfur oxides
TACs - toxic air contaminants
VOC - volatile organic compounds
yr - year

Table 4-1. Construction Schedule
Costco Commercial Center
Fresno, California

CalEEMod® Phase Type[1]	Start Date[1]	End Date[1]	Phase Duration[2] (days)
Demolition	5/1/2023	5/8/2023	7
Site Preparation	5/1/2023	5/8/2023	7
Grading	5/9/2023	6/12/2023	30
Grading/BC Overlap	6/13/2023	7/5/2023	20
Building Construction	7/6/2023	11/10/2023	110
Paving	7/29/2023	9/13/2023	40
Architectural Coating	9/14/2023	11/10/2023	50

Notes:
[1] Construction phases and duration are based on Project-specific estimates.
[2] The construction work week was assumed to be 6 days per week.

Abbreviations:
CalEEMod® - California Emissions Estimator Model

Table 4-2. Construction Equipment
Costco Commercial Center
Fresno, California

Phase Name	Offroad Equipment Type[1]	Number of Equipment[1]	Usage Hours[2] (hours/day)	Equipment Horsepower[2] (hp)	Equipment Load Factor[2]
Demolition	Concrete/Industrial Saws	1	8	81	0.73
	Excavators	3	8	158	0.38
	Rubber Tired Dozers	2	8	247	0.4
Site Preparation	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Graders	3	8	187	0.41
	Other Construction Equipment	2	8	401	0.42
	Paving Equipment	1	8	132	0.36
	Rubber Tired Dozers	4	8	247	0.4
	Scrapers	2	8	367	0.48
	Surfacing Equipment	1	8	263	0.3
	Tractors/Loaders/Backhoes	2	8	97	0.37
Grading/BC Overlap	Excavators	3	8	158	0.38
	Rough Terrain Forklifts	2	8	100	0.4
	Rubber Tired Dozers	3	8	247	0.4
	Tractors/Loaders/Backhoes	3	8	97	0.37
Building Construction	Excavators	3	8	158	0.38
	Rough Terrain Forklifts	2	8	100	0.4
	Rubber Tired Dozers	3	8	247	0.4
	Tractors/Loaders/Backhoes	3	7	97	0.37
Paving	Rough Terrain Forklifts	1	8	100	0.4
	Rubber Tired Dozers	2	8	247	0.4
	Tractors/Loaders/Backhoes	2	8	97	0.37
Architectural Coating	Air Compressors	1	6	78	0.48

Notes:

[1] Number and type of offroad equipment for the Grading, Grading/BC Overlap, Building Construction, and Paving phases based on Project-specific data. Equipment used in the Demolition and Architectural Coating phases are based on CalEEMod® default values.

[2] Equipment usage hours, horsepower, and load factor are based on CalEEMod® defaults, with the exception of the horsepower value for "Other Construction Equipment" during the Grading phase. The "Other Construction Equipment" represents soil compactors and is based is based on project-specific data.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

hp - horsepower

Table 4-3. Construction Material Movement
Costco Commercial Center
Fresno, California

Phase Name	Material Imported[1] (yd^3)	Material Exported[1] (yd^3)
Grading	60,000	0
Grading/BC Overlap	0	3,000

Notes:

[1] Soil import and export quantities based on project-specific data.

Abbreviations:

yd^3 - cubic yard

Table 4-4. Construction Demolition Assumptions
Costco Commercial Center
Fresno, California

Phase Name	Size Metric	Unit Amount[1]
Demolition/Site Prep	Tons of Debris	10

Notes:

[1] Square-footage quantity based on project-specific data.

Table 4-5. Annual and Daily Criteria Air Pollutant Emission Estimates for Project Construction
Costco Commercial Center
Fresno, California

Scenario	Annual Criteria Air Pollutant Emission Estimates[1] (tons/year)						Daily Criteria Air Pollutant Emission Estimates[1] (pounds/day)					
	VOC[2]	**NO_x**	**CO**	**SO_x[3]**	**PM_{10}**	**$PM_{2.5}$**	**VOC[2]**	**NO_x**	**CO**	**SO_x[3]**	**PM_{10}**	**$PM_{2.5}$**
Project Construction[4]	2.1	3.9	4.6	0.01	0.6	0.2	11.3	21.4	25.4	0.1	3.3	1.3
SJVAPCD Significance Thresholds[5]	**10**	**10**	**100**	**27**	**15**	**15**	100	100	100	100	100	100
Exceeds Threshold for any Year of Construction?	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO

Notes:

[1] Total emissions for project construction were estimated using CalEEMod® (see Appendix A). Total construction emissions include construction of the fuel station, warehouse, car wash, and parking lot.

[2] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[3] For purposes of this analysis SO_X emissions are assumed to be equal to SO_2.

[4] Construction emissions assume watering control consistent with SJVAPCD Rule 8021. Construction equipment greater than 50 hp used at the site shall meet USEPA Tier 3 emission standards for PM_{10} and $PM_{2.5}$ and include particulate matter emissions control equivalent to CARB Level 3 verifiable diesel emission control devices.

[5] SJVAPCD Air Quality Significance Thresholds. Available at http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf. Accessed: January 2022.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CARB - California Air Resources Board
CO - carbon monoxide
lbs - pounds
NO_x - nitrogen oxide compounds (NO + NO_2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SJVAPCD - San Joaquin Valley Air Pollution Control District
SO_2 - sulfur dioxide
SO_x - sulfur oxide compounds
USEPA - United States Environmental Protection Agency
VOC - volatile organic compounds

Table 4-6. Gasoline Dispensing Facility Operational VOC Emissions
Costco Commercial Center
Fresno, California

Scenario	VOC Emission Factor[1] (lb/1,000 gallons)						Emissions[2] (tons/year)
	Loading	Breathing	Refueling	Hose Permeation	Spillage	Total	
Herndon/Riverside	0.15	0.024	0.356	0.009	0.24	**0.779**	**9.9**

Notes:

[1] Emission factors obtained from SJVAPCD staff via email on October 13, 2021 for EVR Phase I and EVR Phase II Installed Underground Tank.

[2] Herndon/Riverside emissions are estimated using a throughput of 25.5 million gallons/year.

Abbreviations:

EVR - enhanced vapor recovery

lb - pounds

SJVAPCD - San Joaquin Valley Air Pollution Control District

VOC - volatile organic compounds

Table 4-7. TRU Criteria Air Pollutant Emission Calculations
Costco Commercial Center
Fresno, California

Emission Factor[1,2] (g/bhp-hr)	VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
	2.52	2.12	0.32	0.002	0.06	0.06

Scenario	Number of Round Trips with TRUs[3]	Annual Average TRU Emissions (tons/year)					
		VOC	NOx	CO	SO_x	PM_{10}	$PM_{2.5}$
Herndon/Riverside	712	0.39	0.33	0.05	0.000	0.009	0.009

Notes:

[1] Emission factors obtained from OFFROAD2021 emissions output for Calendar Year 2023, Transportation Refrigeration Unit - Instate Trailer and Transportation Refrigeration Unit - Out-Of-State Trailer in Fresno County.

[2] SO_X emission factors based on sulfur content of ultra-low sulfur diesel fuel (15 ppm) and fuel consumption from OFFROAD2021.

[3] Approximately 15% of warehouse delivery trucks are equipped with TRUs.

[4] Horsepower is based on SJVAPCD Guidance for Air Dispersion Modeling, section 2.3.1 Transportation Refrigeration unit (TRU), Modeling Parameters.

[5] Load factor obtained from CARB Draft 2019 Update to Emissions Inventory for Transport Refrigeration Units, for TRUs Over 25 hp, 2013 and newer. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/cold-storage/documents/hra_emissioninventory2019.pdf. Accessed: January 2022.

[6] TRU Cycle Duration is based on 2 hours of off-site loading time plus the duration of the on-site and off-site transit. It is assumed that loading/unloading will occur while the TRU is plugged in, so no emissions are estimated for this time period. Assumptions based on Table II.G.1 of CARB Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate. Available at: https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/appi.pdf. Accessed: May 2022.

Abbreviations:

CARB - California Air Resources Board
CO - carbon dioxide
NOx - oxides of nitrogen
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
ppm - parts per million
SJVAPCD - San Joaquin Valley Air Pollution Control District
SOx - sulfur oxide compounds
TRU - transportation refrigeration unit
VOCs - Volatile Organic Compounds

Constants:

Horsepower [4]	50	bhp
Load Factor [5]	0.38	
TRU Cycle Duration [6]	622	minutes
Fuel Consumption[2]	0.040	gal/hp-hr
Fuel Sulfur Content[2]	15	ppm
Density of Diesel	3,221	g/gal

Conversion Factors:

453.592	g/lb
1000000	g/MT
60	min/hr
365	day/year
2000	lb/ton

Table 4-8a. Annual Criteria Air Pollutant Emission Estimates for Project Operation
Costco Commercial Center
Fresno, California

Emission Category	Annual Criteria Air Pollutant Emission Estimates[1] (tons/year)					
	VOC[2]	**NO_x**	**CO**	**SO_x[3]**	**PM_{10}**	**$PM_{2.5}$**
Permitted						
Gasoline Dispensing Facility	9.9	--	--	--	--	--
Permitted Total	**9.9**	--	--	--	--	--
SJVAPCD Significance Thresholds[4]	**10**	**10**	**100**	**27**	**15**	**15**
Exceeds Threshold?	NO	--	--	--	--	--
Non-permitted						
Area[5]	0.95	0.00	0.01	0.00	0.00	0.00
Energy[5]	0.01	0.13	0.11	0.00	0.01	0.01
Mobile[6]	8.6	11.8	81.3	0.2	18.1	4.6
Non-permitted Total	**9.5**	**11.9**	**81.4**	**0.2**	**18.1**	**4.6**
SJVAPCD Significance Thresholds[4]	**10**	**10**	**100**	**27**	**15**	**15**
Exceeds Threshold?	NO	YES	NO	NO	YES	NO
Annual Emissions Reduction from Rule 9510 Compliance[7]	--	-3.0	--	--	-9.1	--
Non-permitted Total with Rule Compliance[8]	**9.5**	**8.9**	**81.4**	**0.2**	**9.1**	**4.6**
Exceeds Threshold?	NO	NO	NO	NO	NO	NO

Notes:

[1] Emissions totals may not add up due to rounding. Emissions shown as zero may be non-zero values; however, they are below a meaningful reporting level for this analysis.

[2] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[3] For purposes of this analysis SO_x emissions are assumed to be equal to SO_2.

[4] SJVAPCD Air Quality Significance Thresholds. Available at http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf. Accessed: January 2022.

[5] Total area and energy emissions were estimated using CalEEMod® (see Appendix A).

[6] Total mobile emissions include emissions from on-road vehicles and TRUs. On-road mobile emissions were estimated using CalEEMod® default trip lengths, EMFAC2021 emission factors, and Project-specific vehicle trip rates provided by Kittelson & Associates, See Appendix B for details. TRU emissions were estimated using OFFROAD2021 emission factors.

[7] The annual emissions reductions from Rule 9510 compliance for NOx and PM_{10} are calculated using the SJVAPCD Indirect Source Rule Fee Estimator available at: https://ww2.valleyair.org/media/q2jdhwze/fee-estimator.xlsm. Accessed: February 2023.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
EMFAC - EMission FACtors model
lbs - pounds
NO_x - nitrogen oxide compounds (NO + NO_2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SJVAPCD - San Joaquin Valley Air Pollution Control District
SO_2 - sulfur dioxide
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

Table 4-8b. On-Site Daily Criteria Air Pollutant Emission Estimates for Project Operation
Costco Commercial Center
Fresno, California

Emission Category	On-Site Daily Criteria Air Pollutant Emission Estimates[1]					
	VOC[2]	NO_x	CO	SO_x[3]	PM_{10}	$PM_{2.5}$
	(lbs/day)					
Permitted On-Site						
Gasoline Dispensing Facility[4]	54.4	--	--	--	--	--
Total Daily Permitted On-Site Emissions (lb/day)	**54.4**	--	--	--	--	--
SJVAPCD Significance Thresholds[5]	**100**	**100**	**100**	**100**	**100**	**100**
Exceeds Threshold?	NO	--	--	--	--	--
Non-permitted On-Site						
Area[6]	5.19	0.00	0.06	0.00	0.00	0.00
Energy[6]	0.08	0.74	0.62	0.00	0.06	0.06
Mobile on-road	12.0	9.1	97.6	0.1	0.2	0.1
Mobile TRU Emissions	0.01	0.01	0.00	0.00	0.00	0.00
Mobile[7]	12.0	9.1	97.6	0.1	0.2	0.1
Total Daily Non-permitted On-Site Emissions (lb/day)	**17.3**	**9.8**	**98.3**	**0.1**	**0.3**	**0.2**
SJVAPCD Significance Thresholds[5]	**100**	**100**	**100**	**100**	**100**	**100**
Exceeds Threshold?	NO	NO	NO	NO	NO	NO

Notes:

[1] Emissions totals may not add up due to rounding. Emissions shown as zero may be non-zero values; however, they are below a meaningful reporting level for this analysis.

[2] For purposes of this analysis VOC emissions are assumed to be equal to ROG.

[3] For purposes of this analysis SO_X emissions are assumed to be equal to SO_2.

[4] The gasoline dispensing facility VOC emissions are for the Herndon/Riverside facility.

[5] SJVAPCD Air Quality Significance Thresholds. Available at http://www.valleyair.org/transportation/0714-GAMAQI-Criteria-Pollutant-Thresholds-of-Significance.pdf. Accessed: January 2022.

[6] Total area and energy emissions were estimated using CalEEMod® (see Appendix A).

[7] Total mobile emissions include emissions from on-road vehicles and TRUs. On-road mobile emissions were estimated using CalEEMod® default trip lengths, EMFAC2021 emission factors, and Project-specific vehicle trip rates provided by Kittelson & Associates, See Appendix B for details. TRU emissions were estimated using OFFROAD2021 emission factors.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CO - carbon monoxide
EMFAC - EMission FACtors model
lbs - pounds
NO_x - nitrogen oxide compounds (NO + NO_2)
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SJVAPCD - San Joaquin Valley Air Pollution Control District
SO_2 - sulfur dioxide
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

Table 5-1. HARP Health Risk Assessment Options for Construction HRA
Costco Commercial Center
Fresno, California

HARP2 Risk Analyses Screen/ Option Title		Options Chosen[1]				
		Residential Cancer Risk Run	**Residential Chronic Risk Run**	**Worker Cancer Risk Run**	**Worker Chronic Risk Run**	**Acute Risk Run**
Select Risk Scenario	Analysis Type	Cancer Risk	Chronic Risk (Non-cancer)	Cancer Risk	Chronic Risk (Non-cancer)	Acute Risk (Non-cancer)
	Receptor Type	Individual Resident		Worker		N/A
	Exposure Duration[2]	0.53-Year (0 start age)	N/A	0.53-Year (16 start age)	N/A	N/A
	Intake Rate Percentile	95th percentile (High End)	95th percentile (High End)	95th percentile (High End)		N/A
Select Pathways to Evaluate	Tab "Pathways to Evaluate"	User Defined		Select "Worker Pathways"		Default Inhalation Only Pathway
		Select deposition rate of 0.05 m/s		Select deposition rate of 0.05 m/s		
	Tab "Inh"	Uncheck "Apply fraction of time spent at home (FAH) to ages greater than or equal to 16 years"		Check box "Use Adjustment Factors" with WAF = 1.87[3]		Use Defaults (No Change)
	Tab "Soil"	Use Defaults (No Change)		Use Defaults (No Change)		N/A
	Tab "Derm"	Warm Climate		Warm Climate		N/A
	Tab "MMlk"	Use Defaults (No Change)		N/A	N/A	N/A
	Tab "HG Produce"	Use Defaults (No Change)		N/A	N/A	N/A
	Tab "Pig, Chicken, & Egg"	Use Defaults (No Change)		N/A	N/A	N/A

Notes:

[1] Options were chosen based on SJVAPCD's Draft HRA Guidance provided to Ramboll by Kyle Melching (SJVAPCD) on August 4, 2021.

[2] Exposure duration was set to 0.53 years to reflect the duration of construction activity (i.e. 193 days).

[3] Annual concentration adjustment factor for worker is set based on a construction schedule of 7:00 AM to 10:00 PM, 6 days a week.

Abbreviations:

ADMRT - Air Dispersion Modeling and Risk Tool
HARP - Hotspots Analysis and Reporting Program
N/A - not applicable
SJVAPCD - San Joaquin Valley Air Pollution Control District

Table 5-2. HARP Health Risk Assessment Options for Operational HRA
Costco Commercial Center
Fresno, California

HARP2 Risk Analyses Screen/ Option Title		Options Chosen[1]			
		Residential Cancer Risk Run	**Residential Chronic Risk Run**	**Worker Cancer Risk Run**	**Worker Chronic Risk Run**
Select Risk Scenario	Analysis Type	Cancer Risk	Chronic Risk (Non-cancer)	Cancer Risk	Chronic Risk (Non-cancer)
	Receptor Type	Individual Resident		Worker	
	Exposure Duration[2]	69.47-Year	N/A	39.47-Year (16.53 start age)	N/A
	Intake Rate Percentile	95th percentile (High End)		95th percentile (High End)	
Select Pathways to Evaluate	Tab "Pathways to Evaluate"	User Defined		Select "Worker Pathways"	
		Select deposition rate of 0.05 m/s		Select deposition rate of 0.05 m/s	
	Tab "Inh"	Uncheck "Apply fraction of time spent at home (FAH) to ages greater than or equal to 16 years"		Check box "Use Adjustment Factors" with worker adjustment factor (WAF) = 1.5[3]	
	Tab "Soil"	Use Defaults (No Change)		Use Defaults (No Change)	
	Tab "Derm"	Warm Climate		Warm Climate	
	Tab "MMlk"	Use Defaults (No Change)		N/A	N/A
	Tab "HG Produce"	Use Defaults (No Change)		N/A	N/A
	Tab "Pig, Chicken, & Egg"	Use Defaults (No Change)		N/A	N/A

Notes:

[1] Options were chosen based on SJVAPCD's Draft HRA Guidance provided to Ramboll by Kyle Melching (SJVAPCD) on August 4, 2021.

[2] Exposure duration reflects the start of Project operation after a 0.53-year construction duration.

[3] Annual concentration adjustment factor for workers is set based on Costco general operating hours of 16 hours per day and 7 days a week.

Abbreviations:

ADMRT - Air Dispersion Modeling and Risk Tool
HARP - Hotspots Analysis and Reporting Program
HRA - health risk assessment
N/A - not applicable
SJVAPCD - San Joaquin Valley Air Pollution Control District

Table 5-3. Health Risk Assessment Results
Costco Commercial Center
Fresno, California

Receptor Type	Maximum Estimated Cancer Risk (in a million)	Maximum Estimated Chronic Hazard Index	Maximum Estimated Acute Hazard Index
Project Construction			
Residential	1.3	0.00	0.00
Sensitive	0.2	0.00	0.00
Worker	0.0	0.00	0.00
Project Operational			
Residential	5.1	0.01	0.14
Sensitive	0.8	0.00	0.02
Worker	3.4	0.07	0.52
Total Health Risk[1,2]			
Residential	6.4	0.01	0.14
Sensitive	1.0	0.00	0.02
Worker	3.4	0.07	0.52
SJVAPCD Threshold[3]	20	1	1

Notes:

[1] Total cancer risk and chronic hazard index values are provided relative to the maximally impacted receptors from Project operation.

[2] Acute health hazard index is provided as a maximum of construction and operational values. These values are not additive due to the short-term risk impacts.

[3] SJVAPCD CEQA Thresholds of Significance. Available at: http://www.valleyair.org/transportation/0714-GAMAQI-TACs-Thresholds-of-Significance.pdf. Accessed: July 2022.

Abbreviations:

CEQA - California Environmental Quality Act

SJVAPCD - San Joaquin Valley Air Pollution Control District

FIGURES

Site Boundary
Construction Trucks
Construction Offroad Equipment

0 500 1,000 Feet

MODELED CONSTRUCTION EMISSION SOURCES

Costco Commercial Center
Fresno, California

FIGURE 1

RAMBOLL US Consulting
A RAMBOLL COMPANY

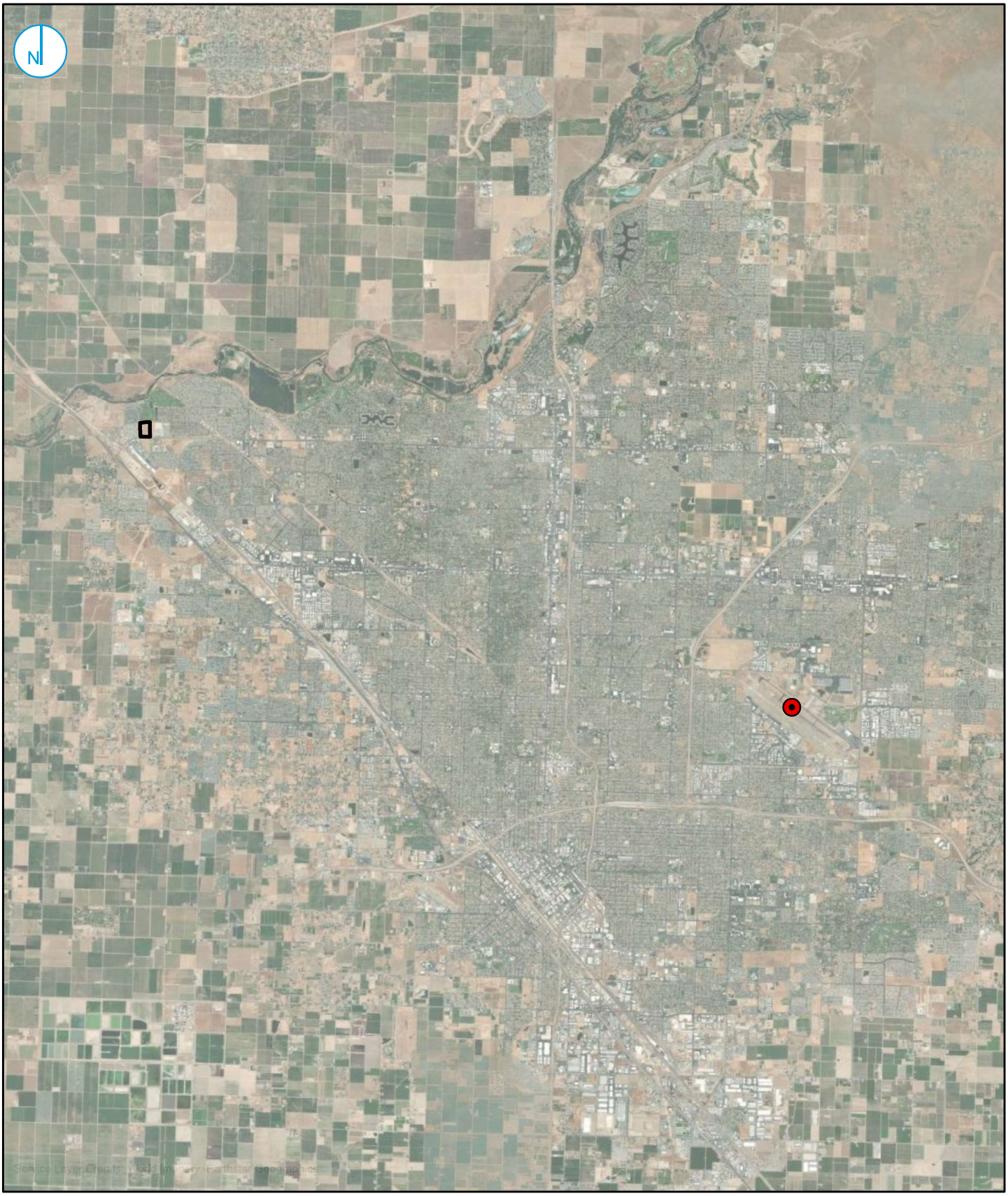
RAMBOLL

MODELED OPERATIONAL EMISSION SOURCES

Costco Commercial Center
Fresno, California

FIGURE 2

RAMBOLL US Consulting
A RAMBOLL COMPANY



Site Boundary

Meteorological Station

0 500 1,000 Feet

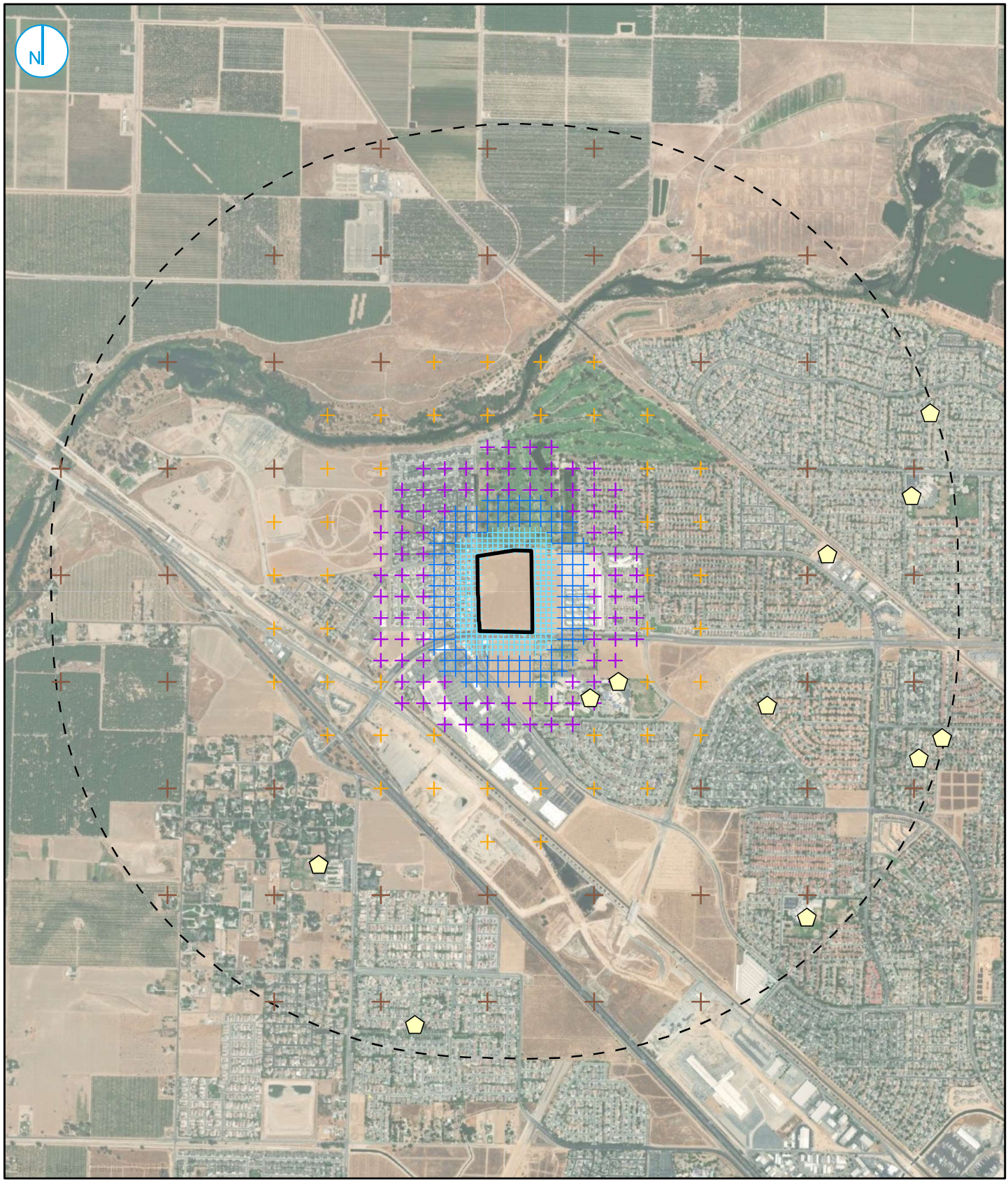
METEOROLOGICAL STATION LOCATION

FIGURE 3

Costco Commercial Center
Fresno, California

RAMBOLL US Consulting
A RAMBOLL COMPANY

RAMBOLL



MODELED GRID AND SENSITIVE RECEPTORS

Costco Commercial Center
Fresno, California

FIGURE 4

RAMBOLL US Consulting
A RAMBOLL COMPANY

RAMBOLL

APPENDIX A
CALEEMOD® OUTPUT

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Costco Fresno Mitigated Construction Run

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	889.00	Space	15.55	355,600.00	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Gasoline/Service Station	32.00	Pump	1.33	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	191.61	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific information (RPS Emission Factor)

Land Use - Project-specific information

Construction Phase - Project-specific information

Off-road Equipment -

Off-road Equipment - Project-specific information

Off-road Equipment -

Off-road Equipment - Project-specific information

Off-road Equipment - Project-specific information

Off-road Equipment - Project-specific information

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Off-road Equipment -

Trips and VMT - Project-specific information

Demolition - Project-specific information

Grading - Project-specific information

Vehicle Trips - Unmitigated Construction Run

Consumer Products - Unmitigated Construction Run

Area Coating - Unmitigated Construction Run

Landscape Equipment - Unmitigated Construction Run

Energy Use - Unmitigated Construction Run

Water And Wastewater - Unmitigated Construction Run

Solid Waste - Unmitigated Construction Run

Construction Off-road Equipment Mitigation - Water 2x/day to comply with SJVAPCD Rule 8021. All construction equipment >50 hp mitigated to Tier 3 + Level 3 DPF.

Vehicle Emission Factors -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	125329	0
tblAreaCoating	Area_Nonresidential_Interior	375986	0
tblAreaCoating	Area_Parking	21336	0
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	50.00
tblConstructionPhase	NumDays	370.00	110.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	35.00	30.00

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	35.00	20.00
tblConstructionPhase	NumDays	20.00	40.00
tblConstructionPhase	NumDays	10.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	4/11/2025	11/10/2023
tblConstructionPhase	PhaseEndDate	2/14/2025	11/10/2023
tblConstructionPhase	PhaseEndDate	5/26/2023	5/8/2023
tblConstructionPhase	PhaseEndDate	7/28/2023	6/12/2023
tblConstructionPhase	PhaseEndDate	9/15/2023	7/5/2023
tblConstructionPhase	PhaseEndDate	3/14/2025	9/13/2023
tblConstructionPhase	PhaseEndDate	6/9/2023	5/8/2023
tblConstructionPhase	PhaseStartDate	3/15/2025	9/14/2023
tblConstructionPhase	PhaseStartDate	9/16/2023	7/6/2023
tblConstructionPhase	PhaseStartDate	6/10/2023	5/9/2023
tblConstructionPhase	PhaseStartDate	7/29/2023	6/13/2023
tblConstructionPhase	PhaseStartDate	2/15/2025	7/29/2023
tblConstructionPhase	PhaseStartDate	5/27/2023	5/1/2023
tblConsumerProducts	ROG_EF	2.14E-05	0
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblConsumerProducts	ROG_EF_PesticidesFertilizers	5.152E-08	0
tblEnergyUse	LightingElect	2.70	0.00
tblEnergyUse	LightingElect	3.71	0.00
tblEnergyUse	LightingElect	2.70	0.00

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24E	2.30	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	NT24NG	2.08	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24E	1.91	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24NG	16.86	0.00
tblEnergyUse	T24NG	8.53	0.00
tblEnergyUse	T24NG	16.86	0.00
tblGrading	MaterialExported	0.00	3,000.00
tblGrading	MaterialImported	0.00	60,000.00
tblLandscapeEquipment	NumberSummerDays	180	0
tblLandUse	LotAcreage	8.00	15.55
tblLandUse	LotAcreage	0.10	1.33
tblOffRoadEquipment	HorsePower	172.00	401.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblProjectCharacteristics	CO2IntensityFactor	203.98	191.61
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	18.34	0.00
tblSolidWaste	SolidWasteGenerationRate	1,037.93	0.00
tblSolidWaste	SolidWasteGenerationRate	17.25	0.00

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblTripsAndVMT	HaulingTripNumber	1.00	2.00
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00
tblWater	IndoorWaterUseRate	451,589.32	0.00
tblWater	IndoorWaterUseRate	17,876,662.33	0.00
tblWater	IndoorWaterUseRate	425,020.45	0.00
tblWater	OutdoorWaterUseRate	276,780.55	0.00
tblWater	OutdoorWaterUseRate	10,956,664.01	0.00
tblWater	OutdoorWaterUseRate	260,496.40	0.00

2.0 Emissions Summary

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	2.2806	4.5511	3.7117	0.0113	0.9356	0.1729	1.1085	0.3872	0.1595	0.5467	0.0000	1,026.9395	1,026.9395	0.1854	0.0533	1,047.4410
Maximum	**2.2806**	**4.5511**	**3.7117**	**0.0113**	**0.9356**	**0.1729**	**1.1085**	**0.3872**	**0.1595**	**0.5467**	**0.0000**	**1,026.9395**	**1,026.9395**	**0.1854**	**0.0533**	**1,047.4410**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	2.0686	3.9074	4.6415	0.0113	0.5786	0.0294	0.6080	0.2169	0.0291	0.2459	0.0000	1,026.9388	1,026.9388	0.1854	0.0533	1,047.4403
Maximum	**2.0686**	**3.9074**	**4.6415**	**0.0113**	**0.5786**	**0.0294**	**0.6080**	**0.2169**	**0.0291**	**0.2459**	**0.0000**	**1,026.9388**	**1,026.9388**	**0.1854**	**0.0533**	**1,047.4403**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**9.30**	**14.14**	**-25.05**	**0.00**	**38.16**	**82.99**	**45.15**	**43.99**	**81.76**	**55.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	5-1-2023	7-31-2023	3.2883	2.7515
2	8-1-2023	9-30-2023	2.0410	1.7429
		Highest	3.2883	2.7515

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2023	5/8/2023	6	7	
2	Site Preparation	Site Preparation	5/1/2023	5/8/2023	6	7	
3	Grading	Grading	5/9/2023	6/12/2023	6	30	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4	Grading/BC Overlap	Grading	6/13/2023	7/5/2023	6	20	
5	Building Construction	Building Construction	7/6/2023	11/10/2023	6	110	
6	Paving	Paving	7/29/2023	9/13/2023	6	40	
7	Architectural Coating	Architectural Coating	9/14/2023	11/10/2023	6	50	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 165

Acres of Paving: 15.55

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 375,986; Non-Residential Outdoor: 125,329; Striped Parking Area: 21,336 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Graders	3	8.00	187	0.41
Grading	Other Construction Equipment	2	8.00	401	0.42
Grading	Paving Equipment	1	8.00	132	0.36
Grading	Rubber Tired Dozers	4	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Surfacing Equipment	1	8.00	263	0.30
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading/BC Overlap	Excavators	3	8.00	158	0.38
Grading/BC Overlap	Rough Terrain Forklifts	2	8.00	100	0.40
Grading/BC Overlap	Rubber Tired Dozers	3	8.00	247	0.40
Grading/BC Overlap	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Excavators	3	8.00	158	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Building Construction	Rough Terrain Forklifts	2	8.00	100	0.40
Building Construction	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Paving	Rough Terrain Forklifts	1	8.00	100	0.40
Paving	Rubber Tired Dozers	2	8.00	247	0.40
Paving	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	2.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	15	38.00	0.00	7,500.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading/BC Overlap	11	28.00	0.00	375.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	11	230.00	99.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	46.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1000e-004	0.0000	1.1000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9400e-003	0.0752	0.0688	1.4000e-004		3.4900e-003	3.4900e-003		3.2500e-003	3.2500e-003	0.0000	11.8972	11.8972	3.3300e-003	0.0000	11.9805
Total	**7.9400e-003**	**0.0752**	**0.0688**	**1.4000e-004**	**1.1000e-004**	**3.4900e-003**	**3.6000e-003**	**2.0000e-005**	**3.2500e-003**	**3.2700e-003**	**0.0000**	**11.8972**	**11.8972**	**3.3300e-003**	**0.0000**	**11.9805**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	3.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0567	0.0567	0.0000	1.0000e-005	0.0593
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.5000e-004	0.0000	6.6000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5083	0.5083	1.0000e-005	1.0000e-005	0.5126
Total	**2.1000e-004**	**2.8000e-004**	**1.8000e-003**	**1.0000e-005**	**6.7000e-004**	**0.0000**	**6.8000e-004**	**1.7000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5650**	**0.5650**	**1.0000e-005**	**2.0000e-005**	**0.5719**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.2400e-003	0.0641	0.0864	1.4000e-004		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004	0.0000	11.8972	11.8972	3.3300e-003	0.0000	11.9805
Total	**3.2400e-003**	**0.0641**	**0.0864**	**1.4000e-004**	**5.0000e-005**	**4.5000e-004**	**5.0000e-004**	**1.0000e-005**	**4.5000e-004**	**4.6000e-004**	**0.0000**	**11.8972**	**11.8972**	**3.3300e-003**	**0.0000**	**11.9805**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	3.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0567	0.0567	0.0000	1.0000e-005	0.0593
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.5000e-004	0.0000	6.6000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5083	0.5083	1.0000e-005	1.0000e-005	0.5126
Total	**2.1000e-004**	**2.8000e-004**	**1.8000e-003**	**1.0000e-005**	**6.7000e-004**	**0.0000**	**6.8000e-004**	**1.7000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5650**	**0.5650**	**1.0000e-005**	**2.0000e-005**	**0.5719**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1200e-003	0.0215	0.0312	4.0000e-005		1.0600e-003	1.0600e-003		9.8000e-004	9.8000e-004	0.0000	3.8302	3.8302	1.2400e-003	0.0000	3.8612
Total	**2.1200e-003**	**0.0215**	**0.0312**	**4.0000e-005**	**0.0000**	**1.0600e-003**	**1.0600e-003**	**0.0000**	**9.8000e-004**	**9.8000e-004**	**0.0000**	**3.8302**	**3.8302**	**1.2400e-003**	**0.0000**	**3.8612**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.1800e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3389	0.3389	1.0000e-005	1.0000e-005	0.3417
Total	**1.4000e-004**	**1.0000e-004**	**1.1800e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3389**	**0.3389**	**1.0000e-005**	**1.0000e-005**	**0.3417**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0600e-003	0.0243	0.0328	4.0000e-005		2.6000e-004	2.6000e-004		2.6000e-004	2.6000e-004	0.0000	3.8302	3.8302	1.2400e-003	0.0000	3.8612
Total	**1.0600e-003**	**0.0243**	**0.0328**	**4.0000e-005**	**0.0000**	**2.6000e-004**	**2.6000e-004**	**0.0000**	**2.6000e-004**	**2.6000e-004**	**0.0000**	**3.8302**	**3.8302**	**1.2400e-003**	**0.0000**	**3.8612**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.1800e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3389	0.3389	1.0000e-005	1.0000e-005	0.3417
Total	**1.4000e-004**	**1.0000e-004**	**1.1800e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3389**	**0.3389**	**1.0000e-005**	**1.0000e-005**	**0.3417**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4522	0.0000	0.4522	0.2086	0.0000	0.2086	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1079	1.1479	0.7006	1.9600e-003		0.0465	0.0465		0.0428	0.0428	0.0000	172.1647	172.1647	0.0557	0.0000	173.5567
Total	**0.1079**	**1.1479**	**0.7006**	**1.9600e-003**	**0.4522**	**0.0465**	**0.4987**	**0.2086**	**0.0428**	**0.2514**	**0.0000**	**172.1647**	**172.1647**	**0.0557**	**0.0000**	**173.5567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-003	0.4693	0.0990	2.2100e-003	0.0642	4.4300e-003	0.0686	0.0177	4.2400e-003	0.0219	0.0000	212.4374	212.4374	1.3900e-003	0.0334	222.4289
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	1.6100e-003	0.0192	6.0000e-005	7.0900e-003	3.0000e-005	7.1200e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	5.5190	5.5190	1.3000e-004	1.4000e-004	5.5650
Total	**0.0103**	**0.4709**	**0.1182**	**2.2700e-003**	**0.0713**	**4.4600e-003**	**0.0757**	**0.0195**	**4.2700e-003**	**0.0238**	**0.0000**	**217.9564**	**217.9564**	**1.5200e-003**	**0.0336**	**227.9939**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2035	0.0000	0.2035	0.0939	0.0000	0.0939	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0480	0.9363	1.0751	1.9600e-003		5.6200e-003	5.6200e-003		5.6200e-003	5.6200e-003	0.0000	172.1645	172.1645	0.0557	0.0000	173.5565
Total	**0.0480**	**0.9363**	**1.0751**	**1.9600e-003**	**0.2035**	**5.6200e-003**	**0.2091**	**0.0939**	**5.6200e-003**	**0.0995**	**0.0000**	**172.1645**	**172.1645**	**0.0557**	**0.0000**	**173.5565**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-003	0.4693	0.0990	2.2100e-003	0.0642	4.4300e-003	0.0686	0.0177	4.2400e-003	0.0219	0.0000	212.4374	212.4374	1.3900e-003	0.0334	222.4289
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	1.6100e-003	0.0192	6.0000e-005	7.0900e-003	3.0000e-005	7.1200e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	5.5190	5.5190	1.3000e-004	1.4000e-004	5.5650
Total	**0.0103**	**0.4709**	**0.1182**	**2.2700e-003**	**0.0713**	**4.4600e-003**	**0.0757**	**0.0195**	**4.2700e-003**	**0.0238**	**0.0000**	**217.9564**	**217.9564**	**1.5200e-003**	**0.0336**	**227.9939**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Grading/BC Overlap - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1967	0.0000	0.1967	0.1011	0.0000	0.1011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0329	0.3343	0.3036	5.7000e-004		0.0151	0.0151		0.0139	0.0139	0.0000	50.3819	50.3819	0.0163	0.0000	50.7893
Total	**0.0329**	**0.3343**	**0.3036**	**5.7000e-004**	**0.1967**	**0.0151**	**0.2118**	**0.1011**	**0.0139**	**0.1149**	**0.0000**	**50.3819**	**50.3819**	**0.0163**	**0.0000**	**50.7893**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-004	0.0235	4.9500e-003	1.1000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	10.6219	10.6219	7.0000e-005	1.6700e-003	11.1215
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	7.9000e-004	9.4400e-003	3.0000e-005	3.4800e-003	2.0000e-005	3.5000e-003	9.2000e-004	1.0000e-005	9.4000e-004	0.0000	2.7111	2.7111	6.0000e-005	7.0000e-005	2.7337
Total	**1.5300e-003**	**0.0243**	**0.0144**	**1.4000e-004**	**6.6900e-003**	**2.4000e-004**	**6.9300e-003**	**1.8000e-003**	**2.2000e-004**	**2.0300e-003**	**0.0000**	**13.3329**	**13.3329**	**1.3000e-004**	**1.7400e-003**	**13.8551**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Grading/BC Overlap - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0885	0.0000	0.0885	0.0455	0.0000	0.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0141	0.2857	0.3759	5.7000e-004		2.1800e-003	2.1800e-003		2.1800e-003	2.1800e-003	0.0000	50.3819	50.3819	0.0163	0.0000	50.7892
Total	**0.0141**	**0.2857**	**0.3759**	**5.7000e-004**	**0.0885**	**2.1800e-003**	**0.0907**	**0.0455**	**2.1800e-003**	**0.0477**	**0.0000**	**50.3819**	**50.3819**	**0.0163**	**0.0000**	**50.7892**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-004	0.0235	4.9500e-003	1.1000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	10.6219	10.6219	7.0000e-005	1.6700e-003	11.1215
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	7.9000e-004	9.4400e-003	3.0000e-005	3.4800e-003	2.0000e-005	3.5000e-003	9.2000e-004	1.0000e-005	9.4000e-004	0.0000	2.7111	2.7111	6.0000e-005	7.0000e-005	2.7337
Total	**1.5300e-003**	**0.0243**	**0.0144**	**1.4000e-004**	**6.6900e-003**	**2.4000e-004**	**6.9300e-003**	**1.8000e-003**	**2.2000e-004**	**2.0300e-003**	**0.0000**	**13.3329**	**13.3329**	**1.3000e-004**	**1.7400e-003**	**13.8551**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1776	1.8072	1.6238	3.0900e-003		0.0814	0.0814		0.0748	0.0748	0.0000	271.4578	271.4578	0.0878	0.0000	273.6527
Total	**0.1776**	**1.8072**	**1.6238**	**3.0900e-003**		**0.0814**	**0.0814**		**0.0748**	**0.0748**	**0.0000**	**271.4578**	**271.4578**	**0.0878**	**0.0000**	**273.6527**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6200e-003	0.2227	0.0698	1.0000e-003	0.0327	1.3900e-003	0.0340	9.4400e-003	1.3300e-003	0.0108	0.0000	95.4877	95.4877	5.3000e-004	0.0144	99.7859
Worker	0.0511	0.0357	0.4263	1.3400e-003	0.1573	7.3000e-004	0.1580	0.0418	6.7000e-004	0.0425	0.0000	122.4820	122.4820	2.9000e-003	3.1900e-003	123.5038
Total	**0.0567**	**0.2584**	**0.4961**	**2.3400e-003**	**0.1899**	**2.1200e-003**	**0.1920**	**0.0512**	**2.0000e-003**	**0.0532**	**0.0000**	**217.9697**	**217.9697**	**3.4300e-003**	**0.0176**	**223.2896**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0758	1.5354	2.0193	3.0900e-003		0.0116	0.0116		0.0116	0.0116	0.0000	271.4575	271.4575	0.0878	0.0000	273.6524
Total	**0.0758**	**1.5354**	**2.0193**	**3.0900e-003**		**0.0116**	**0.0116**		**0.0116**	**0.0116**	**0.0000**	**271.4575**	**271.4575**	**0.0878**	**0.0000**	**273.6524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6200e-003	0.2227	0.0698	1.0000e-003	0.0327	1.3900e-003	0.0340	9.4400e-003	1.3300e-003	0.0108	0.0000	95.4877	95.4877	5.3000e-004	0.0144	99.7859
Worker	0.0511	0.0357	0.4263	1.3400e-003	0.1573	7.3000e-004	0.1580	0.0418	6.7000e-004	0.0425	0.0000	122.4820	122.4820	2.9000e-003	3.1900e-003	123.5038
Total	**0.0567**	**0.2584**	**0.4961**	**2.3400e-003**	**0.1899**	**2.1200e-003**	**0.1920**	**0.0512**	**2.0000e-003**	**0.0532**	**0.0000**	**217.9697**	**217.9697**	**3.4300e-003**	**0.0176**	**223.2896**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0356	0.3745	0.2593	5.4000e-004		0.0168	0.0168		0.0154	0.0154	0.0000	47.0096	47.0096	0.0152	0.0000	47.3896
Paving	0.0204					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0559**	**0.3745**	**0.2593**	**5.4000e-004**		**0.0168**	**0.0168**		**0.0154**	**0.0154**	**0.0000**	**47.0096**	**47.0096**	**0.0152**	**0.0000**	**47.3896**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.3000e-004	8.7600e-003	3.0000e-005	3.2300e-003	1.0000e-005	3.2500e-003	8.6000e-004	1.0000e-005	8.7000e-004	0.0000	2.5174	2.5174	6.0000e-005	7.0000e-005	2.5384
Total	**1.0500e-003**	**7.3000e-004**	**8.7600e-003**	**3.0000e-005**	**3.2300e-003**	**1.0000e-005**	**3.2500e-003**	**8.6000e-004**	**1.0000e-005**	**8.7000e-004**	**0.0000**	**2.5174**	**2.5174**	**6.0000e-005**	**7.0000e-005**	**2.5384**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0131	0.2697	0.3271	5.4000e-004		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	47.0095	47.0095	0.0152	0.0000	47.3896
Paving	0.0204					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0335**	**0.2697**	**0.3271**	**5.4000e-004**		**2.0600e-003**	**2.0600e-003**		**2.0600e-003**	**2.0600e-003**	**0.0000**	**47.0095**	**47.0095**	**0.0152**	**0.0000**	**47.3896**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.3000e-004	8.7600e-003	3.0000e-005	3.2300e-003	1.0000e-005	3.2500e-003	8.6000e-004	1.0000e-005	8.7000e-004	0.0000	2.5174	2.5174	6.0000e-005	7.0000e-005	2.5384
Total	**1.0500e-003**	**7.3000e-004**	**8.7600e-003**	**3.0000e-005**	**3.2300e-003**	**1.0000e-005**	**3.2500e-003**	**8.6000e-004**	**1.0000e-005**	**8.7000e-004**	**0.0000**	**2.5174**	**2.5174**	**6.0000e-005**	**7.0000e-005**	**2.5384**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7900e-003	0.0326	0.0453	7.0000e-005		1.7700e-003	1.7700e-003		1.7700e-003	1.7700e-003	0.0000	6.3831	6.3831	3.8000e-004	0.0000	6.3927
Total	**1.8217**	**0.0326**	**0.0453**	**7.0000e-005**		**1.7700e-003**	**1.7700e-003**		**1.7700e-003**	**1.7700e-003**	**0.0000**	**6.3831**	**6.3831**	**3.8000e-004**	**0.0000**	**6.3927**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6500e-003	3.2500e-003	0.0388	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8000e-003	6.0000e-005	3.8600e-003	0.0000	11.1347	11.1347	2.6000e-004	2.9000e-004	11.2276
Total	**4.6500e-003**	**3.2500e-003**	**0.0388**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8000e-003**	**6.0000e-005**	**3.8600e-003**	**0.0000**	**11.1347**	**11.1347**	**2.6000e-004**	**2.9000e-004**	**11.2276**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4900e-003	0.0339	0.0458	7.0000e-005		3.6000e-004	3.6000e-004		3.6000e-004	3.6000e-004	0.0000	6.3831	6.3831	3.8000e-004	0.0000	6.3927
Total	**1.8184**	**0.0339**	**0.0458**	**7.0000e-005**		**3.6000e-004**	**3.6000e-004**		**3.6000e-004**	**3.6000e-004**	**0.0000**	**6.3831**	**6.3831**	**3.8000e-004**	**0.0000**	**6.3927**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6500e-003	3.2500e-003	0.0388	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8000e-003	6.0000e-005	3.8600e-003	0.0000	11.1347	11.1347	2.6000e-004	2.9000e-004	11.2276
Total	**4.6500e-003**	**3.2500e-003**	**0.0388**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8000e-003**	**6.0000e-005**	**3.8600e-003**	**0.0000**	**11.1347**	**11.1347**	**2.6000e-004**	**2.9000e-004**	**11.2276**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Discount Club	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Gasoline/Service Station	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Parking Lot	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 0	0.0000	0.0000	0.0000	0.0000
Discount Club	0 / 0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 0	0.0000	0.0000	0.0000	0.0000
Discount Club	0 / 0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Equipment Type	Number

11.0 Vegetation

Costco Fresno (Project) Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Costco Fresno (Project) Operation

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	889.00	Space	8.00	355,600.00	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Gasoline/Service Station	32.00	Pump	0.10	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	191.61	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific values (RPS emission factor)

Land Use - Project-specific values

Construction Phase - Operational run

Off-road Equipment - Operational run

Vehicle Trips - Project-specific values, mobile emissions calculated seperately

Consumer Products - Updated emission factor for consumer products to refine the VOC emissions based on recent CARB regulations.

Table Name	Column Name	Default Value	New Value
tblConsumerProducts	ROG_EF	2.14E-05	1.62E-05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	203.98	191.61
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

Costco Fresno (Project) Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	330.8528	330.8528	0.0345	6.5300e-003	333.6620
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	12.3158	18.2653	0.6132	0.0147	37.9717
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**343.1895**	**567.0539**	**13.5261**	**0.0212**	**911.5307**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	330.8528	330.8528	0.0345	6.5300e-003	333.6620
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	12.3158	18.2653	0.6132	0.0147	37.9717
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**343.1895**	**567.0539**	**13.5261**	**0.0212**	**911.5307**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2023	4/30/2023	5	20	

Acres of Grading (Site Preparation Phase): 0

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 0

Acres of Paving: 8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	0	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Discount Club	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Gasoline/Service Station	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Parking Lot	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	183.9160	183.9160	0.0317	3.8400e-003	185.8520
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	183.9160	183.9160	0.0317	3.8400e-003	185.8520
NaturalGas Mitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100
NaturalGas Unmitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	3.5919	6.2000e-004	7.0000e-005	3.6297
Discount Club	1.91141e+006	166.1263	0.0286	3.4700e-003	167.8751
Gasoline/Service Station	38896.5	3.3806	5.8000e-004	7.0000e-005	3.4162
Parking Lot	124460	10.8172	1.8600e-003	2.3000e-004	10.9310
Total		**183.9160**	**0.0317**	**3.8400e-003**	**185.8520**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	3.5919	6.2000e-004	7.0000e-005	3.6297
Discount Club	1.91141e+006	166.1263	0.0286	3.4700e-003	167.8751
Gasoline/Service Station	38896.5	3.3806	5.8000e-004	7.0000e-005	3.4162
Parking Lot	124460	10.8172	1.8600e-003	2.3000e-004	10.9310
Total		**183.9160**	**0.0317**	**3.8400e-003**	**185.8520**

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Unmitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.9000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.9000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

7.0 Water Detail

7.1 Mitigation Measures Water

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	18.2653	0.6132	0.0147	37.9717
Unmitigated	18.2653	0.6132	0.0147	37.9717

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.4398	0.0148	3.5000e-004	0.9144
Discount Club	17.8767 / 10.9567	17.4115	0.5845	0.0140	36.1967
Gasoline/Service Station	0.42502 / 0.260496	0.4140	0.0139	3.3000e-004	0.8606
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**18.2653**	**0.6132**	**0.0147**	**37.9717**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.4398	0.0148	3.5000e-004	0.9144
Discount Club	17.8767 / 10.9567	17.4115	0.5845	0.0140	36.1967
Gasoline/Service Station	0.42502 / 0.260496	0.4140	0.0139	3.3000e-004	0.8606
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**18.2653**	**0.6132**	**0.0147**	**37.9717**

8.0 Waste Detail

8.1 Mitigation Measures Waste

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	217.9149	12.8784	0.0000	539.8748
Unmitigated	217.9149	12.8784	0.0000	539.8748

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number

11.0 Vegetation

APPENDIX B
MOBILE SOURCE EMISSION CALCULATIONS

Table B-1a. Trip Lengths and Vehicle Miles Traveled by Operational Mobile Sources (Herndon/Riverside)
Costco Commercial Center
Fresno, California

Trip Type		Average One-Way Trip Length[1,2]	Peak Daily Trips (one-way trips/day)[3]	Peak Daily VMT[4]	Annual Average Trips (one-way trips/yr)	Annual Average VMT
Member Vehicles	Primary	17.3	10,046	173,528	3,666,790	63,337,720
	Diverted	1.0	4,038	4,119	1,473,870	1,503,435
	Pass-By	0.1	3,788	379	1,382,620	138,262
Warehouse, Fuel Station, and Car Wash Employee Vehicles	Primary	30.7	300	9,210	109,500	3,361,650
MDO Driver and Warehouse Employee Vehicles	Primary	30.7	136	4,175	49,640	1,523,875
MDO Delivery Trucks	Primary	81.5	20	1,630	7,300	594,950
Fuel Delivery Trucks	Primary	125.0	14	1,750	5,110	638,750
Warehouse Delivery Trucks	Primary	125.0	26	3,250	9,490	1,186,250

Notes:

[1] Average trip lengths for primary and diverted trip types are based on Project-specific data provided by Kittelson & Associates. Pass-by trip length for member vehicles is assumed to be equal to the CalEEMod® default trip length of 0.1 miles.

[2] Average trip length for MDO delivery trucks provided by Costco. The average routed round trip length for Fresno MDO delivery trucks is 163 miles.

[3] Peak daily trips are based on Project-specific data provided by Kittelson & Associates.

[4] Peak daily VMT based on Project-specific data provided by Kittelson & Associates or estimated as a product of average trip length and number of trips presented in this table.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel

MDO - market delivery operation

VMT - vehicle miles traveled

Table B-1b. Trip Lengths and Vehicle Miles Traveled by Operational Mobile Sources (4500 W. Shaw Avenue)
Costco Commercial Center
Fresno, California

Trip Type		Peak Daily Trips (one-way trips/day)[1]	Peak Daily VMT[2]	Annual Average Trips (one-way trips/yr)	Annual Average VMT
Passenger Vehicles	Primary	1,363	58,264	497,495	21,266,360
	Pass-by	48	0	17,520	0
	Diverted	2,099	3,442	766,135	1,256,330

Notes:

[1] Peak daily trips are based on Project-specific data provided by Kittelson & Associates.

[2] Peak daily VMT based on Project-specific data provided by Kittelson & Associates or estimated as a product of average trip length and number of trips presented in this table.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel

MDO - market delivery operation

VMT - vehicle miles traveled

Table B-2. Operational Mobile Source Fleet Mixes
Costco Commercial Center
Fresno, California

Vehicle Category	Fuel Type	Fleet Mix CalEEMod® Default[1]	EMFAC VMT Output[2] (miles/day)	Employee Vehicle Fleet Mix[3]	Member Vehicle Fleet Mix[4]
LDA	Gas	51.0%	12,057,533	52.8%	55.0%
	Phe		351,337	1.54%	1.6%
	Elec		514,390	2.25%	0%
	Dsl		22,675	0.10%	0%
LDT1	Gas	5.3%	1,013,826	5.88%	5.9%
	Phe		1,027	0.01%	0.0%
	Elec		1,049	0.01%	0%
	Dsl		250	0.00%	0%
LDT2	Gas	17.6%	5,488,159	19.29%	19.4%
	Phe		39,774	0.14%	0.1%
	Elec		17,710	0.06%	0%
	Dsl		14,595	0.05%	0%
MDV	Gas	16.1%	4,629,686	17.47%	17.8%
	Phe		29,118	0.11%	0.1%
	Elec		19,405	0.07%	0%
	Dsl		71,606	0.27%	0%
LHD1	All	2.7%	--	--	--
LHD2	All	0.7%	--	--	--
MHD	All	1.4%	--	--	--
HHDT	All	2.2%	--	--	--
OBUS	All	0.1%	--	--	--
UBUS	All	0.0%	--	--	--
MCY	All	2.4%	--	--	--
SBUS	All	0.2%	--	--	--
MH	All	0.3%	--	--	--

Notes:

[1] CalEEMod® default for Fresno County calendar year 2023.

[2] Data obtained from EMFAC2021 for default emissions activity.

[3] Fleet mix for employee vehicles estimated based on the ratio of the vehicle classes in CalEEMod® default fleet mix and the EMFAC2021 VMT output.

[4] Fleet mix for member vehicles visiting the Costco Gas Station are estimated based on the ratio of the vehicle classes in CalEEMod® default fleet mix and the EMFAC2021 VMT output. Vehicles are assumed to be gasoline or plug-in hybrid.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
EMFAC - EMission FACtors model
HHDT - Heavy heavy-duty truck
LDA - light duty automobiles
LDT - light-duty trucks
LHD - light heavy-duty trucks
MCY - motorcycles
MDV - medium-duty vehicle
MH - motor homes
MHD - medium heavy-duty trucks
OBUS - other buses
SBUS - school buses
UBUS - urban buses
VMT - vehicle miles traveled

Table B-3. Operational Mobile Source CAP Emission Factors - Running Exhaust, Running Loss, Tire Wear, and Brake Wear
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	EMFAC VMT Output[1] (miles/day)	EMFAC Emissions Output[1,2] (tons/day)					
			VOC[3]	NO_x	CO	SO_x	PM_{10}[4]	$PM_{2.5}$[4]
Passenger Vehicles[5]								
LDA	Gas	12,057,533	0.51	0.58	10.53	0.04	0.20	0.07
LDA	Phe	351,337	0.00	0.00	0.09	0.00	0.00	0.00
LDA	Elec	514,390	0.00	0.00	0.00	0.00	0.01	0.00
LDA	Dsl	22,675	0.00	0.01	0.01	0.00	0.00	0.00
LDT1	Gas	1,013,826	0.16	0.21	2.25	0.00	0.02	0.01
LDT1	Phe	1,027	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Elec	1,049	0.00	0.00	0.00	0.00	0.00	0.00
LDT1	Dsl	250	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	Gas	5,488,159	0.28	0.52	6.01	0.02	0.10	0.03
LDT2	Phe	39,774	0.00	0.00	0.01	0.00	0.00	0.00
LDT2	Elec	17,710	0.00	0.00	0.00	0.00	0.00	0.00
LDT2	Dsl	14,595	0.00	0.00	0.00	0.00	0.00	0.00
MDV	Gas	4,629,686	0.34	0.67	6.18	0.02	0.08	0.03
MDV	Phe	29,118	0.00	0.00	0.01	0.00	0.00	0.00
MDV	Elec	19,405	0.00	0.00	0.00	0.00	0.00	0.00
MDV	Dsl	71,606	0.00	0.01	0.02	0.00	0.00	0.00
Delivery Trucks[5]								
HHDT	Dsl	2,030,441	0.03	3.94	0.16	0.03	0.32	0.14

EMFAC Vehicle Class	Fuel	Running Exhaust, Running Loss, Tire Wear and Brake Wear Emission Factors[6] (grams/mile)					
		VOC[3]	NO_x	CO	SO_x	PM_{10}[4]	$PM_{2.5}$[4]
Passenger Vehicles[5]							
LDA	Gas	0.038	0.044	0.793	0.003	0.015	0.005
LDA	Phe	0.005	0.003	0.221	0.001	0.012	0.004
LDA	Elec	0.000	0.000	0.000	0.000	0.012	0.004
LDA	Dsl	0.032	0.275	0.339	0.002	0.035	0.024
LDT1	Gas	0.141	0.192	2.013	0.003	0.017	0.007
LDT1	Phe	0.003	0.003	0.201	0.001	0.012	0.004
LDT1	Elec	0.000	0.000	0.000	0.000	0.012	0.004
LDT1	Dsl	0.268	1.602	1.824	0.004	0.247	0.226
LDT2	Gas	0.046	0.086	0.994	0.004	0.016	0.006
LDT2	Phe	0.003	0.003	0.209	0.001	0.012	0.004
LDT2	Elec	0.000	0.000	0.000	0.000	0.012	0.004
LDT2	Dsl	0.016	0.080	0.136	0.003	0.023	0.012
MDV	Gas	0.067	0.131	1.210	0.004	0.017	0.006
MDV	Phe	0.004	0.003	0.220	0.001	0.012	0.004
MDV	Elec	0.000	0.000	0.000	0.000	0.012	0.004
MDV	Dsl	0.013	0.103	0.209	0.004	0.023	0.012

Table B-3. Operational Mobile Source CAP Emission Factors - Running Exhaust, Running Loss, Tire Wear, and Brake Wear
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	Running Exhaust, Running Loss, Tire Wear and Brake Wear Emission Factors[6] (grams/mile)					
		VOC[3]	NO_x	CO	SO_x	PM_{10}[4]	$PM_{2.5}$[4]
Member Vehicle Weighted Emission Factor[7]		**0.050**	**0.075**	**0.967**	**0.003**	**0.016**	**0.005**
Employee Vehicle Weighted Emission Factor[7]		**0.049**	**0.075**	**0.945**	**0.003**	**0.016**	**0.005**
Delivery Trucks[5]							
HHDT	Dsl	0.01	1.76	0.07	0.015	0.14	0.06

Notes:

[1] Data obtained from EMFAC2021 for default emissions activity.

[2] Sum of running exhaust, running loss, tire wear, and brake wear emissions obtained from EMFAC2021 for default emissions activity.

[3] For purposes of this analysis VOC is assumed to be equal to ROG.

[4] PM emissions are a sum of exhaust, tire wear, and brake wear.

[5] Delivery trucks are assumed to be diesel-fueled.

[6] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.

[7] Emission factors for EMFAC vehicle classes are weighted based on the project-specific fleet mix in Table B-2 to estimate trip-based emission factors for passenger vehicles.

Abbreviations:

CAP - criteria air pollutant
CO - carbon monoxide
Dsl - Diesel
EMFAC - EMission FACtors model
LDA - light-duty automobile
LDT - light-duty truck
HHDT - heavy heavy-duty truck
MDV - medium-duty vehicle
NO_x - nitrogen oxide compounds (NO + NO_2)
Phe - Plug-in hybrid
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
VOC - volatile organic compounds
VMT - vehicle miles traveled

Conversion Factor:

907184.74 grams per ton

Table B-4. Operational Mobile Source CAP Emission Factors - Starting Exhaust, Hot Soak, Diurnal Loss, and Resting Loss
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	EMFAC Vehicle Trips Output[1] (trips/day)	EMFAC Emissions Output[1] (tons/day)								
			VOC[2]				NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
			Starting Exhaust	Hot Soak	Diurnal	Resting Loss	Starting Exhaust				
Passenger Vehicle											
LDA	Gas	1,459,129	0.547	0.156	0.574	0.000	0.428	5.313	0.001	0.004	0.003
LDA	Phe	31,224	0.006	0.001	0.004	0.000	0.004	0.044	0.000	0.000	0.000
LDA	Elec	56,838	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDA	Dsl	3,207	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT1	Gas	135,565	0.114	0.037	0.154	0.000	0.076	1.087	0.000	0.001	0.001
LDT1	Phe	83	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT1	Elec	118	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT1	Dsl	62	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT2	Gas	657,946	0.318	0.073	0.285	0.000	0.281	2.975	0.001	0.002	0.001
LDT2	Phe	3,337	0.001	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000
LDT2	Elec	2,516	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT2	Dsl	1,661	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MDV	Gas	598,810	0.420	0.084	0.339	0.000	0.358	3.094	0.001	0.002	0.001
MDV	Phe	2,568	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
MDV	Elec	2,761	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MDV	Dsl	8,640	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Delivery Trucks[3]											
HHDT	Dsl	237,288	0	0	0	0	0.7	0.0	0.0	0.0	0.0

Vehicle Class	Fuel	Starting Exhaust, Hot Soak, Diurnal, and Resting Loss Emission Factors[4] (grams/trip)								
		VOC[2]				NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
		Starting Exhaust	Hot Soak	Diurnal	Resting Loss	Starting Exhaust				
Passenger Vehicles										
LDA	Gas	0.340	0.097	0.357	0.000	0.266	3.303	0.001	0.002	0.002
LDA	Phe	0.167	0.043	0.130	0.000	0.113	1.285	0.001	0.002	0.002
LDA	Elec	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDA	Dsl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT1	Gas	0.763	0.251	1.029	0.000	0.512	7.275	0.001	0.004	0.003
LDT1	Phe	0.167	0.025	0.078	0.000	0.113	1.285	0.001	0.002	0.001
LDT1	Elec	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT1	Dsl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT2	Gas	0.438	0.101	0.394	0.000	0.388	4.103	0.001	0.002	0.002
LDT2	Phe	0.167	0.027	0.088	0.000	0.113	1.285	0.001	0.002	0.002
LDT2	Elec	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LDT2	Dsl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MDV	Gas	0.636	0.128	0.513	0.000	0.543	4.687	0.001	0.002	0.002
MDV	Phe	0.167	0.033	0.108	0.000	0.113	1.285	0.001	0.003	0.002
MDV	Elec	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MDV	Dsl	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Member Vehicle Weighted Emission Factor[5]		**0.433**	**0.111**	**0.427**	**0.000**	**0.351**	**3.901**	**0.001**	**0.002**	**0.002**
Employee Vehicle Emission Factor[5]		**0.423**	**0.108**	**0.417**	**0.000**	**0.342**	**3.804**	**0.001**	**0.002**	**0.002**
Delivery Trucks[3]										
HHDT	Dsl	0	0	0	0	2.8	0	0	0	0

Notes:

[1] Data obtained from EMFAC2021 for default emissions activity.

[2] For purposes of this analysis VOC is assumed to be equal to ROG.

[3] Delivery trucks are assumed to be diesel-fueled.

[4] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC trip output.

[5] Emission factors for EMFAC vehicle classes are weighted based on the project-specific fleet mix in Table B-2 to estimate trip-based emission factors for passenger vehicles.

Abbreviations:

CAP - criteria air pollutant
CO - carbon monoxide
Dsl - Diesel
EMFAC - EMission FACtors model
LDA - light-duty automobile
LDT - light-duty truck
HHDT - heavy heavy-duty truck
MDV - medium-duty vehicle
NO_x - nitrogen oxide compounds (NO + NO_2)
Phe - Plug-in hybrid
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
VOC - volatile organic compounds
VMT - vehicle miles traveled

Conversion Factor:

907184.74 grams per ton

Table B-5. Operational Mobile Source CAP Emission Factors - Idling Exhaust
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	Idling Emission Factors[1] (grams/idle-minute)					
		VOC[2]	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Passenger Vehicles							
LDA	Gas	0.003	0.003	0.059	0.000	0.000	0.000
LDA	Phe	0.001	0.001	0.041	0.000	0.000	0.000
LDA	Elec	0.000	0.000	0.000	0.000	0.000	0.000
LDA	Dsl	0.012	0.012	0.177	0.000	0.004	0.003
LDT1	Gas	0.012	0.015	0.158	0.000	0.001	0.001
LDT1	Phe	0.001	0.000	0.037	0.000	0.000	0.000
LDT1	Elec	0.000	0.000	0.000	0.000	0.000	0.000
LDT1	Dsl	0.049	0.044	0.209	0.000	0.042	0.040
LDT2	Gas	0.004	0.007	0.074	0.000	0.000	0.000
LDT2	Phe	0.001	0.001	0.038	0.000	0.000	0.000
LDT2	Elec	0.000	0.000	0.000	0.000	0.000	0.000
LDT2	Dsl	0.012	0.008	0.104	0.000	0.001	0.001
MDV	Gas	0.006	0.010	0.091	0.000	0.000	0.000
MDV	Phe	0.001	0.001	0.040	0.000	0.000	0.000
MDV	Elec	0.000	0.000	0.000	0.000	0.000	0.000
MDV	Dsl	0.009	0.008	0.174	0.000	0.001	0.001
Member Vehicle Weighted Emission Factor[3]		0.0041	0.0059	0.0730	0.0003	0.0004	0.0004
Employee Vehicle Weighted Emission Factor[3]		0.0040	0.0058	0.0720	0.0003	0.0004	0.0004
Delivery Trucks[4]							
HHDT	Dsl	0.045	0.928	0.628	0.002	0.001	0.001

Notes:

[1] Data obtained from EMFAC2021 project-level output. Passenger vehicle emission rates are equivalent to the running exhaust emission rate in grams per mile at 5 mph, multiplied by the speed correction factor of 2.5 mph.

[2] For purposes of this analysis VOC is assumed to be equal to ROG.

[3] Emission factors for EMFAC vehicle classes are weighted based on the project-specific fleet mix in Table B-2 to estimate trip-based emission factors for passenger vehicles.

[4] Delivery trucks are assumed to be diesel-fueled.

Abbreviations:

CAP - criteria air pollutant
CO - carbon monoxide
EMFAC - EMission FACtors model
LDA - light-duty automobile
LDT - light-duty truck
HHDT - heavy heavy-duty truck
MDV - medium-duty vehicle
mph - miles per hour
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
ROG - reactive organic gases
SO_x - sulfur oxide compounds
VOC - volatile organic compounds

Conversion Factor:

60 minutes per hour

Table B-6. Entrained Road Dust Emission Factors for Operational Mobile Sources
Costco Commercial Center
Fresno, California

Vehicle Type	Entrained Road Dust Emission Factor[1] (ton/VMT)	
	PM_{10}	$PM_{2.5}$
Member/Employee Vehicles	3.31E-07	8.11E-08
Delivery Trucks		

Notes:

[1] Emission factor calculated following guidance in the CalEEMod® User's Guide, Appendix A, which is based on AP-42, Section 13.2.1 for vehicles traveling on paved roads. The equation is:

$EF = k \times (sL)^{0.91} \times (W)^{1.02}$, where:

0.0022 = k_{PM10} (lb/VMT), PM_{10} particle size multiplier

0.00054 = $k_{PM2.5}$ (lb/VMT), $PM_{2.5}$ particle size multiplier

0.1 = sL (g/m^2), silt loading (CalEEMod Default)

2.4 = W (tons), mean vehicle weight (CalEEMod Default)

[3] Assumes 100% of on-road travel occurs on paved roads.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

EF - emission factor

lb - pounds

PM_{10} - particulate matter less than 10 microns in aerodynamic diameter

$PM_{2.5}$ - particulate matter less than 2.5 microns in aerodynamic diameter

VMT - vehicle miles traveled

Table B-7a. Annual Criteria Air Pollutant Emission Estimates for Operational Mobile Sources (Herndon/Riverside)
Costco Commercial Center
Fresno, California

Mobile Source Activity	Trip Type	Trip Distance[1] (miles)	Annual Average Trips[1] (one-way trips/year)	Annual Average VMT[1] (miles/year)	Idle Duration[2,3] (minutes/year)	Criteria Air Pollutant Emissions (tons/year)					
						VOC[4]	NO_x[5]	CO[5]	SO_x[5]	PM_{10}[6]	$PM_{2.5}$[6]
Member Vehicles	Primary[7]	17.3	3,666,790	63,337,720	--	7.44	6.69	83.29	0.23	22.04	5.53
	Diverted[8]	1.0	1,473,870	1,503,435	--	0.97	0.69	7.94	0.01	0.53	0.13
	Pass-By[8]	0.10	1,382,620	138,262	--	0.84	0.55	6.09	0.00	0.05	0.02
Warehouse, Fuel Station, and Car Wash Employee Vehicles	Primary[7]	30.7	109,500	3,361,650	--	0.30	0.32	3.96	0.01	1.17	0.29
MDO Driver and Warehouse Employee Vehicles	Primary[7]	30.70	49,640	1,523,875	--	0.13	0.14	1.79	0.01	0.53	0.13
MDO Delivery Trucks	Primary[7]	81.5	7,300	594,950	18,250	0.01	1.20	0.06	0.01	0.29	0.09
Fuel Delivery Trucks	Primary[7]	125.0	5,110	638,750	12,775	0.01	1.27	0.06	0.01	0.31	0.10
Warehouse Delivery Trucks	Primary[7]	125.0	9,490	1,186,250	23,725	0.02	2.36	0.11	0.02	0.58	0.18
GDF Vehicle Idling		--	--	--	33,638,400	0.15	0.22	2.71	0.01	0.02	0.01
					Total Emissions	9.9	13.4	106.0	0.3	25.5	6.5

Notes

[1] Data obtained from Table B-1a.

[2] Idle duration for passenger vehicles visiting the gas station is estimated using a maximum queue length of 3 vehicles per queue lane and a transaction time of 4 minutes per vehicle. The queue is assumed to stay constant while the gas station is open (6 AM to 10 PM), 7 days/week. Queue length is based on Saturday midday peak hour average queue length projections from existing Costco facilities provided by Kittelson & Associates.

[3] Delivery truck idle duration is 5 minutes based on the CARB Air Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: https://ww2.arb.ca.gov/our-work/programs/atcm-to-limit-vehicle-idling/about. Accessed: September 2021. For GDF idling this is actually idling duration in units of minutes per year.

[4] VOC emissions include running exhaust, running loss, hot soak, diurnal, resting loss, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, and B-5 along with annual VMT, annual trips, and idle duration.

[5] NO_X, CO, and SO_X emissions include running exhaust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, and B-5 along with annual VMT, annual trips, and idle duration.

[6] PM_{10} and $PM_{2.5}$ emissions include running exhaust, tire wear, brake wear, fugitive dust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, B-5, and B-6 along with annual VMT, annual trips, and idle duration.

[7] Primary trip emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust), evaporative emissions (hot soak, diurnal, and resting loss), and starting exhaust emissions.

[8] Pass-by and Diverted trip emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust) and hot soak evaporative emissions, and starting exhaust emissions.

Abbreviations:

CO - carbon monoxide
lb - pounds
NO - nitrogen monoxide
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
SOx - sulfur oxide compounds
VOC - Volatile Organic Compound

Table B-7b. Annual Criteria Air Pollutant Emission Estimates for Operational Mobile Sources (4500 W. Shaw Avenue)
Costco Commercial Center
Fresno, California

Mobile Source Activity	Trip Type	Annual Average Trips[1] (one-way trips/year)	Annual Average VMT[1] (miles/year)	Criteria Air Pollutant Emissions (tons/year)					
				VOC[2]	NO_x[3]	CO[3]	SO_x[3]	PM_{10}[4]	$PM_{2.5}$[4]
Passenger Vehicles	Primary[5]	497,495	21,266,360	1.71	1.96	24.81	0.08	7.40	1.85
	Pass-by[6]	17,520	0	0.01	0.00	0.04	0.00	0.00	0.00
	Diverted[6]	766,135	1,256,330	0.30	0.25	2.99	0.00	0.44	0.11
Total Emissions				**1.7**	**2.0**	**24.8**	**0.1**	**7.4**	**1.9**

Notes

[1] Data obtained from Table B-1b.

[2] VOC emissions include running exhaust, running loss, hot soak, diurnal, resting loss, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, and B-5 along with annual VMT, annual trips, and idle duration.

[3] NO_X, CO, and SO_X emissions include running exhaust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, and B-5 along with annual VMT, annual trips, and idle duration.

[4] PM_{10} and $PM_{2.5}$ emissions include running exhaust, tire wear, brake wear, fugitive dust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, B-5, and B-6 along with annual VMT, annual trips, and idle duration.

[5] Primary trip emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust), evaporative emissions (hot soak, diurnal, and resting loss), and starting exhaust emissions.

[6] Pass-by and diverted emissions include travel emissions (running exhaust, running loss, tire wear, brake wear, and fugitive dust) and evaporative emissions (hot soak), and starting exhaust emissions based on the number of round trips (i.e., half of one-way trips).

Abbreviations:

CO - carbon monoxide
lb - pounds
NO - nitrogen monoxide
NO_2 - nitrogen dioxide
NO_x - nitrogen oxide compounds (NO + NO_2)
PM - particulate matter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
PM_{10} - particulate matter less than 10 microns in diameter
SOx - sulfur oxide compounds
VOC - Volatile Organic Compound

APPENDIX C
CONSTRUCTION HEALTH RISK ASSESSMENT EMISSION CALCULATIONS

Table C-1. Off-Road Equipment DPM Emissions
Costco Commercial Center
Fresno, California

Year	Phase	Phase Duration[1] (days)	Emission Source Category[1]	Mitigated PM_{10} Emissions[1] (tons/year)
2023	Demolition	7	Off-Road	4.50E-04
2023	Site Preparation	7	Off-Road	2.60E-04
2023	Grading	30	Off-Road	5.62E-03
2023	Grading/BC Overlap	20	Off-Road	2.18E-03
2023	Building Construction	110	Off-Road	1.16E-02
2023	Paving	40	Off-Road	2.06E-03
2023	Architectural Coating	50	Off-Road	3.60E-04

Notes:
[1] Unmitigated PM_{10} emissions are estimated using CalEEMod® default construction assumptions.

Abbreviations:
CalEEMod® - California Emissions Estimator Model
PM_{10} - particulate matter less than 10 microns in diameter

Table C-2. Vendor and Haul Truck DPM Emissions
Costco Commercial Center
Fresno, California

Modeled Roadway Links[1]		Source Group ID	Percent of Incoming Trips[2]	Percent of Outgoing Trips[2]	Total Annual Hauling Truck Trips[3] (one-way trips/year)	Segment Length[4] (miles)	Segment Length (miles)	Annual VMT[5] (miles/year)	DPM Emissions[6] (lbs/year)
Hauling Truck Routes	Herndon Ave (west of Riverside Drive)	OFFTRV1	100%	100%	7,877	389.3	0.24	1,905.44	1.12E-01
	Riverside Dr (Between Entry D and Herndon Ave)	OFFTRV2	100%	0%	3,939	132.9	0.08	325.24	1.92E-02
	Riverside Dr (Between Entry C and Entry D)	OFFTRV3	100%	0%	3,939	99.0	0.06	242.28	1.43E-02
	Riverside Dr (Between Entry B and Entry C)	OFFTRV4	100%	0%	3,939	93.0	0.06	227.60	1.34E-02
	Arthur Ave (Between Entry E and Herndon Ave)	OFFTRV5	0%	100%	3,939	53.8	0.03	131.66	7.77E-03
	Herndon Ave (Between Riverside Dr and Arthur Ave)	OFFTRV6	0%	100%	3,939	272.5	0.17	666.88	3.94E-02
	Arthur Ave (Between Entry E and Entry F)	OFFTRV7	0%	100%	3,939	292.9	0.18	716.81	4.23E-02
Vendor Truck Routes	Herndon Ave (west of Riverside Drive)	OFFTRV1	100%	100%	99.0	389.3	0.24	23.95	9.26E-04
	Riverside Dr (Between Entry D and Herndon Ave)	OFFTRV2	100%	0%	49.5	132.9	0.08	4.09	1.58E-04
	Riverside Dr (Between Entry C and Entry D)	OFFTRV3	100%	0%	49.5	99.0	0.06	3.05	1.18E-04
	Riverside Dr (Between Entry B and Entry C)	OFFTRV4	100%	0%	49.5	93.0	0.06	2.86	1.11E-04
	Arthur Ave (Between Entry E and Herndon Ave)	OFFTRV5	0%	100%	49.5	53.8	0.03	1.65	6.40E-05
	Herndon Ave (Between Riverside Dr and Arthur Ave)	OFFTRV6	0%	100%	49.5	272.5	0.17	8.38	3.24E-04
	Arthur Ave (Between Entry E and Entry F)	OFFTRV7	0%	100%	49.5	292.9	0.18	9.01	3.48E-04

Notes:

[1] See Figure 1 for a graphic representation of the modeled sources.

[2] A roadway link was conservatively assumed to experience 100% of incoming and outgoing trips if it could experience any percentage of trips.

[3] Total annual one-way trips are calculated as the sum of inbound and outbound one-way trips. Annual one-way haul truck and vendor truck trips per construction phase are estimated using CalEEMod®.

[4] Segment length based on modeled source length in AERMOD.

[5] Annual VMT is calculated as the product of segment length and total annual one-way trips.

[6] DPM emissions are calculated as the product of annual VMT and PM_{10} emission factor per vehicle type. For purposes of this analysis, DPM emissions are assumed to be equal to PM_{10} exhaust emissions from diesel vehicles.

Abbreviations:

AERMOD - American Meteorological Society/Environmental Protection Agency Regulatory Model
CalEEMod® - California Emissions Estimator Model
DPM - diesel particulate matter
lbs - pounds
m - meters
PM_{10} - particulate matter less than 10 microns in diameter
VMT - vehicle miles travelled

APPENDIX D
OPERATIONAL HEALTH RISK ASSESSMENT EMISSION CALCULATIONS

Table D-1. Traffic Volumes and Vehicle Miles Traveled on Modeled Roadways
Costco Commercial Center
Fresno, California

Modeled Roadway Links[1]		Source Group ID	Total Annual Trip Rates[2] (one-way trips/year)	Segment Length[3] (meters)	Segment Length (miles)	Annual VMT[4] (miles/year)
Fuel Delivery Trucks	Herndon Ave (west of Riverside Drive)	FT_TRV1	10,220	389.3	0.24	2,472
	Riverside Dr (Between Entry D and Herndon Ave)	FT_TRV2	10,220	132.9	0.08	844
	Riverside Dr (Between Entry C and Entry D)	FT_TRV3	10,220	99.0	0.06	629
	Riverside Dr (Between Entry B and Entry C)	FT_TRV4	10,220	93.0	0.06	591
	Riverside Dr (Between Spruce Ave and Entry B)	FT_TRV5	10,220	48.7	0.03	309
	Spruce Ave (Between Riverside Drive and Entry A)	FT_TRV6	10,220	57.5	0.04	365
	Spruce Ave (Between Entry A and Arthur Ave)	FT_TRV7	5,110	215.3	0.13	684
	Arthur Ave (Between Spruce Ave and Entry F)	FT_TRV8	5,110	62.9	0.04	200
	Entry F	FT_TRV9	5,110	216.8	0.13	688
	Entry A	FT_TRV10	5,110	53.2	0.03	169
	On-Site Idling	FT_IDLE	5,110	--	--	--
Warehouse Delivery Trucks	Herndon Ave (west of Riverside Drive)	WT_TRV1	18,980	389.3	0.24	4,591
	Riverside Dr (Between Entry D and Herndon Ave)	WT_TRV2	9,490	132.9	0.08	784
	Entry D	WT_TRV3	9,490	247.1	0.15	1,457
	Entry E	WT_TRV4	9,490	126.1	0.08	744
	Arthur Ave (Between Entry E and Herndon Ave)	WT_TRV5	9,490	53.8	0.03	317
	Herndon Ave (Between Riverside Dr and Arthur Ave)	WT_TRV6	9,490	272.5	0.17	1,607
	On-Site Idling	WT_IDLE1	4,745	--	--	--
	On-Site Idling	WT_IDLE2	4,745	--	--	--
MDO Delivery Trucks	Herndon Ave (west of Riverside Drive)	MD_TRV1	8,343	389.3	0.24	2,018
	Riverside Dr (Between Entry D and Herndon Ave)	MD_TRV2	6,257	132.9	0.08	517
	Riverside Dr (Between Entry C and Entry D)	MD_TRV3	2,607	99.0	0.06	160
	Entry D	MD_TRV4	6,779	247.1	0.15	1,041
	Riverside Dr (Between Entry B and Entry C)	MD_TRV5	2,607	93.0	0.06	151
	Entry E	MD_TRV6	7,821	126.1	0.08	613
	Riverside Dr (Between Spruce Ave and Entry B)	MD_TRV7	2,607	48.7	0.03	79
	Arthur Ave (Between Entry E and Herndon Ave)	MD_TRV8	6,257	53.8	0.03	209
	Spruce Ave (Between Entry A and Arthur Ave)	MD_TRV9	1,564	215.3	0.13	209
	Herndon Ave (Between Riverside Dr and Arthur Ave)	MD_TRV10	6,257	272.5	0.17	1,059
	Spruce Ave (Between Riverside Drive and Entry A)	MD_TRV11	1,564	57.5	0.04	56
	Arthur Ave (Between Spruce Ave and Entry F)	MD_TRV12	1,564	62.9	0.04	61
	Spruce Ave (west of Riverside Drive)	MD_TRV13	1,564	393.2	0.24	382
	Riverside Drive (North of Spruce Ave)	MD_TRV14	1,564	395.9	0.25	385

Table D-1. Traffic Volumes and Vehicle Miles Traveled on Modeled Roadways
Costco Commercial Center
Fresno, California

Modeled Roadway Links[1]		Source Group ID	Total Annual Trip Rates[2] (one-way trips/year)	Segment Length[3] (meters)	Segment Length (miles)	Annual VMT[4] (miles/year)
MDO Delivery Trucks *(Continued)*	Spruce Ave (East of Arthur Ave)	MD_TRV15	1,043	398.2	0.25	258
	Riverside Dr (South of Herndon Ave)	MD_TRV16	1,043	463.4	0.29	300
	Herndon Ave (East of Arthur Ave)	MD_TRV17	1,043	396.3	0.25	257
	Arthur Ave (Between Entry E and Entry F)	MD_TRV18	1,564	292.9	0.18	285
	On-Site Idling	MD_IDLE1	7,300	--	--	--
	On-Site Idling	MD_IDLE2	7,300	--	--	--

Notes:

[1] See Figure 2 for a graphic representation of the modeled sources.

[2] Trip rates based Project-specific data provided by Kittelson & Associates. The delivery truck trip rates assume the following for each truck category:

Fuel delivery trucks: 14 trucks per day
Warehouse delivery trucks: 26 trucks per day
MDO delivery trucks: 20 trucks per day

[3] Segment length based on modeled source length in AERMOD.

[4] VMT is calculated as the product of the segment length and the total number of annual one-way trips.

Abbreviations:

AERMOD - American Meteorological Society/Environmental Protection Agency Regulatory Model
VMT - vehicle miles traveled
MDO - Market delivery operation

Table D-2. Diesel Particulate Matter Emission Factors
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	EMFAC VMT Output[1] (miles/day)	DPM Emission Factor[2]		
		Off-site Running Exhaust[3] (g/mile)	On-site Running Exhaust[4] (g/mile)	Idle Exhaust (g/idle-minute)
Fuel Delivery, Warehouse Delivery, and MDO Delivery Trucks				
HHDT	2,030,441	0.029	0.012	0.0002

Notes:

[1] Data obtained from EMFAC2021 output for HHDT diesel vehicle default emissions activity.

[2] For purposes of this analysis, DPM emissions are assumed to be equal to PM_{10} exhaust emissions from diesel vehicles.

[3] Off-site running exhaust emission factor is based on EMFAC2021 default activity output for aggregated speeds.

[4] On-site running exhaust emission factor is based on EMFAC2021 project-level emission rate output for a speed of 5 mph.

Conversion Factors:

60 min/hr
907,185 g/ton

Abbreviations:

DPM - diesel particulate matter
EMFAC - EMission FACtors model
HHDT - Heavy heavy-duty truck
g - grams
hr - hours
min - minutes
mph - miles per hour
PM_{10} - particulate matter less than 10 microns in diameter
VMT - vehicle miles travelled

Table D-3. Delivery Truck Emissions
Costco Commercial Center
Fresno, California

Source Group ID[1]	Modeled Roadway Link	Project VMT[2] (miles)	Project Trips[2] (one-way trips)	Idle Duration (minutes/round trip)	DPM Exhaust Emissions[3,4]
		Annual	Annual		Annual (lb/year)
FT_TRV1	Herndon Ave (West of Riverside Drive)	2,472	10,220	--	1.60E-01
FT_TRV2	Riverside Dr (Between Entry D and Herndon Ave)	844	10,220	--	5.45E-02
FT_TRV3	Riverside Dr (Between Entry C and Entry D)	629	10,220	--	4.06E-02
FT_TRV4	Riverside Dr (Between Entry B and Entry C)	591	10,220	--	3.82E-02
FT_TRV5	Riverside Dr (Between Spruce Ave and Entry B)	309	10,220	--	2.00E-02
FT_TRV6	Spruce Ave (Between Riverside Drive and Entry A)	365	10,220	--	2.36E-02
FT_TRV7	Spruce Ave (Between Entry A and Arthur Ave)	684	5,110	--	4.42E-02
FT_TRV8	Arthur Ave (Between Spruce Ave and Entry F)	200	5,110	--	1.29E-02
FT_TRV9	Entry F	688	5,110	--	1.89E-02
FT_TRV10	Entry A	169	5,110	--	4.63E-03
FT_IDLE	On-Site Idling	--	5,110	5	1.17E-02
WT_TRV1	Herndon Ave (West of Riverside Drive)	4,591	18,980	--	2.97E-01
WT_TRV2	Riverside Dr (Between Entry D and Herndon Ave)	784	9,490	--	5.06E-02
WT_TRV3	Entry D	1,457	9,490	--	4.00E-02
WT_TRV4	Entry E	744	9,490	--	2.04E-02
WT_TRV5	Arthur Ave (Between Entry E and Herndon Ave)	317	9,490	--	2.05E-02
WT_TRV6	Herndon Ave (Between Riverside Dr and Arthur Ave)	1,607	9,490	--	1.04E-01
WT_IDLE1	On-Site Idling	--	4,745	5	5.43E-03
WT_IDLE2	On-Site Idling	--	4,745	5	5.43E-03
MD_TRV1	Herndon Ave (West of Riverside Drive)	2,018	8,343	--	1.30E-01
MD_TRV2	Riverside Dr (Between Entry D and Herndon Ave)	517	6,257	--	3.34E-02
MD_TRV3	Riverside Dr (Between Entry C and Entry D)	160	2,607	--	1.04E-02
MD_TRV4	Entry D	1,041	6,779	--	6.73E-02
MD_TRV5	Riverside Dr (Between Entry B and Entry C)	151	2,607	--	9.74E-03
MD_TRV6	Entry E	613	7,821	--	3.96E-02
MD_TRV7	Riverside Dr (Between Spruce Ave and Entry B)	79	2,607	--	5.10E-03
MD_TRV8	Arthur Ave (Between Entry E and Herndon Ave)	209	6,257	--	1.35E-02
MD_TRV9	Spruce Ave (Between Entry A and Arthur Ave)	209	1,564	--	1.35E-02
MD_TRV10	Herndon Ave (Between Riverside Dr and Arthur Ave)	1,059	6,257	--	6.85E-02
MD_TRV11	Spruce Ave (Between Riverside Drive and Entry A)	56	1,564	--	3.61E-03
MD_TRV12	Arthur Ave (Between Spruce Ave and Entry F)	61	1,564	--	3.95E-03
MD_TRV13	Spruce Ave (West of Riverside Drive)	382	1,564	--	2.47E-02
MD_TRV14	Riverside Drive (North of Spruce Ave)	385	1,564	--	2.49E-02

Table D-3. Delivery Truck Emissions
Costco Commercial Center
Fresno, California

Source Group ID[1]	Modeled Roadway Link	Project VMT[2] (miles)	Project Trips[2] (one-way trips)	Idle Duration (minutes/round trip)	DPM Exhaust Emissions[3,4]
		Annual	Annual		Annual (lb/year)
MD_TRV15	Spruce Ave (East of Arthur Ave)	258	1,043	--	1.67E-02
MD_TRV16	Riverside Dr (South of Herndon Ave)	300	1,043	--	1.94E-02
MD_TRV17	Herndon Ave (East of Arthur Ave)	257	1,043	--	1.66E-02
MD_TRV18	Arthur Ave (Between Entry E and Entry F)	285	1,564	--	1.84E-02
MD_IDLE1	On-Site Idling	--	7,300	5	8.36E-03
MD_IDLE2	On-Site Idling	--	7,300	5	8.36E-03

Notes:

[1] See Figure 2 for a graphic representation of the modeled sources.

[2] Data was obtained from Table D-1.

[3] DPM running exhaust emissions were calculated using the emission factors from Table D-2 along with Project VMT and trips.

[4] DPM emissions for on-site vehicle idling were estimated using the number of round trips (i.e., half of the one-way trips) and DPM idling exhaust emission factor from Table D-2.

Conversion Factor:

453.59 g/lb

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
DPM - diesel particulate matter
g - grams
lb - pounds
VMT - vehicle miles traveled

Table D-4. Gasoline Transfer and Dispensing Emissions
Costco Commercial Center
Fresno, California

		Source Group ID					
		LOADING	BREATH	REFILL			SPILL
		Loading	Breathing	Refueling	Hose Permeation	Total	Spillage
VOC Emission Factor (lb/1,000 gallons)		0.15	0.024	0.356	0.009	--	0.24
Weight Percent	Benzene	0.30%	0.30%	0.30%	0.30%	--	1.00%
	Ethyl Benzene	1.60%	1.60%	1.60%	1.60%	--	1.60%
	Toluene	8.0%	8.0%	8.0%	8.0%	--	8.0%
	Xylene	2.4%	2.4%	2.4%	2.4%	--	2.4%
Emissions (lb/hr)	Benzene	0.0022	0.0003	0.0051	0.0001	0.0053	0.0115
	Ethyl Benzene	0.0115	0.0018	0.0273	0.0007	0.0280	0.0184
	Toluene	0.0576	0.0092	0.1367	0.0035	0.1402	0.0922
	Xylene	0.0173	0.0028	0.0410	0.0010	0.0420	0.0276
Emissions (lb/year)	Benzene	11.48	1.84	27.23	0.69	27.92	61.20
	Ethyl Benzene	61.20	9.79	145.25	3.67	148.92	97.92
	Toluene	306.00	48.96	726.24	18.36	744.60	489.60
	Xylene	91.80	14.69	217.87	5.51	223.38	146.88

Throughput:

Maximum Hourly	4,800 gallons/hr
Annual	25.5 million gallons/year

Notes:

[1] Emission factors and speciation obtained from SJVAPCD and CAPCOA 1997 Gasoline Service Station Industrywide Risk Assessment Technical Guidance. Available at: https://ww2.arb.ca.gov/sites/default/files/classic//ab2588/rrap-iwra/gasiwra.pdf and https://www.valleyair.org/busind/pto/AB-2588-Toxics-Profiles.docx. Accessed: October 2021.

[2] Maximum hourly throughput is based on a maximum of 15 vehicles per dispensing position per hour, with an average fill up of 10 gallons per vehicle.

Abbreviations:

CAPCOA - California Air Pollution Control Officers Association
CARB - California Air Resources Board
hr - hour
lb - pounds
SJVAPCD - San Joaquin Valley Air Pollution Control District
VOC - volatile organic compounds

Table D-5. TRU Emission Calculations
Costco Commercial Center
Fresno, California

Emission Factor[1,2] (g/bhp-hr)	VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
	2.52	2.12	0.32	0.002	0.06	0.06

Number of Trips with TRUs[3]	712

Modeled Roadway Link	Annual VMT (miles/year)	Annual Average TRU Emissions (lb/year)					
		VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
TRU_1	4,591	16.17	13.56	2.03	0.01	0.38	0.35
TRU_2	784	2.76	2.32	0.35	0.00	0.07	0.06
TRU_3	1,457	30.79	25.83	3.87	0.02	0.73	0.67
TRU_4	744	15.71	13.18	1.97	0.01	0.37	0.34
TRU_5	317	1.12	0.94	0.14	0.00	0.03	0.02
TRU_6	1,607	5.66	4.75	0.71	0.00	0.13	0.12

Notes:

[1] Emission factors obtained from OFFROAD2021 emissions output for Calendar Year 2023, Transportation Refrigeration Unit - Instate Trailer and Transportation Refrigeration Unit - Out-Of-State Trailer in Fresno County.

[2] SO_X emission factors based on sulfur content of ultra-low sulfur diesel fuel (15 ppm) and fuel consumption from OFFROAD2021.

[3] Approximately 15% of warehouse delivery trucks are equipped with TRUs.

[4] Horsepower is based on SJVAPCD Guidance for Air Dispersion Modeling, section 2.3.1 Transportation Refrigeration unit (TRU), Modeling Parameters.

[5] Load factor obtained from CARB Draft 2019 Update to Emissions Inventory for Transport Refrigeration Units, for TRUs Over 25 hp, 2013 and newer. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/cold-storage/documents/hra_emissioninventory2019.pdf. Accessed: January 2022.

[6] It is assumed that TRUs will be powered by electric plug-ins at each loading dock during delivieries to the warehouse. Therefore, zero emissions are estimated to occur from TRUs at the loading docks due to zero minutes of TRU idling duration.

[7] TRU On-Road Duration is based on the segment length and travel speed for each roadway. On-site travel speed is assumed to be 5 miles per hour, and off-site travel speed is assumed to be 30 miles per hour. Assumptions are based on Table II.G.1 of CARB Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate. Available at: https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/appi.pdf. Accessed: July 2022.

Constants:

Horsepower [4]	50	bhp
Load Factor [5]	0.38	
TRU Idling Duration [6]	0	min
On-Site Travel [7]	5	miles/hr
Off-Site Travel [7]	30	miles/hr
Fuel Consumption[2]	0.04	gal/hp-hr
Fuel Sulfur Content[2]	15	ppm
Density of Diesel	3,221	g/gal

Conversion Factors:

453.59	g/lb
1,000,000	g/MT
60	min/hr
365	day/year
2,000	lb/ton

Abbreviations:

bph - brake horsepower
CARB - California Air Resources Board
CO - carbon monoxide
g - grams
gal - gallon
hp - horsepower
hr - hour
lb - pounds
min - minutes
NO_x - oxides of nitrogen
PM_{10} - particulate matter less than 10 microns in diameter
$PM_{2.5}$ - particulate matter less than 2.5 microns in diameter
ppm - parts per million
SJVAPCD - San Joaquin Valley Air Pollution Control District
SO_x - oxides of sulfur
TRU - transport/transportation refrigeration unit
VOC - volatile organic compounds

APPENDIX E
AERMOD INPUTS

Table E-1. Modeled Source Parameters - Point Sources
Costco Commercial Center
Fresno, California

Source Type	Model ID	Description	Stack Height[1] (m)	Stack Temperature[1] (K)	Exit Velocity[1] (m/s)	Stack Diameter[1] (m)	Emission Rate (g/s)
Point	LOADING	GDF loading emissions	3.66	291.00	0.00035	0.0508	1
Point	BREATH	GDF breathing emissions	3.66	288.71	0.000106	0.0508	1
Point	FT_IDLE	Fuel Delivery Truck Idling	3.84	366.0	51.71	0.100	1
Point	WT_IDLE_EAST	Warehouse Delivery Truck Idling	3.84	366.0	51.71	0.100	1
Point	WT_IDLE_WEST	Warehouse Delivery Truck Idling	3.84	366.0	51.71	0.100	1
Point	MD_IDLE_EAST	MDO Delivery Truck Idling	0.18	366.0	0.001	0.100	1
Point	MD_IDLE_WEST	MDO Delivery Truck Idling	0.18	366.0	0.001	0.100	1

Notes:

[1] Point source parameters are based on SJVAPCD Guidance for Air Dispersion Modeling. Available at: https://www.valleyair.org/busind/pto/Tox_Resources/Modeling%20Guidance.pdf. Accessed: October 2021.

Abbreviations:

gal - gallons
GDF - gasoline dispensing facility
g - gram
K - Kelvin
m - meters
SJVAPCD - San Joaquin Valley Air Pollution Control District
s - second
TRU - transportation refrigeration unit
yr - year

Table E-2. Modeled Source Parameters - Volume Sources
Costco Commercial Center
Fresno, California

Source Type	Model ID	Description	Release Height[1,2] (m)	Initial Lateral Dimension, Sigma Y[3,4] (m)	Initial Vertical Dimension, Sigma Z[1,2] (m)	Emission Rate[5] (g/s)
Volume	REFILL	Refueling and Hose Permeation	4.0	8.79	1.86	1.0
Volume	SPILL	Spillage	4.0	8.79	1.86	1.0
Volume	VOL_1 through VOL_241	On-Site Construction Equipment	5.0	9.30	1.40	1.0

Notes:

[1] Release height and Sigma Z for refueling, hose permeation, and spillage are based on SJVAPCD Guidance for Air Dispersion Modeling.

[2] Release height and Sigma Z for on-site construction equipment are based on SCAQMD Localized Significance Threshold Methodology.

[3] Initial lateral dimension for refueling, hose permeation, and spillage are based on the dimensions of the GDF canopy and calculated using USEPA AERMOD Guidance.

[4] Initial lateral dimension for on-site construction equipment is based on 20 meters of a volume source length of side provided in SCAQMD Localized Significance Threshold Methodology and calculated using USEPA AERMOD Guidance.

[5] Emission rate for on-site construction equipment represents the sum of all volume source emission rates.

Abbreviations:

g - gram
GDF - gasoline dispensing facility
m - meters
SCAQMD - South Coast Air Quality Management District
SJVAPCD - San Joaquin Valley Air Pollution Control District
s - second
USEPA - United States Environmental Protection Agency

References:

SCAQMD. 2008. Localized Significance Threshold Methodology. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2. Accessed: January 2022.

SJVAPCD. 2006. Guidance for Air Dispersion Modeling. Available at: https://www.valleyair.org/busind/pto/Tox_Resources/Modeling%20Guidance.pdf. Accessed: October 2021.

USEPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas Appendices. November. Available at: https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=P100NN22.pdf. Accessed: May 2021.

Table E-3. Modeled Source Parameters - Mobile Sources
Costco Commercial Center
Fresno, California

Source Type	Model ID	Description	Plume Width[1] (m)	Plume Height[2,3] (m)	Release Height[4,5] (m)
Line-Volume	FT_TRV1 through FT_TRV10	Fuel Delivery Truck Travel	3.66	6.80	3.40
Line-Volume	WT_TRV1 through WT_TRV6	Warehouse Delivery Truck Travel	3.66	6.80	3.40
Line-Volume	MD_TRV1 through MD_TRV18	MDO Truck Travel	3.66	3.84	1.83
Line-Volume	OFFTRV1 through OFFTRV7	Construction-Related Vendor and Hauling Truck Travel	3.66	6.80	3.40

Notes:

[1] Plume width is equal to SJVAPCD recommended value of 12 feet for truck width. Diana Walker (SJVAPCD) confirmed this value on October 7, 2021.

[2] The plume height for fuel delivery, warehouse delivery, and construction-related trucks is assumed to be equal to 1.7 times the vehicle height. Vehicle height is based on the USEPA Transportation Conformity Guidance.

[3] The plume height for MDO delivery trucks is equal to SJVAPCD recommended value of 12.6 feet for truck height. This plume height is lower than the plume heights for other trucks to capture the low-level placement of the MDO delivery trucks' tailpipe exhausts.

[4] Release height for fuel delivery, warehouse delivery, and construction-related trucks is estimated as half of the initial vertical dimension based on the USEPA Transportation Conformity Guidance.

[5] Release height for MDO delivery trucks is equal to SJVAPCD recommended value of 6 feet for truck height. This release height is lower than the release heights for other trucks to capture the low-level placement of the MDO delivery trucks' tailpipe exhausts.

Abbreviations:

m - meters

MDO - market delivery operation

SJVAPCD - San Joaquin Valley Air Pollution Control District

USEPA - United States Environmental Protection Agency

References:

SJVAPCD. 2006. Guidance for Air Dispersion Modeling. Available at: https://www.valleyair.org/busind/pto/Tox_Resources/Modeling%20Guidance.pdf. Accessed: October 2021.

USEPA. 2015. Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas Appendices. November. Available at: https://nepis.epa.gov/Exe/ZyPdf.cgi?Dockey=P100NN22.pdf. Accessed: May 2021.

APPENDIX F
HARP2 OUTPUTS

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
1	240425.00	4080650.00	Worker	0.13	5.58E-03	0.00E+00
3	240475.00	4080650.00	Worker	0.16	6.73E-03	0.00E+00
4	240500.00	4080650.00	Worker	0.18	7.51E-03	0.00E+00
13	240725.00	4080650.00	Worker	0.34	1.42E-02	0.00E+00
14	240750.00	4080650.00	Worker	0.34	1.40E-02	0.00E+00
15	240400.00	4080675.00	Worker	0.15	6.08E-03	0.00E+00
16	240425.00	4080675.00	Worker	0.16	6.73E-03	0.00E+00
18	240475.00	4080675.00	Worker	0.20	8.49E-03	0.00E+00
19	240500.00	4080675.00	Worker	0.24	9.79E-03	0.00E+00
28	240725.00	4080675.00	Worker	0.43	1.78E-02	0.00E+00
29	240750.00	4080675.00	Worker	0.41	1.70E-02	0.00E+00
30	240775.00	4080675.00	Worker	0.38	1.56E-02	0.00E+00
32	240400.00	4080700.00	Worker	0.18	7.26E-03	0.00E+00
33	240425.00	4080700.00	Worker	0.20	8.27E-03	0.00E+00
35	240475.00	4080700.00	Worker	0.27	1.12E-02	0.00E+00
36	240500.00	4080700.00	Worker	0.33	1.38E-02	0.00E+00
67	240375.00	4080750.00	Residential	7.00	8.52E-03	0.00E+00
75	240375.00	4080775.00	Residential	7.94	9.67E-03	0.00E+00
76	240400.00	4080775.00	Residential	9.64	1.17E-02	0.00E+00
77	240425.00	4080775.00	Residential	12.21	1.49E-02	0.00E+00
83	240375.00	4080800.00	Residential	8.87	1.08E-02	0.00E+00
84	240400.00	4080800.00	Residential	10.96	1.34E-02	0.00E+00
85	240425.00	4080800.00	Residential	14.21	1.73E-02	0.00E+00
91	240375.00	4080825.00	Residential	9.71	1.18E-02	0.00E+00
92	240400.00	4080825.00	Residential	12.15	1.48E-02	0.00E+00
93	240425.00	4080825.00	Residential	15.93	1.94E-02	0.00E+00
99	240375.00	4080850.00	Residential	10.39	1.26E-02	0.00E+00
100	240400.00	4080850.00	Residential	13.02	1.58E-02	0.00E+00
101	240425.00	4080850.00	Residential	16.99	2.07E-02	0.00E+00
108	240400.00	4080875.00	Residential	13.59	1.65E-02	0.00E+00
109	240425.00	4080875.00	Residential	17.62	2.15E-02	0.00E+00
115	240375.00	4080900.00	Residential	11.17	1.36E-02	0.00E+00
116	240400.00	4080900.00	Residential	13.93	1.70E-02	0.00E+00
117	240425.00	4080900.00	Residential	18.00	2.19E-02	0.00E+00
123	240375.00	4080925.00	Residential	11.32	1.38E-02	0.00E+00
124	240400.00	4080925.00	Residential	14.08	1.71E-02	0.00E+00
125	240425.00	4080925.00	Residential	18.14	2.21E-02	0.00E+00
139	240375.00	4080975.00	Residential	11.17	1.36E-02	0.00E+00
140	240400.00	4080975.00	Residential	13.88	1.69E-02	0.00E+00
141	240425.00	4080975.00	Residential	17.88	2.18E-02	0.00E+00
147	240375.00	4081000.00	Residential	10.87	1.32E-02	0.00E+00
148	240400.00	4081000.00	Residential	13.51	1.64E-02	0.00E+00
149	240425.00	4081000.00	Residential	17.43	2.12E-02	0.00E+00
156	240400.00	4081025.00	Residential	12.91	1.57E-02	0.00E+00
157	240425.00	4081025.00	Residential	16.71	2.03E-02	0.00E+00
163	240375.00	4081050.00	Residential	9.70	1.18E-02	0.00E+00
164	240400.00	4081050.00	Residential	12.04	1.47E-02	0.00E+00
165	240425.00	4081050.00	Residential	15.59	1.90E-02	0.00E+00
171	240375.00	4081075.00	Residential	8.84	1.08E-02	0.00E+00
172	240400.00	4081075.00	Residential	10.84	1.32E-02	0.00E+00
173	240425.00	4081075.00	Residential	13.86	1.69E-02	0.00E+00
189	240375.00	4081125.00	Residential	6.90	8.40E-03	0.00E+00

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
190	240400.00	4081125.00	Residential	7.93	9.66E-03	0.00E+00
191	240425.00	4081125.00	Residential	9.13	1.11E-02	0.00E+00
192	240450.00	4081125.00	Worker	0.31	1.26E-02	0.00E+00
193	240475.00	4081125.00	Worker	0.34	1.41E-02	0.00E+00
194	240500.00	4081125.00	Worker	0.38	1.55E-02	0.00E+00
195	240525.00	4081125.00	Worker	0.40	1.65E-02	0.00E+00
196	240550.00	4081125.00	Worker	0.40	1.68E-02	0.00E+00
197	240575.00	4081125.00	Worker	0.40	1.65E-02	0.00E+00
207	240375.00	4081150.00	Residential	5.92	7.21E-03	0.00E+00
208	240400.00	4081150.00	Residential	6.57	8.01E-03	0.00E+00
209	240425.00	4081150.00	Residential	7.26	8.84E-03	0.00E+00
210	240450.00	4081150.00	Worker	0.23	9.65E-03	0.00E+00
211	240475.00	4081150.00	Worker	0.25	1.04E-02	0.00E+00
212	240500.00	4081150.00	Worker	0.26	1.09E-02	0.00E+00
213	240525.00	4081150.00	Worker	0.27	1.12E-02	0.00E+00
214	240550.00	4081150.00	Worker	0.27	1.12E-02	0.00E+00
215	240575.00	4081150.00	Worker	0.26	1.09E-02	0.00E+00
216	240600.00	4081150.00	Worker	0.25	1.03E-02	0.00E+00
217	240625.00	4081150.00	Worker	0.23	9.52E-03	0.00E+00
218	240650.00	4081150.00	Worker	0.21	8.49E-03	0.00E+00
219	240675.00	4081150.00	Worker	0.18	7.27E-03	0.00E+00
220	240700.00	4081150.00	Worker	0.14	5.99E-03	0.00E+00
221	240725.00	4081150.00	Worker	0.12	4.91E-03	0.00E+00
222	240750.00	4081150.00	Worker	0.10	4.09E-03	0.00E+00
223	240775.00	4081150.00	Worker	0.08	3.48E-03	0.00E+00
224	240425.00	4081175.00	Residential	5.86	7.13E-03	0.00E+00
225	240450.00	4081175.00	Worker	0.18	7.57E-03	0.00E+00
226	240475.00	4081175.00	Worker	0.19	7.89E-03	0.00E+00
227	240500.00	4081175.00	Worker	0.20	8.10E-03	0.00E+00
228	240525.00	4081175.00	Worker	0.20	8.13E-03	0.00E+00
229	240550.00	4081175.00	Worker	0.19	7.99E-03	0.00E+00
230	240575.00	4081175.00	Worker	0.19	7.69E-03	0.00E+00
231	240600.00	4081175.00	Worker	0.17	7.23E-03	0.00E+00
232	240625.00	4081175.00	Worker	0.16	6.65E-03	0.00E+00
233	240650.00	4081175.00	Worker	0.14	5.96E-03	0.00E+00
234	240675.00	4081175.00	Worker	0.13	5.21E-03	0.00E+00
235	240700.00	4081175.00	Worker	0.11	4.49E-03	0.00E+00
236	240725.00	4081175.00	Worker	0.09	3.85E-03	0.00E+00
237	240750.00	4081175.00	Worker	0.08	3.33E-03	0.00E+00
238	240775.00	4081175.00	Worker	0.07	2.91E-03	0.00E+00
239	240525.00	4081200.00	Worker	0.15	6.19E-03	0.00E+00
240	240550.00	4081200.00	Worker	0.15	6.03E-03	0.00E+00
241	240575.00	4081200.00	Worker	0.14	5.76E-03	0.00E+00
242	240600.00	4081200.00	Worker	0.13	5.41E-03	0.00E+00
243	240625.00	4081200.00	Worker	0.12	4.99E-03	0.00E+00
244	240650.00	4081200.00	Worker	0.11	4.52E-03	0.00E+00
245	240675.00	4081200.00	Worker	0.10	4.03E-03	0.00E+00
246	240700.00	4081200.00	Worker	0.09	3.56E-03	0.00E+00
247	240725.00	4081200.00	Worker	0.08	3.15E-03	0.00E+00
248	240750.00	4081200.00	Worker	0.07	2.79E-03	0.00E+00
249	240400.00	4080500.00	Worker	0.06	2.37E-03	0.00E+00
250	240450.00	4080500.00	Worker	0.06	2.60E-03	0.00E+00

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
251	240500.00	4080500.00	Worker	0.07	2.87E-03	0.00E+00
256	240750.00	4080500.00	Worker	0.12	5.06E-03	0.00E+00
257	240800.00	4080500.00	Worker	0.13	5.41E-03	0.00E+00
258	240300.00	4080550.00	Worker	0.06	2.44E-03	0.00E+00
259	240350.00	4080550.00	Worker	0.06	2.67E-03	0.00E+00
260	240400.00	4080550.00	Worker	0.07	2.94E-03	0.00E+00
261	240450.00	4080550.00	Worker	0.08	3.27E-03	0.00E+00
267	240750.00	4080550.00	Worker	0.17	6.89E-03	0.00E+00
268	240800.00	4080550.00	Worker	0.17	7.14E-03	0.00E+00
269	240850.00	4080550.00	Worker	0.17	7.03E-03	0.00E+00
270	240300.00	4080600.00	Worker	0.07	3.04E-03	0.00E+00
271	240350.00	4080600.00	Worker	0.08	3.38E-03	0.00E+00
272	240400.00	4080600.00	Worker	0.09	3.79E-03	0.00E+00
274	240500.00	4080600.00	Worker	0.12	5.00E-03	0.00E+00
279	240750.00	4080600.00	Worker	0.23	9.68E-03	0.00E+00
280	240800.00	4080600.00	Worker	0.23	9.51E-03	0.00E+00
281	240850.00	4080600.00	Worker	0.21	8.78E-03	0.00E+00
282	240900.00	4080600.00	Worker	0.19	7.78E-03	0.00E+00
283	240250.00	4080650.00	Worker	0.08	3.38E-03	0.00E+00
284	240300.00	4080650.00	Worker	0.09	3.84E-03	0.00E+00
285	240350.00	4080650.00	Worker	0.11	4.41E-03	0.00E+00
286	240400.00	4080650.00	Worker	0.12	5.13E-03	0.00E+00
287	240800.00	4080650.00	Worker	0.30	1.25E-02	0.00E+00
288	240850.00	4080650.00	Worker	0.25	1.05E-02	0.00E+00
289	240900.00	4080650.00	Worker	0.21	8.74E-03	0.00E+00
297	240300.00	4080750.00	Residential	4.73	5.76E-03	0.00E+00
298	240350.00	4080750.00	Residential	6.05	7.37E-03	0.00E+00
299	240850.00	4080750.00	Worker	0.29	1.22E-02	0.00E+00
300	240900.00	4080750.00	Worker	0.22	9.29E-03	0.00E+00
301	240950.00	4080750.00	Worker	0.17	7.22E-03	0.00E+00
302	240250.00	4080800.00	Residential	4.33	5.28E-03	0.00E+00
303	240300.00	4080800.00	Residential	5.52	6.72E-03	0.00E+00
305	240850.00	4080800.00	Worker	0.29	1.20E-02	0.00E+00
306	240900.00	4080800.00	Worker	0.21	8.89E-03	0.00E+00
307	240950.00	4080800.00	Worker	0.16	6.75E-03	0.00E+00
308	240250.00	4080850.00	Residential	4.76	5.80E-03	0.00E+00
309	240300.00	4080850.00	Residential	6.20	7.55E-03	0.00E+00
311	240850.00	4080850.00	Worker	0.27	1.13E-02	0.00E+00
312	240900.00	4080850.00	Worker	0.20	8.14E-03	0.00E+00
313	240950.00	4080850.00	Worker	0.15	6.05E-03	0.00E+00
314	240250.00	4080900.00	Residential	5.05	6.15E-03	0.00E+00
315	240300.00	4080900.00	Residential	6.65	8.10E-03	0.00E+00
317	240850.00	4080900.00	Worker	0.24	1.01E-02	0.00E+00
318	240900.00	4080900.00	Worker	0.17	7.09E-03	0.00E+00
319	240950.00	4080900.00	Worker	0.12	5.17E-03	0.00E+00
321	240300.00	4080950.00	Residential	6.77	8.24E-03	0.00E+00
323	240850.00	4080950.00	Worker	0.20	8.46E-03	0.00E+00
324	240900.00	4080950.00	Worker	0.14	5.81E-03	0.00E+00
325	240950.00	4080950.00	Worker	0.10	4.22E-03	0.00E+00
326	240250.00	4081000.00	Residential	4.97	6.05E-03	0.00E+00
327	240300.00	4081000.00	Residential	6.51	7.93E-03	0.00E+00
329	240850.00	4081000.00	Worker	0.16	6.50E-03	0.00E+00

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
330	240900.00	4081000.00	Worker	0.11	4.47E-03	0.00E+00
331	240950.00	4081000.00	Worker	0.08	3.30E-03	0.00E+00
332	240250.00	4081050.00	Residential	4.61	5.61E-03	0.00E+00
333	240300.00	4081050.00	Residential	5.94	7.23E-03	0.00E+00
335	240850.00	4081050.00	Worker	0.11	4.59E-03	0.00E+00
336	240900.00	4081050.00	Worker	0.08	3.30E-03	0.00E+00
337	240950.00	4081050.00	Worker	0.06	2.53E-03	0.00E+00
338	240250.00	4081100.00	Residential	4.14	5.04E-03	0.00E+00
339	240300.00	4081100.00	Residential	5.18	6.31E-03	0.00E+00
340	240350.00	4081100.00	Residential	6.76	8.23E-03	0.00E+00
341	240850.00	4081100.00	Worker	0.08	3.19E-03	0.00E+00
342	240900.00	4081100.00	Worker	0.06	2.45E-03	0.00E+00
343	240950.00	4081100.00	Worker	0.05	1.97E-03	0.00E+00
344	240250.00	4081150.00	Residential	3.62	4.41E-03	0.00E+00
345	240300.00	4081150.00	Residential	4.35	5.30E-03	0.00E+00
346	240350.00	4081150.00	Residential	5.33	6.49E-03	0.00E+00
347	240800.00	4081150.00	Worker	0.07	3.01E-03	0.00E+00
348	240850.00	4081150.00	Worker	0.06	2.34E-03	0.00E+00
349	240900.00	4081150.00	Worker	0.05	1.89E-03	0.00E+00
350	240950.00	4081150.00	Worker	0.04	1.57E-03	0.00E+00
351	240250.00	4081200.00	Residential	3.07	3.73E-03	0.00E+00
352	240300.00	4081200.00	Residential	3.52	4.29E-03	0.00E+00
353	240350.00	4081200.00	Residential	4.04	4.91E-03	0.00E+00
354	240400.00	4081200.00	Residential	4.56	5.55E-03	0.00E+00
355	240450.00	4081200.00	Worker	0.15	6.05E-03	0.00E+00
356	240500.00	4081200.00	Worker	0.15	6.24E-03	0.00E+00
357	240800.00	4081200.00	Worker	0.05	2.22E-03	0.00E+00
358	240850.00	4081200.00	Worker	0.04	1.81E-03	0.00E+00
359	240900.00	4081200.00	Worker	0.04	1.52E-03	0.00E+00
360	240300.00	4081250.00	Residential	2.79	3.40E-03	0.00E+00
361	240350.00	4081250.00	Residential	3.04	3.70E-03	0.00E+00
362	240400.00	4081250.00	Residential	3.25	3.96E-03	0.00E+00
363	240450.00	4081250.00	Worker	0.10	4.09E-03	0.00E+00
364	240500.00	4081250.00	Worker	0.10	4.05E-03	0.00E+00
365	240550.00	4081250.00	Worker	0.09	3.82E-03	0.00E+00
366	240600.00	4081250.00	Worker	0.08	3.45E-03	0.00E+00
367	240650.00	4081250.00	Worker	0.07	2.97E-03	0.00E+00
368	240700.00	4081250.00	Worker	0.06	2.48E-03	0.00E+00
369	240750.00	4081250.00	Worker	0.05	2.07E-03	0.00E+00
370	240800.00	4081250.00	Worker	0.04	1.72E-03	0.00E+00
371	240850.00	4081250.00	Worker	0.04	1.45E-03	0.00E+00
372	240900.00	4081250.00	Worker	0.03	1.24E-03	0.00E+00
373	240350.00	4081300.00	Residential	2.33	2.83E-03	0.00E+00
374	240400.00	4081300.00	Residential	2.40	2.93E-03	0.00E+00
375	240450.00	4081300.00	Worker	0.07	2.94E-03	0.00E+00
376	240500.00	4081300.00	Worker	0.07	2.85E-03	0.00E+00
377	240550.00	4081300.00	Worker	0.06	2.68E-03	0.00E+00
378	240600.00	4081300.00	Worker	0.06	2.44E-03	0.00E+00
379	240650.00	4081300.00	Worker	0.05	2.15E-03	0.00E+00
380	240700.00	4081300.00	Worker	0.05	1.87E-03	0.00E+00
381	240750.00	4081300.00	Worker	0.04	1.61E-03	0.00E+00
382	240800.00	4081300.00	Worker	0.03	1.39E-03	0.00E+00

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
383	240850.00	4081300.00	Worker	0.03	1.20E-03	0.00E+00
384	240500.00	4081350.00	Worker	0.05	2.14E-03	0.00E+00
385	240550.00	4081350.00	Worker	0.05	2.00E-03	0.00E+00
386	240600.00	4081350.00	Worker	0.04	1.84E-03	0.00E+00
387	240650.00	4081350.00	Worker	0.04	1.65E-03	0.00E+00
388	240700.00	4081350.00	Worker	0.04	1.47E-03	0.00E+00
389	240750.00	4081350.00	Worker	0.03	1.31E-03	0.00E+00
390	240300.00	4080300.00	Worker	0.03	1.11E-03	0.00E+00
391	240400.00	4080300.00	Worker	0.03	1.26E-03	0.00E+00
392	240500.00	4080300.00	Worker	0.03	1.41E-03	0.00E+00
393	240600.00	4080300.00	Worker	0.04	1.57E-03	0.00E+00
395	240800.00	4080300.00	Residential	1.77	2.15E-03	0.00E+00
396	240900.00	4080300.00	Residential	2.03	2.47E-03	0.00E+00
397	240100.00	4080400.00	Worker	0.03	1.17E-03	0.00E+00
398	240200.00	4080400.00	Worker	0.03	1.28E-03	0.00E+00
399	240300.00	4080400.00	Worker	0.03	1.45E-03	0.00E+00
400	240400.00	4080400.00	Worker	0.04	1.68E-03	0.00E+00
401	240500.00	4080400.00	Worker	0.05	1.93E-03	0.00E+00
404	240800.00	4080400.00	Worker	0.08	3.27E-03	0.00E+00
405	240900.00	4080400.00	Worker	0.09	3.64E-03	0.00E+00
406	241000.00	4080400.00	Worker	0.09	3.65E-03	0.00E+00
409	240300.00	4080500.00	Worker	0.05	2.01E-03	0.00E+00
410	240900.00	4080500.00	Worker	0.13	5.47E-03	0.00E+00
411	241000.00	4080500.00	Worker	0.12	4.84E-03	0.00E+00
412	241100.00	4080500.00	Worker	0.10	3.96E-03	0.00E+00
413	240000.00	4080600.00	Worker	0.04	1.73E-03	0.00E+00
415	240200.00	4080600.00	Worker	0.06	2.52E-03	0.00E+00
416	241000.00	4080600.00	Worker	0.14	5.80E-03	0.00E+00
417	241100.00	4080600.00	Worker	0.10	4.23E-03	0.00E+00
418	240000.00	4080700.00	Worker	0.05	2.05E-03	0.00E+00
419	240100.00	4080700.00	Worker	0.06	2.61E-03	0.00E+00
420	240200.00	4080700.00	Worker	0.08	3.45E-03	0.00E+00
424	240000.00	4080800.00	Worker	0.05	2.27E-03	0.00E+00
425	240100.00	4080800.00	Residential	2.49	3.03E-03	0.00E+00
426	240200.00	4080800.00	Residential	3.52	4.29E-03	0.00E+00
427	241000.00	4080800.00	Worker	0.13	5.23E-03	0.00E+00
428	241100.00	4080800.00	Residential	2.72	3.31E-03	0.00E+00
429	241200.00	4080800.00	Residential	1.84	2.24E-03	0.00E+00
430	240000.00	4080900.00	Worker	0.06	2.34E-03	0.00E+00
431	240100.00	4080900.00	Residential	2.66	3.24E-03	0.00E+00
432	240200.00	4080900.00	Residential	3.98	4.84E-03	0.00E+00
433	241000.00	4080900.00	Worker	0.09	3.91E-03	0.00E+00
434	241100.00	4080900.00	Residential	2.01	2.45E-03	0.00E+00
435	241200.00	4080900.00	Residential	1.38	1.68E-03	0.00E+00
438	240200.00	4081000.00	Residential	3.92	4.77E-03	0.00E+00
439	241000.00	4081000.00	Worker	0.06	2.56E-03	0.00E+00
440	241100.00	4081000.00	Residential	1.40	1.70E-03	0.00E+00
441	241200.00	4081000.00	Residential	1.01	1.23E-03	0.00E+00
442	240000.00	4081100.00	Worker	0.05	2.20E-03	0.00E+00
443	240100.00	4081100.00	Residential	2.42	2.94E-03	0.00E+00
444	240200.00	4081100.00	Residential	3.40	4.14E-03	0.00E+00
445	241000.00	4081100.00	Worker	0.04	1.63E-03	0.00E+00

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
446	241100.00	4081100.00	Residential	0.97	1.19E-03	0.00E+00
447	241200.00	4081100.00	Residential	0.75	9.13E-04	0.00E+00
448	240000.00	4081200.00	Worker	0.05	1.98E-03	0.00E+00
449	240100.00	4081200.00	Residential	2.07	2.52E-03	0.00E+00
450	240200.00	4081200.00	Residential	2.67	3.26E-03	0.00E+00
451	241000.00	4081200.00	Residential	0.92	1.12E-03	0.00E+00
452	241100.00	4081200.00	Residential	0.72	8.76E-04	0.00E+00
453	240000.00	4081300.00	Worker	0.04	1.68E-03	0.00E+00
454	240100.00	4081300.00	Residential	1.64	1.99E-03	0.00E+00
455	240200.00	4081300.00	Residential	1.92	2.34E-03	0.00E+00
456	240300.00	4081300.00	Residential	2.21	2.69E-03	0.00E+00
457	240900.00	4081300.00	Worker	0.03	1.04E-03	0.00E+00
458	241000.00	4081300.00	Residential	0.67	8.16E-04	0.00E+00
459	241100.00	4081300.00	Residential	0.55	6.68E-04	0.00E+00
460	240100.00	4081400.00	Residential	1.23	1.50E-03	0.00E+00
461	240200.00	4081400.00	Residential	1.34	1.63E-03	0.00E+00
462	240300.00	4081400.00	Residential	1.43	1.74E-03	0.00E+00
463	240400.00	4081400.00	Residential	1.46	1.78E-03	0.00E+00
464	240500.00	4081400.00	Worker	0.04	1.67E-03	0.00E+00
465	240600.00	4081400.00	Worker	0.03	1.44E-03	0.00E+00
466	240700.00	4081400.00	Worker	0.03	1.20E-03	0.00E+00
467	240800.00	4081400.00	Worker	0.02	9.77E-04	0.00E+00
468	240900.00	4081400.00	Worker	0.02	7.77E-04	0.00E+00
469	241000.00	4081400.00	Residential	0.51	6.25E-04	0.00E+00
470	241100.00	4081400.00	Residential	0.43	5.22E-04	0.00E+00
471	240200.00	4081500.00	Residential	0.97	1.18E-03	0.00E+00
472	240300.00	4081500.00	Residential	1.00	1.22E-03	0.00E+00
473	240400.00	4081500.00	Residential	0.99	1.20E-03	0.00E+00
474	240500.00	4081500.00	Worker	0.03	1.11E-03	0.00E+00
475	240600.00	4081500.00	Worker	0.02	9.74E-04	0.00E+00
476	240700.00	4081500.00	Worker	0.02	8.46E-04	0.00E+00
477	240800.00	4081500.00	Worker	0.02	7.31E-04	0.00E+00
478	240900.00	4081500.00	Worker	0.01	6.13E-04	0.00E+00
479	241000.00	4081500.00	Residential	0.42	5.06E-04	0.00E+00
480	240500.00	4081600.00	Worker	0.02	8.00E-04	0.00E+00
481	240600.00	4081600.00	Worker	0.02	7.10E-04	0.00E+00
482	240700.00	4081600.00	Worker	0.02	6.35E-04	0.00E+00
483	240800.00	4081600.00	Worker	0.01	5.70E-04	0.00E+00
484	240500.00	4079750.00	Worker	0.01	4.62E-04	0.00E+00
485	240750.00	4079750.00	Worker	0.01	5.37E-04	0.00E+00
486	240000.00	4080000.00	Residential	0.39	4.80E-04	0.00E+00
487	240250.00	4080000.00	Worker	0.01	5.99E-04	0.00E+00
489	240750.00	4080000.00	Worker	0.02	8.57E-04	0.00E+00
490	241000.00	4080000.00	Residential	0.92	1.12E-03	0.00E+00
491	241250.00	4080000.00	Residential	1.08	1.31E-03	0.00E+00
492	239750.00	4080250.00	Worker	0.02	6.57E-04	0.00E+00
493	240000.00	4080250.00	Worker	0.02	7.65E-04	0.00E+00
494	240250.00	4080250.00	Worker	0.02	9.30E-04	0.00E+00
495	241000.00	4080250.00	Residential	1.86	2.26E-03	0.00E+00
496	241250.00	4080250.00	Residential	1.77	2.16E-03	0.00E+00
501	241250.00	4080500.00	Worker	0.07	2.77E-03	0.00E+00
506	241500.00	4080750.00	Residential	0.86	1.04E-03	0.00E+00

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
507	239500.00	4081000.00	Worker	0.02	8.00E-04	0.00E+00
508	239750.00	4081000.00	Worker	0.03	1.25E-03	0.00E+00
510	241500.00	4081000.00	Residential	0.50	6.04E-04	0.00E+00
511	239500.00	4081250.00	Worker	0.02	7.70E-04	0.00E+00
512	239750.00	4081250.00	Worker	0.03	1.15E-03	0.00E+00
513	241250.00	4081250.00	Residential	0.48	5.79E-04	0.00E+00
514	241500.00	4081250.00	Residential	0.32	3.95E-04	0.00E+00
515	239750.00	4081500.00	Worker	0.02	8.63E-04	0.00E+00
516	240000.00	4081500.00	Worker	0.03	1.06E-03	0.00E+00
517	241250.00	4081500.00	Residential	0.28	3.45E-04	0.00E+00
518	241500.00	4081500.00	Residential	0.22	2.68E-04	0.00E+00
519	239750.00	4081750.00	Worker	0.01	4.96E-04	0.00E+00
520	240000.00	4081750.00	Worker	0.01	5.31E-04	0.00E+00
521	240250.00	4081750.00	Worker	0.01	5.60E-04	0.00E+00
522	240500.00	4081750.00	Worker	0.01	4.81E-04	0.00E+00
523	240750.00	4081750.00	Worker	0.01	4.27E-04	0.00E+00
524	241000.00	4081750.00	Worker	0.01	3.36E-04	0.00E+00
525	241250.00	4081750.00	Worker	0.01	2.42E-04	0.00E+00
526	240250.00	4082000.00	Worker	0.01	3.67E-04	0.00E+00
527	240500.00	4082000.00	Worker	0.01	3.08E-04	0.00E+00
528	240750.00	4082000.00	Worker	0.01	2.51E-04	0.00E+00
529	241000.00	4082000.00	Worker	0.01	2.30E-04	0.00E+00
531	240000.00	4079000.00	Residential	0.16	1.91E-04	0.00E+00
532	240500.00	4079000.00	Residential	0.16	2.00E-04	0.00E+00
534	241500.00	4079000.00	Worker	0.01	3.10E-04	0.00E+00
535	239000.00	4079500.00	Worker	0.00	1.95E-04	0.00E+00
536	239500.00	4079500.00	Residential	0.18	2.20E-04	0.00E+00
537	240000.00	4079500.00	Residential	0.23	2.74E-04	0.00E+00
538	240500.00	4079500.00	Residential	0.27	3.32E-04	0.00E+00
539	241000.00	4079500.00	Worker	0.01	4.44E-04	0.00E+00
540	241500.00	4079500.00	Worker	0.01	5.98E-04	0.00E+00
541	242000.00	4079500.00	Residential	0.49	5.97E-04	0.00E+00
542	239000.00	4080000.00	Worker	0.01	3.16E-04	0.00E+00
543	239500.00	4080000.00	Residential	0.32	3.90E-04	0.00E+00
544	241500.00	4080000.00	Residential	1.03	1.25E-03	0.00E+00
545	242000.00	4080000.00	Residential	0.65	7.91E-04	0.00E+00
546	242500.00	4080000.00	Residential	0.36	4.34E-04	0.00E+00
547	238500.00	4080500.00	Worker	0.01	2.79E-04	0.00E+00
548	239000.00	4080500.00	Worker	0.01	4.30E-04	0.00E+00
549	242000.00	4080500.00	Residential	0.47	5.77E-04	0.00E+00
550	242500.00	4080500.00	Residential	0.25	3.02E-04	0.00E+00
551	238500.00	4081000.00	Worker	0.01	2.73E-04	0.00E+00
552	239000.00	4081000.00	Worker	0.01	4.28E-04	0.00E+00
553	242000.00	4081000.00	Residential	0.23	2.85E-04	0.00E+00
554	242500.00	4081000.00	Residential	0.14	1.73E-04	0.00E+00
555	238500.00	4081500.00	Worker	0.01	2.49E-04	0.00E+00
556	239000.00	4081500.00	Worker	0.01	3.92E-04	0.00E+00
557	239500.00	4081500.00	Worker	0.02	6.63E-04	0.00E+00
558	242000.00	4081500.00	Residential	0.15	1.79E-04	0.00E+00
559	242500.00	4081500.00	Residential	0.10	1.24E-04	0.00E+00
560	239000.00	4082000.00	Worker	0.01	2.86E-04	0.00E+00
561	239500.00	4082000.00	Worker	0.01	3.34E-04	0.00E+00

Table F-1. Construction Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
562	240000.00	4082000.00	Worker	0.01	3.66E-04	0.00E+00
563	241500.00	4082000.00	Residential	0.12	1.47E-04	0.00E+00
564	242000.00	4082000.00	Residential	0.09	1.06E-04	0.00E+00
565	239500.00	4082500.00	Worker	0.00	2.02E-04	0.00E+00
566	240000.00	4082500.00	Worker	0.01	2.10E-04	0.00E+00
567	240500.00	4082500.00	Worker	0.00	1.67E-04	0.00E+00
568	241000.00	4082500.00	Worker	0.00	1.39E-04	0.00E+00
569	241500.00	4082500.00	Worker	0.00	1.02E-04	0.00E+00
570	242000.00	4082500.00	Worker	0.00	7.38E-05	0.00E+00
571	240000.00	4083000.00	Worker	0.00	1.32E-04	0.00E+00
572	240500.00	4083000.00	Worker	0.00	1.07E-04	0.00E+00
573	241000.00	4083000.00	Worker	0.00	9.31E-05	0.00E+00
574	240982.00	4080428.00	Sensitive	3.30	4.02E-03	0.00E+00
575	241114.00	4080505.00	Sensitive	3.17	3.86E-03	0.00E+00
576	241812.00	4080393.00	Sensitive	0.72	8.83E-04	0.00E+00
577	239709.00	4079647.00	Sensitive	0.22	2.67E-04	0.00E+00
578	239709.00	4079647.00	Sensitive	0.22	2.67E-04	0.00E+00
579	242094.00	4081102.00	Sensitive	0.19	2.25E-04	0.00E+00
580	242489.00	4081376.00	Sensitive	0.11	1.32E-04	0.00E+00
581	241998.00	4079399.00	Sensitive	0.45	5.44E-04	0.00E+00
582	242523.00	4080146.00	Sensitive	0.32	3.86E-04	0.00E+00
583	240160.00	4078896.00	Sensitive	0.15	1.80E-04	0.00E+00
584	242576.00	4081764.00	Sensitive	0.08	1.02E-04	0.00E+00
585	242632.00	4080241.00	Sensitive	0.26	3.21E-04	0.00E+00

Abbreviations:
m - meter

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
1	240425.00	4080650.00	Worker	0.53	1.39E-03	3.98E-02
3	240475.00	4080650.00	Worker	0.56	1.50E-03	4.23E-02
4	240500.00	4080650.00	Worker	0.56	1.55E-03	4.38E-02
13	240725.00	4080650.00	Worker	0.78	2.05E-03	4.11E-02
14	240750.00	4080650.00	Worker	0.69	2.17E-03	4.02E-02
15	240400.00	4080675.00	Worker	0.66	1.46E-03	4.16E-02
16	240425.00	4080675.00	Worker	0.68	1.51E-03	4.23E-02
18	240475.00	4080675.00	Worker	0.72	1.64E-03	4.53E-02
19	240500.00	4080675.00	Worker	0.73	1.70E-03	4.73E-02
28	240725.00	4080675.00	Worker	0.88	2.30E-03	4.46E-02
29	240750.00	4080675.00	Worker	0.75	2.44E-03	4.34E-02
30	240775.00	4080675.00	Worker	0.62	2.58E-03	4.24E-02
32	240400.00	4080700.00	Worker	0.90	1.59E-03	4.51E-02
33	240425.00	4080700.00	Worker	0.92	1.65E-03	4.51E-02
35	240475.00	4080700.00	Worker	0.98	1.79E-03	4.84E-02
36	240500.00	4080700.00	Worker	1.01	1.87E-03	5.05E-02
67	240375.00	4080750.00	Residential	5.56	1.88E-03	5.00E-02
75	240375.00	4080775.00	Residential	5.22	2.10E-03	5.24E-02
76	240400.00	4080775.00	Residential	6.11	2.17E-03	5.57E-02
77	240425.00	4080775.00	Residential	7.61	2.25E-03	5.75E-02
83	240375.00	4080800.00	Residential	5.17	2.35E-03	5.58E-02
84	240400.00	4080800.00	Residential	6.16	2.44E-03	5.98E-02
85	240425.00	4080800.00	Residential	7.76	2.54E-03	6.27E-02
91	240375.00	4080825.00	Residential	5.20	2.65E-03	5.94E-02
92	240400.00	4080825.00	Residential	6.26	2.76E-03	6.34E-02
93	240425.00	4080825.00	Residential	7.95	2.88E-03	6.87E-02
99	240375.00	4080850.00	Residential	5.13	3.01E-03	6.27E-02
100	240400.00	4080850.00	Residential	6.22	3.15E-03	6.79E-02
101	240425.00	4080850.00	Residential	8.30	3.30E-03	7.28E-02
108	240400.00	4080875.00	Residential	5.76	3.63E-03	7.21E-02
109	240425.00	4080875.00	Residential	7.07	3.82E-03	7.87E-02
115	240375.00	4080900.00	Residential	4.61	3.99E-03	7.18E-02
116	240400.00	4080900.00	Residential	5.15	4.23E-03	7.75E-02
117	240425.00	4080900.00	Residential	5.76	4.48E-03	8.47E-02
123	240375.00	4080925.00	Residential	4.34	4.63E-03	8.11E-02
124	240400.00	4080925.00	Residential	4.70	4.97E-03	8.34E-02
125	240425.00	4080925.00	Residential	5.15	5.32E-03	9.16E-02
139	240375.00	4080975.00	Residential	4.07	6.02E-03	9.45E-02
140	240400.00	4080975.00	Residential	4.46	6.74E-03	1.04E-01
141	240425.00	4080975.00	Residential	4.99	7.55E-03	1.18E-01
147	240375.00	4081000.00	Residential	4.02	6.59E-03	9.92E-02
148	240400.00	4081000.00	Residential	4.48	7.55E-03	1.08E-01
149	240425.00	4081000.00	Residential	5.14	8.71E-03	1.24E-01
156	240400.00	4081025.00	Residential	4.50	8.12E-03	1.14E-01
157	240425.00	4081025.00	Residential	5.28	9.60E-03	1.33E-01
163	240375.00	4081050.00	Residential	3.89	7.14E-03	1.02E-01
164	240400.00	4081050.00	Residential	4.47	8.42E-03	1.17E-01
165	240425.00	4081050.00	Residential	5.32	1.01E-02	1.34E-01
171	240375.00	4081075.00	Residential	3.84	7.19E-03	1.06E-01
172	240400.00	4081075.00	Residential	4.42	8.51E-03	1.21E-01
173	240425.00	4081075.00	Residential	5.31	1.03E-02	1.40E-01
189	240375.00	4081125.00	Residential	3.43	7.12E-03	1.06E-01

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
190	240400.00	4081125.00	Residential	3.96	8.44E-03	1.21E-01
191	240425.00	4081125.00	Residential	4.67	1.02E-02	1.38E-01
192	240450.00	4081125.00	Worker	0.79	1.26E-02	1.61E-01
193	240475.00	4081125.00	Worker	0.95	1.60E-02	1.90E-01
194	240500.00	4081125.00	Worker	1.21	2.11E-02	2.28E-01
195	240525.00	4081125.00	Worker	1.62	2.91E-02	2.83E-01
196	240550.00	4081125.00	Worker	2.30	4.25E-02	3.66E-01
197	240575.00	4081125.00	Worker	3.47	6.52E-02	4.69E-01
207	240375.00	4081150.00	Residential	3.26	7.02E-03	1.04E-01
208	240400.00	4081150.00	Residential	3.74	8.29E-03	1.17E-01
209	240425.00	4081150.00	Residential	4.39	9.95E-03	1.34E-01
210	240450.00	4081150.00	Worker	0.74	1.22E-02	1.55E-01
211	240475.00	4081150.00	Worker	0.88	1.52E-02	1.82E-01
212	240500.00	4081150.00	Worker	1.09	1.94E-02	2.23E-01
213	240525.00	4081150.00	Worker	1.39	2.52E-02	2.70E-01
214	240550.00	4081150.00	Worker	1.76	3.26E-02	3.34E-01
215	240575.00	4081150.00	Worker	2.17	4.07E-02	4.03E-01
216	240600.00	4081150.00	Worker	2.45	4.62E-02	4.85E-01
217	240625.00	4081150.00	Worker	2.35	4.43E-02	5.17E-01
218	240650.00	4081150.00	Worker	1.81	3.37E-02	4.15E-01
219	240675.00	4081150.00	Worker	1.26	2.32E-02	3.25E-01
220	240700.00	4081150.00	Worker	0.89	1.61E-02	2.17E-01
221	240725.00	4081150.00	Worker	0.66	1.17E-02	2.21E-01
222	240750.00	4081150.00	Worker	0.51	8.93E-03	1.76E-01
223	240775.00	4081150.00	Worker	0.41	7.04E-03	1.48E-01
224	240425.00	4081175.00	Residential	4.08	9.41E-03	1.32E-01
225	240450.00	4081175.00	Worker	0.67	1.12E-02	1.51E-01
226	240475.00	4081175.00	Worker	0.78	1.35E-02	1.76E-01
227	240500.00	4081175.00	Worker	0.91	1.62E-02	2.09E-01
228	240525.00	4081175.00	Worker	1.06	1.92E-02	2.44E-01
229	240550.00	4081175.00	Worker	1.20	2.20E-02	2.88E-01
230	240575.00	4081175.00	Worker	1.31	2.41E-02	3.36E-01
231	240600.00	4081175.00	Worker	1.34	2.49E-02	3.63E-01
232	240625.00	4081175.00	Worker	1.24	2.30E-02	3.91E-01
233	240650.00	4081175.00	Worker	1.02	1.87E-02	2.78E-01
234	240675.00	4081175.00	Worker	0.80	1.45E-02	2.46E-01
235	240700.00	4081175.00	Worker	0.61	1.09E-02	1.77E-01
236	240725.00	4081175.00	Worker	0.48	8.39E-03	1.26E-01
237	240750.00	4081175.00	Worker	0.39	6.66E-03	1.40E-01
238	240775.00	4081175.00	Worker	0.32	5.45E-03	1.31E-01
239	240525.00	4081200.00	Worker	0.78	1.38E-02	2.16E-01
240	240550.00	4081200.00	Worker	0.82	1.48E-02	2.51E-01
241	240575.00	4081200.00	Worker	0.85	1.54E-02	2.79E-01
242	240600.00	4081200.00	Worker	0.84	1.53E-02	2.78E-01
243	240625.00	4081200.00	Worker	0.77	1.40E-02	3.04E-01
244	240650.00	4081200.00	Worker	0.66	1.19E-02	2.01E-01
245	240675.00	4081200.00	Worker	0.55	9.80E-03	1.81E-01
246	240700.00	4081200.00	Worker	0.45	7.93E-03	1.63E-01
247	240725.00	4081200.00	Worker	0.37	6.35E-03	1.08E-01
248	240750.00	4081200.00	Worker	0.31	5.17E-03	8.77E-02
249	240400.00	4080500.00	Worker	0.22	8.86E-04	2.84E-02
250	240450.00	4080500.00	Worker	0.22	9.37E-04	3.13E-02

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
251	240500.00	4080500.00	Worker	0.23	9.71E-04	2.97E-02
256	240750.00	4080500.00	Worker	0.33	1.22E-03	2.76E-02
257	240800.00	4080500.00	Worker	0.34	1.32E-03	2.67E-02
258	240300.00	4080550.00	Worker	0.28	8.99E-04	2.88E-02
259	240350.00	4080550.00	Worker	0.27	9.44E-04	2.89E-02
260	240400.00	4080550.00	Worker	0.27	1.00E-03	3.07E-02
261	240450.00	4080550.00	Worker	0.28	1.07E-03	3.39E-02
267	240750.00	4080550.00	Worker	0.42	1.44E-03	3.11E-02
268	240800.00	4080550.00	Worker	0.41	1.57E-03	3.02E-02
269	240850.00	4080550.00	Worker	0.37	1.71E-03	2.91E-02
270	240300.00	4080600.00	Worker	0.36	1.03E-03	3.13E-02
271	240350.00	4080600.00	Worker	0.36	1.08E-03	3.32E-02
272	240400.00	4080600.00	Worker	0.36	1.15E-03	3.43E-02
274	240500.00	4080600.00	Worker	0.37	1.31E-03	3.72E-02
279	240750.00	4080600.00	Worker	0.56	1.75E-03	3.50E-02
280	240800.00	4080600.00	Worker	0.48	1.92E-03	3.37E-02
281	240850.00	4080600.00	Worker	0.40	2.11E-03	3.23E-02
282	240900.00	4080600.00	Worker	0.33	2.31E-03	3.05E-02
283	240250.00	4080650.00	Worker	0.59	1.16E-03	3.21E-02
284	240300.00	4080650.00	Worker	0.52	1.21E-03	3.52E-02
285	240350.00	4080650.00	Worker	0.51	1.26E-03	3.72E-02
286	240400.00	4080650.00	Worker	0.52	1.34E-03	3.82E-02
287	240800.00	4080650.00	Worker	0.52	2.41E-03	3.84E-02
288	240850.00	4080650.00	Worker	0.40	2.68E-03	3.57E-02
289	240900.00	4080650.00	Worker	0.34	2.92E-03	3.48E-02
297	240300.00	4080750.00	Residential	4.03	1.72E-03	4.23E-02
298	240350.00	4080750.00	Residential	4.96	1.83E-03	4.63E-02
299	240850.00	4080750.00	Worker	0.42	4.72E-03	4.99E-02
300	240900.00	4080750.00	Worker	0.38	4.89E-03	4.60E-02
301	240950.00	4080750.00	Worker	0.35	4.75E-03	4.17E-02
302	240250.00	4080800.00	Residential	3.00	1.96E-03	4.16E-02
303	240300.00	4080800.00	Residential	3.58	2.11E-03	4.69E-02
305	240850.00	4080800.00	Worker	0.47	6.51E-03	5.85E-02
306	240900.00	4080800.00	Worker	0.43	6.36E-03	5.20E-02
307	240950.00	4080800.00	Worker	0.38	5.78E-03	4.68E-02
308	240250.00	4080850.00	Residential	2.91	2.42E-03	4.89E-02
309	240300.00	4080850.00	Residential	3.48	2.64E-03	5.13E-02
311	240850.00	4080850.00	Worker	0.57	9.00E-03	6.83E-02
312	240900.00	4080850.00	Worker	0.49	8.02E-03	5.98E-02
313	240950.00	4080850.00	Worker	0.41	6.70E-03	5.05E-02
314	240250.00	4080900.00	Residential	2.91	2.94E-03	5.43E-02
315	240300.00	4080900.00	Residential	3.44	3.34E-03	6.33E-02
317	240850.00	4080900.00	Worker	0.70	1.20E-02	8.05E-02
318	240900.00	4080900.00	Worker	0.55	9.38E-03	6.74E-02
319	240950.00	4080900.00	Worker	0.42	7.08E-03	5.85E-02
321	240300.00	4080950.00	Residential	3.30	4.06E-03	6.79E-02
323	240850.00	4080950.00	Worker	0.80	1.40E-02	9.42E-02
324	240900.00	4080950.00	Worker	0.55	9.55E-03	7.35E-02
325	240950.00	4080950.00	Worker	0.39	6.61E-03	5.50E-02
326	240250.00	4081000.00	Residential	2.65	3.65E-03	6.02E-02
327	240300.00	4081000.00	Residential	3.07	4.53E-03	7.22E-02
329	240850.00	4081000.00	Worker	0.74	1.31E-02	9.49E-02

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
330	240900.00	4081000.00	Worker	0.47	8.15E-03	7.19E-02
331	240950.00	4081000.00	Worker	0.33	5.47E-03	5.93E-02
332	240250.00	4081050.00	Residential	2.48	3.72E-03	6.32E-02
333	240300.00	4081050.00	Residential	2.87	4.70E-03	7.46E-02
335	240850.00	4081050.00	Worker	0.54	9.51E-03	1.03E-01
336	240900.00	4081050.00	Worker	0.35	5.99E-03	7.83E-02
337	240950.00	4081050.00	Worker	0.25	4.12E-03	6.24E-02
338	240250.00	4081100.00	Residential	2.18	3.69E-03	6.49E-02
339	240300.00	4081100.00	Residential	2.58	4.67E-03	7.78E-02
340	240350.00	4081100.00	Residential	3.19	6.14E-03	9.61E-02
341	240850.00	4081100.00	Worker	0.36	5.95E-03	1.01E-01
342	240900.00	4081100.00	Worker	0.25	4.05E-03	7.62E-02
343	240950.00	4081100.00	Worker	0.19	2.94E-03	6.04E-02
344	240250.00	4081150.00	Residential	1.97	3.64E-03	6.35E-02
345	240300.00	4081150.00	Residential	2.34	4.60E-03	7.58E-02
346	240350.00	4081150.00	Residential	2.88	6.03E-03	9.26E-02
347	240800.00	4081150.00	Worker	0.34	5.69E-03	1.22E-01
348	240850.00	4081150.00	Worker	0.24	3.92E-03	8.64E-02
349	240900.00	4081150.00	Worker	0.18	2.87E-03	6.86E-02
350	240950.00	4081150.00	Worker	0.14	2.19E-03	5.48E-02
351	240250.00	4081200.00	Residential	1.81	3.54E-03	6.14E-02
352	240300.00	4081200.00	Residential	2.13	4.41E-03	7.21E-02
353	240350.00	4081200.00	Residential	2.58	5.65E-03	8.87E-02
354	240400.00	4081200.00	Residential	3.23	7.40E-03	1.11E-01
355	240450.00	4081200.00	Worker	0.59	9.82E-03	1.48E-01
356	240500.00	4081200.00	Worker	0.72	1.26E-02	1.91E-01
357	240800.00	4081200.00	Worker	0.23	3.68E-03	9.71E-02
358	240850.00	4081200.00	Worker	0.18	2.78E-03	7.75E-02
359	240900.00	4081200.00	Worker	0.14	2.17E-03	6.32E-02
360	240300.00	4081250.00	Residential	1.87	3.99E-03	6.83E-02
361	240350.00	4081250.00	Residential	2.17	4.83E-03	8.72E-02
362	240400.00	4081250.00	Residential	2.52	5.77E-03	1.05E-01
363	240450.00	4081250.00	Worker	0.41	6.63E-03	1.28E-01
364	240500.00	4081250.00	Worker	0.43	7.26E-03	1.58E-01
365	240550.00	4081250.00	Worker	0.44	7.67E-03	1.79E-01
366	240600.00	4081250.00	Worker	0.43	7.45E-03	1.95E-01
367	240650.00	4081250.00	Worker	0.35	6.01E-03	1.24E-01
368	240700.00	4081250.00	Worker	0.28	4.67E-03	1.08E-01
369	240750.00	4081250.00	Worker	0.21	3.44E-03	7.81E-02
370	240800.00	4081250.00	Worker	0.16	2.55E-03	5.11E-02
371	240850.00	4081250.00	Worker	0.13	2.01E-03	5.60E-02
372	240900.00	4081250.00	Worker	0.11	1.65E-03	5.60E-02
373	240350.00	4081300.00	Residential	1.71	3.77E-03	7.74E-02
374	240400.00	4081300.00	Residential	1.85	4.10E-03	9.29E-02
375	240450.00	4081300.00	Worker	0.28	4.35E-03	1.10E-01
376	240500.00	4081300.00	Worker	0.28	4.56E-03	1.24E-01
377	240550.00	4081300.00	Worker	0.28	4.66E-03	1.28E-01
378	240600.00	4081300.00	Worker	0.26	4.39E-03	1.36E-01
379	240650.00	4081300.00	Worker	0.22	3.65E-03	8.75E-02
380	240700.00	4081300.00	Worker	0.19	3.05E-03	7.80E-02
381	240750.00	4081300.00	Worker	0.16	2.47E-03	7.04E-02
382	240800.00	4081300.00	Worker	0.13	1.92E-03	4.43E-02

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
383	240850.00	4081300.00	Worker	0.10	1.53E-03	3.49E-02
384	240500.00	4081350.00	Worker	0.20	3.12E-03	9.65E-02
385	240550.00	4081350.00	Worker	0.20	3.13E-03	9.68E-02
386	240600.00	4081350.00	Worker	0.18	2.89E-03	1.08E-01
387	240650.00	4081350.00	Worker	0.16	2.46E-03	6.66E-02
388	240700.00	4081350.00	Worker	0.14	2.14E-03	6.04E-02
389	240750.00	4081350.00	Worker	0.12	1.84E-03	5.55E-02
390	240300.00	4080300.00	Worker	0.11	5.33E-04	1.99E-02
391	240400.00	4080300.00	Worker	0.11	5.79E-04	2.46E-02
392	240500.00	4080300.00	Worker	0.12	5.97E-04	2.03E-02
393	240600.00	4080300.00	Worker	0.12	6.08E-04	2.09E-02
395	240800.00	4080300.00	Residential	1.14	7.45E-04	1.84E-02
396	240900.00	4080300.00	Residential	1.24	8.29E-04	1.74E-02
397	240100.00	4080400.00	Worker	0.13	5.58E-04	1.90E-02
398	240200.00	4080400.00	Worker	0.14	5.89E-04	2.06E-02
399	240300.00	4080400.00	Worker	0.15	6.39E-04	2.15E-02
400	240400.00	4080400.00	Worker	0.15	7.10E-04	2.87E-02
401	240500.00	4080400.00	Worker	0.15	7.49E-04	2.44E-02
404	240800.00	4080400.00	Worker	0.23	9.67E-04	2.16E-02
405	240900.00	4080400.00	Worker	0.23	1.09E-03	2.07E-02
406	241000.00	4080400.00	Worker	0.21	1.24E-03	1.91E-02
409	240300.00	4080500.00	Worker	0.22	7.92E-04	2.57E-02
410	240900.00	4080500.00	Worker	0.30	1.53E-03	2.46E-02
411	241000.00	4080500.00	Worker	0.23	1.75E-03	2.33E-02
412	241100.00	4080500.00	Worker	0.19	1.83E-03	2.14E-02
413	240000.00	4080600.00	Worker	0.24	8.16E-04	2.08E-02
415	240200.00	4080600.00	Worker	0.42	9.58E-04	2.76E-02
416	241000.00	4080600.00	Worker	0.25	2.54E-03	2.81E-02
417	241100.00	4080600.00	Worker	0.20	2.45E-03	2.51E-02
418	240000.00	4080700.00	Worker	0.24	1.06E-03	2.53E-02
419	240100.00	4080700.00	Worker	0.33	1.17E-03	2.69E-02
420	240200.00	4080700.00	Worker	0.52	1.29E-03	3.21E-02
424	240000.00	4080800.00	Worker	0.23	1.34E-03	2.85E-02
425	240100.00	4080800.00	Residential	2.02	1.58E-03	3.43E-02
426	240200.00	4080800.00	Residential	2.59	1.83E-03	3.78E-02
427	241000.00	4080800.00	Worker	0.33	5.03E-03	4.11E-02
428	241100.00	4080800.00	Residential	1.62	3.53E-03	3.35E-02
429	241200.00	4080800.00	Residential	1.13	2.41E-03	2.49E-02
430	240000.00	4080900.00	Worker	0.22	1.54E-03	3.08E-02
431	240100.00	4080900.00	Residential	1.92	1.97E-03	3.76E-02
432	240200.00	4080900.00	Residential	2.50	2.57E-03	4.79E-02
433	241000.00	4080900.00	Worker	0.32	5.32E-03	4.67E-02
434	241100.00	4080900.00	Residential	1.39	3.12E-03	3.29E-02
435	241200.00	4080900.00	Residential	0.92	1.99E-03	2.50E-02
438	240200.00	4081000.00	Residential	2.32	3.00E-03	5.19E-02
439	241000.00	4081000.00	Worker	0.24	3.90E-03	4.95E-02
440	241100.00	4081000.00	Residential	1.03	2.26E-03	3.57E-02
441	241200.00	4081000.00	Residential	0.70	1.48E-03	2.73E-02
442	240000.00	4081100.00	Worker	0.18	1.59E-03	3.37E-02
443	240100.00	4081100.00	Residential	1.53	2.12E-03	4.22E-02
444	240200.00	4081100.00	Residential	1.90	3.00E-03	5.54E-02
445	241000.00	4081100.00	Worker	0.15	2.24E-03	4.95E-02

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
446	241100.00	4081100.00	Residential	0.73	1.43E-03	3.55E-02
447	241200.00	4081100.00	Residential	0.50	1.00E-03	2.72E-02
448	240000.00	4081200.00	Worker	0.15	1.56E-03	3.25E-02
449	240100.00	4081200.00	Residential	1.26	2.07E-03	4.05E-02
450	240200.00	4081200.00	Residential	1.57	2.90E-03	5.23E-02
451	241000.00	4081200.00	Residential	0.67	1.41E-03	4.18E-02
452	241100.00	4081200.00	Residential	0.49	9.89E-04	3.12E-02
453	240000.00	4081300.00	Worker	0.13	1.49E-03	3.08E-02
454	240100.00	4081300.00	Residential	1.07	1.92E-03	3.87E-02
455	240200.00	4081300.00	Residential	1.28	2.54E-03	4.81E-02
456	240300.00	4081300.00	Residential	1.57	3.35E-03	6.78E-02
457	240900.00	4081300.00	Worker	0.09	1.27E-03	3.47E-02
458	241000.00	4081300.00	Residential	0.47	9.53E-04	3.73E-02
459	241100.00	4081300.00	Residential	0.37	7.41E-04	2.87E-02
460	240100.00	4081400.00	Residential	0.85	1.59E-03	3.80E-02
461	240200.00	4081400.00	Residential	0.94	1.86E-03	4.57E-02
462	240300.00	4081400.00	Residential	0.99	2.05E-03	5.67E-02
463	240400.00	4081400.00	Residential	1.06	2.17E-03	7.11E-02
464	240500.00	4081400.00	Worker	0.15	2.27E-03	7.71E-02
465	240600.00	4081400.00	Worker	0.13	2.05E-03	8.69E-02
466	240700.00	4081400.00	Worker	0.10	1.58E-03	4.79E-02
467	240800.00	4081400.00	Worker	0.08	1.22E-03	4.16E-02
468	240900.00	4081400.00	Worker	0.06	8.66E-04	2.23E-02
469	241000.00	4081400.00	Residential	0.35	6.54E-04	1.76E-02
470	241100.00	4081400.00	Residential	0.28	5.35E-04	2.26E-02
471	240200.00	4081500.00	Residential	0.65	1.24E-03	3.96E-02
472	240300.00	4081500.00	Residential	0.65	1.29E-03	4.71E-02
473	240400.00	4081500.00	Residential	0.68	1.34E-03	5.42E-02
474	240500.00	4081500.00	Worker	0.09	1.36E-03	5.27E-02
475	240600.00	4081500.00	Worker	0.08	1.20E-03	5.89E-02
476	240700.00	4081500.00	Worker	0.07	9.74E-04	3.19E-02
477	240800.00	4081500.00	Worker	0.06	8.31E-04	2.94E-02
478	240900.00	4081500.00	Worker	0.05	6.51E-04	2.34E-02
479	241000.00	4081500.00	Residential	0.28	5.01E-04	1.44E-02
480	240500.00	4081600.00	Worker	0.07	9.05E-04	4.22E-02
481	240600.00	4081600.00	Worker	0.06	7.90E-04	4.21E-02
482	240700.00	4081600.00	Worker	0.05	6.67E-04	2.42E-02
483	240800.00	4081600.00	Worker	0.04	5.96E-04	2.25E-02
484	240500.00	4079750.00	Worker	0.04	2.45E-04	9.93E-03
485	240750.00	4079750.00	Worker	0.05	2.67E-04	9.02E-03
486	240000.00	4080000.00	Residential	0.36	2.77E-04	1.11E-02
487	240250.00	4080000.00	Worker	0.05	3.28E-04	2.00E-02
489	240750.00	4080000.00	Worker	0.07	3.87E-04	1.21E-02
490	241000.00	4080000.00	Residential	0.63	4.75E-04	1.11E-02
491	241250.00	4080000.00	Residential	0.62	5.76E-04	9.98E-03
492	239750.00	4080250.00	Worker	0.08	3.64E-04	1.17E-02
493	240000.00	4080250.00	Worker	0.08	4.03E-04	1.46E-02
494	240250.00	4080250.00	Worker	0.09	4.66E-04	1.65E-02
495	241000.00	4080250.00	Residential	1.08	8.08E-04	1.53E-02
496	241250.00	4080250.00	Residential	0.85	9.86E-04	1.35E-02
501	241250.00	4080500.00	Worker	0.14	1.69E-03	1.81E-02
506	241500.00	4080750.00	Residential	0.51	9.92E-04	1.38E-02

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
507	239500.00	4081000.00	Worker	0.09	6.16E-04	1.50E-02
508	239750.00	4081000.00	Worker	0.13	9.33E-04	2.08E-02
510	241500.00	4081000.00	Residential	0.31	6.05E-04	1.54E-02
511	239500.00	4081250.00	Worker	0.08	5.91E-04	1.49E-02
512	239750.00	4081250.00	Worker	0.10	8.88E-04	2.07E-02
513	241250.00	4081250.00	Residential	0.30	5.79E-04	2.04E-02
514	241500.00	4081250.00	Residential	0.19	3.45E-04	1.35E-02
515	239750.00	4081500.00	Worker	0.07	7.78E-04	1.87E-02
516	240000.00	4081500.00	Worker	0.09	1.08E-03	2.86E-02
517	241250.00	4081500.00	Residential	0.18	3.24E-04	1.51E-02
518	241500.00	4081500.00	Residential	0.13	2.42E-04	1.18E-02
519	239750.00	4081750.00	Worker	0.04	4.55E-04	1.37E-02
520	240000.00	4081750.00	Worker	0.04	4.73E-04	1.67E-02
521	240250.00	4081750.00	Worker	0.04	5.07E-04	2.28E-02
522	240500.00	4081750.00	Worker	0.04	4.84E-04	2.41E-02
523	240750.00	4081750.00	Worker	0.03	4.07E-04	1.63E-02
524	241000.00	4081750.00	Worker	0.03	3.11E-04	1.43E-02
525	241250.00	4081750.00	Worker	0.02	2.06E-04	7.26E-03
526	240250.00	4082000.00	Worker	0.03	3.14E-04	1.61E-02
527	240500.00	4082000.00	Worker	0.02	2.83E-04	1.70E-02
528	240750.00	4082000.00	Worker	0.02	2.14E-04	9.34E-03
529	241000.00	4082000.00	Worker	0.02	1.97E-04	9.12E-03
531	240000.00	4079000.00	Residential	0.11	1.17E-04	1.13E-02
532	240500.00	4079000.00	Residential	0.12	1.17E-04	5.29E-03
534	241500.00	4079000.00	Worker	0.03	1.66E-04	4.38E-03
535	239000.00	4079500.00	Worker	0.02	1.27E-04	4.82E-03
536	239500.00	4079500.00	Residential	0.16	1.40E-04	6.09E-03
537	240000.00	4079500.00	Residential	0.18	1.69E-04	1.22E-02
538	240500.00	4079500.00	Residential	0.20	1.85E-04	7.77E-03
539	241000.00	4079500.00	Worker	0.04	2.33E-04	6.84E-03
540	241500.00	4079500.00	Worker	0.04	2.96E-04	5.94E-03
541	242000.00	4079500.00	Residential	0.26	3.27E-04	5.14E-03
542	239000.00	4080000.00	Worker	0.04	2.00E-04	9.39E-03
543	239500.00	4080000.00	Residential	0.31	2.36E-04	8.10E-03
544	241500.00	4080000.00	Residential	0.52	6.30E-04	9.12E-03
545	242000.00	4080000.00	Residential	0.31	5.09E-04	7.01E-03
546	242500.00	4080000.00	Residential	0.18	3.15E-04	4.97E-03
547	238500.00	4080500.00	Worker	0.03	2.11E-04	5.99E-03
548	239000.00	4080500.00	Worker	0.05	3.10E-04	8.05E-03
549	242000.00	4080500.00	Residential	0.26	4.65E-04	7.27E-03
550	242500.00	4080500.00	Residential	0.13	2.32E-04	4.82E-03
551	238500.00	4081000.00	Worker	0.03	2.16E-04	6.32E-03
552	239000.00	4081000.00	Worker	0.05	3.37E-04	9.15E-03
553	242000.00	4081000.00	Residential	0.14	2.48E-04	7.95E-03
554	242500.00	4081000.00	Residential	0.08	1.40E-04	5.17E-03
555	238500.00	4081500.00	Worker	0.03	1.93E-04	5.51E-03
556	239000.00	4081500.00	Worker	0.04	3.05E-04	8.05E-03
557	239500.00	4081500.00	Worker	0.06	5.54E-04	1.36E-02
558	242000.00	4081500.00	Residential	0.08	1.41E-04	6.58E-03
559	242500.00	4081500.00	Residential	0.06	9.08E-05	5.32E-03
560	239000.00	4082000.00	Worker	0.02	2.36E-04	7.16E-03
561	239500.00	4082000.00	Worker	0.03	2.89E-04	1.04E-02

Table F-2. Operational Health Risk Assessment Results for All Receptors
Costco Commercial Center
Fresno, California

Receptor ID	X-Coordinate (m)	Y-Coordinate (m)	Receptor Type	Cancer Risk (in a million)	Chronic Hazard Index	Acute Hazard Index
562	240000.00	4082000.00	Worker	0.03	3.06E-04	1.40E-02
563	241500.00	4082000.00	Residential	0.07	1.17E-04	4.59E-03
564	242000.00	4082000.00	Residential	0.05	8.31E-05	4.64E-03
565	239500.00	4082500.00	Worker	0.02	1.54E-04	8.74E-03
566	240000.00	4082500.00	Worker	0.01	1.60E-04	9.83E-03
567	240500.00	4082500.00	Worker	0.01	1.39E-04	1.09E-02
568	241000.00	4082500.00	Worker	0.01	1.09E-04	5.67E-03
569	241500.00	4082500.00	Worker	0.01	7.84E-05	3.99E-03
570	242000.00	4082500.00	Worker	0.01	5.47E-05	2.37E-03
571	240000.00	4083000.00	Worker	0.01	9.94E-05	6.33E-03
572	240500.00	4083000.00	Worker	0.01	8.30E-05	6.25E-03
573	241000.00	4083000.00	Worker	0.01	6.95E-05	3.76E-03
574	240982.00	4080428.00	Sensitive	1.57	1.33E-03	2.03E-02
575	241114.00	4080505.00	Sensitive	1.29	1.86E-03	2.12E-02
576	241812.00	4080393.00	Sensitive	0.38	6.92E-04	9.51E-03
577	239709.00	4079647.00	Sensitive	0.20	1.68E-04	7.28E-03
578	239709.00	4079647.00	Sensitive	0.20	1.68E-04	7.28E-03
579	242094.00	4081102.00	Sensitive	0.11	1.85E-04	7.31E-03
580	242489.00	4081376.00	Sensitive	0.06	9.66E-05	4.68E-03
581	241998.00	4079399.00	Sensitive	0.25	2.98E-04	4.83E-03
582	242523.00	4080146.00	Sensitive	0.16	2.87E-04	4.45E-03
583	240160.00	4078896.00	Sensitive	0.11	1.08E-04	4.84E-03
584	242576.00	4081764.00	Sensitive	0.05	7.56E-05	3.92E-03
585	242632.00	4080241.00	Sensitive	0.14	2.39E-04	4.28E-03

Abbreviations:
m - meter

APPENDIX G
CO HOTSPOTS

Table G-1: Level of Service Summary
Costco Commerical Center
Fresno, California

Intersection No.	Location	Level of Service			
		Scenario 1:	Scenario 2:	Scenario 3:	Scenario 4:
		Existing Conditions	Existing Plus Project Conditions	Existing Plus Project Conditions with Off-Site Improvements	Future Conditions
		AM Peak Hour			
1	N Riverside Dr/W Spruce St	A	A	--	A
2	N Riverside Dr/W Fir Ave	A	B	A	A
3	N Riverside Dr/W Herndon Ave	C	E	C	A
4	N Golden State Blvd/W Herndon Ave	C	C	C	C
5	SR 99 NB Off-Ramp/ W Herndon Ave	B	B	--	B
6	N Parkway Dr/W Herndon Ave	C	C	--	C
A	N Riverside Dr/ Site Access A	--	A	--	--
C	N Riverside Dr/ Site Access C	--	A	--	--
D	Site Access D/ W Herndon Ave	--	B	--	--
		PM Peak Hour			
1	N Riverside Dr/W Spruce St	A	B	--	A
2	N Riverside Dr/W Fir Ave	A	F	C	A
3	N Riverside Dr/W Herndon Ave	E	F	D	E
4	N Golden State Blvd/W Herndon Ave	C	E	D	D
5	SR 99 NB Off-Ramp/ W Herndon Ave	C	D	--	B
6	N Parkway Dr/W Herndon Ave	C	C	--	B
A	N Riverside Dr/ Site Access A	--	A	--	--
C	N Riverside Dr/ Site Access C	--	A	--	--
D	Site Access D/ W Herndon Ave	--	C	--	--
		Saturday Peak Hour			
1	N Riverside Dr/W Spruce St	A	B	--	A
2	N Riverside Dr/W Fir Ave	A	F	C	A
3	N Riverside Dr/W Herndon Ave	C	F	D	C
4	N Golden State Blvd/W Herndon Ave	C	E	D	C
5	SR 99 NB Off-Ramp/ W Herndon Ave	B	C	--	A
6	N Parkway Dr/W Herndon Ave	B	C	--	B
A	N Riverside Dr/ Site Access A	--	A	--	--
C	N Riverside Dr/ Site Access C	--	A	--	--
D	Site Access D/ W Herndon Ave	--	C	--	--

Table G-1: Level of Service Summary
Costco Commerical Center
Fresno, California

Intersection No.	Location	Level of Service			
		Scenario 5:	Scenario 6:	Scenario 7:	Scenario 8:
		Future Plus Project Conditions	Future Plus Project with Reclassification Conditions with Off-Site Improvements	Future Plus Project Conditions without Reclassification of W Herndon Ave	Future Plus Project Conditions without Reclassification of W Herndon Ave with Off-Site Improvements
		AM Peak Hour			
1	N Riverside Dr/W Spruce St	A	--	A	--
2	N Riverside Dr/W Fir Ave	B	A	C	A
3	N Riverside Dr/W Herndon Ave	E	C	E	C
4	N Golden State Blvd/W Herndon Ave	C	C	C	C
5	SR 99 NB Off-Ramp/ W Herndon Ave	B	--	B	--
6	N Parkway Dr/W Herndon Ave	C	--	C	--
A	N Riverside Dr/ Site Access A	A	--	A	--
C	N Riverside Dr/ Site Access C	A	--	A	--
D	Site Access D/ W Herndon Ave	B	--	--	--
		PM Peak Hour			
1	N Riverside Dr/W Spruce St	B	--	B	--
2	N Riverside Dr/W Fir Ave	F	B	F	C
3	N Riverside Dr/W Herndon Ave	F	D	F	D
4	N Golden State Blvd/W Herndon Ave	E	D	E	D
5	SR 99 NB Off-Ramp/ W Herndon Ave	B	--	B	--
6	N Parkway Dr/W Herndon Ave	B	--	B	--
A	N Riverside Dr/ Site Access A	A	--	A	--
C	N Riverside Dr/ Site Access C	A	--	A	--
D	Site Access D/ W Herndon Ave	C	--	--	--
		Saturday Peak Hour			
1	N Riverside Dr/W Spruce St	B	--	B	--
2	N Riverside Dr/W Fir Ave	F	C	F	D
3	N Riverside Dr/W Herndon Ave	F	D	F	D
4	N Golden State Blvd/W Herndon Ave	E	D	E	D
5	SR 99 NB Off-Ramp/ W Herndon Ave	B	--	B	--
6	N Parkway Dr/W Herndon Ave	B	--	B	--
A	N Riverside Dr/ Site Access A	A	--	A	--
C	N Riverside Dr/ Site Access C	A	--	A	--
D	Site Access D/ W Herndon Ave	B	--	--	--

Appendix D

Transportation Impact Analysis

KITTELSON & ASSOCIATES

FRESNO COSTCO RELOCATION TRANSPORTATION IMPACT ANALYSIS

FRESNO, CA

May 2023

Inside front cover

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Fresno Costco Relocation Transportation Impact Analysis

Fresno, CA

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Project Number 26784

May 2023

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Section 1
Introduction

INTRODUCTION

This report summarizes the transportation impacts associated with the relocation of a Costco warehouse currently in operation at 4500 W Shaw Ave to a vacant site in the northeast corner of N Riverside Dr and W Herndon Ave in the City of Fresno, CA. Figure 1 illustrates the site vicinity.

PROJECT DESCRIPTION

Costco Wholesale Corporation (Costco) is proposing to relocate their existing wholesale retail facility situated at 4500 W Shaw Ave in Fresno, CA (project). The project would consist of a 191,346-square-foot (sf) relocated retail facility with an attached tire center, 49,996-sf relocated market delivery operation (MDO), 32-position fuel station, and drive-through car wash with approximately 987 parking stalls on a 22.4-acre parcel located at the northeast corner of the intersection of N Riverside Dr and W Herndon Ave. The project would construct a second northbound vehicle travel lane on N Riverside Dr along the project frontage as well as a multiuse path along the southern and western project frontages (W Herndon Ave and N Riverside Dr, respectively). Figure 2 shows the proposed site plan.

The wholesale retail facility is open to Costco members only. The MDOs is a last-mile facility for delivery of large and bulky items and is not open to visitation by Costco members. At MDO facilities, there is a drop off of large goods, organization of the goods, and loading of last-mile trucks for daily deliveries to Costco members' homes.

The project also includes a proposed re-zone and General Plan amendment to reclassify the adjacent portion of W Herndon Ave from expressway to super arterial to allow for appropriate vehicle access. The project site is currently undeveloped and is designated by both the zoning and General Plan as Community Commercial. The project would have its main access points along N Riverside Dr, with secondary access on W Spruce Ave and Arthur Ave (a planned public street on the east side of the site, which would connect to W Herndon Ave).

SCOPE OF THE REPORT

The scope of the report was developed in coordination with the City of Fresno (City) and Caltrans. The analysis performed for this study determines the expected transportation-related effects of the project. *Appendix A* includes the scoping agreement memorandum.

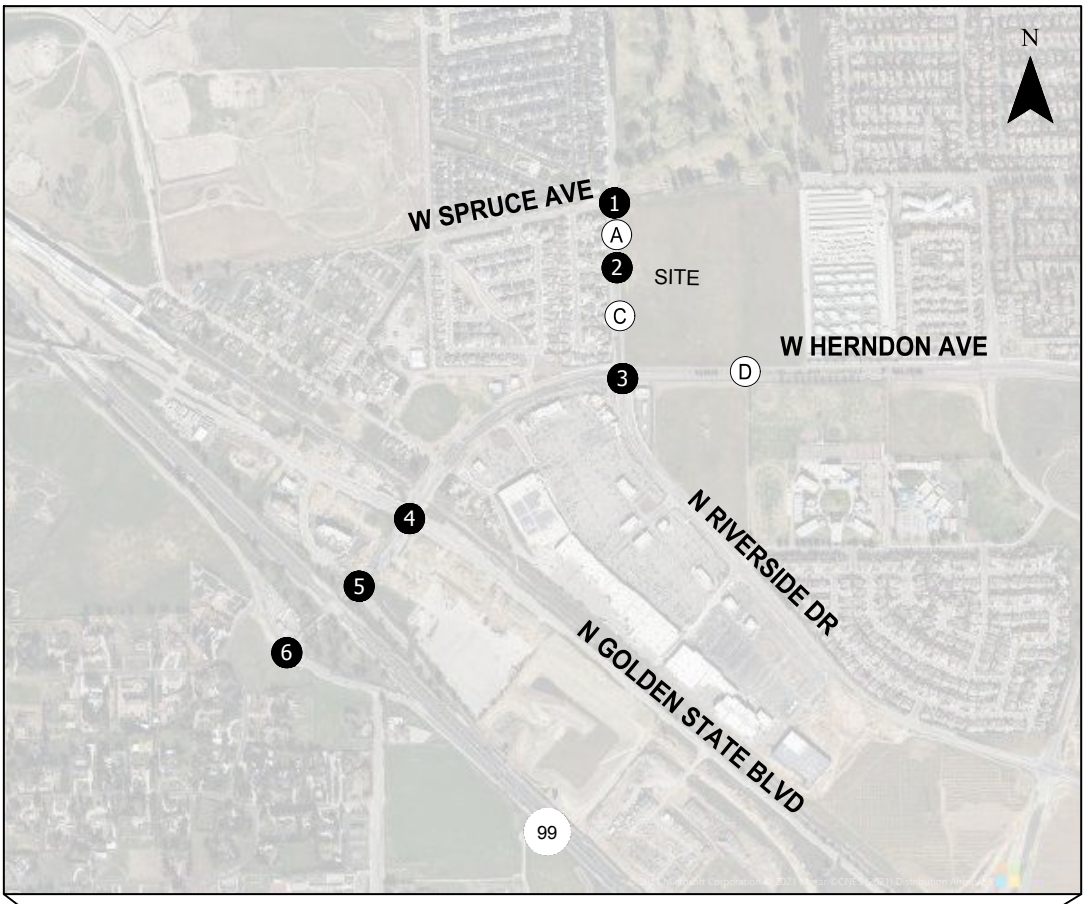
The transportation analyses documented in this report were performed to establish consistency with the City of Fresno General Plan, as implemented through the City's Traffic Impact Study Report Guidelines,[1] and to comply with the California Environmental Quality Act (CEQA), as implemented through the City's CEQA Guidelines for Vehicle Miles Traveled Thresholds.[2] An analysis based on automobile delay (i.e., level of service or LOS) can no longer be used for assessing CEQA impacts. Therefore, the LOS evaluation is not assigned significance levels and is presented in this report regarding consistency with the general plan as a factor for consideration by the decision-makers in acting on the project.

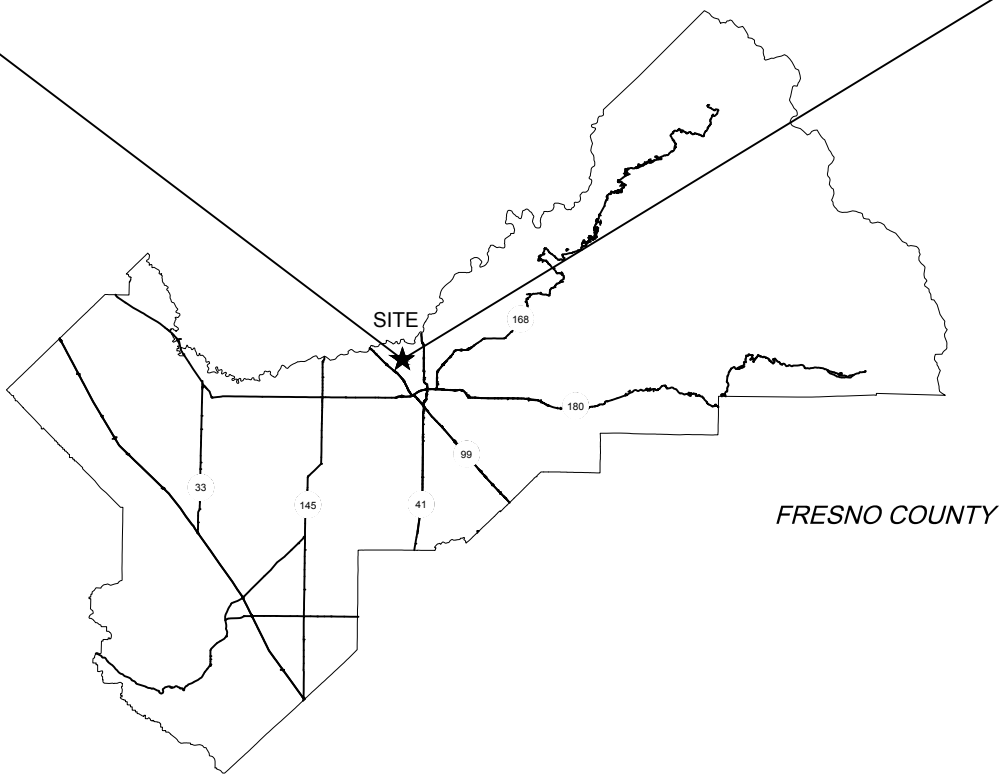
[1] City of Fresno Traffic Impact Study Report Guidelines, updated February 2, 2009

[2] City of Fresno Guidelines for Vehicle Miles Traveled Thresholds, adopted June 25, 2020

This report evaluates the following transportation issues:

- General Plan Consistency
    - Traffic Operations for Five Scenarios
        - Existing Conditions
        - Trip generation and distribution estimates for the project
        - Existing Plus Project Conditions
        - Future Conditions (Year 2042)
        - Future Plus Project Conditions
        - Future Plus Project Conditions, without Functional Classification Change of W Herndon Ave
- CEQA Compliance
    - Consistency with existing programs, plans, ordinances, or policies, including those associated with transit, pedestrian, and bicyclist access
    - Change in regional daily vehicle miles traveled (VMT) due to the project
    - Potential hazards resulting from queues
    - Emergency access around and near the project site





(##) - Study Intersections
(X) - Site Accesses

Site Vicinity Map
Fresno, California

Figure
1

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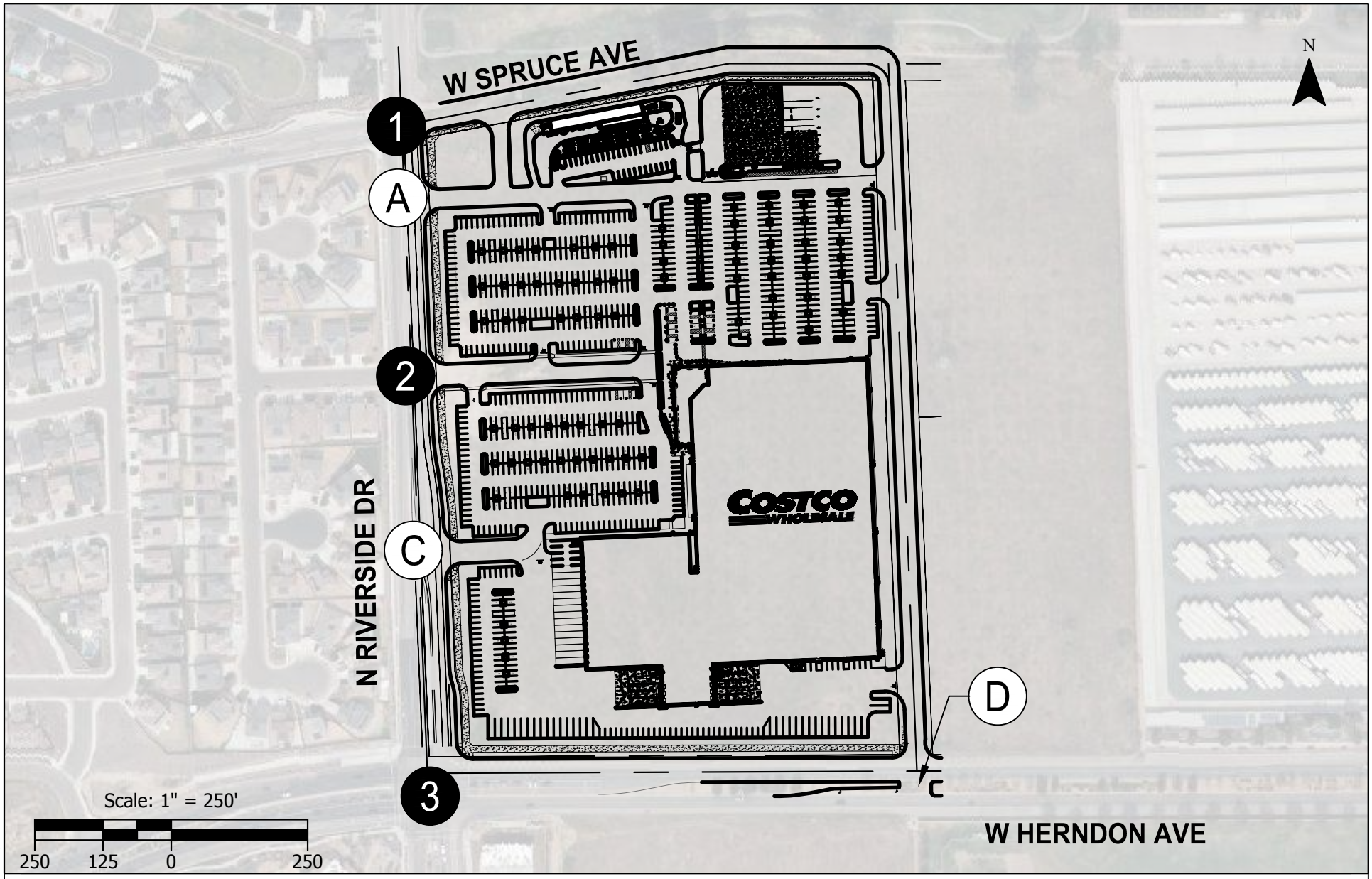

##- Study Intersections
ⓧ- Site Accesses

Recieved From: MG2 Engineering August 10, 2021

Proposed Site Plan
Fresno, California

Figure
2

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Section 2

General Plan Consistency Assessment

GENERAL PLAN CONSISTENCY ASSESSMENT

The general plan consistency, or non-CEQA, section of this report includes analyses for the following:

- Existing Conditions
- Trip generation and distribution estimates for the project
- Existing Plus Project Conditions
- Future Conditions (Year 2042)
- Future Plus Project Conditions
- Future Plus Project Conditions, without Functional Classification Change of W Herndon Ave

The following study intersections were selected for traffic operations evaluation based on land use and circulation conditions near the project site and access to the proposed development:

1. N Riverside Dr & W Spruce Ave
2. N Riverside Dr & W Fir Ave (Plus Project scenarios only)
3. N Riverside Dr & W Herndon Ave
4. N Golden State Blvd & W Herndon Ave
5. SR 99 NB off-ramp & W Herndon Ave
6. N Parkway Dr & W Herndon Ave

EXISTING CONDITIONS

The Existing Conditions analysis identifies the site conditions and current operational and geometric characteristics of the study intersections as well as transit services, bicycle, and pedestrian facilities near the project site.

ROADWAY NETWORK

State Route 99 (SR 99), or Golden State Highway, is a north-south freeway traversing the Central Valley. It connects to I-5 near Wheeler Ridge to the south and ends at SR 36 near Red Bluff to the north. In Fresno, SR 99 has six lanes. In the study area, the nearest interchange is at W Herndon Ave.

W Herndon Ave is an east-west super arterial with four to six lanes and a raised planted median. The posted speed limit is 45 mph.

N Riverside Dr is a north-south roadway with two lanes north of W Herndon Ave (collector) and four lanes south of W Herndon Ave (arterial). Adjacent to the project frontage, a raised median exists to the south of W Fir Ave, and a two-way left-turn lane exists to the north of W Fir Ave. The posted speed limit is 40 mph. N Riverside Dr becomes W Bullard Ave south of N Veteran Blvd.

W Spruce Ave is an east-west collector street with two lanes west of N Riverside Dr and four lanes within the residential development east of the project site. The road does not connect through from N Riverside Dr, along the north perimeter of the project site, to the residential development to the east. The road may connect through in the future, contingent up on development of other parcels. The posted speed limit is 40 miles per hour (mph) to the east with unposted speed limit to the west. W Spruce Ave provides access to residential areas around the project site.

Pedestrian Facilities

A multiuse path is available on the north side of W Herndon Ave starting east of the project site and continuing to the east, but sidewalk is not present on the north side of the street along the project site to N

Riverside Dr. No sidewalk is present on the south side of W Herndon Ave to the east of N Riverside Dr. West of N Riverside Dr, sidewalk is present on the north side of W Herndon Ave for approximately 350', then discontinues. Sidewalk is continuously present on the south side of W Herndon Ave west of N Riverside Dr in the vicinity of the project site.

Sidewalks area present on the west side of N Riverside Dr, both north and south of W Herndon Dr. Sidewalks are nor present along the project frontage (east side) of N Riverside Dr. They are present on the east side of N Riverside Dr to the south of W Herndon Ave for approximately 500'.

The N Riverside Dr/W Herndon Ave signalized intersection has marked crosswalks on the west and south legs with pedestrian signal heads serving those crosswalks. These two crosswalks feature curb ramps with high-visibility truncated dome pads.

Bicycle Facilities

Bicycle facilities are categorized into four types, as described below:

Class I Bikeway (Bike Path). Also known as a shared path or multi-use path, a bike path is a paved right-of-way for bicycle travel that is completely separate from any street or highway.

Class II Bikeway (Bike Lane). A striped and stenciled lane for one-way bicycle travel on a street or highway. This facility could include a buffered space between the bike lane and vehicle lane and the bike lane could be adjacent to on-street parking.

Class III Bikeway (Bike Route). A signed route along a street where the bicyclist shares the right-of-way with motor vehicles. This facility can also be designated using a shared-lane marking (sharrow).

Class IV Bikeway (Separated Bike Lane). A bikeway for the exclusive use of bicycles including a separation required between the separated bikeway and the through vehicular traffic. The separation may include, but is not limited to, grade separation, flexible posts, inflexible physical barriers, or on-street parking.

Existing bicycle facilities in the study area include:

- Class I bikeway on Herndon Ave from Spruce Ave to west of Hayes Ave
- Class I bikeway on Herndon Ave west of Riverside Dr
- Class II bike lane on N Riverside Dr from W Herndon Ave to the Carnegie Ave
- Class II bike lane on N Hayes Ave from W Herndon Ave to W Spruce Ave
- Class II bike lane on W Spruce Ave from N Sandrini Ave to W Herndon Ave
- Class II bike lane on Veterans Blvd from W Wathen Ave to N Hayes Ave

Transit Service

The Fresno Department of Transportation (DOT) provides public bus service known as FAX in Fresno. Two bus lines operate near the project site: 3 and 20. The 3 line runs between the Marketplace at El Paseo (the commercial development on the southwest quadrant of the N Riverside Dr/W Herndon Ave intersection) and the Clovis Community College/Herndon area, which is east of the project site. Service frequency is approximately every 15 minutes between 5:00 AM and 9:00 PM on weekdays and 9:30 AM to 7:00 PM on weekends. The 20 line operates between the Marketplace at El Paseo and Fresno City College, which is just north of downtown. Buses operate on approximately 45 minutes headways between 5:30 AM and 10:00 PM on weekdays and 6:30 AM to 7:30 PM on weekends. Relative to the project site, the closest bus stops for both lines are located on N Riverside Dr in front of the Marketplace at El Paseo.

ANALYSIS METHODOLOGY

Intersection Operations Analysis Methodology and Levels of Service

"Level of service" describes the operating conditions experienced by users of a facility. LOS is a quantitative stratification of a performance measure or measures representing quality of service. The

measures used to determine LOS for transportation system elements are called service measures. The Highway Capacity Manual (HCM) defines six levels of service, ranging from A to F, for each service measure or combination of service measures. The service measures to define the LOS of intersections are control delay and volume-to-capacity (V/C) ratio. Control delay alone is used to characterize LOS for the entire intersection or an approach. Control delay and volume-to-capacity ratio are used to characterize LOS for a lane group (e.g., all northbound lanes approaching an intersection).

Table 1 and Table 2 present the relationship of average delay to level of service for signalized intersections and stop control intersections, respectively.

Table 1: Signalized Intersection Level of Service Definitions

Average Delay Per Vehicle (Seconds)	LOS	Description of Traffic Conditions
≤10.0	A	This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable, or the cycle length is very short.
>10.0 and ≤20.0	B	This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable, or the cycle length is short. More vehicles stop than with LOS A.
>20.0 and ≤35.0	C	This level is typically assigned when progression is favorable, or the cycle length is moderate. Individual cycle failures (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
>35.0 and ≤55.0	D	This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective, or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
>55.0 and ≤80.0	E	This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
≤80.0	F	This level is typically assigned when the volume-to-capacity ratio is very high (greater than 1.0), progression is very poor, and the cycle length is long. Most cycles fail to clear the queue.

Source: Transportation Research Board, Highway Capacity Manual 6th Edition, Washington, D.C., 2016.

Table 2: Stop-Controlled Intersection Level of Service Definitions

Average Delay Per Vehicle (Seconds)	LOS
≤10.0	A
>10.0 and ≤15.0	B
>15.0 and ≤25.0	C
>25.0 and ≤35.0	D
>35.0 and ≤50.0	E
>50.0	F

Source: Transportation Research Board, Highway Capacity Manual 6th Edition, Washington, D.C., 2016.

All intersection level of service evaluations used the peak 15-minute flow rate during the weekday AM and PM and Saturday midday peak hours. Using the peak 15-minute flow rate ensures that this analysis is based on a reasonable worst-case scenario. For this reason, the analysis reflects conditions that are only likely to occur for 15 minutes out of each peak hour. Intersection analysis was conducted using the operational methodology outlined in the HCM 6th Edition (Transportation Research Board, Washington, D.C., 2016) at all intersections, as operationalized by Synchro software version 10.

The City of Fresno has a level of service standard of LOS D for signalized and stop-controlled intersections, as implemented by the City's Traffic Impact Study Report Guidelines.[3]

Analysis Inputs

Synchro 10 software was used to conduct the traffic operations analysis. The following inputs were utilized in this analysis:

Signal Timing

The City and Caltrans provided signal timing on August 16, 2021 for the following intersections:

1. N Riverside Dr & W Herndon Ave (City)
2. N Golden State Blvd & W Herndon Ave (City)
3. SR 99 NB off-ramp & W Herndon Ave (Caltrans)
4. N Parkway Dr & W Herndon Ave (City)

For all analysis scenarios, the existing signal timing was utilized. Signal optimization was applied only under mitigation scenarios, as outlined under the mitigation description.

Pedestrian Volumes

Vehicular turning movement and pedestrian counts were collected at the study intersections on September 23 and 25, 2021. The pedestrian volumes collected were utilized in Synchro as conflicting pedestrian movement volumes and number of pedestrians calls for signalized intersections. In addition to utilizing the pedestrian volumes, the pedestrian signal timing was utilized to model traffic signal operations.

Peak Hour Factor

Existing and Existing Plus Project analyses used intersection-specific peak hour factors (PHFs) collected in the field. For all future year scenarios, the PHF was increased to 0.92 if the existing PHF was lower than 0.92. PHFs observed at or above 0.92 were maintained for future year scenarios. As traffic patterns change and volumes increase, a more consistent traffic flow can be expected. Increasing the PHF provides a conservative analysis of the future traffic flow being more consistent across the entirety of a peak hour.

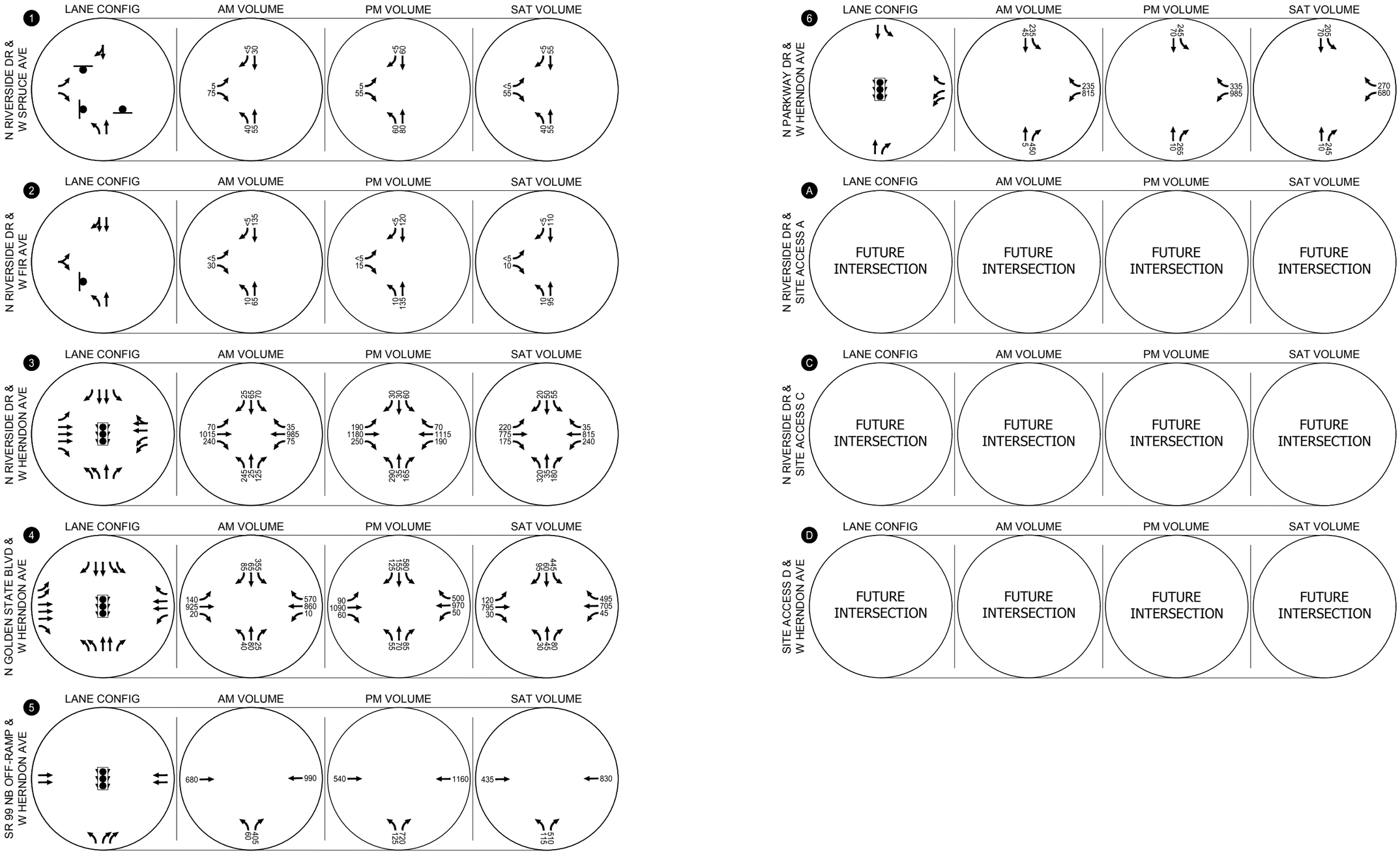
Future Volume Development

Future volumes for 2042 cumulative conditions without the project were developed using the Fresno COG travel demand model. The land uses in the travel model were checked to ensure that the project was not already included in the 2042 model forecast. Volumes for the AM and PM peak hours on each intersection approach were extracted from the model for the years 2019 and 2042. The 2042 adjusted forecasts were calculated for each intersection approach by adding the growth increment between the 2019 and 2042 model volumes to the counts collected in September 2021. If this incremental adjustment would result in a negative forecast on an intersection approach, the forecast volume was instead calculated as the traffic count times the ratio of the 2042 model volume to the 2019 model volume Then, the approach growth rate was calculated using the adjusted 2042 model volumes and the 2021 turning movement counts. For each intersection approach, the 2042 turn movements were calculated by multiplying the turning movement counts by the adjusted approach growth rates. The turn movements were then checked for continuity of flow between adjacent intersections. Model volume output files are included as Appendix Q.

[3] City of Fresno Traffic Impact Study Report Guidelines, updated February 2, 2009

EXISTING TRAFFIC CONDITIONS

Peak hour intersection turning movement counts were collected on September 23, 2021 during weekday AM and PM peak periods (7:00 AM – 9:00 AM and 4:00 PM – 6:00 PM, respectively) and September 25, 2021 during the Saturday midday peak period (11:00 AM – 2:00 PM) while local schools were in session and there were no inclement weather conditions. As coordinated with the City during the scoping process for this transportation study, the 2021 collected counts were used to develop Existing Conditions traffic volumes for the study. The peak hours were identified as the worse four consecutive 15-minute periods during the AM and PM peak periods on weekdays and Saturdays described above. The existing intersection turn movement peak hour traffic volumes are shown in Figure 3. The figure also depicts the intersection lane configurations and traffic controls at each intersection.



- STOP SIGN
- TRAFFIC SIGNAL

Year 2021 Existing Lane Configurations, Traffic Control Devices and Traffic Volumes
Weekday AM, Weekday PM and Weekend Midday Peak Hours
Fresno, California

Figure 3

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Table 3 presents the existing traffic operations at the study intersections. The results indicate that all study intersections are operating at LOS D or better for all peak hours, except the N Riverside Dr/W Herndon Ave intersection (#3), which operates at LOS E during the weekday PM peak hour.

Appendix B includes the Synchro reports for Existing Conditions.

Table 3: Existing Conditions, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
1	N Riverside Dr/W Spruce St	AWSC	AM	7.9	A
			PM	8.0	A
			SAT	7.9	A
2	N Riverside Dr/W Fir Ave	TWSC	AM	9.0	A
			PM	8.7	A
			SAT	8.7	A
3	N Riverside Dr/W Herndon Ave	Signal	AM	28.8	C
			PM	***72.7***	***E***
			SAT	31.8	C
4	N Golden State Blvd/ W Herndon Ave	Signal	AM	28.7	C
			PM	33.6	C
			SAT	29.3	C
5	SR 99 NB Off-Ramp/ W Herndon Ave	Signal	AM	15.0	B
			PM	24.0	C
			SAT	19.4	B
6	N Parkway Dr/W Herndon Ave	Signal	AM	25.4	C
			PM	22.3	C
			SAT	18.7	B

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro Version 10 and HCM 6th Edition methodology were used.
- City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- **Bolded and italicized** indicate intersections operating beyond the City of Fresno standard.
- AWSC: All-Way Stop Control
- TWSC: Two-Way Stop Control
- Average delay in seconds/vehicle is reported for signalized and stop control intersections. For TWSC intersections the worst approach delay is reported.

Crash History Evaluation

Kittelson investigated the history of crashes at the study intersections. In reviewing crash data for the five-year period of 2016-2020,[4] Kittelson found there were nine reported crashes in total amongst the six study intersections. Four crashes caused property damage only, four crashes caused minor injuries, and one crash caused severe injury. Table 4 presents a summary of reported crashes by severity and location. None of the reported crashes involved a pedestrian or bicyclist.

[4] Transportation Injury Mapping System online crash database, https://tims.berkeley.edu/, Statewide Integrated Traffic Records System (SWTIRS) online crash database

Table 4: Crashes by Location and Severity, 2016-2020

No.	Location	PDO*	Minor Injury	Severe Injury
1	N Riverside Dr/W Spruce St			
2	N Riverside Dr/W Fir Ave			
3	N Riverside Dr/W Herndon Ave	2	2	
4	N Golden State Blvd/W Herndon Ave	1		
5	SR 99 NB Off-Ramp/W Herndon Ave	1		
6	W Herndon Ave/N Parkway Dr		2	1

Source: TIMS and SWITRS, 2022
*PDO = property damage only

PROPOSED PROJECT

As described above, the proposed project is the relocation of an existing Costco wholesale retail facility situated at 4500 W Shaw Ave. The project would consist of a relocated retail facility, relocated market delivery operation (MDO), 32-position fuel station, and car wash in a 22.4-acre parcel located at the northeast corner of the intersection of N Riverside Dr and W Herndon Ave.

SITE CIRCULATION ANALYSIS

Costco warehouse and MDO delivery truck inbound access is accommodated at Site Access C on N Riverside Dr. Outbound access is accommodated at Site Access D on W Herndon Ave. If Site Access D were not approved as part of the project, then outbound warehouse and MDO trucks would circulate north along the private drive east of the warehouse to W Spruce Ave. Fuel delivery truck inbound access is accommodated at the private drive from W Spruce Ave. Outbound access is accommodated at Site Access A on N Riverside Dr. The proposed site plan provides adequate lane width and curb radii to accommodate warehouse, MDO, and fuel delivery trucks within the site and at the above-named site access points.

COSTCO WAREHOUSE TRIP CHARACTERISTICS

Costco Warehouse facilities are open to members only and operate seven days a week. Typically, the warehouse building is open to members on weekdays between the hours of 10:00 AM and 8:30 PM. Weekend operating hours open to members are typically from 9:30 or 10:00 AM to 6:00 PM. The warehouses are typically closed on major holidays. Costco Gasoline fuel stations co-located on the site are typically open seven days a week between 5:00 AM and 10:00 PM.

Trip data has been collected at Costco Warehouses across the United States and documented that they typically generate higher traffic volumes than other commercial land uses with similar building sizes. In addition to the number of trips, the Costco trip generation database also documents trip type based on member survey information that provides the percentage of primary, pass-by, and diverted trips, as further described below.

- Primary Trips: an entirely new trip on the roadway system for the express purpose of driving to and from Costco
- Pass-by Trips: existing trips that are on roadways adjacent to the site, which allow motorists to turn into the Costco development and continue to their ultimate destination when their shopping is concluded
- Diverted Trips: existing trips on nearby roadways in which a motorist decides to drive out-of-direction for a distance to stop at Costco, and when their shopping is concluded, continues to their trip to the ultimate destination.

This report assesses the impacts of pass-by and diverted trip impacts at the study intersections. Typically, pass-by trips have an impact only at the site-access driveways, whereas the impact of diverted trips could extend through additional study area intersections beyond the site access points (diverted trips are typically modeled similar to net new trips at many or all of the study area intersections). Diverted and pass-by trips were considered together with engineering judgment to identify how these two trip characteristics should be applied to the project. Recognizing the context of the project site relative to key transportation corridors, this study assumes that all diverted trips would divert from SR 99, N Golden State Blvd, or the Marketplace shopping center at the southwest quadrant of the N Riverside Dr/W Herndon Ave intersection, thereby utilizing the same distribution pattern as net new trips at the site.

Warehouse, Fuel Station, and Car Wash Trip Generation

The warehouse with fuel station and car wash trip rates summarized herein rely on data collection conducted at Costco sites located across the western region of the United States. The trip studies were completed using industry standard engineering practices consistent with guidance within the Institute of Transportation Engineers (ITE) standard reference, Trip Generation Manual, 10th Edition. These cordon surveys were conducted between 2011 and 2021 and include 16 surveys of Costco warehouses with fuel stations in California, Arizona, Oregon, Utah, and Washington. The Costco buildings surveyed range in size between 144,252 sf and 166,451 sf, with an average size of 152,719 square feet, had fuel stations with 20 to 30 fueling positions, and one of which had a car wash. As a result, the Costco trip generation rates inherently account for Costco fuel station and car wash trips within the overall rate. Table 5 summarizes trip characteristics for the weekday AM, weekday PM, and weekend midday peak hours.

Table 5: Trip Characteristics for Costco Warehouse with Fuel Station and Car Wash, Weekday AM, Weekday PM & Weekend Midday Peak Hours

Land Use	Weekday Daily Trip Rate (per KSF)	Weekday AM Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)			Weekday PM Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)			Weekend Daily Trip Rate (per KSF)	Weekend Midday Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)		
		Total	In	Out	Total	In	Out		Total	In	Out
Costco Warehouse W/ Fuel Station and Car Wash	95.18	2.29	54%	46%	8.23	46%	54%	118.31	11.13	49%	51%
Primary Trips	No Data	No Data			57%			No Data	62%		
Pass-by Trips	No Data	No Data			21%			No Data	23%		
Diverted Trips	No Data	No Data			22%			No Data	15%		

Source: Kittelson & Associates, Inc., 2023

MDO Trip Generation

MDOs are Costco's last-mile facilities for big and bulky items. At these facilities, there is a daily morning delivery of large goods, organization of the goods, and loading of last-mile trucks for delivery to members' homes. Delivery of goods using larger trucks dispatched to the MDO occurs well before 6:00 AM daily. Two MDO on-site employee shifts are utilized: one from 6:00 AM to 2:00 PM, the other from 12:00 PM to 8:00 PM. Delivery teams arrive at the MDO site in a personal vehicle around 6:45 AM, load their last-mile trucks, and depart. The delivery teams return to the MDO site between 3:00 PM and 6:00 PM, depending on the time required to complete all deliveries, to unload remaindered materials for recycling, and depart after concluding their workday. The MDO delivery trucks are stored on-site overnight.

Costco's existing MDO serving the greater Fresno area operates today at 3688 E Central Ave and is served by 23 on-site employees and approximately 10 delivery trucks with two-person teams, each of which makes one daily roundtrip of deliveries to members' homes. Two days per week, the MDO has one additional truck make three round trips to another warehouse.

The project includes relocating the MDO operations to a 49,996-sf space on the project site. The relocated MDO will be served by the same on-site and delivery employees working at the existing MDO location. No measured trip data were available for the existing MDO facility at the time this report was prepared. Accordingly, MDO trips were estimated two ways: considering anticipated MDO operations and using nationally available trip data.

The operations of an MDO translate to the following trips generated during weekday AM, weekday PM, and weekend midday peak hours:

- Weekday AM Peak Hour
  - Delivery employees arriving (22 inbound trips)
  - Delivery trucks departing for last-mile deliveries and to other warehouse (11 outbound trips)
- Weekday PM Peak Hour
  - Delivery trucks returning (11 inbound trips)
  - On-site employees return from potential break off-site (conservatively estimate 23 inbound trips)
  - Delivery truck to other warehouse departing (1 outbound trip)
- Weekend Midday Peak Hour
  - On-site employees arriving (23 inbound trips)
  - Delivery truck to other warehouse arriving (1 inbound trip)
  - On-site employees leaving (23 outbound trips)
  - Delivery truck to other warehouse departing (1 outbound trip)

Table 6 presents the sum of these trips based on MDO operations. For comparison purposes, Kittelson also estimated trips for the MDO using ITE *Trip Generation Manual, 10th Edition* trip generation rates for Warehouse, Land Use Code 150, also summarized in Table 6.

Table 6: Trip Generation Estimates for MDO, MDO Operations-Based and ITE Warehouse Comparison

Land Use	ITE Code	Size	Weekday Daily Trip Rate (per KSF)	Weekday AM Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)			Weekday PM Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)			Weekend Daily Trip Rate (per KSF)	Weekend Midday Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)		
				Total	In	Out	Total	In	Out		Total	In	Out
Costco MDO	-	49,996 SF	230	33	22	11	35	34	1	230	48	24	24
Warehouse	150		87	8	7	1	9	2	7	8	2	2	0

Source: Kittelson & Associates, Inc., 2023

As presented in the table, use of ITE warehouse trip rates would underestimate the amount of trip expected to be generated by the MDO when the facilities operations are taken into consideration. Therefore, this study assumed the MDO operations-based trip generation to conduct the transportation analyses.

Project Trip Generation

Table 7 presents the overall project trip generation estimates based on proprietary Costco-specific data.

Table 7: Project Trip Generation Estimate

Land Use	Size	Weekday Daily Trip Rate (per KSF)	Weekday AM Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)			Weekday PM Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)			Weekend Daily Trip Rate (per KSF)	Weekend Midday Peak Hour of Adjacent Street Traffic Trip Rate (trips/1,000 sf)		
			Total	In	Out	Total	In	Out		Total	In	Out
Costco Warehouse w/ Fuel Station & Car Wash	191,346	18,212	439	238	201	1,576	732	844	22,638	2,130	1,040	1,090
Pass-by Trips*		(3,788)	(91)	(49)	(42)	(328)	(152)	(176)	(5,297)	(498)	(243)	(255)
Diverted Trips*		(4,038)	(97)	(52)	(45)	(349)	(162)	(187)	(3,305)	(311)	(152)	(159)
Net New Trips		10,386	251	137	114	899	418	481	14,036	1,321	645	676
MDO	49,996	230	33	22	11	35	34	1	230	48	24	24
Net New Trips		10,616	284	159	125	934	452	482	14,266	1,369	669	700

Source: Kittelson & Associates, Inc., 2023

*No data are available for daily and weekday AM peak hour pass-by and diverted trips through the Costco database. Kittelson applied the weekday PM rates to the weekday AM and daily trips and applied the weekend midday rates to the weekend daily trips.

As shown in Table 7, the project is estimated to generate 10,616 weekday daily net new trip ends. Of these, 284 are estimated to occur in the weekday AM peak hour (159 inbound / 125 outbound), 934 are estimated to occur in the weekday PM peak hour (452 inbound / 482 outbound). The project is estimated to generate 14,266 weekend daily net new trip ends. Of these, 1,369 are estimated to occur in the weekend midday peak hour (669 inbound / 700 outbound).

Warehouse Deliveries

Costco anticipates an average of about 10-13 Costco trucks a day delivering goods to the Costco warehouse. Costco fleet trucks typically measure up to approximately 70 feet long for double-axle trailers. Typical receiving time is from 2:00 AM to 1:00 PM, averaging two to three trucks per hour, with most of the deliveries completed before the mid-morning warehouse opening time. Deliveries to the warehouse are made primarily in Costco trucks from its freight consolidation facility (depot) in Tracy, CA. In addition to the Costco depot trucks, deliveries such as bread are expected to be made by local vendors using single unit trucks and/or single-axle trailers.

MDO Deliveries

Costco anticipates one daily delivery of large goods to the MDO facility. Typical receiving time is before 6:00 AM made primarily in Costco trucks from its freight consolidation facility (depot) in Tracy, CA.

Costco Gasoline Deliveries

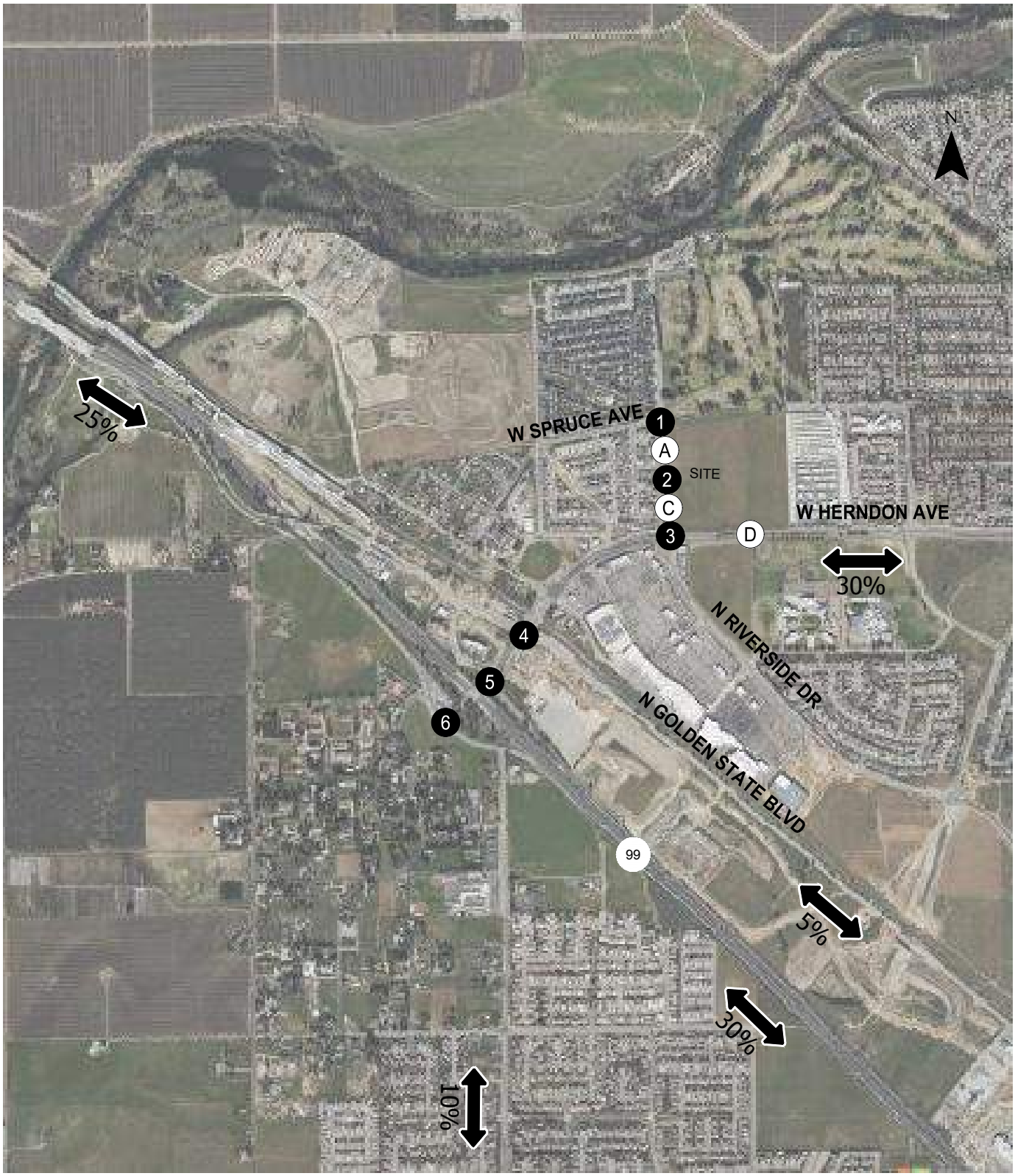
Costco anticipates that the Costco Gasoline fuel station will receive five to seven fuel deliveries per day on average. During busy holiday weeks, an additional delivery is often required during the day. These deliveries typically occur any time when the fuel station is open.

PROJECT TRIP DISTRIBUTION

The relocated Costco would be situated approximately 2.9 miles northwest of the existing Costco location on W Shaw Ave and 7.8 miles west of the North Fresno Costco, located on N Abby St. The project trip

distribution utilizes proprietary Costco transaction data for the existing warehouses at W Shaw Ave and N Abby St, proprietary market area data for the relocated warehouse, and Costco membership data, and it considers the roadway network.

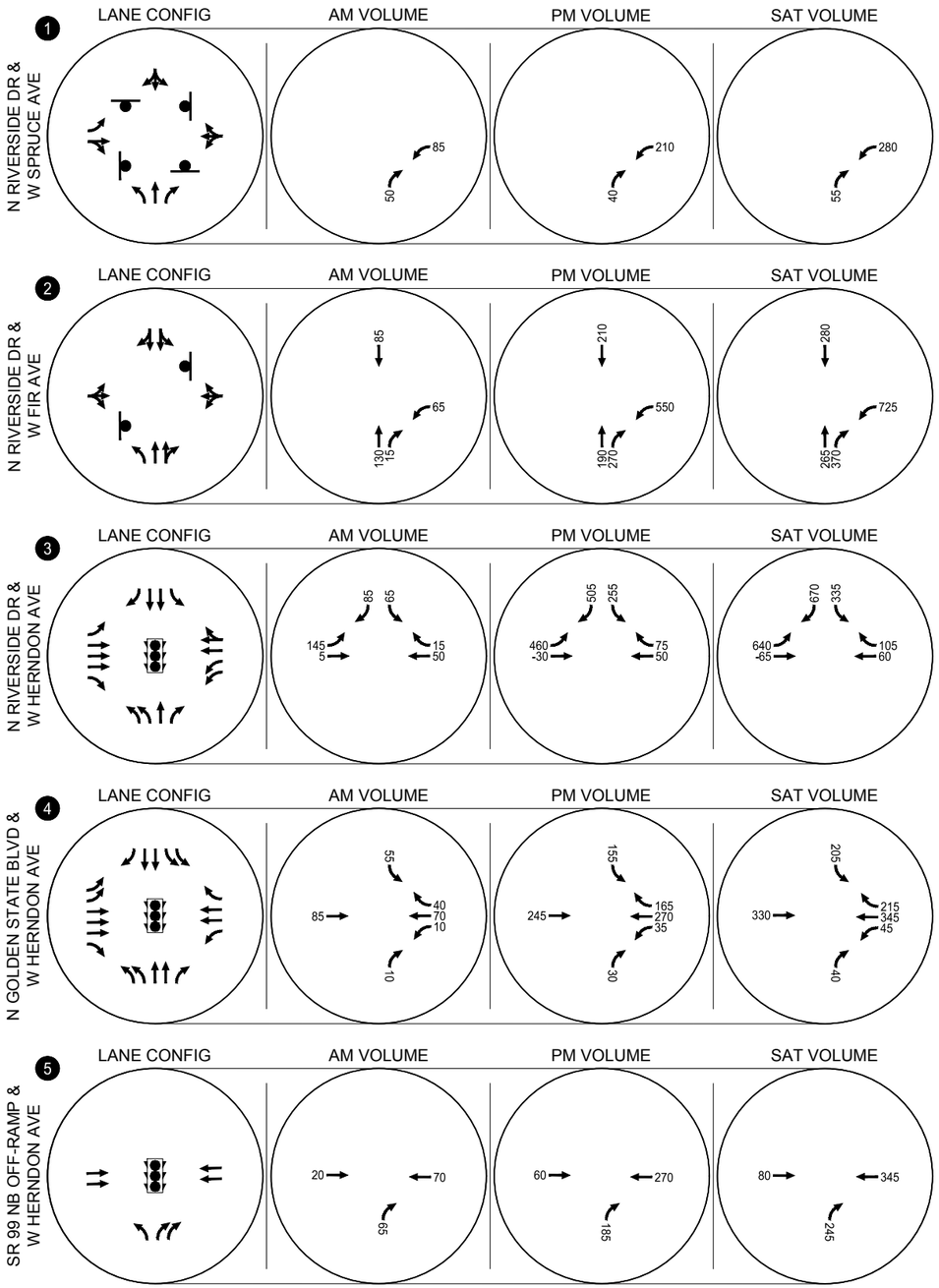
Figure 4 presents the project trip distribution. Figure 5 presents project trip volumes.



##- Study Intersections
XX% Trip Distribution Percentage

Project Trip Distribution
Fresno, California

Figure
4



- STOP SIGN
- TRAFFIC SIGNAL

Project Trip Volumes
Weekday AM, Weekday PM and Weekend Midday Peak Hours
Fresno, California

Figure
5

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EXISTING PLUS PROJECT CONDITIONS

The potential effects of the project on existing traffic operations at the study intersections are discussed in this section. This analysis includes the reclassification of W Herndon Ave from an expressway to a super arterial. As an expressway, no direct site access is permitted onto the roadway. Under the reclassification scenario the site proposes an additional left-in, right-in, right-out intersection onto W Herndon Ave.

INTERSECTION OPERATIONS

Kittelson developed traffic volumes for Existing Plus Project conditions using an additive approach. Kittelson estimated vehicle trips generated by the project and added those trips to existing volumes on the roadway network to develop the volumes for the Existing Plus Project conditions. Existing Plus Project turning movement volumes are presented in Figure 6.

As shown in Table 8, all study intersections would operate within City standard of LOS D or better under Existing Plus Project conditions, except for the following:

- N Riverside Dr/W Fir Ave (Intersection 2)
    - PM Peak Hour (LOS F)
    - Saturday Midday Peak Hour (LOS F)
- N Riverside Dr/W Herndon Ave (Intersection 3)
    - AM Peak Hour (LOS E)
    - PM Peak Hour (LOS F)
    - Saturday Midday Peak Hour (LOS F)
- N Golden State Blvd/W Herndon Ave (Intersection 4)
    - PM Peak Hour (LOS E)
    - Saturday Midday Peak Hour (LOS E)

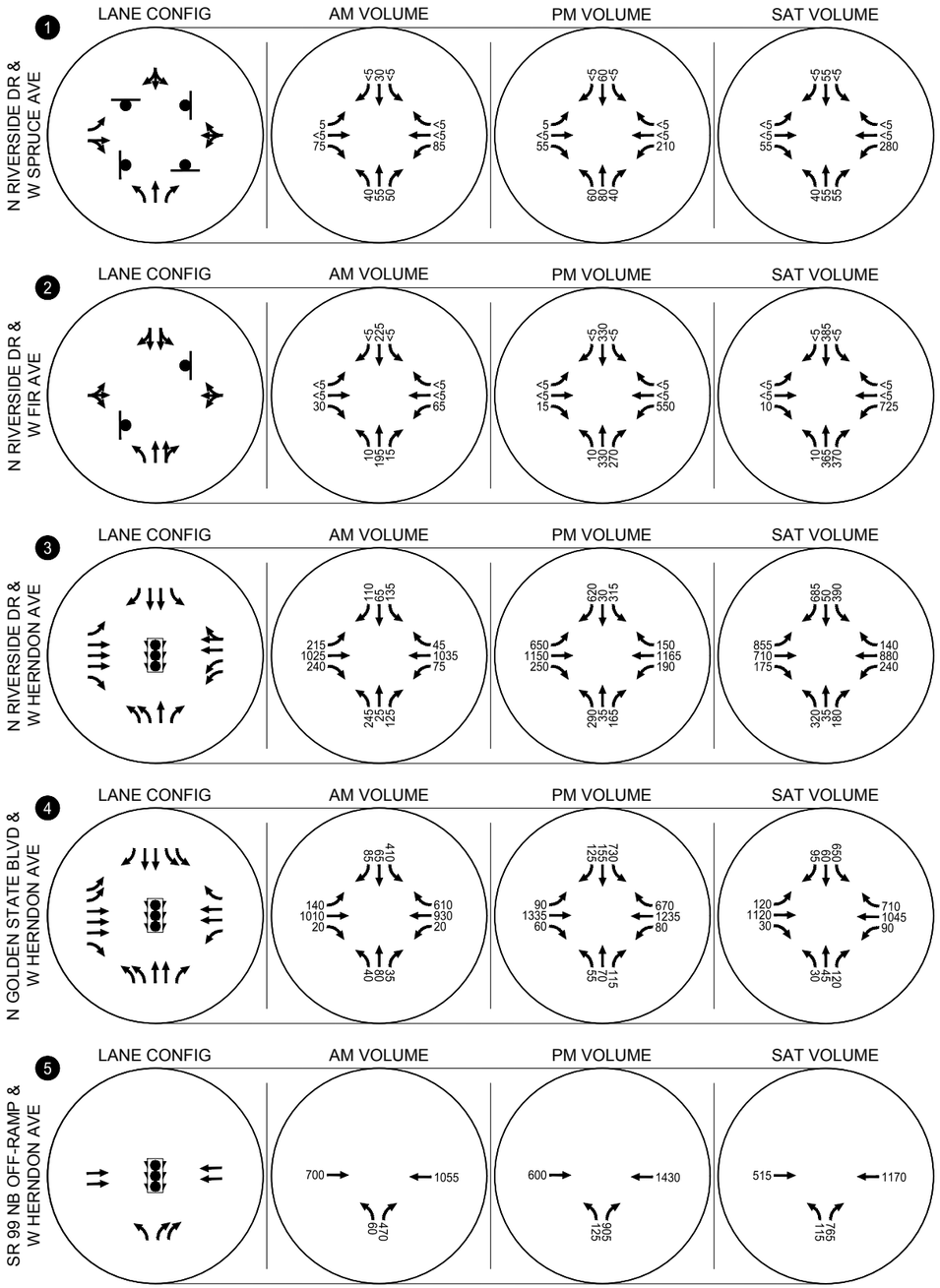
Appendix C includes Synchro output reports for Existing Plus Project conditions.

Table 8: Existing Plus Project Conditions, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
1	N Riverside Dr/ W Spruce Ave	AWSC	AM	8.7	A
			PM	10.3	B
			SAT	12.1	B
2	N Riverside Dr/ W Fir Ave	TWSC	AM	14.8	B
			PM	***>50***	***F***
			SAT	***>50***	***F***
3	N Riverside Dr/ W Herndon Ave	Signal	AM	***63.1***	***E***
			PM	***>80***	***F***
			SAT	***>80***	***F***
4	N Golden State Blvd/ W Herndon Ave	Signal	AM	34.2	C
			PM	***66.5***	***E***
			SAT	***70.8***	***E***
5	SR 99 NB Off-Ramp/ W Herndon Ave	Signal	AM	16.6	B
			PM	37.2	D
			SAT	26.3	C
6	N Parkway Dr/ W Herndon Ave	Signal	AM	26.1	C
			PM	25.8	C
			SAT	22.4	C
A	N Riverside Dr/ Site Access A	TWSC	AM	<1	A
			PM	<1	A
			SAT	<1	A
C	N Riverside Dr/ Site Access C	TWSC	AM	<1	A
			PM	<1	A
			SAT	<1	A
D	Site Access D/ W Herndon Ave	TWSC	AM	14.5	B
			PM	19.2	C
			SAT	16.4	C

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro Version 10 and HCM 6th Edition methodology were used.
- City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- **Bolded and italicized** indicate intersections operating beyond the City of Fresno standard.
- AWSC: All-Way Stop Control
- TWSC: Two-Way Stop Control
- Average delay in seconds/vehicle is reported for signalized and stop control intersections. For TWSC intersections the worst approach delay is reported.



- STOP SIGN
- TRAFFIC SIGNAL

Year 2021 Existing Plus Project Lane Configurations, Traffic Control Devices and Traffic Volumes
Weekday AM, Weekday PM and Weekend Midday Peak Hours
Fresno, California

Figure
6

KITTELSON & ASSOCIATES

DRIVEWAY OPERATIONS

Traffic operations were evaluated at the Costco site driveways on N Riverside Dr adjacent to the proposed site accesses using Synchro, applying HCM 6th Edition methodologies. In addition, left-turn and right-turn lane needs were analyzed with project volumes utilizing guidance from the *National Cooperative Highway Research Program's (NCHRP) Report 279: Intersection Channelization Design Guide* and *NCHRP Report 457: Evaluating Intersection Improvements: An Engineering Study Guide*. The analyses were conducted using Saturday midday volumes as they represented the highest volumes at the driveways.

Turn Lane Assessment

Turn lane opportunities were analyzed for the site accesses along N Riverside Dr and W Herndon Ave with the findings summarized in Table 9. *Appendix D* contains the turn lane analysis worksheets.

Table 9: Existing Plus Project, Turn Lane Analysis Results

No.	Intersection	Proposed Access Type	Turn Lane	Threshold Met
2	N Riverside Dr/ W Fir Ave	Full-Movement Two-Way Stop-Controlled	NB Right Turn Lane	***Yes***
			SB Left Turn Lane	No
A	N Riverside Dr/ Site Access A	Right-In Right-Out Stop-Controlled	NB Right Turn Lane	No
C	N Riverside Dr/ Site Access C	Right-In, Right-Out Stop-Controlled	NB Right Turn Lane	***Yes***
D	Site Access D/ W Herndon Ave	Left-In, Right-In, Right-Out Stop Controlled	WB Right-Turn Lane	***Yes***
			EB Left-Turn Lane	***Yes***

Source: Kittelson & Associates, Inc., 2023

N Riverside Dr at W Fir Ave and at Site Access C satisfy the right-turn thresholds with Existing Plus Project traffic volumes.

The curb-to-curb width at N Riverside Dr for the northbound approach at W Fir Ave is about 60 feet, with a 5-foot bike lane, two 11-foot southbound travel lanes, an 11.5-foot northbound left turn lane, and an 18.5-foot northbound lane. A northbound right-turn lane can be accommodated if the roadway is widened onto the project site.

The curb-to-curb width at N Riverside Dr for the northbound approach at Site Access C is about 65 feet, with a 5-foot bike lane, 11-foot southbound travel lanes, a concrete median, and about 30 feet of asphalt in the northbound direction. A northbound right-turn lane may be accommodated if the median is moved, and/or the roadway is widened onto the project site.

While Site Accesses A and C meet the threshold for a right-turn lane, the project already will construct a second northbound travel lane along the project frontage between W Herndon Ave and W Spruce Ave. At W Spruce Ave, there is not a second receiving lane to the north of the intersection. Therefore, the second northbound lane would function as a right-turn lane at the intersection and would not carry through traffic. Given the lower speeds expected on the section of N Riverside Dr along the project frontage and the absence of a second receiving lane to the north of W Spruce Ave, the second northbound lane constructed as part of the project could accommodate right-turn traffic entering the project site while through traffic uses the inner lane.

SIGNAL WARRANTS

The *Manual on Uniform Traffic Control Devices* (MUTCD) identifies nine warrants for traffic signal installation. The first three volume-based warrants (#1-Eight Hour, #2-Four Hour, #3-Peak Hour) were evaluated based on traffic volumes for Existing Plus Project conditions. *Appendix E* contains the signal warrants worksheets.

Table 10: Existing Plus Project Conditions, Signal Warrants

No.	Intersection	Proposed Access Type	Warrant	Threshold Met
1	N Riverside Dr/ W Spruce Ave	PM	#1 - Eight-Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	No
		SAT	#1 - Eight-Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	No
2	N Riverside Dr/ W Fir Ave	PM	#1 - Eight-Highest	***Yes***
			#2 – Four-Hour	***Yes***
			#3 – Peak Hour	***Yes***
		SAT	#1 - Eight-Highest	***Yes***
			#2 – Four-Hour	***Yes***
			#3 – Peak Hour	***Yes***
D	Site Access D/ W Herndon Ave	PM	#1 – Eight Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	***Yes***
		SAT	#1 – Eight Highest	***Yes***
			#2 – Four Hour	***Yes***
			#3 – Peak Hour	***Yes***

Source: Kittelson & Associates, Inc., 2023

For N Riverside Dr/W Fir Ave, the threshold for warrants 1, 2, and 3 are met on a weekday and Saturday. Based on this finding and the proposed location of the primary full-access driveway to the project site at this intersection, it is recommended that a signal be installed at this location.

For Site Access D on W Herndon Ave, the threshold for warrant 3 is met on a weekday and the threshold for warrants 1, 2, and 3 are met on Saturday. Given the proximity of Site Access D to the signalized N Riverside Dr/W Herndon Ave intersection (800' to the east), the minor access characterization of Site Access D, and that the intersection is expected to operate within City standard, installation of a signal is not recommended at this location.

95TH PERCENTILE QUEUES

An analysis of 95th percentile queue lengths was performed using Synchro software version 10. Queue lengths are presented in Table 11 for the Existing peak hours. The longest queue present during any of the three peak hours is shown in the table. The study intersections were found to mostly have sufficient storage to contain the 95th percentile queue lengths. Exceptions to this are:

- **N Riverside Dr/W Fir Ave (Intersection 2):** The queue for exiting the project site (westbound approach) is predicted to extend well within the site during the Saturday midday peak hour.
- **N Riverside Dr/W Herndon Ave (Intersection 3):** Northbound left, southbound left, southbound right, and eastbound left movements are predicted to exceed available capacity during the PM peak hour.
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Southbound left, eastbound through, and westbound right are predicted to exceed available capacity during the PM peak hour.

Appendices B, C, and F contain queue length summary reports for the different scenarios.

Table 11: Existing Plus Project Conditions, 95th Percentile Queues

No.	Intersection	Scenario	Northbound			Southbound			Eastbound			Westbound		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
1	N Riverside Dr/ W Spruce Ave	Storage	150	375	100		-		80	225			575	
		Existing SAT	25	25	-		25		25	25			-	
		Existing + Project SAT	25	25	25		25		25	25			125	
2	N Riverside Dr/ W Fir Ave	Storage	225	250			375			225			700	
		Existing SAT	25	-			25			25			-	
		Existing + Project SAT	25	25			25			25			***>1,000***	
		Existing + Project SAT with Improvements	25	175			125			25			575	
3	N Riverside Dr/ W Herndon Ave	Storage	225	-	225	325	-	100	225	-	275	225	-	
		Existing PM	***275***	75	50	100	25	25	250	300	50	100	600	
		Existing + Project PM	***275***	50	50	***625***	25	***625***	***1,325***	375	50	150	950	
		Existing + Project PM with Improvements	***275***	75	50	***450***	25	***500***	***450***	375	50	150	875	25
4	N Golden State Blvd/ W Herndon Ave	Storage	150	300	150	275	600	175	250	500	350	150	325	325
		Existing PM	50	50	75	***300***	75	50	50	300	25	75	***450***	275
		Existing + Project PM	50	50	100	***425***	75	50	50	425	25	100	***700***	***550***
		Existing + Project PM with Improvements	50	75	100	***475***	100	50	75	500	25	150	***750***	***400***
5	SR 99 NB Off Ramp/ W Herndon Ave	Storage	275	-	650		-			500			550	
		Existing PM	125	-	175		-			200			325	
		Existing + Project PM	100	-	300		-			200			375	
6	N Parkway Dr/ W Herndon Ave	Storage	-	500	150	125	300	-		-		500	-	175
		Existing PM	-	25	50	250	50	-		-		150	-	25
		Existing + Project PM	-	25	50	250	50	-		-		375	-	150
A	N Riverside Dr/ Site Access A	Storage		-			-			-			700	
		Existing SAT		-			-			-			-	
		Existing + Project SAT		-			-			-			25	
C	N Riverside Dr/ Site Access C	Storage		-			-			-			300	
		Existing SAT		-			-			-			-	
		Existing + Project SAT		-			-			-			25	
D	Site Access D/ W Herndon Ave	Storage		-		-	-	1000	100	-	-		-	
		Existing SAT		-		-	-	-	-	-	-		-	
		Existing + Project SAT		-		-	-	25	25	-	-		-	

Source: Kittelson & Associates, Inc. 2023
Intersections analyzed using HCM 6 methodologies
Queue lengths reported in feet (rounded to the nearest vehicle length)
Intersections shaded in gray represent locations where queue lengths would exceed storage.

RECOMMENDED OFF-SITE IMPROVEMENTS

The following improvements in conjunction with site development would mitigate the Existing Plus Project traffic operations to a level that satisfies City intersection performance requirements.

- **N Riverside Dr/W Fir Ave (Intersection 2):** Signalize intersection.
- **N Riverside Dr/W Herndon Ave (Intersection 3):** Restripe existing eastbound approach to include second eastbound left turn lane. Extend eastbound left-turn lane an additional 150 feet, repurposing the raised median in the roadway cross section. Add southbound right-turn overlap to traffic signal.
    - **Note:** A revision of the signal timing to change all left turns from protected only to protected-permitted would mitigate the intersection to a level that satisfies performance requirements. However, the City does not support protected-permitted left-turns for this location.
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Revise signal phasing to optimize green-time allocation relative to anticipated volumes. For the westbound approach, the queue would extend past the N Weber Ave intersection. To reduce queue blockage of the intersection, "DO NOT BLOCK" pavement markings are recommended for the full width of N Weber Ave. On the north leg, reconstruct the median to extend the southbound dual left-turn pocket as far north as possible without interfering with the existing northbound left-turn pocket at W Kathryn Ave.

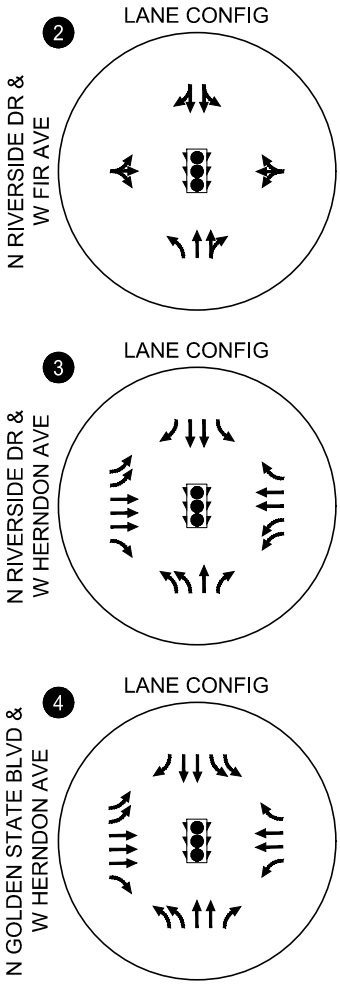
Table 12 presents the operations at the intersections with the recommended improvements. Figure 7 illustrates the resultant lane configurations and traffic control devices at the intersections with recommended geometric improvements. *Appendix F* contains Synchro output reports for the Existing Plus Project Conditions.

Table 12: Existing Plus Project Conditions with Off-Site Improvements, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
2	N Riverside Dr/W Fir Ave	Signal	AM	4.8	A
			PM	15.7	B
			SAT	44.3	D
3	N Riverside Dr/W Herndon Ave	Signal	AM	51.9	D
			PM	***86.0***	***F***
			SAT	***76.5***	***E***
4	N Golden State Blvd/W Herndon Ave	Signal	AM	34.2	C
			PM	45.2	D
			SAT	46.3	D

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro 10th Edition and HCM 6th Edition methodology were used.
- City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- Average delay in seconds/ vehicle is reported for signalized and stop control intersections.



Proposed Intersection Improvements
Fresno, California

Figure
7

FUTURE CONDITIONS

The future traffic conditions analysis forecasts how the study intersections would operate in the Year 2042 with the traffic generated by regional growth and development in the area assuming completion of planned transportation projects. regional growth and planned transportation improvements in the project area. Future volumes were developed using the Fresno Council of Governments (FCOG) transportation system model. The model provides expected future AM and PM traffic volumes. In the study area an additional State Highway interchange is planned to the south of W Herndon Ave and north of W Shaw Ave. This planned interchange results in lower traffic volumes within the immediate project vicinity. The future PM volumes from the model were used to develop the future Saturday midday volumes by applying the projected trip growth factors realized in the PM peak hour to the Saturday volumes.

INTERSECTION OPERATIONS

Traffic volumes for Future Conditions prior to project site development were developed using a compounded growth rate approach. Specifically, existing traffic volumes were multiplied by a compounded growth rate developed using the Fresno Coalition of Governments (Fresno COG) countywide travel demand model. Future peak hour turning movement volumes are presented in Figure 8.

As shown in Table 13, all study intersections are projected to operate acceptably at LOS D or better under Future Conditions, except under the following scenario:

- N Riverside Dr/W Herndon Ave (Intersection 3)
    - PM Peak Hour (LOS E)

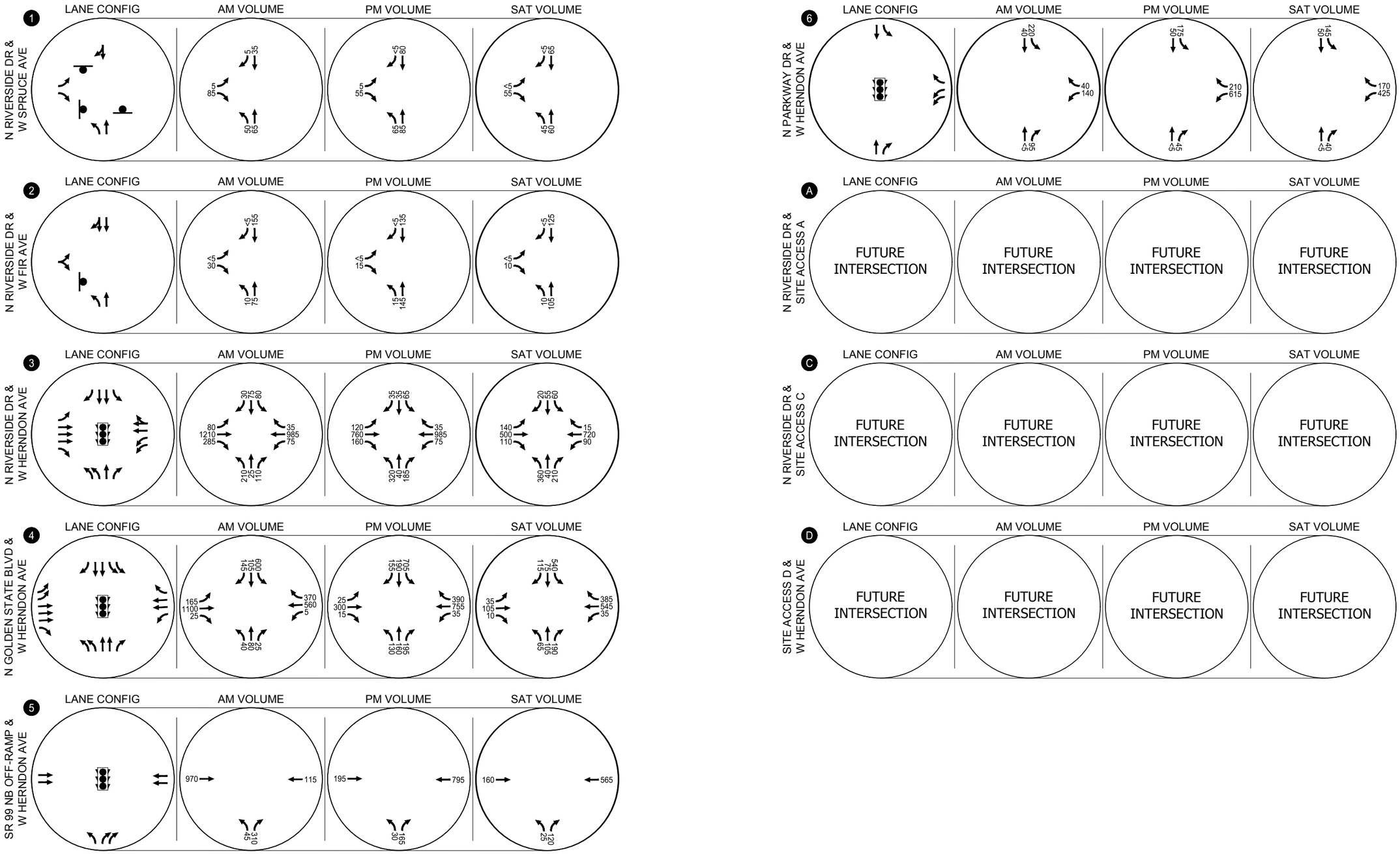
Appendix G includes Synchro output reports for Future Conditions.

Table 13: Future Conditions, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
1	N Riverside Dr/W Spruce Ave	AWSC	AM	7.9	A
			PM	8.1	A
			SAT	7.9	A
2	N Riverside Dr/W Fir Ave	TWSC	AM	8.9	A
			PM	8.8	A
			SAT	8.7	A
3	N Riverside Dr/W Herndon Ave	Signal	AM	25.8	A
			PM	***76.6***	***E***
			SAT	32.2	C
4	N Golden State Blvd/W Herndon Ave	Signal	AM	28.4	C
			PM	42.1	D
			SAT	34.6	C
5	SR 99 NB Off Ramp/W Herndon Ave	Signal	AM	15.1	B
			PM	10.5	B
			SAT	9.9	A
6	N Parkway Dr/W Herndon Ave	Signal	AM	26.1	C
			PM	16.5	B
			SAT	15.2	B

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro Version 10 and HCM 6th Edition methodology were used.
- City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- **Bolded and italicized** indicate intersections operating beyond the City of Fresno standard.
- AWSC: All-Way Stop Control
- TWSC: Two-Way Stop Control
- Average delay in seconds/vehicle is reported for signalized and stop control intersections. For TWSC intersections the worst approach delay is reported.



- STOP SIGN
- TRAFFIC SIGNAL

Year 2042 Future Lane Configurations, Traffic Control Devices and Traffic Volumes
Weekday AM, Weekday PM and Weekend Midday Peak Hours
Fresno, California

Figure
8

KITTELSON & ASSOCIATES

FUTURE PLUS PROJECT CONDITIONS

The potential effects of the project on future traffic operations at the study intersections are discussed in this section. This analysis includes the reclassification of W Herndon Ave from an expressway to a major arterial. As an expressway, no direct site access is permitted onto the roadway. Under the reclassification scenario the site proposes an additional left-in, right-in, right-out intersection onto W Herndon Ave.

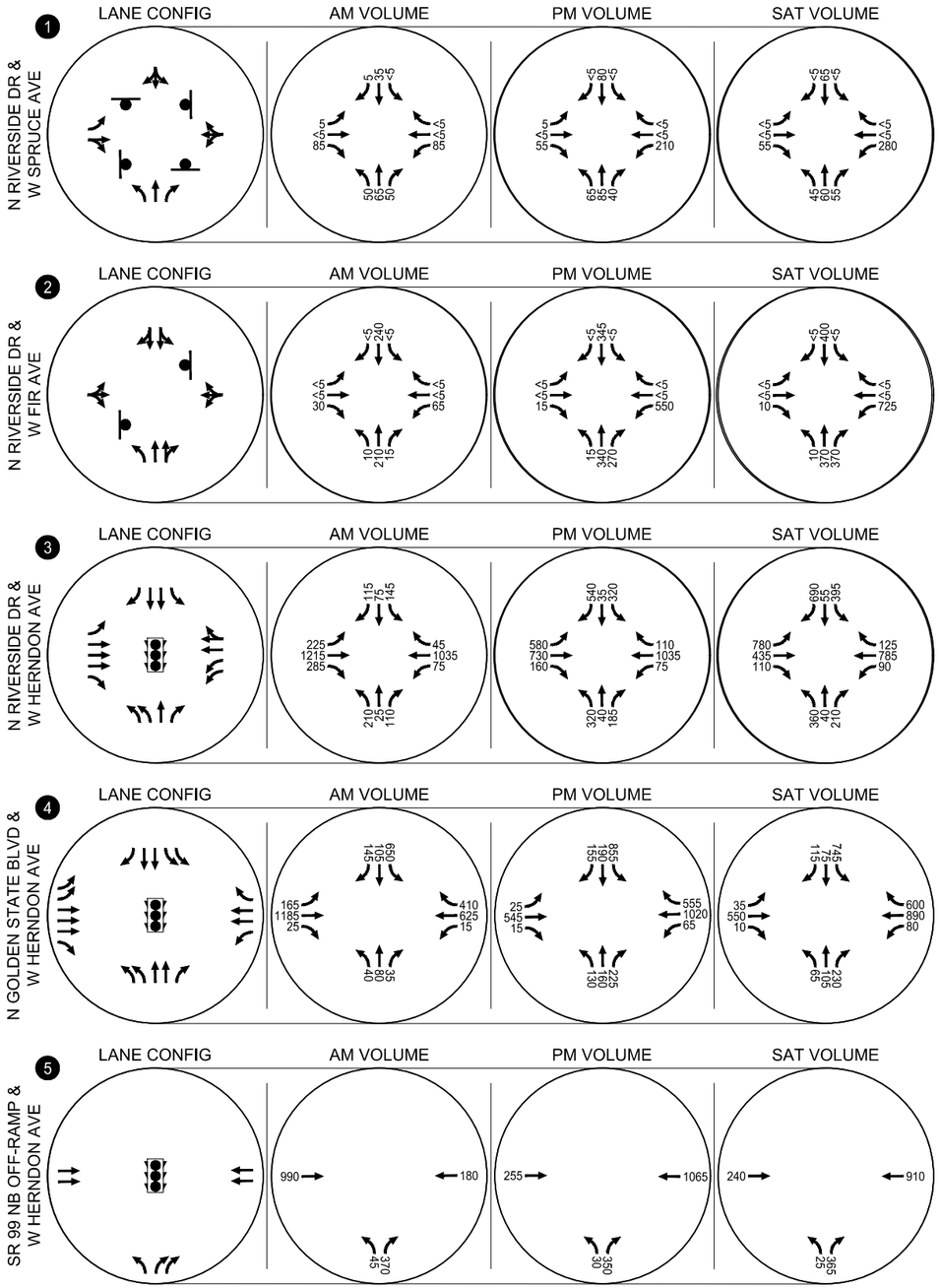
INTERSECTION OPERATIONS

Traffic volumes for Future Plus Project conditions were developed using an additive approach. Project trips were added to Future Conditions traffic on the roadway network to develop the volumes for the Future Plus Project with reclassification conditions. Future Plus Project with reclassification turning movement volumes for weekday AM, PM and Saturday peak hours are presented in Figure 9.

As shown in Table 14, the following study intersections would operate at unacceptable LOS during the analysis periods listed:

- N Riverside Dr/W Fir Ave (Intersection 2)
    - PM Peak Hour (LOS F)
    - Saturday Midday Peak Hour (LOS F)
- N Riverside Dr/W Herndon Ave (Intersection 3)
    - AM Peak Hour (LOS E)
    - PM Peak Hour (LOS F)
    - Saturday Midday Peak Hour (LOS F)
- N Golden State Blvd/W Herndon Ave (Intersection 4)
    - PM Peak Hour (LOS E)
    - Saturday Midday Peak Hour (LOS E)

Appendix H includes Synchro output reports for Future Plus Project conditions.



- STOP SIGN
- TRAFFIC SIGNAL

Year 2042 Future Plus Project Lane Configurations, Traffic Control Devices and Traffic Volumes
Weekday AM, Weekday PM and Weekend Midday Peak Hours
Fresno, California

Figure
9

KITTELSON & ASSOCIATES

Table 14: Future Plus Project Conditions, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
1	N Riverside Dr/W Spruce Ave	AWSC	AM	8.5	A
			PM	10.5	B
			SAT	11.7	B
2	N Riverside Dr/W Fir Ave	TWSC	AM	13.0	B
			PM	***>50***	***F***
			SAT	***>50***	***F***
3	N Riverside Dr/W Herndon Ave	Signal	AM	***56.9***	***E***
			PM	***>80***	***F***
			SAT	***>80***	***F***
4	N Golden State Blvd/W Herndon Ave	Signal	AM	31.4	C
			PM	***76.2***	***E***
			SAT	***68.9***	***E***
5	SR 99 NB Off Ramp/W Herndon Ave	Signal	AM	16.1	B
			PM	14.7	B
			SAT	15.6	B
6	N Parkway Dr/W Herndon Ave	Signal	AM	23.9	C
			PM	16.4	B
			SAT	16.9	B
A	N Riverside Dr/Site Access A	TWSC	AM	<1	A
			PM	<1	A
			SAT	<1	A
C	N Riverside Dr/Site Access C	TWSC	AM	<1	A
			PM	<1	A
			SAT	<1	A
D	Site Access D/W Herndon Ave	TWSC	AM	14.5	B
			PM	15.4	C
			SAT	13.9	B

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro Version 10 and HCM 6th Edition methodology were used.
- City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- **Bolded and italicized** indicate intersections operating beyond the City of Fresno standard.
- AWSC: All-Way Stop Control
- TWSC: Two-Way Stop Control
- Average delay in seconds/vehicle is reported for signalized and stop control intersections. For TWSC intersections the worst approach delay is reported.

FUTURE DRIVEWAY OPERATIONS

Traffic operations at the Costco site driveways on N Riverside Dr and W Herndon Ave adjacent to the proposed site accesses were also evaluated with the revised site access for the weekday AM, PM and Saturday midday peak hours.

Turn Lane Assessment

Turn lane opportunities were analyzed for the site accesses along N Riverside Dr and W Herndon Ave. The warrant analysis used the AASHTO Green Book. The warrants were developed using Saturday midday volumes as they represented the highest volumes at the driveways. Appendix I contains the turn lane warrants worksheets.

Table 15 shows the results of the turn lane analysis at the site access locations.

Table 15: Future Plus Project Conditions, Turn Lane Analysis Results

No.	Intersection	Proposed Access Type	Turn Lane	Threshold Met
2	N Riverside Dr/ W Fir Ave	Full-Movement Two-Way Stop-Controlled	NB Right Turn Lane	**Yes**
			SB Left Turn Lane	No
A	N Riverside Dr/ Site Access A	Right-In Right-Out Two-Way Stop-Controlled	NB Right Turn Lane	No
C	N Riverside Dr/ Site Access C	Right-In, Right-Out Two-Way Stop-Controlled	NB Right Turn Lane	**Yes**
D	Site Access A/ W Herndon Ave	Left-In, Right-In, Right-Out Two-Way Stop-Controlled	WB Right Turn Lane	**Yes**
			EB Left Turn Lane	**Yes**

Source: Kittelson & Associates, Inc., 2023

Like the Existing Plus Project condition, N Riverside Dr at W Fir Ave and at Site Access C meet the right-turn assessment with Future Plus Project traffic volumes.

In addition, westbound right turn and eastbound left turn lane warrants are also met at Site Access A and W Herndon Ave. Currently, the curb-to-curb right of way on W Herndon Ave at the proposed site access is approximately 95 feet, with 5 12-foot travel lanes (3 eastbound and 2 westbound lanes) and a 25-foot median. Turn lanes can likely be accommodated on W Herndon Ave while maintaining current lane widths if the median is removed.

SIGNAL WARRANTS

The MUTCD 8-hour, 4-hour and peak hour traffic signal warrants were analyzed for the Future Plus Project conditions. Results are presented in Table 16. *Appendix J* contains the signal warrants worksheets.

Table 16: Future Plus Project Conditions, Signal Warrants

No.	Intersection	Peak Hour	Warrant	Threshold Met
1	N Riverside Dr/W Spruce Ave	PM	#1 - Eight-Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	No
		SAT	#1 - Eight-Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	No
2	N Riverside Dr/W Fir Ave	PM	#1 - Eight-Highest	***Yes***
			#2 – Four-Hour	***Yes***
			#3 – Peak Hour	***Yes***
		SAT	#1 - Eight-Highest	***Yes***
			#2 – Four-Hour	***Yes***
			#3 – Peak Hour	***Yes***
D	Site Access D/W Herndon Ave	PM	#1 - Eight-Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	***Yes***
		SAT	#1 - Eight-Highest	***Yes***
			#2 – Four-Hour	***Yes***
			#3 – Peak Hour	***Yes***

Source: Kittelson & Associates, Inc., 2023

Like the Existing Plus Project conditions, warrants 1, 2, and 3 are met for N Riverside Dr and W Fir Ave under Future Plus Project conditions. Therefore, it is recommended that a signal be installed at this location. Warrants are not met at any additional locations.

For Site Access D on W Herndon Ave, the threshold for warrant 3 is met on a weekday and the threshold for warrants 1, 2, and 3 are met on Saturday. Given the proximity of Site Access D to the signalized N Riverside Dr/W Herndon Ave intersection (800' to the east), the minor access characterization of Site Access D, and that the intersection is expected to operate within City standard, installation of a signal is not recommended at this location.

95TH PERCENTILE QUEUES

An analysis of 95th percentile queue lengths was performed using Synchro software version 10. Queue lengths presented in Table 17 for the Existing peak hours. The longest queue present during any of the three peak hours is shown in the table. The study intersections were found to mostly have sufficient storage to contain the 95th percentile queue lengths. Exceptions to this are:

- **N Riverside Dr/W Fir Ave (Intersection 2):** Westbound approach: expected to exceed available capacity on Saturdays
- **N Riverside Dr/W Herndon Ave (Intersection 3):** Northbound left, southbound left, southbound right, and eastbound left movements: expected to exceed available capacity during the PM peak hour
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Southbound left, eastbound through, and westbound right: expected to exceed available capacity during the PM peak hour

All intersections and movements that exceed the storage capacity under Future Conditions with reclassification also exceed the storage capacity under Existing Plus Project conditions. No new movements exceed the storage capacity.

Appendices G, H and K contain queue length summary reports for the different scenarios.

Table 17: Future Plus Project Conditions, 95th Percentile Queues

No.	Intersection	Scenario	Northbound			Southbound			Eastbound			Westbound		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
1	N Riverside Dr/ W Spruce Ave	Storage	150	375	100		-		80	225			575	
		Future SAT	25	25	25		25		25	25			-	
		Future + Project SAT	25	25	25		25		25	25			75	
2	N Riverside Dr/ W Fir Ave	Storage	225	250			375			225			700	
		Future SAT	25	-			-			25			-	
		Future + Project SAT	25	-			25			25			***>1000***	
		Future + Project SAT with Improvements	25	150			125			25			525	
3	N Riverside Dr/ W Herndon Ave	Storage	225	-	225	325	-	100	225	-	275	225	-	
		Future PM	***325***	75	75	125	50	25	175	175	50	50	475	
		Future + Project PM	***325***	75	75	***675***	25	***650***	***1225***	225	50	75	775	
		Future + Project PM with Improvements	175	75	75	***400***	25	550	***675***	200	50	50	700	25
4	N Golden State Blvd/ W Herndon Ave	Storage	150	300	150	275	600	175	250	400	350	150	325	325
		Future PM	75	100	125	***400***	100	50	25	75	25	50	325	50
		Future + Project PM	75	100	200	***550***	100	50	25	***150***	25	100	***500***	325
		Future + Project PM with Improvements	75	125	150	***450***	100	50	25	***150***	25	100	***500***	***125***
5	SR 99 NB Off-Ramp/ W Herndon Ave	Storage	275	-	650		-			500			550	
		Future PM	50	-	50		-			25			25	
		Future + Project PM	50	-	50		-			25			150	
6	N Parkway Dr/ W Herndon Ave	Storage	-	500	150	125	300	-		-		500	-	175
		Future PM	-	25	25	175	25	-		-		50	-	25
		Future + Project PM	-	25	25	175	50	-		-		275	-	75
A	N Riverside Dr/ Site Access A	Storage		-			-			-			700	
		Existing SAT		-			-			-			-	
		Existing + Project SAT		-			-			-			25	
B	N Riverside Dr/ Site Access C	Storage		-			-			-			300	
		Existing SAT		-			-			-			-	
		Existing + Project SAT		-			-			-			25	
C	Site Access D/ W Herndon Ave	Storage		-			1000		100	-	-			
		Existing SAT		-			-		-	-	-			
		Existing + Project SAT		-			25		25	-	-			

Source: Kittelson & Associates, Inc. 2023
Intersections analyzed using HCM 6 methodologies
Queue lengths reported in feet (rounded to the nearest vehicle length)
Intersections shaded in gray represent locations where queue lengths would exceed storage.

RECOMMENDED OFF-SITE IMPROVEMENTS

To improve upon intersection operations at locations that would operation beyond the standard, Kittelson recommends the following improvements:

- **N Riverside Dr/W Fir Ave (Intersection 2):** Signalize intersection.

- **N Riverside Dr/W Herndon Ave (Intersection 3):** Restripe existing eastbound approach to include second eastbound left turn lane. Extend eastbound left-turn lane an additional 150 feet, repurposing the raised median in the roadway cross section. Add southbound right-turn overlap to traffic signal.
    - **Note:** A revision of the signal timing to change the northbound and southbound left turns from protected only to protected-permitted would mitigate the intersection to a level that satisfies performance requirements. However, the City does not support protected-permitted left-turns for this location.
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Revise signal phasing to optimize green-time allocation relative to anticipated volumes. For the westbound approach, the queue would extend past the N Weber Ave intersection. To reduce queue blockage of the intersection, "DO NOT BLOCK" pavement markings are recommended for the full width of N Weber Ave. On the north leg, reconstruct the median to extend the southbound dual left-turn pocket as far north as possible without interfering with the existing northbound left-turn pocket at W Kathryn Ave.

Table 18 presents the operations at the intersections with the recommended improvements. *Appendix K* contains Synchro output reports.

Table 18: Future Plus Project with Reclassification Conditions with Off-Site Improvements, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
2	N Riverside Dr/W Fir Ave	Signal	AM	4.5	A
			PM	15.7	B
			SAT	29.9	C
3	N Riverside Dr/W Herndon Ave	Signal	AM	32.3	C
			PM	***73.7***	***E***
			SAT	***78.4***	***E***
4	N Golden State Blvd/W Herndon Ave	Signal	AM	31.4	C
			PM	49.4	D
			SAT	48.4	D

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro Version 10 and HCM 6th Edition methodology were used.
- City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- Average delay in seconds/vehicle is reported for signalized and stop control intersections.

FUTURE PLUS PROJECT CONDITIONS WITHOUT RECLASSIFICATION OF W HERNDON AVE

The Future Plus Project conditions without reclassification of W Herndon Ave analysis forecasts how the study intersections would operate with the traffic generated by the proposed project development and assumes no direct access were provided to W Herndon Ave. If W Herndon Ave remained an expressway, no direct site access would be permitted onto the roadway. Therefore, this analysis excludes the reclassification of W Herndon Ave from an expressway to a major arterial (which is assumed for the plus project conditions), and project trips that were routed to/from the Site Access D and W Herndon Ave location were redistributed to the other site accesses. The analysis includes quantification of the potential affects to traffic operations due to project traffic without the roadway reclassification.

INTERSECTION OPERATIONS

Traffic volumes for Future Plus Project conditions without reclassification of W Herndon Ave were developed using an additive approach. Project trips shown in Table 7 were added to Future Conditions traffic on the roadway network to develop the volumes for the Future Plus Project conditions without Reclassification of W Herndon Ave. Project-only volumes for this scenario for weekday AM, PM and Saturday peak hours are presented in Figure 10. Turning movement volumes for Future Plus Project conditions without reclassification of W Herndon Ave are presented in Figure 11.

As shown in Table 19, the following study intersections would operate at unacceptable LOS during the analysis periods listed under Future Plus Project conditions without reclassification of W Herndon Ave:

- N Riverside Dr/W Fir Ave (Intersection 2)
    - PM Peak Hour (LOS F)
    - Saturday Midday Peak Hour (LOS F)
- N Riverside Dr/W Herndon Ave (Intersection 3)
    - AM Peak Hour (LOS E)
    - PM Peak Hour (LOS F)
    - Saturday Midday Peak Hour (LOS F)
- N Golden State Blvd/W Herndon Ave (Intersection 4)
    - PM Peak Hour (LOS E)
    - Saturday Midday Peak Hour (LOS E)

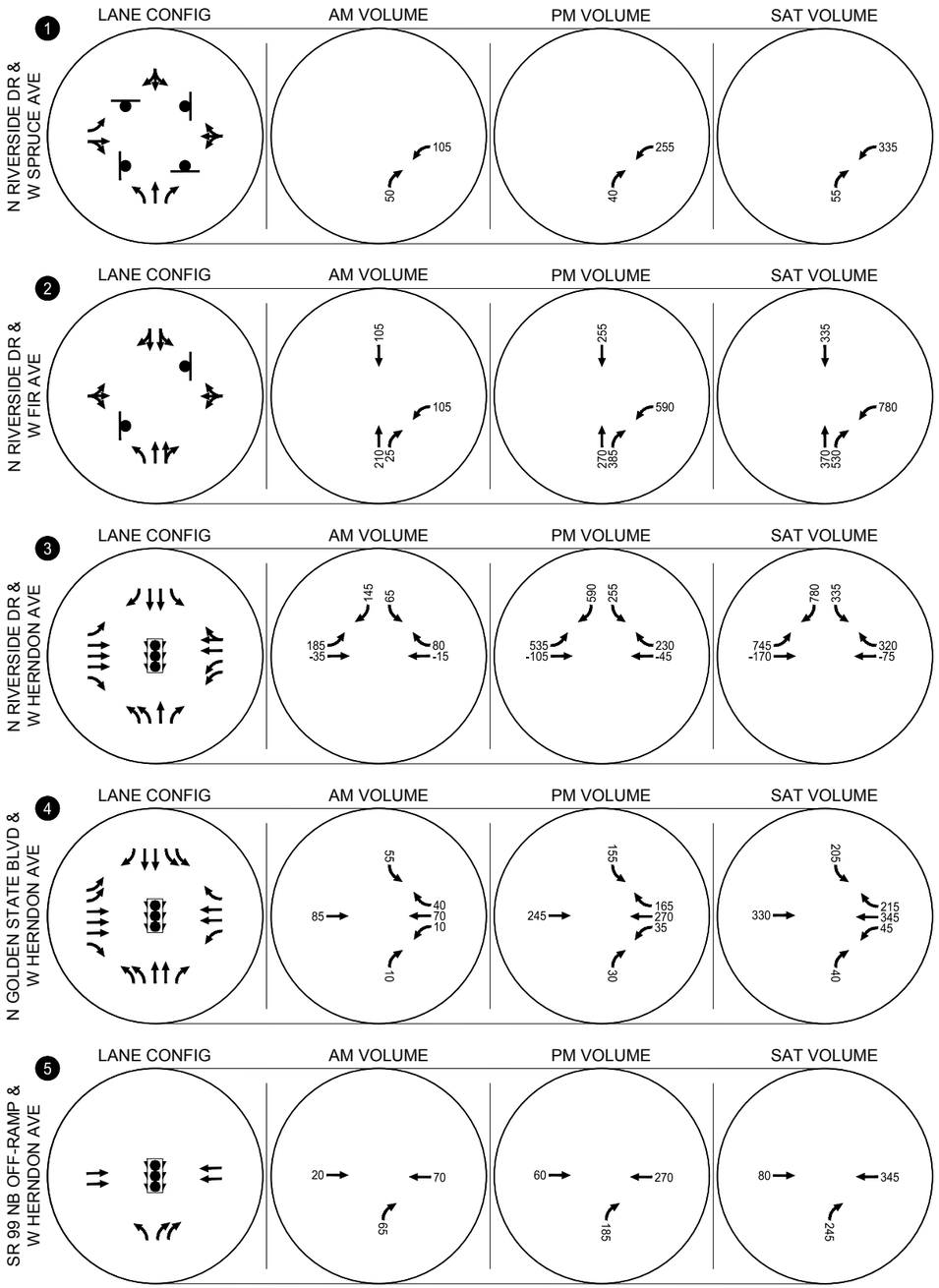
Appendix L includes Synchro output reports for Future Plus Project conditions without reclassification of W Herndon Ave.

Table 19: Future Plus Project Conditions without Reclassification of W Herndon Ave, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
1	N Riverside Dr/W Spruce Ave	AWSC	AM	8.7	A
			PM	11.4	B
			SAT	13.8	B
2	N Riverside Dr/W Fir Ave	TWSC	AM	16.1	C
			PM	***>50***	***F***
			SAT	***>50***	***F***
3	N Riverside Dr/W Herndon Ave	Signal	AM	***72.9***	***E***
			PM	***>80***	***F***
			SAT	***>80***	***F***
4	N Golden State Blvd/W Herndon Ave	Signal	AM	31.4	C
			PM	***76.2***	***E***
			SAT	***68.9***	***E***
5	SR 99 NB Off Ramp/W Herndon Ave	Signal	AM	16.1	B
			PM	14.7	B
			SAT	15.6	B
6	N Parkway Dr/W Herndon Ave	Signal	AM	23.9	C
			PM	16.4	B
			SAT	16.9	B
A	N Riverside Dr/Site Access A	TWSC	AM	<1	A
			PM	<1	A
			SAT	<1	A
C	N Riverside Dr/Site Access C	TWSC	AM	<1	A
			PM	<1	A
			SAT	<1	A

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro Version 10 and HCM 6th Edition methodology were used
-City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- **Bolded and italicized** indicate intersections operating beyond the City of Fresno standard
- AWSC: All-Way Stop Control
- TWSC: Two-Way Stop Control
- Average delay in seconds/vehicle is reported for signalized and stop control intersections. For TWSC intersections the worst approach delay is reported.

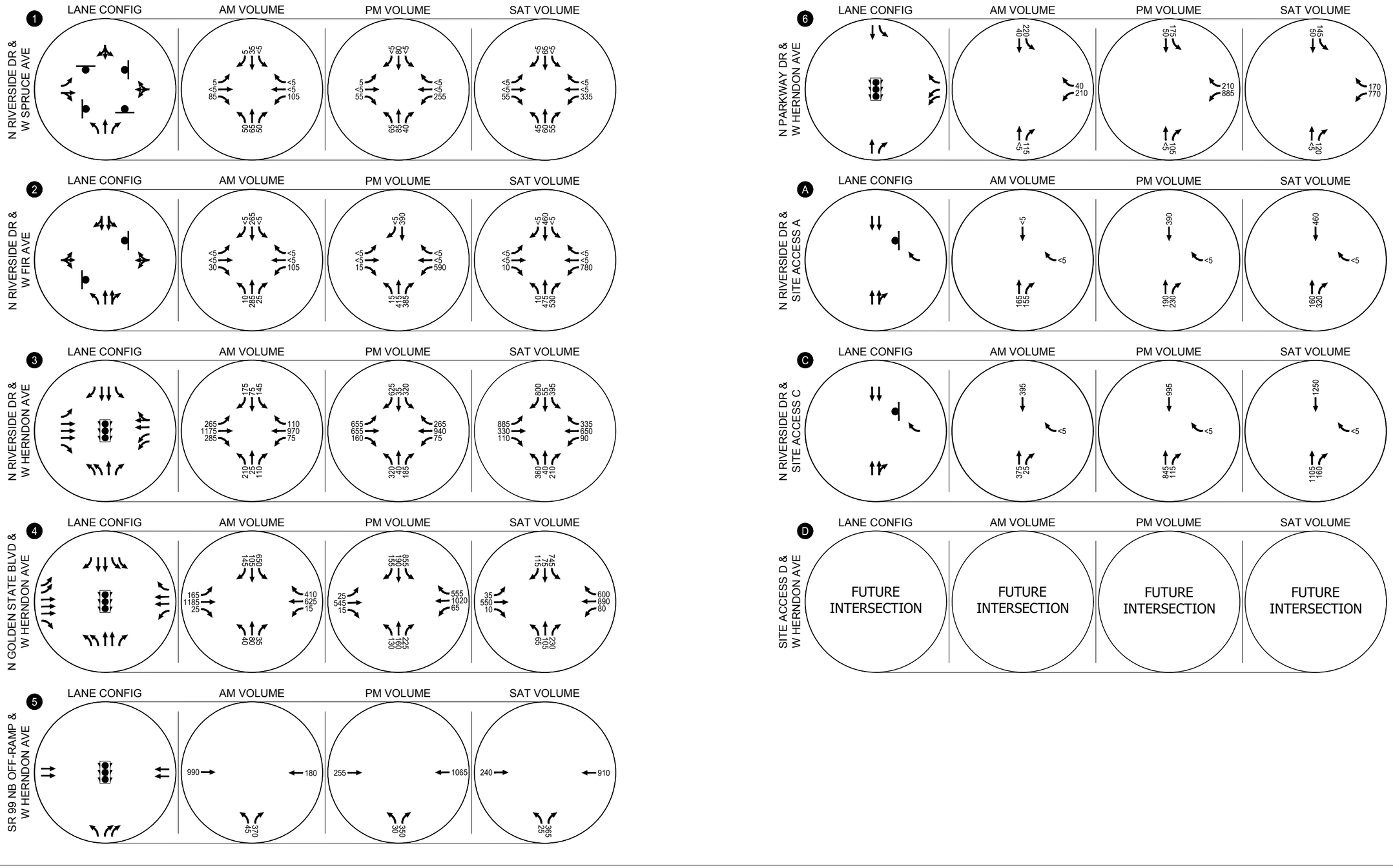


- STOP SIGN
- TRAFFIC SIGNAL

Project Trip Volumes Without Reclassification of W Herndon Ave
Weekday AM, Weekday PM and Weekend Midday Peak Hours
Fresno, California

Figure
10

KITTELSON & ASSOCIATES



- STOP SIGN
- TRAFFIC SIGNAL

Year 2042 Future Plus Project Without Reclassification of W Herndon Ave, Lane Configurations, Traffic Control Devices and Traffic Volumes
Weekday AM, Weekday PM and Weekend Midday Peak Hours
Fresno, California

Figure 11

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FUTURE DRIVEWAY CONSIDERATIONS

In addition to the operations analysis results presented in Table 14, the potential need for right and left turn lanes as well as signalization was evaluated for the three project driveways using the methodologies cited earlier in this report.

Turn Lane Assessment

Turn lane opportunities were analyzed for the site accesses along N Riverside Dr and W Herndon Ave using Saturday midday peak hour volumes as they represented the highest volumes projected at the driveways. *Appendix M* contains the turn lane analysis worksheets.

Table 20 shows the results of the turn lane analysis at the site access locations.

Table 20: Future Plus Project Conditions without Reclassification of W Herndon Ave, Turn Lane Analysis Results

No.	Intersection	Proposed Access Type	Turn Lane	Threshold Met
2	N Riverside Dr/ W Fir Ave	Full-Movement Two-Way Stop-Controlled	NB Right Turn Lane	**Yes**
			SB Left Turn Lane	No
A	N Riverside Dr/ Site Access A	Right-In Right-Out Two-Way Stop-Controlled	NB Right Turn Lane	**Yes**
C	N Riverside Dr/ Site Access C	Right-In, Right-Out Two-Way Stop-Controlled	NB Right Turn Lane	**Yes**

Source: Kittelson & Associates, Inc., 2023

Like the Existing Plus Project condition, N Riverside Dr at W Fir Ave and at Site Access C meet the right-turn warrant threshold under Future Plus Project conditions without reclassification of W Herndon Ave. Under Future Plus Project without Reclassification of W Herndon Ave conditions N Riverside Dr at Site Access A meet the right-turn warrant.

SIGNAL WARRANTS

The MUTCD 8-hour, 4-hour and peak hour traffic signal warrants were analyzed for the Future Plus Project conditions without reclassification of W Herndon Ave. *Appendix N* contains the signal warrants worksheets.

Table 21: Future Plus Project Conditions without Reclassification of W Herndon Ave, Signal Warrants

No.	Intersection	Proposed Access Type	Warrant	Threshold Met
1	N Riverside Dr/ W Spruce Ave	PM	#1 - Eight-Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	No
		SAT	#1 - Eight-Highest	No
			#2 – Four-Hour	No
			#3 – Peak Hour	No
2	N Riverside Dr/ W Fir Ave	PM	#1 - Eight-Highest	**Yes**
			#2 – Four-Hour	**Yes**
			#3 – Peak Hour	**Yes**
		SAT	#1 - Eight-Highest	**Yes**
			#2 – Four-Hour	**Yes**
			#3 – Peak Hour	**Yes**

Source: Kittelson & Associates, Inc., 2023

Like the Existing Plus Project conditions, warrants 1, 2, and 3 are met for N Riverside Dr and W Fir Ave under Future Plus Project conditions without reclassification of W Herndon Ave. Based on this finding and the proposed location of the primary full-access driveway to the project site at this intersection, it is recommended that a signal be installed at this location.

95TH PERCENTILE QUEUES

Projected 95th percentile queues are presented in Table 22 for the Existing Plus Project conditions. The longest queue projected during the three peak hours is shown in the table for each movement reported. The following projected 95th percentile queues exceed the available storage:

- **N Riverside Dr/W Fir Ave (Intersection 2):** Westbound approach: expected to exceed available capacity on Saturday midday peak hour
- **N Riverside Dr/W Herndon Ave (Intersection 3):** Northbound left, southbound left, southbound right, and eastbound left movements: expected to exceed available capacity during the PM peak hour
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Southbound left, eastbound through, and westbound right: expected to exceed available capacity during the PM peak hour

All intersections and movements that exceed the storage capacity under Future Conditions also exceed the storage capacity under Existing Plus Project conditions. No new movements exceed the storage capacity relative to Existing Plus Project conditions.

Appendices G, L and O contain queue length summary reports for the different scenarios.

Table 22: Future Plus Project Conditions without Reclassification of W Herndon Ave, 95th Percentile Queues

No.	Intersection	Scenario	Northbound			Southbound			Eastbound			Westbound		
			Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
1	N Riverside Dr/Spruce Ave	Storage	150	375	100		-		80	225			575	
		Future SAT	25	25	25		25		25	25			-	
		Future + Project SAT	25	25	25		25		25	25			100	
2	N Riverside Dr/Fir Ave	Storage	225	250			375			225			700	
		Future SAT	25	-			-			25			-	
		Future + Project SAT	25	25			25			25			***>1,000***	
		Future + Project SAT with Improvements	25	150			100			25			600	
3	N Riverside Dr/Herndon Ave	Storage	225	-	225	325	-	100	225	-	275	225	-	
		Future PM	***325***	75	75	125	50	25	175	175	50	50	475	
		Future + Project PM	***325***	75	75	***650***	25	***825***	***>1,000***	200	50	65	850	
		Future + Project PM with Improvements	175	75	75	***400***	25	650	***400***	175	50	75	650	150
4	Golden State Blvd/Herndon Ave	Storage	150	300	150	275	600	175	250	400	350	150	325	325
		Future PM	75	100	125	***400***	100	50	25	75	25	50	325	50
		Future + Project PM	75	100	200	***550***	100	50	25	***150***	25	100	***500***	325
		Future + Project PM with Improvements	75	125	150	***450***	100	50	25	***150***	25	100	***500***	***125***
5	SR 99 NB Off-Ramp/Herndon Ave	Storage	275	-	650		-			500			550	
		Future PM	50	-	50		-			25			25	
		Future + Project PM	50	-	50		-			25			150	
6	N Parkway Dr/Herndon Ave	Storage	-	500	150	125	300	-		-		500	-	175
		Future PM	-	25	25	175	25	-		-		50	-	25
		Future + Project PM	-	25	25	175	50	-		-		275	-	75

Source: Kittelson & Associates, Inc. 2020
Intersections analyzed using HCM 6 methodologies
Queue lengths reported in feet (rounded to the nearest vehicle length)
Intersections shaded in gray represent locations where queue lengths would exceed storage.

RECOMMENDED OFF-SITE IMPROVEMENTS

The following improvements are recommended in conjunction with project development to address project trip effects to traffic operations and to restore acceptable operations to respective intersections:

- **N Riverside Dr/W Fir Ave (Intersection 2):** Signalize intersection.
- **N Riverside Dr/W Herndon Ave (Intersection 3):** Restripe existing eastbound approach to include second eastbound left turn lane. Extend eastbound left-turn lane an additional 150 feet, repurposing the raised median in the roadway cross section. Add southbound right-turn overlap to traffic signal.
    - **Note:** A revision of the signal timing to change the northbound and southbound left turns from protected only to protected-permitted would mitigate the intersection to a level that satisfies performance requirements. However, the City does not support protected-permitted left-turns for this location.
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Revise signal phasing to optimize green-time allocation relative to anticipated volumes. For the westbound approach, the queue

would extend past the N Weber Ave intersection. To reduce queue blockage of the intersection, "DO NOT BLOCK" pavement markings are recommended for the full width of N Weber Ave. On the north leg, reconstruct the median to extend the southbound dual left-turn pocket as far north as possible without interfering with the existing northbound left-turn pocket at W Kathryn Ave.

Table 23 presents the operations at the intersections with the recommended improvements. *Appendix O* contains Synchro output reports.

Table 23: Future Plus Project Conditions without Reclassification of W Herndon Ave with Off-Site Improvements, Intersection Operations

No.	Location	Control	Peak Hour	Delay	LOS
2	N Riverside Dr/W Fir Ave	Signal	AM	5.2	A
			PM	20.7	C
			SAT	47.4	D
3	N Riverside Dr/W Herndon Ave	Signal	AM	33.7	C
			PM	***73.2***	***E***
			SAT	***78.2***	***E***
4	N Golden State Blvd/W Herndon Ave	Signal	AM	30.6	C
			PM	49.4	D
			SAT	48.4	D

Source: Kittelson & Associates, Inc., 2023

Note:
- Synchro Version 10 and HCM 6th Edition methodology were used.
- City of Fresno LOS Standard D for Signalized and Unsignalized Intersections
- **Bolded and italicized** indicate intersections operating beyond the City of Fresno standard.
- AWSC: All-Way Stop Control
- TWSC: Two-Way Stop Control
- Average delay in seconds/vehicle is reported for signalized and stop control intersections. For TWSC intersections the worst approach delay is reported.

Section 3
CEQA Compliance Assessment

CEQA COMPLIANCE ASSESSMENT

The transportation impact analysis identifies the degree to which regional vehicle miles traveled may change and how the study area's transportation system is expected to operate when the project is operational. The expected transportation-related effects of the project were examined considering the following:

- Consistency with existing programs, plans, ordinances, or policies
- Change in regional daily vehicle miles traveled (VMT) due to the project
- Transit, pedestrian, and bicyclist access to and near the project site
- Emergency access around and near the project site

This analysis includes both effects that would result in potentially significant impacts under CEQA guidelines and non-CEQA effects associated with traffic operations on the transportation network.

CEQA SIGNIFICANCE CRITERIA

The project's impact is not considered to be significant unless it would:

a. Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

b. Conflict or be inconsistent with CEQA Guideline section 15064.3, subdivision (b).

c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

d. Result in inadequate emergency access.

Significance criterion "b" is related to the implementation of vehicle-miles traveled (VMT) as the primary performance metric.

The City of Fresno's CEQA guidelines for VMT thresholds identify the following threshold for significant impacts for developments such as the project:

- A retail project that results in a net increase of regional VMT

CONSISTENCY WITH PLANS AND PROGRAMS

The City of Fresno has jurisdiction over City streets and City-operated traffic signals. Caltrans has jurisdiction over State facilities and on- and off-ramp intersections with local streets. The County of Fresno has jurisdiction over streets in unincorporated areas, as well as County expressways. Kittelson reviewed the applicable programs, plans, ordinances, and policies that pertain to the project's potential impacts on the transportation system.

STATE REGULATORY FRAMEWORK

Senate Bill 743

Adopted on September 27, 2013, SB 743 directs the California Office of Planning and Research (OPR) to administer new CEQA guidance for jurisdictions that removes automobile vehicle delay and LOS from CEQA analysis and replaces it with VMT analysis or other measures that "promote the reduction of

greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses," to be used as a basis for determining significant transportation impacts.

REGIONAL REGULATORY FRAMEWORK

Fresno County Council of Governments

The Fresno County Council of Governments (Fresno COG) is a voluntary association of local governments and a regional planning agency composed of 16 member agencies, including the City of Fresno. The purpose of the Fresno COG is to establish a consensus on the transportation and land use needs of the Fresno County area and to further action plans for issues in the region. The current regional transportation plan (RTP) was adopted in 2018. The 2022 RTP is under development at the time this report is being prepared. The RTP addresses GHG emission reductions and other air emissions related to transportation, with the goal of preparing for future growth sustainably.

Fresno County Transportation Authority and Measure C

The Fresno County Transportation Authority (FCTA) is a regional agency that was created to administer the voter-passed Measure C program in 1986. Measure C was a 20-year program that achieved a half-cent sales tax for transportation expenditures and infrastructure. After its 20-year duration, the program was extended in 2006 for another 20 years. The FCTA established goals and core values for using these funds for building roads, expanding the bicycling network, expanding the transit network and transit services, and supporting vanpools and ride hailing services.

Fresno County Congestion Management Process

The Fresno County Congestion Management Process (CMP) is an effective systematic and regionally acceptable approach for managing congestion. Its responsibilities are to provide information on transportation system performance and assess alternative strategies for alleviating congestion and improving mobility. The CMP has identified a CMP network that includes SR 41 from the SR 99 interchange to the Madera/Fresno County line, SR 99 from the Madera/Fresno County line to the Jensen Ave interchange, SR 168 from the SR 180 interchange to the W Herndon Ave interchange, and SR 180 from the SR 99 interchange to the SR 168 interchange.

LOCAL REGULATORY FRAMEWORK

City of Fresno Active Transportation Plan

The City of Fresno's Active Transportation Plan, adopted in March 2017, provides a comprehensive guide outlining the vision for active transportation in Fresno. The plan lays out specific goals to improve bicycle access and connectivity in Fresno. These goals include the following:

- Equitably improve the safety and perceived safety of walking and bicycling in Fresno
- Increase walking and bicycling trips in Fresno by creating user-friendly facilities
- Improve the geographical equity of access to walking and bicycling facilities in Fresno
- Fill key gaps in Fresno's walking and bicycling network

Complete Streets Policy

The City's Complete Streets Policy was adopted by the City Council on October 10, 2019, to guide the implementation of the City's complete streets and multimodal objectives and policies within the Fresno General Plan. The City has integrated complete streets designs into its policies in compliance with Assembly Bill 1358.

SB 743 Implementation Policies

The City has initiated its incorporation of SB 743 goals into transportation policies in the in-progress General Plan update. Policies that address development of multimodal networks, reductions in greenhouse gases, and increasing diversity of land use have been developed in the General Plan.

IMPACT FINDING

The project would be consistent with the applicable plans policies and programs and would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. Therefore, the impact of the project would be ***less than significant***.

CHANGE IN REGIONAL VMT

This section discusses the analysis methodologies, data, and findings associated with the expected change in regional VMT that would result from the project.

ANALYSIS METHODOLOGIES AND DATA

The VMT analysis includes:

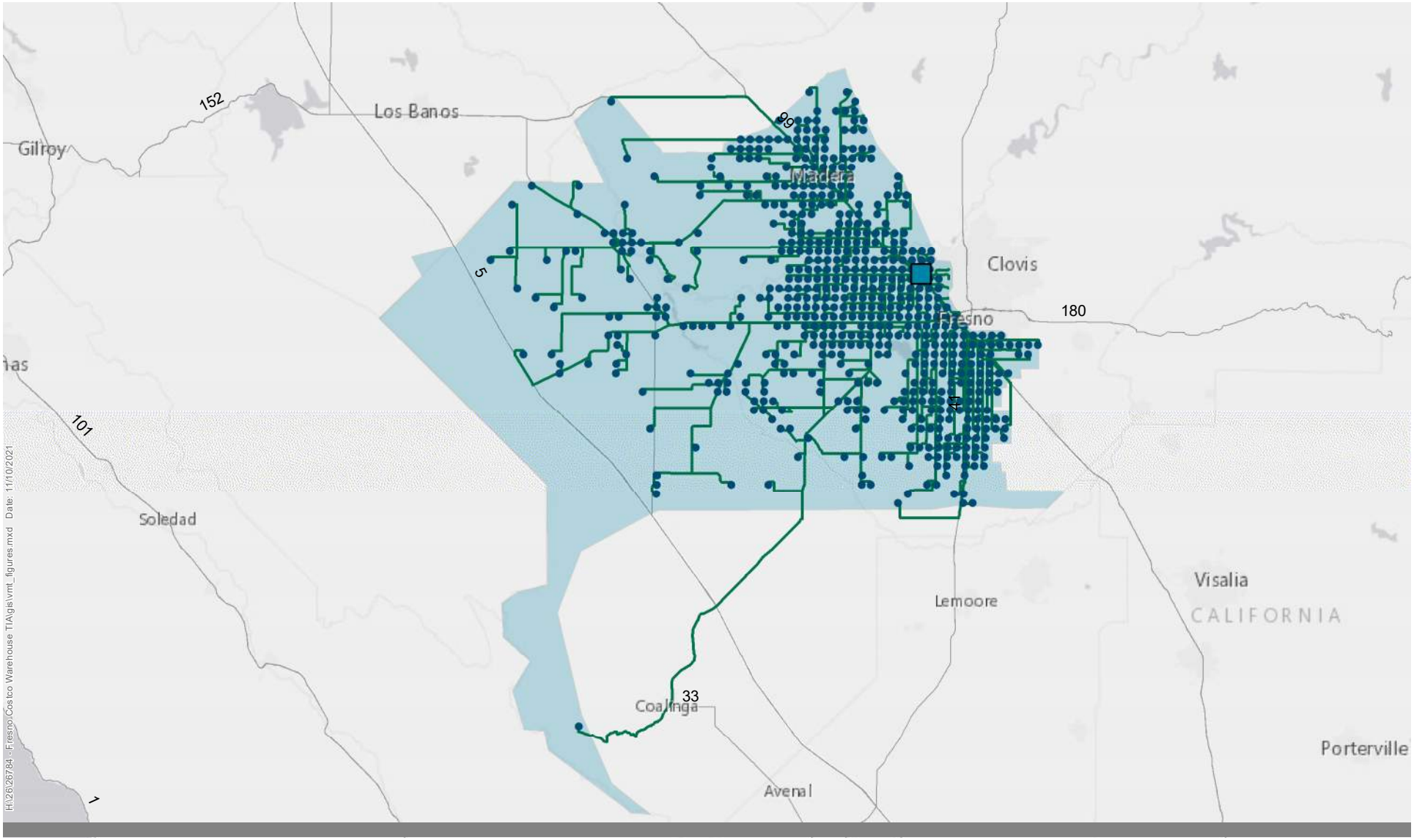
- Assessment of **project trip generation**
  - Including: members (accounting for primary and diverted member trips), warehouse employees, and fuel station employees for the existing and relocated Costcos, as well as car wash employees, MDO on-site employees, and MDO delivery employees for the relocated Costco
  - Excluding: members making pass-by trips, warehouse delivery trucks and fuel delivery trucks for the existing and relocated Costcos as well as MDO delivery truck from the depot and MDO delivery-to-members/other warehouse trucks for the relocated Costco
- Calculation of **member average primary trip length** based on Costco member approximate home locations
- Calculation of **member diverted trip lengths** based on expected diversion routes for the Costco site
- Calculation of **employee average trip lengths** based on the Fresno COG VMT Calculation Tool average employee trip lengths for the relevant transportation analysis zones (TAZs)
- Calculation of **MDO on-site and delivery employee average trip length** based on the Fresno COG VMT Calculation Tool average employee trip length for the relevant TAZs
- Calculation of **trips for an eventual shopping center use** that would backfill the vacated Shaw Costco warehouse
- Calculation of **average trip length for an eventual shopping center use**
- Calculation of **Shaw Costco fuel station trips** that would remain with the existing fuel station
- Calculation of **Shaw Costco fuel station average primary and diverted trip lengths**
- Calculation of overall expected **change in regional VMT** that would result from the project

Costco provided the following data for a typical month of sales at the existing Costco:

- Approximate home locations of Costco members who shopped during September 2019, grouped in 1-square-mile zones
- Number of visits to Costco in September 2019 by members in each 1-square-mile zone
- Market area of the existing Costco and projected market area of the relocated Costco

Member Average Primary Trip Lengths

Based on the trip generation of the existing Costco and relocated Costco, a portion of trips are made between Costco members' homes and Costco. These are characterized as primary trips. ArcGIS Online software was used to develop trip lengths between each 1-square-mile zone and the existing and proposed Costco locations. These zones and the travel routes to the existing and proposed Costco locations are presented in Figure 12 and Figure 13, respectively.



Legend

- Existing Fresno Costco (W Shaw Ave)
- Approximate Location of Member Households
- Routes to Existing Fresno
- Fresno Market Area

0 21 Miles

Figure 12

Travel Routes to Existing Costco (W Shaw Ave)

Fresno Costco Relocation

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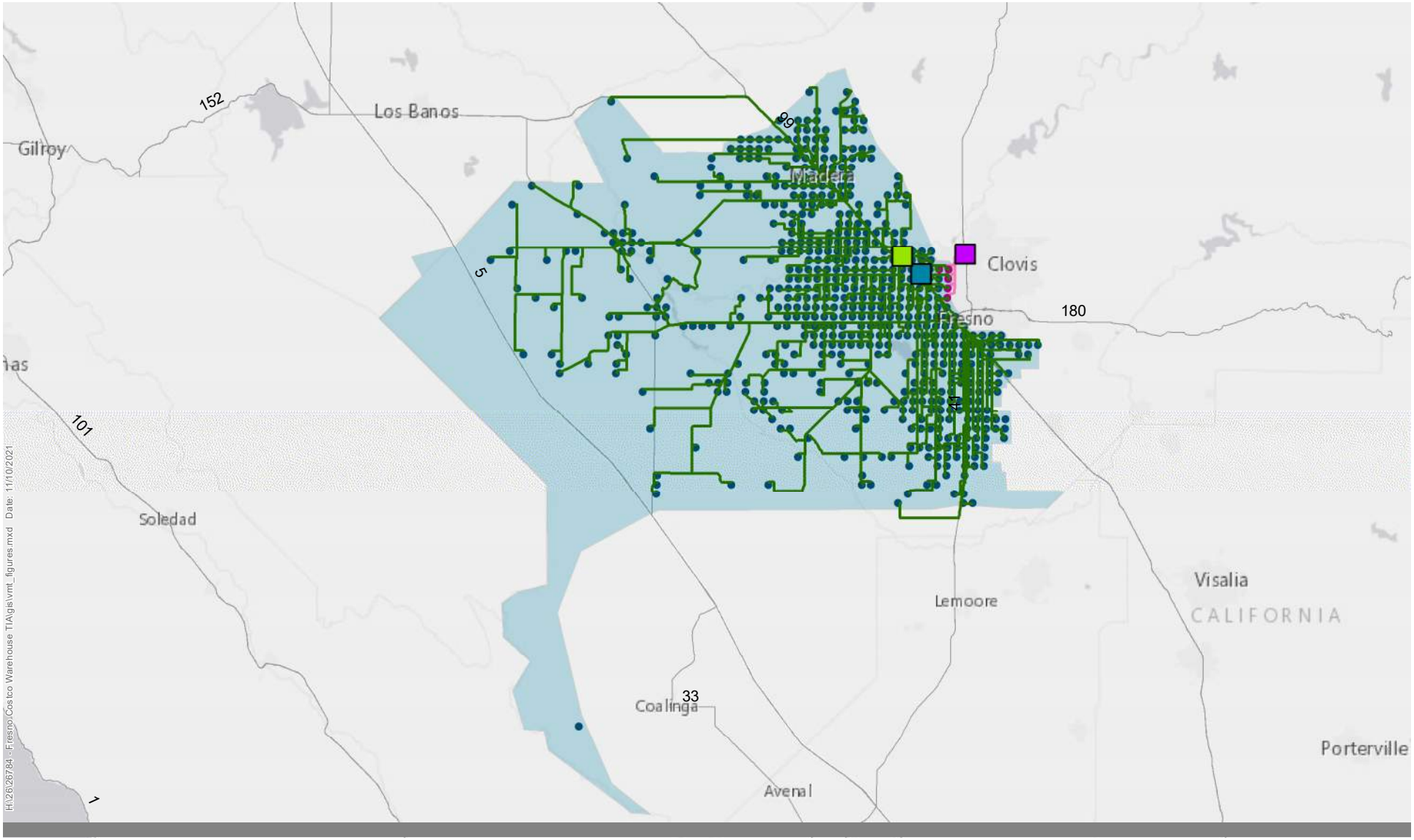

Legend

- Relocated Costco (N Riverside Ave)
- North Fresno Costco
- Existing Fresno Costco (W Shaw Ave)
- Approximate Location of Member Households, Members Shifting from Existing Costco (W Shaw Ave) to North Fresno Costco
- Relocated Fresno Market Area
- Travel Routes to Relocated Costco
- Travel Routes to North Fresno Costco
- Approximate Location of Member Households for Relocated Costco

0 21 Miles

Figure 13

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Travel Routes to After Costco Relocation

Fresno Costco Relocation

Upon developing the trip lengths between the zones and the two Costco sites, a weighted average trip length to the existing Costco and a weighted average trip length to the proposed Costco were developed based on the number of member visits made to the existing Costco in September 2019 by members in each zone. In essence, the trip length from a zone with several member visits during the month would carry more "weight" than the trip length from a zone with few member visits when developing the weighted average trip length.

Costco membership projections forecast that nearly all existing members will shop at the new site. The exception is a small set of members of the existing Costco on W Shaw Ave who are expected to transition to shopping at the North Fresno warehouse on N Abby St following the relocation of the W Shaw Ave Costco to the N Riverside Dr location. These few member households that are expected to shift to North Fresno are shown in magenta on Figure 13. The respective 1-square-mile zones were excluded from developing the weighted average trip lengths of primary trips to the relocated Costco.

Member Diverted Trip Lengths

Based on the trip generation of the existing Costco and relocated Costco, a portion of trips to and from Costco are made by members who are traveling on the surrounding street network for some other primary travel purpose and who travel a short distance out of their way to access the site while en route to their primary destination. These are characterized as diverted trips. ArcGIS Online software was used to develop trip lengths for the following expected diversion routes to the existing and proposed Costco locations:

Existing Costco

- SR 99 (Golden State Highway)
- N Golden State Blvd
- Brawley Avenue

Relocated Costco

- SR 99 (Golden State Highway)
- N Golden State Blvd
- Marketplace at El Paseo

Diversion distances were calculated based on the path a vehicle would need to travel beyond their primary route to access the warehouse and then return to their original path to continue to their destination. Figure 14, Figure 15, and Figure 16 illustrate expected diversion routes for the existing Costco while Figure 17, Figure 18, and Figure 19 illustrate the expected diversion routes for the relocated Costco.

Warehouse, Fuel Station, and Car Wash Employee Average Trip Lengths

Based on the trip generation of the existing Costco and relocated Costco, a portion of trips to and from Costco are made by warehouse and fuel station employees for both locations, as well as by car wash employees for the relocated Costco. These are considered home-based trips and are not associated with where members live. The average employee trip lengths provided for the relevant TAZs in the Fresno COG VMT Calculation Tool were used for the analysis.

Costco provides a robust commute benefit to its employees. Costco provides carpool incentives, partners with local agencies to provide vanpool services, subsidizes transit passes, and provides secure bicycle storage and locker rooms for employees who bike to work.

MDO On-Site and Delivery Employee Average Trip Length

Based on the trip generation of the relocated Costco, a portion of trips to and from the new location are made by MDO on-site and delivery employees. Additionally, the same MDO on-site and delivery employees work today at the existing MDO facility. These are considered home-based trips and are not associated with where members live. The average employee trip lengths provided for the relevant TAZs in the Fresno COG VMT Calculation Tool were used for the analysis.

Shaw Building Backfill Retail Use Trips

Once Costco vacates the building in the shopping center on W Shaw Avenue (Shaw building) to relocate to the new building on W Herndon Avenue (Herndon building), the Shaw building will be available for another retail use. Since the Shaw building is part of an existing development that already has undergone environmental review, the next retail use to occupy and operate from the building would not undergo environmental review. Therefore, the trips and VMT being generated today at the Shaw building by the existing Costco are trips and VMT that exist in the region and, in essence, already have been approved to be generated by a use at this location in Fresno. To determine the anticipated change in regional VMT resulting from the project – which entails the relocation of the Shaw Costco warehouse and development of a new fuel station and car wash – the difference in VMT generated by the Shaw building use after another retail use occupies and operates from it must be computed.

The Shaw building comprises 133,944 square feet and is part of a shopping center with WinCo Foods and another strip commercial building with several smaller commercial businesses. Since a future retail use has not been identified for the Shaw building, the ITE Shopping Center (LU 820) trip rates would apply. The shopping center indeed is larger than 150,000 square feet, as the Shaw building alone comprises more than 130,000 square feet. Therefore, daily trip generation for a future retail use is computed using Shopping Center rates.

Table 24 presents the trip generation for additional shopping center use at the Shaw building after another retail use occupies and operates from the vacated Costco warehouse. As shown, a future retail use would be expected to generate 4,238 daily primary trips.

Table 24: Shaw Building Trip Generation (Shopping Center)

Land Use	Size	Unit	Weekday Daily	
			Rate	ADT
Shopping Center (ITE LU 820)	133.944	KSF	37.01	4,957
Pass-By Trips*			14.5%	719
Primary Trips				4,238

Source: Kittelson & Associates, Inc., 2023

Notes:
Source: ITE *Trip Generation Manual*, 11th Ed.
- Pass-by trips information from Trip Generation Manual appendices.
* Daily pass-by trip rate is assumed based on the ITE-provided PM peak hour pass-by trip rate of 29% divided by two since the PM peak hour may not as accurately represent pass-by activity over the course of the day.

Shaw Building Backfill Retail Use Average Trip Length

Kittelson used the Fresno COG countywide travel demand model to estimate the average length of trips to and from the future retail use at the Shaw building. Transportation analysis zone (TAZ) 559 comprises the shopping center. The travel demand model estimates 10,515 daily trips in TAZ 559 generating 78,580 VMT. These values correspond to an average trip length of 7.47 miles (78,580 ÷ 10,515 = 7.47). This average trip length is used to estimate the anticipated VMT of the future retail use at the Shaw building.

Shaw Costco Fuel Station Trips

As previously discussed, Kittelson maintains a database of trip characteristics for Costco Wholesale sites throughout North America, including specific trip information for Costco fuel stations. Kittelson developed a daily trip generation estimate for the Costco fuel station at the Shaw building based on trip data for nine representative Costco fuel stations in California. Table 25 presents the daily trip generation for the Shaw Costco fuel station after the warehouse relocation.

Table 25: Shaw Costco Fuel Station Trip Generation

Trip Type	Daily Trips
Total Trips	4,282
Pass-by	1,884
Diverted	728
Primary	1,670

Source: Kittelson & Associates, Inc., 2023

As presented in Table 25, the Shaw Costco fuel station is expected to generate 4,282 total daily trips, of which 1,670 would be primary trips and 728 would be diverted trips.

Shaw Costco Fuel Station Average Primary and Diverted Trip Lengths

The same member household location information used to develop member average primary trip lengths for the Herndon warehouse was used to develop average primary trip lengths to the Shaw Costco fuel station. ArcGIS Online software was used to develop trip lengths between each 1-square-mile zone and the Shaw Costco location.

Likewise, the same method used to develop member diverted trip lengths for the Herndon warehouse was used to develop diverted trip lengths to the Shaw location. ArcGIS Online software was used to develop trip lengths for the following expected diversion routes to the existing locations:

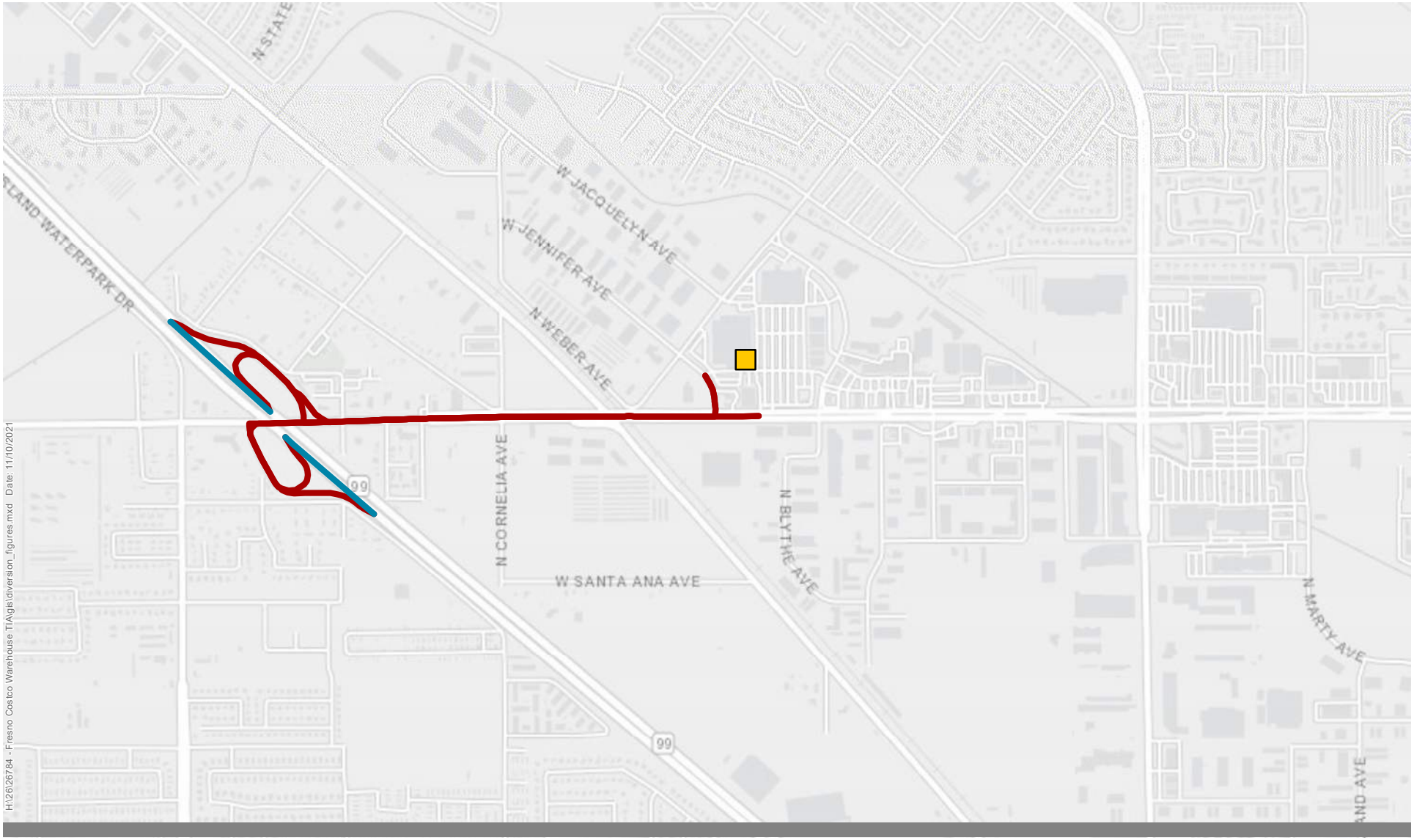
- SR 99 (Golden State Highway)
- N Golden State Blvd
- Brawley Avenue

Table 26 presents the primary and diverted trip lengths to the Shaw Costco fuel station.

Table 26: Diverted Trip Lengths, Shaw Costco Fuel Station

Trip Type	Miles
Primary	15.3
Pass-by	0.0
Diverted	1.6

Source: Kittelson & Associates, Inc., 2023



Legend

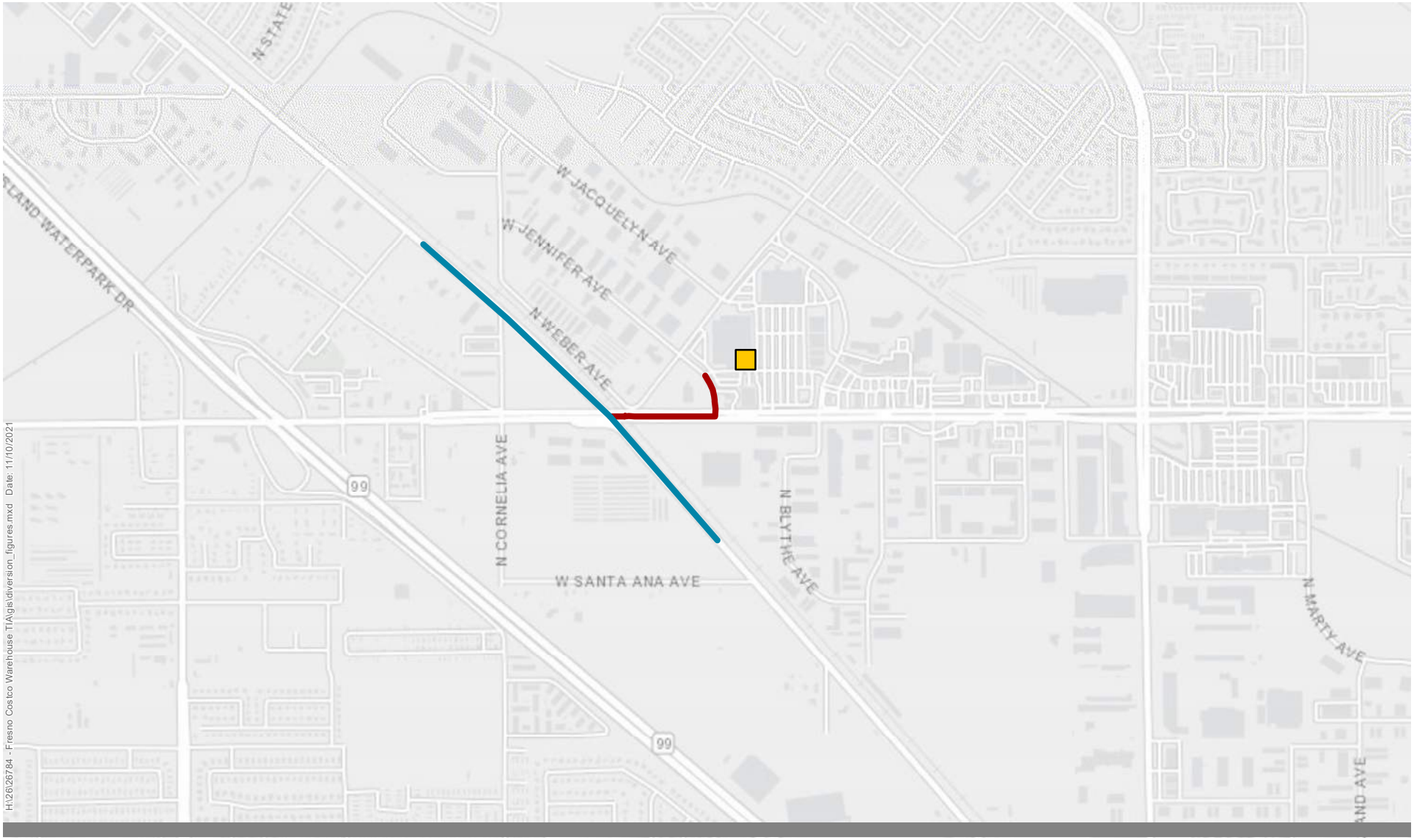
- Existing Costco (W Shaw Ave)
- Diverted Route
- Route Without Diversion

0 0.3 Miles

Figure 14

Existing Costco Diversion Routes
To/From SR 99
Fresno Costco Relocation

KITTELSON & ASSOCIATES



Legend

- Existing Costco (W Shaw Ave)
- Diverted Route
- Route Without Diversion

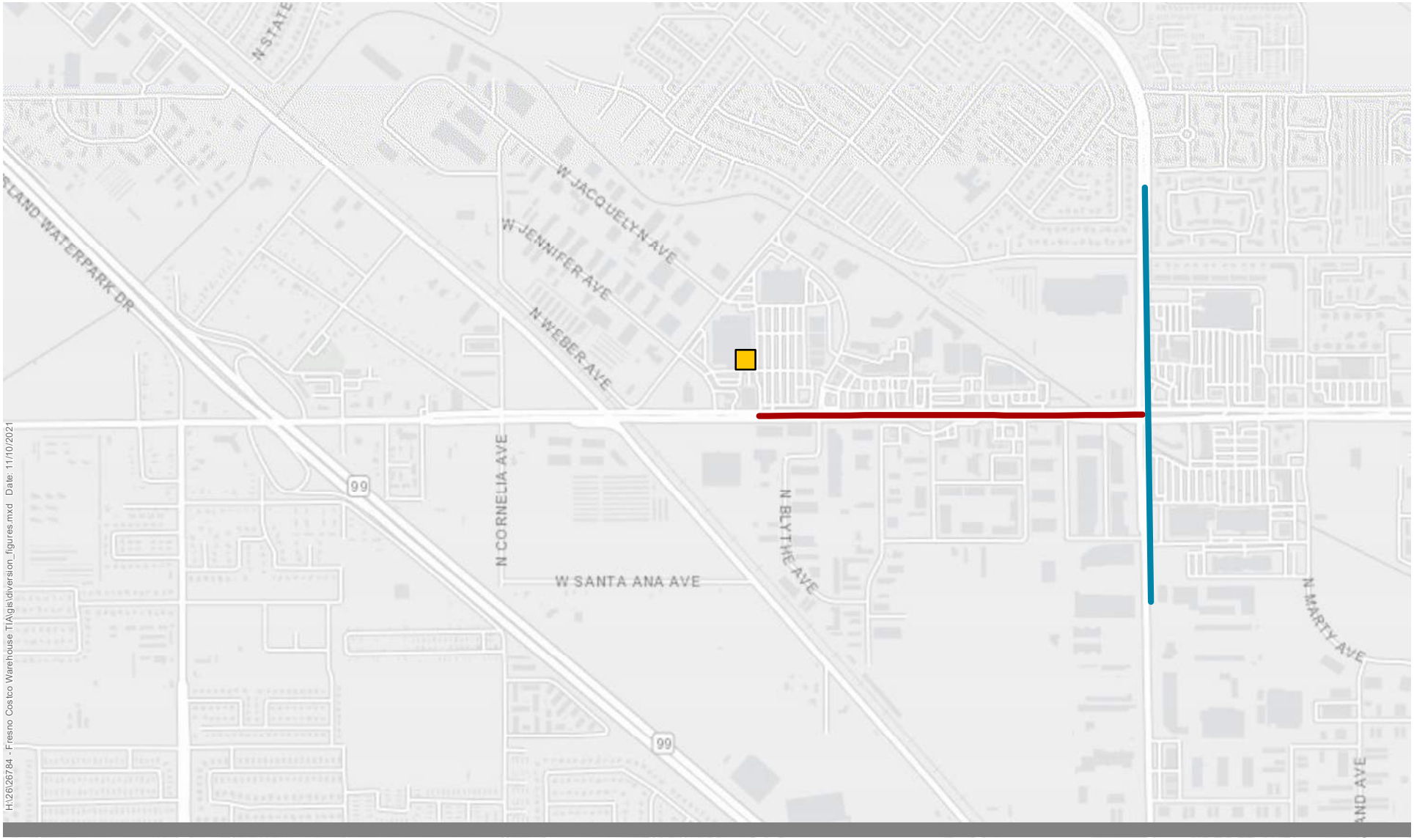
0 0.3 Miles

Figure 15

Existing Costco Diversion Routes To/From Golden State Boulevard

Fresno Costco Relocation

KITTELSON & ASSOCIATES



Legend

- Existing Costco (W Shaw Ave)
- Diverted Route
- Route Without Diversion

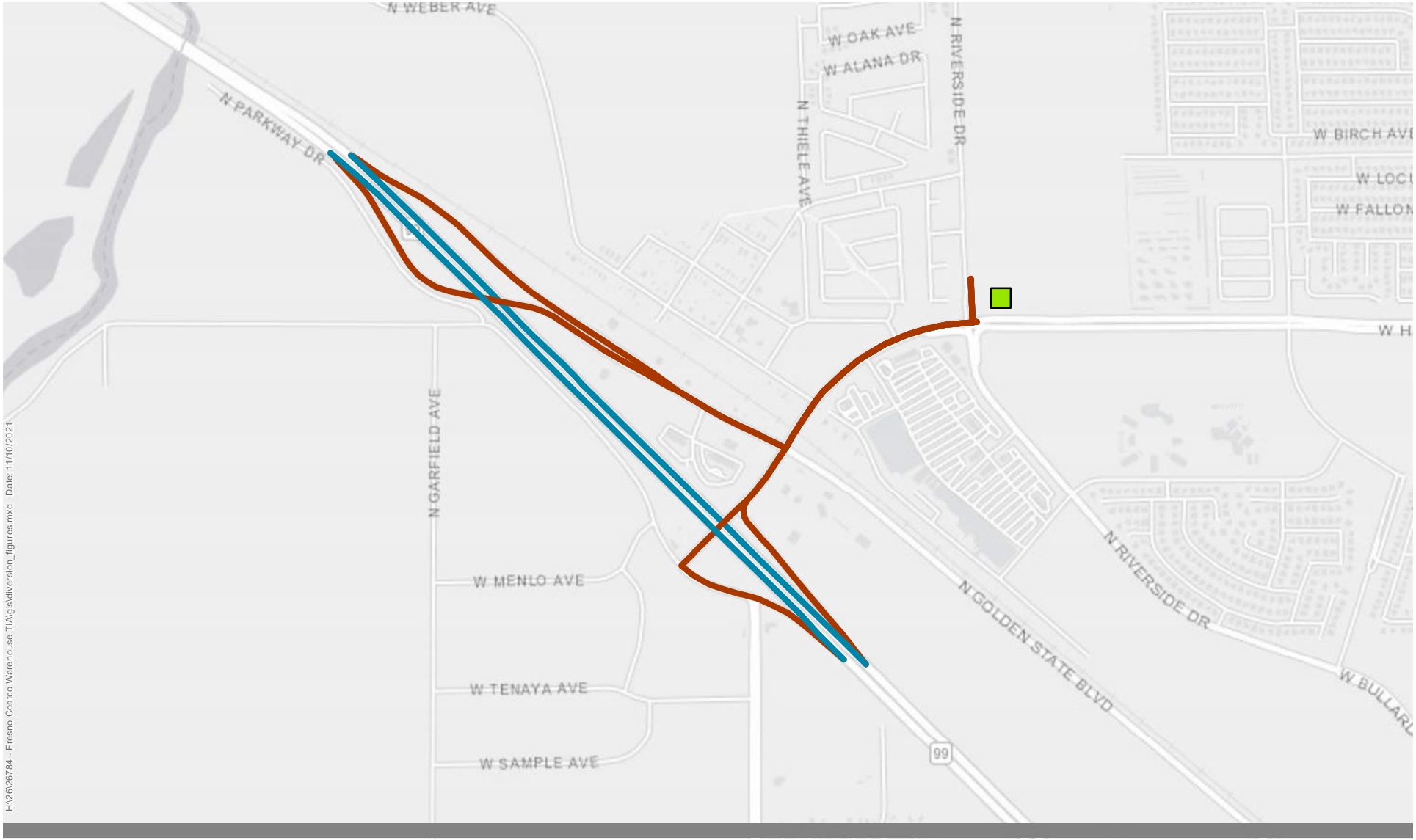
0 0.3 Miles

Figure 16

Existing Costco Diversion Routes To/From Brawley Avenue

Fresno Costco Relocation

KITTELSON & ASSOCIATES



Legend

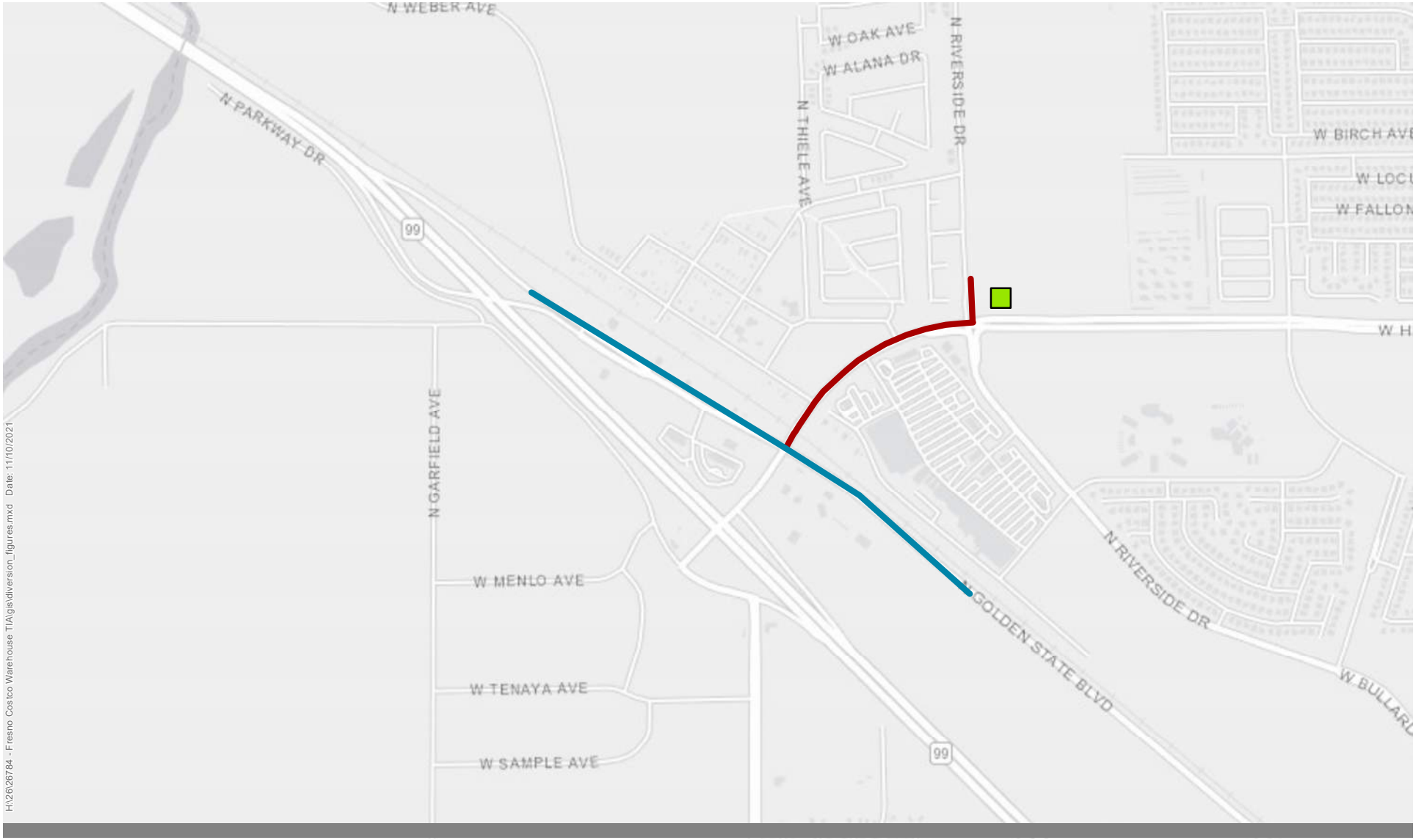
- Relocated Costco (N Riverside Ave)
- Diverted Route
- Route Without Diversion

0 0.3 Miles

Figure 17

Relocated Costco Diversion Routes
To/From SR 99
Fresno Costco Relocation

KITTELSON & ASSOCIATES



Legend

- Relocated Costco (N Riverside Ave)
- Diverted Route
- Route Without Diversion

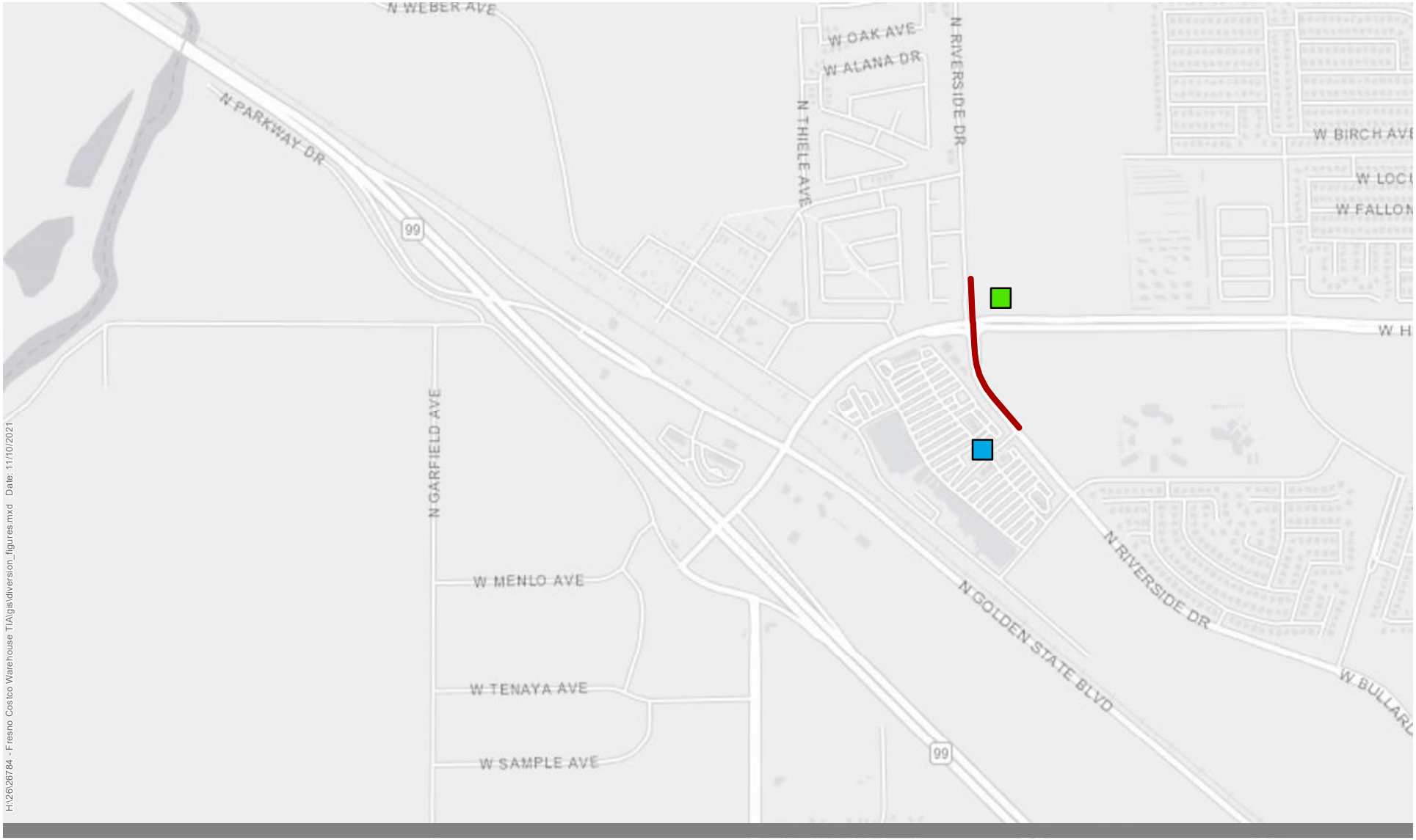
0 0.3 Miles

Figure 18

Relocated Costco Diversion Routes To/From Golden State Boulevard

Fresno Costco Relocation

KITTELSON & ASSOCIATES



Legend

- Relocated Costco (N Riverside Ave)
- Marketplace
- Diverted Route

0 0.3 Miles

KITTELSON & ASSOCIATES

Figure 19

Relocated Costco Diversion Routes
Marketplace at El Paseo
Fresno Costco Relocation

CHANGE IN REGIONAL VMT

VMT for the existing and relocated Costcos are computed by multiplying the number of each trip type by its associated trip length.

Existing Shaw Costco Daily VMT

Table 27 presents the weekday daily trips for each trip type for the existing Costco, the associated trip lengths, VMT for each trip type, and total daily VMT. As shown in the table, total daily VMT estimated for the existing Shaw Costco site is **120,083 miles**.

Table 27: Existing Costco VMT Summary

Trip Type	Weekday Daily Trips	Trip Length (miles)	Daily VMT
Members, Primary	7,001	15.3	106,943
Members, Pass-by	2,651	0.0	0
Members, Diverted	2,827	1.6	4,636
Warehouse & Fuel Station Employees	240	17.3	4,152
MDO Warehouse Employees	92	32.0	2,944
MDO Driver Employees	44	32.0	1,408
MDO Deliveries[1]	20	-	-
Fuel Truck Delivery[1]	10	128.0	-
Warehouse Truck Delivery[1]	20	128.0	-
Total	12,749	-	**120,083**

Source: Kittelson & Associates, Inc., 2023
[1] Delivery truck trips are excluded from the VMT calculation as good movement is not evaluated for identifying transportation impacts pursuant to CEQA.

Shaw Building Backfill Retail Use Daily VMT

Since the proposed project entails the Costco warehouse vacating the Shaw building to relocate to the Herndon building, the VMT associated with Costco at the Shaw building will be eliminated and a future unknown retail use is assumed to backfill the Shaw building, generating its own VMT. Table 28 presents the weekday daily primary trips for the Shaw building backfill retail use. As shown in the table, total daily VMT estimated for the existing Shaw building backfill retail use is **31,673 miles**.

Table 28: Shaw Building Backfill Retail Use Daily VMT

	Weekday Daily Trips	Trip Length (miles)	Daily VMT
Total	4,238	7.47	**31,673**

Source: Kittelson & Associates, Inc., 2023

Shaw Costco Fuel Station Daily VMT

The existing Shaw Costco fuel station is assumed to remain operational after the Costco warehouse vacates the building on the site and a future unknow retail use occupies and operates on the site. Table 29 presents the weekday daily trips for the Shaw Costco fuel station. As shown in the table, total daily VMT estimated for the existing Shaw Costco fuel station is **26,704 miles**.

Table 29: Shaw Costco Fuel Station Daily VMT

	Weekday Daily Trips	Trip Length (miles)	Daily VMT
Primary	1,670	15.3	25,510
Diverted	728	1.6	1,194
Fuel Station Total	4,282		**26,704**

Source: Kittelson & Associates, Inc., 2023

Relocated Herndon Costco Daily VMT

Table 30 presents the weekday daily trips for each trip type for the relocated Costco, the associated trip lengths, VMT for each trip type, and total daily VMT. As presented in the table, total daily VMT anticipated for the relocated Herndon Costco site is **191,032 miles**.

Table 30: Relocated Herndon Costco Daily VMT

Trip Type	Weekday Daily Trips	Trip Length (miles)	Daily VMT
Member Primary	10,046	17.3	173,528
Member Pass-by	3,788	0.0	0
Member Diverted	4,038	1.0	4,119
Warehouse, Fuel Station, + Car Wash Employees	300	30.7	9,210
MDO Warehouse Employees	92	30.7	2,824
MDO Driver Employees	44	30.7	1,351
MDO Deliveries[1]	20	-	-
Fuel Truck Delivery[1]	14	125.0	-
Warehouse Truck Delivery[1]	26	125.0	-
Total	18,368	-	**191,032**

Source: Kittelson & Associates, Inc., 2023
[1] Delivery truck trips are excluded from the VMT calculation as good movement is not evaluated for identifying transportation impacts pursuant to CEQA.

Net Change in Regional VMT

The anticipated VMT would be the difference in daily VMT at the Shaw property with the associated off-site MDO operations, due to changes in the retail use of the Shaw building and the Costco fuel station remaining operational, and the relocated Costco with on-site MDO operations. Table 31 presents the change in regional daily VMT resulting from the project. The change in regional daily VMT resulting from the project is **129,326 miles**.

Table 31: Overall Change in Regional Daily VMT with Relocated Costco Warehouse

Scenario	Daily VMT
Difference in Shaw Property VMT	-61,706
Existing Shaw Costco Daily VMT	*-120,083*
Shaw Building Backfill Retail Use	*31,673*
Shaw Costco Fuel Station	*26,704*
Relocated Herndon Costco Daily VMT	191,032
Change in Regional Daily VMT (Project VMT)	**129,326**

Source: Kittelson & Associates, Inc., 2023

IMPACT FINDING

With construction and operation of the Costco warehouse, regional daily VMT is estimated to increase by 129,326 miles. Therefore, the project impact would be ***significant***.

VMT MITIGATION

The California Air Pollution Control Officers Association (CAPCOA) first published a handbook in 2010 titled *Quantifying Greenhouse Gas Mitigation Measures Handbook* (GHG Handbook). The GHG Handbook was updated by the Sacramento Metropolitan Air Quality Management District and adopted by CAPCOA in December 2021.

The GHG Handbook is provided as a planning resource for agencies and developers. It includes a transportation section that discusses solutions to mitigate VMT by shifting modes of travel from single-occupancy vehicles to shared or active modes of transportation.

Most of the VMT mitigation measures that Costco can implement will be geared towards reducing employee trips. However, employee trips account for 436 daily trips (less than 2% of the total daily trips) and 13,385 VMT (approximately 7% of the daily VMT). Thus, VMT reductions from mitigation measures will be minimal.

Table 32: Trip Reduction Programs for Employees (Project/Site)

#	VMT Mitigation Measure	Percent Reduction	Notes
T-5, T-6	Implement Commute Trip Reduction Program	Up to 4% (voluntary) Up to 26% (mandatory)	CTR can be voluntary or mandatory. This must include measures T-7 through T-11.
T-7	Commute Trip Reduction Marketing	Up to 4%	
T-8	Provide Ridesharing Program	Up to 8%	Designate parking spaces for rideshare vehicles. Designated passenger loading and unloading and waiting areas.
T-9	Implement Subsidized or Discount Transit Program	Up to 5.5%	
T-10	Provide End-of-Trip Bicycle Facilities	Up to 4.4%	
T-11	Provide Employer-Sponsored Vanpool	Up to 20.4%	

Source: GHG Handbook

Costco provides a voluntary commute trip reduction program for employees that includes marketing, end-of-trip bicycle facilities, vanpool, and discounted transit. This can result in a 4% reduction in employee vehicle trips, reducing the project daily VMT by 535 miles or less than 0.5%. Even if Costco implemented a mandatory commute reduction program and 100% of employees were eligible, this would only result in a 3,480-mile decrease or less than 2% of project daily VMT.

The bulk of the daily VMT is driven by members shopping at the warehouse. While Costco is implementing neighborhood design improvements such as pedestrian network improvements and constructing bikeway facilities as part of the project, and in theory could implement bike-share or scooter-share on-site or implement transit-supportive roadway treatments, the nature of Costco's land use and business model has been shown to be auto-oriented. Members purchase items in bulk at Costco, making walking, biking, or transit trips to the warehouse impractical.

Costco will encourage employee carpooling, subsidize transit passes, and provide end-of-trip bicycle facilities for employees, which will mitigate a small share of employee VMT. However, the project VMT impact will remain ***significant***.

POTENTIAL HAZARDS RESULTING FROM QUEUES

Per the City's Traffic Impact Study Report Guidelines, the City does not have formally adopted guidelines on queuing criterion that establishes thresholds of significance for vehicle queues at intersections. For the purposes of this study, a vehicle queue that overflows the available storage for a turn pocket and blocking the adjacent travel lane or that queues to an upstream signal blocking through traffic is considered a potential safety hazard and would be considered a significant impact. Therefore, this study identifies a significant impact as occurring at locations where the project traffic would cause the queue length for a turn pocket to overflow its available storage compared to no project conditions or cause a queue to spillback into an upstream signalized intersection.

An analysis of 95th percentile queue lengths was performed using Synchro software version 10. Queue lengths for the AM, PM and Saturday midday peak hours were analyzed for all conditions. Most study intersections were found to have sufficient storage to contain 95th percentile queues with implementation of recommended off-site improvements. Exceptions to this are N Riverside Dr/W Herndon Ave (Intersection 3) and N Golden State Blvd/W Herndon Ave (Intersection 4). The recommended improvements at these locations are:

- **N Riverside Dr/W Herndon Ave (Intersection 3):** Restripe existing eastbound approach to include second eastbound left turn lane. Extend eastbound left-turn lane an additional 150 feet, repurposing the raised median in the roadway cross section. Add southbound right-turn overlap to traffic signal.
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Revise signal phasing to optimize green-time allocation relative to anticipated volumes. For the westbound approach, the queue would extend past the N Weber Ave intersection. To reduce queue blockage of the intersection, "DO NOT BLOCK" pavement markings are recommended for the full width of N Weber Ave. On the north leg, reconstruct the median to extend the southbound dual left-turn pocket as far north as possible without interfering with the existing northbound left-turn pocket at W Kathryn Ave.

IMPACT FINDING

Following construction of project off-site improvements, the southbound right-turn queue at N Riverside Dr/ W Herndon Ave would continue to exceed the available storage for the right-turn pocket and spill into the adjacent travel lane. This spillback condition would occur during the most congested period of the day and would not be a continuous condition. Constraints in the roadway cross section preclude widening the roadway to extend the right-turn pocket while also maintaining the upstream bike lane. Following construction of project off-site improvements, the southbound left-turn queue at the N Golden State Blvd/W Herndon Ave intersection may extend beyond the turn pocket and spill into the adjacent travel lane by approximately 50', depending on final construction of the improvement. This spillback condition would occur during the most congested period of the day and would not be a continuous condition. Therefore, the project impact would be ***less than significant***.

EMERGENCY ACCESS

Emergency vehicle access to the project site is accommodated at the driveways on N Riverside Dr and within the drive aisles in the parking lot and to the queue storage area of the fuel station. The intersection of N Riverside Dr/W Fir Ave serves as the primary access point for emergency vehicles to service the

warehouse and MDO facility. The intersection of N Riverside Dr/Site Access A provides emergency access to the northern portion of the site including the car wash and fuel station. The proposed site plan provides adequate lane width and curb radii to accommodate emergency vehicles. *Appendix P* provide turning templates for emergency vehicles on the site.

IMPACT FINDING

The project provides emergency access to and within the site via the driveways on N Riverside Dr, existing on-site easements, and on-site drive aisles. Therefore, the impact of the project on emergency access would be ***less than significant***.

CONCLUSIONS

Recommended project off-site improvements to the transportation network and environmental impacts are discussed in this section.

RECOMMENDED OFF-SITE IMPROVEMENTS

The project would result in traffic operations below the City's standard of LOS D at the N Riverside Dr/W Fir Ave two-way stop-controlled intersection, the N Riverside Dr/W Herndon Ave signalized intersection and the N Golden State Blvd/W Herndon Ave signalized intersection. Therefore, Kittelson recommends the following improvements in conjunction with project development to provide operations that satisfy City General Plan LOS standards:

- **N Riverside Dr/W Fir Ave (Intersection 2):** Signalize intersection.
- **N Riverside Dr/W Herndon Ave (Intersection 3):** Restripe existing eastbound approach to include second eastbound left turn lane. Extend eastbound left-turn lane an additional 150 feet, repurposing the raised median in the roadway cross section. Add southbound right-turn overlap to traffic signal.
    - **Note:** A revision of the signal timing to change the northbound and southbound left turns from protected only to protected-permitted would mitigate the intersection to a level that satisfies performance requirements. However, the City does not support protected-permitted left-turns for this location.
- **N Golden State Blvd/W Herndon Ave (Intersection 4):** Revise signal phasing to optimize green-time allocation relative to anticipated volumes. For the westbound approach, the queue would extend past the N Weber Ave intersection. To reduce queue blockage of the intersection, "DO NOT BLOCK" pavement markings are recommended for the full width of N Weber Ave. On the north leg, reconstruct the median to extend the southbound dual left-turn pocket as far north as possible without interfering with the existing northbound left-turn pocket at W Kathryn Ave.

PROJECT ENVIRONMENTAL IMPACTS

The CEQA compliance analysis resulted in the following impact findings.

Consistency with Plans, Policies, and Programs

The project would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. Therefore, the project impact would be ***less than significant***.

Regional VMT

With construction and operation of the Costco warehouse, regional daily VMT is estimated to be 129,326 miles. Costco provides a voluntary commute trip reduction program for employees that includes marketing, end-of-trip bicycle facilities, vanpool, and discounted transit. This can result in a 4% reduction in employee vehicle trips, reducing the project daily VMT by 535 miles or less than 0.5%. Therefore, the project impact would be ***significant***.

Potential Hazards Resulting from Queues

Following construction of project off-site improvements, the southbound right-turn queue at N Riverside Dr/ W Herndon Ave would continue to exceed the available storage for the right-turn pocket and spill into the adjacent travel lane. This spillback condition would occur during the most congested period of the day and would not be a continuous condition. Constraints in the roadway cross section preclude widening the roadway to extend the right-turn pocket while also maintaining the upstream bike lane. Following construction of project off-site improvements, the southbound left-turn queue at the N Golden State Blvd/W Herndon Ave intersection may extend beyond the turn pocket and spill into the adjacent travel lane by approximately 50', depending on final construction of the improvement. This spillback condition would occur during the most congested period of the day and would not be a continuous condition. Therefore, the project impact would be ***less than significant***.

Emergency Access

The project provides emergency access to and within the site via the driveways on N Riverside Dr, existing on-site easements, and on-site drive aisles. Therefore, the impact of the project on emergency access would be ***less than significant***.

Appendix E

Energy Technical Report

Prepared for
Ascent Environmental, Inc.
Sacramento, California

Project Number
1690023335

Date
June 2023

COSTCO COMMERCIAL CENTER ENERGY TECHNICAL REPORT

FRESNO, CALIFORNIA

RAMBOLL

CONTENTS

CONTENTS *(CONTINUED)*

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AB	Assembly Bill
ACC	Advanced Clean Cars
AEI	annual emissions inventory
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
CalEEMod®	California Emissions Estimator Model®
CalGreen	California Green Building Standards Code
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
COG	Council of Governments
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPUC	California Public Utilities Commission
CUP	conditional use permit
CY	cubic yard
CVRP	Clean Vehicle Rebate Project
DOT	U.S. Department of Transportation
EIR	Environmental Impact Report
EPA	U.S. Environmental Protection Agency
EV	Electric vehicle
GHG	greenhouse gas
GHS	grid harmonization strategies
GWh	gigawatt hours
hp	horsepower
HOV	high-occupancy vehicle
HVAC	Heating, Ventilation and Air Conditioning
IEPR	Integrated Energy Policy Report
ISTEA	Intermodal Surface Transportation Efficiency Act
kWh	kilowatt hours
LCFS	Low Carbon Fuel Standard
LEED	Leadership in Energy and Environmental Design
LLC	Limited Liability Company
LPG	liquefied petroleum gas
MCY	million cubic yards
mpg	miles per gallon
MPO	Metropolitan Planning Organization
MSW	municipal solid waste
MWh	megawatt hours
NEMA	National Electric Manufacturers Association
NHTSA	National Highway Traffic Safety Administration

ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

Acronym	Definition
NO_X	oxides of nitrogen
MM	Mitigation measure
PG&E	Pacific Gas and Electric Company
PM	particulate matter
RCRA	Resource Conservation and Recovery Act
RPS	Renewables Portfolio Standard
RTPs	regional transportation plans
SAFE	Safer Affordable Fuel-Efficient
SB	Senate Bill
SCE	Southern California Edison
SCS	Sustainable Communities Strategy
SDG&E	San Diego Gas & Electric
SUVs	sport utility vehicles
TDV	time dependent valuation
TEA	Transportation Efficiency Act
tpd	tons per day
VDECS	Verified Diesel Emission Control Strategies
VMT	vehicle miles travelled
VW	Volkswagen
ZEV	zero emission vehicle
ZNE	zero net energy

1. INTRODUCTION

Ramboll US Consulting, Inc. (Ramboll) was retained to prepare an Energy Technical Report for the proposed Costco Commercial Center (Project).

This Energy Technical Report analyzes the Project's energy impacts from construction and operations. In particular, this report describes the existing setting of the Project site, describes the relevant regulatory background, discusses the methodology used to evaluate energy impacts related to the Project, and evaluates potential impacts related to energy that would be affected as a result of implementation of the Project.

1.1 Existing Conditions

The existing 22.4-acre site is currently undeveloped, located within the Bullard Community Plan Area, and designated by both the General Plan and zoning as Community Commercial. The location of the site is in Fresno, California at West Herndon Avenue and North Riverside Drive.

1.2 Project Analysis

The Costco Wholesale Corporation (Costco) proposes to construct the Costco Commercial Center, which comprises a new Costco facility (including loading docks and internal space to provide last-mile home delivery of big and bulky items) with an attached tire center and a detached gas station and drive-through car wash in the City of Fresno.

The project would develop a new Costco retail building; gas station; car wash; and associated parking areas, driveways, and other supporting infrastructure. Costco Wholesale is proposing to construct a wholesale retail facility with approximately 178,000 square feet (sq. ft.); of which approximately 57,000 sq. ft. would be reserved for storage and receiving at the northeast corner of W. Herndon Ave. and N. Riverside Dr (APN 50302012). The project involves the construction of a Costco retail facility that includes an attached tire center, as well as a detached gas station and a drive-through car wash. The project would include a Costco members-only gas station on the northern portion of the project site adjacent to West Spruce Avenue. The gas dispensing facility would include an approximately 11,500 square-foot canopy and a 125 square-foot controller enclosure. There would be four covered fueling islands, each with four two-sided fuel dispensers to provide for the fueling of eight cars at each island, for a total of 32 fueling positions. A Costco members-only automated carwash would be located at the northeastern corner of the project site, adjacent to the gas station. The car wash structure would be approximately 4,800 sq. ft. The project would have its main access points along North Riverside Drive and include approximately 889 parking stalls. The project is requesting conditional use permits for Large-Format Retail and alcohol sales, as well as a General Plan Amendment to reclassify the portion of W. Herndon Ave. fronting the project site from Expressway to Superarterial.

2. ENERGY ENVIRONMENTAL AND REGULATORY OVERVIEW

2.1 General Setting

2.1.1 Energy Production and Distribution

Among the states, California ranks seventh in the nation in production of crude oil, 14th in production of natural gas, second in generation of hydroelectric power, and first as a producer of electricity from biomass, geothermal, and solar energy.[1] California produces approximately 10% of the natural gas used in the state; approximately 90% of the natural gas used in California is imported from Canada, the Southwest, and the Rocky Mountains region of the United States. Over half of the crude oil refined in California is from foreign countries, including Saudi Arabia, Iraq, Ecuador, and Colombia. Additional crude oil is imported from Alaska. Over one-fourth of California's electricity is from out-of-state locations in the Pacific Northwest and the Southwest.[2]

Electricity Supply

The production of electricity requires the combustion, consumption, or conversion of other energy resources, including water, wind, oil, natural gas, coal, solar, geothermal, and nuclear. Of the electricity that is generated within the state in 2020, 48.4% is generated by natural gas-fired power plants, 15.4% by solar, 11.2% by hydroelectric, 8.5% by nuclear power plants, 7.2% by wind, and a remaining 9.3% by other renewables.[3]

For Fresno County, Pacific Gas and Electric Company (PG&E) is the primary supplier of electricity to businesses and residents of the area. PG&E's 70,000-square-mile service area covers both Northern and Central California. By the end of 2020, about 30.6 percent of the energy delivered to PG&E's customers came from eligible renewable energy-related projects.[4]

Transportation Fuels Supply

Most petroleum fuel refined in California is for use in on-road motor vehicles and is refined within California to meet state-specific formulations required by the California Air Resources Board (CARB). The major categories of petroleum fuels are gasoline and diesel for passenger vehicles, transit, and rail vehicles; and fuel oil for industry and emergency electrical power generation. Other liquid fuels include kerosene, jet fuel, and residual fuel oil for marine vessels.

California's oil fields make it the third-largest petroleum-producing state in the United States, behind Texas and North Dakota (federal offshore production is the biggest producer

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1 U.S. Energy Information Administration. 2021. California State Profile and Energy Estimates: Profile Overview. Available online at: http://www.eia.gov/state/?sid=CA. Accessed: January 2022.

2 U.S. Energy Information Administration. 2021. California State Profile and Energy Estimates: Profile Analysis. Available online at: https://www.eia.gov/state/analysis.cfm?sid=CA. Accessed: January 2022.

3 California Energy Commission. 2020. 2020 Total System Electric Generation in Gigawatt Hours. Available online at: https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2020-total-system-electric-generation. Accessed: January 2022.

4 Pacific Gas and Electric Company. 2021. Corporate Responsibility and Sustainability Report 2021. Executive Summary. Available online at: https://www.pgecorp.com/corp_responsibility/reports/2021/assets/PGE_CRSR_2021_Executive_Summary.pdf. Accessed: January 2022.

in the United States). Crude oil is moved from area to area within California through a network of pipelines that carry it from both onshore and offshore oil wells to the refineries that are located in the San Francisco Bay Area, the Los Angeles area, and the Central Valley. Currently, 14 petroleum refineries operate in California, processing approximately 1.8 million barrels per day of crude oil.[5]

Other transportation fuel sources are alternative fuels, such as methanol and denatured ethanol (alcohol mixtures that contain no less than 70% alcohol), natural gas (compressed or liquefied), liquefied petroleum gas (LPG), hydrogen, and fuels derived from biological materials (i.e., biomass).

2.1.2 Energy Consumption

Electricity Consumption

Californians consumed 279,510 gigawatt hours (GWh) of electricity in 2020.[6] Of this total, Fresno County consumed 8,018 GWh.[7]

Transportation Sector Fuels Consumption

The transportation sector is a major end use of energy in California, accounting for approximately 39.3% of total state-wide energy consumption in 2019, the most recent year for which data is available.[8] In addition, energy is consumed in connection with construction and maintenance of transportation infrastructure, such as streets, highways, freeways, rail lines, and airport runways. California's 28.4 million vehicles consume more than 12.9 billion gallons of gasoline and more than 3 billion gallons of diesel each year.[9] In Fresno County, about 313 million gallons of gasoline and 131 million gallons of diesel are consumed each year by approximately 708,000 vehicles.[10]

[5] U.S. Energy Information Administration. 2021. Petroleum & Other Liquids. Number and Capacity of Petroleum Refineries. Available online at: https://www.eia.gov/dnav/pet/PET_PNP_CAP1_DCU_SCA_A.htm. Accessed: January 2022.

[6] A watt hour is a unit of energy equivalent to one watt of power expended for one hour. For example, a typical light bulb is 60 watts, meaning that if it is left on for one hour, 60-watt hours have been used. One kilowatt equals 1,000 watts. The consumption of electrical energy by homes and businesses is usually measured in kilowatt hours (kWh). Some large businesses and institutions also use megawatt hours (MWh), where one MWh equals 1,000 kWh. One gigawatt equals one thousand (1,000) megawatts, or one million (1,000,000) kilowatts. The energy output of large power plants over long periods of time, or the energy consumption of jurisdictions, can be expressed in gigawatt hours (GWh).

[7] Electricity data for Fresno County and the State of California in 2020 are obtained from the California Energy Commission, electricity consumption by county. Available at: https://ecdms.energy.ca.gov/elecbycounty.aspx. Accessed: January 2022.

[8] U.S. Energy Information Administration. 2020. California State Profile and Energy Estimates: California Energy Consumption by End-Use Sector, 2019. Available online at: http://www.eia.gov/state/?sid=CA#tabs-2. Accessed: January 2022.

[9] CARB. EMFAC2021. Emissions Inventory - State-wide for Calendar Year 2020. Available online at: https://arb.ca.gov/emfac/. Accessed: January 2022.

[10] CARB. EMFAC2021. Emissions Inventory – Fresno County for Calendar Year 2020. Available online at: https://arb.ca.gov/emfac/. Accessed: February 2022.

2.2 Regulatory Overview

2.2.1 Federal Programs

2.2.1.1 Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 was established in response to the oil crisis of 1973, which increased oil prices due to a shortage of reserves. The Act requires that all vehicles sold in the U.S. meet certain fuel economy goals, known as the Corporate Average Fuel Economy standards. The National Highway Traffic Safety Administration (NHTSA) of the U.S. Department of Transportation (DOT) administers the Corporate Average Fuel Economy program, and the U.S. Environmental Protection Agency (EPA) provides the fuel economy data.

In April 2010, the EPA and NHTSA issued a final rulemaking establishing new federal fuel economy standards for model years 2012 to 2016 passenger cars and light-duty trucks. For model year 2012, the fuel economy standards for passenger cars, light trucks, and combined cars and trucks were 33.3 miles per gallon (mpg), 25.4 mpg, and 29.7 mpg, respectively.[11] These standards increase progressively up to 37.8 mpg, 28.8 mpg, and 34.1, respectively, for model year 2016. In subsequent rulemakings, the agencies extended the national program of fuel economy standards to passenger vehicles and light-duty trucks of model years 2017-2025, culminating in fuel economy of 54.5 mpg by model year 2025,[12] as well as to medium- and heavy-duty vehicles of model years 2014-2018, including large pickup trucks and vans, semi-trucks, and all types and sizes of work trucks and buses. [13]

In August 2016, the EPA and NHTSA adopted the next phase (Phase 2) of the fuel economy and GHG standards for medium- and heavy-duty trucks, which apply to vehicles with model year 2018 and later.[14] In response to the EPA's adoption of the Phase 2 standards, CARB staff brought a proposed California Phase 2 program before its Board in 2017; and the Board approved the program in March 2018.[15]

In 2018, the EPA and NHTSA proposed to amend certain existing Corporate Average Fuel Economy standards for passenger cars and light trucks and establish new standards, covering model years 2021-2026. Compared to maintaining the post-2020 standards now in place, the proposal would increase U.S. fuel consumption.[16]

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[11] United States Environmental Protection Agency (EPA) and United States Department of Transportation (DOT). 2010. *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards*. Final Rule. 75 Fed. Reg. 25324-25728.

[12] United States Environmental Protection Agency (EPA) and United States Department of Transportation (DOT). 2012. *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards*; Final Rule. 77 Fed. Reg. 62623.

[13] United States Environmental Protection Agency (EPA) and United States Department of Transportation (DOT). 2011. *Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles.* 76 Fed. Reg. 57106.

[14] USEPA. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-greenhouse-gas-emissions-and-fuel-efficiency. Accessed: January 2022.

[15] CARB. CA Phase 2 GHG webpage: https://ww2.arb.ca.gov/our-work/programs/greenhouse-gas-standards-medium-and-heavy-duty-engines-and-vehicles/phase2. Accessed: January 2022.

[16] Federal Register. 2018. *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks*. Available at: https://www.federalregister.gov/documents/2018/08/24/2018-16820/the-safer-affordable-fuel-efficient-safe-vehicles-rule-for-model-years-2021-2026-passenger-cars-and. Accessed: January 2022.

In 2019, the EPA and NHTSA announced the One National Program Rule, which allows the federal government to set the standard for uniform fuel economy and greenhouse gas emissions of automobiles and light duty trucks. This rule pre-empts state and local programs from setting the national standard, which includes California's GHG and ZEV programs.[17]

In December 2021, EPA finalized revised national greenhouse gas emissions standards for passenger cars and light trucks for Model Years 2023-2026.[18]

2.2.1.2 Energy Policy Act of 2005 and Energy Independence and Security Act of 2007

The Energy Policy Act of 2005 seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the Energy Policy Act, consumers and businesses can attain federal tax credits for purchasing fuel-efficient appliances and products. Because driving fuel-efficient vehicles and installing energy-efficient appliances can provide many benefits, such as lower energy bills, increased indoor comfort, and reduced air pollution, businesses are eligible for tax credits for buying hybrid vehicles, building energy-efficient buildings, and improving the energy efficiency of commercial buildings. Additionally, tax credits are given for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment.

The Energy Policy Act of 2005 also established the first renewable fuel volume mandate in the United States. The original Renewable Fuel Standard program required 7.5 billion gallons of renewable fuel to be blended into gasoline by 2012. Under the Energy Independence and Security Act of 2007, the Renewable Fuel Standard program was expanded to include diesel and to increase the volume of renewable fuel required to be blended into transportation fuel from 9 billion gallons in 2008 to 36 billion gallons by 2022.

2.2.1.3 American Recovery and Reinvestment Act

The American Recovery and Reinvestment Act of 2009 was passed in response to the economic crisis of the late 2000s, with the primary purpose of maintaining existing jobs and creating new jobs. Among the secondary objectives of the American Recovery and Reinvestment Act was investment in "green" energy programs, including funding the following through grants, loans, or other mechanisms: private companies developing renewable energy technologies; local and state governments implementing energy efficiency and clean energy programs; research in renewable energy, biofuels, and carbon capture; and development of high efficiency or electric vehicles. [19]

2.2.1.4 Intermodal Surface Transportation Efficiency Act

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 promotes the development of inter-modal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. The Intermodal Surface Transportation Efficiency Act contains factors that metropolitan planning organizations (MPO), such as the

[17] EPA. 2019. *Trump Administration Announces One National Program Rule on Federal Preemption of State Fuel Economy Standards*. Available at: https://www.epa.gov/newsreleases/trump-administration-announces-one-national-program-rule-federal-preemption-state-fuel. Accessed: January 2022.

[18] United States Environmental Protection Agency. 2021. Regulations for Greenhouse Gas Emissions from Passenger Cars and Trucks. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-greenhouse-gas-emissions-passenger-cars-and. Accessed: January 2022.

[19] United States Environmental Protection Agency (EPA). 2009. *Recovery: EPA Gets Involved.* Available at: https://archive.epa.gov/recovery/web/html/. Accessed: January 2022.

Kern Council of Governments (Kern COG), are to address in developing transportation plans and programs, including some energy-related factors. To meet the ISTEA requirements, MPOs have adopted explicit policies defining the social, economic, energy, and environmental values that guide transportation decisions in their respective metropolitan areas. The planning process for specific projects would then address these policies. Another requirement of the ISTEA is to consider the consistency of transportation planning with federal, state, and local energy goals. Through this requirement, energy consumption is expected to be a decision criterion, along with cost and other values to determine the best transportation solution.

2.2.1.5 Transportation Equity Act for the 21st Century

The Transportation Equity Act for the 21st Century ("TEA-21") was signed into law in 1998 and builds upon the initiatives established in the ISTEA legislation discussed above. TEA-21 authorizes highway, highway safety, transit, and other efficient surface transportation programs. TEA-21 continues the program structure established for highways and transit under ISTEA, such as flexibility in the use of funds, emphasis on measures to improve the environment, and focus on a strong planning process as the foundation of good transportation decisions. TEA-21 also provides for investment in research and its application to maximize the performance of the transportation system through, for example, deployment of Intelligent Transportation Systems, to help improve operations and management of transportation systems and vehicle safety.

2.2.2 State Programs

2.2.2.1 AB 32 and SB 32 (State-wide GHG Reductions with Energy Co-Benefits)

The California Global Warming Solutions Act of 2006 (AB 32) was signed into law in September 2006.[20] The law instructed CARB to develop and enforce regulations for the reporting and verification of state-wide GHG emissions. The bulk of GHG emissions in California are carbon dioxide that result from fossil fuel consumption. Therefore, a reduction in GHG emissions typically translates into reduced fuel and increased energy efficiency. The bill directed CARB to set a state-wide GHG emission limit based on 1990 levels, to be achieved by 2020.

AB 32 requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. In December 2008, CARB adopted its Climate Change Scoping Plan: A Framework for Change (Scoping Plan), which included the state's strategies for achieving AB 32's reduction targets. These strategies are implemented with additional rules and regulations of relevance to energy analysis, such as the Advanced Clean Cars Program, the low carbon fuel standard (LCFS), Title 24 building efficiency standards, and the Renewable Portfolio Standard (RPS). These are discussed further below.

Enacted in 2016, Senate Bill (SB) 32 (Pavley, 2016) codifies a 2030 GHG emissions reduction goal and requires CARB to ensure that state-wide GHG emissions are reduced to 40 percent below 1990 levels by 2030. Similar to AB 32, a reduction in GHG emissions typically corresponds with a reduction in energy usage as the bulk of GHGs result from the combustion of fossil fuel.

[20] CARB. Assembly Bill 32 Overview. 2006a. Available at: http://www.arb.ca.gov/cc/ab32/ab32.htm. Accessed: January 2022.

2.2.2.2 SB 350 (Clean Energy and Pollution Reduction Act of 2015)

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This bill requires the State Energy Resources Conservation and Development Commission to establish annual targets for state-wide energy efficiency savings and demand reduction that will achieve a cumulative doubling of state-wide energy efficiency savings in electricity and natural gas final end uses of retail customers by January 1, 2030.

2.2.2.3 2020 Integrated Energy Policy Report Update

The 2020 Integrated Energy Policy Report (IEPR) Update provides an assessment of major energy trends and issues for a variety of energy sectors, as well as policy recommendations.[21] Prepared by the California Energy Commission (CEC), this report details the key energy issues facing California and develops potential strategies to address these issues. The 2020 IEPR Update includes a discussion of several strategies to reduce climate change impacts and lessen energy consumption and recommendations for each topic. Examples include a discussion of California's transportation future and the transition to zero-emission vehicles, the potential of microgrids to contribute to a clean and resilient energy system, and California's energy demand outlook updated to reflect the global pandemic. The assessments and forecasted energy demand within this report will be used by the CEC to develop future energy policies.

2.2.2.4 Title 24 Building Energy Efficiency Standards

The California Green Building Standards Code, as specified in Title 24, Part 11 of the California Code of Regulations, commonly referred to as CalGreen Building Standards (CalGreen), establishes voluntary and mandatory standards to improve public health, safety, and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in five categories: planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. The provisions of this code apply to the planning, design, operation, construction, replacement, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout California. Examples of CalGreen provisions include reducing indoor water use, moisture sensing irrigation systems for landscaped areas, construction waste diversion goals, and energy system inspections. CalGreen is periodically amended; the most recent 2019 standards became effective on January 1, 2020.

The Energy Efficiency Standards for Residential and Nonresidential Buildings, as specified in Title 24, Part 6, of the California Code of Regulations, were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods for building features such as space conditioning, water heating, lighting, and whole envelope. The 2005, 2008, and 2013 updates to the efficiency standards included provisions such as cool roofs on commercial buildings, increased use of skylights, and higher efficiency lighting, HVAC, and water heating systems. Additionally,

[21] California Energy Commission. 2020. 2020 Integrated Energy Policy Report Update. Available at: https://www.energy.ca.gov/data-reports/reports/integrated-energy-policy-report/2020-integrated-energy-policy-report-update. Accessed: January 2022.

some standards focused on larger energy saving concepts such as reducing loads at peak periods and seasons and improving the quality of such energy-saving installations. Past updates to the Title 24 standards have proven very effective in reducing building energy use, with the 2013 update estimated to reduce energy consumption in residential buildings by 25% and energy consumption in commercial buildings by 30%, relative to the 2008 standards.[22] The 2016 updates included additional high efficiency lighting requirements, high performance attic and walls, and higher efficiency water and space heaters. The 2016 standards were expected to reduce residential electricity consumption by 28% and non-residential electricity by 5%.[23] The CEC has developed and adopted 2019 standards, which went into effect on January 1, 2020.

The 2019 Title 24 standards are the currently applicable building energy efficiency standards, and became effective on January 1, 2020.[24] The 2019 updates include a requirement for solar photovoltaic systems for new homes, requirements for newly constructed healthcare facilities, additional high efficiency lighting requirements, high performance attic and walls, higher efficiency water and space heaters, and high efficiency air filters. Relative to the 2016 standards, the 2019 standards are expected to reduce high-rise residential and non-residential electricity consumption by approximately 10.7% and natural gas consumption by 1% and require new low-rise residential buildings to achieve zero net electricity consumption using a combination of building efficiency and on-site renewable electricity generation.[25]

As the Project phasing schedule anticipates build out as late as 2035, further reductions can be anticipated from future Title 24 code cycles. Thus, this analysis represents a conservative estimate of energy-related emissions. Estimated Project energy use rates for both the unmitigated and mitigated case are based on data provided by ConSol, which is described in more detail in Section 4.2 below.

The California Public Utilities Commission, CEC, and CARB also have a shared, established goal of achieving Zero Net Energy (ZNE) for new construction in California. The key policy timelines include: (1) all new residential construction in California will be ZNE by 2020, and (2) all new commercial construction in California will be ZNE by 2030. The ZNE goal generally means that new buildings must use a combination of improved efficiency and renewable energy generation to meet 100 percent of their annual energy need, as specifically defined by the CEC:

> "A ZNE Code Building is one where the value of the energy produced by on-site renewable energy resources is equal to the value of the energy consumed annually by the building, at the level of a single 'project' seeking development entitlements and building code permits, measured using the [CEC]'s Time Dependent Valuation (TDV) metric. A ZNE Code Building meets an Energy Use Intensity value designated in the

[22] CEC. 2012. Energy Commission Approves More Efficient Buildings for California's Future. Available at: https://planning.lacity.org/eir/CrossroadsHwd/deir/files/references/C17.pdf. Accessed: January 2022.

[23] CEC. 2015. 2016 Building Energy Efficiency Standards Adoption Hearing. Available at: https://web.archive.org/web/20190602115405/http://www.energy.ca.gov/title24/2016standards/rulemaking/documents/2015-06-10_hearing/2015-06-10_Adoption_Hearing_Presentation.pdf. Accessed: January 2022.

[24] CEC. 2019. California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Available online at: https://www.energy.ca.gov/title24/2019standards/. Accessed: January 2022.

[25] CEC. 2018. 2019 Title 24 Impact Analysis. June. Available at: https://web.archive.org/web/20190601203553/https://www.energy.ca.gov/title24/2019standards/post_adoption/documents/2019_Impact_Analysis_Final_Report_2018-06-29.pdf. Accessed: January 2022.

Building Energy Efficiency Standards by building type and climate zone that reflect best practices for highly efficient buildings."[26]

While the adopted 2019 Title 24 standards do not achieve the 2020 Zero Net Energy goal, they do move the State further along the path to achieving this goal. The CEC has more recently focused on grid harmonization strategies (GHS), to bring maximum benefits to the grid, environment, and occupants; and GHG emissions reductions.[27]

At the time of this writing, the CEC had adopted the 2022 Energy Code. In December 2021, the California Building Standards Commission approved the code for inclusion into the California Building Standards Code. The Energy Code encourages efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, strengthens ventilation standards, and more. Buildings whose permit applications are applied for or after January 1, 2023, must comply with the 2022 Energy Code.

2.2.2.5 Renewables Portfolio Standard

SB 1078 (2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to obtain at least 20 percent of their energy supply from renewable sources by 2017. SB 107 (2006) changed that target date to 2010. In November 2008, then-Governor Schwarzenegger signed Executive Order S-14-08, which expanded the state's Renewable Portfolio Standard to 33 percent renewable power by 2020. In April 2011, then-Governor Brown signed SB 2X, which legislated the prior Executive Order S-14-08 renewable standard. SB 350 (2015) set an additional RPS goal of 50 percent renewables by 2030. And SB 100 (2018) accelerated and extended again the RPS – requiring achievement of a 50 percent RPS by 2026 and a 60 percent RPS by 2030. SB 100 also established a state policy goal to achieve 100 percent carbon-free electricity by 2045.

2.2.2.6 Mobile Source Regulations

SB 743 (Transportation Analysis under CEQA)

Public Resources Code Section 21099(c)(1), as codified through enactment of SB 743, was enacted with the intent to change the focus of transportation analyses conducted under the California Environmental Quality Act (CEQA). SB 743 reflects a legislative policy to balance the needs of congestion management with state-wide goals related to infill development, promotion of public health through active transportation, and reduction of GHG emissions. As finalized in December 2018, amendments to the State CEQA Guidelines adopted in furtherance of SB 743 establish vehicle miles travelled (VMT), in lieu of level of service, as the new metric for transportation analysis. Implementation of SB 743 is anticipated to improve the efficiency of transportation fuels consumption.

SB 375 (Land Use Planning)

SB 375, the Sustainable Communities and Climate Protection Act of 2008, supports the State's climate action goals to reduce GHG emissions through coordinated transportation and land use planning. SB 375 required CARB to establish GHG emission reduction targets (Regional Targets) for each metropolitan planning region. On September 23, 2010, CARB

[26] CEC, 2015 Integrated Energy Policy Report (2015), p. 41.

[27] CEC. 2018. The 2019 Building Energy Efficiency Standards ZNE Strategy. September 11. Available at: https://www.cesa.org/wp-content/uploads/CESA-webinar-slides-9.11.2018.pdf. Accessed: January 2022.

adopted Regional Targets applying to the years 2020 and 2035. In 2011, CARB adopted Regional Targets of 5% for 2020 and 10% for 2035 for the area under the jurisdiction of Fresno COG. These targets were in place through September 30, 2018. In March 2018, CARB approved updated regional targets of 6% for 2020 and 13% for 2035 for Fresno COG, which will be applied by Fresno COG in future planning cycles.

SB 375 requires MPOs, including Fresno COG, to incorporate a "sustainable communities strategy" (SCS) in their regional transportation plans (RTPs) that will achieve the GHG emission Reduction Targets set by CARB, primarily by reducing VMT from light-duty vehicles through development of more compact, complete, and efficient communities. Fresno COG most recently prepared the 2018 Regional Transportation Plan and Sustainable Communities Strategy[28] to fulfill this requirement; and the CARB accepted Fresno COG's GHG quantification demonstration for that plan, which demonstrates achievement of the targets set prior to 2018.[29] At this time, the Fresno COG is working towards a Regional Transportation Plan Update, which is expected to be adopted in mid-2022.

Clean Cars

In January 2012, CARB approved the Advanced Clean Cars Program, which established an emissions control program for cars and light-duty trucks (such as SUVs, pickup trucks, and minivans) of model years 2017-2025. When the program is fully implemented, new vehicles would emit 75% less smog-forming pollutants than the average new car sold today, and greenhouse gas emissions would be reduced by nearly 35%. This Program would help reduce fossil fuel usage for internal combustion engine powered vehicles.

Commercial Motor Vehicle Idling Regulation

In July 2004, CARB initially adopted an Airborne Toxic Control Measure (ATCM) to limit idling of diesel-fueled commercial motor vehicles (idling ATCM) and subsequently amended it in October 2005, October 2009, and December 2013. This ATCM is set forth in Title 13, California Code of Regulations, Section 2485, and requires, among other things, that drivers of diesel-fueled commercial motor vehicles with gross vehicle weight ratings greater than 10,000 pounds, including buses and sleeper berth equipped trucks, not idle the vehicle's primary diesel engine longer than five minutes at any location. This anti-idling regulation helps to reduce fuel consumption by reducing engine usage. The ATCM also requires owners and motor carriers that own or dispatch these vehicles to ensure compliance with the ATCM requirements. The regulation consists of new engine and in-use truck requirements and emission performance requirements for technologies used as alternatives to idling the truck's main engine. Under the new engine requirements, 2008 and newer model year heavy-duty diesel engines need to be equipped with a non-programmable engine shutdown system that automatically shuts down the engine after five minutes of idling or optionally meet a stringent oxides of nitrogen idling emission standard.

[28] Fresno Council of Governments. 2018. The 2018 Regional Transportation Plan and Sustainable Communities Strategy. Available at: https://www.fresnocog.org/project/regional-transportation-plan-rtp/. Accessed: January 2022.

[29] CARB. 2020. Technical Evaluation of the Greenhouse Gas Emissions Reduction Quantification for Fresno Council of Governments' SB 375 2018 Sustainable Communities Strategy. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/Technical_Evaluation_of_the_GHG_Emissions_Reduction_Quantification_for_the_FCOG_SB_375_SCS_September_2019.pdf. Accessed: January 2022.

In-Use Off-Road Diesel Fueled Fleets Regulation

In May 2008, CARB approved the In-Use Off-Road Diesel Fueled Fleets Regulation (Off-Road Regulation), which was later amended in December 2009, July 2010, and December 2011. The overall purpose of the Off-Road Regulation is to reduce emissions of oxides of nitrogen (NO_X) and particulate matter (PM) from off-road diesel vehicles operating within California. The regulation applies to all self-propelled off-road diesel vehicles 25 horsepower (hp) or greater used in California and most two-engine vehicles. The Off Road Regulation:

- Imposes limits on idling (i.e., fleets must limit unnecessary idling to 5 minutes), requires a written idling policy, and requires a disclosure when selling vehicles;
- Requires all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System, DOORS) and labelled;
- Restricts the adding of older vehicles into fleets starting on January 1, 2014; and
- Requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (VDECS) (i.e., exhaust retrofits).

The anti-idling component of this Off-Road Regulation helps to reduce fuel consumption by reducing engine usage.

Tractor-Trailer Greenhouse Gas Regulation

CARB's Tractor-Trailer Greenhouse Gas regulation reduces the energy consumption of large trucks. CARB developed this regulation to make heavy-duty tractors more fuel efficient. Fuel efficiency is improved by requiring the use of aerodynamic tractors and trailers that are also equipped with low rolling resistance tires. The tractors and trailers subject to this regulation must either use EPA's SmartWay (SmartWay) certified tractors and trailers or retrofit their existing fleet with SmartWay verified technologies. The SmartWay certification process is part of their broader voluntary program called the SmartWay Transport Partnership Program. The regulation applies primarily to owners of 53-foot or longer box-type trailers, and owners of the heavy-duty tractors that pull them on California highways. These owners are responsible for replacing or retrofitting their affected vehicles with compliant aerodynamic technologies and low rolling resistance tires. All owners regardless of where their vehicle is registered must comply with the regulation when they operate their affected vehicles on California highways. Besides the owners of these vehicles, drivers, motor carriers, California-based brokers and California-based shippers that operate or use them also share in the responsibility for compliance with the regulation.

Zero Emission Vehicles

Zero emission vehicles (ZEVs) include hydrogen fuel cell electric vehicles and plug-in electric vehicles, such as battery electric vehicles and plug-in hybrid electric vehicles.

In 2012, Governor Brown issued EO B-16-2012, which calls for the increased penetration of ZEVs into California's vehicle fleet in order to help California achieve a reduction of GHG emissions from the transportation sector equalling 80 percent less than 1990 levels by 2050. In furtherance of that state-wide target for the transportation sector, the EO also calls upon CARB, the CEC and the California Public Utilities Commission to establish benchmarks that will: (1) allow over 1.5 million ZEVs to be on California roadways by 2025, and (2) provide the State's residents with easy access to ZEV infrastructure. EO B-16-2012 specifically

directed California to "encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth, and improve the quality of life in the State."[30]

In 2018, Governor Brown also issued EO B-48-18, which launched an eight-year initiative to accelerate the sales of ZEVs through a mix of rebate programs and infrastructure improvements. The EO also sets a new target of five million ZEVs in California by 2030 and includes funding for multiple state agencies to increase EV charging infrastructure and provide purchase rebates/incentives.

In furtherance of the State's ZEV penetration goals, in February 2013, the Governor's Interagency Working Group on Zero-emission Vehicles issued the *2013 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California* roadways *by 2025*.[31] The 2013 ZEV Action Plan identifies four broad goals for State government to advance ZEVs: 1) Complete needed infrastructure and planning; 2) Expand consumer awareness and demand; 3) Transform fleets; and 4) Grow jobs and investment in the private sector. As part of these goals, some highlighted strategies and actions include: i) supporting ZEV infrastructure planning and investment by private entities; ii) enabling universal access to ZEV infrastructure for California drivers; iii) reducing upfront purchase costs for ZEVs; iv) promoting consumer awareness of ZEVs; and v) helping to expand ZEVs in bus fleets. The Action Plan discusses the challenges of ZEV expansion, which include the need to enable electric vehicle chargers in homes, increase consumer awareness, address up-front costs and operational limitations, and address that ZEVs are not commercially available for all categories of vehicles.

In October 2016, the Governor's Interagency Working Group on Zero-Emission Vehicles issued the *2016 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California* roadways *by 2025*.[32] This report provides an update on progress toward achieving the 2013 goals and highlights the following four top priorities for the upcoming years: 1) Raise consumer awareness and education about ZEVs; 2) Ensure ZEVs are accessible to a broad range of Californians; 3) Make ZEV technologies commercially viable in targeted applications in the medium-duty, heavy-duty, and freight sectors; and 4) Aid ZEV market growth beyond California. The broad goals to advance ZEV adoption are: i) achieve mainstream consumer awareness of ZEV options and benefits; ii) make ZEVs an affordable and attractive option for drivers; iii) ensure convenient charging and fueling infrastructure for greatly expanded use of ZEVs; iv) maximize economic and job opportunities from ZEV technologies; v) bolster ZEV market growth outside of California; and vi) lead by example by integrating ZEVs into State government. The goals and strategies proposed in the 2013 Action Plan will continue to be implemented; however, additional strategies are proposed to help achieve the new goals, including setting targets to increase home charging stations in multiunit dwellings and disadvantaged communities and for public transit and school bus electrification. The 2016 Action Plan describes challenges toward achieving the 2025 goal of

[30] Executive Order B-16-2012. Available at: https://www.ca.gov/archive/gov39/2012/03/23/news17472/. Accessed: January 2022.

[31] Governor's Interagency Working Group on Zero-emission Vehicles. 2013. Available at: http://opr.ca.gov/docs/Governors_Office_ZEV_Action_Plan_(02-13).pdf. Accessed: January 2022.

[32] Governor's Interagency Working Group on Zero-emission Vehicles. 2016. Available at: https://www.ca.gov/archive/gov39/wp-content/uploads/2018/01/2016_ZEV_Action_Plan-1.pdf. Accessed: January 2022.

1.5 million ZEVs in California, such as that most consumers are still not aware of the benefits of passenger ZEVs and that over 1,000,000 charge points will be needed at homes, workplaces, and public locations but only 11,000 non-home charge points are installed as stated in the 2016 ZEV Action Plan.

In September 2018, the Governor's Interagency Working Group on Zero-Emission Vehicles published the 2018 ZEV Action Plan Priorities Update.[33] This update is the result of Governor Brown's directive to update the 2016 Zero-Emission Vehicle Action Plan to help expand private investment in zero-emission vehicle infrastructure, particularly in low income and disadvantaged communities. The 2018 Priorities Update serves three fundamental purposes: 1) Provide direction to state agencies on the most important actions to be executed in 2018 to enable progress toward the 2025 targets and 2030 Vision; 2) Give stakeholders transparency into the actions state agencies plan to take (or are taking) this year to further the ZEV market; and 3) Create a platform for stakeholder engagement, feedback, and collaboration. As of July 2018, over 410,000 ZEVs have been sold in California, which is approximately 150,000 ZEVs since the publication of the 2016 Action Plan in October 2016.

In July 2020, CARB prepared an Assessment of CARB's Zero-Emission Vehicles Programs Per Senate Bill 498. In this report, CARB staff reviews its programs that affect the adoption of light, medium, and heavy-duty ZEVs, including identifying each program's goals and status in meeting those goals, performing a cost-benefit analysis where data are available, and comparing CARB's ZEV programs with those of other jurisdictions. Additionally, pursuant to SB 498, CARB provides policy recommendations for increasing the use of ZEVs in the State, as well as recommendations for vehicle fleet operators to increase the use of ZEVs.[34]

The California Zero-Emission Vehicle Market Development Strategy was published in February 2021.[35] This strategy was prepared to meet the targets identified by Governor Newsom in Executive Order N-79-20, which include the following zero-emission vehicle targets for California:

- 100% of in-state sales of new passenger cars and light-duty trucks will be zero-emission by 2035,
- 100% zero-emission medium and heavy-duty vehicles in the state by 2045 where feasible and by 2035 for drayage trucks, and
- 100% zero-emission off-road vehicles and equipment operations by 2035, where feasible.

A document prioritizing near-term actions for the next year was prepared in August 2021 called the ZEV Pillar Priorities.[36] This annual implementation document identifies the

[33] Governor's Interagency Working Group on Zero-emission Vehicles. 2018. Available at: https://static.business.ca.gov/wp-content/uploads/2019/12/2018-ZEV-Action-Plan-Priorities-Update.pdf. Accessed: January 2022.

[34] CARB. 2020. Assessment of CARB's Zero-Emission Vehicles Programs Per Senate Bill 498. Available at: https://ww3.arb.ca.gov/programs/zev/SB-498-Report-072320.pdf. Accessed: January 2022.

[35] CARB. 2021. California Zero-Emission Vehicle Market Development Strategy. Available at: https://static.business.ca.gov/wp-content/uploads/2021/02/ZEV_Strategy_Feb2021.pdf. Accessed: January 2022.

[36] CARB. 2021. ZEV Pillar Priorities. Available at: https://static.business.ca.gov/wp-content/uploads/2021/08/ZEVPillarPriority.pdf. Accessed: January 2022.

near-term actions to create market opportunity, remove barriers, and further collective understanding.

In June 2020, CARB approved the Advanced Clean Trucks regulation, which has requirements for manufacturer ZEV sales and a one-time reporting requirement for large entities and fleets.[37] The Advanced Clean Truck Regulation is part of a holistic approach to accelerate a large-scale transition of zero-emission medium-and heavy-duty vehicles from Class 2b to Class 8. Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines are required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. Large employers including retailers, manufacturers, brokers, and others are required to report information about shipments and shuttle services. Fleet owners, with 50 or more trucks, are required to report about their existing fleet operations. This information helps to identify future strategies to ensure that fleets purchase available zero-emission trucks and place them in service where suitable to meet their needs.

California is incentivizing the purchase of ZEVs through implementation of the Clean Vehicle Rebate Project (CVRP), which is administered by a non-profit organization (The Center for Sustainable Energy) for CARB and currently subsidizes the purchase of passenger near-zero and zero emission vehicles as follows:

- Hydrogen Fuel Cell Electric Vehicles: $5,000;
    - Battery Electric Vehicles: $2,500;
    - Plug-In Hybrid Electric Vehicles: $1,500; and
    - Neighborhood Electric Vehicles and Zero Emission Motorcycles: $900.

In March 2017, CARB received Volkswagen's (VW) first 30-month ZEV Investment Plan (Plan).[38] This Plan is required by California's partial settlement with VW resulting from VW's use of illegal devices in its 2.0-liter (2.0L) diesel cars sold in the State from model years 2009 to 2015. The Plan describes how VW is proposing to spend the first $200 million in California on ZEV charging infrastructure (including the development and maintenance of ZEV charging stations), public awareness, increasing ZEV access, and a green city demonstration. In June 2017, Electrify America (a subsidiary of VW) provided CARB with additional information on the Plan.[39] CARB approved the first of the four plans in July 2017.[40]

[37] CARB. 2020. Advanced Clean Trucks. Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks. Accessed: January 2022.

[38] VOLKSWAGEN, Group of America. 2017. California ZEV Investment Plan: Cycle 1, March 8, 2017. Available at: https://www.electrifyamerica.com/assets/pdf/California%20ZEV%20Investment%20Plan%20Cycle%201.3bc672a3.pdf. Accessed: January 2022.

[39] Electrify America. 2017. Supplement to the California ZEV Investment Plan, Cycle 1, June 29, 2017. Available at: https://www.electrifyamerica.com/assets/pdf/Cycle%201%20CA%20ZEV%20Invest%20Plan%20Supplement.a92e7705.pdf. Accessed: January 2022.

[40] CARB, 2017. CARB Approves $200 Million VW Zero-Emission Vehicle Investment in California, July, 27. Available at: https://ww2.arb.ca.gov/news/carb-approves-200-million-vw-zero-emission-vehicle-investment-california. Accessed: January 2022.

In its 2014 First Update, CARB recognized that the light-duty vehicle fleet "will need to become largely electrified by 2050 in order to meet California's emission reduction goals."[41] Accordingly, CARB's ACC program – summarized above – requires about 15 percent of new cars sold in California in 2025 to be a plug-in hybrid, battery electric or fuel cell vehicle.[42]

Other state-wide and regional initiatives that spur ZEV uptake include the following:

- CARB currently subsidizes the purchase of passenger near-zero and zero emission vehicles and provides access to high-occupancy vehicle (HOV) lanes to ZEV drivers.
- The VW settlement will result in $800 million in ZEV projects in California over the next ten years, with a focus on increasing public awareness and infrastructure in the first funding cycle.[43]
- The CalGreen standards require new residential and non-residential construction to be pre-wired to facilitate the future installation and use of electric vehicle chargers (see Section 4.106.4 and Section 5.106.5.3 of 2016 CalGreen standards for the residential and nonresidential pre-wiring requirements, respectively).

In January 2017, three of California's largest utilities submitted proposals to the California Public Utilities Commission (CPUC) to electrify the State's transportation sector through more than $1 billion in investments:

- Southern California Edison (SCE) filed an application to expand electric transportation in its service area. Some of SCE's proposals include monetary rewards to rideshare drivers who use an electric vehicle, additional fast charge infrastructure at targeted locations within the region, and rates that are designed to incentivize electric vehicle adoption.[44]
- Pacific Gas and Electric (PG&E) submitted an application that aims to expand the electrification of medium- and heavy-duty vehicle fleets, expand fast-charging stations that can refuel EVs in 20-30 minutes, and explore new uses for vehicle electrification.[45]
- San Diego Gas & Electric (SDG&E) submitted an application to install tens of thousands of charging stations in its service area to boost the transition to zero-emission vehicles, trucks, shuttles, and delivery fleets.[46]

[41] CARB, First Update to the Climate Change Scoping Plan: Building on the Framework (May 2014), p. 48.

[42] Id. at p. 47.

[43] CARB, Volkswagen Settlement – California ZEV Investments webpage, available at: https://www.arb.ca.gov/msprog/vw_info/vsi/vw-zevinvest/vw-zevinvest.htm. Accessed: January 2022.

[44] SCE, Application of Southern California Edison Company (U 338-E) for Approval of Its 2017 Transportation Electrification Proposals (January 20, 2017).

[45] PG&E, In the Matter of the Application of Pacific Gas and Electric Company for Approval of its Senate Bill 350 Transportation Electrification Program (January 20, 2017).

[46] SDG&E, Application of San Diego Gas & Electric Company (U902E) for Approval of SB 350 Transportation Electrification Proposals (January 20, 2017).

2.2.3 Local Programs

2.2.3.1 City of Fresno General Plan

The City of Fresno's General Plan was adopted in December 2014.[47] As part of a General Plan Update, the City of Fresno prepared a Program Environmental Impact Report for the continued implementation of the approved Fresno General Plan, text changes to the Mobility and Transportation Element related to Vehicle Miles Traveled (VMT) analysis, and an update to the Greenhouse Gas Reduction Plan. The Greenhouse Gas Reduction Plan Update includes measures related to energy conservation strategies for new and existing buildings and energy efficiency reductions.[48]

[47] City of Fresno. 2014. Fresno General Plan. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2019/07/ConsolidatedGP6182020.pdf. Accessed: January 2022.

[48] LSA. 2021. Appendix G Greenhouse Gas Reduction Plan Update. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2021/03/Link4AppendixGGHGRPUpdate.pdf. Accessed: January 2022.

3. SIGNIFICANCE THRESHOLDS

The analysis provided in this report evaluates the significance of the Project's energy by reference to the following questions from Section VI, Energy, of Appendix G of the CEQA Guidelines:

Threshold 1. Would the Project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction or operation?

Threshold 2. Would the Project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

While no quantitative thresholds related to energy are included in the CEQA Guidelines, Part I of Appendix F of the CEQA Guidelines states as follows:

"The goal of conserving energy implies the wise and efficient use of energy. The means of achieving this goal include:

1. decreasing overall per capita energy consumption,
2. decreasing reliance on fossil fuels such as coal, natural gas and oil, and
3. increasing reliance on renewable energy resources."

Appendix F of the CEQA Guidelines states that an Environmental Impact Report (EIR) should include a discussion of the potential energy impacts of a project, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

For purposes of this analysis, impacts to energy resources will be considered to be significant if the project would result in the wasteful, inefficient or unnecessary consumption of fuel or energy, and conversely if the project would not incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other project features.

To determine whether a project would result in the wasteful, inefficient or unnecessary consumption of fuel or energy, and conversely whether the project would fail to incorporate renewable energy or energy efficiency measures into building design, equipment use, transportation or other project features, Appendix F of the CEQA Guidelines identifies six categories of potential energy-related environmental impacts:

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate the energy intensiveness of materials may be discussed.
2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.
3. The effects of the project on peak and base period demands for electricity and other forms of energy.
4. The degree to which the project complies with existing energy standards.
5. The effects of the project on energy resources.
6. The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

This report, relative to Threshold 1, assesses the Project's electricity, natural gas, and fossil fuel consumption during construction and operation by way of the six questions above. This report, relative to Threshold 2, evaluates the Project for consistency with applicable plans related to renewable energy and energy efficiency (see **Appendix B, Table B-1**: State Plan Level Consistency Analysis and **Appendix B, Table B-2**: Local Plan-Level Consistency Analysis). The Local Plan-Level Consistency Analysis is based on the City of Fresno's Greenhouse Gas Reduction Plan Update[49] and the applicable City of Fresno General Plan[50] policies and objectives.

[49] City of Fresno. 2021. Greenhouse Gas Reduction Plan Update. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2021/03/Link4AppendixGGHGRPUpdate.pdf. Accessed: February 2022.

[50] City of Fresno. 2014. Fresno General Plan. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2019/07/ConsolidatedGP6182020.pdf. Accessed: February 2022.

4. METHODOLOGY FOR DEVELOPMENT OF ENERGY PROJECTIONS

This section describes the methodology that Ramboll used to develop the regulatory compliance-based energy projections associated with the Project, which include one-time demand from construction and annual operational demand. This section also identifies the results of the energy projections for the Project based on compliance with applicable regulatory requirements.

Additional information regarding methodology can be found in the **Greenhouse Gas Emissions Technical Report** and **Air Quality Technical Report** for the Project; only the methodology specific to energy usage is discussed in this report.

4.1 Construction Equipment & Activities

Project construction is planned to begin in 2023, with full build out expected in 2023.

Construction of the Project is not anticipated to require natural gas fuel. As such, natural gas related to construction of the Project is not discussed further.

Construction of the Project requires the use of transportation fuel, including gasoline and diesel use in construction equipment, material transport via hauling trucks, delivery via vendor trucks, and construction worker vehicles. Fuel consumed by construction equipment would be the primary energy resource expended over the course of construction, while VMT associated with the transportation of construction materials and construction worker commutes would also result in fuel consumption. Heavy-duty construction equipment associated with construction activities would use diesel fuel. Construction workers would travel to and from the project site throughout the duration of construction; this analysis assumed that construction workers would primarily use gasoline-powered passenger vehicles.

Heavy-duty construction equipment of various types would be used during each phase of construction. CalEEMod® was used to estimate construction equipment usage, and results are included in **Appendix A**. Fuel consumption from construction equipment was estimated by converting the total carbon dioxide (CO_2) emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of diesel. The estimated diesel fuel usage from off-road construction sources, which totals 55,154 gallons of diesel over the course of the project construction period, is shown in **Table 4-1**.

Fuel consumption from worker, vendor, and hauling trips are estimated by converting the total CO_2 emissions from each construction phase to gallons using conversion factors for CO_2 to gallons of gasoline or diesel. Worker vehicles are assumed to include light-duty automobiles and trucks, vendor vehicles are assumed to include an equal mix of medium heavy-duty trucks and heavy heavy-duty trucks, and hauling vehicles are assumed to include heavy heavy-duty trucks. Estimated fuel usage, which totals 17,539 gallons of gasoline and 29,805 gallons of diesel over the course of the project construction period, is shown in **Table 4-2**.

4.2 Operational Energy Requirements

Energy requirements are evaluated for the first year of Project operations (2023).

4.2.1 Electricity

Operation of the Project will result in electricity demand for the car wash, warehouse, gas station, and parking lot. The annual electricity usage for each land use is presented in **Table 4-3**. The total electricity use for the Project incorporates 2019 Title 24 standards.

4.2.2 Natural Gas

The Project will require natural gas, mainly for building heating and hot water. Natural gas is estimated using CalEEMod® defaults based on averages for the climate zone for the car wash, warehouse, and gas station. The annual natural gas usage for each land use is presented in **Table 4-4**. Estimates for the project are conservative because they assume the project would be built to existing Title 24, Part 6 standards, even though subsequent, more energy efficient iterations of the code will apply.

4.2.3 Fuel Usage

4.2.3.1 Gasoline

Gasoline fuel consumption for Project operation is shown in **Table 4-5**. Operational gasoline fuel usage occurs due to member trips and employee trips when commuting to work at the warehouse, car wash, and gas station and is calculated based on gasoline vehicle VMT. The development of the member and employee VMT is described in detail in the **Greenhouse Gas Emissions Technical Report** and **Air Quality Technical Report**. Gasoline fuel consumption for the Project is calculated by dividing total member and employee VMT by average fuel efficiency of gasoline vehicles in Fresno County from the EMFAC2021 database for calendar year 2023. The analysis also reflects the reasonably foreseeable change based on the discontinued operation of the Costco Warehouse located at 4500 W Shaw Avenue. For purposes of this analysis, 4500 W Shaw Avenue is assumed to be backfilled by a shopping center use resulting in less fuel use. The methodology to account for this change is described in detail in the **Air Quality Technical Report**.

4.2.3.2 Diesel

Diesel fuel consumption for Project operation is shown in **Table 4-6**. Operational diesel fuel usage occurs due to warehouse truck, fuel delivery truck, and MDO delivery truck trips to the site.

Warehouse truck, fuel delivery truck, and MDO delivery truck fuel consumption is based on total VMT, which described in detail in the **Greenhouse Gas Emissions Technical Report** and **Air Quality Technical Report**. Diesel fuel consumption for the Project is calculated by dividing total diesel truck VMT by the average fuel efficiency of diesel vehicles in Fresno County from the EMFAC2021 database for calendar year 2023.

4.2.3.3 Electricity

Electricity consumption from electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs) for Project operation is shown in **Table 4-7**. Operational transportation-related electricity usage occurs due to member trips and employee trips when commuting to work at the warehouse, car wash, and gas station and is calculated based on gasoline vehicle VMT. The development of the member and employee VMT is described in detail in the **Greenhouse Gas Emissions Technical Report** and **Air Quality Technical Report**.

Electricity consumption for the Project is calculated by dividing total electric-powered VMT by the average energy efficiency of electric vehicles and plug-in hybrid electric vehicles in Fresno County from the EMFAC2021 database for calendar year 2023. The analysis also reflects the reasonably foreseeable change based on the discontinued operation of the Costco Warehouse located at 4500 W Shaw Avenue. The methodology to account for this change is described in detail in the **Air Quality Technical Report**.

5. PROJECT INVENTORY IN CONTEXT

This section assesses the significance of the Project's energy demand for purposes of CEQA. Project impacts – i.e., energy use beyond existing Baseline conditions – are assessed against the thresholds.

5.1 Threshold 1

Would the Project Result in a Potentially Significant Environmental Impact Due to Wasteful, Inefficient, or Unnecessary Consumption of Energy Resources, during Project Construction or Operation?

5.1.1 Energy Requirements and Energy Use Efficiencies

This section addresses the following category of environmental impact described in Appendix F of the CEQA Guidelines:

> *The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate the energy intensiveness of materials may be discussed.*

5.1.1.1 Construction

Construction of the proposed project would result in fuel usage as shown in **Table 5-1**. There are no unusual project characteristics or construction processes that would require the use of equipment that would be more energy intensive than is used for comparable activities, or equipment that would not conform to current emissions standards (and related fuel efficiencies).

5.1.1.2 Operations

Operation of the Project would result in electricity, natural gas, gasoline, and diesel fuel usage, as shown in **Table 5-2**. There are no unusual project characteristics that would require consumption that would be more energy intensive than is used for comparable activities, or equipment that would not conform to current emissions standards (and related fuel efficiencies).

Over the lifetime of the project, the fuel efficiency of the vehicles being used for Project operation is expected to improve. The amount of fuel consumption from vehicular trips to and from the project site during operation would correspondingly decrease over time as vehicles become more efficient. Numerous regulations have been adopted that encourage, and require, increased fuel efficiency. For example, CARB has adopted an approach to passenger vehicles that combines the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards. The approach also includes efforts to support and accelerate the numbers of plug-in hybrids and zero-emissions vehicles in California. As such, operation of the Project is expected to use decreasing amounts of fuel over time, due to advances in fuel economy.

5.1.2 Local and Regional Energy Supplies

This section addresses the following category of environmental impact described in Appendix F of the CEQA Guidelines:

> *The effects of the project on local and regional energy supplies and on requirements for additional capacity.*

5.1.2.1 Construction

The Project's fuel consumption during construction is discussed in **Section 4.1**. Relative to total electricity and fuel comparison countywide, Project construction would use approximately 0.005% of gasoline and 0.04% of diesel fuel over the duration of construction (**Table 5-1**). In comparison to State-wide usage, construction of the Project would equate to approximately 0.0001% of gasoline usage and less than 0.002% of diesel fuel usage (**Table 5-1**). Therefore, fuel use during construction would be temporary and negligible. Fuel consumption in 2023 (the year of full build-out of the Project) was estimated using EMFAC2021 for Fresno County and California State-wide.

5.1.2.2 Operations

Electricity

The Project's electricity demand during operation is discussed in **Section 4.2.1**. For comparison, based on 2020 consumption, operation of the Project would equate to 0.029% of the total electricity demand countywide and 0.001% of the total electricity demand state-wide (**Table 5-2**). Therefore, the Project is not expected to have an impact on the local utility.

In 2020, total in-state electricity consumption was 279,510 GWh.[51] The CEC estimates that state-wide energy demand will increase to 354,209 GWh in 2030.[52] The Project's anticipated electricity usage of 2,292,337 kWh/year is approximately 0.0008% of the state-wide demand in 2020. Given that the state is growing annually, the anticipated state-wide energy demand for the Project Operational build-out year of 2023 will likely be greater than that in 2020, and thus the project's relative percentage contribution to the state-wide energy demand would be even less.

The Project's electricity use projections also represent a small percentage of regional estimates for PG&E. The CEC estimates that PG&E energy demand will increase to about 114,000 GWh in 2023.[53] The project's anticipated electricity usage of 2,292,337 kWh/year is approximately 0.002% of the projected PG&E planning area demand in 2023.

Overall, the Project's projected electricity demand is consistent with, and a small percentage of, state and regional projections. Therefore, the Project will not require additional generation capacity beyond more general state-wide expansion.

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[51] California Energy Commission. 2020. Electricity consumption by county. Available at: https://ecdms.energy.ca.gov/elecbycounty.aspx Accessed: January 2022.

[52] California Energy Commission. 2018. California Energy Demand 2018-2030 Revised Forecast. Available online at: https://efiling.energy.ca.gov/getdocument.aspx?tn=223244. Accessed: January 2022.

[53] California Energy Commission. 2018. Electricity and Natural Gas Demand Forecast. Available online at: https://efiling.energy.ca.gov/getdocument.aspx?tn=223244. Accessed: January 2022.

Natural Gas

The Project's natural gas demand during operation is described in **Section 4.2.2**. For comparison, based on 2020 consumption, operation of the Project would equate to 0.008% of the total natural gas demand countywide and 0.0002% of the total natural gas demand state-wide (**Table 5-2**).

Overall, the Project's natural gas consumption is a small percentage of state and regional consumption. Therefore, the Project is not expected to have an impact on the local natural gas resources.

Fuel Usage

The Project's fuel usage during operation is discussed in **Section 4.2.3**. As discussed in **Section 4.2.3.1**, Project gasoline consumption due to mobile VMT is approximately 2,001,579 gallons/year, which is 0.522% of the gasoline that would be used countywide in and 0.013% of the gasoline used state-wide in 2023. Project operational diesel consumption is approximately 344,953 gallons/year, which is 0.161% of the total diesel that would be used countywide in 2023. Operation of the Project would result in about 0.007% of the total diesel that would be used state-wide each year (**Table 5-2**).

5.1.2.3 Summary

The Project will not have a substantial impact on the local or regional energy supplies or require additional capacity to be constructed. The Project's impacts are less than significant.

5.1.3 Peak and Base Period Demands

This section addresses the following category of environmental impact described in Appendix F of the CEQA Guidelines:

> *The effects of the project on peak and base period demands for electricity and other forms of energy.*

5.1.3.1 Construction

The Project's base energy consumption compared to regional and state-wide energy consumption is discussed above in **Section 5.1.2**. The electricity demand associated with construction of the Project will be supplied by existing on-site power poles when available. In the event of an emergency or during a power outage, the use of generator sets is permissible, which are comprised of a generator and diesel engine used to produce power off-grid. Therefore, relatively negligible impacts to energy demand are expected as a result of construction activities.

5.1.3.2 Operation

The Project Operation will not have a substantial impact on the peak and base period demands for electricity or other forms of energy. The Project's base energy consumption compared to regional and state-wide energy consumption is discussed above in **Section 5.1.2**. Further details and reasoning on the peak demand are described below.

In 2020, California's peak grid demand was 47,236 MW. On August 14, 2020, PG&E reached a maximum demand of 21,103 MW.[54] In comparison, the Project's maximum demand is expected to be approximately 0.6 MW in 2023. This is a conservative estimate since it was

[54] California ISO. 2021. 2020-2021 Transmission Plan. Available online at: http://www.caiso.com/Documents/BoardApproved2020-2021TransmissionPlan.pdf. Accessed: January 2022.

derived by dividing the total electricity energy required for Project Operation by the annual number of working hours, though some sources of electricity would operate 24 hours per day for every day of the year. Thus, the Project will have a relatively negligible effect on state-wide and PG&E peak demands.

5.1.3.3 Summary

As described above, the Project will not have a substantial impact on peak and base period demands for electricity and other forms of energy. The Project's impacts are less than significant.

5.1.4 Existing Energy Standards

This section addresses the following category of environmental impact described in Appendix F of the CEQA Guidelines:

The degree to which the project complies with existing energy standards.

5.1.4.1 Construction

Project construction requires use of on-road trucks for soil hauling and deliveries, and off-road equipment such as excavators, tractors/loaders/backhoes, forklifts, and graders. The construction activities would comply with state requirements designed to minimize idling and associated emissions, which also minimizes use of fuel. Specifically, idling of commercial vehicles and off-road equipment would be limited to five minutes in accordance with the Commercial Motor Vehicle Idling Regulation and the Off-Road Regulation, and the trucks used would be compliant with the requirements of the Tractor-Trailer Greenhouse Gas Regulation.

5.1.4.2 Operation

Electricity

The Project's anticipated electricity use is discussed in **Section 4.2.1**.

The electricity demand estimate for the Project incorporates the 2019 Title 24 standards. If the application for the Project is applied for on or after January 1, 2023, then the Project will comply with the 2022 Title 24 Standards.

Natural Gas

The Project's anticipated natural gas use is discussed in **Section 4.2.2**.

The natural gas demand for the Project is estimated in accordance with the Title 24 standards. For this analysis, the Project is assumed to meet 2019 Title 24 standards. If the application for the Project is applied for on or after January 1, 2023, then the Project will comply with the 2022 Title 24 Standards.

Fuel Usage

The Project's anticipated fuel use is discussed in **Section 4.2.3**. There are no unusual project characteristics that would require the use of gasoline and diesel that would be more energy intensive than is used for comparable activities, or equipment that would not conform to current emissions standards (and related fuel efficiencies).

Vehicle use for the proposed project also has been evaluated pursuant to the technical advisory the Governor's Office of Planning and Research published under SB 743, which

created a process to change the methods used for transportation impacts analyses under CEQA from focusing on level of service to VMT. (See 14 CCR 15064.3.)

5.1.4.3 Summary

As described above, the Project will comply with all applicable energy standards. The Project's impacts are less than significant.

5.1.5 Energy Resources

This section addresses the following category of environmental impact described in Appendix F of the CEQA Guidelines:

> *The effects of the project on energy resources.*

The Project's energy use is discussed in **Section 4** above, including electricity, natural gas, gasoline, and diesel consumption associated with on-site equipment, mobile operations, and construction activities. The Project's use of energy will not have a substantial effect on state-wide or regional energy resources. Total operational energy use requirements for the Project are summarized in **Table 5-2**. Programs and measures relevant to energy resources are discussed in detail above.

The Project will not significantly impact energy resources and the Project's impacts are less than significant.

5.1.6 Transportation Energy Use

This section addresses the following category of environmental impact described in Appendix F of the CEQA Guidelines:

> *The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.*

Conventional gasoline and diesel vehicles consume gasoline or diesel fuel, whereas EVs consume electricity that can be sourced by fossil fuels or renewables. EVs, including battery-electric vehicles and plug-in hybrid electric vehicles, comprise a growing fraction of the passenger vehicles on the roads in California. EV adoption is expected to increase over the upcoming decades due in part to improvements in battery technology and public initiatives and goals. This increase in EV adoption will decrease the fuel requirements due to transportation.

New state-wide regulations. such as Truck and Bus Rule (Title 13 CCR Section 2025), On-Road Heavy-Duty Vehicle Program (Title 13, CCR Section 1956.8), Pavley Clean Car Standards and the Advanced Clean Cars (ACC) program have been instated which reduce emissions and fuel requirements from trucks and cars.

Gasoline fuel usage for the Project shown in **Table 4-5** will decrease over time as fleets become more fuel efficient and switch to more electric vehicles. While there is a growth in diesel fuel usage, the growth rate is slower than the increase in VMT due to enhanced fuel efficiency of heavy-duty vehicles in the Project year as shown in **Table 4-6**.

5.1.7 Summary

Based on the above analysis of each of the environmental impact factors identified in CEQA Guidelines Appendix F, the potential for the Project to result in wasteful, inefficient, or unnecessary consumption of fuel or energy, and conversely to fail to incorporate energy efficiency measures into equipment use, transportation or other project features is **less than significant.**

5.2 Threshold 2

Would the Project Conflict with or Obstruct a State or Local Plan for Renewable Energy or Energy Efficiency?

The Proposed Project would comply with any applicable state plans for renewable energy or energy efficiency to the extent required by law. Further, the Project would be consistent with the renewable energy and energy efficiency provisions of the City of Fresno General Plan[55]. This plan is described in more detail in **Section 2.2.3** and the relevant provisions of each plan are listed in **Appendix B**. The Project has been evaluated for consistency with state plans and has been concluded to be consistent; the assessment for state plan measures is found in **Appendix B, Table B-1**. Additionally, the Project has been evaluated for consistency with the relevant provisions and has been concluded to be consistent; the assessment for individual local plan measures is found in **Appendix B, Table B-2**. As such, Project impacts are **less than significant**.

[55] City of Fresno. 2014. Fresno General Plan. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2019/07/ConsolidatedGP6182020.pdf. Accessed: January 2022.

TABLES

Table 4-1. Construction Off-road Equipment Fuel Consumption
Costco Commercial Center
Fresno, California

Year	CO_2 Emissions[1] (MT/yr)	Diesel Consumption[2] (gallons/yr)
2023	563	55,154

Conversions:

10.21 kg CO_2/gallon diesel

1,000 kg CO_2/MT CO_2

Notes:

[1] Offroad emissions estimated using CalEEMod® guidance as presented in the CalEEMod® User's Guide, Appendix A. Available at: www.caleemod.com. Accessed: January 2022.

[2] The conversion factor for diesel is 10.21 kg CO_2/gallon per The Climate Registry, 2021. Available at: https://www.theclimateregistry.org/wp-content/uploads/2021/05/2021-Default-Emission-Factor-Document.pdf. Accessed: January 2022.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel

CO_2 - carbon dioxide

kg - kilograms

MT - metric ton

yr - year

Table 4-2. Construction On-Road Fuel Consumption
Costco Commercial Center
Fresno, California

Year	Gasoline Consumption[1,2] (gallons/yr)	Diesel Consumption[1,2] (gallons/yr)
2023	17,539	29,805

Conversions:[3]

8.78 kg CO_2/gallon gasoline
10.21 kg CO_2/gallon diesel
1,000 kg CO_2/MT CO_2

Notes:

[1] Onroad CO_2 emissions are calculated using emission factors from EMFAC2017 based on fleet wide totals, including worker, vendor, and hauling trips. Worker vehicles are assumed to include light duty automobiles and trucks (50% LDA, 25% LDT1, 25% LDT2). Vendor vehicles are assumed to include medium heavy-duty trucks and heavy heavy-duty trucks (50% MHDT, 50% HHDT). Hauling vehicles are assumed to include heavy heavy-duty trucks (100% HHDT). Onroad CO_2 emissions can be referenced in the CalEEMod output.

[2] CO_2 emissions for worker, vendor, and hauling trips were split based on gasoline or diesel fuel consumption. The fuel consumption breakdown was derived using fuel consumption in Fresno County using EMFAC2021.

[3] The conversion factors for gasoline and diesel are 8.78 kg CO_2/gallon and 10.21 kg CO_2/gallon, respectively, per The Climate Registry, 2021. Available at: https://www.theclimateregistry.org/wp-content/uploads/2021/05/2021-Default-Emission-Factor-Document.pdf. Accessed: January 2022.

Abbreviations:
CO_2 - carbon dioxide
EMFAC - EMission FACtors model
kg - kilograms
HHDT - heavy heavy-duty trucks
LDA - light-duty automobile
LDT - light-duty truck
MHDT - medium heavy-duty trucks
MT - metric ton
yr - year

Table 4-3. Electricity Consumption
Costco Commercial Center
Fresno, California

Land Use	Electricity Demand (kWh/yr)[1]
Automobile Care Center	41,328
Discount Club	1,911,410
Gasoline/Service Station	38,897
Parking Lot	124,460
Project	**2,116,095**

Notes:

[1] Project electricity demand is obtained from CalEEMod® outputs.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
kWh - kilowatt hours
yr - year

Table 4-4. Natural Gas Consumption
Costco Commercial Center
Fresno, California

Land Use	Natural Gas Demand (kBTU/yr)[1]
Automobile Care Center	99,360
Discount Club	2,560,620
Gasoline/Service Station	93,514
Parking Lot	0
Project	**2,753,494**

Notes:

[1] Project natural gas demand is obtained from CalEEMod® outputs.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
kBTU - kilo British Thermal Unit
yr - year

Table 4-5. Gasoline Consumption
Costco Commercial Center
Fresno, California

Mobile Source Activity	VMT (miles/yr)[1]	Gasoline Consumption (gallons/yr)[2]
4500 W. Shaw Ave		
Gasoline Vehicles	22,315,831	955,908
Herndon/Riverside		
Gasoline Vehicles	69,043,050	2,957,487

Constants:

Average efficiency in 2023 23.35 miles per gallon[3]

Notes:

[1] Vehicle miles traveled are based on data provided by Kittelson & Associates, 2023.

[2] Gasoline consumption is calculated by assuming an average fuel efficiency and the reported VMT. The portion of the VMT that is gasoline vehicles is determined using the project-specific fleet mix.

[3] The average fuel efficiency is obtained from EMFAC2021 for Fresno County based on the fuel consumption and vehicle miles traveled for 2023.

Abbreviations:

EMFAC - EMission FACtors model

VMT - vehicle miles traveled

yr - year

Table 4-6. Diesel Consumption
Costco Commercial Center
Fresno, California

Mobile Source Activity	Annual Diesel-Related Activity[1]	Diesel Consumption (gallons/yr)[2]
4500 W. Shaw Ave		
Diesel Vehicles (VMT per year)[3]	0	0
Herndon/Riverside		
Transportation Refrigeration Units (hours per year)	7,382	5,655
Diesel Vehicles (VMT per year)[3]	2,440,575	339,298

Constants:

Average efficiency in 2023	7.19	miles per gallon[4]
TRU fuel consumption rate[4]	0.77	gallons per hour
	60	minutes per hour

Notes:

[1] Diesel VMT are based on data provided by Kittelson & Associates, 2023. TRU Cycle Duration is based on 2 hours of loading time plus the duration of the on-site and off-site transit. Assumptions based on Table II.G.1 of CARB Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate. Available at: https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/appi.pdf. Accessed: June 2022.

[2] Diesel consumption for diesel vehicles is calculated by assuming an average fuel efficiency and the reported VMT. The portion of the VMT that is diesel vehicles is determined using the project-specific fleet mix. TRU diesel consumption is calculated based on OFFROAD2021 fuel consumption rate and the annual operation.

[3] Vehicle miles traveled are based on data provided by Kittelson & Associates, 2023.

[4] The average fuel efficiency is obtained from EMFAC2021 for Fresno County based on the fuel consumption and vehicle miles traveled for 2023.

[4] TRU fuel consumption rate is obtained from the OFFROAD2021 emissions output for Calendar Year 2023, Transportation Refrigeration Unit - Instate Trailer and Transportation Refrigeration Unit - Out-Of-State Trailer in Fresno County.

Abbreviations:

EMFAC - EMission FACtors model

TRU - Transport Refrigeration Units

VMT - vehicle miles traveled

yr - year

Table 4-7. Electricity Consumption from Vehicles
Costco Commercial Center
Fresno, California

Mobile Source Activity	VMT (miles/yr)[1]	Electricity Consumption[2] (kWh/yr)
4500 W. Shaw Ave		
Plug-in Hybrid Electric Vehicles[3]	206,859	62,478
Herndon/Riverside		
Electric Vehicles	116,874	45,420
Plug-in Hybrid Electric Vehicles[3]	640,004	193,300

Constants:

Average efficiency in 2023

Electric Vehicles	2.57	mi/kWh[4]
Plug-in Hybrid Electric Vehicles	3.31	mi/kWh[4]

Notes:

[1] Vehicle miles traveled are based on data provided by Kittelson & Associates, 2023.

[2] Electricity consumption from electric miles driven is calculated by assuming an average energy economy and the reported VMT. The portion of the VMT that is electric-powered is determined using the project-specific fleet mix.

[3] The VMT from plug-in hybrid electric vehicles accounts for electric vehicle miles traveled, also known as eVMT.

[4] The average fuel efficiency is obtained from EMFAC2021 for Fresno County based on the energy consumption and electric vehicle miles traveled for 2023.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
EMFAC - EMission FACtors model
eVMT - electric vehicle miles traveled
kWh - kilowatt-hour
mi - mile
VMT - vehicle miles traveled
yr - year

Table 5-1. Construction Energy Resource Summary
Costco Commercial Center
Fresno, California

Energy Resource	Total Construction[1]	Fresno County		California	
		Annual Consumption	Project's Construction Contribution[4] (%)	Annual Consumption	Project's Construction Contribution[4] (%)
Gasoline (gallons)[2]	17,539	383,581,859	0.005%	15,688,627,269	0.00011%
Diesel (gallons)[3]	84,959	214,135,125	0.040%	5,000,677,060	0.00170%

Notes:

[1] Offroad and onroad emissions are calculated using methodology consistent with CalEEMod® version 2020.4.0. Offroad emission factors are from OFFROAD whereas onroad emission factors are from EMFAC2017. See Tables 4-1 and 4-2 for detailed fuel consumption of the Off-Road Equipment and On-Road Vehicles categories, respectively.

[2] Gasoline data for Fresno County and the State of California are obtained from EMFAC2021 for calendar year 2023.

[3] Diesel data for Fresno County and the State of California are obtained from EMFAC2021 and OFFROAD2021 for calendar year 2023.

[4] The project's construction contribution was calculated based on the maximum annual construction energy consumption.

Abbreviations:

% - percent

CalEEMod® - CALifornia Emissions Estimator MODel

EMFAC - California Air Resources Board Emissions Factor Model

Table 5-2. Operation Energy Resource Summary
Costco Commercial Center
Fresno, California

Energy Resource	Operation[1]	Fresno County		California	
		Consumption	Project's Contribution (%)[8]	Consumption	Project's Contribution (%)[8]
Electricity (kWh/yr)[2,3]	2,292,337	8,017,830,742	0.029%	279,510,007,246	0.0008%
Natural Gas (kBtu/yr)[4,5]	2,753,494	32,583,736,325	0.008%	1,232,858,294,229	0.0002%
Gasoline (gallons/yr)[6]	2,001,579	383,581,859	0.522%	15,688,627,269	0.013%
Diesel (gallons/yr)[7]	344,953	214,135,125	0.161%	5,000,677,060	0.007%

Conversions:

99,976.1	Btu/therm
1,000	Btu/kBtu
1,000,000	kWh/GWh
1,000	kWh/MWh

Notes:

[1] Project data are based on CalEEMod® output.

[2] Electricity data for Fresno County in 2020 from http://www.ecdms.energy.ca.gov/elecbycounty.aspx.

[3] Electricity data for the State is obtained for all counties in 2020 from http://www.ecdms.energy.ca.gov/elecbycounty.aspx.

[4] Natural gas data for Fresno County in 2020 from http://www.ecdms.energy.ca.gov/gasbycounty.aspx.

[5] Natural gas data for the State is obtained for all counties in 2020 from http://www.ecdms.energy.ca.gov/gasbycounty.aspx.

[6] Gasoline data for Fresno County and the State of California are obtained from EMFAC2021 for calendar year 2023.

[7] Diesel data for Fresno County and the State of California are obtained from EMFAC2021 and OFFROAD2021 for calendar year 2023.

[8] The project's construction contribution was calculated based on the maximum annual operational energy consumption.

Abbreviations:

Btu - British thermal unit
CalEEMod® - CALifornia Emissions Estimator MODel
EMFAC - EMission FACtors model
GWh - gigawatt hours
kWh - kilowatt hours
kBtu - kilo-British thermal unit
MWh - megawatt hours
yr - year

APPENDIX A
CALEEMOD OUTPUT

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Costco Fresno Mitigated Construction Run

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	889.00	Space	15.55	355,600.00	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Gasoline/Service Station	32.00	Pump	1.33	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	191.61	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific information (RPS Emission Factor)

Land Use - Project-specific information

Construction Phase - Project-specific information

Off-road Equipment -

Off-road Equipment - Project-specific information

Off-road Equipment -

Off-road Equipment - Project-specific information

Off-road Equipment - Project-specific information

Off-road Equipment - Project-specific information

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Off-road Equipment -

Trips and VMT - Project-specific information

Demolition - Project-specific information

Grading - Project-specific information

Vehicle Trips - Unmitigated Construction Run

Consumer Products - Unmitigated Construction Run

Area Coating - Unmitigated Construction Run

Landscape Equipment - Unmitigated Construction Run

Energy Use - Unmitigated Construction Run

Water And Wastewater - Unmitigated Construction Run

Solid Waste - Unmitigated Construction Run

Construction Off-road Equipment Mitigation - Water 2x/day to comply with SJVAPCD Rule 8021. All construction equipment >50 hp mitigated to Tier 3 + Level 3 DPF.

Vehicle Emission Factors -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	125329	0
tblAreaCoating	Area_Nonresidential_Interior	375986	0
tblAreaCoating	Area_Parking	21336	0
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	50.00
tblConstructionPhase	NumDays	370.00	110.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	35.00	30.00

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	35.00	20.00
tblConstructionPhase	NumDays	20.00	40.00
tblConstructionPhase	NumDays	10.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	4/11/2025	11/10/2023
tblConstructionPhase	PhaseEndDate	2/14/2025	11/10/2023
tblConstructionPhase	PhaseEndDate	5/26/2023	5/8/2023
tblConstructionPhase	PhaseEndDate	7/28/2023	6/12/2023
tblConstructionPhase	PhaseEndDate	9/15/2023	7/5/2023
tblConstructionPhase	PhaseEndDate	3/14/2025	9/13/2023
tblConstructionPhase	PhaseEndDate	6/9/2023	5/8/2023
tblConstructionPhase	PhaseStartDate	3/15/2025	9/14/2023
tblConstructionPhase	PhaseStartDate	9/16/2023	7/6/2023
tblConstructionPhase	PhaseStartDate	6/10/2023	5/9/2023
tblConstructionPhase	PhaseStartDate	7/29/2023	6/13/2023
tblConstructionPhase	PhaseStartDate	2/15/2025	7/29/2023
tblConstructionPhase	PhaseStartDate	5/27/2023	5/1/2023
tblConsumerProducts	ROG_EF	2.14E-05	0
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblConsumerProducts	ROG_EF_PesticidesFertilizers	5.152E-08	0
tblEnergyUse	LightingElect	2.70	0.00
tblEnergyUse	LightingElect	3.71	0.00
tblEnergyUse	LightingElect	2.70	0.00

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24E	2.30	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	NT24NG	2.08	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24E	1.91	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24NG	16.86	0.00
tblEnergyUse	T24NG	8.53	0.00
tblEnergyUse	T24NG	16.86	0.00
tblGrading	MaterialExported	0.00	3,000.00
tblGrading	MaterialImported	0.00	60,000.00
tblLandscapeEquipment	NumberSummerDays	180	0
tblLandUse	LotAcreage	8.00	15.55
tblLandUse	LotAcreage	0.10	1.33
tblOffRoadEquipment	HorsePower	172.00	401.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblProjectCharacteristics	CO2IntensityFactor	203.98	191.61
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	18.34	0.00
tblSolidWaste	SolidWasteGenerationRate	1,037.93	0.00
tblSolidWaste	SolidWasteGenerationRate	17.25	0.00

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblTripsAndVMT	HaulingTripNumber	1.00	2.00
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00
tblWater	IndoorWaterUseRate	451,589.32	0.00
tblWater	IndoorWaterUseRate	17,876,662.33	0.00
tblWater	IndoorWaterUseRate	425,020.45	0.00
tblWater	OutdoorWaterUseRate	276,780.55	0.00
tblWater	OutdoorWaterUseRate	10,956,664.01	0.00
tblWater	OutdoorWaterUseRate	260,496.40	0.00

2.0 Emissions Summary

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	2.2806	4.5511	3.7117	0.0113	0.9356	0.1729	1.1085	0.3872	0.1595	0.5467	0.0000	1,026.9395	1,026.9395	0.1854	0.0533	1,047.4410
Maximum	**2.2806**	**4.5511**	**3.7117**	**0.0113**	**0.9356**	**0.1729**	**1.1085**	**0.3872**	**0.1595**	**0.5467**	**0.0000**	**1,026.9395**	**1,026.9395**	**0.1854**	**0.0533**	**1,047.4410**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	2.0686	3.9074	4.6415	0.0113	0.5786	0.0294	0.6080	0.2169	0.0291	0.2459	0.0000	1,026.9388	1,026.9388	0.1854	0.0533	1,047.4403
Maximum	**2.0686**	**3.9074**	**4.6415**	**0.0113**	**0.5786**	**0.0294**	**0.6080**	**0.2169**	**0.0291**	**0.2459**	**0.0000**	**1,026.9388**	**1,026.9388**	**0.1854**	**0.0533**	**1,047.4403**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**9.30**	**14.14**	**-25.05**	**0.00**	**38.16**	**82.99**	**45.15**	**43.99**	**81.76**	**55.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	5-1-2023	7-31-2023	3.2883	2.7515
2	8-1-2023	9-30-2023	2.0410	1.7429
		Highest	3.2883	2.7515

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2023	5/8/2023	6	7	
2	Site Preparation	Site Preparation	5/1/2023	5/8/2023	6	7	
3	Grading	Grading	5/9/2023	6/12/2023	6	30	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4	Grading/BC Overlap	Grading	6/13/2023	7/5/2023	6	20	
5	Building Construction	Building Construction	7/6/2023	11/10/2023	6	110	
6	Paving	Paving	7/29/2023	9/13/2023	6	40	
7	Architectural Coating	Architectural Coating	9/14/2023	11/10/2023	6	50	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 165

Acres of Paving: 15.55

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 375,986; Non-Residential Outdoor: 125,329; Striped Parking Area: 21,336 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Graders	3	8.00	187	0.41
Grading	Other Construction Equipment	2	8.00	401	0.42
Grading	Paving Equipment	1	8.00	132	0.36
Grading	Rubber Tired Dozers	4	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Surfacing Equipment	1	8.00	263	0.30
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading/BC Overlap	Excavators	3	8.00	158	0.38
Grading/BC Overlap	Rough Terrain Forklifts	2	8.00	100	0.40
Grading/BC Overlap	Rubber Tired Dozers	3	8.00	247	0.40
Grading/BC Overlap	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Excavators	3	8.00	158	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Building Construction	Rough Terrain Forklifts	2	8.00	100	0.40
Building Construction	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Paving	Rough Terrain Forklifts	1	8.00	100	0.40
Paving	Rubber Tired Dozers	2	8.00	247	0.40
Paving	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	2.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	15	38.00	0.00	7,500.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading/BC Overlap	11	28.00	0.00	375.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	11	230.00	99.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	46.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1000e-004	0.0000	1.1000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9400e-003	0.0752	0.0688	1.4000e-004		3.4900e-003	3.4900e-003		3.2500e-003	3.2500e-003	0.0000	11.8972	11.8972	3.3300e-003	0.0000	11.9805
Total	**7.9400e-003**	**0.0752**	**0.0688**	**1.4000e-004**	**1.1000e-004**	**3.4900e-003**	**3.6000e-003**	**2.0000e-005**	**3.2500e-003**	**3.2700e-003**	**0.0000**	**11.8972**	**11.8972**	**3.3300e-003**	**0.0000**	**11.9805**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	3.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0567	0.0567	0.0000	1.0000e-005	0.0593
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.5000e-004	0.0000	6.6000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5083	0.5083	1.0000e-005	1.0000e-005	0.5126
Total	**2.1000e-004**	**2.8000e-004**	**1.8000e-003**	**1.0000e-005**	**6.7000e-004**	**0.0000**	**6.8000e-004**	**1.7000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5650**	**0.5650**	**1.0000e-005**	**2.0000e-005**	**0.5719**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.2400e-003	0.0641	0.0864	1.4000e-004		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004	0.0000	11.8972	11.8972	3.3300e-003	0.0000	11.9805
Total	**3.2400e-003**	**0.0641**	**0.0864**	**1.4000e-004**	**5.0000e-005**	**4.5000e-004**	**5.0000e-004**	**1.0000e-005**	**4.5000e-004**	**4.6000e-004**	**0.0000**	**11.8972**	**11.8972**	**3.3300e-003**	**0.0000**	**11.9805**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	3.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0567	0.0567	0.0000	1.0000e-005	0.0593
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.5000e-004	0.0000	6.6000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5083	0.5083	1.0000e-005	1.0000e-005	0.5126
Total	**2.1000e-004**	**2.8000e-004**	**1.8000e-003**	**1.0000e-005**	**6.7000e-004**	**0.0000**	**6.8000e-004**	**1.7000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5650**	**0.5650**	**1.0000e-005**	**2.0000e-005**	**0.5719**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1200e-003	0.0215	0.0312	4.0000e-005		1.0600e-003	1.0600e-003		9.8000e-004	9.8000e-004	0.0000	3.8302	3.8302	1.2400e-003	0.0000	3.8612
Total	**2.1200e-003**	**0.0215**	**0.0312**	**4.0000e-005**	**0.0000**	**1.0600e-003**	**1.0600e-003**	**0.0000**	**9.8000e-004**	**9.8000e-004**	**0.0000**	**3.8302**	**3.8302**	**1.2400e-003**	**0.0000**	**3.8612**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.1800e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3389	0.3389	1.0000e-005	1.0000e-005	0.3417
Total	**1.4000e-004**	**1.0000e-004**	**1.1800e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3389**	**0.3389**	**1.0000e-005**	**1.0000e-005**	**0.3417**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0600e-003	0.0243	0.0328	4.0000e-005		2.6000e-004	2.6000e-004		2.6000e-004	2.6000e-004	0.0000	3.8302	3.8302	1.2400e-003	0.0000	3.8612
Total	**1.0600e-003**	**0.0243**	**0.0328**	**4.0000e-005**	**0.0000**	**2.6000e-004**	**2.6000e-004**	**0.0000**	**2.6000e-004**	**2.6000e-004**	**0.0000**	**3.8302**	**3.8302**	**1.2400e-003**	**0.0000**	**3.8612**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.1800e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3389	0.3389	1.0000e-005	1.0000e-005	0.3417
Total	**1.4000e-004**	**1.0000e-004**	**1.1800e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3389**	**0.3389**	**1.0000e-005**	**1.0000e-005**	**0.3417**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4522	0.0000	0.4522	0.2086	0.0000	0.2086	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1079	1.1479	0.7006	1.9600e-003		0.0465	0.0465		0.0428	0.0428	0.0000	172.1647	172.1647	0.0557	0.0000	173.5567
Total	**0.1079**	**1.1479**	**0.7006**	**1.9600e-003**	**0.4522**	**0.0465**	**0.4987**	**0.2086**	**0.0428**	**0.2514**	**0.0000**	**172.1647**	**172.1647**	**0.0557**	**0.0000**	**173.5567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-003	0.4693	0.0990	2.2100e-003	0.0642	4.4300e-003	0.0686	0.0177	4.2400e-003	0.0219	0.0000	212.4374	212.4374	1.3900e-003	0.0334	222.4289
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	1.6100e-003	0.0192	6.0000e-005	7.0900e-003	3.0000e-005	7.1200e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	5.5190	5.5190	1.3000e-004	1.4000e-004	5.5650
Total	**0.0103**	**0.4709**	**0.1182**	**2.2700e-003**	**0.0713**	**4.4600e-003**	**0.0757**	**0.0195**	**4.2700e-003**	**0.0238**	**0.0000**	**217.9564**	**217.9564**	**1.5200e-003**	**0.0336**	**227.9939**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2035	0.0000	0.2035	0.0939	0.0000	0.0939	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0480	0.9363	1.0751	1.9600e-003		5.6200e-003	5.6200e-003		5.6200e-003	5.6200e-003	0.0000	172.1645	172.1645	0.0557	0.0000	173.5565
Total	**0.0480**	**0.9363**	**1.0751**	**1.9600e-003**	**0.2035**	**5.6200e-003**	**0.2091**	**0.0939**	**5.6200e-003**	**0.0995**	**0.0000**	**172.1645**	**172.1645**	**0.0557**	**0.0000**	**173.5565**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-003	0.4693	0.0990	2.2100e-003	0.0642	4.4300e-003	0.0686	0.0177	4.2400e-003	0.0219	0.0000	212.4374	212.4374	1.3900e-003	0.0334	222.4289
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	1.6100e-003	0.0192	6.0000e-005	7.0900e-003	3.0000e-005	7.1200e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	5.5190	5.5190	1.3000e-004	1.4000e-004	5.5650
Total	**0.0103**	**0.4709**	**0.1182**	**2.2700e-003**	**0.0713**	**4.4600e-003**	**0.0757**	**0.0195**	**4.2700e-003**	**0.0238**	**0.0000**	**217.9564**	**217.9564**	**1.5200e-003**	**0.0336**	**227.9939**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Grading/BC Overlap - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1967	0.0000	0.1967	0.1011	0.0000	0.1011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0329	0.3343	0.3036	5.7000e-004		0.0151	0.0151		0.0139	0.0139	0.0000	50.3819	50.3819	0.0163	0.0000	50.7893
Total	**0.0329**	**0.3343**	**0.3036**	**5.7000e-004**	**0.1967**	**0.0151**	**0.2118**	**0.1011**	**0.0139**	**0.1149**	**0.0000**	**50.3819**	**50.3819**	**0.0163**	**0.0000**	**50.7893**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-004	0.0235	4.9500e-003	1.1000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	10.6219	10.6219	7.0000e-005	1.6700e-003	11.1215
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	7.9000e-004	9.4400e-003	3.0000e-005	3.4800e-003	2.0000e-005	3.5000e-003	9.2000e-004	1.0000e-005	9.4000e-004	0.0000	2.7111	2.7111	6.0000e-005	7.0000e-005	2.7337
Total	**1.5300e-003**	**0.0243**	**0.0144**	**1.4000e-004**	**6.6900e-003**	**2.4000e-004**	**6.9300e-003**	**1.8000e-003**	**2.2000e-004**	**2.0300e-003**	**0.0000**	**13.3329**	**13.3329**	**1.3000e-004**	**1.7400e-003**	**13.8551**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Grading/BC Overlap - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0885	0.0000	0.0885	0.0455	0.0000	0.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0141	0.2857	0.3759	5.7000e-004		2.1800e-003	2.1800e-003		2.1800e-003	2.1800e-003	0.0000	50.3819	50.3819	0.0163	0.0000	50.7892
Total	**0.0141**	**0.2857**	**0.3759**	**5.7000e-004**	**0.0885**	**2.1800e-003**	**0.0907**	**0.0455**	**2.1800e-003**	**0.0477**	**0.0000**	**50.3819**	**50.3819**	**0.0163**	**0.0000**	**50.7892**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-004	0.0235	4.9500e-003	1.1000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	10.6219	10.6219	7.0000e-005	1.6700e-003	11.1215
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	7.9000e-004	9.4400e-003	3.0000e-005	3.4800e-003	2.0000e-005	3.5000e-003	9.2000e-004	1.0000e-005	9.4000e-004	0.0000	2.7111	2.7111	6.0000e-005	7.0000e-005	2.7337
Total	**1.5300e-003**	**0.0243**	**0.0144**	**1.4000e-004**	**6.6900e-003**	**2.4000e-004**	**6.9300e-003**	**1.8000e-003**	**2.2000e-004**	**2.0300e-003**	**0.0000**	**13.3329**	**13.3329**	**1.3000e-004**	**1.7400e-003**	**13.8551**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1776	1.8072	1.6238	3.0900e-003		0.0814	0.0814		0.0748	0.0748	0.0000	271.4578	271.4578	0.0878	0.0000	273.6527
Total	**0.1776**	**1.8072**	**1.6238**	**3.0900e-003**		**0.0814**	**0.0814**		**0.0748**	**0.0748**	**0.0000**	**271.4578**	**271.4578**	**0.0878**	**0.0000**	**273.6527**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6200e-003	0.2227	0.0698	1.0000e-003	0.0327	1.3900e-003	0.0340	9.4400e-003	1.3300e-003	0.0108	0.0000	95.4877	95.4877	5.3000e-004	0.0144	99.7859
Worker	0.0511	0.0357	0.4263	1.3400e-003	0.1573	7.3000e-004	0.1580	0.0418	6.7000e-004	0.0425	0.0000	122.4820	122.4820	2.9000e-003	3.1900e-003	123.5038
Total	**0.0567**	**0.2584**	**0.4961**	**2.3400e-003**	**0.1899**	**2.1200e-003**	**0.1920**	**0.0512**	**2.0000e-003**	**0.0532**	**0.0000**	**217.9697**	**217.9697**	**3.4300e-003**	**0.0176**	**223.2896**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0758	1.5354	2.0193	3.0900e-003		0.0116	0.0116		0.0116	0.0116	0.0000	271.4575	271.4575	0.0878	0.0000	273.6524
Total	**0.0758**	**1.5354**	**2.0193**	**3.0900e-003**		**0.0116**	**0.0116**		**0.0116**	**0.0116**	**0.0000**	**271.4575**	**271.4575**	**0.0878**	**0.0000**	**273.6524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6200e-003	0.2227	0.0698	1.0000e-003	0.0327	1.3900e-003	0.0340	9.4400e-003	1.3300e-003	0.0108	0.0000	95.4877	95.4877	5.3000e-004	0.0144	99.7859
Worker	0.0511	0.0357	0.4263	1.3400e-003	0.1573	7.3000e-004	0.1580	0.0418	6.7000e-004	0.0425	0.0000	122.4820	122.4820	2.9000e-003	3.1900e-003	123.5038
Total	**0.0567**	**0.2584**	**0.4961**	**2.3400e-003**	**0.1899**	**2.1200e-003**	**0.1920**	**0.0512**	**2.0000e-003**	**0.0532**	**0.0000**	**217.9697**	**217.9697**	**3.4300e-003**	**0.0176**	**223.2896**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0356	0.3745	0.2593	5.4000e-004		0.0168	0.0168		0.0154	0.0154	0.0000	47.0096	47.0096	0.0152	0.0000	47.3896
Paving	0.0204					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0559**	**0.3745**	**0.2593**	**5.4000e-004**		**0.0168**	**0.0168**		**0.0154**	**0.0154**	**0.0000**	**47.0096**	**47.0096**	**0.0152**	**0.0000**	**47.3896**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.3000e-004	8.7600e-003	3.0000e-005	3.2300e-003	1.0000e-005	3.2500e-003	8.6000e-004	1.0000e-005	8.7000e-004	0.0000	2.5174	2.5174	6.0000e-005	7.0000e-005	2.5384
Total	**1.0500e-003**	**7.3000e-004**	**8.7600e-003**	**3.0000e-005**	**3.2300e-003**	**1.0000e-005**	**3.2500e-003**	**8.6000e-004**	**1.0000e-005**	**8.7000e-004**	**0.0000**	**2.5174**	**2.5174**	**6.0000e-005**	**7.0000e-005**	**2.5384**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0131	0.2697	0.3271	5.4000e-004		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	47.0095	47.0095	0.0152	0.0000	47.3896
Paving	0.0204					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0335**	**0.2697**	**0.3271**	**5.4000e-004**		**2.0600e-003**	**2.0600e-003**		**2.0600e-003**	**2.0600e-003**	**0.0000**	**47.0095**	**47.0095**	**0.0152**	**0.0000**	**47.3896**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.3000e-004	8.7600e-003	3.0000e-005	3.2300e-003	1.0000e-005	3.2500e-003	8.6000e-004	1.0000e-005	8.7000e-004	0.0000	2.5174	2.5174	6.0000e-005	7.0000e-005	2.5384
Total	**1.0500e-003**	**7.3000e-004**	**8.7600e-003**	**3.0000e-005**	**3.2300e-003**	**1.0000e-005**	**3.2500e-003**	**8.6000e-004**	**1.0000e-005**	**8.7000e-004**	**0.0000**	**2.5174**	**2.5174**	**6.0000e-005**	**7.0000e-005**	**2.5384**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7900e-003	0.0326	0.0453	7.0000e-005		1.7700e-003	1.7700e-003		1.7700e-003	1.7700e-003	0.0000	6.3831	6.3831	3.8000e-004	0.0000	6.3927
Total	**1.8217**	**0.0326**	**0.0453**	**7.0000e-005**		**1.7700e-003**	**1.7700e-003**		**1.7700e-003**	**1.7700e-003**	**0.0000**	**6.3831**	**6.3831**	**3.8000e-004**	**0.0000**	**6.3927**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6500e-003	3.2500e-003	0.0388	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8000e-003	6.0000e-005	3.8600e-003	0.0000	11.1347	11.1347	2.6000e-004	2.9000e-004	11.2276
Total	**4.6500e-003**	**3.2500e-003**	**0.0388**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8000e-003**	**6.0000e-005**	**3.8600e-003**	**0.0000**	**11.1347**	**11.1347**	**2.6000e-004**	**2.9000e-004**	**11.2276**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4900e-003	0.0339	0.0458	7.0000e-005		3.6000e-004	3.6000e-004		3.6000e-004	3.6000e-004	0.0000	6.3831	6.3831	3.8000e-004	0.0000	6.3927
Total	**1.8184**	**0.0339**	**0.0458**	**7.0000e-005**		**3.6000e-004**	**3.6000e-004**		**3.6000e-004**	**3.6000e-004**	**0.0000**	**6.3831**	**6.3831**	**3.8000e-004**	**0.0000**	**6.3927**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6500e-003	3.2500e-003	0.0388	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8000e-003	6.0000e-005	3.8600e-003	0.0000	11.1347	11.1347	2.6000e-004	2.9000e-004	11.2276
Total	**4.6500e-003**	**3.2500e-003**	**0.0388**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8000e-003**	**6.0000e-005**	**3.8600e-003**	**0.0000**	**11.1347**	**11.1347**	**2.6000e-004**	**2.9000e-004**	**11.2276**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Discount Club	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Gasoline/Service Station	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Parking Lot	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 0	0.0000	0.0000	0.0000	0.0000
Discount Club	0 / 0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 0	0.0000	0.0000	0.0000	0.0000
Discount Club	0 / 0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Equipment Type	Number

11.0 Vegetation

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	889.00	Space	8.00	355,600.00	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Gasoline/Service Station	32.00	Pump	0.10	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	191.61	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific values (RPS emission factor)

Land Use - Project-specific values

Construction Phase - Operational run

Off-road Equipment - Operational run

Vehicle Trips - Project-specific values, mobile emissions calculated seperately

Consumer Products - Updated emission factor for consumer products to refine the VOC emissions based on recent CARB regulations.

Table Name	Column Name	Default Value	New Value
tblConsumerProducts	ROG_EF	2.14E-05	1.62E-05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	203.98	191.61
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	330.8528	330.8528	0.0345	6.5300e-003	333.6620
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	12.3158	18.2653	0.6132	0.0147	37.9717
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**343.1895**	**567.0539**	**13.5261**	**0.0212**	**911.5307**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	330.8528	330.8528	0.0345	6.5300e-003	333.6620
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	12.3158	18.2653	0.6132	0.0147	37.9717
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**343.1895**	**567.0539**	**13.5261**	**0.0212**	**911.5307**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2023	4/30/2023	5	20	

Acres of Grading (Site Preparation Phase): 0

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 0

Acres of Paving: 8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	0	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Discount Club	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Gasoline/Service Station	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Parking Lot	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	183.9160	183.9160	0.0317	3.8400e-003	185.8520
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	183.9160	183.9160	0.0317	3.8400e-003	185.8520
NaturalGas Mitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100
NaturalGas Unmitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

Costco Fresno (Project) Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	3.5919	6.2000e-004	7.0000e-005	3.6297
Discount Club	1.91141e+006	166.1263	0.0286	3.4700e-003	167.8751
Gasoline/Service Station	38896.5	3.3806	5.8000e-004	7.0000e-005	3.4162
Parking Lot	124460	10.8172	1.8600e-003	2.3000e-004	10.9310
Total		**183.9160**	**0.0317**	**3.8400e-003**	**185.8520**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	3.5919	6.2000e-004	7.0000e-005	3.6297
Discount Club	1.91141e+006	166.1263	0.0286	3.4700e-003	167.8751
Gasoline/Service Station	38896.5	3.3806	5.8000e-004	7.0000e-005	3.4162
Parking Lot	124460	10.8172	1.8600e-003	2.3000e-004	10.9310
Total		**183.9160**	**0.0317**	**3.8400e-003**	**185.8520**

6.0 Area Detail

6.1 Mitigation Measures Area

Costco Fresno (Project) Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Unmitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.9000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.9000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

7.0 Water Detail

7.1 Mitigation Measures Water

Costco Fresno (Project) Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	18.2653	0.6132	0.0147	37.9717
Unmitigated	18.2653	0.6132	0.0147	37.9717

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.4398	0.0148	3.5000e-004	0.9144
Discount Club	17.8767 / 10.9567	17.4115	0.5845	0.0140	36.1967
Gasoline/Service Station	0.42502 / 0.260496	0.4140	0.0139	3.3000e-004	0.8606
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**18.2653**	**0.6132**	**0.0147**	**37.9717**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.4398	0.0148	3.5000e-004	0.9144
Discount Club	17.8767 / 10.9567	17.4115	0.5845	0.0140	36.1967
Gasoline/Service Station	0.42502 / 0.260496	0.4140	0.0139	3.3000e-004	0.8606
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**18.2653**	**0.6132**	**0.0147**	**37.9717**

8.0 Waste Detail

8.1 Mitigation Measures Waste

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	217.9149	12.8784	0.0000	539.8748
Unmitigated	217.9149	12.8784	0.0000	539.8748

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number

11.0 Vegetation

APPENDIX B
STATE AND LOCAL CONSISTENCY ANALYSES

Table B-1. Consistency with Applicable State Renewable Energy and Energy Efficiency Strategies
Costco Commercial Center
Fresno, California

#	Plan	Category Description	Consistency Analysis
1	California Renewables Portfolio Standard (RPS) and SB 100	As most recently amended by SB 100 (2018), California's RPS increases the proportion of electricity from renewable sources to 33 percent renewable power by 2020; 50 percent renewable power by 2026; and, 60 percent renewable power by 2030. SB 350 (2015) also requires the State Energy Resources Conservation and Development Commission to double (by 2030) the energy efficiency savings in electricity and natural gas final end uses of retail customers through energy efficiency and conservation.	**Consistent.** The Project would be consistent with and not impair implementation of the state's RPS. The electricity for the operation of the Project would be supplied by Pacific Gas & Electric, which is composed of 30% renewable resources as of 2020.
2	California Code of Regulations, Title 24, Part 6	Title 24, Part 6 of the California Code of Regulations establishes energy and water efficiency requirements for residential and non-residential new construction, additions to existing buildings, and alterations to existing buildings. Standards include requirements for water heating, HVAC, lighting, electrical systems, and solar design.	**Consistent.** The Project would meet or exceed the Title 24 energy efficiency standards in effect at the time of building permit application.
3	Assembly Bill 1109	The Lighting Efficiency And Toxics Reduction Act (AB 1109) requires a reduction in average statewide electrical energy consumption by not less than 50 percent from the 2007 levels for indoor residential lighting and not less than 25 percent from the 2007 levels for indoor commercial and outdoor lighting by 2018.	**Consistent.** The Project would meet the applicable requirements from AB 1109.
4	California Green (CalGreen) Building Standards Code Requirements	CalGreen establishes green building standards to meet the goals of AB 32. CalGreen includes standards for residential and nonresidential structures such as new buildings or portions of new buildings, additions and alterations, and all occupancies where no other state agency has the authority to adopt green building standards applicable to those occupancies. Standards include requirements for site development, indoor and outdoor water use, construction waste reduction, disposal and recycling and building maintenance and operation.	**Consistent.** To the extent applicable to the Project, the Project would meet the CalGreen Building Standards Code in effect at the time of building permit application.
Mobile Sources			
5	AB 1493 (Pavley Regulations)	Reduces GHG emissions in new passenger vehicles from model years 2012-2016 (Phase I) and model years 2017–2025 (Phase II). Also reduces gasoline consumption to a rate of 31 percent of 1990 gasoline consumption (and associated GHG emissions) by 2020.	**Consistent.** The Project would not impair implementation of the AB 1493 regulations.
6	Low Carbon Fuel Standard (LCFS)	Establishes protocols for measuring and reducing the life-cycle carbon intensity of transportation fuels and helps to establish use of alternative fuels.	**Consistent.** The Project would not conflict with implementation of the LCFS.
7	Advanced Clean Cars (ACC) Program	In 2012, the California Air Resources Board (CARB) adopted the ACC program to reduce criteria pollutant emissions and GHG emissions for model year vehicles 2015 through 2025. ACC includes the Low-Emission Vehicle (LEV) regulations that reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles, and the Zero-Emission Vehicle (ZEV) regulations that require manufacturers to produce an increasing number of pure ZEVs (meaning battery electric and fuel cell electric vehicles), with provisions to also produce plug-in hybrid electric vehicles (PHEV) in the 2018 through 2025 model years.	**Consistent.** The Project would not conflict with implementation of the ACC program.
8	SB 375	SB 375 establishes mechanisms for the development of regional targets for reducing passenger vehicle GHG emissions. Under SB 375, CARB is required, in consultation with the state's Metropolitan Planning Organizations, to set regional GHG reduction targets for the passenger vehicle and light-duty truck sector for 2020 and 2035.	**Consistent.** The Project would not conflict with the implementation of SB 375. Furthermore, the Project would be consistent with the goals of the Fresno Council of Government's (Fresno COG's) Regional Transporation Plan/Sustainable Communities Strategy, which demonstrates how the Fresno region under Fresno COG's jurisdiction will meet the emission reduction targets of SB 375.

Abbreviations:
AB - Assembly Bill
CalGreen - California Green Building Standards Code
RPS - Renewable Portfolio Standard
SB - Senate Bill

Table B-2. Consistency with Applicable City of Fresno Renewable Energy and Energy Efficiency Strategies
Costco Commercial Center
Fresno, California

#	Category	General Plan Policy or Objective	Category Description	Consistency Analysis
2b	Electric Vehicle Strategies	**RC-8-j: Alternative Fuel Network**. Support the development of a network of integrated charging and alternate fuel station for both public and private vehicles, and if feasible, open up municipal stations to the public as part of network development.	For new commercial buildings, does project provide EV charging spaces capable of supporting EV capable spaces at 4% to 10% of the parking spaces per 2019 California Green Building Standards Code (CALGREEN, Title 24, Part 11), Section 5.106.5.3	**Consistent.** The Project would be consistent with this code with 45 installed EV spaces, which is 5% of the parking spaces at the site.
3a	Energy Conservation Strategies	**RC-5-c: GHG Reduction through Design and Operations**. Increase efforts to incorporate requirements for GHG emission reductions in land use entitlement decisions, facility design, and operational measures subject to City regulation.	Does the project meet or exceed mandatory state building energy codes? If yes, does the project follow any other GreenPoint ratings such as LEED, Energy Star or others? If yes, indicate level of certification-Silver, gold, platinum if applicable?	**Consistent.** The Project would be consistent with this by meeting mandatory building energy codes. Costco's warehouse designs are consistent with the requirements of LEED.
		Objective RC-8: Reduce the consumption of non-renewable energy resources by requiring and encouraging conservation measures and the use of alternative energy sources.		
		RC-8-a: Existing Standards and Programs. Continue existing beneficial energy conservation programs, including adhering to the California Energy Code in new construction and major renovations.		

Abbreviations:
AB - Assembly Bill
CalGreen - California Green Building Standards Code
EV - electric vehicle
GHG - greenhouse gas
LEED - Leadership in Energy and Environmental Design

Appendix F

Greenhouse Gas Emissions
Technical Report

Prepared for
Ascent Environmental, Inc.
Sacramento, California

Project Number
1690023335

Date
June 2023

COSTCO COMMERCIAL CENTER GREENHOUSE GAS EMISSIONS TECHNICAL REPORT

FRESNO, CALIFORNIA

RAMBOLL

CONTENTS

CONTENTS *(CONTINUED)*

TABLES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Acronym	Definition
AB	Assembly Bill
ACC	Advanced Clean Cars
ACE	Affordable Clean Energy
AEP	Association of Environmental Professionals
AP-42	United States Environmental Protection Agency's Compilation of Air Pollutant Emission Factors
APCD	Air Pollution Control District
APR	Application Review
AQMD	Air Quality Management District
AR4	Fourth Assessment Report
AR5	Fifth Assessment Report
AvgHP	Maximum rated average horsepower
BAU	Business-As-Usual
BPS	Best Performance Standards
CAA	Clean Air Act
CAFE	Corporate Average Fuel Economy
CalEEMod®	California Emission Estimator Model®
CalEPA	California Environmental Protection Agency
CalRecycle	California Department of Resources Recycling and Recovery
CAMX	California and Mexico
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	Climate Action Team
CCCC	California Climate Change Center
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CFR	Code of Federal Regulations
CH_4	Methane
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COG	Council of Governments
CPUC	California Public Utilities Commission
CY	cubic yard
DOE	Department of Energy
DTSC	Department of Toxic Substances Control
DWR	Department of Water Resources
EF	emission factor
EISA	Energy Independence and Security Act
EMFAC	EMission FACtors model
EO	Executive Order
EPA	Environmental Protection Agency
EVs	Electric vehicles
FR	Federal Register

ACRONYMS AND ABBREVIATIONS *(CONTINUED)*

Acronym	Definition
GAMAQI	Guidance for Assessing and Mitigating Air Quality Impacts
GHG	greenhouse gas
GW	Gigawatt
GWP	global warming potential
HFCs	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
lbs	Pounds
LCFS	Low Carbon Fuel Standard
LLC	Limited Liability Company
MCY	million cubic yards
MDO	Market delivery operation
MRR	Mandatory Reporting Rule
MSW	Municipal solid waste
MT	metric tons
N_2O	nitrogen dioxide
NHTSA	National Highway Traffic Safety Administration
OFFROAD	Off-road Emissions Inventory Program model
OPR	Office of Planning and Research
PFCs	perfluorocarbons
PG&E	Pacific Gas and Electric
ppm	parts per million
PUP	Power/Utility Protocol
RCP	Representative Concentration Pathways
RCRA	Resource Conservation and Recovery Act
RPS	Renewables Portfolio Standards
RTP	Regional Transportation Plan
SAFE	Safer Affordable Fuel-Efficient
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCS	Sustainable Communities Strategy
SDG&E	San Diego Gas & Electric
SF_6	Sulfur hexafluoride
SJVAPCD	San Joaquin Valley Air Pollution Control District
SLCPs	short-lived climate pollutants
TRU	transportation refrigeration unit
USDOT	the Department of Transportation
USEPA	United States Environmental Protection Agency
VMT	vehicle miles travelled
VW	Volkswagen
ZEVs	Zero emission vehicles

1. INTRODUCTION

Ramboll US Consulting, Inc. (Ramboll) was retained to prepare a Greenhouse Gas (GHG) Emissions Technical Report for the proposed Costco warehouse and gasoline dispensing facility in Fresno, California (Project).

This GHG Emissions Technical Report analyzes the Project's impacts on GHGs from construction and operations. In particular, this report describes the existing setting of the Project site, describes the relevant regulatory setting, discusses the methodology used to evaluate GHG emissions related to the Project, and evaluates potential impacts related to GHGs that would result with implementation of the Project.

1.1 Existing Conditions

The existing 22.4-acre site is currently undeveloped, located within the Bullard Community Plan Area, and designated by both the General Plan and zoning as Community Commercial. The location of the site is in Fresno, California at West Herndon Avenue and North Riverside Drive (**Figure 1**).

1.2 Project Analysis

The Costco Wholesale Corporation (Costco) proposes to construct the Costco Commercial Center, which comprises a new Costco facility (including loading docks and internal space to provide last-mile home delivery of big and bulky items) with an attached tire center and a detached gas station and drive-through car wash in the City of Fresno.

The project would develop a new Costco retail building; gas station; car wash; and associated parking areas, driveways, and other supporting infrastructure. Costco Wholesale is proposing to construct a wholesale retail facility with approximately 178,000 square feet (sq. ft.); of which approximately 57,000 sq. ft. would be reserved for storage and receiving at the northeast corner of W. Herndon Ave. and N. Riverside Dr (APN 50302012). The project involves the construction of a Costco retail facility that includes an attached tire center, as well as a detached gas station and a drive-through car wash. The project would include a Costco members-only gas station on the northern portion of the project site adjacent to West Spruce Avenue. The facility would include an approximately 11,500 square-foot canopy and a 125 square-foot controller enclosure. There would be four covered fueling islands, each with four two-sided fuel dispensers to provide for the fueling of eight cars at each island, for a total of 32 fueling positions. A Costco members-only automated carwash would be located at the northeastern corner of the project site, adjacent to the gas station. The car wash structure would be approximately 4,800 sq. ft. The project would have its main access points along North Riverside Drive and include approximately 889 parking stalls. The project is requesting conditional use permits for Large-Format Retail and alcohol sales, as well as a General Plan Amendment to reclassify the portion of W. Herndon Ave. fronting the project site from Expressway to Superarterial.

2. SCIENTIFIC AND REGULATORY BACKGROUNDS

2.1 Scientific Background

2.1.1 Science of Global Climate Change

There is a general scientific consensus that global climate change is occurring, caused in whole or in part by increased emissions of GHGs that keep the Earth's surface warm by trapping heat in the Earth's atmosphere, in much the same way as glass traps heat in a greenhouse. The Earth's climate is changing because human activities, primarily the combustion of fossil fuels, are altering the chemical composition of the atmosphere through the buildup of GHGs. GHGs allow the sun's radiation to penetrate the atmosphere and warm the Earth's surface, but do not let the infrared radiation emitted from the Earth escape back into outer space. As a result, global temperatures are predicted to increase over the century. In particular, if climate change remains unabated, surface temperatures in California are expected to increase anywhere from 4.1 to 8.6 degrees Fahrenheit by the end of the century. Not only would higher temperatures directly affect the health of individuals through greater risk of dehydration, heat stroke, and respiratory distress, the higher temperatures may increase ozone formation, thereby worsening air quality. Rising temperatures could also reduce the snowpack, which would increase the risk of water shortages. Higher temperatures along with reduced water supplies could reduce the quantity and quality of agricultural products. In addition, there could be an increase in wildfires and a shift in distribution of natural vegetation throughout the State. Global warming could also increase sea levels and coastal storms resulting in greater risk of flooding.

Emissions of carbon dioxide (CO_2) are the leading cause of global warming, with other pollutants such as methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons, and sulfur hexafluoride also contributing. The magnitude of the impact on global warming differs among the GHGs. For example, HFCs, perfluorocarbons, and sulfur hexafluoride have a greater "global warming potential" than CO_2. In other words, these other GHGs have a greater contribution to global warming than CO_2 on a per mass basis. The effect each GHG has on climate change is measured as a combination of the volume of its emissions and its global warming potential (GWP), and is expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of megagrams or metric tons (MT) of carbon dioxide equivalent (CO_2e). CO_2 has the greatest impact on global warming because of the relatively large quantities of CO_2 emitted into the atmosphere.

Globally, CO_2 concentrations, which ranged from 265 parts per million (ppm) to 280 ppm over the last 10,000 years, only began rising in the last 200 years to current levels of 410 ppm,[1] a 46 percent increase.

In 2019, the United States emitted about 6.6 billion MT of CO_2e or about 20 MT/person/year, calculated by dividing the emissions total by the U.S. Census Bureau 2019 population

[1] Intergovernmental Panel on Climate Change (IPCC). Climate Change 2021, The Physical Science Basis. 2021. Available at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf. Accessed: January 2022.

estimate. [2, 3] This represents a 12 percent reduction below 2005 total emission levels. Of the five major sectors nationwide -- residential, commercial, industrial, electric power generation, and transportation - transportation accounts for the highest fraction of GHG emissions (approximately 29 percent of emissions from these five sectors). These emissions are entirely generated from direct fossil fuel combustion. Fifty-eight percent of these transportation emissions resulted from passenger car and light-duty truck use. The remaining emissions came from other transportation activities, including the combustion of diesel fuel in medium- and heavy-duty vehicles, and jet fuel in aircraft. According to the Inventory of U.S. Greenhouse Gas Emissions and Sinks,[4] from 1990 to 2019 as a whole, transportation emissions from fossil fuel combustion rose, "due, in large part, to increased demand for travel".

In 2019, California emitted approximately 418 million tonnes of CO_2e, or about 6 percent of the U.S. emissions.[5] California's percentage contribution is due primarily to the sheer size of California, as compared to other states. For example, in 2018 (the most recent year of state rankings for energy-related CO_2 emissions per capita), California had the third lowest per capita energy-related CO_2 emission rates in the country (including Washington DC),[6] due to the success of its energy efficiency and renewable energy programs and commitments that have lowered the State's GHG emissions rate of emissions growth.[7] California's per capita GHG emissions in 2019 were 10.5 metric tons per person[8], while the U.S. per capita GHG emissions in that same year were 20.0 metric tons per person.[9, 10] Another factor that has reduced California's fuel use and GHG emissions is its mild climate compared to that of many other states. The emissions for the City of Fresno were approximately 2.9 million metric tons of CO_2e in 2016. The projected 2020 emissions for the City of Fresno are about 2.1 million

[2] USEPA. 2021. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019. Available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2019. Accessed: January 2022.

[3] U.S. Census Bureau. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2019. (NST-EST2020). Available at: https://www2.census.gov/programs-surveys/popest/tables/2010-2020/state/totals/nst-est2020.xlsx. Accessed: January 2022.

[4] USEPA. 2021. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019. Available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2019. Accessed: January 2022.

[5] CARB. 2021. California Greenhouse Gas Emissions for 2000 to 2019 Trends of Emissions and Other Indicators. Available at: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2019/ghg_inventory_trends_00-19.pdf. Accessed: January 2022.

[6] US EIA. 2021.Table 5: Per capita energy-related carbon dioxide emissions by state. Available at: https://www.eia.gov/environment/emissions/state/. Accessed: January 2022.

[7] The Center for Resource Efficient Communities. 2013. Residential Energy Use and GHG Emissions Impact of Compact Land Use Types. Report to ARB, Contract No. 10-323. Available at: http://www.arb.ca.gov/research/apr/past/10-323h.pdf. Accessed: January 2022.

[8] CARB. 2021. California Greenhouse Gas Emissions for 2000 to 2019 Trends of Emissions and Other Indicators. Available at: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2019/ghg_inventory_trends_00-19.pdf. Accessed: January 2022.

[9] USEPA. 2021. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019. Available at: https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2019. Accessed: January 2022.

[10] U.S. Census Bureau. Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2019. (NST-EST2020). Available at: https://www2.census.gov/programs-surveys/popest/tables/2010-2020/state/totals/nst-est2020.xlsx. Accessed: January 2022.

metric tons of CO_2e when accounting for emission reductions achieved by state-wide regulations, programs, and measures.[11]

The California Energy Commission (CEC) found that transportation is the source of approximately 40 percent of the State's GHG emissions, followed by industrial sources at 21 percent, and electricity generation (both in-state and out-of-state) at 14 percent. Residential and commercial activities comprised approximately 11 percent of the inventory. Agriculture and forestry is the source of approximately 8 percent of the State's GHG emissions.[12]

2.1.2 Potential Effects of Human Activity on Global Climate Change

Globally, climate change has the potential to impact numerous environmental resources through anticipated, though uncertain, impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. At the end of the 21st century, global surface temperature change is likely to exceed 1.5°C (relative to 1850-1900 levels) in all four assessed climate model projections but one.[13]

The understanding of GHG emissions, particulate matter, and aerosols on global climate trends is complex and involves varying uncertainties and a balance of different effects. In addition to uncertainties about the extent to which human activity rather than solar or volcanic activity is responsible for increasing warming, there is also evidence that some human activity has cooling, rather than warming, effects, as discussed in detail in numerous publications by the Intergovernmental Panel on Climate Change (IPCC), such as the Fifth Assessment Report (AR5) Synthesis Report.[14, 15] Nonetheless, when all effects and uncertainties are considered together, there is a strong scientific consensus that human activity has contributed significantly to global warming. As stated in the executive summary for the Working Group I contribution to the Sixth Assessment Report, "The evidence for human influence on recent climate change strengthened from the IPCC Second Assessment Report to the IPCC Fifth Assessment Report, and is now even stronger in this assessment."[16]

[11] LSA. 2021. Greenhouse Gas Reduction Plan Update for the City of Fresno. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2021/03/Link4AppendixGGHGRPUpdate.pdf. Accessed: March 2022.

[12] CARB. 2021. California Greenhouse Gas Emissions for 2000 to 2019 Trends of Emissions and Other Indicators. Available at: https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2019/ghg_inventory_trends_00-19.pdf. Accessed: January 2022.

[13] IPCC. Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Climate Change 2014: Synthesis Report. 2014. SPM.2.2. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf. Accessed: January 2022.

[14] The IPCC was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme to assess scientific, technical, and socio-economic information relevant for the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC has produced a series of Assessment Reports comprised of full scientific and technical assessments of climate change. The first assessment report was developed in 1990. The Fifth Assessment Report was completed in November 2014 with the Synthesis Report.

[15] Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Climate Change 2014: Synthesis Report. 2014. Figure SPM.3. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf. Accessed: January 2022.

[16] IPCC. 2021. Climate Change 2021 The Physical Science Basis, Working Group I contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Available at:

Acknowledging uncertainties regarding the rate at which anthropogenic GHG emissions would continue to increase (based upon various factors under human control, such as future population growth and the locations of that growth; the amount, type, and locations of economic development; the amount, type, and locations of technological advancement; adoption of alternative energy sources; legislative and public initiatives to curb emissions; and public awareness and acceptance of methods for reducing emissions), and the impact of such emissions on climate change, the IPCC devises emission scenarios which utilize various assumptions about the rates of economic development, population growth, and technological advancement over the course of the next century. For the AR5, Representative Concentration Pathways (RCPs) were developed to describe four different 21st century scenarios of greenhouse gas emissions, atmospheric concentrations, air pollutant emissions, and land use. RCPs are based on a combination of integrated assessment models, simple climate models, atmospheric chemistry, and global carbon cycle models.

- The projected effects of global warming are assessed under each of the five scenarios.[17]
- It is, at a minimum, more likely than not a 1.5°C increase in globally averaged surface area temperature (GSAT) will occur between 2021-2045 relative to the average over the period of 1850-1900.
- It is virtually certain that global mean sea level (GMSL) will continue to rise through the 21st century.
- It is likely the Arctic Ocean in September, the month of annual minimum sea ice area, will become practically ice free averaged over 2081-2100 and all available simulations.
- It is very likely that the cumulative uptake of carbon by the ocean and by land will increase through the end of the 21st century.

Potential secondary effects from global warming include impacts to agriculture, changes in disease vectors, and changes in habitat and biodiversity.

2.1.3 Potential Effects of Climate Change on the State of California

According to the California Air Resources Board (CARB), some of the potential impacts in California of global warming may include loss in snowpack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years.[18] The California Climate Change Center (CCCC) has released four assessment reports on climate change in California, the most recent in 2018. California's Fourth Climate Change Assessment projects an increase by 5.6-8.8°F from 2070 to 2100 depending on greenhouse gas emission reductions (at a moderate rate or continuing at current rates).[19]

https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Full_Report.pdf. Accessed: January 2022.

[17] Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report. Climate Change 2014: Synthesis Report. 2014. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf. Accessed: January 2022.

[18] California Air Resources Board (CARB), 2006. Public Workshop to Discuss Establishing the 1990 Emissions Level and the California 2020 Limit and Developing Regulations to Require Reporting of Greenhouse Gas Emissions, Sacramento, CA. December 1.

[19] California Climate Change Center, 2018. California's Changing Climate 2018. A Summary of Key Findings from California's Fourth Climate Change Assessment.

Below is a summary of some of the potential effects reported in an array of studies that could be experienced in California as a result of global warming and climate change.

2.1.3.1 Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California. Climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. For other pollutants, the effects of climate change and/or weather are less well studied, and even less well understood.

If higher temperatures are accompanied by drier conditions, the potential for large wildfires could increase, which, in turn, would further worsen air quality. Studies have been conducted to evaluate the potential impacts of climate change on wildfire frequency based on lower and higher emissions scenarios. Per California's Fourth Climate Change Assessment, under a higher emissions scenario, the average area burned statewide could increase by 77 percent above historic levels by 2100.[20] Per California's Third Climate Change Assessment, the estimated burned area is projected to increase between 57 and 169 percent, depending on location.[21] However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains would tend to temporarily clear the air of particulate pollution and reduce the incidence of large wildfires, thus ameliorating the pollution associated with wildfires. Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the State.[22]

It is estimated that over the next decade, higher temperatures could increase the demand for electricity by 1 Gigawatt (GW) during summer months, which would require purchase of costly peak power from external sources or the construction of one new large power plant in California.[23] During periods of extreme heat, efficiency of electricity generation is reduced at natural gas plants; hydropower generation is reduced; and increased losses occur at substations; all while electricity demands are increased. These factors are projected to result in the need for more than 17 GW, or 38 percent of additional capacity, needed by 2100. Additionally, transmission lines lose 7 to 8 percent of transmitting capacity in higher temperatures, which also results in a need for increased power generation.[24]

2.1.3.2 Water Supply

Uncertainty remains with respect to the overall impact of global climate change on future water supplies in California. For example, models that predict drier conditions suggest decreased reservoir inflows and storage, and decreased river flows, relative to current

[20] Ibid.

[21] California Climate Change Center, 2012. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California. CEC-500-2012-007. July, 2012.

[22] California Climate Change Center (CCCC), 2006. Our Changing Climate: Assessing the Risks to California, CEC500-2006-077, Sacramento, CA. July. Available at: https://www.engr.scu.edu/~emaurer/papers/CEC-500-2006-077.pdf. Accessed: January 2022.

[23] California Climate Change Center, 2012. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California. CEC-500-2012-007. July, 2012.

[24] California Climate Change Center, 2012. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California. CEC-500-2012-007. July, 2012.

conditions. By comparison, models that predict wetter conditions project increased reservoir inflows and storage, and increased river flows.[25]

A July 2006 technical report prepared by the California Department of Water Resources (DWR) addresses the State Water Project, the Central Valley Project, and the Sacramento-San Joaquin Delta. Although the report projects that, "[c]limate change will likely have a significant effect on California's future water resources … [and] future water demand," it also reports that, "there is much uncertainty about future water demand, especially those aspects of future demand that will be directly affected by climate change and warming. While climate change is expected to continue through at least the end of this century, the magnitude and, in some cases, the nature of future changes is uncertain. This uncertainty serves to complicate the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood,"[26] DWR adds that "[i]t is unlikely that this level of uncertainty will diminish significantly in the foreseeable future."[27] Still, changes in water supply are expected to occur, and many regional studies have shown that large changes in the reliability of water yields from reservoirs could result from only small changes in inflows.[28]

California's Third Climate Change Assessment outlines the State's urgent water management challenges brought on as a result of climate change. These include increasing demand from a growing population as temperatures rise, earlier snowmelt and runoff, and faster-than-historical sea-level rise threatening aging coastal water infrastructure and levees in the Sacramento-San Joaquin Delta.[29] Additionally, they predict that competition between urban and agriculture water users and environmental needs will increase due to effects on water supply and stream flows. The Fourth Climate Change Assessment concludes that by 2100, water supply from snowpack is projected to decline by two-thirds, and that by 2050, California's agricultural production could face climate-related water shortages of up to 16 percent in certain regions.[30]

2.1.3.3 Hydrology

As discussed above, climate change could potentially affect the following: the amount of snowfall, rainfall, and snowpack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide, and high runoff events); sea level rise and coastal flooding; coastal erosion; and the potential for saltwater intrusion. Sea level rise can be a product of global warming through two main processes -- expansion of sea water as the oceans warm and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could also jeopardize California's water supply. In particular,

[25] Brekke, L.D., et al, 2004. —Climate Change Impacts Uncertainty for Water Resources in the San Joaquin River Basin, California. Journal of the American Water Resources Association. 40(2): 149–164. Malden, MA, Blackwell Synergy for AWRA.

[26] California Department of Water Resources (DWR), 2006. Progress on Incorporating Climate Change into Management of California Water Resources, Sacramento, CA. July.

[27] California Department of Water Resources (DWR), 2006. Progress on Incorporating Climate Change into Management of California Water Resources, Sacramento, CA. July.

[28] Kiparsky 2003, op. cit; DWR, 2005, op. cit.; Cayan, D., et al, 2006. Scenarios of Climate Change in California: An Overview (White Paper, CEC-500-2005-203-SF), Sacramento, CA. February.

[29] California Climate Change Center, 2012. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California. CEC-500-2012-007. July, 2012.

[30] California Climate Change Center, 2018. California's Changing Climate 2018. A Summary of Key Findings from California's Fourth Climate Change Assessment.

saltwater intrusion would threaten the quality and reliability of the State's major fresh water supply that is pumped from the southern portion of the Sacramento/San Joaquin River Delta. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events. Assuming the rate of sea level rise continues to follow global trends, sea level along California's coastline in 2050 could be 10-18 inches higher than in 2000, and 31-55 inches higher by the end of this century.[31] Based on these current projections, the current 100-year storm could occur once every year. California's Fourth Climate Change Assessment projects that without implementation of protective measures, airports in major urban areas will be susceptible to major flooding from a combination of sea-level rise and storm surge by 2040 to 2080 and that the miles of highways susceptible to coastal flooding from a 100-year storm will triple from current levels by 2100.[32]

2.1.3.4 Agriculture

California has a $30 billion agricultural industry that produces half the country's fruits and vegetables. The CCCC notes that higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, water demand could increase, crop-yield could be threatened by a less reliable water supply, and greater ozone pollution could render plants more susceptible to pest and disease outbreaks. In addition, temperature increases could change the time of year that certain crops, such as wine grapes, bloom or ripen, and thus affect their quality.[33]

2.1.3.5 Ecosystems and Wildfire

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. In 2004, the Pew Center on Global Climate Change released a report examining the possible impacts of climate change on ecosystems and wildlife.[34] The report outlines four major ways in which it is thought that climate change could affect plants and animals: (1) timing of ecological events, (2) geographic range, (3) species' composition within communities, and (4) ecosystem processes such as carbon cycling and storage.

2.2 Regulatory Background

2.2.1 Federal

2.2.1.1 Clean Air Act

In April 2007, in *Massachusetts v. EPA*, the U.S. Supreme Court directed the Administrator of the U.S. Environmental Protection Agency (USEPA) to determine whether GHG emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the USEPA Administrator was directed to follow the language of Section 202(a) of the Clean Air Act (CAA). In December 2009, the

[31] California Climate Change Center, 2012. Our Changing Climate 2012: Vulnerability and Adaptation to the Increasing Risks from Climate Change in California. CEC-500-2012-007. July, 2012.

[32] California Climate Change Center, 2018. California's Changing Climate 2018. A Summary of Key Findings from California's Fourth Climate Change Assessment.

[33] California Climate Change Center (CCCC), 2006, op. cit.

[34] Parmesan, C. and H. Galbraith, Observed Impacts of Global Climate Change in the U.S., Arlington, VA: Pew Center on Global Climate Change, November 2004.

Administrator signed a final rule with two distinct findings regarding GHGs under Section 202(a) of the CAA:

- Elevated concentrations of GHGs—CO_2, CH_4, N_2O, HFCs, perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations. This is referred to as the "endangerment finding."
- The combined emissions of GHGs—CO_2, CH_4, N_2O, and HFCs—from new motor vehicles and new motor vehicle engines contribute to the GHG air pollution that endangers public health and welfare. This is referred to as the "cause or contribute finding."

These two findings were necessary to establish the foundation for regulation of GHGs from new motor vehicles as air pollutants under the CAA.

2.2.1.2 Federal Plan to Reduce GHG Emissions by 2025

In 2015, President Obama signed Executive Order 13693 (EO 13693), which was intended to reduce the federal government's GHG emissions by 40 percent by 2025 by requiring the following:

- Ensuring that 25 percent of total energy consumption is from clean energy sources.
- Reducing energy use in federal buildings by 2.5 percent per year between 2015 and 2025.
- Reducing per-mile GHG emissions from federal fleets by 30 percent (from 2014 levels) by 2025 and increasing the percentage of zero-emissions and plug-in hybrid vehicles in federal fleets.
- Reducing water intensity in federal buildings by 2 percent per year through 2025.

This executive order was revoked by President Trump's Executive Order 13834 in May 2018. President Biden's Executive Order 13990 revoked Executive Order 13834 except for sections 6 (*Duties of the Federal Chief Sustainability Officer*), 7 (*Duties of Heads of Agencies*), and 11 (*General Provisions*).[35]

2.2.1.3 Executive Order 14008

On January 27, 2021, President Biden issued an Executive Order on Tackling the Climate Crisis at Home and Abroad (Executive Order 14008).[36] Part I of the Order highlights putting the climate crisis at the center of United States foreign policy and national security. Addressing the climate crisis will require significant short-term global reductions in GHG emissions and net-zero global emissions by mid-century or sooner. The United States will pursue green recovery efforts and initiatives to advance the clean energy transition.

Part II of the Order relays the government-wide approach to the climate crisis, which involves reducing climate pollution in every sector of the economy, especially through innovation, commercialization, and deployment of clean energy technologies and

[35] White House Briefing Room. 2021. *Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*. January 20. Available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/20/executive-order-protecting-public-health-and-environment-and-restoring-science-to-tackle-climate-crisis/. Accessed: March 2022.

[36] White House Briefing Room. 2021. *Executive Order on Tackling the Climate Crisis at Home and Abroad*. January 27. Available at: https://www.whitehouse.gov/briefing-room/presidential-actions/2021/01/27/executive-order-on-tackling-the-climate-crisis-at-home-and-abroad/. Accessed: January 2022.

infrastructure. A National Climate Task Force is established to focus on addressing the climate crisis through key federal actions to reduce climate change impacts. A 100% carbon pollution-free electricity sector is targeted by no later than 2035 and a net-zero emissions economy is to be achieved by no later than 2050. Offshore wind is aimed to be doubled by 2030. Opportunities for federal funding of clean energy technology and infrastructure shall be identified. Federal permitting decisions need to consider the effects of GHG emissions and climate change.

2.2.1.4 Paris Climate Agreement

On June 1, 2017, President Trump withdrew the United States from the Paris Agreement.[37] The Paris Agreement was negotiated within the United Nations Framework Convention on Climate Change in 2015 to reduce GHG emissions internationally. The goal of the Paris Agreement was to keep the global temperature rise this century to below 2 degrees Celsius above pre-industrial standards, with efforts to limit temperature increase even further to 1.5 degrees Celsius. The Paris Agreement became effective on November 4, 2016. As of October 5, 2016, 155 of 197 parties had ratified the Paris Agreement.[38] On January 20, 2021, President Biden signed an Executive Order formally rejoining the United States to the Paris Agreement.[39]

2.2.1.5 Federal Vehicle Standards

In response to the *Massachusetts v. EPA* decision discussed above, in 2007, President Bush directed the USEPA, the Department of Transportation (USDOT), and the Department of Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. In 2009, the National Highway Traffic Safety Administration (NHTSA) issued a final rule regulating fuel efficiency for and GHG emissions from cars and light-duty trucks for model year 2011; and in 2010, the USEPA and NHTSA issued a final rule regulating cars and light-duty trucks for model years 2012–2016.

In 2010, President Obama issued a memorandum directing the same federal agencies to establish additional standards regarding fuel efficiency and GHG reduction, clean fuels, and advanced vehicle infrastructure. In response to this directive, the USEPA and NHTSA proposed stringent, coordinated federal GHG and fuel economy standards for model year 2017–2025 light-duty vehicles. The proposed standards are projected to achieve 163 grams/mile of CO_2 in model year 2025, on an average industry fleet-wide basis, which is equivalent to 54.5 miles per gallon if this level were achieved solely through fuel efficiency. The final rule was adopted in 2012 for model years 2017–2021.

In August 2017, the USEPA asked for additional information and data relevant to assessing whether the GHG emissions standards for model years 2022-2025 remain appropriate. In early 2018, the USEPA Administrator announced that the midterm evaluation for the GHG emissions standards for cars and light-duty trucks for model years 2022-2025 was completed and stated his determination that the current standards should be revised in light

[37] USEPA. 2017. Administrator Scott Pruitt Speech on Paris Accord, As Prepared. June 1. Available at: https://archive.epa.gov/epa/speeches/administrator-scott-pruitt-speech-paris-accord-prepared.html. Accessed: January 2022.

[38] United Nations Framework Convention on Climate Change. 2017. The Paris Agreement. July 27. Available at: http://unfccc.int/paris_agreement/items/9485.php. Accessed: January 2022.

[39] White House Briefing Room. 2021. *Paris Climate Agreement.* January 20. Available at: https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/20/paris-climate-agreement/. Accessed: January 2022.

of recent data. Subsequently, in 2018, the USEPA and NHTSA proposed to amend certain existing Corporate Average Fuel Economy (CAFE) standards and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards, covering model years 2021-2026. Compared to maintaining the post-2020 standards now in place, the pending proposal would increase U.S. fuel consumption.[40] California and other states have announced their intent to challenge federal actions that would delay or eliminate GHG reductions. In April 2020, NHTSA and EPA amended the CAFE and GHG emissions standards for passenger cars and light trucks and established new less stringent standards, covering model years 2021 through 2026.

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011, the USEPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles.

In August 2016, the USEPA and NHTSA announced the adoption of the phase two program related to the fuel economy and GHG standards for medium- and heavy-duty trucks. The phase two program will apply to vehicles with model year 2018 through 2027 for certain trailers, and model years 2021 through 2027 for semi-trucks, large pickup trucks, vans and all types of sizes of buses and work trucks. The final standards are expected to lower carbon dioxide emissions by approximately 1.1 billion MT and reduce oil consumption by up to two billion barrels over the lifetime of the vehicles sold under the program.[41]

On September 27, 2019, the USEPA and NHTSA published the SAFE Rule (Part One).[42] The SAFE Rule (Part One) went into effect in November 2019, and revoked California's authority to set its own GHGs standards and set zero emission vehicle mandates in California. The SAFE Rule (Part One) freezes new zero emission vehicles (ZEV) sales at model year 2020 levels for year 2021 and beyond, and will likely result in a lower number of future ZEVs and a corresponding greater number of future gasoline internal combustion engine vehicles. In response to the USEPA's adoption of the SAFE Rule (Part One), CARB has issued guidance regarding the adjustment of vehicle emissions factors to account for the rule's implications on criteria air pollutant and greenhouse gas emissions.[43,44] The SAFE Rule is subject to ongoing litigation and on February 8, 2021, the D.C. Circuit Court of Appeals granted the Biden Administration's motion to stay litigation over Part 1 of the SAFE Rule. On April 22 and

[40] Federal Register. 2018. *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Final Rule for Model Years 2021-2026 Passenger Cars and Light Trucks*. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/safer-affordable-fuel-efficient-safe-vehicles-final-rule. Accessed: January 2022.

[41] USEPA and NHTSA, 2016. Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium and Heavy-Duty Engines and Vehicles – Phase 2. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed: January 2022.

[42] USEPA and NHTSA. 2019. Federal Register, Vol. 84, No. 188, *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program*. September 27. Available at: https://www.govinfo.gov/content/pkg/FR-2019-09-27/pdf/2019-20672.pdf. Accessed: January 2022.

[43] CARB. 2019. EMFAC Off-Model Adjustment Factors to Account for the SAFE Vehicle Rule Part One. November 20. Available at: https://ww3.arb.ca.gov/msei/emfac_off_model_adjustment_factors_final_draft.pdf. Accessed: January 2022.

[44] CARB. 2020. EMFAC Off-Model Adjustment Factors for Carbon Dioxide Emissions to Account for the SAFE Vehicles Rule Part One and the Final SAFE Rule. June 26. Available at: https://ww3.arb.ca.gov/msei/emfac_off_model_co2_adjustment_factors_06262020-final.pdf. Accessed: January 2022

April 28, 2021, respectively, NHTSA and USEPA formally announced their intent to reconsider the Safe Rule (Part One).[45,46] A virtual public hearing for EPA's Notice of Reconsideration of SAFE I was held on June 2, 2021. The NHTSA finalized the Corporate Average Fuel Economy Pre-emption rulemaking to withdraw its portions of the SAFE I Rule on December 21, 2021.[47] On March 9, 2022, USEPA reinstated California's authority under the Clean Air Act to implement its own GHG emission standards and ZEV sales mandate and entirely rescinded the SAFE Rule (Part One).

In December 2021, the USEPA finalized federal GHG emissions standards for passenger cars and light trucks for Model Years 2023 through 2026. These standards are the strongest vehicle emissions standards ever established for the light-duty vehicle sector and are based on sound science and grounded in a rigorous assessment of current and future technologies. The updated standards will result in avoiding more than 3 billion tons of GHG emissions through 2050.[48]

2.2.1.6 Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard that requires fuel producers to use at least 36 billion gallons of biofuel in 2022.
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances.
- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020.
- While superseded by the USEPA and NHTSA actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."

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[45] NHTSA. 2021. NHTSA Advances Biden-Harris Administration's Climate & Jobs Goals. April 22. Available at: https://www.nhtsa.gov/press-releases/nhtsa-advances-biden-harris-administrations-climate-jobs-goals. Accessed: January 2022.

[46] USEPA. 2021. Federal Register, Vol. 86, No. 80, *California State Motor Vehicle Pollution Control Standards; Advanced Clean Car Program; Reconsideration of a previous Withdrawal of a Waiver of Preemption; Opportunity for Public Hearing and Public Comment*. April 28. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/notice-reconsideration-previous-withdrawal-waiver. Accessed: January 2022.

[47] NHTSA. Available at: https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy. Accessed: May 2022.

[48] USEPA. 2021. Final Rule to Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026. Available at: https://www.epa.gov/regulations-emissions-vehicles-and-engines/final-rule-revise-existing-national-ghg-emissions. Accessed: January 2022.

2.2.2 State

The State of California considers GHG emissions and the impacts of climate change to be a serious threat to the public health, environment, economic well-being, and natural resources of California, and has taken an aggressive stance to mitigate the State's impact on climate change through the adoption of policies and legislation. CARB is responsible for the coordination and oversight of State and local air pollution control programs in California. California has numerous regulations aimed at reducing the State's GHG emissions. Some of the major initiatives are summarized below.

2.2.2.1 Executive Order S-3-05

In 2005, Governor Schwarzenegger issued EO S-3-05, which identifies Statewide GHG emission reduction targets to achieve long-term climate stabilization as follows.

- Reduce GHG emissions to 1990 levels by 2020; and
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

In response to EO S-3-05, California Environmental Protection Agency (CalEPA) created the Climate Action Team (CAT), which in March 2006 published the Climate Action Team Report (the "2006 CAT Report").[49] The 2006 CAT Report identified a recommended list of strategies that the State could pursue to reduce GHG emissions. These are strategies that could be implemented by various State agencies to ensure that the emission reduction targets in EO S-3-05 are met and can be met with existing authority of the State agencies. The strategies include, but are not limited to, the reduction of passenger and light-duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, and landfill methane capture.

2.2.2.2 Assembly Bill 32

Assembly Bill (AB) 32 (Nunez, 2006), the California Global Warming Solutions Act of 2006, was enacted after considerable study and expert testimony before the Legislature. The heart of AB 32 is the requirement that statewide GHG emissions be reduced to 1990 levels by 2020. In order to achieve this reduction mandate, AB 32 requires California Air Resources Board to adopt rules and regulations in an open public process that achieve the maximum technologically feasible and cost-effective GHG reductions.

In 2007, CARB approved a statewide limit on the GHG emissions level for year 2020 consistent with the determined 1990 baseline. CARB's adoption of this limit is in accordance with Health & Safety Code Section 38550, as codified through enactment of AB 32.

Per Health & Safety Code Section 38561(b), CARB also is required to prepare, approve and amend a scoping plan that identifies and makes recommendations on "direct emission reduction measures, alternative compliance mechanisms, market-based compliance mechanisms, and potential monetary and nonmonetary incentives for sources and categories of sources that [CARB] finds are necessary or desirable to facilitate the achievement of the maximum feasible and cost-effective reductions of greenhouse gas emissions by 2020."

[49] California Environmental Protection Agency (CalEPA), March 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature. Available at: http://s3-us-west-2.amazonaws.com/ucldc-nuxeo-ref-media/0bdec21c-ca2b-4f4d-9e11-35935ac4cf5f. Accessed: January 2022.

In 2008, CARB adopted the *Climate Change Scoping Plan: A Framework for Change* (2008 Scoping Plan) in accordance with Health & Safety Code Section 38561. During the development of the 2008 Scoping Plan, CARB created a planning framework that is comprised of eight emissions sectors: (1) transportation; (2) electricity; (3) commercial and residential; (4) industry; (5) recycling and waste; (6) high GWP gases; (7) agriculture; and (8) forest net emissions. The 2008 Scoping Plan establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions from the eight emissions sectors to 1990 levels by 2020.

In the 2011 *Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document* (2011 Final Supplement), CARB revised its estimates of the projected 2020 emissions level in light of the economic recession and the availability of updated information about GHG reduction regulations.

a) 2014 First Update to the Scoping Plan

In 2014, CARB adopted the *First Update to the Climate Change Scoping Plan: Building on the Framework* (2014 First Update).[50] The stated purpose of the 2014 First Update is to "highlight […] California's success to date in reducing its GHG emissions and lay […] the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050."[51] The 2014 First Update found that California is on track to meet the 2020 emissions reduction mandate established by AB 32, and noted that California could reduce emissions further by 2030 to levels squarely in line with those needed to stay on track to reduce emissions to 80 percent below 1990 levels by 2050 if the State realizes the expected benefits of existing policy goals.[52]

In conjunction with the 2014 First Update, CARB identified "six key focus areas comprising major components of the State's economy to evaluate and describe the larger transformative actions that will be needed to meet the State's more expansive emission reduction needs by 2050."[53] Those six areas are: (1) energy; (2) transportation (vehicles/equipment, sustainable communities, housing, fuels, and infrastructure); (3) agriculture; (4) water; (5) waste management; and (6) natural and working lands. The 2014 First Update identifies key recommended actions for each sector that will facilitate achievement of the 2050 reduction target.

Based on CARB's research efforts, it has a "strong sense of the mix of technologies needed to reduce emissions through 2050."[54] Those technologies include energy demand reduction through efficiency and activity changes; large-scale electrification of on-road vehicles, buildings, and industrial machinery; decarbonizing electricity and fuel supplies; and the rapid market penetration of efficient and clean energy technologies.

As part of the 2014 First Update, CARB recalculated the State's 1990 emissions level using more recent global warming potentials identified by the IPCC. Using the recalculated 1990 emissions level and the revised 2020 emissions level projection identified in the 2011 Final Supplement, CARB determined that achieving the 1990 emissions level by 2020 would

[50] Health & Safety Code Section 38561(h) requires CARB to update the Scoping Plan every five years.

[51] CARB, First Update to the Climate Change Scoping Plan: Building on the Framework (May 2014), p. 4.

[52] Id. at p. 34.

[53] Id. at p. 6.

[54] Id. at p. 32.

require a reduction in GHG emissions of approximately 15.3 percent (instead of 28.5 percent or 16 percent) from the business-as-usual (BAU) conditions.

The 2014 First Update included a strong recommendation from CARB for setting a mid-term statewide GHG emissions reduction target. CARB specifically recommended that the mid-term target be consistent with: (i) the United States' pledge to reduce emissions 42 percent below 2005 levels (which translates to a 35 percent reduction from 1990 levels in California); and (ii) the long-term policy goal of reducing emissions to 80 percent below 1990 levels by 2050.

The 2014 First Update discussed new residential and commercial building energy efficiency improvements, specifically identifying progress towards zero net energy buildings as an element of meeting mid-term and long-term GHG reduction goals. The 2014 First Update expressed CARB's commitment to working with the California Public Utilities Commission (CPUC) and CEC to facilitate further achievements in building energy efficiency.

b) 2017 Scoping Plan

In November 2017, CARB published California's 2017 Climate Change Scoping Plan (2017 Scoping Plan), which was subsequently adopted by CARB's Board in December 2017.[55] The 2017 Scoping Plan identifies CARB's strategy for achieving the State's 2030 GHG target as established in Senate Bill (SB) 32 (discussed below).The strategy includes continuation of the Cap-and-Trade Program through 2030, and incorporates a Mobile Source Strategy that includes strategies targeted to increase zero emission vehicle fleet penetration and a more stringent target for the Low Carbon Fuel Standard by 2030. The 2017 Scoping Plan also incorporates approaches to cutting short-lived climate pollutants (SLCPs) under the Short-Lived Climate Pollutant Reduction Strategy (a planning document that was adopted by CARB in March 2017), and acknowledges the need for reducing emissions in agriculture and highlights the work underway to ensure that California's natural and working lands increasingly sequester carbon.

When discussing project-level GHG emissions reduction actions and thresholds, the 2017 Scoping Plan states:

"***Project-Level Greenhouse Gas Emissions Reduction Actions and Thresholds***

Beyond plan-level goals and actions, local governments can also support climate action when considering discretionary approvals and entitlements of individual projects through CEQA [California Environmental Quality Act]. Absent conformity with an adequate geographically-specific GHG reduction plan …, CARB recommends that projects incorporate design features and GHG reduction measures, to the degree feasible, to minimize GHG emissions. Achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development.

Achieving net zero increases in GHG emissions, resulting in no contribution to GHG impacts, may not be feasible or appropriate for every project, however, and the inability of a project to mitigate its GHG emissions to net zero does not imply the project results in a substantial contribution to the cumulatively significant environmental impact of climate change under CEQA.

[55] CARB. 2017. California's 2017 Climate Change Scoping Plan. November. Available at: https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf. Accessed: January 2022.

California's future climate strategy will require increased focus on integrated land use planning to support liveable, transit-connected communities, and conservation and other lands. Accommodating population and economic growth through travel- and energy-efficient land use provides GHG-efficient growth, reducing GHGs from both transportation and building energy use. GHGs can be further reduced at the project level through implementing energy-efficient construction and travel demand management approaches."

c) 2022 Scoping Plan Update

The 2022 Scoping Plan Update assesses progress towards achieving the Senate Bill 32 2030 target and lays out a path to achieve carbon neutrality no later than 2045. This plan update was approved by the Board in December 2022.[56] The 2022 Scoping Plan Update outlines a sector-by-sector roadmap for California to achieve carbon neutrality by 2045 or earlier. It aims to reduce anthropogenic emissions to 85% below 1990 levels by 2045 using technically feasible and cost-effective solutions. The 2022 Scoping Plan Update focuses on electrification of transportation, homes and buildings, and phasing out fossil fuels. In hard-to-electrify sectors, new solutions such as renewable hydrogen and biomethane are leveraged to achieve emissions reductions.

CARB's 2022 Scoping Plan Update outlines a number of actions for the Scoping Plan Scenario in Table 2-1. The list below represents the actions which are most relevant to the Project:

- GHG Emissions Reductions Relative to the SB 32 Target - 40% below 1990 levels by 2030.
- Smart Growth / Vehicle Miles Traveled (VMT) - VMT per capita reduced 25% below 2019 levels by 2030, and 30% below 2019 levels by 2045.
- Light-duty Vehicle (LDV) Zero Emission Vehicles (ZEVs) - 100% of LDV sales are ZEV by 2035.
- Truck ZEVs - 100% of medium-duty (MDV)/HDV sales are ZEV by 2040 (AB 74 University of California Institute of Transportation Studies [ITS] report).
- Freight and Passenger Rail - 100% of passenger and other locomotive sales are ZEV by 2030; 100% of line haul locomotive sales are ZEV by 2035; Line haul and passenger rail rely primarily on hydrogen fuel cell technology, and others primarily utilize electricity.
- New Residential and Commercial Buildings - All electric appliances beginning 2026 (residential) and 2029 (commercial), contributing to 6 million heat pumps installed statewide by 2030.
- Construction Equipment - 25% of energy demand electrified by 2030 and 75% electrified by 2045.
- Low Carbon Fuels for Transportation - Biomass supply is used to produce conventional and advanced biofuels, as well as hydrogen.
- Low Carbon Fuels for Buildings and Industry - In 2030s biomethane blended in pipeline; Renewable hydrogen blended in fossil gas pipeline at 7% energy (~20% by volume), ramping up between 2030 and 2040.

[56] CARB. 2022. Final 2022 Scoping Plan Update and Appendices. December. Available at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents. Accessed: February 2023.

- Non-combustion Methane Emissions - Moderate adoption of enteric strategies by 2030; Divert 75% of organic waste from landfills by 2025.

In addition to the previous focus areas, the 2022 Scoping Plan Update developed a table of priority GHG reduction strategies that can be utilized by local governments. This is Table 1 in Appendix D of the 2022 Scoping Plan Update.[57] When discussing this table, the 2022 Scoping Plan Update notes:

"To assist local jurisdictions with developing local climate plans, measures, policies, and actions aligned with the State's climate goals, Table 1 presents a non-exhaustive list of impactful GHG reduction strategies that can be implemented by local governments. The strategies in Table 1 are not applicable to all local jurisdictions, nor are they the only strategies that local governments can adopt, but they represent the core strategies that most jurisdictions in California can implement to reduce GHG emissions regardless of whether they have developed a CEQA-qualified CAP. Reaching the outcomes of these priority GHG reduction strategies requires a locally appropriate, comprehensive adoption of policies in support of these objectives. When developing local climate plans, measures, policies, and actions, local jurisdictions should incorporate the recommendations described in Table 1 to the extent appropriate to ensure alignment with State climate goals."

2.2.2.3 SB 605 - Short-lived Climate Pollutants (SLCP)

Short-lived climate pollutants (i.e., black carbon, fluorinated gases, and methane) are powerful climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants. Their relative potency, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2. The impacts of short-lived climate pollutants are especially strong over the short term. Reducing these emissions can make an immediate beneficial impact on climate change.[58] Governor Brown signed SB 605 on September 21, 2014, directing CARB to develop a Short-Lived Climate Pollutant Strategy by January 1, 2016. On May 7, 2015, CARB released a concept paper for reducing emissions of these substances. In September 2015, CARB released a draft of their Short-Lived Climate Pollutant Strategy. Several updates to the draft have been made since September 2015, with the most current version dated March 2017. The Strategy aims for a 40 percent reduction in methane and HFC emissions below 2013 levels by 2030 and a 50 percent reduction in anthropogenic emissions of black carbon below 2013 levels by 2030.[59]

2.2.2.4 Executive Order B-30-15

In April 2015, Governor Brown signed EO B-30-15, which established the following GHG emission reduction goal for California: by 2030, reduce GHG emissions to 40 percent below 1990 levels. This EO also directed all state agencies with jurisdiction over GHG-emitting sources to implement measures designed to achieve the new interim 2030 goal, as well as the pre-existing, long-term 2050 goal identified in EO S-3-05 (see discussion above).

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[57] CARB. 2022. Final 2022 Scoping Plan Update and Appendices. December. Available at: https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/2022-scoping-plan-documents. Accessed: February 2023.

[58] CARB. 2016. Reducing Short-Lived Climate Pollutants in California. Available at: https://www.arb.ca.gov/cc/shortlived/shortlived.htm. Accessed: January 2022.

[59] CARB. 2017. Short-Lived Climate Pollutant Reduction Strategy. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-07/final_SLCP_strategy.pdf. Accessed: January 2022.

Additionally, the EO directed CARB to update its Scoping Plan (see discussion above) to address the 2030 goal.

2.2.2.5 Senate Bill 32 and Assembly Bill 197

Enacted in 2016, SB 32 (Pavley, 2016) codifies the 2030 emissions reduction goal of EO B-30-15 by requiring CARB to ensure that statewide GHG emissions are reduced to 40 percent below 1990 levels by 2030.

SB 32 was coupled with a companion bill: AB 197 (Garcia, 2016). Designed to improve the transparency of CARB's regulatory and policy-oriented processes, AB 197 created the Joint Legislative Committee on Climate Change Policies, a committee with the responsibility to ascertain facts and make recommendations to the Legislature concerning statewide programs, policies, and investments related to climate change. AB 197 also requires CARB to make certain GHG emissions inventory data publicly available on its web site; consider the social costs of GHG emissions when adopting rules and regulations designed to achieve GHG emission reductions; and include specified information in all Scoping Plan updates for the emission reduction measures contained therein.

2.2.2.6 Executive Order B-55-18

In September 2018, Governor Brown signed EO B-55-18, which established a new statewide goal "to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter." This EO directs CARB to "work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal."

In January 2019, CARB kicked off workshops regarding carbon neutrality in California,[60] during which CARB staff explained that the definitional parameters and meaning of the term – carbon neutrality – are still being explored. CARB held additional workshops throughout 2019 and 2020 to explore specific topics related to the pursuit of carbon neutrality, engage with other experts in the field and stakeholders, and conduct research to ensure that any path to carbon neutrality balances scientific, economic and social justice principles.

2.2.2.7 Energy Sources

a) Renewables Portfolio Standard

As most recently amended by SB 100 (2018), California's Renewables Portfolio Standard requires retail sellers of electric services and local publicly-owned electric utilities to increase procurement from eligible renewable energy resources to 50 percent of total retail sales by 2026, and 60 percent of total retail sales by 2030. SB 100 also established a State policy goal to achieve 100 percent renewables by 2045.

In March 2021, CEC, CPUC, and CARB released a joint-agency report evaluating the current feasibility of achieving the energy resource and GHG reductions goals of SB 100. The report finds that SB 100 is technically feasible when analyzed under scenarios of varying timelines, advancements in energy generation technology, and energy source portfolios. Under the

[60] CARB. Carbon Neutrality in California Context Webinar. January 2019. Available at: https://www.arb.ca.gov/cc/scopingplan/meetings/012319/cneutrality_ca_script.pdf. Accessed: January 2022.

SB 100 Core Scenario, it is anticipated that California will need to triple its current electricity power capacity.[61]

b) Building Energy Efficiency Standards

Title 24, Part 6 of the California Code of Regulations regulates the design of building shells and building components. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods.

The CEC's 2019 Building Energy Efficiency Standards (2019 Building Standards), which became effective January 1, 2020, are the currently applicable version of these standards. In general, single-family homes built to the 2019 standards are anticipated to use about 7% less energy due to energy efficiency measures than those built to the 2016 standards, and nonresidential buildings built to the 2019 standards will use an estimated 30% less energy than those built to the 2016 standards.[62]

In addition to the CEC's efforts, in 2008, the California Building Standards Commission adopted the nation's first green building standards. The California Green Building Standards Code (Part 11 of Title 24) is commonly referred to as CalGreen Building Standard (CalGreen), and establishes voluntary and mandatory standards pertaining to the planning and design of sustainable site development, energy efficiency, water conservation, material conservation, and interior air quality. Like Part 6 of Title 24, the CalGreen standards are periodically updated, with increasing energy savings and efficiencies associated with each code update.

At the time of this writing, the CEC has adopted the 2022 Energy Code, which improves upon the 2019 standards for construction of residential and non-residential buildings. The standards will be effective on January 1, 2023.[63]

c) Appliance Standards

The CEC periodically amends and enforces Appliance Efficiency Regulations contained in Title 20 of the California Code of Regulations. The regulations establish water and energy efficiency standards for both federally-regulated appliances and non-federally regulated appliances. The regulations cover numerous categories of appliances (e.g., refrigerators; plumbing fixtures; dishwashers; clothes washer and dryers; televisions) and apply to appliances offered for sale in California.[64]

2.2.2.8 Mobile Sources

a) Sustainable Communities Strategy Plans

SB 375 (Steinberg, 2008), the Sustainable Communities and Climate Protection Act, coordinates land use planning, regional transportation plans, and funding priorities to reduce

[61] CEC. 2021. 2021 SB 100 Joint Agency Report, Achieving 100 Percent Clean Electricity in California: An Initial Assessment. Available at: https://www.energy.ca.gov/publications/2021/2021-sb-100-joint-agency-report-achieving-100-percent-clean-electricity. Accessed: January 2022.

[62] CEC. 2018. 2019 Building Energy Efficiency Standards – Frequently Asked Questions. Available at: https://www.energy.ca.gov/sites/default/files/2020-03/Title_24_2019_Building_Standards_FAQ_ada.pdf. Accessed: January 2022.

[63] CEC. 2022 Building Energy Efficiency Standards. Available at: https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency. Accessed: January 2022.

[64] CEC. Title 20 Appliance Efficiency Program. Available at: https://www.energy.ca.gov/rules-and-regulations/appliance-efficiency-regulations-title-20. Accessed: January 2022.

GHG emissions from passenger vehicles through better-integrated regional transportation, land use, and housing planning that provides easier access to jobs, services, public transit, and active transportation options. SB 375 specifically requires the Metropolitan Planning Organization relevant to the Project area (here, the Fresno Council of Governments [Fresno COG]) to include a Sustainable Communities Strategy in its Regional Transportation Plan (RTP) that, if implemented, will achieve GHG emission reduction targets set by CARB by reducing vehicle miles traveled from light-duty vehicles through the development of more compact, complete, and efficient communities.

For the area under Fresno COG's jurisdiction, including the Project site, CARB originally adopted regional targets for reduction of mobile source-related GHG emissions of 5 percent for 2020 and 10 percent for 2035. The targets are expressed as a percentage change in per capita passenger vehicle GHG emissions relative to 2005 emissions levels. These original targets were in place through September 30, 2018. In March 2018, CARB approved updated regional targets of 6% for 2020 and 13% for 2035 for Fresno COG, which apply to future RTP/SCS planning cycles beginning October 1, 2018.[65]

b) Senate Bill 743

Public Resources Code Section 21099(c)(1), as codified through enactment of SB 743 (Steinberg, 2013), authorized the Governor's Office of Planning and Research (OPR) to establish "alternative metrics to the metrics used for traffic levels of service for transportation impacts outside transit priority areas." SB 743 reflects a legislative policy to balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of GHG emissions. As finalized in December 2018, amendments to the State CEQA Guidelines adopted in furtherance of SB 743 establish vehicle miles traveled (VMT), in lieu of level of service, as the new metric for transportation analysis.

c) Pavley Regulations

AB 1493 (Pavley, 2002) required CARB to adopt regulations to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks for model years 2009–2016. CARB obtained a waiver from the USEPA that allows for implementation of these regulations notwithstanding possible federal pre-emption concerns.

d) Low Carbon Fuel Standard

EO S-1-07, as issued by Governor Schwarzenegger, called for a 10 percent or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by CARB by 2020.[66] In response, CARB approved the Low Carbon Fuel Standard (LCFS) regulations in 2009, which became fully effective in April 2010. Thereafter, a lawsuit was filed challenging CARB's adoption of the regulations; and in 2013, a court order was issued compelling CARB to remedy substantive and procedural defects of the LCFS adoption process under CEQA.[67] However, the court allowed implementation of the LCFS to continue pending correction of the identified defects. In September 2015, CARB re-adopted the LCFS regulations. The LCFS would reduce GHG emissions by reducing the carbon intensity of

[65] CARB. Regional Plan Targets. Available at: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets. Accessed: January 2022.

[66] Carbon intensity is a measure of the GHG emissions associated with the various production, distribution, and use steps in the "lifecycle" of a transportation fuel.

[67] *POET, LLC v. CARB* (2013) 217 Cal.App.4th 1214.

transportation fuels used in California by at least 10% by 2020 and, as most recently amended in 2018, by at least 20% by 2030.

e) Advanced Clean Cars Program

In 2012, CARB approved the Advanced Clean Cars (ACC) program, a new emissions-control program for non-commercial passenger vehicles and light-duty truck for model years 2017-2025. The program combines the control of smog, soot, and GHGs with requirements for greater numbers of zero emission vehicles. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions. In August 2022, CARB adopted Advanced Clean Cars II (ACC II) regulations which "will seek to reduce criteria and greenhouse gas emissions from new light- and medium-duty vehicles beyond the 2025 model year, and increase the number of zero emission vehicles (ZEVs) for sale".[68]

f) Zero Emission Vehicles

ZEVs include hydrogen fuel cell electric vehicles and plug-in electric vehicles, such as battery electric vehicles and plug-in hybrid electric vehicles.

In 2012, Governor Brown issued EO B-16-2012, which calls for the increased penetration of ZEVs into California's vehicle fleet in order to help California achieve a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels by 2050. In furtherance of that statewide target for the transportation sector, the EO also calls upon CARB, the CEC, and the California Public Utilities Commission to establish benchmarks that will: (1) allow over 1.5 million ZEVs to be on California roadways by 2025, and (2) provide the State's residents with easy access to ZEV infrastructure. EO B-16-2012 specifically directed California to "encourage the development and success of zero-emission vehicles to protect the environment, stimulate economic growth, and improve the quality of life in the State."[69]

In 2018, Governor Brown also issued EO B-48-18, which launched an eight-year initiative to accelerate the sales of ZEVs through a mix of rebate programs and infrastructure improvements. The EO also sets a new target of five million ZEVs in California by 2030, and includes funding for multiple state agencies to increase electric vehicle (EV) charging infrastructure and provide purchase rebates/incentives.

In furtherance of the State's ZEV penetration goals, in February 2013, the Governor's Interagency Working Group on Zero-emission Vehicles issued the *2013 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California* roadways *by 2025*.[70] The 2013 ZEV Action Plan identifies four broad goals for State government to advance ZEVs: 1) Complete needed infrastructure and planning; 2) Expand consumer awareness and demand; 3) Transform fleets; and 4) Grow jobs and investment in the private sector. As part of these goals, some highlighted strategies and actions include: i) supporting ZEV infrastructure planning and investment by private entities; ii) enabling universal access to ZEV infrastructure for California drivers; iii) reducing upfront purchase costs for ZEVs;

[68] Advanced Clean Cars II Program. Available at: https://ww2.arb.ca.gov/advanced-clean-cars-ii-meetings-workshops. Accessed: January 2022.

[69] Executive Order B-16-2012. Available at: https://www.ca.gov/archive/gov39/2012/03/23/news17472/. Accessed: January 2022.

[70] Governor's Interagency Working Group on Zero-emission Vehicles. 2013. Available at: http://opr.ca.gov/docs/Governors_Office_ZEV_Action_Plan_(02-13).pdf. Accessed: January 2022.

iv) promoting consumer awareness of ZEVs; and v) helping to expand ZEVs in bus fleets. The Action Plan discusses the challenges of ZEV expansion, which include the need to enable electric vehicle chargers in homes, increase consumer awareness, address up-front costs and operational limitations, and address that ZEVs are not commercially available for all categories of vehicles.

In October 2016, the Governor's Interagency Working Group on Zero-emission Vehicles issued the *2016 ZEV Action Plan: A roadmap toward 1.5 million zero-emission vehicles on California* roadways *by 2025*.[71] This report provides an update on progress toward achieving the 2013 goals and highlights the following four top priorities for the upcoming years: 1) Raise consumer awareness and education about ZEVs; 2) Ensure ZEVs are accessible to a broad range of Californians; 3) Make ZEV technologies commercially viable in targeted applications in the medium-duty, heavy-duty, and freight sectors; and 4) Aid ZEV market growth beyond California. The broad goals to advance ZEV adoption are: i) achieve mainstream consumer awareness of ZEV options and benefits; ii) make ZEVs an affordable and attractive option for drivers; iii) ensure convenient charging and fueling infrastructure for greatly expanded use of ZEVs; iv) maximize economic and job opportunities from ZEV technologies; v) bolster ZEV market growth outside of California; and vi) lead by example by integrating ZEVs into State government. The goals and strategies proposed in the 2013 Action Plan will continue to be implemented; however, additional strategies are proposed to help achieve the new goals, including setting targets to increase home charging stations in multiunit dwellings and disadvantaged communities and for public transit and school bus electrification. The 2016 Action Plan describes challenges toward achieving the 2025 goal of 1.5 million ZEVs in California, such as that most consumers are still not aware of the benefits of passenger ZEVs and that over 1,000,000 charge points will be needed at homes, workplaces, and public locations but only 11,000 non-home charge points are installed as stated in the 2016 ZEV Action Plan.

In September 2018, the Governor's Interagency Working Group on Zero-Emission Vehicles published the 2018 ZEV Action Plan Priorities Update.[72] This update is the result of Governor Brown's directive to update the 2016 Zero-Emission Vehicle Action Plan to help expand private investment in zero-emission vehicle infrastructure, particularly in low income and disadvantaged communities. The 2018 Priorities Update serves three fundamental purposes: 1) Provide direction to state agencies on the most important actions to be executed in 2018 to enable progress toward the 2025 targets and 2030 Vision; 2) Give stakeholders transparency into the actions state agencies plan to take (or are taking) this year to further the ZEV market; and 3) Create a platform for stakeholder engagement, feedback, and collaboration. As of July 2018, over 410,000 ZEVs have been sold in California, which is approximately 150,000 ZEVs since the publication of the 2016 Action Plan in October 2016.

In June 2020, CARB approved the Advanced Clean Trucks regulation, which has requirements for manufacturer ZEV sales and a one-time reporting requirement for large

[71] Governor's Interagency Working Group on Zero-emission Vehicles. 2016. Available at: https://www.ca.gov/archive/gov39/wp-content/uploads/2018/01/2016_ZEV_Action_Plan-1.pdf. Accessed: January 2022.

[72] Governor's Interagency Working Group on Zero-emission Vehicles. 2018. Available at: https://static.business.ca.gov/wp-content/uploads/2019/12/2018-ZEV-Action-Plan-Priorities-Update.pdf. Accessed: January 2022.

entities and fleets.[73] The Advanced Clean Truck Regulation is part of a holistic approach to accelerate a large-scale transition of zero-emission medium-and heavy-duty vehicles from Class 2b to Class 8. Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines are required to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emission truck/chassis sales need to be 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales. Large employers including retailers, manufacturers, brokers, and others are required to report information about shipments and shuttle services. Fleet owners, with 50 or more trucks, are required to report about their existing fleet operations. This information helps to identify future strategies to ensure that fleets purchase available zero-emission trucks and place them in service where suitable to meet their needs.

California is incentivizing the purchase of ZEVs through implementation of the Clean Vehicle Rebate Project, which is administered by a non-profit organization (The Center for Sustainable Energy) for CARB and currently subsidizes the purchase of passenger near-zero and zero emission vehicles as follows:

- Hydrogen Fuel Cell Electric Vehicles: $5,000;
- Battery Electric Vehicles: $2,500;
- Plug-In Hybrid Electric Vehicles: $1,500; and
- Neighborhood Electric Vehicles and Zero Emission Motorcycles: $900.

In March 2017, CARB received Volkswagen's (VW) first 30-month ZEV Investment Plan (Plan).[74] This Plan is required by California's partial settlement with VW resulting from VW's use of illegal devices in its 2.0-liter (2.0L) diesel cars sold in the State from model years 2009 to 2015. The Plan describes how VW is proposing to spend the first $200 million in California on ZEV charging infrastructure (including the development and maintenance of ZEV charging stations), public awareness, increasing ZEV access, and a green city demonstration. In June 2017, Electrify America (a subsidiary of VW) provided CARB with additional information on the Plan.[75] CARB approved the first of the four plans in July 2017.[76]

In its 2014 First Update, CARB recognized that the light-duty vehicle fleet "will need to become largely electrified by 2050 in order to meet California's emission reduction goals."[77] Accordingly, CARB's ACC program – summarized above – requires about 15 percent of new cars sold in California in 2025 to be a plug-in hybrid, battery electric or fuel cell vehicle.[78]

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[73] CARB. 2020. Advanced Clean Trucks. Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks. Accessed: January 2022.

[74] VOLKSWAGEN, Group of America. 2017. California ZEV Investment Plan: Cycle 1, March 8, 2017. Available at: https://www.electrifyamerica.com/assets/pdf/California%20ZEV%20Investment%20Plan%20Cycle%201.3bc672a3.pdf. Accessed: January 2022.

[75] Electrify America. 2017. Supplement to the California ZEV Investment Plan, Cycle 1, June 29, 2017. Available at: https://www.electrifyamerica.com/assets/pdf/Cycle%201%20CA%20ZEV%20Invest%20Plan%20Supplement.a92e7705.pdf. Accessed: January 2022.

[76] CARB, 2017. CARB Approves $200 Million VW Zero-Emission Vehicle Investment in California, July, 27. Available at: https://ww2.arb.ca.gov/news/carb-approves-200-million-vw-zero-emission-vehicle-investment-california. Accessed: January 2022.

[77] CARB, First Update to the Climate Change Scoping Plan: Building on the Framework (May 2014), p. 48.

[78] Id. at p. 47.

Other statewide and regional initiatives that spur ZEV uptake include the following:

- CARB currently subsidizes the purchase of passenger near-zero and zero emission vehicles, and provides access to high-occupancy vehicle lanes to ZEV drivers.
- The VW settlement will result in $800 million in ZEV projects in California over the next ten years, with a focus on increasing public awareness and infrastructure in the first funding cycle.[79]
- The CalGreen standards require new residential and non-residential construction to be pre-wired to facilitate the future installation and use of electric vehicle chargers (see Section 4.106.4 and Section 5.106.5.3 of 2016 CalGreen standards for the residential and nonresidential pre-wiring requirements, respectively).

In January 2017, three of California's largest utilities submitted proposals to the CPUC to electrify the State's transportation sector through more than $1 billion in investments:

- Southern California Edison (SCE) filed an application to expand electric transportation in its service area. Some of SCE's proposals include monetary rewards to rideshare drivers who use an electric vehicle, additional fast charge infrastructure at targeted locations within the region, and rates that are designed to incentivize electric vehicle adoption.[80]
- Pacific Gas and Electric (PG&E) submitted an application that aims to expand the electrification of medium- and heavy-duty vehicle fleets, expand fast-charging stations that can refuel EVs in 20-30 minutes, and explore new uses for vehicle electrification.[81]
- San Diego Gas & Electric (SDG&E) submitted an application to install tens of thousands of charging stations in its service area to boost the transition to zero-emission vehicles, trucks, shuttles and delivery fleets.[82]

On September 23, 2020, California Governor Gavin Newsom issued Executive Order N-79-20, which entails the following actions:

- All new passenger vehicles sold in California be zero-emission by 2035
- All medium- and heavy-duty vehicles be zero-emission where feasible by 2045
- All off-road vehicles and equipment be zero-emission where feasible by 2035

Governor Newsom ordered extensive inter-agency efforts to support the Executive Order, including evaluations of technological feasibility and cost effectiveness, expansion of EV charging options and affordable fueling, as well as identification of near-term strategies to increase zero-emission public transportation options.

The Executive Order was generally aimed at transitioning away from fossil fuel dependence in the State, with emphasis on transportation initiatives. However, Governor Newsom

[79] CARB, Volkswagen Settlement – California ZEV Investments webpage, available at: https://www.arb.ca.gov/msprog/vw_info/vsi/vw-zevinvest/vw-zevinvest.htm. Accessed: January 2022.

[80] SCE, Application of Southern California Edison Company (U 338-E) for Approval of Its 2017 Transportation Electrification Proposals (January 20, 2017).

[81] PG&E, In the Matter of the Application of Pacific Gas and Electric Company for Approval of its Senate Bill 350 Transportation Electrification Program (January 20, 2017).

[82] SDG&E, Application of San Diego Gas & Electric Company (U902E) for Approval of SB 350 Transportation Electrification Proposals (January 20, 2017).

addressed efforts to repurpose oil production facilities and extraction sites while continuing the State's existing goals to reduce the carbon intensity of fuels.[83]

2.2.2.9 Water

In January 2014, Governor Brown signed EO B-29-15, which directed the State Water Resources Control Board to impose restrictions to reduce residential potable urban water usage; to implement water efficiency measures at commercial, industrial, and institutional properties; and to prohibit irrigation with potable water for certain uses. In addition, this directed the California Department of Water Resources to lead a statewide initiative to replace laws and ornamental turfs with drought tolerant landscapes.

Pursuant to the EO B-29-15, water-related standards were adopted as amendments to the 2013 CalGreen Code and carried over into the 2016 code.

Following EO-B-29-2015, Governor Brown signed EO-B-37-16 in May 2016 to promote more conscious consumer water use and to improve agricultural water use efficiency and drought planning.

2.2.2.10 Solid Waste Diversion

The California Integrated Waste Management Act of 1989, as modified by AB 341 (Chesbro, 2011), requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows: (1) diversion of 25 percent of all solid waste by January 1, 1995, through source reduction, recycling, and composting activities; (2) diversion of 50 percent of all solid waste on and after January 1, 2000; and (3) source reduction, recycling and composting of 75 percent of all solid waste on or after 2020, and annually thereafter. CalRecycle is required to develop strategies, including source reduction, recycling, and composting activities, to achieve the 2020 goal.

CalRecycle published a discussion document, entitled *California's New Goal: 75 Percent Recycling,* which identified concepts that would assist the State in reaching the 75 percent goal by 2020. Subsequently, in August 2015, CalRecycle released the *AB 341 Report to the Legislature*, which identifies five priority strategies for achievement of the 75 percent goal: (1) moving organics out of landfills; (2) expanding recycling/ manufacturing infrastructure; (3) exploring new approaches for State and local funding of sustainable waste management programs; (4) promoting State procurement of post-consumer recycled content products; and (5) promoting extended producer responsibility.

2.2.2.11 Draft Climate Adaptation Strategy

The Draft California Climate Adaptation Strategy, dated October 18, 2021, outlines the state's key climate resilience priorities, includes specific and measurable steps, and serves as a framework for action across sectors and regions in California.[84]

The priorities outlined in the Strategy are as follows: 1) Strengthen Protections for Climate Vulnerable Communities, 2) Bolster Public Health and Safety in Light of Increasing Climate Risks, 3) Build a Climate Resilient Economy, 4) Accelerate Nature-Based Climate Solutions

[83] State of California. 2020. Executive Order N-79-20. Available at: https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf. Accessed: January 2022.

[84] California Natural Resources Agency. 2021. Draft California Climate Adaptation Strategy. Available at: https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/Climate-Resilience/SAS-Workshops/Draft-CA-Climate-Adaptation-Strategy-ada.pdf. Accessed: January 2022.

and Strengthen Climate Resilience of Natural Systems, 5) Make Decisions based on the Best Available Climate Science, and 6) Partner and Collaborate to Leverage Resources.

2.2.3 Regional

2.2.3.1 Fresno COG Regional Transportation Plan and Sustainable Communities Strategy

As previously discussed, SB 375 requires Fresno COG to incorporate a Sustainable Communities Strategy into its RTP that achieves the GHG emission reduction targets set by CARB. Fresno COG's Sustainable Communities Strategy was first included in the 2014 Regional Transportation Plan & Sustainable Communities Strategy (RTP/SCS), which was adopted by Fresno COG in June 2014. The original plan has since been superseded by the RTP/SCS adopted by Fresno COG in July 2018, and more recently in July 2022.

In general, the goals and policies of the Sustainable Communities Strategy are to improve mobility, accessibility, reliability, efficiency, liveability, sustainability, and equity. The Sustainable Communities Strategy adopted by Fresno COG is expected to reduce per capita transportation emissions by 6% by 2020 and by 13% by 2035, as compared to 2005 baseline levels.

In July 2018, CARB accepted Fresno COG's determination that the 2018 Sustainable Communities Strategy would meet the region's GHG reduction targets per Government Code Section 65080(b)(2)(J)(ii), as memorialized in CARB's Resolution 2018-26.[85] As of February 2023, CARB has not yet performed this review of the 2022 Fresno COG RTP/SCS.

Pursuant to Government Code Section 65080(b)(2)(K), a Sustainable Communities Strategy does not: (i) regulate the use of land; (ii) supersede the land use authority of cities and counties; or (iii) require that a city's or county's land use policies and regulations, including those in a general plan, be consistent with it.

2.2.3.2 San Joaquin Valley Air Pollution Control District

While CARB is responsible for the regulation of mobile emission sources within the State, local air quality management districts (AQMDs) and air pollution control districts (APCDs) are responsible for enforcing standards and regulating stationary sources. The Project area is located within the San Joaquin Valley Air Basin and is subject to the San Joaquin Valley Air Pollution Control District (SJVAPCD) guidelines and regulations.

[85] CARB. Executive Order G-19-092. Fresno Council of Governments (FCOG) 2018 Sustainable Communities Strategy CARB Acceptance of GHG Quantification Determination. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/FCOG_2018_SCS_ARB_Acceptance_of_GHG_Quantification_Determination_Executive_Order.pdf. Accessed: January 2022.

In December 2009, SJVACPD issued its *Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA* (Guidance). In its Guidance, the District recommends determining the significance of project-specific GHG emissions by using Best Performance Standards (BPS). Under the Guidance, a project's impacts on global climate change would be less than significant if the project implements BPS, or if the project reduces or mitigates its GHG emissions by 29 percent, consistent with the statewide GHG emission reduction targets established in the 2008 Scoping Plan. The District also adopted the *District Policy: Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*. This policy aligns with the Guidance process for evaluating GHG significance, specific to stationary source projects.

Also, in June 2014, the District released *APR – 2025, CEQA Determinations of Significance for Projects Subject to [CARB]'s GHG Cap-and-Trade Regulation* (APR – 2025). In APR - 2025, the District concluded that GHG emissions increases that are otherwise covered under CARB's Cap-and-Trade Program cannot constitute significant increases in emissions under CEQA for two separate reasons: (1) the Cap-and-Trade Program is an adopted statewide regulation for reducing GHG emissions from targeted industries/sources; and (2) GHG emissions addressed by the Cap-and-Trade Program are subject to an industry-wide, decreasing emissions cap. More specifically, the District concluded that "all GHG emission increases resulting from the combustion of any fuel produced, imported, and/or delivered in California are mitigated under Cap-and-Trade. Therefore, GHG emission increases caused by fuel use (other than jet fuels) are determined to have a less than significant impact on global climate change under CEQA."

In March 2015, the District issued its *Guidance for Assessing and Mitigating Air Quality Impacts* (GAMAQI), which provides technical guidance for the review of air quality impacts from proposed projects within the boundaries of the District.[86] This guidance recommends an approach for evaluating the significance of a proposed project's GHG emissions; specifically, whether a proposed project would have reduced or mitigated GHG emissions by 29%, consistent with GHG emission reduction targets established in the CARB's Scoping Plan. The guidance recommends the following hierarchy for evaluating a proposed project's impact with respect to its GHG emissions:

- Projects complying with an approved GHG emission reduction plan or GHG mitigation program which avoids or substantially reduces GHG emissions within the geographic area in which the project is located would be determined to have a less-than-significant individual and cumulative impact for GHG emissions. Such plans or programs must be specified in law or approved by the lead agency with jurisdiction over the affected resource and supported by a CEQA-compliant environmental review document adopted by the lead agency. Projects complying with an approved GHG emission reduction plan or GHG mitigation program would not be required to implement Best Performance Standards.
- Projects implementing Best Performance Standards would not require quantification of project-specific GHG emissions. Consistent with the CEQA Guidelines, such projects

[86] San Joaquin Valley Unified Air Pollution Control District. 2015. Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI). Available at: http://www.valleyair.org/transportation/GAMAQI.pdf. Accessed: January 2022.

would be determined to have a less-than-significant individual and cumulative impact for GHG emissions.

While the GAMAQI discussions include a comparison to a BAU approach, the *Center for Biological Diversity v. California Department of Fish and Wildlife* Court Decision established additional standards for such an approach. Due to that court decision, the comparison to BAU approach will not be relied upon in this analysis.

2.2.4 Local

2.2.4.1 City of Fresno General Plan

The current City of Fresno General Plan, adopted originally in 2014, has a Resource Conservation and Resilience section which addresses both air quality and GHG emissions.[87] The City's General Plan notes that SJVAPCD authority to regulate air emissions is restricted to stationary sources, while mobile sources emissions reductions are only incentivized by SJVAPCD. The City acknowledges its role in improving air quality can come from efforts to reduce mobile vehicle emissions, which is summarized in Policy RC-4-a. The same policy to control mobile vehicle emissions additionally addresses GHG reduction efforts. An additional policy that is compatible with mobile vehicle emissions reductions is Policy RC-2-a, which aims to promote higher density land use developments, thereby decreasing vehicle travel and emissions. Other policies aimed at reducing GHG emissions include Policy RC-5-a and Policy RC-5-b, which set GHG reduction targets in line with AB 32 and adopt a GHG Reduction Plan for the City, respectively. The latter is outlined below.

2.2.4.2 City of Fresno GHG Reduction Plan

In December 2014, the City of Fresno adopted a GHG Reduction Plan, also referred to as the Climate Action Plan, as its primary strategy for reducing GHG emissions under the control or influence of the City.[88] The GHG Reduction Plan was later updated in March 2020 to re-evaluate the City's GHG reduction targets and existing reduction strategies from the 2014 GHG Reduction Plan.[89] The latest version of the GHG Reduction Plan Update was finalized in March 2021.[90] The GHG Reduction Plan Update provides more details on GHG reduction measures mentioned in the City's General Plan. These details largely highlight land use strategies for increased population density and mobile vehicle travel reductions like the City's General Plan but provide indicators for the effectiveness of such measures. The GHG Reduction Plan provides a review process for projects that require discretionary approval from the City to ensure adherence to the streamlined CEQA review process and non-significant GHG impacts. Significance thresholds for GHG emissions are discussed in more detail below.

City of Fresno. 2014. Resource Conservation and Resilience. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2019/07/General-Plan-7-Resources-Conservation-and-Resilience-7-19.pdf. Accessed: January 2022.

[88] FirstCarbon Solutions. 2014. DRAFT Fresno General plan Update, Greenhouse Gas Reduction Plan, City of Fresno California. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2016/11/F-2-Greenhouse-Gas-Reduction-Plan.pdf. Accessed: January 2022.

[89] LSA. 2020. DRAFT Greenhouse Gas Reduction Plan Update. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2020/03/Appendix_G-GHG_Reduction_Plan_Update.pdf. Accessed: January 2022.

[90] LSA. 2021. Greenhouse Gas Reduction Plan Update. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2021/03/Link4AppendixGGHGRPUpdate.pdf. Accessed: January 2022.

2.2.5 Other CEQA Guidance

2.2.5.1 CAPCOA

a) CAPCOA 2008 CEQA & Climate Change White Paper

In January 2008, the California Air Pollution Control Officers Association (CAPCOA) published its *CEQA & Climate Change* white paper.[91] In the white paper, CAPCOA surveyed three options available to CEQA lead agencies for purposes of evaluating the significance of a project's GHG emissions, including identifying no significance thresholds for GHG emissions, setting a zero emissions threshold, or setting a non-zero emissions threshold. As to the non-zero thresholds, CAPCOA's white paper considered two approaches, one grounded in statute and executive order with four possible options, and one grounded in a tiered framework. As for the approach grounded in statute and executive order, CAPCOA identified four threshold concepts:

- Threshold 1.1: AB 32/S-3-05 Derived Uniform Percentage-Based Reduction;
- Threshold 1.2: Uniform Percentage-Based (e.g., 50 percent) Reduction for New Development;
- Threshold 1.3: Uniform Percentage-Based Reduction by Economic Sector; and
- Threshold 1.4: Uniform Percentage-Based Reduction by Region.

For purposes of the tiered framework approach, a project's GHG emissions would result in a less-than-significant impact provided one of the following criteria were achieved: (1) compliance with a general or regional plan in alignment with AB 32; (2) application of a CEQA exemption; (3) inclusion on the "green list;" (4) consistency with a qualified GHG reduction strategy; or (5) demonstration that quantified GHG emissions are less than significant. Tables 4 and 5 of the white paper identified advantages and disadvantages associated with all of the options presented for consideration.

b) CAPCOA 2010 Quantifying Greenhouse Gas Mitigation Measures

In August 2010, CAPCOA published its *Quantifying Greenhouse Gas Mitigation Measures* report, which presents information and analysis regarding the quantification of project-level mitigation of GHG emissions associated with land use, transportation, energy use, and other related project areas. CAPCOA and its contractors conducted an extensive literature review in order to provide reliable and substantiated evidentiary bases for the quantification protocols presented in the report; as such, individual GHG reduction measures are accompanied by "fact sheets" that set forth the relevant parameters for the quantification calculations.

c) CAPCOA 2021 Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity

In December 2021, CAPCOA published the final draft of the *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity* report, which builds upon CAPCOA's previous efforts to provide accurate

[91] CAPCOA is a non-profit association of the air pollution control officers from all 35 local air quality agencies throughout California.

and reliable quantification measures.[92] This Handbook identifies and evaluates new and emerging GHG reduction measures and removed outdated measures from the 2010 Handbook. The purpose of the Handbook is to provide local governments with accurate, reliable, and standardized emission reduction quantification methods for land use, climate action, and long-term planning. It also aims to support and enhance the consideration of climate vulnerabilities, health, and equity during the planning process.

2.2.5.2 Association of Environmental Professionals

a) AEP Beyond 2020 White Paper

In March 2015, the Association of Environmental Professionals (AEP) released its draft *Beyond 2020: The Challenge of Greenhouse Gas Reduction Planning by Local Governments in California* (Beyond 2020) white paper.[93] In the white paper, AEP presented evidence showing that it is infeasible for a local jurisdiction to achieve EO S-3-05's 2050 reduction target (i.e., 80 percent below 1990 levels) absent a real post-2020 State plan of action. As such, AEP recommended assessing project significance in relation to the 2050 reduction target by asking whether a project would "impede substantial progress in local, regional, and State GHG emissions reductions over time toward long-term GHG reduction targets."

b) AEP Beyond 2020 and Newhall White Paper

In April 2016, AEP released its draft *Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California* (Beyond 2020 and Newhall) white paper. In the white paper, AEP surveyed the following significance threshold concepts for utilization in CEQA-oriented GHG emissions analysis: consistency with qualified GHG reduction plans; bright line values; efficiency metrics; hybrid metrics that separate transportation and non-transportation emissions; best management practices; regulatory compliance; and percent reductions from business as usual. In doing so, AEP identified the present circumstances as a "transitional period" due to the absence of comprehensive State planning for post-2020, non-legislatively adopted, statewide targets.

[92] CAPCOA. 2021. Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity. Available at: http://www.airquality.org/ClimateChange/Documents/Final%20Handbook_AB434.pdf. Accessed: January 2022.

[93] AEP is a non-profit association of public and private sector professionals with a common interest in serving the principles underlying CEQA.

3. SIGNIFICANCE THRESHOLDS

3.1 CEQA Guidelines on GHG Emissions

In 2007, SB 97 was enacted and directed OPR and the California Natural Resources Agency to prepare amendments to the CEQA Guidelines addressing the analysis of GHG emissions under CEQA. Following formal rulemaking, a series of amendments to the CEQA Guidelines were adopted to provide the general framework for the analysis of GHG emissions, and became effective in 2010. The amendments do not provide a mandatory, quantitative rubric for GHG emissions analysis, but instead provide general guidance and recognize long-standing CEQA principles regarding the discretion afforded to lead agencies where supported by substantial evidence. More specifically, CEQA Guidelines Section 15064.4(a) recognizes that the "determination of the significance" of GHG emissions "calls for careful judgment by the lead agency" in accordance with the more general provisions of CEQA Guidelines Section 15064; each agency "shall have discretion to determine" whether to conduct quantitative or qualitative analysis, provided its determination is supported by substantial evidence. Section 15064.4 was most recently amended by OPR and the California Natural Resources Agency in December 2018.

The analysis provided in this report evaluates the significance of the Project's GHG emissions by reference to the following questions from Section VIII, Greenhouse Gases, of Appendix G of the CEQA Guidelines:

Threshold 1. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Threshold 2. Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

3.2 Other Guidance

The City of Fresno has not developed a quantitative threshold of significance for GHG emissions. As of the most recent version of the City of Fresno's Greenhouse Gas Reduction Plan, the City developed a GHG checklist to assist CEQA projects in evaluating significance.[94]

SJVAPCD has adopted guidance documents for assessing and mitigating GHG impacts on global climate change. Rather than establishing specific numeric thresholds of significance (as in the case of criteria pollutant emissions), the SJVAPCD guidance utilizes a tiered approach to assess cumulative impacts on global climate change. Notably, the SJVAPCD establishes that a project can demonstrate compliance with an approved GHG emissions reduction program (such as CARB's statewide GHG Cap-and-Trade Program). Furthermore, SJVAPCD's December 2009 CEQA GHG policies and its 2015 GAMAQI states that a project whose emissions have been reduced or mitigated consistent with the California Global Warming Solutions Act of 2006 (AB 32) should be considered to have a less than significant impact on global climate change.[95] SJVAPCD and the City of Fresno have not adopted a numerical GHG threshold.

[94] LSA. 2021. Greenhouse Gas Reduction Plan Update. Available at: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2021/03/Link4AppendixGGHGRPUpdate.pdf. Accessed: January 2022.

[95] SJVAPCD. 2015. Final Draft Guidance for Assessing and Mitigating Air Quality Impacts. Available at: http://www.valleyair.org/transportation/GAMAQI.pdf. Accessed: January 2022.

The City of Fresno's Greenhouse Gas Reduction Plan Update (GHGRP) is considered a "Qualified Plan" which allows project-level CEQA tiering and streamlining. As a qualified plan, the plan must include a community-wide inventory of GHG emissions, forecasted future emissions, targets for GHG reductions in line with State goals, quantifiable GHG reduction measures, established monitoring procedures, an environmental review, and adoption through a public process (CEQA Guidelines § 15183.5(b)).

The GHGRP establishes the City's GHG inventory based on the most recent data available for the year 2016. Forecasted emissions with future growth are developed for the business-as-usual (BAU) and adjusted BAU (ABAU) scenarios (the ABAU scenario includes State policies) for the years 2020, 2030, and 2035. The 2020 and 2030 forecast years are consistent with the goals identified in Assembly Bill (AB) 32 and Senate Bill (SB) 32, which identify Statewide GHG reduction targets by 2020 and 2030. The 2035 forecast year corresponds to the City's General Plan horizon year and will allow the City to develop long-term strategies to continue GHG reductions. The GHGRP analysis establishes a basis and criteria for project level land use development in the City of Fresno.

The City of Fresno GHGRP's analysis is based on specific land uses for the City of Fresno. Fresno's GHGRP includes general plan buildout that accounts for an incremental increase of 40.5 million square feet of industrial use, 20.8 million square feet of mixed use, and 63.3 million square feet of commercial/office/public facility use. For 2030 and 2035, the City of Fresno establishes a reduction from the adjusted BAU emissions that will meet the state targets. For 2030 this is a 1.5% reduction from the ABAU emissions and for 2035 this reduction is an 11.6% reduction from the ABAU. The GHGRP has thus established a City and land use specific criteria for individual Projects to demonstrate consistency with.

3.3 Project Approach to Significance

This report, relative to Threshold 1, quantifies the Project's GHG emissions during operation and construction for disclosure and in the absence of a numerical GHG significance threshold will evaluate consistency with the City of Fresno GHG Reduction Plan Update to determine significance of the Project's GHG emissions. This report, relative to Threshold 2, evaluates the Project for consistency with applicable plans related to GHG emissions at the state, regional, and local levels.

4. PROJECT GHG EMISSIONS INVENTORY

This section describes the methodology that Ramboll used to develop the GHG emission inventories associated with the Project, which include one-time emissions (construction emissions and emissions due to vegetation changes), and operational emissions. Sub-categories of GHG operational emissions include: **area sources, energy use**, **water supply and wastewater**, **solid waste,** and **mobile sources**. The emissions inventory reflects the reasonably foreseeable change based on the discontinued operation of the Costco Warehouse located at 4500 W Shaw Avenue. For purposes of this analysis, 4500 W Shaw Avenue is assumed to be backfilled by a shopping center use.

4.1 Measurement, Resources and Baseline Condition

4.1.1 Units of Measurement: Tonnes of CO_2 and CO_2e

In this report, the term "GHGs" includes gases that contribute to the natural greenhouse effect, such as CO_2, CH_4, N_2O, and water, as well as gases that are only man-made and that are emitted through the use of modern industrial products, such as HFCs and chlorofluorocarbons (CFCs). GHG emissions are typically measured in terms of mass of CO_2e. CO_2e are calculated as the product of the mass of a given GHG and its specific GWP, as described in **Section 2.1**. GWPs of 25 and 298 were used for CH_4 and N_2O, respectively, for this analysis. In many sections of this report, including the final summary sections, emissions are presented in units of CO_2e either because the GWPs of CH_4 and N_2O were accounted for explicitly, or the CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions from that particular emissions category.

In this report, a tonne refers to MT (1,000 kilograms). Additionally, exact totals presented in all tables and report sections may not equal the sum of components due to independent rounding of numbers.

4.1.2 Resources

4.1.2.1 CalEEMod® Methodology

Ramboll primarily utilized the California Emissions Estimator Model (CalEEMod®) version 2020.4.0[96] methodology to assist in quantifying the GHG emissions in the inventories presented in this report for the Project. CalEEMod® provides methodology to calculate both construction emissions and operational emissions from a land use development project. It calculates total or annual GHG emissions. Specifically, the model methodology aids the user in the following calculations:

- One-time short-term construction emissions associated with demolition, site preparation, grading, building, and paving from off-road construction equipment, and on-road mobile equipment associated with workers, vendors, and hauling.
- One-time vegetation sequestration changes, such as permanent vegetation land use changes and new tree plantings.
- Operational emissions associated with the fully built out land use development, such as on-road mobile vehicle traffic generated by the land uses, off-road emissions from

[96] SCAQMD. 2021. California Emissions Estimator Model®. Available at: https://www.aqmd.gov/caleemod/. Accessed: January 2022.

landscaping equipment, natural gas usage in the buildings, electricity usage in the buildings, water usage by the land uses, and solid waste disposal by the land uses.

CalEEMod® is a statewide program designed to calculate both criteria pollutant and GHG emissions from development projects in California developed under the auspices of the South Coast Air Quality Management District (SCAQMD), with input from other California air districts, and is currently supported by numerous lead agencies for use in quantifying the emissions associated with development projects undergoing environmental review. CalEEMod® utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. These models and default estimates use sources such as the USEPA AP-42 emission factors,[97] CARB's on-road and off-road equipment emission models such as the EMission FACtor model (EMFAC) and the Emissions Inventory Program model (OFFROAD), and studies commissioned by California agencies such as the CEC and CalRecycle.

As mentioned above, CalEEMod® is based upon the CARB-approved OFFROAD and EMFAC models. OFFROAD[98] is an emission factor model used to calculate emission rates from off-road mobile sources (e.g., construction equipment, agricultural equipment). The off-road diesel emission factors used by CalEEMod® are based on the CARB OFFROAD2011 program. EMFAC is an emission factor model used to calculate emissions rates from on-road vehicles (e.g., passenger vehicles). CalEEMod® 2020.4.0 contains EMFAC2017 emission factors. The latest version of EMFAC is the CARB EMFAC2021 program.[99]

In addition, CalEEMod® contains default values and existing regulation methodologies to use in each specific local air district region. Appropriate statewide default values can be utilized if regional default values are not defined. Ramboll used default factors for the Fresno County area (within the SJVAPCD's jurisdiction) for the emissions inventory, unless otherwise noted in the methodology descriptions below.

Details regarding the specific methodologies used by CalEEMod® can be found in the CalEEMod® User's Guide and associated appendices.[100]

4.1.2.2 OFFROAD2017

OFFROAD2017 is CARB's most current off-road emissions inventory model. The exhaust emission factors for each equipment at each horsepower range were back-calculated from total daily emissions reported in the model output files and annual usage in terms of horsepower-hours for each equipment type in the specified region and calendar year. These emission factors are then used in the calculation of Baseline and Project emissions for each type of equipment utilized at the Facility.

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[97] The USEPA maintains a compilation of Air Pollutant Emission Factors and process information for several air pollution source categories. The data is based on source test data, material balance studies, and engineering estimates. Available at: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors. Accessed: January 2022.

[98] CARB. 2011. Off Road Mobile Source Emission factors. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory. Accessed: January 2022.

[99] CARB. 2021. EMFAC2021. Available at: https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools-emfac-software-and. Accessed: January 2022.

[100] SCAQMD. 2021. California Emissions Estimator Model User's Guide. Version 2020.4.0. Available at: https://www.aqmd.gov/caleemod/. Accessed: January 2022.

4.1.2.3 Other Resources

Ramboll directly or indirectly relied on emissions estimation guidance from government-sponsored organizations, government-commissioned studies of energy use patterns, Project-specific studies (e.g., Kittelson's Fresno Costco Relocation Transportation Impact Analysis[101]), and emission estimation software as described above. In cases noted below, third-party studies were also relied upon to support analyses and assumptions made outside of the approach described above.

4.1.3 Indirect GHG Emissions from Electricity Use

Project-related electricity use results in indirect emissions, due to electricity generation activities occurring at off-site power plant locations. For the Project, electrical power will be supplied by PG&E. The indirect GHG emissions created as a result of Project-related electricity use are calculated through application of the following methodology.

For purposes of electricity use, intensity factors are GHG emission rates from a given source relative to the energy generation activities, and are expressed in terms of the amount of GHG released per megawatt of energy produced. The default electricity intensity factors for PG&E in CalEEMod® for CO_2, CH_4, and N_2O are 203.983, 0.033, and 0.004 pounds (lbs) of GHG per megawatt-hour, respectively. The CalEEMod® CO_2 default factor is based on the emission factor provided to Sacramento Metro Air Quality Management District by PG&E. The CH_4 and N_2O default factors are based on E-Grid values for the Western Electricity Coordinating Council California and Mexico (CAMX) region. PG&E's Power/Utility Protocol (PUP) reports show that renewable energy sources do not result in any new CO_2 emissions.

While CalEEMod®'s emission factors for CH_4 and N_2O conservatively were used for this project, CalEEMod®'s CO_2 intensity factor was modified based on PG&E's 2019 Corporate Sustainability Report, to account for the Renewables Portfolio Standard's (RPS) requirement for 2030 (i.e., 60 percent RPS). The 2017 and 2018 mix of renewable and non-renewable energy sources in PG&E's energy supply were both used to calculate the intensity factors for PG&E's non-renewable energy. (For disclosure purposes, PG&E's current RPS is 30.6 percent.)[102] The PG&E data provides the basis for the estimate of the intensity factors for the non-renewable energy; and this data is used to project what the intensity factors will be when the Project reaches build-out. The intensity factor for CO_2 is calculated by multiplying the percentage of energy delivered by PG&E from non-renewable energy resources with the intensity factor for non-renewable energy as calculated (see **Section 4.3.4** below).

4.2 One-Time Emissions

One-time emissions are those emissions that are not reoccurring over the life of the Project. This includes emissions associated with construction and emissions associated with land use changes.

[101] Kittelson & Associates, Inc. 2023. Fresno Costco Relocation Transportation Impact Analysis. May.

[102] PG&E. 2021 Corporate Responsibility and Sustainability Report. Available at: https://www.pgecorp.com/corp_responsibility/reports/2021/pf04_renewable_energy.html. Accessed: June 2022.

4.2.1 Construction Emissions

This section describes the estimation of GHG emissions from construction activities at the Project site. While the exact construction schedule and equipment mix may vary from the current analysis, the GHG emissions are not expected to be higher than that calculated given the conservative assumptions included in this analysis.

The major construction phases included in this analysis are:

- Demolition: involves removing buildings or structures.
- Site Preparation: involves clearing vegetation (grubbing and tree/stump removal) and removing stones and other unwanted material or debris prior to grading.
- Grading: involves the cut and fill of land to ensure the proper base and slope for the construction foundation.
- Building Construction: involves the construction of structures and buildings.
- Paving: involves the laying of concrete or asphalt such as in parking lots or roads.
- Architectural Coating: involves the application of coatings to both the interior and exterior of buildings or structures, the painting of parking lot or parking garage striping, associated signage and curbs, and the painting of the walls or other components such as stair railings inside parking structures.

GHG emissions from these construction phases are attributable to fuel use from construction equipment usage onsite and from on-road worker, vendor, and hauling trips.

Ramboll primarily used CalEEMod® to quantify the construction emissions. The modeled construction schedule is shown in **Table 4-1**. The construction off-road equipment list is a Project-specific estimate; the off-road equipment specifications are based on CalEEMod® model defaults.

The construction-related equipment mix assumptions are shown in **Table 4-2. Table 4-3** presents the material handling volumes which are anticipated to be imported and exported. **Table 4-4** includes the Project-specific demolition assumptions.

4.2.1.1 Emissions from On-Road Construction Trips

Construction generates on-road vehicle GHG emissions from personal vehicles for worker and vendor commuting, and trucks for soil and material hauling. These emissions are based on the number of trips and VMT, along with emission factors from EMFAC. Default model trip rates were used for construction. The emissions from mobile sources were calculated in CalEEMod® with the trip rates, trip lengths, and emission factors for running exhaust from EMFAC as follows:[103]

$$Emissions_{pollutant} = VMT * EF_{running,\ pollutant}$$

Where:

$Emissions_{pollutant}$ = emissions from vehicle running for each pollutant

VMT = vehicle miles traveled

[103] SCAQMD. 2021. California Emissions Estimator Model® User's Guide, Appendix A. Available at: https://www.aqmd.gov/caleemod/. Accessed: January 2022.

$EF_{running, pollutant}$ = emission factor for running emissions

On-road construction trip emissions are presented in the CalEEMod® output in **Appendix A**.

4.2.1.2 Emissions from Construction Equipment

The emissions associated with construction equipment are from off-road equipment engine use based on the equipment list and phase length, and on-road vehicle trips and phase length.

Since the majority of the off-road construction equipment used for construction projects are diesel fueled, CalEEMod® assumes all of the equipment operates on diesel fuel. The calculations include the running exhaust emissions from off-road equipment. Since the equipment is assumed to be diesel, there are no starting emissions associated with the equipment, as these are *de minimis* for diesel-fueled equipment. The exhaust emissions are calculated based on CARB's OFFROAD2011 methodology using the equation presented below.[104]

$$Emissions_{Diesel} = \sum_{i} (EF_i \times Pop_i \times AvgHP_i \times Load_i \times Activity_i)$$

Where:

EF = Emission factor in grams per horsepower-hour (g/bhp-hr) as processed from OFFROAD2011

Pop = Population, or the number of pieces of equipment

AvgHp = Maximum rated average horsepower

Load = Load factor

Activity = Hours of operation

i = equipment type

Emissions for off-road construction equipment for each phase of construction are detailed in **Appendix A**.

4.2.1.3 Total Construction Emissions

The Project construction emissions were run within CalEEMod® to generate the annual emissions. The total emissions from construction from all phases for off-road and on-road emissions in 2023 are summarized in **Appendix A**.

4.2.2 Vegetation Changes

Vegetation changes that occur as a result of land use development constitute a one-time change in the carbon sequestration capacity of a project site. In this case, the land the Project will occupy is vacant.

4.3 Annual Operational Emissions

This section describes the estimation of GHG emissions from operational activities at the Project site. The operational emissions were calculated with CalEEMod® and separately for mobile source emissions. Operational GHG emissions are calculated for landscaping, natural

[104] SCAQMD. 2018. California Emissions Estimator Model® User's Guide, Appendix A. Available at: https://www.aqmd.gov/caleemod/. Accessed: January 2022.

gas and electricity usage, on-road mobile trips, water usage, and solid waste generated. Operational emissions are evaluated for the first year of Project Operation in 2023.

4.3.1 Area Sources

Area sources are direct sources of GHG emissions, such as emissions from landscaping activities. The area source GHG emissions included in this analysis are landscaping-related fuel combustion sources, such as lawn mowers.

4.3.2 Mobile Sources

The GHG emissions associated with on-road mobile sources are generated from workers, vendors, and haul trucks travelling to and from the Project site. The GHG emissions associated with on-road mobile sources include running and starting exhaust emissions. Running emissions are dependent on VMT. Starting emissions are associated with the number of starts or time between vehicle uses and the assumptions used in determining these values are described below. Ramboll calculated mobile source emissions using trip rates and trip length information based on analyses conducted by Kittelson.

The analysis includes the benefit of reductions from some adopted regulatory programs, which are accounted within EMFAC2021 as follows:

- AB 1493 ("the Pavley Standard") required CARB to adopt regulations by January 1, 2005, to reduce GHG emissions from non-commercial passenger vehicles and light-duty trucks of model year 2009 and thereafter. EMFAC2021 includes emission reductions for non-commercial passenger vehicles and light-duty trucks of model year 2017 – 2025.
- The ACC program adopted by CARB, introduced in 2012, combines the control of smog, soot causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2015 through 2025. EMFAC2021 includes reductions associated with this regulation that are represented in this analysis.
- The USEPA/NHTSA advanced fuel economy and GHG standards (Phase 1) were adopted in 2011 for medium and heavy-duty trucks for model years 2014-2018.[105] This Heavy-Duty National Program is intended to reduce fuel use and GHG emissions from medium- and heavy-duty vehicles, semi-trucks, pickup trucks and vans, and all types and sizes of work trucks and buses in between. EMFAC2021 includes reductions associated with this regulation that are represented in this analysis.
- The USEPA/NHTSA advanced fuel economy and GHG standards (Phase 2) were adopted in 2016 for medium- and heavy-duty trucks for model years 2018 and beyond.[106] The Phase 2 program includes technology-advancing standards that substantially reduce GHG emissions and fuel consumption resulting in an ambitious, yet achievable, program that will allow manufacturers to meet the applicable standards over time, at reasonable cost,

[105] USEPA, Office of Transportation and Air Quality. 2011. Available at: https://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-20740.pdf. Accessed: January 2022.

[106] USEPA, Office of Transportation and Air Quality. 2016. Available at: https://www.gpo.gov/fdsys/pkg/FR-2016-10-25/pdf/2016-21203.pdf. Accessed: January 2022.

through a mix of different technologies. The Phase 2 program's standards will be phased in, beginning with model year 2021 and culminating with model year 2027.[107]

In June 2020, CARB released EMFAC off-model adjustment factors to account for the Final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule.[108] The SAFE Rule has been incorporated into this analysis as it is incorporated in EMFAC2021.

4.3.2.1 Estimating Mobile Source Emissions

Mobile source emissions calculation requires trip rates and trip lengths for each different trip type in the Project (e.g., employee, vendor, and haul truck).

The following sections describe the methodology to derive the necessary inputs.

a) Trip Generation Rates

The trip generation rates for the Project were based on Kittelson data. The trips for the northeast corner of W. Herndon Ave. and N. Riverside Dr (Herndon/Riverside) and 4500 W Shaw Ave are shown in **Appendix B** in **Table B-1a** and **Table B-1b**.

b) Trip Lengths

The Project trip lengths were based on Kittelson analysis, other than the MDO delivery truck trip length, which was based on the average routed round trip length for Fresno MDO deliveries. These trip lengths for Herndon/Riverside and 4500 W Shaw Ave are represented in **Appendix B, Table B-1a** and **Table B-1b**, respectively.

c) Fleet Mix

The fleet mixes derived based on CalEEMod® and EMFAC2021 were used to determine the mix of light-duty vehicles used for member vehicles and employee vehicles. The MDO delivery trucks, fuel delivery trucks, and warehouse delivery trucks were assumed to be heavy-heavy-duty trucks. The fleet mixes for the operational mobile trips are shown in **Table B-2** of **Appendix B**.

d) Transport Refrigeration Units

The Project includes Transport Refrigeration Units (TRUs), which are refrigeration systems powered by diesel internal combustion engines designed to refrigerate or heat perishable products that are transported in various containers, including truck vans, semi-truck trailers, shipping containers, and railcars. These TRUs account for approximately 15% of the warehouse delivery trucks. This analysis assumes that TRUs are plugged in at the loading dock. OFFROAD2021 has emission factors for TRUs, which were obtained for Fresno County in 2023. Emissions of CO_2 from TRUs were estimated, as shown in **Table 4-6**.

4.3.2.2 Mobile Source Emissions

The weighted emission factors from running exhaust for each vehicle type are presented in **Appendix B, Table B-3**. Starting exhaust emission factors for each vehicle type are

[107] The emission reductions attributable to Phase 2 of the regulations for medium- and heavy-duty trucks were not included in the Project's emissions inventory due to the difficulty in quantifying the reductions. Excluding these reductions results in a more conservative (i.e., higher) estimate of emissions for the Project.

[108] CARB. 2020. EMFAC Off-Model Adjustment Factors for Carbon Dioxide (CO_2) Emissions to Account for the SAFE Vehicles Rule Part One and the Final SAFE Rule. Available at: https://ww3.arb.ca.gov/msei/emfac_off_model_co2_adjustment_factors_06262020-final.pdf. Accessed: January 2022.

displayed in **Appendix B, Table B-4**. Idling emission factors for passenger vehicles and delivery trucks are presented in **Appendix B, Table B-5**. The overall mobile source emissions from running, starting, and idling are shown in **Appendix B, Table B-6a** and **B-6b**, along with the VMT, trips, and idling durations.

4.3.3 Water Supply, Treatment and Distribution

Indirect GHG emissions result from the production of electricity used to convey, treat, and distribute the Project's water and wastewater. The amount of electricity required to convey, treat, and distribute water depends on the volume of water as well as the sources of the water. Additionally, direct CH_4 and N_2O emissions result from the treatment of wastewater. Water demand and wastewater generation values were based on CalEEMod® defaults.

The water usage and associated GHG emissions are shown in **Appendix A**.

4.3.4 Energy Use

Energy usage within buildings (e.g., electricity and natural gas fuelled equipment) contribute to the facility's GHG inventory. Combustion of any type of fuel emits CO_2 and other GHGs directly into the atmosphere; these emissions are considered direct emissions associated with a building. GHGs are also emitted during the generation of electricity from fossil fuels; these emissions are considered to be indirect emissions.

To estimate GHG emissions from the natural gas and electricity usage for the Project, Ramboll utilized CalEEMod® default assumptions, which incorporate Title 24 2019 Standards. **Table 4-5** identifies the emission factors for electricity (i.e., pounds of CO_2 per megawatt-hour delivered) used in this analysis. As illustrated in **Table 4-5**, an PG&E-specific emission factor that accounts for interpolation between the 33 percent RPS required by 2020 and 60 percent RPS required by 2030, as discussed in **Section 4.1.3**, was calculated based on 41.1 percent RPS in 2023.

The annual natural gas and electricity use and corresponding GHG emissions for the Project are shown in **Appendix A**.

4.3.5 Solid Waste

Municipal solid waste (MSW) is the amount of material that is disposed of by landfilling, recycling, or composting. CalEEMod® calculates the indirect GHG emissions associated with waste that is disposed of at a landfill. The program uses annual waste disposal rates from the CalRecycle data for individual land uses. CalEEMod® uses the overall California Waste Stream composition to generate the necessary types of different waste disposed into landfills. The program quantifies the GHG emissions associated with the decomposition of the waste, which generates methane based on the total amount of degradable organic carbon. The program quantifies the CO_2 emissions associated with the combustion of methane, if applicable. Default landfill gas concentrations were used as reported in Section 2.4 of AP-42. The IPCC has a similar method to calculate GHG emissions from MSW in its 2006 Guidelines for National Greenhouse Gas Inventories.

Solid waste generation associated with the Project is based on default values for waste generation in CalEEMod®. The Project's solid waste generation and GHG emissions associated with solid waste are provided in **Appendix A.**

4.4 Total Annual Operational Emissions

As shown in **Table 4-7**, the Project emissions are 22,428 MT CO_2e per year. The total GHG emissions from Project construction are 1,047 MT CO_2e and are summarized in **Appendix A** for construction off-road equipment and mobile trips. When amortized over a period of 30 years, the emission estimates for the Project construction become 35 MT CO_2e/yr.[109] The total GHG emissions include the amortized construction emissions.

[109] This approach to one-time construction and vegetation change GHG emissions is based on the GHG Threshold Working Group Meeting #13 Minutes from August 26, 2009. Available at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-13/ghg-meeting-13-minutes.pdf. Accessed: January 2022.

5. PROJECT INVENTORY IN CONTEXT

This section assesses the significance of the Project's emissions for purposes of CEQA.

5.1 Project Emissions Inventory

This section evaluates the significance of the Project's GHG emissions by reference to Threshold 1 from Section VIII, Greenhouse Gases, of Appendix G of the CEQA Guidelines:

Threshold 1. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

5.1.1 GHG Inventory

The Project GHG emissions were calculated to be 22,428 MT CO_2e/yr for the buildout year (2023). The City of Fresno's Greenhouse Gas Reduction Plan Update provides a 2016 inventory consisting of 2,923,633 MT CO_2e. The projected 2020 emissions for the City are 2,132,326 MT CO_2e when accounting for emission reductions achieved by state-wide regulations, programs, and measures. In the absence of a numerical GHG threshold, the significance of these emissions will be based on consistency with the City of Fresno GHG Reduction Plan Update as discussed below.

5.2 Consistency Analysis

This section evaluates the significance of the Project's GHG emissions by reference to Threshold 2 from Section VIII, Greenhouse Gases, of Appendix G of the CEQA Guidelines:

Threshold 2. Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

5.2.1 Statewide Emissions Reduction Targets

As discussed in **Section 2.2.2**, the 2022 Scoping Plan Update has priority GHG reduction strategies that are the focus for the state to achieve its statewide emission reduction targets. The three main priorities areas are "Transportation Electrification", "VMT Reduction", and "Building Decarbonization". These measures represent the core strategies that local jurisdictions in California can implement to reduce GHGs in alignment with State goals.

The Project will be consistent with the state's GHG reduction goals as discussed in the 2022 CARB Scoping Plan. The Project will serve the needs of consumers in California and provide an effective and efficient means to shop at the warehouse, fill up a gasoline vehicle, and get a car wash all in the same location. The Project's emissions sources are regulated (and are foreseeably expected to continue to be regulated in the future) in furtherance of the State's environmental policy objectives and the Project will continue to meet those regulations to continually improve and reduce GHG emissions. Costco has a focus on sustainability, with specific measures being implemented to manage energy use across its warehouses. Costco's warehouse designs are consistent with the requirements of Leadership in Energy and Environmental Design (LEED), an internationally accepted benchmark for green building design and construction. Costco continues to improve the design and construction of its buildings, as technological advancements in these areas and building materials improve. Improved engineering and design has resulted in the use of less materials, such as columns and I-beams, while providing more strength. Costco prefers full metal buildings in order to use the maximum amount of recycled material.

As demonstrated in **Table C-1** in **Appendix C**, the Project would be consistent with applicable 2022 California Scoping Plan strategies for the reduction of GHG emissions.

5.2.2 Fresno Council of Governments (Fresno COG)

The Project will be consistent with the state's GHG reduction goals and strategies as discussed in the Fresno COG's 2022 Regional Transportation Plan/Sustainable Communities Strategy[110] (the current RTP/SCS for the region), which contains four key elements:

1. Policy Element– Sets forth Fresno COG's transportation goals, objectives, and policies for each transportation mode.
2. Sustainable Communities Strategy – Integrates land use and transportation planning efforts to meet Fresno County's greenhouse gas emission reduction targets, improve accessibility to major employment and other regional activity centers.
3. Action Element – Describes the existing transportation system, discusses recent accomplishments, provides a transportation needs assessment, and proposes short-term and long-term actions for both transportation planning and actual transportation project improvements.
4. Financial Element – Identifies both existing and anticipated revenue sources as well as the financing techniques available for the region's planned transportation investments, ongoing operations, and maintenance.

The RTP/SCS is based on an analysis that considers the entire County, and includes all projects involving changes in regional growth and land use in Fresno County, as well as the countywide vehicle traffic projections. Cumulative GHG emissions analyzed in the RTP were compared to regional GHG thresholds and analyzed under statewide plans and regulations. This analysis concluded that there would be a decrease in GHG emissions from existing conditions to 2046, which are primarily be due to focusing growth in developed areas, moderately increasing residential densities, encouraging infill development, protecting open space and agricultural land, and providing alternatives to single-occupancy vehicle trips.

As shown in **Table C-2** in **Appendix C**, the Project would be consistent with applicable Fresno COG strategies for the reduction of GHG emissions.

5.2.3 City of Fresno GHG Reduction Plan

The City of Fresno's 2021 GHG Reduction Plan Update contains a Greenhouse Gas Reduction Strategy in Section 5. The strategies are organized into the following categories: land use and transportation; transportation facilities strategies; transportation demand strategies; energy conservation strategies for new and existing buildings; water conservation strategies; waste diversion and recycling and energy recovery; strategies for existing development; and municipal strategies.

Section 6 of the Reduction Plan Update describes actions for individual development projects. Individual projects are tasked with reviewing the GHG Reduction Plan Project Update CEQA Consistency Checklist that lists the local GHG reduction strategies identified in the GHG Plan Update to determine applicability to the project.

[110] Fresno COG. 2018 Regional Transportation Plan and Sustainable Communities Strategy. Available at: https://www.fresnocog.org/project/regional-transportation-plan-rtp/. Accessed: January 2022.

Proposed development projects that are consistent with the GHG Plan Update as determined through the GHG Plan Update CEQA Consistency Checklist may rely on the GHG Plan Update for the cumulative impacts analysis of GHG emissions. Projects that are not consistent with the GHG Plan Update must prepare a comprehensive project-specific analysis of GHG emissions, including quantification of existing and projected GHG emissions and apply appropriate GHG reduction mitigation measures. The GHG Reduction Plan Update includes the GHG reduction strategies that individual projects review to determine applicability.

In the GHG Plan Update CEQA Consistency Checklist, the first step in determining the consistency with the GHG Reduction Plan is to determine land use consistency. The Project is asked whether it is consistent with the approved General Plan, Specific Plan, and Community Plan planned land use and zoning designations. The project is requesting a zoning change to change the site's General Plan Land Use Designation from Community Commercial[111] to General Commercial[112]. The Project includes a wholesale club, which is classified under the General Commercial designation. Based on the allowable floor to area ratio under these two designations and the relatively similar allowable uses under these two designations, the potential emissions at maximum buildout for the proposed designation would be greater than that for maximum buildout of the existing designation. Per the checklist, the Project's unmitigated GHG impact is significant.

The checklist provides two options based on this determination. The Project must either show consistency with applicable General Plan objectives and policies or provide analysis and measures to incorporate into the project to bring the GHG emissions to a level that is less than or equal to the estimated project emission at maximum buildout of the existing designation(s). The Project will demonstrate consistency with applicable General Plan objectives and policies through an evaluation of the Project's alignment with General Plan objectives and policies relative to the GHGRP. The Project is quantitatively evaluated using the same methodology as the GHGRP to demonstrate this consistency. Given that there is a proposed development project associated with this rezone, the GHG Plan Update Consistency Checklist has been completed and applicable measures incorporated.

As shown in the **GHG Consistency Checklist** in **Appendix C**, the Project meets 11 of the total 12 applicable items listed. However, the project would not meet 'item h.' due to a significant VMT impact. As required by the City of Fresno GHG reduction plan, the Project has prepared a full GHG emissions inventory and applied appropriate GHG reduction strategies as demonstrated by the 11 categories of the checklist which the project is consistent with. The Project will meet the applicable GHG reduction strategies for non-residential projects identified in the GHG Plan Update and listed in the checklist, other than 'item h'.

Due to the inconsistency with 'item h', a Project emissions inventory for 2030 and 2035 was calculated to demonstrate how the Project still aligns with the GHG reduction goals of the GHGRP. The Project operational emissions were calculated for 2030 and 2035 for the

[111] Community Commercial is intended for commercial development that primarily serves local needs such as convenience shopping and small offices. Specific uses allowed include medium-scale retail, office, civic and entertainment uses, supermarkets, drug stores and supporting uses. The maximum Floor Area Ratio is 1.0.

[112] The General Commercial designation is intended for a range of retail and service uses that are not appropriate in other areas because of higher volumes of vehicle traffic and potential adverse impacts on other uses. Development such as strip malls fall into this designation. Examples of allowable uses include: building materials, storage facilities with active storefronts, equipment rental, wholesale businesses, and specialized retail not normally found in shopping centers. The maximum Floor Area Ratio is 2.0.

adjusted BAU scenario to align with the City of Fresno's GHGRP adjusted BAU analysis (**Table 5-1**). Based on those calculated emission inventories, the Project would be required to achieve an additional reduction of 381 MT CO_2e in 2030 and 2,711 MT CO_2e in 2035 as identified in the City of Fresno's GHGRP (see Table 4-C of the GHGRP which identifies the reduction needed from an adjusted BAU scenario to meet the City's goals. The calculated reductions for the Project are the same percentage reduction required, i.e., 1.5% reduction in 2030 and 11.6% in 2035.). As identified in the GHGRP, the Project would realize GHG reductions due to project commitments in line with the local measures established by the GHGRP, which includes Land Use Strategies and Transportation Demand Management, Electric Vehicle Charging Stations, Net Zero Energy Commercial Building, Water Conservation, and Waste Diversion and Recycling. Specifically, the Project includes:

- Transportation Demand Management for employees via a voluntary commute trip reduction program for employees Costco provides that includes marketing, end-of-trip bicycle facilities, vanpool, and discounted transit. This can result in a 4% reduction in employee vehicle trips (This is VMT mitigation per the Fresno Costco Relocation Transportation Impact Analysis).
- EV chargers that meet the 2022 California Green Building Standards Code, Title 24, Part 11 that are beyond the adjusted BAU assumptions for the City.
- Commitments to renewable energy through PG&E's Solar Choice program (This is a project design feature to align with the local measure from the GHG Reduction Plan).
- Achieving waste diversion goals as identified in the GHGRP.

In addition, since the City's GHGRP was developed, there have been additional efforts by the state that will increase the expected presence of electric trucks and electric vehicles through the Advanced Clean Truck Rule[113] and Advanced Clean Cars II[114]. Advanced Clean Cars II was proposed to support Governor Newsom's 2020 Executive Order N-79-20 that requires all new passenger vehicles sold in California to be zero emissions by 2035. Advanced Clean Cars II was approved in August 2022. The 2022 Scoping Plan Update was approved in December 2022 and the proposed scenario for achieving this executive order provides data on year-to-year expected populations of zero-emission light-duty vehicles that exceed the assumptions made in EMFAC2021. Reductions in 2030 and 2035 have been calculated to account for this increased penetration of electric vehicles expected in the future (**Table 5-2**). The combined GHG reductions from these project specific commitments and state regulations demonstrate that the Project will achieve the same level of reductions as the City of Fresno GHGRP expects. The GHGRP has established a City and land use specific criteria for individual Projects to demonstrate consistency with. As such, the Project would align with the City's GHGRP GHG reduction goals, and thus is consistent with the City's GHGRP.

5.3 Impact Determination

While the Project would represent an increase in GHG emissions when compared to the existing conditions on the vacant site, the Project would not conflict with the Fresno COG's RTP/SCS or statewide emission reduction targets in the 2022 CARB Scoping Plan Update. The Project's significant VMT impact means that the Project would not meet "item h." on the

[113] Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-trucks. Accessed: August 2022.

[114] Available at: https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii. Accessed: August 2022.

City of Fresno's GHG Consistency Checklist. Because the Project does not meet all of the GHG reduction strategies identified in the GHG Reduction Plan Update Consistency Checklist, the Project has disclosed the Project emissions inventory and has demonstrated consistency with the GHG Reduction Plan by demonstrating the Project GHG reductions align with those expected for the City in the GHG Reduction Plan. Therefore, the Project's GHG emissions will be less than significant in the context of Threshold 1 and Threshold 2, as discussed in **Section 3.3**.

Further, the SJVAPCD's GAMAQI observes that: "It is widely recognized that no single project could generate sufficient GHG emissions to noticeably change global climate temperature. However, the combination of GHG emissions from past, present, and future projects could contribute substantially to global climate change. Thus, project specific GHG emissions should be evaluated in terms of whether or not they would result in a cumulatively significant impact on global climate change."[115] In this context, and based on the analysis above, the Project's GHG emissions are not cumulatively considerable.

[115] SJVAPCD. 2015. Final Draft Guidance for Assessing and Mitigating Air Quality Impacts. Available at: http://www.valleyair.org/transportation/GAMAQI.pdf. Accessed: January 2022.

TABLES

Table 4-1. Construction Schedule
Costco Commercial Center
Fresno, California

CalEEMod® Phase Type[1]	Start Date[1]	End Date[1]	Phase Duration[2] (days)
Demolition	5/1/2023	5/8/2023	7
Site Preparation	5/1/2023	5/8/2023	7
Grading	5/9/2023	6/12/2023	30
Grading/BC Overlap	6/13/2023	7/5/2023	20
Building Construction	7/6/2023	11/10/2023	110
Paving	7/29/2023	9/13/2023	40
Architectural Coating	9/14/2023	11/10/2023	50

Notes:

[1] Construction phases and duration are based on Project-specific estimates.

[2] The construction work week was assumed to be 6 days per week.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

Table 4-2. Construction Equipment
Costco Commercial Center
Fresno, California

Phase Name	Offroad Equipment Type[1]	Number of Equipment[1]	Usage Hours[2] (hours/day)	Equipment Horsepower[2] (hp)	Equipment Load Factor[2]
Demolition	Concrete/Industrial Saws	1	8	81	0.73
	Excavators	3	8	158	0.38
	Rubber Tired Dozers	2	8	247	0.4
Site Preparation	Tractors/Loaders/Backhoes	4	8	97	0.37
Grading	Graders	3	8	187	0.41
	Other Construction Equipment	2	8	401	0.42
	Paving Equipment	1	8	132	0.36
	Rubber Tired Dozers	4	8	247	0.4
	Scrapers	2	8	367	0.48
	Surfacing Equipment	1	8	263	0.3
	Tractors/Loaders/Backhoes	2	8	97	0.37
Grading/BC Overlap	Excavators	3	8	158	0.38
	Rough Terrain Forklifts	2	8	100	0.4
	Rubber Tired Dozers	3	8	247	0.4
	Tractors/Loaders/Backhoes	3	8	97	0.37
Building Construction	Excavators	3	8	158	0.38
	Rough Terrain Forklifts	2	8	100	0.4
	Rubber Tired Dozers	3	8	247	0.4
	Tractors/Loaders/Backhoes	3	7	97	0.37
Paving	Rough Terrain Forklifts	1	8	100	0.4
	Rubber Tired Dozers	2	8	247	0.4
	Tractors/Loaders/Backhoes	2	8	97	0.37
Architectural Coating	Air Compressors	1	6	78	0.48

Notes:

[1] Number and type of offroad equipment for the Grading, Grading/BC Overlap, Building Construction, and Paving phases based on Project-specific data. Equipment used in the Demolition and Architectural Coating phases are based on CalEEMod® default values.

[2] Equipment usage hours, horsepower, and load factor are based on CalEEMod® defaults, with the exception of the horsepower value for "Other Construction Equipment" during the Grading phase. The "Other Construction Equipment" represents soil compactors and is based is based on project-specific data.

Abbreviations:

CalEEMod® - California Emissions Estimator Model

hp - horsepower

Table 4-3. Construction Material Movement
Costco Commercial Center
Fresno, California

Phase Name	Material Imported[1] (yd^3)	Material Exported[1] (yd^3)
Grading	60,000	0
Grading/BC Overlap	0	3,000

Notes:

[1] Soil import and export quantities based on project-specific data.

Abbreviations:

yd^3 - cubic yard

Table 4-4. Construction Demolition Assumptions
Costco Commercial Center
Fresno, California

Phase Name	Size Metric	Unit Amount[1]
Demolition/Site Prep	Tons of Debris	10

Notes:

[1] Square-footage quantity based on project-specific data.

Table 4-5. Utility GHG Emission Factor Associated with Renewable Portfolio Standard
Costco Commercial Center
Fresno, California

Energy Delivered [MWh]				
	2017	2018	Average	Units
CO_2 Intensity Factor per Total Energy Delivered[1]	210	206	208	lbs CO_2/MWh delivered
% of Total Energy From Renewables[2]	33.0%	38.9%	36.0%	
CO_2 Intensity Factor per Total Non-Renewable Energy[3]	314	338	325	lbs CO_2/MWh delivered

Calculated Intensity Factors for Total Energy Delivered[4]				
2020 RPS (33%)	210.4	226.2	218.0	lbs CO_2/MWh delivered
2030 RPS (60%)	125.6	135.1	130.1	lbs CO_2/MWh delivered
2023 RPS[5]	185.0	198.9	191.6	lbs CO_2/MWh delivered

Year	Emission Factors (lb/MWh)			
	CO_2	CH_4	N_2O	CO_2e
2018	208.4	0.033	0.004	210.4
2023	191.61	0.033	0.004	193.6

Notes:

[1]2017 and 2018 intensity factors per total energy delivered available at: https://www.theclimateregistry.org/our-members/cris-public-reports/. Accessed: September 2021.

[2]Percent of total energy from RPS-eligible renewables are from the PG&E 2018 and 2019 Corporate Responsibility Reports. Available at: http://www.pgecorp.com/corp_responsibility/reports/2018/assets/PGE_CRSR_2018.pdf and http://www.pgecorp.com/corp_responsibility/reports/2019/assets/PGE_CRSR_2019.pdf. Accessed: September 2021.

[3] The emissions metric presented here is calculated based on the total CO_2 emissions divided by the energy delivered from non-renewable sources.

[4] The intensity factors for default RPS assumption are calculated by multiplying the percentage of energy delivered from non-renewable energy by the CO_2 emissions per total non-renewable energy metric calculated above. The emission factors presented here are 33% RPS for 2020 and 60% RPS for 2030. The estimate provided here and the PUP reports issued by PG&E assume that renewable energy sources do not result in any CO_2 emissions.

[5]The RPS percentage for the 2023 future year is interpolated from the goals of 33% RPS in 2020 and 60% RPS in 2030.

[6]The most recent emission factor available is for 2017 and 2018, which is why these values are being used to interpolate 2023 emission factors even though more recent sustainability reports by PG&E are available.

Abbreviations:

CO_2 - carbon dioxide
GHG - greenhouse gases
lbs - pounds
MT - metric tonnes
MWh - megawatt-hour
PG&E - Pacific Gas and Electric
PUP - Power/Utility Protocol
RPS - Renewable Portfolio Standards

GWP	
CH_4	N_2O
25	298

Table 4-6. TRU Greenhouse Gas Emission Calculations
Costco Commercial Center
Fresno, California

CO_2 Emission Factor[1] (g/bhp-hr)	Number of Round Trips with TRUs[2]	Annual Average CO_2 Emissions (MT/year)
	Herndon/Riverside	Herndon/Riverside
410	712	57.5

Notes:

[1] Emission factors obtained from OFFROAD2021 emissions output for Calendar Year 2023, Transportation Refrigeration Unit - Instate Trailer and Transportation Refrigeration Unit - Out-Of-State Trailer in Fresno County.

[2] Approximately 15% of warehouse delivery trucks are equipped with TRUs.

[3] Horsepower is based on SJVAPCD Guidance for Air Dispersion Modeling, section 2.3.1 Transportation Refrigeration unit (TRU), Modeling Parameters.

[4] Load factor obtained from CARB Draft 2019 Update to Emissions Inventory for Transport Refrigeration Units, for TRUs Over 25 hp, 2013 and newer. Available at: https://ww2.arb.ca.gov/sites/default/files/classic/cc/cold-storage/documents/hra_emissioninventory2019.pdf. Accessed: January 2022.

[5] TRU Cycle Duration is based on 2 hours of off-site loading time plus the duration of the on-site and off-site transit. It is assumed that loading/unloading will occur while the TRU is plugged in, so no emissions are estimated for this time period. Assumptions based on Table II.G.1 of CARB Proposed Amendments to the Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate. Available at: https://ww2.arb.ca.gov/sites/default/files/barcu/board/rulemaking/tru2021/appi.pdf. Accessed: May 2022.

Abbreviations:

bhp-hr - brake horsepower hour
CARB - California Air Resources Board
CO_2 - Carbon Dioxide equivalents
g - gram
MT - metric tonnes
SJVAPCD - San Joaquin Valley Air Pollution Control District
TRU - Transportation Refrigeration unit

Constants:

Horsepower [3]	50	bhp
Load Factor [4]	0.38	
TRU Cycle Duration [5]	622	minutes
Density of Diesel	3,221	g/gal

Conversion Factors:

453.592	g/lb
1000000	g/MT
60	min/hr
365	day/year
2000	lb/ton

Table 4-7. Summary of GHG Emissions
Costco Commercial Center
Fresno, California

Emissions Category[1]	GHG Emissions[2,3] (MT CO_2e/yr)
Area Sources	0.02
Energy Usage	334
Mobile[4]	21,482
Water	38
Waste Disposed	540
Operational Sub-Total	*22,393*
Construction Amortized[5]	35
Total[6]	22,428

Notes:

[1] One-time emissions (i.e., construction) and operational emissions were calculated using CalEEMod®. See Appendix A for details

[2] Emissions are presented as CO_2e, which include CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

[3] Emissions shown as zero may be non-zero values, however, they are below a meaningful reporting level for this analysis.

[4] Total mobile emissions include emissions from on-road vehicles and TRUs. On-road mobile emissions were estimated using CalEEMod® default trip lengths, EMFAC2021 emission factors, and Project-specific vehicle trip rates provided by Kittelson & Associates, See Appendix B for details. TRU emissions were estimated using OFFROAD2021 emission factors.

[5] One-time emissions from construction were amortized over a 30-year period.

[6] Sum of annualized one-time emissions and operational emissions.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EMFAC - EMission FACtors model
MT - metric tonnes
TRU - Transportation Refrigeration unit

Table 5-1. Summary of ABAU and Project GHG Emissions in 2030 and 2035
Costco Commercial Center
Fresno, California

Emissions Category[1]	GHG Emissions[2] (MT CO_2e/yr)			
	ABAU[3]		Project[4]	
	2030	2035	2030	2035
Area Sources	0.02	0.02	0.02	0.02
Energy Usage[5]	275	233	148	148
Mobile[6,7,8]	24,342	22,504	21,782	16,943
Water	34	31	34	31
Waste Disposed[9]	540	540	365	365
Operational Total	**25,191**	**23,308**	**22,328**	**17,487**
Percent Reduction Needed From ABAU[10]	**1.5%**	**11.6%**	**--**	
Emission Reduction Needed[11]	**381**	**2,711**	**--**	

Notes:

[1] Operational emissions were calculated using CalEEMod®. See Appendix A for details.

[2] Emissions are presented as CO_2e, which include CO_2, CH_4, and N_2O emissions, weighted by their respective global warming potentials.

[3] The ABAU emissions account for the local regulations that were in place at the time the Fresno GHGRP was published.

[4] The Project emissions take into account the project commitments in line with the local measures established by the GHGRP, which includes Land Use Strategies and Transportation Demand Management, Electric Vehicle Charging Stations, Net Zero Energy Commercial Building, Water Conservation, and Waste Diversion and Recycling. It also takes into account additional local measures that would result in project emissions reductions beyond the ABAU scenario, such as the Advanced Clean Trucks regulation and the Executive Order N-79-20. The exact assumptions made for the project emissions inventory reductions are detailed in Table 5-2.

[5] The project's ABAU emissions accounts for RPS-required improvements to the electric grid carbon intensity, while the Project emissions account for 100% solar energy, based on the Project's commitment to the PG&E's "Solar Choice" program, which provides 100% solar electricity to customers.

[6] For both the ABAU and Project emissions, total mobile emissions include emissions from on-road vehicles and TRUs, using Project-specific vehicle trip rates provided by Kittelson & Associates. TRU emissions were estimated using OFFROAD2021 emission factors.

[7] For the ABAU emissions, on-road mobile emissions were estimated using CalEEMod® default trip lengths, EMFAC2021 emission factors, and fleet mix assumptions for employee and member vehicles to represent the same assumptions as the GHGRP. Based on the available EMFAC version at the time of the GHGRP preparation (i.e., EMFAC2017), the analysis assumes extracted data from EMFAC2017. For the delivery truck fleet mix, the analysis made a simplifying assumption that the fraction of natural gas and gasoline-powered HHDT would be diesel-powered.

[8] For the Project emissions, on-road mobile emissions were estimated using CalEEMod® default trip lengths, EMFAC2021 emission factors, and EMFAC2021 fleet mix for delivery trucks. The fleet mixes for employee and member light duty vehicles are based on the Draft 2022 Scoping Plan E3 Modeling workbook. Please see footnote 7 in Table 5-2 for more details.

[9] The solid waste generation for ABAU was estimated using CalEEMod® defaults. The Project emissions were estimated based on the State goal of a 75% waste diversion target and Fresno's GHGRP methodology. Please see footnote 10 in Table 5-2 for more details.

[10] The percent reduction for the Project are the same percentage reduction required, i.e., 1.5% reduction in 2030 and 11.6% in 2035 from Table 4-C in the Fresno GHGRP.

[11] Emission reduction needed from ABAU is calculated as the percent reduction from the operational total. The Project emissions do not include an emission reduction since this is solely based on the ABAU conditions.

Abbreviations:

ABAU - Adjusted Business-As-Usual
CalEEMod® - CALifornia Emissions Estimator MODel
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalents
EMFAC - EMission FACtors model
GHG - greenhouse gases
GHGRP - Greenhouse Gas Reduction Plan
HHDT - heavy-heavy duty trucks
MT - metric tonnes
N_2O - nitrous oxide
PG&E - Pacific Gas & Electric
RPS - Renewable Portfolio Standard
TRU - Transportation Refrigeration unit
yr - year

Table 5-2. Local Measures Reductions Table for 2030 and 2035
Costco Commercial Center
Fresno, California

Sector	Local Measures	Emissions Reductions (MT CO_2e/year)	
		2030	**2035**
Transportation[1]	Land Use Strategies and Transportation Demand Management[2]	48	36
	Electric Vehicle Charging Stations[3,4,5]	230	862
	Advanced Clean Trucks[6]	142	297
	ZEV Regulations[7]	2,418	5,265
Commercial Energy	Net Zero Energy Commercial Building[8]	127	85
Industrial Energy (water)	Water Conservation[9]	0	0
Solid Waste	Waste Diversion and Recycling[10]	175	175
Total		**3,140**	**6,719**
Reduction Needed[11]		**381**	**2,711**
Reduction Met?		**YES**	**YES**

Notes:

[1] The ABAU emissions for the transportation emissions inventory utilizes EMFAC2017 fleet mix defaults which takes into account the State policies that were in place at the time of the Fresno GHG Reduction Plan Update release.

[2] Costco will provide a voluntary commute trip reduction program for employees that can result in a 4% reduction in employee vehicle trips, based on Kittelson & Associates TIA.

[3] The number of electric vehicle chargers assumed for 2030/2035 aligns with CalGreen2022 requirements, see Table 5.106.5.3.1. Available here: https://codes.iccsafe.org/content/CAGBC2022P1/chapter-5-nonresidential-mandatory-measures. Accessed: August 2022.

[4] For 2030, Annual energy delivery is estimated based on an average monthly energy delivery of 588 kWh per charging station for conventional Level 2 chargers, as reported by the California Energy Commission. Available at: https://www.energy.ca.gov/2018publications/CEC-500-2018-020/CEC-500-2018-020.pdf.

[5] For 2035, it is assumed that the EV chargers will be used 8 hours/day at 25 miles per hour of charge in line with the increase in EVs predicted by the Draft 2022 Scoping Plan E3 PATHWAYS Modeling Workbook.

[6] EMFAC2021 fleet mix defaults are utilized for the delivery truck fleet mixes, which represents the improvement from ABAU due to the Advanced Clean Trucks regulation which became effective March 2021 and was incorporated into the EMFAC2021 model. This regulation requires an increasing number of zero emission truck sales over time starting in 2024. Available here: https://arb.ca.gov/emfac/. Accessed: August 2022.

[7] The member and employee light-duty vehicle fleet assumptions were based on Executive Order N-79-20, which requires that by 2035 100% of in-state sales of new passenger cars and trucks will be zero-emission by 2035. The fleet mix projections were calculated to align with the Draft 2022 Scoping Plan Update E3 PATHWAYS modeling workbook, which provides year-by-year fleet projections that align with this Executive Order. The E3 Modeling workbook can be found here: https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-PATHWAYS-data-E3.xlsx. Accessed: August 2022.

[8] The project has committed to PG&E's "Solar Choice" program, which provides 100% solar electricity to customers. The ABAU emissions for commercial building energy accounts for RPS-required improvements to the electric grid carbon intensity, and the improvements from this in 2030 and 2035 reflect the Project's commitment to PG&E's "Solar Choice" program.

[9] The project will align with CalGreen2019, which is accounted for in Fresno's GHGRP ABAU emissions.

[10] The ABAU solid waste generation was estimated using CalEEMod® defaults assumes a 63% employee-based diversion rate statewide, based on 2010 CalRecycle data, available here: https://calrecycle.ca.gov/lgcentral/goalmeasure/disposalrate/graphs/estdiversion/. Accessed: August 2022. The improvement from ABAU was estimated based on the State goal of a 75% waste diversion target and Fresno's GHGRP methodology.

[11] The reduction needed is calculated based on the percent reduction from ABAU needed in Table 4-C in the Fresno GHGRP.

Abbreviations:

ABAU - Adjusted Business-As-Usual
CalEEMod® - CALifornia Emissions Estimator MODel
CalGreen - California Green Building Standards Code
CO_2e - carbon dioxide equivalents
EMFAC - EMissions FACtor Model
EV - electric vehicle
GHGRP - Greenhouse Gas Reduction Plan
MT - metric tonnes
PG&E - Pacific Gas & Electric
RPS - Renewable Portfolio Standard
TIA - transportation impact assessment
VMT - vehicle mile traveled
ZEV - zero emission vehicle

APPENDIX A
CALEEMOD® OUTPUT

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Costco Fresno Mitigated Construction Run

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	889.00	Space	15.55	355,600.00	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Gasoline/Service Station	32.00	Pump	1.33	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	191.61	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific information (RPS Emission Factor)

Land Use - Project-specific information

Construction Phase - Project-specific information

Off-road Equipment -

Off-road Equipment - Project-specific information

Off-road Equipment -

Off-road Equipment - Project-specific information

Off-road Equipment - Project-specific information

Off-road Equipment - Project-specific information

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Off-road Equipment -

Trips and VMT - Project-specific information

Demolition - Project-specific information

Grading - Project-specific information

Vehicle Trips - Unmitigated Construction Run

Consumer Products - Unmitigated Construction Run

Area Coating - Unmitigated Construction Run

Landscape Equipment - Unmitigated Construction Run

Energy Use - Unmitigated Construction Run

Water And Wastewater - Unmitigated Construction Run

Solid Waste - Unmitigated Construction Run

Construction Off-road Equipment Mitigation - Water 2x/day to comply with SJVAPCD Rule 8021. All construction equipment >50 hp mitigated to Tier 3 + Level 3 DPF.

Vehicle Emission Factors -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Exterior	125329	0
tblAreaCoating	Area_Nonresidential_Interior	375986	0
tblAreaCoating	Area_Parking	21336	0
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	DPF	No Change	Level 3
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	14.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	50.00
tblConstructionPhase	NumDays	370.00	110.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	35.00	30.00

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	NumDays	35.00	20.00
tblConstructionPhase	NumDays	20.00	40.00
tblConstructionPhase	NumDays	10.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	4/11/2025	11/10/2023
tblConstructionPhase	PhaseEndDate	2/14/2025	11/10/2023
tblConstructionPhase	PhaseEndDate	5/26/2023	5/8/2023
tblConstructionPhase	PhaseEndDate	7/28/2023	6/12/2023
tblConstructionPhase	PhaseEndDate	9/15/2023	7/5/2023
tblConstructionPhase	PhaseEndDate	3/14/2025	9/13/2023
tblConstructionPhase	PhaseEndDate	6/9/2023	5/8/2023
tblConstructionPhase	PhaseStartDate	3/15/2025	9/14/2023
tblConstructionPhase	PhaseStartDate	9/16/2023	7/6/2023
tblConstructionPhase	PhaseStartDate	6/10/2023	5/9/2023
tblConstructionPhase	PhaseStartDate	7/29/2023	6/13/2023
tblConstructionPhase	PhaseStartDate	2/15/2025	7/29/2023
tblConstructionPhase	PhaseStartDate	5/27/2023	5/1/2023
tblConsumerProducts	ROG_EF	2.14E-05	0
tblConsumerProducts	ROG_EF_Degreaser	3.542E-07	0
tblConsumerProducts	ROG_EF_PesticidesFertilizers	5.152E-08	0
tblEnergyUse	LightingElect	2.70	0.00
tblEnergyUse	LightingElect	3.71	0.00
tblEnergyUse	LightingElect	2.70	0.00

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblEnergyUse	LightingElect	0.35	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24E	2.30	0.00
tblEnergyUse	NT24E	4.16	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	NT24NG	2.08	0.00
tblEnergyUse	NT24NG	3.84	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24E	1.91	0.00
tblEnergyUse	T24E	1.75	0.00
tblEnergyUse	T24NG	16.86	0.00
tblEnergyUse	T24NG	8.53	0.00
tblEnergyUse	T24NG	16.86	0.00
tblGrading	MaterialExported	0.00	3,000.00
tblGrading	MaterialImported	0.00	60,000.00
tblLandscapeEquipment	NumberSummerDays	180	0
tblLandUse	LotAcreage	8.00	15.55
tblLandUse	LotAcreage	0.10	1.33
tblOffRoadEquipment	HorsePower	172.00	401.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	4.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblProjectCharacteristics	CO2IntensityFactor	203.98	191.61
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblSolidWaste	SolidWasteGenerationRate	18.34	0.00
tblSolidWaste	SolidWasteGenerationRate	1,037.93	0.00
tblSolidWaste	SolidWasteGenerationRate	17.25	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblTripsAndVMT	HaulingTripNumber	1.00	2.00
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00
tblWater	IndoorWaterUseRate	451,589.32	0.00
tblWater	IndoorWaterUseRate	17,876,662.33	0.00
tblWater	IndoorWaterUseRate	425,020.45	0.00
tblWater	OutdoorWaterUseRate	276,780.55	0.00
tblWater	OutdoorWaterUseRate	10,956,664.01	0.00
tblWater	OutdoorWaterUseRate	260,496.40	0.00

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	2.2806	4.5511	3.7117	0.0113	0.9356	0.1729	1.1085	0.3872	0.1595	0.5467	0.0000	1,026.9395	1,026.9395	0.1854	0.0533	1,047.4410
Maximum	**2.2806**	**4.5511**	**3.7117**	**0.0113**	**0.9356**	**0.1729**	**1.1085**	**0.3872**	**0.1595**	**0.5467**	**0.0000**	**1,026.9395**	**1,026.9395**	**0.1854**	**0.0533**	**1,047.4410**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	2.0686	3.9074	4.6415	0.0113	0.5786	0.0294	0.6080	0.2169	0.0291	0.2459	0.0000	1,026.9388	1,026.9388	0.1854	0.0533	1,047.4403
Maximum	**2.0686**	**3.9074**	**4.6415**	**0.0113**	**0.5786**	**0.0294**	**0.6080**	**0.2169**	**0.0291**	**0.2459**	**0.0000**	**1,026.9388**	**1,026.9388**	**0.1854**	**0.0533**	**1,047.4403**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**9.30**	**14.14**	**-25.05**	**0.00**	**38.16**	**82.99**	**45.15**	**43.99**	**81.76**	**55.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	5-1-2023	7-31-2023	3.2883	2.7515
2	8-1-2023	9-30-2023	2.0410	1.7429
		Highest	3.2883	2.7515

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2023	5/8/2023	6	7	
2	Site Preparation	Site Preparation	5/1/2023	5/8/2023	6	7	
3	Grading	Grading	5/9/2023	6/12/2023	6	30	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4	Grading/BC Overlap	Grading	6/13/2023	7/5/2023	6	20	
5	Building Construction	Building Construction	7/6/2023	11/10/2023	6	110	
6	Paving	Paving	7/29/2023	9/13/2023	6	40	
7	Architectural Coating	Architectural Coating	9/14/2023	11/10/2023	6	50	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 165

Acres of Paving: 15.55

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 375,986; Non-Residential Outdoor: 125,329; Striped Parking Area: 21,336 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Graders	3	8.00	187	0.41
Grading	Other Construction Equipment	2	8.00	401	0.42
Grading	Paving Equipment	1	8.00	132	0.36
Grading	Rubber Tired Dozers	4	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Grading	Surfacing Equipment	1	8.00	263	0.30
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading/BC Overlap	Excavators	3	8.00	158	0.38
Grading/BC Overlap	Rough Terrain Forklifts	2	8.00	100	0.40
Grading/BC Overlap	Rubber Tired Dozers	3	8.00	247	0.40
Grading/BC Overlap	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Excavators	3	8.00	158	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Building Construction	Rough Terrain Forklifts	2	8.00	100	0.40
Building Construction	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Paving	Rough Terrain Forklifts	1	8.00	100	0.40
Paving	Rubber Tired Dozers	2	8.00	247	0.40
Paving	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	2.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	4	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	15	38.00	0.00	7,500.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading/BC Overlap	11	28.00	0.00	375.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	11	230.00	99.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	46.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Use DPF for Construction Equipment

Water Exposed Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1000e-004	0.0000	1.1000e-004	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	7.9400e-003	0.0752	0.0688	1.4000e-004		3.4900e-003	3.4900e-003		3.2500e-003	3.2500e-003	0.0000	11.8972	11.8972	3.3300e-003	0.0000	11.9805
Total	**7.9400e-003**	**0.0752**	**0.0688**	**1.4000e-004**	**1.1000e-004**	**3.4900e-003**	**3.6000e-003**	**2.0000e-005**	**3.2500e-003**	**3.2700e-003**	**0.0000**	**11.8972**	**11.8972**	**3.3300e-003**	**0.0000**	**11.9805**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	3.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0567	0.0567	0.0000	1.0000e-005	0.0593
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.5000e-004	0.0000	6.6000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5083	0.5083	1.0000e-005	1.0000e-005	0.5126
Total	**2.1000e-004**	**2.8000e-004**	**1.8000e-003**	**1.0000e-005**	**6.7000e-004**	**0.0000**	**6.8000e-004**	**1.7000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5650**	**0.5650**	**1.0000e-005**	**2.0000e-005**	**0.5719**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.0000e-005	0.0000	5.0000e-005	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.2400e-003	0.0641	0.0864	1.4000e-004		4.5000e-004	4.5000e-004		4.5000e-004	4.5000e-004	0.0000	11.8972	11.8972	3.3300e-003	0.0000	11.9805
Total	**3.2400e-003**	**0.0641**	**0.0864**	**1.4000e-004**	**5.0000e-005**	**4.5000e-004**	**5.0000e-004**	**1.0000e-005**	**4.5000e-004**	**4.6000e-004**	**0.0000**	**11.8972**	**11.8972**	**3.3300e-003**	**0.0000**	**11.9805**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.3000e-004	3.0000e-005	0.0000	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0000	1.0000e-005	0.0000	0.0567	0.0567	0.0000	1.0000e-005	0.0593
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.7700e-003	1.0000e-005	6.5000e-004	0.0000	6.6000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5083	0.5083	1.0000e-005	1.0000e-005	0.5126
Total	**2.1000e-004**	**2.8000e-004**	**1.8000e-003**	**1.0000e-005**	**6.7000e-004**	**0.0000**	**6.8000e-004**	**1.7000e-004**	**0.0000**	**1.9000e-004**	**0.0000**	**0.5650**	**0.5650**	**1.0000e-005**	**2.0000e-005**	**0.5719**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.1200e-003	0.0215	0.0312	4.0000e-005		1.0600e-003	1.0600e-003		9.8000e-004	9.8000e-004	0.0000	3.8302	3.8302	1.2400e-003	0.0000	3.8612
Total	**2.1200e-003**	**0.0215**	**0.0312**	**4.0000e-005**	**0.0000**	**1.0600e-003**	**1.0600e-003**	**0.0000**	**9.8000e-004**	**9.8000e-004**	**0.0000**	**3.8302**	**3.8302**	**1.2400e-003**	**0.0000**	**3.8612**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.1800e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3389	0.3389	1.0000e-005	1.0000e-005	0.3417
Total	**1.4000e-004**	**1.0000e-004**	**1.1800e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3389**	**0.3389**	**1.0000e-005**	**1.0000e-005**	**0.3417**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.3 Site Preparation - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.0600e-003	0.0243	0.0328	4.0000e-005		2.6000e-004	2.6000e-004		2.6000e-004	2.6000e-004	0.0000	3.8302	3.8302	1.2400e-003	0.0000	3.8612
Total	**1.0600e-003**	**0.0243**	**0.0328**	**4.0000e-005**	**0.0000**	**2.6000e-004**	**2.6000e-004**	**0.0000**	**2.6000e-004**	**2.6000e-004**	**0.0000**	**3.8302**	**3.8302**	**1.2400e-003**	**0.0000**	**3.8612**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4000e-004	1.0000e-004	1.1800e-003	0.0000	4.4000e-004	0.0000	4.4000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3389	0.3389	1.0000e-005	1.0000e-005	0.3417
Total	**1.4000e-004**	**1.0000e-004**	**1.1800e-003**	**0.0000**	**4.4000e-004**	**0.0000**	**4.4000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3389**	**0.3389**	**1.0000e-005**	**1.0000e-005**	**0.3417**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4522	0.0000	0.4522	0.2086	0.0000	0.2086	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1079	1.1479	0.7006	1.9600e-003		0.0465	0.0465		0.0428	0.0428	0.0000	172.1647	172.1647	0.0557	0.0000	173.5567
Total	**0.1079**	**1.1479**	**0.7006**	**1.9600e-003**	**0.4522**	**0.0465**	**0.4987**	**0.2086**	**0.0428**	**0.2514**	**0.0000**	**172.1647**	**172.1647**	**0.0557**	**0.0000**	**173.5567**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-003	0.4693	0.0990	2.2100e-003	0.0642	4.4300e-003	0.0686	0.0177	4.2400e-003	0.0219	0.0000	212.4374	212.4374	1.3900e-003	0.0334	222.4289
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	1.6100e-003	0.0192	6.0000e-005	7.0900e-003	3.0000e-005	7.1200e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	5.5190	5.5190	1.3000e-004	1.4000e-004	5.5650
Total	**0.0103**	**0.4709**	**0.1182**	**2.2700e-003**	**0.0713**	**4.4600e-003**	**0.0757**	**0.0195**	**4.2700e-003**	**0.0238**	**0.0000**	**217.9564**	**217.9564**	**1.5200e-003**	**0.0336**	**227.9939**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.4 Grading - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.2035	0.0000	0.2035	0.0939	0.0000	0.0939	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0480	0.9363	1.0751	1.9600e-003		5.6200e-003	5.6200e-003		5.6200e-003	5.6200e-003	0.0000	172.1645	172.1645	0.0557	0.0000	173.5565
Total	**0.0480**	**0.9363**	**1.0751**	**1.9600e-003**	**0.2035**	**5.6200e-003**	**0.2091**	**0.0939**	**5.6200e-003**	**0.0995**	**0.0000**	**172.1645**	**172.1645**	**0.0557**	**0.0000**	**173.5565**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	8.0000e-003	0.4693	0.0990	2.2100e-003	0.0642	4.4300e-003	0.0686	0.0177	4.2400e-003	0.0219	0.0000	212.4374	212.4374	1.3900e-003	0.0334	222.4289
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3000e-003	1.6100e-003	0.0192	6.0000e-005	7.0900e-003	3.0000e-005	7.1200e-003	1.8800e-003	3.0000e-005	1.9100e-003	0.0000	5.5190	5.5190	1.3000e-004	1.4000e-004	5.5650
Total	**0.0103**	**0.4709**	**0.1182**	**2.2700e-003**	**0.0713**	**4.4600e-003**	**0.0757**	**0.0195**	**4.2700e-003**	**0.0238**	**0.0000**	**217.9564**	**217.9564**	**1.5200e-003**	**0.0336**	**227.9939**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Grading/BC Overlap - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1967	0.0000	0.1967	0.1011	0.0000	0.1011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0329	0.3343	0.3036	5.7000e-004		0.0151	0.0151		0.0139	0.0139	0.0000	50.3819	50.3819	0.0163	0.0000	50.7893
Total	**0.0329**	**0.3343**	**0.3036**	**5.7000e-004**	**0.1967**	**0.0151**	**0.2118**	**0.1011**	**0.0139**	**0.1149**	**0.0000**	**50.3819**	**50.3819**	**0.0163**	**0.0000**	**50.7893**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-004	0.0235	4.9500e-003	1.1000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	10.6219	10.6219	7.0000e-005	1.6700e-003	11.1215
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	7.9000e-004	9.4400e-003	3.0000e-005	3.4800e-003	2.0000e-005	3.5000e-003	9.2000e-004	1.0000e-005	9.4000e-004	0.0000	2.7111	2.7111	6.0000e-005	7.0000e-005	2.7337
Total	**1.5300e-003**	**0.0243**	**0.0144**	**1.4000e-004**	**6.6900e-003**	**2.4000e-004**	**6.9300e-003**	**1.8000e-003**	**2.2000e-004**	**2.0300e-003**	**0.0000**	**13.3329**	**13.3329**	**1.3000e-004**	**1.7400e-003**	**13.8551**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.5 Grading/BC Overlap - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0885	0.0000	0.0885	0.0455	0.0000	0.0455	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0141	0.2857	0.3759	5.7000e-004		2.1800e-003	2.1800e-003		2.1800e-003	2.1800e-003	0.0000	50.3819	50.3819	0.0163	0.0000	50.7892
Total	**0.0141**	**0.2857**	**0.3759**	**5.7000e-004**	**0.0885**	**2.1800e-003**	**0.0907**	**0.0455**	**2.1800e-003**	**0.0477**	**0.0000**	**50.3819**	**50.3819**	**0.0163**	**0.0000**	**50.7892**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.0000e-004	0.0235	4.9500e-003	1.1000e-004	3.2100e-003	2.2000e-004	3.4300e-003	8.8000e-004	2.1000e-004	1.0900e-003	0.0000	10.6219	10.6219	7.0000e-005	1.6700e-003	11.1215
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.1300e-003	7.9000e-004	9.4400e-003	3.0000e-005	3.4800e-003	2.0000e-005	3.5000e-003	9.2000e-004	1.0000e-005	9.4000e-004	0.0000	2.7111	2.7111	6.0000e-005	7.0000e-005	2.7337
Total	**1.5300e-003**	**0.0243**	**0.0144**	**1.4000e-004**	**6.6900e-003**	**2.4000e-004**	**6.9300e-003**	**1.8000e-003**	**2.2000e-004**	**2.0300e-003**	**0.0000**	**13.3329**	**13.3329**	**1.3000e-004**	**1.7400e-003**	**13.8551**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1776	1.8072	1.6238	3.0900e-003		0.0814	0.0814		0.0748	0.0748	0.0000	271.4578	271.4578	0.0878	0.0000	273.6527
Total	**0.1776**	**1.8072**	**1.6238**	**3.0900e-003**		**0.0814**	**0.0814**		**0.0748**	**0.0748**	**0.0000**	**271.4578**	**271.4578**	**0.0878**	**0.0000**	**273.6527**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6200e-003	0.2227	0.0698	1.0000e-003	0.0327	1.3900e-003	0.0340	9.4400e-003	1.3300e-003	0.0108	0.0000	95.4877	95.4877	5.3000e-004	0.0144	99.7859
Worker	0.0511	0.0357	0.4263	1.3400e-003	0.1573	7.3000e-004	0.1580	0.0418	6.7000e-004	0.0425	0.0000	122.4820	122.4820	2.9000e-003	3.1900e-003	123.5038
Total	**0.0567**	**0.2584**	**0.4961**	**2.3400e-003**	**0.1899**	**2.1200e-003**	**0.1920**	**0.0512**	**2.0000e-003**	**0.0532**	**0.0000**	**217.9697**	**217.9697**	**3.4300e-003**	**0.0176**	**223.2896**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.6 Building Construction - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0758	1.5354	2.0193	3.0900e-003		0.0116	0.0116		0.0116	0.0116	0.0000	271.4575	271.4575	0.0878	0.0000	273.6524
Total	**0.0758**	**1.5354**	**2.0193**	**3.0900e-003**		**0.0116**	**0.0116**		**0.0116**	**0.0116**	**0.0000**	**271.4575**	**271.4575**	**0.0878**	**0.0000**	**273.6524**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.6200e-003	0.2227	0.0698	1.0000e-003	0.0327	1.3900e-003	0.0340	9.4400e-003	1.3300e-003	0.0108	0.0000	95.4877	95.4877	5.3000e-004	0.0144	99.7859
Worker	0.0511	0.0357	0.4263	1.3400e-003	0.1573	7.3000e-004	0.1580	0.0418	6.7000e-004	0.0425	0.0000	122.4820	122.4820	2.9000e-003	3.1900e-003	123.5038
Total	**0.0567**	**0.2584**	**0.4961**	**2.3400e-003**	**0.1899**	**2.1200e-003**	**0.1920**	**0.0512**	**2.0000e-003**	**0.0532**	**0.0000**	**217.9697**	**217.9697**	**3.4300e-003**	**0.0176**	**223.2896**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0356	0.3745	0.2593	5.4000e-004		0.0168	0.0168		0.0154	0.0154	0.0000	47.0096	47.0096	0.0152	0.0000	47.3896
Paving	0.0204					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0559**	**0.3745**	**0.2593**	**5.4000e-004**		**0.0168**	**0.0168**		**0.0154**	**0.0154**	**0.0000**	**47.0096**	**47.0096**	**0.0152**	**0.0000**	**47.3896**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.3000e-004	8.7600e-003	3.0000e-005	3.2300e-003	1.0000e-005	3.2500e-003	8.6000e-004	1.0000e-005	8.7000e-004	0.0000	2.5174	2.5174	6.0000e-005	7.0000e-005	2.5384
Total	**1.0500e-003**	**7.3000e-004**	**8.7600e-003**	**3.0000e-005**	**3.2300e-003**	**1.0000e-005**	**3.2500e-003**	**8.6000e-004**	**1.0000e-005**	**8.7000e-004**	**0.0000**	**2.5174**	**2.5174**	**6.0000e-005**	**7.0000e-005**	**2.5384**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.7 Paving - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0131	0.2697	0.3271	5.4000e-004		2.0600e-003	2.0600e-003		2.0600e-003	2.0600e-003	0.0000	47.0095	47.0095	0.0152	0.0000	47.3896
Paving	0.0204					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0335**	**0.2697**	**0.3271**	**5.4000e-004**		**2.0600e-003**	**2.0600e-003**		**2.0600e-003**	**2.0600e-003**	**0.0000**	**47.0095**	**47.0095**	**0.0152**	**0.0000**	**47.3896**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0500e-003	7.3000e-004	8.7600e-003	3.0000e-005	3.2300e-003	1.0000e-005	3.2500e-003	8.6000e-004	1.0000e-005	8.7000e-004	0.0000	2.5174	2.5174	6.0000e-005	7.0000e-005	2.5384
Total	**1.0500e-003**	**7.3000e-004**	**8.7600e-003**	**3.0000e-005**	**3.2300e-003**	**1.0000e-005**	**3.2500e-003**	**8.6000e-004**	**1.0000e-005**	**8.7000e-004**	**0.0000**	**2.5174**	**2.5174**	**6.0000e-005**	**7.0000e-005**	**2.5384**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.7900e-003	0.0326	0.0453	7.0000e-005		1.7700e-003	1.7700e-003		1.7700e-003	1.7700e-003	0.0000	6.3831	6.3831	3.8000e-004	0.0000	6.3927
Total	**1.8217**	**0.0326**	**0.0453**	**7.0000e-005**		**1.7700e-003**	**1.7700e-003**		**1.7700e-003**	**1.7700e-003**	**0.0000**	**6.3831**	**6.3831**	**3.8000e-004**	**0.0000**	**6.3927**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6500e-003	3.2500e-003	0.0388	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8000e-003	6.0000e-005	3.8600e-003	0.0000	11.1347	11.1347	2.6000e-004	2.9000e-004	11.2276
Total	**4.6500e-003**	**3.2500e-003**	**0.0388**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8000e-003**	**6.0000e-005**	**3.8600e-003**	**0.0000**	**11.1347**	**11.1347**	**2.6000e-004**	**2.9000e-004**	**11.2276**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.8 Architectural Coating - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.8169					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4900e-003	0.0339	0.0458	7.0000e-005		3.6000e-004	3.6000e-004		3.6000e-004	3.6000e-004	0.0000	6.3831	6.3831	3.8000e-004	0.0000	6.3927
Total	**1.8184**	**0.0339**	**0.0458**	**7.0000e-005**		**3.6000e-004**	**3.6000e-004**		**3.6000e-004**	**3.6000e-004**	**0.0000**	**6.3831**	**6.3831**	**3.8000e-004**	**0.0000**	**6.3927**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.6500e-003	3.2500e-003	0.0388	1.2000e-004	0.0143	7.0000e-005	0.0144	3.8000e-003	6.0000e-005	3.8600e-003	0.0000	11.1347	11.1347	2.6000e-004	2.9000e-004	11.2276
Total	**4.6500e-003**	**3.2500e-003**	**0.0388**	**1.2000e-004**	**0.0143**	**7.0000e-005**	**0.0144**	**3.8000e-003**	**6.0000e-005**	**3.8600e-003**	**0.0000**	**11.1347**	**11.1347**	**2.6000e-004**	**2.9000e-004**	**11.2276**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Discount Club	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Gasoline/Service Station	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Parking Lot	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 0	0.0000	0.0000	0.0000	0.0000
Discount Club	0 / 0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0 / 0	0.0000	0.0000	0.0000	0.0000
Discount Club	0 / 0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Costco Fresno Mitigated Construction Run - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	0	0.0000	0.0000	0.0000	0.0000
Discount Club	0	0.0000	0.0000	0.0000	0.0000
Gasoline/Service Station	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Equipment Type	Number

11.0 Vegetation

Costco Fresno (Project) Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Costco Fresno (Project) Operation

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	889.00	Space	8.00	355,600.00	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Gasoline/Service Station	32.00	Pump	0.10	4,517.60	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2023
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	191.61	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific values (RPS emission factor)

Land Use - Project-specific values

Construction Phase - Operational run

Off-road Equipment - Operational run

Vehicle Trips - Project-specific values, mobile emissions calculated seperately

Consumer Products - Updated emission factor for consumer products to refine the VOC emissions based on recent CARB regulations.

Table Name	Column Name	Default Value	New Value
tblConsumerProducts	ROG_EF	2.14E-05	1.62E-05

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblProjectCharacteristics	CO2IntensityFactor	203.98	191.61
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00

2.0 Emissions Summary

Costco Fresno (Project) Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	330.8528	330.8528	0.0345	6.5300e-003	333.6620
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	12.3158	18.2653	0.6132	0.0147	37.9717
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**343.1895**	**567.0539**	**13.5261**	**0.0212**	**911.5307**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	330.8528	330.8528	0.0345	6.5300e-003	333.6620
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	12.3158	18.2653	0.6132	0.0147	37.9717
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**343.1895**	**567.0539**	**13.5261**	**0.0212**	**911.5307**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	4/1/2023	4/30/2023	5	20	

Acres of Grading (Site Preparation Phase): 0

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Acres of Grading (Grading Phase): 0

Acres of Paving: 8

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	0	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Demolition - 2023

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Discount Club	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Gasoline/Service Station	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090
Parking Lot	0.510058	0.053037	0.175964	0.161396	0.026773	0.007006	0.013819	0.022114	0.000717	0.000291	0.024206	0.001529	0.003090

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	183.9160	183.9160	0.0317	3.8400e-003	185.8520
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	183.9160	183.9160	0.0317	3.8400e-003	185.8520
NaturalGas Mitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100
NaturalGas Unmitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	3.5919	6.2000e-004	7.0000e-005	3.6297
Discount Club	1.91141e+006	166.1263	0.0286	3.4700e-003	167.8751
Gasoline/Service Station	38896.5	3.3806	5.8000e-004	7.0000e-005	3.4162
Parking Lot	124460	10.8172	1.8600e-003	2.3000e-004	10.9310
Total		**183.9160**	**0.0317**	**3.8400e-003**	**185.8520**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	3.5919	6.2000e-004	7.0000e-005	3.6297
Discount Club	1.91141e+006	166.1263	0.0286	3.4700e-003	167.8751
Gasoline/Service Station	38896.5	3.3806	5.8000e-004	7.0000e-005	3.4162
Parking Lot	124460	10.8172	1.8600e-003	2.3000e-004	10.9310
Total		**183.9160**	**0.0317**	**3.8400e-003**	**185.8520**

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Unmitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.9000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.9000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	18.2653	0.6132	0.0147	37.9717
Unmitigated	18.2653	0.6132	0.0147	37.9717

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.4398	0.0148	3.5000e-004	0.9144
Discount Club	17.8767 / 10.9567	17.4115	0.5845	0.0140	36.1967
Gasoline/Service Station	0.42502 / 0.260496	0.4140	0.0139	3.3000e-004	0.8606
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**18.2653**	**0.6132**	**0.0147**	**37.9717**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.4398	0.0148	3.5000e-004	0.9144
Discount Club	17.8767 / 10.9567	17.4115	0.5845	0.0140	36.1967
Gasoline/Service Station	0.42502 / 0.260496	0.4140	0.0139	3.3000e-004	0.8606
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**18.2653**	**0.6132**	**0.0147**	**37.9717**

8.0 Waste Detail

8.1 Mitigation Measures Waste

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	217.9149	12.8784	0.0000	539.8748
Unmitigated	217.9149	12.8784	0.0000	539.8748

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Equipment Type	Number

11.0 Vegetation

Costco Fresno (Project) 2030 Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Costco Fresno (Project) 2030 Operation

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Gasoline/Service Station	32.00	Pump	1.33	4,517.60	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Parking Lot	889.00	Space	15.55	355,600.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2030
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	130.13	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific values (RPS emission factor)

Land Use - Project-specific values

Construction Phase - Operational emissions only

Off-road Equipment - Operational emissions only

Vehicle Trips - Project-specific values, mobile emissions calculated seperately

Consumer Products - Updated emission factor for consumer products to refine the VOC emissions based on recent CARB regulations.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	0.00

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	PhaseEndDate	5/26/2023	4/30/2023
tblConsumerProducts	ROG_EF	2.14E-05	1.62E-05
tblLandUse	LotAcreage	0.10	1.33
tblLandUse	LotAcreage	8.00	15.55
tblProjectCharacteristics	CO2IntensityFactor	203.98	130.13
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	271.8415	271.8415	0.0345	6.5300e-003	274.6507
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	8.3641	14.3137	0.6132	0.0147	34.0200
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**280.2265**	**504.0909**	**13.5261**	**0.0212**	**848.5677**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	271.8415	271.8415	0.0345	6.5300e-003	274.6507
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	8.3641	14.3137	0.6132	0.0147	34.0200
Total	**0.9616**	**0.1351**	**0.1241**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**280.2265**	**504.0909**	**13.5261**	**0.0212**	**848.5677**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2023	4/30/2023	5	0	

Acres of Grading (Site Preparation Phase): 0

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.55

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition			0.00	0.00	16.80	6.60				

3.1 Mitigation Measures Construction

3.2 Demolition - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.542478	0.054482	0.176258	0.134700	0.021641	0.005926	0.015139	0.022678	0.000679	0.000278	0.021974	0.001325	0.002442
Discount Club	0.542478	0.054482	0.176258	0.134700	0.021641	0.005926	0.015139	0.022678	0.000679	0.000278	0.021974	0.001325	0.002442
Gasoline/Service Station	0.542478	0.054482	0.176258	0.134700	0.021641	0.005926	0.015139	0.022678	0.000679	0.000278	0.021974	0.001325	0.002442
Parking Lot	0.542478	0.054482	0.176258	0.134700	0.021641	0.005926	0.015139	0.022678	0.000679	0.000278	0.021974	0.001325	0.002442

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	124.9047	124.9047	0.0317	3.8400e-003	126.8407
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	124.9047	124.9047	0.0317	3.8400e-003	126.8407
NaturalGas Mitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100
NaturalGas Unmitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	2.4394	6.2000e-004	7.0000e-005	2.4772
Discount Club	1.91141e+006	112.8230	0.0286	3.4700e-003	114.5718
Gasoline/Service Station	38896.5	2.2959	5.8000e-004	7.0000e-005	2.3315
Parking Lot	124460	7.3464	1.8600e-003	2.3000e-004	7.4602
Total		**124.9047**	**0.0317**	**3.8400e-003**	**126.8407**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	2.4394	6.2000e-004	7.0000e-005	2.4772
Discount Club	1.91141e+006	112.8230	0.0286	3.4700e-003	114.5718
Gasoline/Service Station	38896.5	2.2959	5.8000e-004	7.0000e-005	2.3315
Parking Lot	124460	7.3464	1.8600e-003	2.3000e-004	7.4602
Total		**124.9047**	**0.0317**	**3.8400e-003**	**126.8407**

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Unmitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.8000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.8000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	14.3137	0.6132	0.0147	34.0200
Unmitigated	14.3137	0.6132	0.0147	34.0200

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.3447	0.0148	3.5000e-004	0.8192
Discount Club	17.8767 / 10.9567	13.6446	0.5845	0.0140	32.4298
Gasoline/Service Station	0.42502 / 0.260496	0.3244	0.0139	3.3000e-004	0.7710
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**14.3137**	**0.6132**	**0.0147**	**34.0200**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.3447	0.0148	3.5000e-004	0.8192
Discount Club	17.8767 / 10.9567	13.6446	0.5845	0.0140	32.4298
Gasoline/Service Station	0.42502 / 0.260496	0.3244	0.0139	3.3000e-004	0.7710
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**14.3137**	**0.6132**	**0.0147**	**34.0200**

8.0 Waste Detail

8.1 Mitigation Measures Waste

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	217.9149	12.8784	0.0000	539.8748
Unmitigated	217.9149	12.8784	0.0000	539.8748

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Equipment Type	Number

11.0 Vegetation

Costco Fresno (Project) 2035 Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Costco Fresno (Project) 2035 Operation

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1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Gasoline/Service Station	32.00	Pump	1.33	4,517.60	0
Automobile Care Center	4.80	1000sqft	0.11	4,800.00	0
Discount Club	241.34	1000sqft	5.54	241,340.00	0
Parking Lot	889.00	Space	15.55	355,600.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2035
Utility Company	Pacific Gas and Electric Company				
CO2 Intensity (lb/MWhr)	86.75	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project-specific values (RPS emission factor)

Land Use - Project-specific values

Construction Phase - Operational emissions only

Off-road Equipment - Operational emissions only

Vehicle Trips - Project-specific values, mobile emissions calculated seperately

Consumer Products - Updated emission factor for consumer products to refine the VOC emissions based on recent CARB regulations.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	0.00

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

tblConstructionPhase	PhaseEndDate	5/26/2023	4/30/2023
tblConsumerProducts	ROG_EF	2.14E-05	1.62E-05
tblLandUse	LotAcreage	0.10	1.33
tblLandUse	LotAcreage	8.00	15.55
tblProjectCharacteristics	CO2IntensityFactor	203.98	86.75
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblVehicleTrips	ST_TR	23.72	0.00
tblVehicleTrips	ST_TR	53.75	0.00
tblVehicleTrips	ST_TR	182.17	0.00
tblVehicleTrips	SU_TR	11.88	0.00
tblVehicleTrips	SU_TR	33.67	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	WD_TR	23.72	0.00
tblVehicleTrips	WD_TR	41.80	0.00
tblVehicleTrips	WD_TR	172.01	0.00

2.0 Emissions Summary

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2023					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	230.2034	230.2034	0.0345	6.5300e-003	233.0126
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	5.5759	11.5254	0.6132	0.0147	31.2318
Total	**0.9616**	**0.1351**	**0.1240**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**235.8002**	**459.6646**	**13.5261**	**0.0212**	**804.1414**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Energy	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	230.2034	230.2034	0.0345	6.5300e-003	233.0126
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	217.9149	0.0000	217.9149	12.8784	0.0000	539.8748
Water						0.0000	0.0000		0.0000	0.0000	5.9496	5.5759	11.5254	0.6132	0.0147	31.2318
Total	**0.9616**	**0.1351**	**0.1240**	**8.1000e-004**	**0.0000**	**0.0103**	**0.0103**	**0.0000**	**0.0103**	**0.0103**	**223.8644**	**235.8002**	**459.6646**	**13.5261**	**0.0212**	**804.1414**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	5/1/2023	4/30/2023	5	0	

Acres of Grading (Site Preparation Phase): 0

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Acres of Grading (Grading Phase): 0

Acres of Paving: 15.55

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition			0.00	0.00	16.80	6.60				

3.1 Mitigation Measures Construction

3.2 Demolition - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

3.2 Demolition - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Automobile Care Center	0.00	0.00	0.00		
Discount Club	0.00	0.00	0.00		
Gasoline/Service Station	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Automobile Care Center	14.70	6.60	6.60	33.00	48.00	19.00	21	51	28
Discount Club	14.70	6.60	6.60	16.70	64.30	19.00	45	40	15
Gasoline/Service Station	14.70	6.60	6.60	2.00	79.00	19.00	14	27	59
Parking Lot	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Automobile Care Center	0.553747	0.055870	0.176952	0.125831	0.019734	0.005457	0.015107	0.021893	0.000653	0.000272	0.021077	0.001181	0.002226
Discount Club	0.553747	0.055870	0.176952	0.125831	0.019734	0.005457	0.015107	0.021893	0.000653	0.000272	0.021077	0.001181	0.002226
Gasoline/Service Station	0.553747	0.055870	0.176952	0.125831	0.019734	0.005457	0.015107	0.021893	0.000653	0.000272	0.021077	0.001181	0.002226
Parking Lot	0.553747	0.055870	0.176952	0.125831	0.019734	0.005457	0.015107	0.021893	0.000653	0.000272	0.021077	0.001181	0.002226

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	83.2666	83.2666	0.0317	3.8400e-003	85.2026
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	83.2666	83.2666	0.0317	3.8400e-003	85.2026
NaturalGas Mitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100
NaturalGas Unmitigated	0.0149	0.1350	0.1134	8.1000e-004		0.0103	0.0103		0.0103	0.0103	0.0000	146.9368	146.9368	2.8200e-003	2.6900e-003	147.8100

Costco Fresno (Project) 2035 Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

Costco Fresno (Project) 2035 Operation - Fresno County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Automobile Care Center	99360	5.4000e-004	4.8700e-003	4.0900e-003	3.0000e-005		3.7000e-004	3.7000e-004		3.7000e-004	3.7000e-004	0.0000	5.3022	5.3022	1.0000e-004	1.0000e-004	5.3337
Discount Club	2.56062e+006	0.0138	0.1255	0.1054	7.5000e-004		9.5400e-003	9.5400e-003		9.5400e-003	9.5400e-003	0.0000	136.6443	136.6443	2.6200e-003	2.5100e-003	137.4563
Gasoline/Service Station	93514.3	5.0000e-004	4.5800e-003	3.8500e-003	3.0000e-005		3.5000e-004	3.5000e-004		3.5000e-004	3.5000e-004	0.0000	4.9903	4.9903	1.0000e-004	9.0000e-005	5.0199
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0149**	**0.1350**	**0.1134**	**8.1000e-004**		**0.0103**	**0.0103**		**0.0103**	**0.0103**	**0.0000**	**146.9368**	**146.9368**	**2.8200e-003**	**2.7000e-003**	**147.8100**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	1.6262	6.2000e-004	7.0000e-005	1.6640
Discount Club	1.91141e+006	75.2125	0.0286	3.4700e-003	76.9612
Gasoline/Service Station	38896.5	1.5306	5.8000e-004	7.0000e-005	1.5661
Parking Lot	124460	4.8974	1.8600e-003	2.3000e-004	5.0113
Total		**83.2666**	**0.0317**	**3.8400e-003**	**85.2026**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Automobile Care Center	41328	1.6262	6.2000e-004	7.0000e-005	1.6640
Discount Club	1.91141e+006	75.2125	0.0286	3.4700e-003	76.9612
Gasoline/Service Station	38896.5	1.5306	5.8000e-004	7.0000e-005	1.5661
Parking Lot	124460	4.8974	1.8600e-003	2.3000e-004	5.0113
Total		**83.2666**	**0.0317**	**3.8400e-003**	**85.2026**

6.0 Area Detail

6.1 Mitigation Measures Area

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Unmitigated	0.9467	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.8000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1817					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7641					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.8000e-004	1.0000e-004	0.0107	0.0000		4.0000e-005	4.0000e-005		4.0000e-005	4.0000e-005	0.0000	0.0209	0.0209	5.0000e-005	0.0000	0.0222
Total	**0.9467**	**1.0000e-004**	**0.0107**	**0.0000**		**4.0000e-005**	**4.0000e-005**		**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0209**	**0.0209**	**5.0000e-005**	**0.0000**	**0.0222**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	11.5254	0.6132	0.0147	31.2318
Unmitigated	11.5254	0.6132	0.0147	31.2318

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.2775	0.0148	3.5000e-004	0.7521
Discount Club	17.8767 / 10.9567	10.9867	0.5845	0.0140	29.7718
Gasoline/Service Station	0.42502 / 0.260496	0.2612	0.0139	3.3000e-004	0.7078
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**11.5254**	**0.6132**	**0.0147**	**31.2318**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Automobile Care Center	0.451589 / 0.276781	0.2775	0.0148	3.5000e-004	0.7521
Discount Club	17.8767 / 10.9567	10.9867	0.5845	0.0140	29.7718
Gasoline/Service Station	0.42502 / 0.260496	0.2612	0.0139	3.3000e-004	0.7078
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**11.5254**	**0.6132**	**0.0147**	**31.2318**

8.0 Waste Detail

8.1 Mitigation Measures Waste

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	217.9149	12.8784	0.0000	539.8748
Unmitigated	217.9149	12.8784	0.0000	539.8748

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Automobile Care Center	18.34	3.7229	0.2200	0.0000	9.2232
Discount Club	1037.93	210.6904	12.4515	0.0000	521.9766
Gasoline/Service Station	17.25	3.5016	0.2069	0.0000	8.6751
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		**217.9149**	**12.8784**	**0.0000**	**539.8748**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied

Equipment Type	Number

11.0 Vegetation

APPENDIX B
OPERATIONAL MOBILE SOURCE EMISSIONS CALCULATIONS

Table B-1a. Trip Lengths and Vehicle Miles Traveled by Operational Mobile Sources (Herndon/Riverside)
Costco Commercial Center
Fresno, California

Trip Type		Average One-Way Trip Length[1,2]	Peak Daily Trips (one-way trips/day)[3]	Peak Daily VMT[4]	Annual Average Trips (one-way trips/yr)	Annual Average VMT
Member Vehicles	Primary	17.3	10,046	173,528	3,666,790	63,337,720
	Diverted	1.0	4,038	4,119	1,473,870	1,503,435
	Pass-By	0.1	3,788	379	1,382,620	138,262
Warehouse, Fuel Station, and Car Wash Employee Vehicles	Primary	30.7	300	9,210	109,500	3,361,650
MDO Driver and Warehouse Employee Vehicles	Primary	30.7	136	4,175	49,640	1,523,875
MDO Delivery Trucks	Primary	81.5	20	1,630	7,300	594,950
Fuel Delivery Trucks	Primary	125.0	14	1,750	5,110	638,750
Warehouse Delivery Trucks	Primary	125.0	26	3,250	9,490	1,186,250

Notes:

[1] Average trip lengths for primary and diverted trip types are based on Project-specific data provided by Kittelson & Associates. Pass-by trip length for member vehicles is assumed to be equal to the CalEEMod® default trip length of 0.1 miles.

[2] Average trip length for MDO delivery trucks provided by Costco. The average routed round trip length for Fresno MDO delivery trucks is 163 miles.

[3] Peak daily trips are based on Project-specific data provided by Kittelson & Associates.

[4] Peak daily VMT based on Project-specific data provided by Kittelson & Associates or estimated as a product of average trip length and number of trips presented in this table.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel

MDO - market delivery operation

VMT - vehicle miles traveled

Table B-1b. Trip Lengths and Vehicle Miles Traveled by Operational Mobile Sources (4500 W. Shaw Avenue)
Costco Commercial Center
Fresno, California

Trip Type		Peak Daily Trips (one-way trips/day)[1]	Peak Daily VMT[2]	Annual Average Trips (one-way trips/yr)	Annual Average VMT
Passenger Vehicles	Primary	1,363	58,264	497,495	21,266,360
	Pass-by	48	0	17,520	0
	Diverted	2,099	3,442	766,135	1,256,330

Notes:

[1] Peak daily trips are based on Project-specific data provided by Kittelson & Associates.

[2] Peak daily VMT based on Project-specific data provided by Kittelson & Associates or estimated as a product of average trip length and number of trips presented in this table.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel

MDO - market delivery operation

VMT - vehicle miles traveled

Table B-2. Operational Mobile Source Fleet Mixes
Costco Commercial Center
Fresno, California

Vehicle Category	Fuel Type	Fleet Mix CalEEMod® Default[1]	EMFAC VMT Output[2] (miles/day)	Employee Vehicle Fleet Mix[3]	Member Vehicle Fleet Mix[4]
LDA	Gas	51.0%	12,057,533	52.8%	55.0%
	Phe		351,337	1.54%	1.6%
	Elec		514,390	2.25%	0%
	Dsl		22,675	0.10%	0%
LDT1	Gas	5.3%	1,013,826	5.88%	5.9%
	Phe		1,027	0.01%	0.0%
	Elec		1,049	0.01%	0%
	Dsl		250	0.00%	0%
LDT2	Gas	17.6%	5,488,159	19.29%	19.4%
	Phe		39,774	0.14%	0.1%
	Elec		17,710	0.06%	0%
	Dsl		14,595	0.05%	0%
MDV	Gas	16.1%	4,629,686	17.47%	17.8%
	Phe		29,118	0.11%	0.1%
	Elec		19,405	0.07%	0%
	Dsl		71,606	0.27%	0%
LHD1	All	2.7%	--	--	--
LHD2	All	0.7%	--	--	--
MHD	All	1.4%	--	--	--
HHDT	All	2.2%	--	--	--
OBUS	All	0.1%	--	--	--
UBUS	All	0.0%	--	--	--
MCY	All	2.4%	--	--	--
SBUS	All	0.2%	--	--	--
MH	All	0.3%	--	--	--

Notes:

[1] CalEEMod® default for Fresno County calendar year 2023.

[2] Data obtained from EMFAC2021 for default emissions activity.

[3] Fleet mix for employee vehicles estimated based on the ratio of the vehicle classes in CalEEMod® default fleet mix and the EMFAC2021 VMT output.

[4] Fleet mix for member vehicles visiting the Costco Gas Station are estimated based on the ratio of the vehicle classes in CalEEMod® default fleet mix and the EMFAC2021 VMT output. Vehicles are assumed to be gasoline or plug-in hybrid.

Abbreviations:

CalEEMod® - CALifornia Emissions Estimator MODel
EMFAC - EMission FACtors model
HHDT - Heavy heavy-duty truck
LDA - light duty automobiles
LDT - light-duty trucks
LHD - light heavy-duty trucks
MCY - motorcycles
MDV - medium-duty vehicle
MH - motor homes
MHD - medium heavy-duty trucks
OBUS - other buses
SBUS - school buses
UBUS - urban buses
VMT - vehicle miles traveled

Table B-3. Operational Mobile Source GHG Emission Factors - Running Exhaust
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	EMFAC VMT Output[1] (miles/day)	EMFAC Emissions Output[1]		
			CO_2	N_2O	CH_4
Passenger Vehicles					
LDA	Gas	12,057,533	3,843	0.06	0.03
LDA	Phe	351,337	53	0.00	0.00
LDA	Elec	514,390	0	0.00	0.00
LDA	Dsl	22,675	6	0.00	0.00
LDT1	Gas	1,013,826	388	0.01	0.01
LDT1	Phe	1,027	0	0.00	0.00
LDT1	Elec	1,049	0	0.00	0.00
LDT1	Dsl	250	0	0.00	0.00
LDT2	Gas	5,488,159	2,188	0.04	0.02
LDT2	Phe	39,774	6	0.00	0.00
LDT2	Elec	17,710	0	0.00	0.00
LDT2	Dsl	14,595	5	0.00	0.00
MDV	Gas	4,629,686	2,265	0.05	0.02
MDV	Phe	29,118	4	0.00	0.00
MDV	Elec	19,405	0	0.00	0.00
MDV	Dsl	71,606	32	0.01	0.00
Delivery Trucks[2]					
HHDT	Dsl	2,030,441	3,590	0.57	0.00

EMFAC Vehicle Class	Fuel	Running Exhaust Emission Factors[3] (grams/mile)		
		CO_2	N_2O	CH_4
Passenger Vehicles				
LDA	Gas	289	0.005	0.002
LDA	Phe	136	0.001	0.000
LDA	Elec	0	0.000	0.000
LDA	Dsl	231	0.036	0.001
LDT1	Gas	347	0.013	0.009
LDT1	Phe	124	0.001	0.000
LDT1	Elec	0	0.000	0.000
LDT1	Dsl	401	0.063	0.012
LDT2	Gas	362	0.007	0.003
LDT2	Phe	129	0.001	0.000
LDT2	Elec	0	0.000	0.000
LDT2	Dsl	307	0.048	0.001
MDV	Gas	444	0.009	0.005
MDV	Phe	136	0.001	0.000
MDV	Elec	0	0.000	0.000
MDV	Dsl	412	0.065	0.001

Table B-3. Operational Mobile Source GHG Emission Factors - Running Exhaust
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	Running Exhaust Emission Factors[3] (grams/mile)		
		CO_2	N_2O	CH_4
Member Vehicle Emission Factor[4]		331	0.006	0.003
Employee Vehicle Emission Factor[4]		324	0.006	0.003
Delivery Trucks[2]				
HHDT	Dsl	1604.00	0.25	0.00

Notes:

[1] Data obtained from EMFAC2021 for default emissions activity.

[2] Delivery trucks are assumed to be diesel-fueled.

[3] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.

[4] Emission factors for EMFAC vehicle classes are weighted based on the project-specific fleet mix in Table B-2 to estimate trip-based emission factors for passenger vehicles.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
Dsl - Diesel
Elec - Electric
EMFAC - EMission FACtors model
LDA - Light Duty Automobile
LDT - Light-Duty Truck
HHDT - Heavy-Heavy Duty truck
MDV - medium-duty vehicle
N_2O - nitrous oxide
Phe - Plug-in hybrid
VMT - vehicle miles traveled

Conversion Factor:

907184.74 grams per ton

Table B-4. Operational Mobile Source GHG Emission Factors - Starting Exhaust
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	EMFAC Vehicle Trips Output[1] (trips/day)	EMFAC Emissions Output[1] (tons/day)		
			CO_2	N_2O	CH_4
Passenger Vehicles					
LDA	Gas	1,459,129	115.4	0.1	0.119
LDA	Phe	31,224	2.29	0.0	0.001
LDA	Elec	56,838	0	0	0
LDA	Dsl	3,207	0	0	0
LDT1	Gas	135,565	13.9	0.0	0.021
LDT1	Phe	83	0.0066	0.000	0.0
LDT1	Elec	118	0	0	0
LDT1	Dsl	62	0	0	0
LDT2	Gas	657,946	66.5	0.0	0.067
LDT2	Phe	3,337	0.290	0.0	0.000
LDT2	Elec	2,516	0	0	0
LDT2	Dsl	1,661	0	0	0
MDV	Gas	598,810	75.1	0.0	0.081
MDV	Phe	2,568	0.3	0.0	0.000
MDV	Elec	2,761	0	0	0
MDV	Dsl	8,640	0	0	0
Delivery Trucks[2]					
HHDT	Dsl	237,288	0.0	0.0	0.0

Vehicle Class	Fuel	Starting Exhaust Emission Factors[3] (grams/trip)		
		CO_2	N_2O	CH_4
Passenger Vehicles				
LDA	Gas	71.73	0.03	0.0742
LDA	Phe	66.44	0.02	0.0416
LDA	Elec	0	0	0
LDA	Dsl	0	0	0
LDT1	Gas	93.34	0.04	0.1408
LDT1	Phe	72.34	0.02	0.0416
LDT1	Elec	0	0	0
LDT1	Dsl	0	0	0
LDT2	Gas	91.64	0.04	0.0925
LDT2	Phe	78.85	0.02	0.0416
LDT2	Elec	0	0	0
LDT2	Dsl	0	0	0
MDV	Gas	113.71	0.05	0.1229
MDV	Phe	99.36	0.02	0.0416
MDV	Elec	0	0	0
MDV	Dsl	0	0	0
Member Vehicle Weighted Emission Factor[4]		84	0.038	0.090
Employee Vehicle Weighted Emission Factor[4]		82	0.037	0.087

Table B-4. Operational Mobile Source GHG Emission Factors - Starting Exhaust
Costco Commercial Center
Fresno, California

Vehicle Class	Fuel	Starting Exhaust Emission Factors[3] (grams/trip)		
		CO_2	N_2O	CH_4
Delivery Trucks[2]				
HHDT	Dsl	0.0	0.0	0.0

Notes:

[1] Data obtained from EMFAC2021 for default emissions activity.

[2] Delivery trucks are assumed to be diesel-fueled.

[3] Emission factors for EMFAC vehicle classes are estimated as a ratio of the EMFAC emissions output and EMFAC VMT output.

[4] Emission factors for EMFAC vehicle classes are weighted based on the project-specific fleet mix in Table B-2 to estimate trip-based emission factors for passenger vehicles.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
Dsl - Diesel
Elec - Electric
EMFAC - EMission FACtors model
LDA - Light Duty Automobile
LDT - Light-Duty Truck
HHDT - Heavy-Heavy Duty truck
MDV - medium-duty vehicle
N_2O - nitrous oxide
Phe - Plug-in hybrid
VMT - vehicle miles traveled

Conversion Factor:

907184.74 grams per ton

Table B-5. Operational Mobile Source GHG Emission Factors - Idling Exhaust
Costco Commercial Center
Fresno, California

EMFAC Vehicle Class	Fuel	Idling Emission Factors[1] (grams/idle-minute)		
		CO_2	N_2O	CH_4
Passenger Vehicles				
LDA	Gas	27.7	0	0.0007
LDA	Phe	17.1	0	0.0002
LDA	Elec	0.0	0	0.0000
LDA	Dsl	25.1	0	0.0006
LDT1	Gas	33.2	0	0.0023
LDT1	Phe	15.5	0	0.0002
LDT1	Elec	0.0	0	0.0000
LDT1	Dsl	43.0	0	0.0023
LDT2	Gas	34.9	0	0.0009
LDT2	Phe	16.1	0	0.0002
LDT2	Elec	0.0	0	0.0000
LDT2	Dsl	32.9	0	0.0005
MDV	Gas	43.1	0	0.0013
MDV	Phe	16.9	0	0.0002
MDV	Elec	0.0	0	0.0000
MDV	Dsl	41.6	0	0.0004
Member Vehicle Weighted Emission Factor[2]		32.0	0	0.0009
Employee Vehicle Weighted Emission Factor[2]		31.3	0	0.0009
Delivery Trucks[3]				
HHDT	Dsl	224.0	0	0.0021

Notes:

[1] Data obtained from EMFAC2021 project-level output. Passenger vehicle emission rates are equivalent to the running exhaust emission rate in grams per mile at 5 mph, multiplied by the speed correction factor of 2.5 mph.

[2] Emission factors for EMFAC vehicle classes are weighted based on the project-specific fleet mix in Table B-2 to estimate trip-based emission factors for passenger vehicles.

[3] Delivery trucks are assumed to be diesel-fueled.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
Dsl - Diesel
Elec - Electric
EMFAC - EMission FACtors model
LDA - Light Duty Automobile
mph - miles per hour
LDT - Light-Duty Truck
HHDT - Heavy-Heavy Duty truck
MDV - medium-duty vehicle
N_2O - nitrous oxide
Phe - Plug-in hybrid
VMT - vehicle miles traveled

Conversion Factor:

60 minutes per hour

Table B-6a. Greenhouse Gas Emission Estimates for Operational Mobile Sources (Herndon/Riverside)
Costco Commercial Center
Fresno, California

Mobile Source Activity	Trip Type	Trip Distance[1] (miles)	Annual Average Trips[1] (one-way trips/year)	Annual Average VMT[1] (miles/year)	Idle Duration[2,3] (minutes/year)	GHG Emissions[4] (MT/yr)			
						CO_2	N_2O	CH_4	CO_2e[5]
Member Vehicles	Primary	17.3	3,666,790	63,337,720	--	21,293	0.54	0.54	21,468.0
	Diverted	1.0	1,473,870	1,503,435	--	622.32	0.07	0.14	645.2
	Pass-By	0.10	1,382,620	138,262	--	162.36	0.05	0.12	181.3
Warehouse, Fuel Station, and Car Wash Employee Vehicles	Primary	30.7	109,500	3,361,650	--	1,099	0.03	0.02	1,106.9
MDO Driver and Warehouse Employee Vehicles	Primary	30.70	49,640	1,523,875	--	498	0.01	0.01	501.8
MDO Delivery Trucks	Primary	81.5	7,300	594,950	18,250	958	0.15	0.00	1,003.2
Fuel Delivery Trucks	Primary	125.0	5,110	638,750	12,775	1,027	0.16	0.00	1,075.5
Warehouse Delivery Trucks	Primary	125.0	9,490	1,186,250	23,725	1,908	0.30	0.00	1,997.4
Member Vehicle Idling at Gasoline Dispensing Facility	Primary	--	--	--	33,638,400	1,076	0.00	0.03	1,076.5
					Total Emissions	28,643	1.31	0.86	29,056

Notes

[1] Data obtained from Table B-1a.

[2] Idle duration for passenger vehicles visiting the gas station is estimated using a maximum queue length of 3 vehicles per queue lane and a transaction time of 4 minutes per vehicle. The queue is assumed to stay constant while the gas station is open (6 AM to 10 PM), 7 days/week. Queue length is based on Saturday midday peak hour average queue length projections from existing Costco facilities provided by Kittelson & Associates.

[3] Delivery truck idle duration is 5 minutes based on the CARB Air Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. Available at: https://ww2.arb.ca.gov/our-work/programs/atcm-to-limit-vehicle-idling/about. Accessed: September 2021. For GDF idling this is actually idling duration in units of minutes per year.

[4] GHG emissions include running exhaust, starting exhaust, and idling exhaust. Emissions were estimated using emission factors from Tables B-3, B-4, and B-5 along with annual VMT, annual trips, and idle duration.

[5] CO_2e was estimated using the global warming potentials of CO_2, CH_4, and N_2O, which are 1, 25, and 298 respectively.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
MT - metric tonnes
N_2O - nitrous oxide
VMT - vehicle miles traveled
yr - year

Table B-6b. Greenhouse Gas Emission Estimates for Operational Mobile Sources (4500 W. Shaw Avenue)
Costco Commercial Center
Fresno, California

Mobile Source Activity	Trip Type	Annual Average Trips[1] (one-way trips/year)	Annual Average VMT[1] (miles/year)	GHG Emissions[2] (MT/yr)			
				CO_2	N_2O	CH_4	CO_2e[3]
Passenger Vehicles	Primary	497,495	21,266,360	7,087	0.15	0.11	7,136
	Pass-by	17,520	0	1.48	0.00	0.00	1.7
	Diverted	766,135	1,256,330	481	0.04	0.07	494
Total Emissions				**7,570**	**0.19**	**0.19**	**7,632**

Notes

[1] Data obtained from Table B-1b.

[2] GHG emissions include running exhaust and starting exhaust. Emissions were estimated using emission factors from Tables B-3 and B-4 along with annual VMT and annual trips.

[3] CO_2e was estimated using the global warming potentials of CO_2, CH_4, and N_2O, which are 1, 25, and 298, respectively.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
MT - metric tonnes
N_2O - nitrous oxide
VMT - vehicle miles traveled
yr - year

APPENDIX C
GHG CONSISTENCY

Table C-1. Consistency with 2022 CARB Scoping Plan Update
Costco Commercial Center
Fresno, California

Priority Areas	Priority GHG Reduction Strategies	Consistency
Transportation Electrification	Convert local government fleets to ZEVs and provide EV charging at public sites	**Consistent.** Although this goal is not applicable to an individual commercial development project, the Project includes an EV parking requirement and includes 45 installed EV spaces.
	Create a jurisdiction-specific ZEV ecosystem to support deployment of ZEVs statewide (such as building standards that exceed state building codes, permit streamlining, infrastructure siting, consumer education, preferential parking policies, and ZEV readiness plans)	
VMT Reduction	Reduce or eliminate minimum parking standards	**Consistent.** Although this goal is not applicable to an individual commercial development project, the Project is implementing neighborhood design improvements such as pedestrian network improvements and constructing bikeway facilities as part of the project. The Project also includes a redesignation from Expressway Area to Superarterial, which allows for multiple modes of travel traffic, including pedestrian and bikes. This could lead to further development of these types of non-vehicular facilities, including bike lanes and sidewalks, which are not currently allowed under the Expressway Area designation. In addition, the Project plans to encourage employee commute trip reduction through a variety of strategies. The project will provide carpool incentives, partner with local agencies to provide vanpool services, subsidize transit passes and provide bicycle storage and locker rooms for employees who bike to work. This will reduce the employee VMT and provide incentives for employees to commute to work alternative ways.
	Implement Complete Streets policies and investments, consistent with general plan circulation element requirements	
	Increase access to public transit by increasing density of development near transit, improving transit service by increasing service frequency, creating bus priority lanes, reducing or eliminating fares, microtransit, etc.	
	Increase public access to clean mobility options by planning for and investing in electric shuttles, bike share, car share, and walking	
	Implement parking pricing or transportation demand management pricing strategies	
	Amend zoning or development codes to enable mixed-use, walkable, transit-oriented, and compact infill development (such as increasing the allowable density of a neighborhood)	
	Preserve natural and working lands by implementing land use policies that guide development toward infill areas and do not convert "greenfield" land to urban uses (e.g., green belts, strategic conservation easements)	
Building Decarbonization	Adopt all-electric new construction reach codes for residential and commercial uses	**Consistent.** Although this goal is not applicable to an individual commercial development project, the Project plans to use PG&E's Solar Choice program, which provides 100% solar energy to customers. In addition, to the extent applicable to the Project, the Project would meet the CalGreen Building Standards Code in effect at the time of building permit application, which would include a number of energy saving requirements.
	Adopt policies and incentive programs to implement energy efficiency retrofits for existing buildings, such as weatherization, lighting upgrades, and replacing energy-intensive appliances and equipment with more efficient systems (such as Energy Star-rated equipment and equipment controllers)	
	Adopt policies and incentive programs to electrify all appliances and equipment in existing buildings such as appliance rebates, existing building reach codes, or time of sale electrification ordinances	
	Facilitate deployment of renewable energy production and distribution and energy storage on privately owned land uses (e.g., permit streamlining, information sharing)	
	Deploy renewable energy production and energy storage directly in new public projects and on existing public facilities (e.g., solar photovoltaic systems on rooftops of municipal buildings and on canopies in public parking lots, battery storage systems in municipal buildings)	

Abbreviations:
CalGreen - California Green Building Standards Code
CARB - California Air Resources Board
EV - electric vehicle
GHG - greenhouse gas
PG&E - Pacific Gas & Electric
VMT - vehicle miles traveled
ZEV - zero emission vehicle

Table C-2. Consistency with Fresno Regional Transportation Plan/Sustainable Communities Strategy
Costco Commercial Center
Fresno, California

#	Goal	Policy	Consistency Analysis
1	Improved mobility and accessibility for all	Encourage and prioritize full, fair, and equitable participation by all affected communities in transportation decision-making and planning processes.	**Consistent.** Although this goal is not applicable to an individual commercial development project, it is envisioned that Project's location will provide convenient access for nearby residences for additional retail shopping experiences. In addition, the project is implementing neighborhood design improvements such as pedestrian network improvements and constructing bikeway facilities as part of the project, and will be located in close proximity to transit stops (e.g., NW Herndon-Hayes transit stop).
		Actively work to ensure equitable distribution of the benefits and burdens of transportation projects.	
		Promote the improvement and expansion of accessible transportation options to serve the needs of all residents, especially those who have historically faced disproportionate transportation burdens.	
2	Vibrant communities that are accessible by sustainable transportation options	Encourage alternatives to single-occupancy vehicles that reduce vehicle miles traveled (VMT) and greenhouse gas emissions.	**Consistent.** Although this goal is not applicable to an individual commercial development project, the Project includes a redesignation from Expressway Area to Superarterial, which allows for multiple modes of travel traffic, including pedestrian and bikes. This could lead to further development of these types of non-vehicular facilities, including bike lanes and sidewalks, which are not currently allowed under the Expressway Area designation. In addition, the project is implementing neighborhood design improvements such as pedestrian network improvements and constructing bikeway facilities as part of the project. The Project will be located nearby transit facilities such as the NW Herndon-Hayes transit stop, thus allowing for alternatives to single-occupancy vehicle visits to the Project that would support efforts to improve air quality and minimize pollutants from transportation.
		Support investment in and promotion of active transportation and transit to improve public health and mobility, especially in historically underinvested areas.	
		Encourage sustainable development that focuses growth near activity centers and mobility options that achieve greater location efficiency.	
		Support local jurisdictions' efforts to minimize the loss of farmland, environmentally sensitive areas, and natural resources	
		Support local jurisdictions' efforts to facilitate the development of diverse housing choices for all income groups.	
		Facilitate and promote interagency coordination and consistency across planning efforts.	
		Incentivize and support efforts to improve air quality and minimize pollutants from transportation.	
3	A safe, well-maintained, efficient, and climate-resilient multimodal transportation network	Prioritize investment in and promote multimodal safety measures to reduce traffic fatalities and incidents in the region.	**Consistent.** Per the Transportation Impact Analysis, the Project would be consistent with the applicable plans, policies, and programs and would not conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities. The Project plans to encourage commute trip reduction through a variety of strategies. The Project will provide carpool incentives, partner with local agencies to provide vanpool services, subsidize transit passes and provide bicycle storage and locker rooms for employees who bike to work. This will reduce the employee VMT and provide incentives for employees to commute to work alternative ways. The Project is implementing neighborhood design improvements such as pedestrian network improvements and constructing bikeway facilities as part of the project. In addition, the Project would be located nearby to transit stops and thus would allow for utilization of existing transit facilities to visit the Project.
		Promote enhanced Transportation Systems Management (TSM) and Transportation Demand Management (TDM) strategies to reduce congestion and vehicle miles traveled.	
		Encourage improvements in travel connections across all modes to create an integrated, accessible, and seamless transportation network.	
		Maximize the cost-effectiveness of transportation improvements.	
		Encourage investments that increase the system's resilience to extreme weather events, natural disasters, and pandemics.	
		Preserve and maintain existing multimodal transportation assets in a state of good repair	
4	A transportation network that supports a sustainable and vibrant economy	Support local and regional economic development by leveraging planning and transportation funds that foster public and private investment.	**Consistent.** Although this goal is not applicable to an individual commercial development project, the Project will facilitate goods movement to the Fresno area and provide approximately 165 to 175 jobs.
		Facilitate efficient, reliable, resilient, and sustainable goods movement.	
5	A region embracing clean transportation, technology, and innovation	Support innovative mobility solutions that are accessible, affordable, reduce greenhouse gas emissions, and improve air quality.	**Consistent.** Although this goal is not applicable to an individual commercial development project, the Project would be located nearby to transit stops and thus would allow for utilization of existing transit facilities to visit the Project. In addition, the Project includes an EV parking requirement and includes 45 installed EV spaces.
		Support efforts to expand broadband access throughout the region.	**Not Applicable.**

Abbreviations:
EV - electric vehicle
NW - northwest
TDM - Transportation Demand Management
TSM - Transportation Systems Management
VMT - vehicle miles traveled

3. Greenhouse Gas (GHG) Reduction Plan Update - CEQA Project Consistency Checklist

GHG Reduction Plan Update consistency review involves the evaluation of project consistency with the applicable strategies of the GHG Reduction Plan Update. The GHG reduction strategies identified in the GHG Reduction Plan Update relies upon the General Plan and additional local measures as the basis of the development related strategies to reduce GHG emissions. This checklist is developed based on the key local GHG reduction strategies and actions identified in the GHG Reduction Plan Update that are applicable to proposed development projects. Note that not all strategies listed below will apply to all projects. For example, not all projects will meet mixed-use related policies of the General Plan, because not all projects are required to be mixed use.

Checklist Item (Check the appropriate box and provide an explanation for your answer)	Relevant General Plan Policy	Yes	No	Not Applicable (NA)	Explanation
1: Land Use and Transportation Demand Strategies					
a. Does the project include mixed-use, development? For GHG Reduction Plan consistency, mixed-use development is defined as pedestrian-friendly development that blends two or more residential, commercial, cultural, or institutional, uses, one of which must be residential	Policy UF-1-c, LU-3-b, Objective-UF 12, UF-12-a, UF-12-b, UF-12-d, Policy RC-2-a			NA	The project is not a mixed-use development as it does not include residential development.
b. Is the project high density? For GHG Reduction Plan consistency, is the project developed at 12 units per acre or higher?	LU-5-f			NA	The project is not high density.
c. Is the project infill development, pursuant to the General Plan definition of location within the City limits as of December 31, 2012?	LU-2-a, Objective-12, UF-12-a, UF-12-b, UF-12-d	yes			
d. Does the project implement pedestrian bicycle, and transit linkages with surrounding land uses and neighborhoods? For GHG Reduction Plan consistency, the project must include all sidewalks, paths, trails, and facilities required by the General Plan and Active Transportation Plan, as implemented through the Fresno Municipal Code and project conditions of approval.	Policy UF-1-c, UF-12-e, Policy RC-2-a, Objective MT-4,5,6, Policy MT-4-c, Policy MT-6-a, Policy POSS-7-h Objective MT 8, Policies MT-8-a, MT-8-b	yes			The project implements pedestrian, bicycle, and transit linkages to surrounding land uses and neighborhoods consistent with Fresno's General Plan and Active Transportation Plan.
e. If the project includes mixed-use or high density development, is it located within ½ mile of a High Quality Transit Area as defined in the City's CEQA Guidelines for Vehicle Miles Traveled? Or, is the project located within 500 feet of an existing or planned transit stop?	Policy UF-12-a, UF-12-b, LU-3-b, Objective MT 8, Policies MT-8-a, MT-8-b			NA	The project is not a mixed-use or high density development
f. Will the project accommodate a large employer (over 100 employees) and will it implement trip reduction programs such as increasing transit use, carpooling, vanpooling, bicycling, or other measures to reduce vehicle miles traveled pursuant to San Joaquin Valley Air Pollution Control District Rule 9410? See the SJVAPCD website for details: https://www.valleyair.org/rules/currntrules/r9410.pdf	Policy MT-8-b, Objective MT-9, Policy MT-10-c, San Joaquin Valley Air Pollution Control District Rule 9410	yes			The project will implement trip reduction programs to encourage carpooling and other measures to reduce employee VMT.

Checklist Item (Check the appropriate box and provide an explanation for your answer)	Relevant General Plan Policy	Yes	No	Not Applicable (NA)	Explanation
g. If the project includes modifications to the transportation network, do those improvements meet the requirements of the City of Fresno's Complete Streets Policy, adopted in October 2019? According to the policy, a complete street is a transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users - including bicyclists, pedestrians, transit vehicles, trucks, and motorists - appropriate to the function and context of the facility while connecting to a larger transportation network. See City of Fresno website for details: https://www.fresno.gov/publicworks/wp-content/uploads/sites/17/2019/10/Complete-Streets-091119.pdf	MT-1-g, MT-1-h	yes			The project includes modifications to the transportation network consistent with the City's Complete Streets Policy. Such improvements include constructing sidewalk along the project frontage, constructing a multi-use path, and installing striping to better delineate the roadway cross section for different users.
h. Does the project have a less than significant VMT impact, either through satisfying screening criteria or mitigating VMT impacts, pursuant to the City's adopted VMT thresholds? See City of Fresno website for details: https://www.fresno.gov/darm/wp-content/uploads/sites/10/2021/01/CEQA-Guidelines-for-Vehicle-Miles-Traveled-Final-Adopted-Version.pdf	MT-2-b, MT-2-c	no			The project has a significant VMT impact.
2: Electric Vehicle Strategies					
a. For new multi-family dwelling units with parking, does the project provide EV charging spaces capable of supporting future EV supply equipment (EV capable) at 10% of the parking spaces per 2019 California Green Building Standards Code (CALGREEN, Title 24, Part 11), Section 4.106.4	Policy RC-8-j			NA	The project does not consist of multi-family dwelling units.
b. For new commercial buildings, does project provide EV charging spaces capable of supporting EV capable spaces at 4% to 10% of the parking spaces per 2019 California Green Building Standards Code (CALGREEN, Title 24, Part 11), Section 5.106.5.3	Policy RC-8-j	yes			Of 889 parking spaces, there will be 45 installed EV spaces, which is 5% of the parking spaces (in range).
3: Energy Conservation Strategies					
a. Does the project meet or exceed mandatory state building energy codes? If yes, does the project follow any other GreenPoint ratings such as LEED, Energy Star or others? If yes, indicate level of certification-Silver, gold, platinum if applicable?	Policy RC-5-c, Objective RC-8, Policy RC 8-a	yes			The project meets mandatory building energy codes; Costco's warehouse designs are consistent with the requirements of LEED.
b. For commercial projects, does the project achieve net zero emissions electricity? Mark NA if project will be permitted before 2030. Mark Yes if voluntary. Add source and capacity in explanation.	Additional Recommended GHG Plan Measure, supports Objective RC-8			NA	Project buildout is in 2023.

Checklist Item (Check the appropriate box and provide an explanation for your answer)	Relevant General Plan Policy	Yes	No	Not Applicable (NA)	Explanation
4: Water Conservation Strategies					
a. Does the project meet or exceed the mandatory outdoor water use measures of the 2019 California Green Building Standards Code (CALGREEN, Title 24, Part 11), Section 4.304? If the project exceeds CalGreen Code mandatory measures provide methods in excess of requirements in the explanation. Examples include outdoor water conservation measures such as; drought tolerant landscaping plants, compliant irrigation systems, xeriscape, replacing turf etc. Provide the conservation measure that the project will include in the explanation.	Objective RC-7, Policy RC-7-a, RC-7-h	yes			The project meets the mandatory outdoor water use measures.
b. Does the project meet or exceed the mandatory indoor water use measures of the 2019 California Green Building Standards Code (CALGREEN, Title 24, Part 11), Section 4.303? If the project exceeds CalGreen Code, mandatory measures provide methods in excess of requirements in the explanation. Examples may include water conserving devices and systems such as water leak detection system, hot water pipe insulation, pressure reducing valves, energy efficient appliances such as Energy Star Certified dishwashers, washing machines, dual flush toilets, point of use and/or tankless water heaters.	Objective RC-7, Policy RC-7-a, RC-7-e	yes			The project meets the mandatory indoor water use measures. High-efficiency restroom fixtures save 40% more water.
5: Waste Diversion and Recycling Strategies					
a. Does the project implement techniques of solid waste segregation, disposal and reduction, such as recycling, composting, waste to energy technology, and/or waste separation, to reduce the volume of solid wastes that must be sent to landfill facilities?	Policy PU-9-a, RC-11-a	yes			Costco prefers full metal buildings in order to use the maximum amount of recycled material.
b. During construction will the project recycle construction and demolition waste?	Policy RC-11-a	yes			The project will recycle construction and demolition waste.
c. Does the project provide recycling canisters in public areas where trashcans are also provided?	Policy RC-11-a	yes			The project will provide recycling canisters.

Note: The GHG reduction strategies included in this checklist are based on the GHG reduction strategies identified in the Chapter 5 of the GHG Reduction Plan Update.

Appendix G

Phase II Environmental Site Assessment

February 26, 2021
Kleinfelder Project No. 20212904.001A

Costco Wholesale
999 Lake Drive
Issaquah, Washington 98027

Attention: Ms. Kim Katz
Director of Real Estate Development

Subject: Limited Phase II Environmental Site Assessment Report
Proposed Costco Warehouse and Gas Station
NE Corner of North Riverside Drive and West Herndon Avenue
Fresno, Fresno County, California 93722
N Fresno (Riverside-Relo W031) CW20-0569

Dear Mr. Katz:

Kleinfelder is pleased to provide Costco Wholesale Corporation (Costco) this Limited Phase II Environmental Site Assessment (ESA) Report concerning the proposed Costco warehouse and gas station (the "Site") on the property located at the northeastern corner of West Herndon Avenue and North Riverside Drive, in the City of Fresno, Fresno County, California (see Figure 1).

In summary, ten composite soil samples (including one duplicate) and ten discrete soil samples (including one duplicate) were collected during the Limited Phase II ESA and were submitted for laboratory analysis of organochlorine pesticides (OCPs), arsenic, and lead. The analytical results were compared by Kleinfelder to environmental and human health screening levels and hazardous waste threshold values. The comparisons indicated reported concentrations of OCPs, arsenic, and lead present in the soil samples were below their respective human health screening criteria for commercial/industrial soils, and below thresholds for classification as a California-regulated or Federal Resource Conservation and Recovery Act (RCRA) hazardous waste. Based on the analytical results, no further assessment for OCPs and metals is presently recommended.

BACKGROUND INFORMATION

The Site consists of approximately 23.74 acres of land northeast of the intersection of North Riverside Drive and West Herndon Avenue. The Site is located on a portion of one parcel of land, identified by the Fresno County Assessor as Assessor's Parcel Number (APN) 503-020-12. The Site was used as an orchard from at least 1937 through 1998. The Site has been vacant from 2006 to date. An electrical transmission line has been present extending across the Site diagonally from the northwest corner to the eastern side of the Site since at least 1964. Stockpiles of soil and debris were visible on the 2009 aerial photograph.

24411 Ridge Route Drive, Suite 225, Laguna Hills, CA 92653 **p |** 949.727.4466 **f |** 949.727.9242

Kleinfelder's draft Phase I ESA, dated January 15, 2021[1], identified the historical use of the Site as an orchard as a recognized environmental concern (REC) due to the potential presence of arsenic and lead in surface soils, as these metals were often used as a pesticide in orchards. Kleinfelder's Phase I ESA recommended a Limited Phase II ESA to assess the presence of arsenic, lead, and pesticides and assist in waste characterization during proposed construction activities.

LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT

The Limited Phase II ESA scope included the following.

Health and Safety Plan Preparation

Prior to initiation of field activities, Kleinfelder prepared a Site-Specific Health and Safety Plan that includes information regarding possible chemical hazards, physical hazards, monitoring equipment, and contingency plans for emergencies that may arise during field activities. This plan was based on the general knowledge of chemical characteristics of materials likely present on the Site. Based on environmental conditions actually present, Level D Protection (with personal protective equipment including gloves, steel-toe rubber boots, hard hat, and eye protection) was adequate for performing the field activities described herein.

Soil Sampling

In total, Kleinfelder collected soil samples from 36 locations, designated SS-1a, -1b, -1c, and -1d through SS-9a, -9b, -9c, and -9d, at the Site. Soil samples were collected from the upper six inches of soil. Kleinfelder used a hand trowel to clear the vegetation from each sample location, and then packed the laboratory-provided glass jars by hand. The glass jars were then labeled with pertinent information and then promptly placed into a (water) ice-chilled cooler for temporary storage.

Prior to the collection of each sample, the hand trowel was cleaned by washing in a non-phosphate detergent (i.e., Liquinox™) and tap water wash, and then rinsing in deionized water.

Laboratory Analyses

The soil samples were submitted to ASSET Laboratories (ASSET), a California Environmental Laboratory Accreditation Program-accredited laboratory, for analysis. Soil samples were composited into nine primary soil samples (SS-1 COMPOSITE through SS-9 COMPOSITE) plus one duplicate sample (SS-7 duplicate COMPOSITE) at a four-to-one ratio and analyzed for OCPs, using United States Environmental Protection Agency (US EPA) Method 8081A. Additionally, nine primary discrete soil samples (SS-1@1c through SS-9@9c) plus one duplicate sample (SS-7 duplicate @7d) collected from across the Site were analyzed for arsenic and lead using US EPA Method 6010B.

[1] Kleinfelder, 2021. *DRAFT - Phase I Environmental Site Assessment, Proposed Costco Warehouse and Gas Station, NE Corner of North Riverside Drive and West Herndon Avenue, Fresno, Fresno County, California 93722, N Fresno (Riverside-Relo W031) CW20-0569,* January 15.

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FIELD OBSERVATIONS AND ANALYTICAL RESULTS

Soil Sampling Analytical Results

A summary of the analytical results for the soil samples follows:

- As Table 1 indicates, ten composite soil samples were analyzed for OCPs, including a duplicate collected of the SS-7 COMPOSITE soil sample. The OCPs 4,4'-dichlorodiphenyldichloroethene (4,4'-DDE), alpha-chlordane, chlordane, and gamma-chlordane had concentrations reported above method detection limits (MDL). The OCPs 4,4'-DDE and gamma-chlordane were reported at concentrations of 0.35 J milligrams per kilogram (mg/kg) and 0.32 J mg/kg, respectively, in the SS-2 COMPOSITE soil sample. The "J" qualifier indicates that the analytical result is above the MDL but below the laboratory reporting limit and is an estimated value. The OCPs alpha-chlordane, chlordane, and gamma-chlordane were reported at concentrations of 0.96 J mg/kg, 12 mg/kg, and 1.2 mg/kg, respectively, in the SS-3 COMPOSITE soil sample. Other OCPs were not present in the samples at concentrations at or above their respective reporting limit.
- As Table 2 indicates, ten discrete soil samples were analyzed arsenic and lead, including a duplicate of the SS-07@7d soil sample. Arsenic concentrations were not present in each of the samples at concentrations at or above their respective MDL. Lead concentrations were detected in each sample analyzed and ranged from 4.4 mg/kg to 7.4 mg/kg.

ASSET's laboratory report of its analyses is attached. Kleinfelder's evaluation of the analytical results is provided in the next section of this report.

EVALUATION OF ANALYTICAL RESULTS

The soil analytical results were compared to San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) Tier 1 Environmental Screening Levels (ESLs), last updated in July 2019. The Tier 1 ESLs were designed by the SFBRWQCB to be protective for properties with unrestricted land and water use, and they address media including soil, groundwater, and soil vapor along with a range of concerns including direct exposure human health risks, impact to drinking water, vapor intrusion, and impact to terrestrial habitat. Use of the Tier 1 ESLs applies the most conservative ESL for each analyte of concern. In addition to comparison with the Tier 1 ESLs, the results were also compared to the SFBRWQCB's commercial/industrial ESLs updated in July 2019.

The soil analytical results were also compared to human-health risk-based screening levels for commercial/industrial soil presented in the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC), Office of Human and Ecological Risk (HERO) Human Health Risk Assessment (HHRA) Note Number 3, last updated in June 2020, for analytes that have such values. For those analytes without published DTSC HERO screening values (DTSC-SLs) for soil, Kleinfelder compared the measured concentrations in the soil samples to the US EPA's November 2020 Regional Screening Levels (RSLs) for industrial soil (for Hazard Quotient of 1.0).

Also, in consideration of concentration thresholds for California-regulated and Federal RCRA hazardous wastes, the reported concentrations were compared to their respective California Code of Regulations (CCR) Title 22 Total Threshold Limit Concentration (TTLC) value, if an constituent has a published TTLC. Also, to assess whether soluble analysis was warranted, the reported concentrations were compared to 10 times the given constituent's CCR Title 22 Soluble Threshold Limit Concentration (STLC) and 20 times its Federal Toxicity Characteristics Leaching Potential

(TCLP) thresholds, if the constituent has such published values (as previously discussed). The soluble results were compared to the respective STLC or TCLP threshold (as applicable). These applicable screening values are included in Tables 1 and 2.

As Table 1 indicates, the OCPs 4,4'-DDE, alpha-chlordane, chlordane, and gamma-chlordane had concentrations reported above MDLs in one or two of the composite soil samples. The reported concentration of 4,4'-DDE did not exceed the Tier 1 or commercial/industrial soil ESLs, commercial/industrial soil DTSC-SL, industrial soil RSL, or the TTLC for 4,4'-DDE. Alpha-chlordane and gamma-chlordane do not have individual screening levels; however, when alpha-chlordane and gamma-chlordane concentrations were added together with chlordane (as additive chlordane isomers), they do not exceed the commercial/industrial soil ESL, commercial/industrial soil DTSC-SL, industrial soil RSL, or the TTLC for chlordane. The chlordane concentration in the SS-2 COMPOSITE sample exceeded the Tier 1 ESL for chlordane, which is protective of terrestrial habitat, and is not a human health screening level or a construction worker exposure screening level. As the chlordane analytical result in the SS-2 COMPOSITE sample does not exceed human health screening levels, and the planned use of the property is development as a Costco warehouse and gas station, no further assessment is recommended.

As Table 2 indicates, arsenic was not detected above MDLs and lead concentrations did not exceed screening levels. However, the MDL for arsenic does exceed the arsenic Tier 1 and commercial/industrial soil ESLs, and the commercial/industrial soil DTSC-SL; though the arsenic MDL does not exceed the industrial RSL. The DTSC and SFBRWQCB have acknowledged that naturally-occurring (i.e., background) levels of arsenic in California soils commonly exceed soil risk-based screening levels for arsenic[2]. The MDL for arsenic is two orders of magnitude below naturally-occurring background arsenic levels. Therefore, it is Kleinfelder's opinion that the MDL is sufficiently low, and that arsenic is not a concern for the Site.

As also indicated in Table 2, arsenic and lead concentrations did not exceed the given metal's TTLC, 10 times the STLC, or 20 times the TTLC. Based on the analytical results, soil waste would be considered non-hazardous. Therefore, no further assessment is recommended.

CONCLUSIONS AND RECOMMENDATIONS

Kleinfelder's field observations and evaluations of the analytical results of the 54 samples collected and analyzed during this Limited Phase II ESA have revealed the following:

- The reported OCP concentrations do not exceed the commercial/industrial ESLs, DTSC-SLs, and RSLs for soil. Chlordane in one composite soil sample exceeds the Tier 1 ESL for terrestrial habitat, which is not directly applicable to the commercial development of the Site.
- Arsenic was not detected above the laboratory MDLs.
- Reported lead concentrations in the soil samples did not exceed its respective Tier 1 ESL, or commercial/industrial ESLs, DTSC-SLs, or RSLs.

[2] Bradford, GR, Chang AC, Page AL, Bakhtar D, Frampton JA, Wright H, 1996. *Background Concentrations of Trace Metals and Major Elements in California Soils*, Kearney Foundation of Soil Science, Division of Agriculture and Natural Resources, University of California, March 1996.

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- Kleinfelder understands the Site area sampled will be developed by Costco as a parking lot. Based on the analytical results, no further assessment for OCPs and metals is presently recommended.

LIMITATIONS

Kleinfelder performed this assessment and prepared this report in accordance with generally accepted standards of care that exist in California at this time. This report may be used only by Costco and only for the purposes stated, within a reasonable time from its issuance, but in no event later than 5 years from the date of the report. All information gathered by Kleinfelder is considered confidential and will be released only upon written authorization of Costco or as required by law. Non-compliance with any of these requirements by Costco, unless specifically agreed to in advance by Kleinfelder in writing, will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party, but only to the extent of any such non-compliance by Costco. Further limitations applicable hereto may be set forth in Costco's written agreement with Kleinfelder covering the work performed herein.

Kleinfelder's professional opinions and recommendations are based on a limited number of field observations and tests, designed, collected, and performed in accordance with the generally accepted engineering practice that exists at the time. Consequently, no warranty or guarantee, expressed or implied, is intended or made.

CLOSING REMARKS

Thank you for the opportunity to provide Kleinfelder's professional environmental services to Costco. Kleinfelder looks forward to future work with you on other projects. Please feel free to call the undersigned should you have questions.

Sincerely,

KLEINFELDER, INC.

Lindsey Dandridge-Perry
Project Professional

Lizanne Simmons, PG 7431
Senior Principal Geologist

cc: Andy Franks, Kleinfelder

Paolo Dizon, Kleinfelder

Attachments: Figure
1 – Sample Location Map
Tables
1 – Soil Analytical Results Summary – Organochlorine Pesticides
2 – Soil Analytical Results Summary – Arsenic and Lead
Analytical Laboratory Report

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FIGURE

KLEINFELDER
Bright People. Right Solutions.

PROJECT:	20212904
DRAWN:	FEB 2021
DRAWN BY:	KFH
CHECKED BY:	LDP
FILE NAME:	PhaseII_Fig1.mxd

SAMPLE LOCATION MAP

LIMITED PHASE II ENVIRONMENTAL SITE ASSESSMENT
PROPOSED COSTCO WAREHOUSE AND GAS STATION
NE CORNER OF NORTH RIVERSIDE DRIVE
AND WEST HERNDON AVENUE
FRESNO, FRESNO COUNTY, CALIFORNIA 93722
N FRESNO (RIVERSIDE-RELO W031) CW20-0569

FIGURE
1

PLOTTED: 2/26/2021 11:32:40 AM, KHagan
FILE: L:\2021\20211904.001A - CSM Costco Carson CA ENV\2.0 Technical Information\2.8 GIS
LAGUNA HILLS, CA

TABLES

Table 1
Soil Analytical Results Summary – Organochlorine Pesticides
Proposed Costco Warehouse and Gas Station
Northeast Corner of North Riverside Drive and West Herndon Avenue
Fresno, California 93722

Sample	Date Sampled	4,4'-DDD µg/kg 8081A	4,4'-DDE µg/kg 8081A	4,4'-DDT µg/kg 8081A	alpha-Chlordane µg/kg 8081A	Chlordane µg/kg 8081A	gamma-Chlordane µg/kg 8081A	Other OCPs µg/kg 8081A
SS-1 COMPOSITE	2/16/2021	ND<0.68	ND<0.35	ND<0.43	ND<0.52	ND<2.4	ND<0.28	ND<0.24-15
SS-2 COMPOSITE	2/16/2021	ND<0.67	0.35 J	ND<0.43	ND<0.52	ND<2.4	0.32 J	ND<0.24-15
SS-3 COMPOSITE	2/16/2021	ND<0.67	ND<0.35	ND<0.43	0.96 J	12	1.2	ND<0.24-15
SS-4 COMPOSITE	2/16/2021	ND<0.68	ND<0.35	ND<0.43	ND<0.52	ND<2.4	ND<0.28	ND<0.24-15
SS-5 COMPOSITE	2/16/2021	ND<0.68	ND<0.35	ND<0.43	ND<0.52	ND<2.4	ND<0.28	ND<0.24-15
SS-6 COMPOSITE	2/16/2021	ND<0.67	ND<0.35	ND<0.43	ND<0.52	ND<2.4	ND<0.28	ND<0.24-15
SS-7 COMPOSITE	2/16/2021	ND<0.68	ND<0.35	ND<0.43	ND<0.52	ND<2.4	ND<0.28	ND<0.24-15
SS-7 duplicate COMPOSITE	2/16/2021	ND<0.67	ND<0.35	ND<0.43	ND<0.52	ND<2.4	ND<0.27	ND<0.24-15
SS-8 COMPOSITE	2/16/2021	ND<0.67	ND<0.35	ND<0.43	ND<0.51	ND<2.3	ND<0.27	ND<0.23-14
SS-9 COMPOSITE	2/16/2021	ND<0.67	ND<0.35	ND<0.43	ND<0.52	ND<2.4	ND<0.28	ND<0.24-14
ESL - Tier 1		2,700	330	110	NV	8.5	NV	Vary by analyte or NV
ESL - Commercial/Industrial		12,000	8,300	8,500	NV	2,200	NV	Vary by analyte or NV
DTSC-SL - Commercial/Industrial		6,200	9,300	7,100	NV	6,100	NV	Vary by analyte or NV
RSL - Industrial		9,600	9,300	8,500	NV	7,700	NV	Vary by analyte or NV
TTLC (µg/kg)		1,000	1,000	1,000	NV	2,500	NV	Vary by analyte or NV
STLC (µg/L)		100	100	100	NV	250	NV	Vary by analyte or NV
TCLP (µg/L)		NV	NV	NV	NV	30	NV	Vary by analyte or NV
10 x STLC		1,000	1,000	1,000	NV	2,500	NV	Vary by analyte or NV
20 x TCLP		NV	NV	NV	NV	600	NV	Vary by analyte or NV

Notes:

DDD	Dichlorodiphenyldichloroethane.
DDE	Dichlorodiphenyldichloroethene.
DDT	Dichlorodiphenyltrichloroethane.
OCPs	Organochlorine pesticides, analyzed using US EPA Method 8081.
µg/kg	Micrograms per kilogram.
µg/L	Micrograms per liter.
8081A	United States Environmental Protection Agency (US EPA) analytical method number.
ND<X	Not detected at a concentration at or above the laboratory method detection limit, which follows the "less than" symbol (<).
NV	Analyte has no published value.
ESL	San Francisco Bay Regional Water Quality Control Board Environmental Screening Level for shallow soils (July 2019).
DTSC-SL	Department of Toxic Substances Control-recommended modified screening level for commercial/industrial soil (June 2020).
RSL	US EPA Regional Screening Level for industrial soil (November 2020).
TTLC	California Code of Regulations Title 22 Total Threshold Limit Concentration.
STLC	California Code of Regulations Title 22 Soluble Threshold Limit Concentration.
TCLP	Federal Toxicity Characteristic Leaching Procedure.

Table 2
Soil Analytical Results Summary – Arsenic and Lead
Proposed Costco Warehouse and Gas Station
Northeast Corner of North Riverside Drive and West Herndon Avenue
Fresno, California 93722

Sample	Date Sampled	Arsenic (mg/kg) 6010B	Lead (mg/kg) 6010B
SS-01@1c	2/16/2021	ND<0.54	5.8
SS-02@2d	2/16/2021	ND<0.54	5.5
SS-03@3b	2/16/2021	ND<0.54	6.1
SS-04@4d	2/16/2021	ND<0.54	5.8
SS-05@5a	2/16/2021	ND<0.54	4.4
SS-06@6a	2/16/2021	ND<0.54	6.1
SS-07@7d	2/16/2021	ND<0.54	5.6
SS-07 duplicate @7d	2/16/2021	ND<0.54	5.6
SS-08@8b	2/16/2021	ND<0.54	5.6
SS-09@9c	2/16/2021	ND<0.54	7.4
ESL - Tier 1		0.067	32
ESL - Commercial/Industrial		0.31	320
DTSC-SL - Commercial/Industrial		0.36	320
RSL - Industrial		3.0	800
TTLC		500	1,000
STLC (mg/L)		5.0	5.0
TCLP (mg/L)		5.0	5.0
	10 x STLC	50	50
	20 x TCLP	100	100

Notes:

mg/kg	Milligrams per kilogram.
mg/L	Milligrams per liter.
6010B	United States Environmental Protection Agency (US EPA
ND<X	Not present at a concentration at or above the method de
ESL	San Francisco Bay Regional Water Quality Control Board
DTSC-SL	Department of Toxic Substances Control-recommended s
RSL	US EPA Regional Screening Level for industrial soil (Nov
TTLC	California Code of Regulations Title 22 Total Threshold L
STLC	California Code of Regulations Title 22 Soluble Threshol
TCLP	Federal Toxicity Characteristic Leaching Procedure.

ANALYTICAL LABORATORY REPORTS

February 18, 2021

Lindsey Dandridge-Perry
Kleinfelder
24411 Ridge Route Dr. #225
Laguna Hills, CA 92653

TEL: (949) 585-3133
FAX:

Workorder No.: N044190

RE: Fresno Phase II, 20212901.001A Task 03

Attention: Lindsey Dandridge-Perry

Enclosed are the results for sample(s) received on February 16, 2021 by ASSET Laboratories. The sample(s) are tested for the parameters as indicated in the enclosed chain of custody in accordance with the applicable laboratory certifications.

Thank you for the opportunity to service the needs of your company.

Please feel free to call me at (562) 219-7435 if I can be of further assistance to your company.

Sincerely,

Andrew Garaniel
Laboratory Director

CLIENT: Kleinfelder
Project: Fresno Phase II, 20212901.001A Task 03
Lab Order: N044190

CASE NARRATIVE

SAMPLE RECEIVING/GENERAL COMMENTS:

All sample containers were received intact with proper chain of custody documentation.

Information on sample receipt conditions including discrepancies can be found in attached Sample Receipt Checklist Form.

Cooler temperature and sample preservation were verified upon receipt of samples if applicable.

Samples were analyzed within method holding time.

Results were J-Flag. "J" is used to flag those results that are between the PQL (Practical Quantitation Limit) and the calculated MDL (Method Detection Limit). Results that are "J" Flagged are estimated values since it becomes difficult to accurately quantitate the analyte near the MDL.

Analytical comments for EPA 8081A:

RPD for Matrix Spike (MS)/Matrix Spike Duplicate (MSD) is outside criteria on analyte 4,4´-DDT; however, the analytical batch was validated by the Laboratory Control Sample (LCS).

CLIENT: Kleinfelder
Project: Fresno Phase II, 20212901.001A Task 03
Lab Order: N044190
Contract No:

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Date Reported
N044190-001A	SS-1a	Soil	2/16/2021 8:05:00 AM	2/16/2021	2/18/2021
N044190-002A	SS-1b	Soil	2/16/2021 8:15:00 AM	2/16/2021	2/18/2021
N044190-003A	SS-1c	Soil	2/16/2021 8:10:00 AM	2/16/2021	2/18/2021
N044190-004A	SS-1d	Soil	2/16/2021 8:20:00 AM	2/16/2021	2/18/2021
N044190-005A	SS-1 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-006A	SS-2a	Soil	2/16/2021 8:30:00 AM	2/16/2021	2/18/2021
N044190-007A	SS-2b	Soil	2/16/2021 8:35:00 AM	2/16/2021	2/18/2021
N044190-008A	SS-2c	Soil	2/16/2021 8:50:00 AM	2/16/2021	2/18/2021
N044190-009A	SS-2d	Soil	2/16/2021 8:40:00 AM	2/16/2021	2/18/2021
N044190-010A	SS-2 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-011A	SS-3a	Soil	2/16/2021 9:55:00 AM	2/16/2021	2/18/2021
N044190-012A	SS-3b	Soil	2/16/2021 9:45:00 AM	2/16/2021	2/18/2021
N044190-013A	SS-3c	Soil	2/16/2021 10:00:00 AM	2/16/2021	2/18/2021
N044190-014A	SS-3d	Soil	2/16/2021 9:40:00 AM	2/16/2021	2/18/2021
N044190-015A	SS-3 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-016A	SS-4a	Soil	2/16/2021 9:00:00 AM	2/16/2021	2/18/2021
N044190-017A	SS-4b	Soil	2/16/2021 9:07:00 AM	2/16/2021	2/18/2021
N044190-018A	SS-4c	Soil	2/16/2021 9:25:00 AM	2/16/2021	2/18/2021
N044190-019A	SS-4d	Soil	2/16/2021 9:15:00 AM	2/16/2021	2/18/2021
N044190-020A	SS-4 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-021A	SS-5a	Soil	2/16/2021 12:00:00 PM	2/16/2021	2/18/2021
N044190-022A	SS-5b	Soil	2/16/2021 12:20:00 PM	2/16/2021	2/18/2021
N044190-023A	SS-5c	Soil	2/16/2021 12:10:00 PM	2/16/2021	2/18/2021
N044190-024A	SS-5d	Soil	2/16/2021 12:15:00 PM	2/16/2021	2/18/2021
N044190-025A	SS-5 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-026A	SS-6a	Soil	2/16/2021 12:25:00 PM	2/16/2021	2/18/2021
N044190-027A	SS-6b	Soil	2/16/2021 12:35:00 PM	2/16/2021	2/18/2021
N044190-028A	SS-6c	Soil	2/16/2021 12:45:00 PM	2/16/2021	2/18/2021
N044190-029A	SS-6d	Soil	2/16/2021 12:40:00 PM	2/16/2021	2/18/2021

CLIENT: Kleinfelder
Project: Fresno Phase II, 20212901.001A Task 03
Lab Order: N044190
Contract No:

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Date Reported
N044190-030A	SS-6 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-031A	SS-7a	Soil	2/16/2021 2:10:00 PM	2/16/2021	2/18/2021
N044190-032A	SS-7b	Soil	2/16/2021 1:55:00 PM	2/16/2021	2/18/2021
N044190-033A	SS-7c	Soil	2/16/2021 2:25:00 PM	2/16/2021	2/18/2021
N044190-034A	SS-7d	Soil	2/16/2021 1:30:00 PM	2/16/2021	2/18/2021
N044190-035A	SS-7 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-036A	SS-7a duplicate	Soil	2/16/2021 2:15:00 PM	2/16/2021	2/18/2021
N044190-037A	SS-7b duplicate	Soil	2/16/2021 2:00:00 PM	2/16/2021	2/18/2021
N044190-038A	SS-7c duplicate	Soil	2/16/2021 2:30:00 PM	2/16/2021	2/18/2021
N044190-039A	SS-7d duplicate	Soil	2/16/2021 1:35:00 PM	2/16/2021	2/18/2021
N044190-040A	SS-7 duplicate COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-041A	SS-8a	Soil	2/16/2021 12:50:00 PM	2/16/2021	2/18/2021
N044190-042A	SS-8b	Soil	2/16/2021 12:55:00 PM	2/16/2021	2/18/2021
N044190-043A	SS-8c	Soil	2/16/2021 1:10:00 PM	2/16/2021	2/18/2021
N044190-044A	SS-8d	Soil	2/16/2021 1:05:00 PM	2/16/2021	2/18/2021
N044190-045A	SS-8 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-046A	SS-9a	Soil	2/16/2021 2:40:00 PM	2/16/2021	2/18/2021
N044190-047A	SS-9b	Soil	2/16/2021 2:45:00 PM	2/16/2021	2/18/2021
N044190-048A	SS-9c	Soil	2/16/2021 2:55:00 PM	2/16/2021	2/18/2021
N044190-049A	SS-9d	Soil	2/16/2021 3:05:00 PM	2/16/2021	2/18/2021
N044190-050A	SS-9 COMPOSITE	Soil	2/16/2021	2/16/2021	2/18/2021
N044190-051A	SS-01@1c	Soil	2/16/2021 8:12:00 AM	2/16/2021	2/18/2021
N044190-052A	SS-02@2d	Soil	2/16/2021 8:43:00 AM	2/16/2021	2/18/2021
N044190-053A	SS-03@3b	Soil	2/16/2021 9:50:00 AM	2/16/2021	2/18/2021
N044190-054A	SS-04@4d	Soil	2/16/2021 9:20:00 AM	2/16/2021	2/18/2021
N044190-055A	SS-05@5a	Soil	2/16/2021 12:05:00 PM	2/16/2021	2/18/2021
N044190-056A	SS-06@6a	Soil	2/16/2021 12:30:00 PM	2/16/2021	2/18/2021
N044190-057A	SS-07@7d	Soil	2/16/2021 1:40:00 PM	2/16/2021	2/18/2021
N044190-058A	SS-07 duplicate@7d	Soil	2/16/2021 1:45:00 PM	2/16/2021	2/18/2021
N044190-059A	SS-08@8b	Soil	2/16/2021 1:00:00 PM	2/16/2021	2/18/2021

CLIENT: Kleinfelder
Project: Fresno Phase II, 20212901.001A Task 03
Lab Order: N044190
Contract No:

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Date Reported
N044190-060A	SS-09@9c	Soil	2/16/2021 3:00:00 PM	2/16/2021	2/18/2021

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-005

Client Sample ID: SS-1 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3546 **EPA 8081A**

RunID: **NV00922-GC7_210217A** QC Batch: **85282** PrepDate: **2/17/2021** Analyst: **YG**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.68	2.0		µg/Kg	1	2/17/2021 02:31 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 02:31 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 02:31 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 02:31 PM
alpha-BHC	ND	0.44	1.0		µg/Kg	1	2/17/2021 02:31 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 02:31 PM
beta-BHC	ND	0.35	1.0		µg/Kg	1	2/17/2021 02:31 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 02:31 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 02:31 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 02:31 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 02:31 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 02:31 PM
Endosulfan sulfate	ND	0.49	2.0		µg/Kg	1	2/17/2021 02:31 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 02:31 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 02:31 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 02:31 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 02:31 PM
gamma-Chlordane	ND	0.28	1.0		µg/Kg	1	2/17/2021 02:31 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 02:31 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 02:31 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 02:31 PM
Toxaphene	ND	15	85		µg/Kg	1	2/17/2021 02:31 PM
Surr: Tetrachloro-m-xylene	49.9	0	32-100		%REC	1	2/17/2021 02:31 PM
Surr: Decachlorobiphenyl	56.0	0	26-104		%REC	1	2/17/2021 02:31 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-010

Client Sample ID: SS-2 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3546 **EPA 8081A**

RunID: **NV00922-GC7_210217A** QC Batch: **85282** PrepDate: **2/17/2021** Analyst: **YG**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.67	2.0		µg/Kg	1	2/17/2021 02:57 PM
4,4´-DDE	0.35	0.35	2.0	J	µg/Kg	1	2/17/2021 02:57 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 02:57 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 02:57 PM
alpha-BHC	ND	0.43	1.0		µg/Kg	1	2/17/2021 02:57 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 02:57 PM
beta-BHC	ND	0.34	1.0		µg/Kg	1	2/17/2021 02:57 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 02:57 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 02:57 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 02:57 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 02:57 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 02:57 PM
Endosulfan sulfate	ND	0.48	2.0		µg/Kg	1	2/17/2021 02:57 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 02:57 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 02:57 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 02:57 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 02:57 PM
gamma-Chlordane	0.32	0.28	1.0	J	µg/Kg	1	2/17/2021 02:57 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 02:57 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 02:57 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 02:57 PM
Toxaphene	ND	14	85		µg/Kg	1	2/17/2021 02:57 PM
Surr: Tetrachloro-m-xylene	52.6	0	32-100		%REC	1	2/17/2021 02:57 PM
Surr: Decachlorobiphenyl	54.7	0	26-104		%REC	1	2/17/2021 02:57 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-015

Client Sample ID: SS-3 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD							
EPA 3546			**EPA 8081A**				
RunID: **NV00922-GC7_210217A** QC Batch: **85282**				PrepDate:		**2/17/2021**	Analyst: **YG**
4,4´-DDD	ND	0.67	2.0		µg/Kg	1	2/17/2021 03:22 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 03:22 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 03:22 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 03:22 PM
alpha-BHC	ND	0.44	1.0		µg/Kg	1	2/17/2021 03:22 PM
alpha-Chlordane	0.96	0.52	1.0	J	µg/Kg	1	2/17/2021 03:22 PM
beta-BHC	ND	0.35	1.0		µg/Kg	1	2/17/2021 03:22 PM
Chlordane	12	2.4	8.5		µg/Kg	1	2/17/2021 03:22 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 03:22 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 03:22 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 03:22 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 03:22 PM
Endosulfan sulfate	ND	0.49	2.0		µg/Kg	1	2/17/2021 03:22 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 03:22 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 03:22 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 03:22 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 03:22 PM
gamma-Chlordane	1.2	0.28	1.0		µg/Kg	1	2/17/2021 03:22 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 03:22 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 03:22 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 03:22 PM
Toxaphene	ND	15	85		µg/Kg	1	2/17/2021 03:22 PM
Surr: Tetrachloro-m-xylene	53.7	0	32-100		%REC	1	2/17/2021 03:22 PM
Surr: Decachlorobiphenyl	51.5	0	26-104		%REC	1	2/17/2021 03:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-020

Client Sample ID: SS-4 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3546 **EPA 8081A**

RunID: **NV00922-GC7_210217A** QC Batch: **85282** PrepDate: **2/17/2021** Analyst: **YG**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.68	2.0		µg/Kg	1	2/17/2021 04:20 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 04:20 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 04:20 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 04:20 PM
alpha-BHC	ND	0.44	1.0		µg/Kg	1	2/17/2021 04:20 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 04:20 PM
beta-BHC	ND	0.35	1.0		µg/Kg	1	2/17/2021 04:20 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 04:20 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 04:20 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 04:20 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 04:20 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 04:20 PM
Endosulfan sulfate	ND	0.49	2.0		µg/Kg	1	2/17/2021 04:20 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 04:20 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 04:20 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 04:20 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 04:20 PM
gamma-Chlordane	ND	0.28	1.0		µg/Kg	1	2/17/2021 04:20 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 04:20 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 04:20 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 04:20 PM
Toxaphene	ND	15	85		µg/Kg	1	2/17/2021 04:20 PM
Surr: Tetrachloro-m-xylene	57.1	0	32-100		%REC	1	2/17/2021 04:20 PM
Surr: Decachlorobiphenyl	58.9	0	26-104		%REC	1	2/17/2021 04:20 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-025

Client Sample ID: SS-5 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3546 **EPA 8081A**

RunID: **NV00922-GC7_210217A** QC Batch: **85282** PrepDate: **2/17/2021** Analyst: **YG**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.68	2.0		µg/Kg	1	2/17/2021 04:46 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 04:46 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 04:46 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 04:46 PM
alpha-BHC	ND	0.44	1.0		µg/Kg	1	2/17/2021 04:46 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 04:46 PM
beta-BHC	ND	0.35	1.0		µg/Kg	1	2/17/2021 04:46 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 04:46 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 04:46 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 04:46 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 04:46 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 04:46 PM
Endosulfan sulfate	ND	0.49	2.0		µg/Kg	1	2/17/2021 04:46 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 04:46 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 04:46 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 04:46 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 04:46 PM
gamma-Chlordane	ND	0.28	1.0		µg/Kg	1	2/17/2021 04:46 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 04:46 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 04:46 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 04:46 PM
Toxaphene	ND	15	85		µg/Kg	1	2/17/2021 04:46 PM
Surr: Tetrachloro-m-xylene	61.0	0	32-100		%REC	1	2/17/2021 04:46 PM
Surr: Decachlorobiphenyl	55.0	0	26-104		%REC	1	2/17/2021 04:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-030

Client Sample ID: SS-6 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3546 **EPA 8081A**

RunID: **NV00922-GC7_210217A** QC Batch: **85282** PrepDate: **2/17/2021** Analyst: **YG**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.67	2.0		µg/Kg	1	2/17/2021 05:12 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 05:12 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 05:12 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 05:12 PM
alpha-BHC	ND	0.43	1.0		µg/Kg	1	2/17/2021 05:12 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 05:12 PM
beta-BHC	ND	0.34	1.0		µg/Kg	1	2/17/2021 05:12 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 05:12 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 05:12 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 05:12 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 05:12 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 05:12 PM
Endosulfan sulfate	ND	0.48	2.0		µg/Kg	1	2/17/2021 05:12 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 05:12 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 05:12 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 05:12 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 05:12 PM
gamma-Chlordane	ND	0.28	1.0		µg/Kg	1	2/17/2021 05:12 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 05:12 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 05:12 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 05:12 PM
Toxaphene	ND	14	85		µg/Kg	1	2/17/2021 05:12 PM
Surr: Tetrachloro-m-xylene	70.6	0	32-100		%REC	1	2/17/2021 05:12 PM
Surr: Decachlorobiphenyl	56.6	0	26-104		%REC	1	2/17/2021 05:12 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-035

Client Sample ID: SS-7 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3546 **EPA 8081A**

RunID: **NV00922-GC7_210217A** QC Batch: **85282** PrepDate: **2/17/2021** Analyst: **YG**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.68	2.0		µg/Kg	1	2/17/2021 05:37 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 05:37 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 05:37 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 05:37 PM
alpha-BHC	ND	0.44	1.0		µg/Kg	1	2/17/2021 05:37 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 05:37 PM
beta-BHC	ND	0.35	1.0		µg/Kg	1	2/17/2021 05:37 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 05:37 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 05:37 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 05:37 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 05:37 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 05:37 PM
Endosulfan sulfate	ND	0.49	2.0		µg/Kg	1	2/17/2021 05:37 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 05:37 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 05:37 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 05:37 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 05:37 PM
gamma-Chlordane	ND	0.28	1.0		µg/Kg	1	2/17/2021 05:37 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 05:37 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 05:37 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 05:37 PM
Toxaphene	ND	15	85		µg/Kg	1	2/17/2021 05:37 PM
Surr: Tetrachloro-m-xylene	41.7	0	32-100		%REC	1	2/17/2021 05:37 PM
Surr: Decachlorobiphenyl	49.5	0	26-104		%REC	1	2/17/2021 05:37 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-040

Client Sample ID: SS-7 duplicate COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD							
EPA 3546			**EPA 8081A**				
RunID: **NV00922-GC7_210217A** QC Batch: **85282**					PrepDate: **2/17/2021**		Analyst: **YG**
4,4´-DDD	ND	0.67	2.0		µg/Kg	1	2/17/2021 06:03 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 06:03 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 06:03 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 06:03 PM
alpha-BHC	ND	0.43	1.0		µg/Kg	1	2/17/2021 06:03 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 06:03 PM
beta-BHC	ND	0.34	1.0		µg/Kg	1	2/17/2021 06:03 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 06:03 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 06:03 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 06:03 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 06:03 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 06:03 PM
Endosulfan sulfate	ND	0.48	2.0		µg/Kg	1	2/17/2021 06:03 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 06:03 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 06:03 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 06:03 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 06:03 PM
gamma-Chlordane	ND	0.27	1.0		µg/Kg	1	2/17/2021 06:03 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 06:03 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 06:03 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 06:03 PM
Toxaphene	ND	14	85		µg/Kg	1	2/17/2021 06:03 PM
Surr: Tetrachloro-m-xylene	53.3	0	32-100		%REC	1	2/17/2021 06:03 PM
Surr: Decachlorobiphenyl	53.0	0	26-104		%REC	1	2/17/2021 06:03 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-045

Client Sample ID: SS-8 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
ORGANOCHLORINE PESTICIDES BY GC/ECD							
EPA 3546			**EPA 8081A**				
RunID: **NV00922-GC7_210217A** QC Batch: **85282**					PrepDate: **2/17/2021**		Analyst: **YG**
4,4´-DDD	ND	0.67	2.0		µg/Kg	1	2/17/2021 06:29 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 06:29 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 06:29 PM
Aldrin	ND	0.28	0.99		µg/Kg	1	2/17/2021 06:29 PM
alpha-BHC	ND	0.43	0.99		µg/Kg	1	2/17/2021 06:29 PM
alpha-Chlordane	ND	0.51	0.99		µg/Kg	1	2/17/2021 06:29 PM
beta-BHC	ND	0.34	0.99		µg/Kg	1	2/17/2021 06:29 PM
Chlordane	ND	2.3	8.4		µg/Kg	1	2/17/2021 06:29 PM
delta-BHC	ND	0.45	0.99		µg/Kg	1	2/17/2021 06:29 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 06:29 PM
Endosulfan I	ND	0.30	0.99		µg/Kg	1	2/17/2021 06:29 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 06:29 PM
Endosulfan sulfate	ND	0.48	2.0		µg/Kg	1	2/17/2021 06:29 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 06:29 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 06:29 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 06:29 PM
gamma-BHC	ND	0.23	0.99		µg/Kg	1	2/17/2021 06:29 PM
gamma-Chlordane	ND	0.27	0.99		µg/Kg	1	2/17/2021 06:29 PM
Heptachlor	ND	0.60	0.99		µg/Kg	1	2/17/2021 06:29 PM
Heptachlor epoxide	ND	0.27	0.99		µg/Kg	1	2/17/2021 06:29 PM
Methoxychlor	ND	2.8	8.4		µg/Kg	1	2/17/2021 06:29 PM
Toxaphene	ND	14	84		µg/Kg	1	2/17/2021 06:29 PM
Surr: Tetrachloro-m-xylene	51.7	0	32-100		%REC	1	2/17/2021 06:29 PM
Surr: Decachlorobiphenyl	52.0	0	26-104		%REC	1	2/17/2021 06:29 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Lab Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03
Lab ID: N044190-050

Client Sample ID: SS-9 COMPOSITE
Collection Date: 2/16/2021
Matrix: SOIL

ORGANOCHLORINE PESTICIDES BY GC/ECD

EPA 3546 **EPA 8081A**

RunID: **NV00922-GC7_210217A** QC Batch: **85282** PrepDate: **2/17/2021** Analyst: **YG**

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
4,4´-DDD	ND	0.67	2.0		µg/Kg	1	2/17/2021 06:55 PM
4,4´-DDE	ND	0.35	2.0		µg/Kg	1	2/17/2021 06:55 PM
4,4´-DDT	ND	0.43	2.0		µg/Kg	1	2/17/2021 06:55 PM
Aldrin	ND	0.28	1.0		µg/Kg	1	2/17/2021 06:55 PM
alpha-BHC	ND	0.43	1.0		µg/Kg	1	2/17/2021 06:55 PM
alpha-Chlordane	ND	0.52	1.0		µg/Kg	1	2/17/2021 06:55 PM
beta-BHC	ND	0.34	1.0		µg/Kg	1	2/17/2021 06:55 PM
Chlordane	ND	2.4	8.5		µg/Kg	1	2/17/2021 06:55 PM
delta-BHC	ND	0.45	1.0		µg/Kg	1	2/17/2021 06:55 PM
Dieldrin	ND	0.44	2.0		µg/Kg	1	2/17/2021 06:55 PM
Endosulfan I	ND	0.30	1.0		µg/Kg	1	2/17/2021 06:55 PM
Endosulfan II	ND	0.61	2.0		µg/Kg	1	2/17/2021 06:55 PM
Endosulfan sulfate	ND	0.48	2.0		µg/Kg	1	2/17/2021 06:55 PM
Endrin	ND	1.0	2.0		µg/Kg	1	2/17/2021 06:55 PM
Endrin aldehyde	ND	0.90	2.0		µg/Kg	1	2/17/2021 06:55 PM
Endrin ketone	ND	0.58	2.0		µg/Kg	1	2/17/2021 06:55 PM
gamma-BHC	ND	0.24	1.0		µg/Kg	1	2/17/2021 06:55 PM
gamma-Chlordane	ND	0.28	1.0		µg/Kg	1	2/17/2021 06:55 PM
Heptachlor	ND	0.60	1.0		µg/Kg	1	2/17/2021 06:55 PM
Heptachlor epoxide	ND	0.27	1.0		µg/Kg	1	2/17/2021 06:55 PM
Methoxychlor	ND	2.8	8.5		µg/Kg	1	2/17/2021 06:55 PM
Toxaphene	ND	14	85		µg/Kg	1	2/17/2021 06:55 PM
Surr: Tetrachloro-m-xylene	55.5	0	32-100		%REC	1	2/17/2021 06:55 PM
Surr: Decachlorobiphenyl	55.3	0	26-104		%REC	1	2/17/2021 06:55 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-01@1c
Lab Order:	N044190	**Collection Date:**	2/16/2021 8:12:00 AM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-051		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B			**EPA 6010B**			
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:		**2/17/2021**	Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 03:25 PM
Lead	5.8	0.30	1.0		mg/Kg	1	2/17/2021 03:25 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-02@2d
Lab Order:	N044190	**Collection Date:**	2/16/2021 8:43:00 AM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-052		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B		**EPA 6010B**				
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 03:54 PM
Lead	5.5	0.29	1.0		mg/Kg	1	2/17/2021 03:54 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-03@3b
Lab Order:	N044190	**Collection Date:**	2/16/2021 9:50:00 AM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-053		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B		**EPA 6010B**				
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:10 PM
Lead	6.1	0.29	1.0		mg/Kg	1	2/17/2021 04:10 PM

Qualifiers:

B	Analyte detected in the associated Method Blank
E	Value above quantitation range
H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit
S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified
DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-04@4d
Lab Order:	N044190	**Collection Date:**	2/16/2021 9:20:00 AM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-054		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B		**EPA 6010B**				
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:16 PM
Lead	5.8	0.30	1.0		mg/Kg	1	2/17/2021 04:16 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-05@5a
Lab Order:	N044190	**Collection Date:**	2/16/2021 12:05:00 PM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-055		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B		**EPA 6010B**				
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:22 PM
Lead	4.4	0.30	1.0		mg/Kg	1	2/17/2021 04:22 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-06@6a
Lab Order:	N044190	**Collection Date:**	2/16/2021 12:30:00 PM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-056		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B			**EPA 6010B**			
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:28 PM
Lead	6.1	0.29	1.0		mg/Kg	1	2/17/2021 04:28 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-07@7d
Lab Order:	N044190	**Collection Date:**	2/16/2021 1:40:00 PM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-057		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B		**EPA 6010B**				
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:34 PM
Lead	5.6	0.29	1.0		mg/Kg	1	2/17/2021 04:34 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-07 duplicate@7d
Lab Order:	N044190	**Collection Date:**	2/16/2021 1:45:00 PM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-058		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B		**EPA 6010B**				
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:40 PM
Lead	5.6	0.30	1.0		mg/Kg	1	2/17/2021 04:40 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-08@8b
Lab Order:	N044190	**Collection Date:**	2/16/2021 1:00:00 PM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-059		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B			**EPA 6010B**			
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:		**2/17/2021**	Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:46 PM
Lead	5.6	0.29	1.0		mg/Kg	1	2/17/2021 04:46 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT:	Kleinfelder	**Client Sample ID:**	SS-09@9c
Lab Order:	N044190	**Collection Date:**	2/16/2021 3:00:00 PM
Project:	Fresno Phase II, 20212901.001A Task 03	**Matrix:**	SOIL
Lab ID:	N044190-060		

Analyses	Result	MDL	PQL	Qual	Units	DF	Date Analyzed
TOTAL METALS BY ICP							
	EPA 3050B		**EPA 6010B**				
RunID: **NV00922-ICP2_210217A**	QC Batch: **85278**			PrepDate:	**2/17/2021**		Analyst: **CEI**
Arsenic	ND	0.54	1.0		mg/Kg	1	2/17/2021 04:52 PM
Lead	7.4	0.30	1.0		mg/Kg	1	2/17/2021 04:52 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range
H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
ND	Not Detected at the Reporting Limit	S	Spike/Surrogate outside of limits due to matrix interference
	Results are wet unless otherwise specified	DO	Surrogate Diluted Out

CLIENT: Kleinfelder
Work Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-85278**	SampType: **MBLK**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **2/17/2021**	RunNo: **150787**
Client ID: **PBS**	Batch ID: **85278**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **2/17/2021**	SeqNo: **4109732**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	1.0									
Lead	ND	1.0									

Sample ID: **LCS-85278**	SampType: **LCS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **2/17/2021**	RunNo: **150787**
Client ID: **LCSS**	Batch ID: **85278**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **2/17/2021**	SeqNo: **4109733**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	24.689	1.0	25.00	0	98.8	80	120				
Lead	24.862	1.0	25.00	0	99.4	80	120				

Sample ID: **N044190-051A-MS**	SampType: **MS**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **2/17/2021**	RunNo: **150787**
Client ID: **ZZZZZZ**	Batch ID: **85278**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **2/17/2021**	SeqNo: **4109739**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	20.524	1.0	24.95	0	82.3	75	125				
Lead	28.025	1.0	24.95	5.759	89.2	75	125				

Sample ID: **N044190-051A-MSD**	SampType: **MSD**	TestCode: **6010_S**	Units: **mg/Kg**	Prep Date: **2/17/2021**	RunNo: **150787**
Client ID: **ZZZZZZ**	Batch ID: **85278**	TestNo: **EPA 6010B**	**EPA 3050B**	Analysis Date: **2/17/2021**	SeqNo: **4109740**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	20.936	1.0	24.99	0	83.8	75	125	20.52	1.99	20	
Lead	28.099	1.0	24.99	5.759	89.4	75	125	28.03	0.263	20	

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

CLIENT: Kleinfelder
Work Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081SOIL_M

Sample ID: **LCS-85282** SampType: **LCS** TestCode: **8081SOIL_M** Units: **µg/Kg** Prep Date: **2/17/2021** RunNo: **150789**
Client ID: **LCSS** Batch ID: **85282** TestNo: **EPA 8081A** **EPA 3546** Analysis Date: **2/17/2021** SeqNo: **4109834**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	14.537	2.0	16.67	0	87.2	35	117				
4,4´-DDE	13.668	2.0	16.67	0	82.0	44	118				
4,4´-DDT	12.995	2.0	16.67	0	78.0	37	114				
Aldrin	12.940	1.0	16.67	0	77.6	35	128				
alpha-BHC	13.457	1.0	16.67	0	80.7	38	123				
alpha-Chlordane	13.052	1.0	16.67	0	78.3	39	118				
beta-BHC	11.995	1.0	16.67	0	72.0	34	109				
delta-BHC	13.075	1.0	16.67	0	78.4	40	107				
Dieldrin	14.103	2.0	16.67	0	84.6	39	129				
Endosulfan I	13.233	1.0	16.67	0	79.4	39	118				
Endosulfan II	13.890	2.0	16.67	0	83.3	34	139				
Endosulfan sulfate	15.410	2.0	16.67	0	92.4	49	114				
Endrin	15.153	2.0	16.67	0	90.9	47	130				
Endrin aldehyde	13.730	2.0	16.67	0	82.4	42	116				
Endrin ketone	16.018	2.0	16.67	0	96.1	43	114				
gamma-BHC	13.625	1.0	16.67	0	81.7	35	124				
gamma-Chlordane	13.315	1.0	16.67	0	79.9	33	117				
Heptachlor	13.233	1.0	16.67	0	79.4	44	126				
Heptachlor epoxide	12.807	1.0	16.67	0	76.8	37	118				
Methoxychlor	14.528	8.5	16.67	0	87.2	49	121				
Surr: Tetrachloro-m-xylene	11.668		16.67		70.0	32	100				
Surr: Decachlorobiphenyl	13.297		16.67		79.8	26	104				

Sample ID: **MB-85282** SampType: **MBLK** TestCode: **8081SOIL_M** Units: **µg/Kg** Prep Date: **2/17/2021** RunNo: **150789**
Client ID: **PBS** Batch ID: **85282** TestNo: **EPA 8081A** **EPA 3546** Analysis Date: **2/17/2021** SeqNo: **4109835**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	ND	2.0									
4,4´-DDE	ND	2.0									
4,4´-DDT	ND	2.0									

Qualifiers:

B Analyte detected in the associated Method Blank
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit
R RPD outside accepted recovery limits
S Spike/Surrogate outside of limits due to matrix interference
DO Surrogate Diluted Out
Calculations are based on raw values

CLIENT: Kleinfelder
Work Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081SOIL_M

Sample ID: **MB-85282**	SampType: **MBLK**	TestCode: **8081SOIL_M**	Units: **µg/Kg**	Prep Date: **2/17/2021**	RunNo: **150789**
Client ID: **PBS**	Batch ID: **85282**	TestNo: **EPA 8081A**	**EPA 3546**	Analysis Date: **2/17/2021**	SeqNo: **4109835**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aldrin	ND	1.0									
alpha-BHC	ND	1.0									
alpha-Chlordane	ND	1.0									
beta-BHC	ND	1.0									
Chlordane	ND	8.5									
delta-BHC	ND	1.0									
Dieldrin	ND	2.0									
Endosulfan I	ND	1.0									
Endosulfan II	ND	2.0									
Endosulfan sulfate	ND	2.0									
Endrin	ND	2.0									
Endrin aldehyde	ND	2.0									
Endrin ketone	ND	2.0									
gamma-BHC	ND	1.0									
gamma-Chlordane	ND	1.0									
Heptachlor	ND	1.0									
Heptachlor epoxide	ND	1.0									
Methoxychlor	ND	8.5									
Toxaphene	ND	85									
Surr: Tetrachloro-m-xylene	11.177		16.67		67.0	32	100				
Surr: Decachlorobiphenyl	12.612		16.67		75.7	26	104				

Sample ID: **N044190-005A-MS**	SampType: **MS**	TestCode: **8081SOIL_M**	Units: **µg/Kg**	Prep Date: **2/17/2021**	RunNo: **150789**
Client ID: **ZZZZZZ**	Batch ID: **85282**	TestNo: **EPA 8081A**	**EPA 3546**	Analysis Date: **2/17/2021**	SeqNo: **4109847**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	11.275	2.0	16.63	0	67.8	33	104				
4,4´-DDE	9.096	2.0	16.63	0	54.7	27	104				
4,4´-DDT	3.537	2.0	16.63	0	21.3	16	103				
Aldrin	8.512	1.0	16.63	0	51.2	27	101				

Qualifiers:

- B Analyte detected in the associated Method Blank
- E Value above quantitation range
- H Holding times for preparation or analysis exceeded
- J Analyte detected below quantitation limits
- ND Not Detected at the Reporting Limit
- R RPD outside accepted recovery limits
- S Spike/Surrogate outside of limits due to matrix interference
- DO Surrogate Diluted Out
- Calculations are based on raw values

CLIENT: Kleinfelder
Work Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081SOIL_M

Sample ID: **N044190-005A-MS** SampType: **MS** TestCode: **8081SOIL_M** Units: **µg/Kg** Prep Date: **2/17/2021** RunNo: **150789**
Client ID: **ZZZZZZ** Batch ID: **85282** TestNo: **EPA 8081A** **EPA 3546** Analysis Date: **2/17/2021** SeqNo: **4109847**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
alpha-BHC	8.928	1.0	16.63	0	53.7	30	100				
alpha-Chlordane	8.504	1.0	16.63	0	51.1	32	100				
beta-BHC	8.170	1.0	16.63	0	49.1	24	100				
delta-BHC	8.871	1.0	16.63	0	53.4	32	100				
Dieldrin	9.234	2.0	16.63	0	55.5	30	100				
Endosulfan I	8.529	1.0	16.63	0	51.3	26	100				
Endosulfan II	8.936	2.0	16.63	0	53.7	26	100				
Endosulfan sulfate	9.663	2.0	16.63	0	58.1	26	100				
Endrin	9.771	2.0	16.63	0	58.8	37	102				
Endrin aldehyde	7.779	2.0	16.63	0	46.8	15	100				
Endrin ketone	8.399	2.0	16.63	0	50.5	19	100				
gamma-BHC	8.890	1.0	16.63	0	53.5	30	100				
gamma-Chlordane	8.946	1.0	16.63	0	53.8	24	102				
Heptachlor	7.743	1.0	16.63	0	46.6	30	106				
Heptachlor epoxide	8.559	1.0	16.63	0	51.5	28	100				
Methoxychlor	5.623	8.5	16.63	0	33.8	21	122				J
Surr: Tetrachloro-m-xylene	8.037		16.63		48.3	32	100				
Surr: Decachlorobiphenyl	8.684		16.63		52.2	26	104				

Sample ID: **N044190-005A-MSD** SampType: **MSD** TestCode: **8081SOIL_M** Units: **µg/Kg** Prep Date: **2/17/2021** RunNo: **150789**
Client ID: **ZZZZZZ** Batch ID: **85282** TestNo: **EPA 8081A** **EPA 3546** Analysis Date: **2/17/2021** SeqNo: **4109848**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4,4´-DDD	10.603	2.0	16.65	0	63.7	33	104	11.27	6.15	20	
4,4´-DDE	8.783	2.0	16.65	0	52.8	27	104	9.096	3.50	20	
4,4´-DDT	4.897	2.0	16.65	0	29.4	16	103	3.537	32.2	20	R
Aldrin	8.261	1.0	16.65	0	49.6	27	101	8.512	3.00	20	
alpha-BHC	8.407	1.0	16.65	0	50.5	30	100	8.928	6.01	20	
alpha-Chlordane	8.319	1.0	16.65	0	50.0	32	100	8.504	2.20	20	
beta-BHC	7.818	1.0	16.65	0	47.0	24	100	8.170	4.40	20	

Qualifiers:

B Analyte detected in the associated Method Blank
E Value above quantitation range
H Holding times for preparation or analysis exceeded
J Analyte detected below quantitation limits
ND Not Detected at the Reporting Limit
R RPD outside accepted recovery limits
S Spike/Surrogate outside of limits due to matrix interference
DO Surrogate Diluted Out
Calculations are based on raw values

CLIENT: Kleinfelder
Work Order: N044190
Project: Fresno Phase II, 20212901.001A Task 03

ANALYTICAL QC SUMMARY REPORT

TestCode: 8081SOIL_M

Sample ID: **N044190-005A-MSD** SampType: **MSD** TestCode: **8081SOIL_M** Units: **µg/Kg** Prep Date: **2/17/2021** RunNo: **150789**
Client ID: **ZZZZZZ** Batch ID: **85282** TestNo: **EPA 8081A** **EPA 3546** Analysis Date: **2/17/2021** SeqNo: **4109848**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
delta-BHC	8.499	1.0	16.65	0	51.0	32	100	8.871	4.29	20	
Dieldrin	8.648	2.0	16.65	0	51.9	30	100	9.234	6.55	20	
Endosulfan I	8.620	1.0	16.65	0	51.8	26	100	8.529	1.06	20	
Endosulfan II	8.830	2.0	16.65	0	53.0	26	100	8.936	1.20	20	
Endosulfan sulfate	9.033	2.0	16.65	0	54.3	26	100	9.663	6.74	20	
Endrin	9.516	2.0	16.65	0	57.2	37	102	9.771	2.64	20	
Endrin aldehyde	6.901	2.0	16.65	0	41.5	15	100	7.779	12.0	20	
Endrin ketone	8.021	2.0	16.65	0	48.2	19	100	8.399	4.61	20	
gamma-BHC	8.555	1.0	16.65	0	51.4	30	100	8.890	3.83	20	
gamma-Chlordane	8.695	1.0	16.65	0	52.2	24	102	8.946	2.85	20	
Heptachlor	7.425	1.0	16.65	0	44.6	30	106	7.743	4.19	20	
Heptachlor epoxide	8.069	1.0	16.65	0	48.5	28	100	8.559	5.89	20	
Methoxychlor	6.268	8.5	16.65	0	37.7	21	122	5.623	0	20	J
Surr: Tetrachloro-m-xylene	8.009		16.65		48.1	32	100		0		
Surr: Decachlorobiphenyl	8.474		16.65		50.9	26	104		0		

Qualifiers:

B	Analyte detected in the associated Method Blank	E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below quantitation limits	ND	Not Detected at the Reporting Limit	R	RPD outside accepted recovery limits
S	Spike/Surrogate outside of limits due to matrix interference	DO	Surrogate Diluted Out		Calculations are based on raw values

N044190

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CHAIN OF CUSTODY RECORD

Page 1 of 6

Client: Kleinfelder	**Report to:** Lindsey Dandridge-Perry	**Bill to:**	**EDD Requirement:** Excel EDD ☐ Geotracker ☐ Labspec ☐ Others ☐
Address:	**Company:** Kleinfelder	**Address:**	**QA/QC:** RTNE ☐ RWQCB ☐ CalTrans ☐ Level III ☐ LEVEL IV ☐ Regulatory ☐
Address:	**Email:** LDandridge@kleinfelder.com		**Sampe Receipt Condition:** Y / N: 1. Chilled ☑ ☐; 2. Headspace ☐ ☐; 3. Container Intact ☑ ☐; 4. Seal Present ☐ ☑; 5. IR number 9; 6. Method of Cooling Ice
Phone:	**Fax:**	**Address:** 24411 Ridge Route Drive Suite 225 Laguna Hills, CA 92653	**Email to:**	**PO#:**	**Specify:**
Submitted By:			**Phone:**	**Fax:**	**Global ID:**
Title:		**Phone:** 949-585-3133 **Fax:**	**Specify State:**		Sample Temp: 3.8°C / 4.1°C
Signature:	**Date:**	**Sampler's Signature and Date:** 2/16/2021			Courier: ASSET
I hereby authorize ASSET Labs to perform the tests indicated below:		*I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.*			Tracking No.
Project Name: Fresno Phase II		**Sampler's Name:** Steve Linton			
Project Number: 20212904.001A Task 03					

Matrix: Ground ☐ Sediment ☐ Potable ☐ Soil ☒ NPDES ☐ Other Solid ☐ Surface ☐

Analyses Requested: OCPs EPA method 8081

Item No.	Laboratory Work Order No.	Sample ID/Location	Date	Time	Water	Solid	Others	Turn Around Time	No. of container	Container Type	PRESERVATION	Remarks
1	N044190-01	SS-1a	2/16/21	0805		X		24hr TAT				Composite for Testing
2	-02	SS-1b	↓	0815		↓						
3	-03	SS-1c		0810								
4	-04	SS-1d		0820								
5												
6	-06	SS-2a	2/16/21	0830		X						Composite for Testing
7	-07	SS-2b	↓	0835		↓						
8	-08	SS-2c		0850								
9	-09	SS-2d		0840								
10												

Relinquished by (Signature and Printed Name)	Date / Time	Received by (Signature and Printed Name)	Date / Time
Steve Linton	2/16/2021 1620	[illegible]	2/16/21 1620
[illegible]	2/16/21 2050	ROMEO ALCANTARA	2/16/21 2050
REL/REC ROMEO ALCANTARA	2/17/21 12:30 AM		

Turn Around Time (TAT):
- ☒ A < 24 Hrs or Same Day TAT
- ☐ B = Next Workday
- ☐ C = 2 Workdays
- ☐ D = 3 Workdays
- ☐ E = Routine 5-7 Workdays

TAT Starts at 8 AM the following day if samples received after 3:00 PM.

Special Instruction:

Terms
1. All samples will be disposed in 45 days upon receipt and records will be destroyed in 5 years upon submission of final report.
2. Regular TAT is 5-7 business days, surcharges will apply for rush analysis. Less than 24 Hrs = 200% Next Day = 100% 2 Workdays = 50% 3 Workdays = 35% 4 Workdays = 20%
3. Custom EDD formats will be an additional 3% of the total project price.
4. Add 10% surcharge for Level III Data Packages, 15% for Level IV Data Packages. Surcharge applied on total project price.
5. Trip Blanks and Equipment Blanks are billable sample.
6. ASSET Laboratories is not responsible for samples collected using incorrect methodology.
7. Terms are net 30 Days.
8. All reports are submitted in electronic format. Please inform ASSET Laboratories if hard copy of report is needed.
9. For subcontract analysis, TAT and Surcharges will vary.

Preservatives:				Container Type:		
H = HCl	N = HNO_3	S = H_2SO_4	C = 4°C	T = Tube	V = VOA	P = Pint
Z = Zn(AC)2	O = NaOH	T = $Na_2S_2O_3$		J = Jar	B = Tedlar	G = Glass
Others/Specify:				M = Metal	P = Plastic	C = Can

White = Laboratory Copy

Yellow = Customer's Copy

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California: 11110 Artesia Blvd. Ste. B • Cerritos, CA 90703
P: 562.219.7435 F: 562.219.7436
www.assetlaboratories.com

CHAIN OF CUSTODY RECORD

Client:	**Report to:**	**Bill to:**	**EDD Requirement**	**QA/QC**	**Sampe Receipt Condition**
Address:	**Company:** Klenfelder	**Address:**	Excel EDD ☐	RTNE ☐	Y / N
Address:	**Email:**		Geotracker ☐	RWQCB ☐	1. Chilled ☑ ☐
Phone: **Fax:**	**Address:**	**Email to:** **PO#**	Labspec ☐	CalTrans ☐	2. Headspace ☐ ☐
Submitted By:		**Phone:** **Fax:**	Others ☐	Level III ☐	3. Container Intact ☑ ☐
Title:	**Phone:** **Fax:**		Specify:	LEVEL IV ☐	4. Seal Present ☐ ☑
Signature: **Date:**	**Sampler's Signature and Date:** AA 2/16/2021		Global ID:	Regulatory ☐	5. IR number 2
I hereby authorize ASSET Labs to perform the tests indicated below:	*I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.*			Specify State:	6. Method of Cooling Ice
Project Name: Fresno Phase II					Sample Temp: 3.8°C / 4.1°C
Project Number: 20212904.001A Task 03	**Sampler's Name:** Steve Linton				Courier: ASSET Tracking No.

Matrix			
Ground	☐	Sediment	☐
Potable	☐	Soil	☒
NPDES	☐	Other Solid	☐
Surface	☐		

Item No.	Laboratory Work Order No.	Sample ID/Location	Date	Time	Water	Solid	Others	OCPs EPA method 8081	Turn Around Time	No. of container	Container Type	PRESERVATION	Remarks
1	N044190-11	SS - 3a	2/16/21	0955		X		/					Composite for Testing
2	-12	SS - 3b	↓	0945		↓		/	24 hr TAT				
3	-13	SS - 3c		1000				/					
4	-14	SS - 3d	↓	0940		↓		/					
5													
6	-16	SS - 4a	2/16/21	0900		X		/					Composite for Testing
7	-17	SS - 4b	↓	0907		↓		/					
8	-18	SS - 4c		0925				/					
9	-19	SS - 4d	↓	0915		↓		/					
10													

Relinquished by (Signature and Printed Name):	Date / Time	Received by (Signature and Printed Name):	Date / Time
AA Steve Linton	2/16/2021 1620	[signature] / ASSET	2/16/21 1620
[signature] / ASSET	2/16/21 1850	RM ROMEO MCKINTOSH	2/16/21 2050
REL / REC RM ROMEO MCKINTOSH	2/17/21 12:20AM		

Turn Around Time (TAT)
- ☐ A < 24 Hrs or Same Day TAT
- ☐ B = Next Workday
- ☐ C = 2 Workdays
- ☐ D = 3 Workdays
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TAT Starts at 8 AM the following day if samples received after 3:00 PM.

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   Less than 24 Hrs = 200% Next Day = 100% 2 Workdays = 50% 3 Workdays = 35% 4 Workdays = 20%
3. Custom EDD formats will be an additional 3% of the total project price.
4. Add 10% surcharge for Level III Data Packages, 15% for Level IV Data Packages. Surcharge applied on total project price.
5. Trip Blanks and Equipment Blanks are billable samples.
6. ASSET Laboratories is not responsible for samples collected using incorrect methodology.
7. Terms are net 30 Days.
8. All reports are submitted in electronic format. Please inform ASSET Laboratories if hard copy of report is needed.
9. For subcontract analysis, TAT and Surcharges will vary.

Preservatives:				Container Type:		
H = HCl	N = HNO_3	S = H_2SO_4	C = 4°C	T = Tube	V = VOA	P = Pint
Z = $Zn(AC)_2$	O = NaOH	T = $Na_2S_2O_3$		J = Jar	B = Tedlar	G = Glass
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CHAIN OF CUSTODY RECORD

Client:	**Report to:**	**Bill to:**	**EDD Requirement**	**QA/QC**	**Sampe Receipt Condition**
Address:	**Company:** Kleinfelder	**Address:**	Excel EDD ☐	RTNE ☐	Y N
Address:	**Email:**		Geotracker ☐	RWQCB ☐	1. Chilled ☑ ☐
Phone: **Fax:**	**Address:**	**Email to:** **PO#**	Labspec ☐	CalTrans ☐	2. Headspace ☐ ☐
Submitted By:		**Phone:** **Fax:**	Others ☐	Level III ☐	3. Container Intact ☑ ☐
Title:	**Phone:** **Fax:**		Specify:	LEVEL IV ☐	4. Seal Present ☐ ☑
Signature: **Date:**	**Sampler's Signature and Date:** 2/16/2021		Global ID:	Regulatory ☐	5. IR number 2
I hereby authorize ASSET Labs to perform the tests indicated below:	*I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.*			Specify State:	6. Method of Cooling Ice
Project Name: Fresno Phase II					Sample Temp: 3.8°C / 4.1°C
Project Number: 20212904.001A Task 03	**Sampler's Name:** Steve Linton				Courier: ASSET
					Tracking No.

Matrix: Ground ☐ Sediment ☐ | Potable ☐ Soil ☒ | NPDES ☐ Other Solid ☐ | Surface ☐

Analyses Requested: OCPs EPA method 8081

Item No.	Laboratory Work Order No.	Sample ID/Location	Date	Time	Water	Solid	Others	Turn Around Time	No. of container	Container Type	PRESERVATION	Remarks
1	N044190-21	SS - 5a	2/16/21	1200		X		24 hr TAT				Composite for Testing
2	-22	SS - 5b	↓	1220		↓						
3	-23	SS - 5c		1210								
4	-24	SS - 5d		1215								
5												
6	-26	SS - 6a	2/16/21	1225		X						Composite for Testing
7	-27	SS - 6b		1235								
8	-28	SS - 6c		1245								
9	-29	SS - 6d	↓	1240		↓						
10												

Relinquished by (Signature and Printed Name)	Date / Time	Received by (Signature and Printed Name)	Date / Time
Steve Linton	2/16/2021 1620	ARCPO	2/16/21 1620
ARCPO	2/16/21 2050	Romeo Alcantara	2/16/21 2050
REL / REC PM Romeo Alcantara	2/17/21 1230 AM		

Turn Around Time (TAT)
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Z = Zn(AC)2	O = NaOH	T = Na2S2O3		J = Jar	B = Tedlar	G = Glass
Others/Specify:				M = Metal	P = Plastic	C = Can

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CHAIN OF CUSTODY RECORD

Client:	**Report to:**	**Bill to:**	**EDD Requirement**	**QA/QC**	**Sampe Receipt Condition**
Address:	**Company:** Kleinfelder	**Address:**	Excel EDD ☐	RTNE ☐	Y / N
Address:	**Email:**		Geotracker ☐	RWQCB ☐	1. Chilled ☐ ☐
Phone: **Fax:**	**Address:**	**Email to:** **PO#**	Labspec ☐	CalTrans ☐	2. Headspace ☐ ☐
Submitted By:		**Phone:** **Fax:**	Others ☐	Level III ☐	3. Container Intact ☒ ☐
Title:	**Phone:** **Fax:**		Specify:	LEVEL IV ☐	4. Seal Present ☐ ☒
Signature: **Date:**	**Sampler's Signature and Date:**		Global ID:	Regulatory ☐	5. IR number 2
I hereby authorize ASSET Labs to perform the tests indicated below:	*I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.*			Specify State:	6. Method of Cooling Ice
Project Name: Fresno Phase II	**Sampler's Name:** Steve Lhton				Sample Temp: 3.8°C / 4.1°C
Project Number: 20212904.001A Task 03					Courier: Asset
					Tracking No.

Matrix: Ground ☐ Sediment ☐ | Potable ☐ Soil ☒ | NPDES ☐ Other Solid ☐ | Surface ☐

Analyses Requested: OCPs EPA method 8081

Item No.	Laboratory Work Order No.	Sample ID/Location	Date	Time	Water	Solid	Others	Turn Around Time	No. of container	Container Type	PRESERVATION	Remarks
1	N044190-31	SS - 7a	2/16/21	1410		X						Composite for Testing
2	-32	SS - 7b	"	1355		"		24 hr				
3	-33	SS - 7c	"	1425		"						
4	-34	SS - 7d	"	1330		"		TAT				
5												
6	-36	SS - 7a duplicate	2/16/21	1415		X						Composite for Testing
7	-37	SS - 7b duplicate	"	1400		"						
8	-38	SS - 7c duplicate	"	1430		"						
9	-39	SS - 7d duplicate	"	1335		"						
10												

Relinquished by (Signature and Printed Name):	Date / Time	Received by (Signature and Printed Name):	Date / Time
Steve Lhton	2/16/2021 1620		2/16/21 1620
	2/16/21 2050	ROMEO ALCANTARA	2/16/21 2080
ROMEO ALCANTARA	2/17/21 12:30 AM		

Turn Around Time (TAT)
- ☐ A < 24 Hrs or Same Day TAT
- ☐ B = Next Workday
- ☐ C = 2 Workdays
- ☐ D = 3 Workdays
- ☐ E = Routine 5-7 Workdays

TAT Starts at 8 AM the following day if samples received after 3:00 PM.

Special Instruction:

Terms
1. All samples will be disposed in 45 days upon receipt and records will be destroyed in 5 years upon submission of final report.
2. Regular TAT is 5-7 business days, surcharges will apply for rush analysis
   Less than 24 Hrs = 200% Next Day = 100% 2 Workdays = 50% 3 Workdays = 35% 4 Workdays = 20%
3. Custom EDD formats will be an additional 3% of the total project price.
4. Add 10% surcharge for Level III Data Packages, 15% for Level IV Data Packages. Surcharge applied on total project price.
5. Trip Blanks and Equipment blanks are billable sample.
6. ASSET Laboratories is not responsible for samples collected using incorrect methodology.
7. Terms are net 30 Days.
8. All reports are submitted in electronic format. Please inform ASSET Laboratories if hard copy of report is needed.
9. For subcontract analysis. TAT and Surcharges will vary.

Preservatives: H = HCl | N = HNO3 | S = H_2SO_4 | C = 4°C | Z = Zn(AC)2 | O = NaOH | T = $Na_2S_2O_3$ | Others/Specify:

Container Type: T = Tube | V = VOA | P = Pint | J = Jar | B = Tedlar | G = Glass | M = Metal | P = Plastic | C = Can

White = Laboratory Copy

Yellow = Customer's Copy

ASSET LABORATORIES
ANALYTICAL SUPPORT SERVICES FOR ENVIRONMENTAL TECHNOLOGIES

Contact us:
Nevada: 3151 W. Post Road, Las Vegas, NV 89118
P: 702.307.2659 F: 702.3072691
California: 11110 Artesia Blvd. Ste. B • Cerritos, CA 90703
P: 562.219.7435 F: 562.219.7436
www.assetlaboratories.com

CHAIN OF CUSTODY RECORD

Client:	**Report to:**	**Bill to:**	**EDD Requirement**	**QA/QC**	**Sampe Receipt Condition**
Address:	**Company:** Kleinfelder	**Address:**	Excel EDD ☐	RTNE ☐	Y N
Address:	**Email:**		Geotracker ☐	RWQCB ☐	1. Chilled ☑ ☐
Phone: **Fax:**	**Address:**	**Email to:** **PO#**	Labspec ☐	CalTrans ☐	2. Headspace ☐ ☐
Submitted By:		**Phone:** **Fax:**	Others ☐	Level III ☐	3. Container intact ☑ ☐
Title:	**Phone:** **Fax:**		Specify:	LEVEL IV ☐	4. Seal Present ☐ ☑
Signature: **Date:**	**Sampler's Signature and Date:** AA/[illegible] 2/16/2021		Global ID:	Regulatory ☐	5. IR number 2
I hereby authorize ASSET Labs to perform the tests indicated below:	*I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.*		Specify State:		6. Method of Cooling Ice
Project Name: Fresno Phase II	**Sampler's Name:** Steve Linton				Sample Temp: 3.8°C / 4.1°C
Project Number: 20212904.001A Task 03					Courier: ASSET
					Tracking No.

Matrix: Ground ☐, Sediment ☐, Potable ☐, Soil ☐, NPDES ☐, Other Solid ☐, Surface ☐

Analyses Requested: OCPs EPA method 8081

Item No.	Laboratory Work Order No.	Sample ID/Location	Date	Time	Water	Solid	Others	Turn Around Time	No. of container	Container Type	PRESERVATION	Remarks
1	N044190-41	SS - 8a	2/16/21	1250		X						
2	-42	SS - 8b	↓	1255		↓		24hr				Composite for Testing
3	-43	SS - 8c		1310								
4	-44	SS - 8d	↓	1305		↓		TAT				
5												
6	-46	SS - 9a	2/16/21	1440		X						
7	-47	SS - 9b	↓	1445		↓						Composite for Testing
8	-48	SS - 9c		1455								
9	-49	SS - 9d	↓	1505		↓		↓				
10												

Relinquished by (Signature and Printed Name): AA/[illegible] Steve Linton — Date / Time: 2/16/2021 1620	Received by (Signature and Printed Name): [illegible] — Date / Time: 2/16/21 1620	**Turn Around Time (TAT)** ☐ A < 24 Hrs or Same Day TAT ☐ B = Next Workday ☐ C = 2 Workdays ☐ D = 3 Workdays ☐ E = Routine 5-7 Workdays **TAT Starts at 8 AM the following day if samples received after 3:00 PM.**
Relinquished by (Signature and Printed Name): [illegible] — Date / Time: 2/16/21 2050	Received by (Signature and Printed Name): RA Romeo Alcantara — Date / Time: 2/16/21 2080	**Special Instruction:**
Relinquished by (Signature and Printed Name): PER REC RA Romeo Alcantara — Date / Time: 2/17/21 1230 AM	Received by (Signature and Printed Name): — Date / Time:	

Terms
1. All samples will be disposed in 45 days upon receipt and records will be destroyed in 5 years upon submission of final report.
2. Regular TAT is 5-7 business days, surcharges will apply for rush analysis
Less than 24 Hrs = 200% Next Day = 100% 2 Workdays = 50% 3 Workdays = 35% 4 Workdays = 20%
3. Custom EDD formats will be an additional 3% of the total project price.
4. Add 10% surcharge for Level III Data Packages, 15% for Level IV Data Packages. Surcharge applied on total project price.
5. Trip Blanks and Equipment Blanks are billable sample.
6. ASSET Laboratories is not responsible for samples collected using incorrect methodology.
7. Terms are net 30 Days.
8. All reports are submitted in electronic format. Please inform ASSET Laboratories if hard copy of report is needed.
9. For subcontract analysis. TAT and Surcharges will vary.

Preservatives:				**Container Type:**		
H = HCl	N = HNO_3	S = H_2SO_4	C = 4°C	T = Tube	V = VOA	P = Pint
Z = $Zn(AC)_2$	O = NaOH	T = $Na_2S_2O_3$		J = Jar	B = Tedlar	G = Glass
Others/Specify:				M = Metal	P = Plastic	C = Can

White = Laboratory Copy
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www.assetlaboratories.com

CHAIN OF CUSTODY RECORD

Client:	Report to:	Bill to:	EDD Requirement	QA/QC	Sampe Receipt Condition
Address:	Company: Kleinfelder	Address:	Excel EDD ☐	RTNE ☐	Y / N
Address:	Email:		Geotracker ☐	RWQCB ☐	1. Chilled ☑ ☐
Phone: Fax:	Address:	Email to: PO#	Labspec ☐	CalTrans ☐	2. Headspace ☐ ☐
Submitted By:		Phone: Fax:	Others ☐	Level III ☐	3. Container Intact ☑ ☐
Title:	Phone: Fax:		Specify:	LEVEL IV ☐	4. Seal Present ☐ ☑
Signature: Date:	Sampler's Signature and Date: 2/16/2021	Matrix		Regulatory ☐	5. iR number 2
I hereby authorize ASSET Labs to perform the tests indicated below:	I attest to the validity and authenticity of this sample. I am aware that tampering with or intentionally mislabeling the sample location, date or time of collection is considered fraud and may be grounds for legal action.	Ground ☐ Sediment ☐ Potable ☐ Soil ☒ NPDES ☐ Other Solid ☐ Surface ☐	Global ID:	Specify State:	6. Method of Cooling Ice
Project Name: Fresno Phase II	Sampler's Name: Steve Linton				Sample Temp: 3.8°C / 4.1°C
Project Number: 20212904.001A Task 03					Courier: ASSET Tracking No.

Item No.	Laboratory Work Order No.	Sample ID/Location	Date	Time	Water	Solid	Others	Arsenic and Lead EPA method 6010B	Turn Around Time	No. of container	Container Type	PRESERVATION	Remarks
1	N044190-51	SS-01 @ 1c	2/16/21	0812		X		✓	24 hr TAT				
2	-52	SS-02 @ 2d		0843				✓					
3	-53	SS-03 @ 3b		0950				✓					
4	-54	SS-04 @ 4d		0920				✓					
5	-55	SS-05 @ 5a		1205				✓					
6	-56	SS-06 @ 6a		1230				✓					
7	-57	SS-07 @ 7d		1340				✓					
8	-58	SS-07 duplicate @ 7d		1345				✓					
9	-59	SS-08 @ 8b		1300				✓					
10	-60	SS-09 @ 9c		1500		✓		✓					

Relinquished by (Signature and Printed Name):	Date / Time	Received by (Signature and Printed Name):	Date / Time
Steve Linton	2/16/2021 1620		2/16/21 1620
		Romeo Alcantara	2/16/21 2050
REL/REC PA Romeo Alcantara	2/17/21 12:30 AM		

Turn Around Time (TAT)
- ☐ A < 24 Hrs or Same Day TAT
- ☐ B = Next Workday
- ☐ C = 2 Workdays
- ☐ D = 3 Workdays
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Special Instruction:

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7. Terms are net 30 Days.
8. All reports are submitted in electronic format. Please inform ASSET Laboratories if hard copy of report is needed.
9. For subcontract analysis. TAT and Surcharges will vary.

Preservatives:				Container Type:		
H = HCl	N = HNO3	S = H2SO4	C = 4°C	T = Tube	V = VOA	P = Pint
Z = Zn(AC)2	O = NaOH	T = Na2S2O3		J = Jar	B = Tedlar	G = Glass
Others/Specify:				M = Metal	P = Plastic	C = Can

White = Laboratory Copy
Yellow = Customer's Copy

ASSET Laboratories

Please review the checklist below. Any NO signifies non-compliance. Any non-compliance will be noted and must be understood as having an impact on the quality of the data. All tests will be performed as requested regardless of any compliance issues.

If you have any questions or further instruction, please contact our Project Coordinator at (702) 307-2659.

Cooler Received/Opened On:	2/17/2021	Workorder:	N044190
Rep sample Temp (Deg C):	3.8/4.1	IR Gun ID:	2
Temp Blank:	☑ Yes ☐ No		
Carrier name:	ASSET		
Last 4 digits of Tracking No.:	NA	Packing Material Used:	None
Cooling process:	☑ Ice ☐ Ice Pack ☐ Dry Ice ☐ Other ☐ None		

Sample Receipt Checklist

1. Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
2. Custody seals intact, signed, dated on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
3. Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
4. Chain of custody present?	Yes ☑	No ☐	
5. Sampler's name present in COC?	Yes ☑	No ☐	
6. Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
7. Chain of custody agrees with sample labels?	Yes ☑	No ☐	
8. Samples in proper container/bottle?	Yes ☑	No ☐	
9. Sample containers intact?	Yes ☑	No ☐	
10. Sufficient sample volume for indicated test?	Yes ☑	No ☐	
11. All samples received within holding time?	Yes ☑	No ☐	
12. Temperature of rep sample or Temp Blank within acceptable limit?	Yes ☑	No ☐	NA ☐
13. Water - VOA vials have zero headspace?	Yes ☐	No ☐	NA ☑
14. Water - pH acceptable upon receipt? Example: pH > 12 for (CN,S); pH<2 for Metals	Yes ☐	No ☐	NA ☑
15. Did the bottle labels indicate correct preservatives used?	Yes ☐	No ☐	NA ☑
16. Were there Non-Conformance issues at login?	Yes ☐	No ☐	NA ☑
Was Client notified?	Yes ☐	No ☐	NA ☑

Comments:

MBC 02/17/2021

Checklist Completed By: BHN BHdez 2/17/2021 Reviewed By: _____

ASSET Laboratories

WORK ORDER Summary

17-Feb-21

WorkOrder: N044190

Client ID: KLEFE02

Project: Fresno Phase II, 20212901.001A Task 03 **QC Level:** RTNE **Date Received:** 2/16/2021

Comments:

Sample ID	Client Sample ID	Date Collected	Date Due	Matrix	Test No	Test Name	Hld	MS	Sub	Storage
N044190-001A	SS-1a	2/16/2021 8:05:00 AM		Soil			☐	☐	☐	WS
N044190-002A	SS-1b	2/16/2021 8:15:00 AM					☐	☐	☐	WS
N044190-003A	SS-1c	2/16/2021 8:10:00 AM					☐	☐	☐	WS
N044190-004A	SS-1d	2/16/2021 8:20:00 AM					☐	☐	☐	WS
N044190-005A	SS-1 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-006A	SS-2a	2/16/2021 8:30:00 AM					☐	☐	☐	WS
N044190-007A	SS-2b	2/16/2021 8:35:00 AM					☐	☐	☐	WS
N044190-008A	SS-2c	2/16/2021 8:50:00 AM					☐	☐	☐	WS
N044190-009A	SS-2d	2/16/2021 8:40:00 AM					☐	☐	☐	WS
N044190-010A	SS-2 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-011A	SS-3a	2/16/2021 9:55:00 AM					☐	☐	☐	WS
N044190-012A	SS-3b	2/16/2021 9:45:00 AM					☐	☐	☐	WS
N044190-013A	SS-3c	2/16/2021 10:00:00 AM					☐	☐	☐	WS
N044190-014A	SS-3d	2/16/2021 9:40:00 AM					☐	☐	☐	WS
N044190-015A	SS-3 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-016A	SS-4a	2/16/2021 9:00:00 AM					☐	☐	☐	WS
N044190-017A	SS-4b	2/16/2021 9:07:00 AM					☐	☐	☐	WS
N044190-018A	SS-4c	2/16/2021 9:25:00 AM					☐	☐	☐	WS

ASSET Laboratories

WORK ORDER Summary

17-Feb-21

WorkOrder: N044190

Client ID: KLEFE02

Project: Fresno Phase II, 20212901.001A Task 03 **QC Level:** RTNE **Date Received:** 2/16/2021

Comments:

Sample ID	Client Sample ID	Date Collected	Date Due	Matrix	Test No	Test Name	Hld	MS	Sub	Storage
N044190-019A	SS-4d	2/16/2021 9:15:00 AM		Soil			☐	☐	☐	WS
N044190-020A	SS-4 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-021A	SS-5a	2/16/2021 12:00:00 PM					☐	☐	☐	WS
N044190-022A	SS-5b	2/16/2021 12:20:00 PM					☐	☐	☐	WS
N044190-023A	SS-5c	2/16/2021 12:10:00 PM					☐	☐	☐	WS
N044190-024A	SS-5d	2/16/2021 12:15:00 PM					☐	☐	☐	WS
N044190-025A	SS-5 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-026A	SS-6a	2/16/2021 12:25:00 PM					☐	☐	☐	WS
N044190-027A	SS-6b	2/16/2021 12:35:00 PM					☐	☐	☐	WS
N044190-028A	SS-6c	2/16/2021 12:45:00 PM					☐	☐	☐	WS
N044190-029A	SS-6d	2/16/2021 12:40:00 PM					☐	☐	☐	WS
N044190-030A	SS-6 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-031A	SS-7a	2/16/2021 2:10:00 PM					☐	☐	☐	WS
N044190-032A	SS-7b	2/16/2021 1:55:00 PM					☐	☐	☐	WS
N044190-033A	SS-7c	2/16/2021 2:25:00 PM					☐	☐	☐	WS
N044190-034A	SS-7d	2/16/2021 1:30:00 PM					☐	☐	☐	WS
N044190-035A	SS-7 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG

ASSET Laboratories

WORK ORDER Summary

17-Feb-21

WorkOrder: N044190

Client ID: KLEFE02

Project: Fresno Phase II, 20212901.001A Task 03 **QC Level:** RTNE **Date Received:** 2/16/2021

Comments:

Sample ID	Client Sample ID	Date Collected	Date Due	Matrix	Test No	Test Name	Hld	MS	Sub	Storage
N044190-036A	SS-7a duplicate	2/16/2021 2:15:00 PM		Soil			☐	☐	☐	WS
N044190-037A	SS-7b duplicate	2/16/2021 2:00:00 PM					☐	☐	☐	WS
N044190-038A	SS-7c duplicate	2/16/2021 2:30:00 PM					☐	☐	☐	WS
N044190-039A	SS-7d duplicate	2/16/2021 1:35:00 PM					☐	☐	☐	WS
N044190-040A	SS-7 duplicate COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-041A	SS-8a	2/16/2021 12:50:00 PM					☐	☐	☐	WS
N044190-042A	SS-8b	2/16/2021 12:55:00 PM					☐	☐	☐	WS
N044190-043A	SS-8c	2/16/2021 1:10:00 PM					☐	☐	☐	WS
N044190-044A	SS-8d	2/16/2021 1:05:00 PM					☐	☐	☐	WS
N044190-045A	SS-8 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-046A	SS-9a	2/16/2021 2:40:00 PM					☐	☐	☐	WS
N044190-047A	SS-9b	2/16/2021 2:45:00 PM					☐	☐	☐	WS
N044190-048A	SS-9c	2/16/2021 2:55:00 PM					☐	☐	☐	WS
N044190-049A	SS-9d	2/16/2021 3:05:00 PM					☐	☐	☐	WS
N044190-050A	SS-9 COMPOSITE	2/16/2021	2/18/2021		EPA 3546	Microwave Extraction	☐	☐	☐	YG
			2/18/2021		EPA 8081A	ORGANOCHLORINE PESTICIDES BY GC/ECD	☐	☐	☐	YG
N044190-051A	SS-01@1c	2/16/2021 8:12:00 AM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-052A	SS-02@2d	2/16/2021 8:43:00 AM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI

ASSET Laboratories

WORK ORDER Summary

17-Feb-21

WorkOrder: N044190

Client ID: KLEFE02

Project: Fresno Phase II, 20212901.001A Task 03 **QC Level:** RTNE **Date Received:** 2/16/2021

Comments:

Sample ID	Client Sample ID	Date Collected	Date Due	Matrix	Test No	Test Name	Hld	MS	Sub	Storage
N044190-052A	SS-02@2d	2/16/2021 8:43:00 AM	2/18/2021	Soil	EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-053A	SS-03@3b	2/16/2021 9:50:00 AM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-054A	SS-04@4d	2/16/2021 9:20:00 AM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-055A	SS-05@5a	2/16/2021 12:05:00 PM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-056A	SS-06@6a	2/16/2021 12:30:00 PM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-057A	SS-07@7d	2/16/2021 1:40:00 PM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-058A	SS-07 duplicate@7d	2/16/2021 1:45:00 PM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-059A	SS-08@8b	2/16/2021 1:00:00 PM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-060A	SS-09@9c	2/16/2021 3:00:00 PM	2/18/2021		EPA 3050B	SOPREP TOTAL METALS	☐	☐	☐	CEI
			2/18/2021		EPA 6010B	TOTAL METALS BY ICP	☐	☐	☐	CEI
N044190-061A	FOLDER	2/18/2021	2/18/2021		Folder	Folder	☐	☐	☐	LAB
			2/18/2021		Folder	Folder	☐	☐	☐	LAB

Appendix H

Noise Calculations

Existing Traffic Noise

Project:

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

	Segment Description and Location			Input											Output				
						Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics							Ldn,	Distance to Contour, (feet)$_3$			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night		(dBA)$_{5,6,7}$	75 dBA	70 dBA	65 dBA	60 dBA
1	Riverside Dr (Between Spruce Ave and the northernmost project driveway)			2,050	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		57.0	1	2	8	25
2	Riverside Dr (Between the northernmost project driveway and Fir Avenue)			2,060	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		58.6	1	4	11	36
3	Riverside Dr (Between Fir Avenue and the southernmost project driveway)			2,270	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		59.0	1	4	12	39
4	Riverside Dr (Between the southernmost project driveway and Herndon Ave)			2,260	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		59.0	1	4	12	39
5	Herndon Ave (west of Riverside Drive)			24,880	45	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		70.8	19	61	191	605
6	Herndon Ave (Between Riverside Dr and Arthur Ave)			21,050	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		71.4	22	70	221	698
7	Herndon Ave (East of Arthur Ave)			21,050	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		71.4	22	70	221	698
8	ADT Limit to Comply with General Plan Exterior Noise Standard			9,000	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		65.0	5	16	49	156
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Existing-Plus-Project Traffic Noise

Project:

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

	Segment Description and Location			Input											Output				
						Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics							Ldn,	Distance to Contour, (feet)[3]			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night		(dBA)[5,6,7]	75 dBA	70 dBA	65 dBA	60 dBA
1	Riverside Dr (Between Spruce Ave and the northernmost project driveway)			5,536	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		61.3	2	7	21	67
2	Riverside Dr (Between the northernmost project driveway and Fir Avenue)			7,783	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		64.3	4	14	43	135
3	Riverside Dr (Between Fir Avenue and the southernmost project driveway)			19,500	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		68.3	11	34	107	339
4	Riverside Dr (Between the southernmost project driveway and Herndon Ave)			20,603	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		68.6	11	36	113	358
5	Herndon Ave (west of Riverside Drive)			37,158	45	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		72.6	29	90	286	904
6	Herndon Ave (Between Riverside Dr and Arthur Ave)			26,352	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		72.4	28	87	276	873
7	Herndon Ave (East of Arthur Ave)			26,321	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%		72.4	28	87	276	872
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%						

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project:

Noise Level Descriptor: Ldn
Site Conditions: Hard
Traffic Input: ADT
Traffic K-Factor:

						Input								Output				
Segment Description and Location						Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics							Distance to Contour, (feet)[3]			
Number	Name	From	To	ADT	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	Ldn, (dBA)[5,6,7]	75 dBA	70 dBA	65 dBA	60 dBA
Existing Conditions																		
1	Riverside Dr (Between Spruce Ave and Entry B)			6,124	35	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	61.7	2	7	23	74
2	Riverside Dr (Between Entry B and Entry C)			9,483	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.2	5	16	52	165
3	Riverside Dr (Between Entry C and Entry D)			23,459	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	69.1	13	41	129	408
4	Riverside Dr (Between Entry D and Herndon Ave)			25,128	40	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	69.4	14	44	138	437
5	Herndon Ave (west of Riverside Drive)			37,169	45	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.6	29	90	286	904
6	Herndon Ave (Between Riverside Dr and Arthur Ave)			26,332	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.4	28	87	276	873
7	Herndon Ave (East of Arthur Ave)			26,332	50	50	50	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	72.4	28	87	276	873
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					
					35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%					

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Citation #	Citations	
1	Caltrans Technical Noise Supplement. 2009 (November). Table (5-11), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Table (4-2), Pg 4-17.
2	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-26), Pg 5-60.	Caltrans Technical Noise Supplement. 2013 (September). Equation (4-5), Pg 4-17
3	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-16), Pg 2-32.	FHWA 2004 TNM Version 2.5
4	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-11), Pg 5-47, 48.	FHWA 2004 TNM Version 2.5
5	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-26), Pg 2-55, 56.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-23), Pg 2-5
6	Caltrans Technical Noise Supplement. 2009 (November). Equation (2-27), Pg 2-57.	Caltrans Technical Noise Supplement. 2013 (September). Equation (2-24), Pg 2-5
7	Caltrans Technical Noise Supplement. 2009 (November). Pg 2-53.	Caltrans Technical Noise Supplement. 2013 (September). Pg 2-57.
8	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-7), Pg 5-45.	FHWA 2004 TNM Version 2.5
9	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-8), Pg 5-45.	FHWA 2004 TNM Version 2.5
10	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-9), Pg 5-45.	FHWA 2004 TNM Version 2.5
11	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-13), Pg 5-49.	FHWA 2004 TNM Version 2.5
12	Caltrans Technical Noise Supplement. 2009 (November). Equation (5-14), Pg 5-49.	FHWA 2004 TNM Version 2.5
13	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (16), Pg 67	
14	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (20), Pg 69	
15	Federal Highway Administration Traffic Noise Model Technical Manual. Report No. FHWA-PD-96-010. 1998 (January). Equation (18), Pg 69	

References

California Department of Transportation (Caltrans). 2009 (November). Technical Noise Supplement. Available: http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf. Accessed A
2017.

Fresno Costco Onsite Construction Noise

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	1,193	60.0
	50	87.6
Single-Family Residence (West Parr Avenue west of project site)	90	82.4
Rio Vista Middle School	850	62.9
River Bluff Elementary School	1230	59.7

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Paver	85	0.2
Grader	85	0.4
Roller	85	0.2
Scraper	85	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Paver	78.0
Grader	81.0
Roller	78.0
Scraper	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
88

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Fresno Costco Offsite Construction Noise

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	974	60.0
	50	85.8
Nearest Residence	90	80.7
Off-site improvements corresponding with infrastructure improvment 1 in PD	60	84.2
Off-site improvements corresponding with infrastructure improvment 3 in PD	1000	59.8
Off-site improvements corresponding with infrastructure improvment 5 in PD	80	81.7

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Paver	85	0.2
Grader	85	0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Paver	78.0
Grader	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
86

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Blasting	na	94	na	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	na	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS signs)	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	na	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jack	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer (hoe ram)	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzle)	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacuum Excavator (Vac-truck)	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0
chipper		75							

Source:
FHWA Roadway Construction Noise Model, January 2006. Table 9.1
U.S. Department of Transportation
CA/T Construction Spec. 721.560

Nightime Construction Activities- Concrete Pour

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)	Interior Noise Level (Leq dBA)	Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
threshold	3,077	50.0		**Concrete Mixer Truck**	85	0.4
					85	
Single-family Residence (West Parr				**Concrete Mixer Truck**		
Avenue west of project site)	400	67.7	43.7			0.4
Rio Vista Middle School	1400	56.8	32.8	**Concrete Pump Truck**	82	0.16
River Bluff Elementary School	1550	56.0	32.0	**Tractor**	84	0.4
						0.4
						0.4
						0.4
						0.4
						0.4

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Concrete Mixer Truck	81.0
Concrete Mixer Truck	81.0
Concrete Pump Truck	74.0
Tractor	80.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
85.8

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Nightime Construction Activities- Concrete Pour

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
threshold	5,104	50.0
Single-family Residence (West Parr Avenue west of project site)	400	72.1
Rio Vista Middle School	1400	61.2
River Bluff Elementary School	1550	60.4

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Concrete Mixer Truck	85	1
Concrete Mixer Truck	85	1
Concrete Pump Truck	82	1
Tractor	84	1
		1
		1
		1
		1

Ground Type	hard
Source Height	8
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Concrete Mixer Truck	85.0
Concrete Mixer Truck	85.0
Concrete Pump Truck	82.0
Tractor	84.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
90.2

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log (U.F.) - 20*\log (D/50) - 10*G*\log (D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Blasting	na	94	na	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	na	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS s	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	na	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jac	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer (	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzl	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacuum Excavator (Vac-tru	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0

Source:
FHWA Roadway Construction Noise Model, January 2006. Table 9.1
U.S. Department of Transportation
CA/T Construction Spec. 721.560

Distance Propagation Calculations for Stationary Sources of Ground Vibration

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.

— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.
— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level vibration level (VdB)	@	distance (ft)	Attenuated Noise Level at Receptor vibration level (VdB)	@	distance (ft)	
Vibratory Roller	94	@	25	77.3	@	90	Distance to sensitive receptor
Vibratory Roller	94	@	25	80.0	@	73	Threshold
Small bull dozer	58.0	@	25	41.3	@	90	80 vdb
Large bull dozer	87.0	@	25	70.3	@	90	
Loaded trucks	86.0	@	25	69.3	@	90	

The Lv metric (VdB) is used to assess the likelihood for vibration to result in human annoyance.

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level vibration level (PPV)	@	distance (ft)	Attenuated Noise Level at Receptor vibration level (PPV)	@	distance (ft)	
Vibratory Roller	0.210	@	25	0.031	@	90	Distance to sensitive receptor
Vibratory Roller	0.210	@	25	0.198	@	26	Threshold
Small bull dozer	0.003	@	25	0.000	@	90	
Large bull dozer	0.089	@	25	0.013	@	90	0.2 ppv
Loaded trucks	0.076	@	25	0.011	@	90	

The PPV metric (in/sec) is used for assessing the likelihood for the potential of structural damage.

Notes:
Computation of propagated vibration levels is based on the equations presented on pg. 185 of FTA 2018. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Washington, D.C. Accessed: December 20, 2020. Page Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Distance Propagation Calculations for Stationary Sources of Ground Vibration

KEY: Orange cells are for input.

Grey cells are intermediate calculations performed by the model.

Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.

— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.

— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)
loaded truck	86	@	25	74.6	@	60
loaded truck	86	@	25	37.9	@	1000
loaded truck	86	@	25	70.8	@	80
loaded truck	86	@	25	79.9	@	40

80 vdb

Off-site improvements corresponding with infrastructure improvment 1 in PD

Off-site improvements corresponding with infrastructure improvment 3 in PD

Off-site improvements corresponding with infrastructure improvment 5 in PD

Threshold

The Lv metric (VdB) is used to assess the likelihood for vibration to result in human annoyance.

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor		
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)
loaded truck	0.076	@	25	0.020	@	60
loaded truck	0.076	@	25	0.000	@	1000
loaded truck	0.076	@	25	0.013	@	80
loaded truck	0.076	@	25	0.181	@	14

0.2 ppv

Off-site improvements corresponding with infrastructure improvment 1 in PD

Off-site improvements corresponding with infrastructure improvment 3 in PD

Off-site improvements corresponding with infrastructure improvment 5 in PD

Threshold

The PPV metric (in/sec) is used for assessing the likelihood for the potential of structural damage.

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 185 of FTA 2018. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Washington, D.C. Accessed: December 20, 2020. Page Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Distance Propagation Calculations for Stationary Sources of Ground Vibration

KEY: Orange cells are for input.

Grey cells are intermediate calculations performed by the model.

Green cells are data to present in a written analysis (output).

STEP 1: Determine units in which to perform calculation.

— If vibration decibels (VdB), then use Table A and proceed to Steps 2A and 3A.

— If peak particle velocity (PPV), then use Table B and proceed to Steps 2B and 3B.

STEP 2A: Identify the vibration source and enter the reference vibration level (VdB) and distance.

STEP 3A: Select the distance to the receiver.

Table A. Propagation of vibration decibels (VdB) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor			
	vibration level (VdB)	@	distance (ft)	vibration level (VdB)	@	distance (ft)	
large bull dozer	87.0	@	25	49.1	@	460	80 vdb
large bull dozer	87.0	@	25	79.9	@	43	Learn4Life Highschool
							Threshold

The Lv metric (VdB) is used to assess the likelihood for vibration to result in human annoyance.

STEP 2B: Identify the vibration source and enter the reference peak particle velocity (PPV) and distance.

STEP 3B: Select the distance to the receiver.

Table B. Propagation of peak particle velocity (PPV) with distance

Noise Source/ID	Reference Noise Level			Attenuated Noise Level at Receptor			
	vibration level (PPV)	@	distance (ft)	vibration level (PPV)	@	distance (ft)	
large bull dozer	0.089	@	25	0.001	@	460	0.2 ppv
large bull dozer	0.089	@	25	0.191	@	15	Learn4Life Highschool
							Threshold

The PPV metric (in/sec) is used for assessing the likelihood for the potential of structural damage.

Notes:

Computation of propagated vibration levels is based on the equations presented on pg. 185 of FTA 2018. Estimates of attenuated vibration levels do not account for reductions from intervening underground barriers or other underground structures of any type, or changes in soil type.

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Washington, D.C. Accessed: December 20, 2020. Page Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

Decommissioning

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	1,732	50.0
Learn4Life Highschool	450	63.4
Nearest Residence (West San Jose Ave and North Gates Ave)	1400	50.4

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Concrete Saw	90	0.2
Excavator	85	0.4
Excavator	85	0.4
Excavator	85	0.4
Dozer	85	0.4
Dozer	85	0.4

Ground Type	Soft
Source Height	8
Receiver Height	5
Ground Factor[2]	0.63

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Concrete Saw	83.0
Excavator	81.0
Excavator	81.0
Excavator	81.0
Dozer	81.0
Dozer	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
88.5

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Equipment Description	Acoustical Usage Factor (%)	Spec 721.560 Lmax @ 50ft (dBA slow)	Actual Measured Lmax @ 50ft (dBA slow)	No. of Actual Data Samples (count)	Spec 721.560 LmaxCalc	Spec 721.560 Leq	Distance	Actual Measured LmaxCalc	Actual Measured Leq
Auger Drill Rig	20	85	84	36	79.0	72.0	100	78.0	71.0
Backhoe	40	80	78	372	74.0	70.0	100	72.0	68.0
Bar Bender	20	80	na	0	74.0	67.0	100		
Blasting	na	94	na	0	88.0		100		
Boring Jack Power Unit	50	80	83	1	74.0	71.0	100	77.0	74.0
Chain Saw	20	85	84	46	79.0	72.0	100	78.0	71.0
Clam Shovel (dropping)	20	93	87	4	87.0	80.0	100	81.0	74.0
Compactor (ground)	20	80	83	57	74.0	67.0	100	77.0	70.0
Compressor (air)	40	80	78	18	74.0	70.0	100	72.0	68.0
Concrete Batch Plant	15	83	na	0	77.0	68.7	100		
Concrete Mixer Truck	40	85	79	40	79.0	75.0	100	73.0	69.0
Concrete Pump Truck	20	82	81	30	76.0	69.0	100	75.0	68.0
Concrete Saw	20	90	90	55	84.0	77.0	100	84.0	77.0
Crane	16	85	81	405	79.0	71.0	100	75.0	67.0
Dozer	40	85	82	55	79.0	75.0	100	76.0	72.0
Drill Rig Truck	20	84	79	22	78.0	71.0	100	73.0	66.0
Drum Mixer	50	80	80	1	74.0	71.0	100	74.0	71.0
Dump Truck	40	84	76	31	78.0	74.0	100	70.0	66.0
Excavator	40	85	81	170	79.0	75.0	100	75.0	71.0
Flat Bed Truck	40	84	74	4	78.0	74.0	100	68.0	64.0
Front End Loader	40	80	79	96	74.0	70.0	100	73.0	69.0
Generator	50	82	81	19	76.0	73.0	100	75.0	72.0
Generator (<25KVA, VMS signs)	50	70	73	74	64.0	61.0	100	67.0	64.0
Gradall	40	85	83	70	79.0	75.0	100	77.0	73.0
Grader	40	85	na	0	79.0	75.0	100		
Grapple (on Backhoe)	40	85	87	1	79.0	75.0	100	81.0	77.0
Horizontal Boring Hydr. Jack	25	80	82	6	74.0	68.0	100	76.0	70.0
Hydra Break Ram	10	90	na	0	84.0	74.0	100		
Impact Pile Driver	20	95	101	11	89.0	82.0	100	95.0	88.0
Jackhammer	20	85	89	133	79.0	72.0	100	83.0	76.0
Man Lift	20	85	75	23	79.0	72.0	100	69.0	62.0
Mounted Impact Hammer (hoe ram)	20	90	90	212	84.0	77.0	100	84.0	77.0
Pavement Scarafier	20	85	90	2	79.0	72.0	100	84.0	77.0
Paver	50	85	77	9	79.0	76.0	100	71.0	68.0
Pickup Truck	40	55	75	1	49.0	45.0	100	69.0	65.0
Pneumatic Tools	50	85	85	90	79.0	76.0	100	79.0	76.0
Pumps	50	77	81	17	71.0	68.0	100	75.0	72.0
Refrigerator Unit	100	82	73	3	76.0	76.0	100	67.0	67.0
Rivit Buster/chipping gun	20	85	79	19	79.0	72.0	100	73.0	66.0
Rock Drill	20	85	81	3	79.0	72.0	100	75.0	68.0
Roller	20	85	80	16	79.0	72.0	100	74.0	67.0
Sand Blasting (Single Nozzle)	20	85	96	9	79.0	72.0	100	90.0	83.0
Scraper	40	85	84	12	79.0	75.0	100	78.0	74.0
Shears (on backhoe)	40	85	96	5	79.0	75.0	100	90.0	86.0
Slurry Plant	100	78	78	1	72.0	72.0	100	72.0	72.0
Slurry Trenching Machine	50	82	80	75	76.0	73.0	100	74.0	71.0
Soil Mix Drill Rig	50	80	na	0	74.0	71.0	100		
Tractor	40	84	na	0	78.0	74.0	100		
Vacuum Excavator (Vac-truck)	40	85	85	149	79.0	75.0	100	79.0	75.0
Vacuum Street Sweeper	10	80	82	19	74.0	64.0	100	76.0	66.0
Ventilation Fan	100	85	79	13	79.0	79.0	100	73.0	73.0
Vibrating Hopper	50	85	87	1	79.0	76.0	100	81.0	78.0
Vibratory Concrete Mixer	20	80	80	1	74.0	67.0	100	74.0	67.0
Vibratory Pile Driver	20	95	101	44	89.0	82.0	100	95.0	88.0
Warning Horn	5	85	83	12	79.0	66.0	100	77.0	64.0
Welder / Torch	40	73	74	5	67.0	63.0	100	68.0	64.0
chipper		75							

Source:
FHWA Roadway Construction Noise Model, January 2006. Table 9.1
U.S. Department of Transportation
CA/T Construction Spec. 721.560

Attenuation Calculations for Stationary Noise Sources (HVAC and Car Wash)

KEY:
Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Identify the noise source and enter the reference noise level (dBA and distance).

STEP 2: Select the ground type (hard or soft), and enter the source and receiver heights.

STEP 3: Select the distance to the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor		
	noise level (dBA)	@	distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	noise level (dBA)	@	distance (ft)
HVAC units	70.0	@	50	soft	10	5	0.62	46.4	@	400
HVAC units	70.0	@	50	hard	10	5	0.00	44.9	@	900
Car Wash Dryers	69.0	@	50	hard	10	5	0.00	43.9	@	900

Notes:

Estimates of attenuated noise levels do not account for reductions from intervening barriers, including walls, trees, vegetation, or structures of any type.

Computation of the attenuated noise level is based on the equation presented on pg. 176 and 177 of FTA 2018.

Computation of the ground factor is based on the equation presentd in Table 4-26 on pg. 86 of FTA 2018, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: <http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-

Attenuation Calculations for Stationary Noise Sources (Heavy Vehicle Loading)

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Identify the noise source and enter the reference noise level (dBA and distance).

STEP 2: Select the ground type (hard or soft), and enter the source and receiver heights.

STEP 3: Select the distance to the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor		
	noise level (dBA)	@	distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	noise level (dBA)	@	distance (ft)
Operational Noise Lmax at nearest residence	86.0	@	50	hard	5	8	0.00	66.0	@	500
Operational Noise CNEL at nearest residence	88.7	@	50	hard	5	8	0.00	68.7	@	500
Operational Noise Leq at nearest residence	84.0	@	50	hard	5	8	0.00	64.0	@	500
							0.66			
							0.66			
							0.66			
							0.66			
							0.66			
							0.66			

Notes:

Estimates of attenuated noise levels do not account for reductions from intervening barriers, including walls, trees, vegetation, or structures of any type.

Computation of the attenuated noise level is based on the equation presented on pg. 176 and 177 of FTA 2018.

Computation of the ground factor is based on the equation presentd in Table 4-26 on pg. 86 of FTA 2018, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: <http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-

Attenuation Calculations for Stationary Noise Sources

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Identify the noise source and enter the reference noise level (dBA and distance).

STEP 2: Select the ground type (hard or soft), and enter the source and receiver heights.

STEP 3: Select the distance to the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor		
	noise level (dBA)	@	distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	noise level (dBA)	@	distance (ft)
Tire Center	65.0	@	50	hard	2	5	0.00	46.9	@	400

Notes:
Estimates of attenuated noise levels do not account for reductions from intervening barriers, including walls, trees, vegetation, or structures of any type.

Computation of the attenuated noise level is based on the equation presented on pg. 176 and 177 of FTA 2018.

Computation of the ground factor is based on the equation presentd in Table 4-26 on pg. 86 of FTA 2018, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:
Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: <http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf>Accessed: March 5, 2020.

Parking Lot Noise Calculation

KEY:	Orange cells are for input.
	Green cells are data to present in a written analysis (output).

Number of automobiles per hour	2130
Number of buses per hour	0
Distance to sensitive receptor (feet)	400

	distance	sound level
Leq @	50	**65.7**
Leq @	400	**47.6**

Source

Federal Transit Administration. 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Accessed February 4, 2019. See pages 45–47, including Equation 4-14.

Attenuation Calculations for Stationary Noise Sources (Trash Compactor)

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Identify the noise source and enter the reference noise level (dBA and distance).

STEP 2: Select the ground type (hard or soft), and enter the source and receiver heights.

STEP 3: Select the distance to the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor			
	noise level (dBA)	@	distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	noise level (dBA)	@	distance (ft)	
Trash Compactor	50.0	@	50	hard	5	5	0.00	31.9	@	400	Distance to nearest residence west of project site

Notes:

Estimates of attenuated noise levels do not account for reductions from intervening barriers, including walls, trees, vegetation, or structures of any type.

Computation of the attenuated noise level is based on the equation presented on pg. 176 and 177 of FTA 2018.

Computation of the ground factor is based on the equation presentd in Table 4-26 on pg. 86 of FTA 2018, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:

Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: <http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf>Accessed: March 5, 2020.

Attenuation Calculations for Stationary Noise Sources

KEY: Orange cells are for input.
Grey cells are intermediate calculations performed by the model.
Green cells are data to present in a written analysis (output).

STEP 1: Identify the noise source and enter the reference noise level (dBA and distance).

STEP 2: Select the ground type (hard or soft), and enter the source and receiver heights.

STEP 3: Select the distance to the receiver.

Noise Source/ID	Reference Noise Level			Attenuation Characteristics				Attenuated Noise Level at Receptor			
	noise level (dBA)	@	distance (ft)	Ground Type (soft/hard)	Source Height (ft)	Receiver Height (ft)	Ground Factor	noise level (dBA)	@	distance (ft)	
High range of typical SENL (Haul Truck)	90.0	@	50	soft	8	5	0.63	92.6	@	40	nearest recpetor w/ sound wall
High range of typical SENL (Haul Truck)	90.0	@	50	hard	8	5	0.00	91.9	@	40	nearest recpetor w/ sound wall
							0.66				
							0.66				
							0.66				
							0.66				
							0.66				
							0.66				

Notes:
Estimates of attenuated noise levels do not account for reductions from intervening barriers, including walls, trees, vegetation, or structures of any type.

Computation of the attenuated noise level is based on the equation presented on pg. 176 and 177 of FTA 2018.

Computation of the ground factor is based on the equation presentd in Table 4-26 on pg. 86 of FTA 2018, where the distance of the reference noise leve can be adjusted and the usage factor is not applied (i.e., the usage factor is equal to 1).

Sources:
Federal Transit Association (FTA). 2018 (September). Transit Noise and Vibration Impact Assessment. Washington, D.C. Available: <http://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-